

Beyond Pain®

An Evidence-Based and Multilingual Biopsychosocial Pain Science Training and Treatment Manual®



Funded by the IASP Developing Countries Project
Supported by DIGNITY – Danish Institute Against Torture
Organized by Wchan Organization

Written by Dr. April Gamble PT, DPT, CLT
Founder of ACR – The American Center for Rehabilitation



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Version May, 2020
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Beyond Pain[©]

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DIGNITY – Danish Institute Against Torture is committed to working with local partners to provide evidence-based mental health and psychosocial support interventions for trauma affected survivors. In alignment with this vision, we are pleased to offer Beyond Pain - An Evidence-Based and Multilingual Biopsychosocial Pain Science Training and Treatment Manual[©] in a free and open source format. However, as creating Beyond Pain[©] required significant effort and resources, we ask that it be cited appropriately when any content is used. Please use the following citation:

Beyond Pain - An Evidence-Based and Multilingual Biopsychosocial Pain Science Training and Treatment Manual[©], By Dr. April Gamble PT, DPT, CLT from ACR – The American Center for Rehabilitation (april.dpt@gmail.com), ©2020 DIGNITY – Danish Institute Against Torture, www.dignity.dk, Contributor Anne-Mette Karrer.

Beyond Pain[©] (Eng): ISBN (print) 978-87-93675-41-4

Beyond Pain[©] (Arabic): ISBN (print) 978-87-93675-42-1

Beyond Pain[©] (Kurdish): ISBN (print) 978-87-93675-43-8

What is Beyond Pain[©]?

Beyond Pain[©] is an evidence-based and multilingual (English, Kurdish Sorani, & Arabic) pain science training and treatment manual to support healthcare professionals, especially physiotherapists and those in the Middle East Region, to deliver biopsychosocial care to persons with persistent pain including survivors of psychological trauma such as torture, war, and displacement.

Why was Beyond Pain[©] developed?

During a needs assessment, physiotherapists and healthcare professional in the Middle East Region reported working with vulnerable populations - survivors of torture and war trauma, survivors of sexual violence, persons with mental health disorders, persons that are imprisoned, refugees, internally displaced persons, children with special needs, persons with disabilities, and cancer survivors.

The healthcare professionals also expressed that despite some efforts of international capacity building programs, the majority do not have the knowledge or skills to meet the unique needs of these vulnerable populations including addressing the interaction between biopsychosocial factors and their influence on the human pain experience.

By Dr. April Gamble PT, DPT, CLT



How was Beyond Pain® developed?

Beyond Pain® was developed as a component of an IASP Developing Countries Project and in collaboration with a variety of organizations and experts. The program director and primary author is Dr. April Gamble PT, DPT, CLT who lives and works in the Middle East Region and aims to come alongside communities to strengthen rehabilitation services. Contributions were made by experts from DIGNITY - Danish Institute Against Torture, including Anne-Mette Karrer.

Beyond Pain® was specifically designed to meet the needs of physiotherapists and other healthcare professionals living and working in the Middle East Region. The training content and style, as well as the assessment and treatment recommendations, are designed to be culturally and contextually appropriate for the populations of this region.

Beyond Pain® emphasizes and integrates therapeutic neuroscience education (TNE), which is a treatment intervention that involves guiding a person to understand the neurobiology of pain through relevant metaphors, stories, examples, pictures, and experiential learning opportunities. The TNE included in Beyond Pain was developed in collaboration with physiotherapists and patients in the Middle East Region to ensure that it is relevant and effective for the language, culture, context, and commonly expressed unhelpful beliefs.

Beyond Pain® does not include direct trainings about the unique needs of survivors of torture and trauma. However, in many ways it integrates and applies relevant information related to treating pain in this underserved population including 1) delivering knowledge about the relationship between pain and trauma, 2) including mental health screening tools within the assessment, and 3) including interventions aimed to calm down the nervous system and provide relief and management of emotional distress.

What is included in Beyond Pain®?

Materials are available in English, Kurdish Sorani, and Arabic.

Part 1: Introduction to Pain – Includes a written manual and slides

After completing part one, you should be able to:

- Understand how theories impact how you, as a healthcare professional, assess and treat pain
- Describe the biomedical theory and how it is no longer an accurate or effective clinical framework
- Describe the evidence-based theories that we should now use
- Describe the evidence-based definition of pain
- Demonstrate the ability to use the ICF model to organize information about a patient

Part 2: The Neurobiology of Pain - Includes a written manual and slides

After completing part two, you should be able to:

- Describe the biological process that happens as a person experiences pain
- Define therapeutic neuroscience education
- Describe the biological changes that increases the sensitivity of the nervous system
- Describe the factors that contribute to the pain experience
- Demonstrate the ability to educate a client about the neurobiology of pain in a clear and simple way

Part 3: The Biopsychosocial Assessment of Pain - Includes a written manual, slides, a blank assessment form, & a case example of an assessment form

After completing part three, you should be able to:

- Conduct a comprehensive and evidence-based physiotherapy assessment using the assessment form
- Understand how to identify the physiotherapy problems, including the factors contributing to pain
- Understand how to establish goals for treatment, establish a treatment plan specific to the patient's problems and goals, and develop a therapeutic relationship with the patient

Part 4: The Biopsychosocial Treatment of Pain - Includes a written treatment manual, a blank treatment documentation form, & a case example of the treatment documentation form

After completing part four, you should be able to:

- Provide a 10-session evidence-based treatment plan designed to meet the needs of persons with persistent pain

Treatment Resource: Includes pictures for therapeutic neuroscience education and patient education handouts designed to be used when delivering the treatment plan described in part 4

How do you use Beyond Pain®?

Beyond Pain® was designed to be used to train physiotherapists and other healthcare professionals that work with persons experiencing persistent pain. Part 3 and 4 of Beyond Pain® was designed specifically for physiotherapists as it describes the physiotherapy assessment and treatment of persistent pain, including skilled therapeutic exercise.

Parts 3 and 4 of Beyond Pain® were also designed to provide clinical documentation forms and treatment details to support the evidence-based assessment and treatment of pain. They are designed to meet the needs of contexts and cultures in the Middle East Region and have been used and proven feasible and effective in Iraq. It may also be helpful to use this assessment and treatment content of Beyond Pain when working with persons from the Middle East Region that are residing in other areas of the world, such as refugees in Europe.

If you are a healthcare professional, you could read Beyond Pain® in order to enhance your knowledge and skills. You may also consider using it to train others. As with any training, it is best when conducted by a trained expert and when adapted to the specific context. If you would like additional support in delivering trainings or using Beyond Pain®, please contact the primary author: april.dpt@gmail.com

Please use the following citation when using any content from this manual:

Beyond Pain - An Evidence-Based and Multilingual Biopsychosocial Pain Science Training and Treatment Manual®, By Dr. April Gamble PT, DPT, CLT from ACR – The American Center for Rehabilitation (april.dpt@gmail.com), ©2020 DIGNITY – Danish Institute Against Torture, www.dignity.dk, Contributor Anne-Mette Karrer. Beyond Pain © (Eng): ISBN (print) 978-87-93675-41-4 Beyond Pain © (Arabic): ISBN (print) 978-87-93675-42-1 Beyond Pain © (Kurdish):ISBN (print) 978-87-93675-43-8

This manual is developed using the most current research as of 2019. It is outside the scope of this manual to reference the citations throughout the manual. However, here is a list of key references. These apply to the entire manual.

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Part One Introduction to Pain



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ONE – INTRODUCTION TO PAIN

Estimated time to teach part one: 90 minutes

Materials required:

- Flip chart and markers
- PowerPoint projector
- Speakers for videos to play with sound
- Pre-test for all participants
- Attendance sheet
- Training curriculum for participants

SLIDE 1

This is part one of an extensive training curriculum on modern pain science. In the last decade, significant changes have happened in how healthcare professionals understand, assess, and treat pain. This curriculum aims to provide you with the current evidence in this field so that you can better treat persons in pain.

Part one will describe the theories that have been used in the past to understand pain. It will also introduce the new evidence-based theories that we should now use.

SLIDE 2

After completing part one, you should be able to:

1. Understand how theories effect how you, as a healthcare professional, assess and treat pain
2. Describe the biomedical theory and how it is not accurate
3. Describe the evidence-based theories that we should now use
4. Describe the evidence-based definition of pain
5. Demonstrate the ability to use the ICF model to organize information about a patient

Tell the participants that learning objectives are included in the beginning of each part. They can use them to check their understanding of the key ideas and prepare for the post-test

SLIDE 3

First, it is important to recognize that the content of this curriculum is not the authors' beliefs. But this curriculum describes the research and the current best practice recommendations as of 2019.

It is the responsibility of all healthcare professionals to perform evidence-based practice (EBP). EBP is an approach where healthcare professionals, including physiotherapists, use research evidence, their clinical experience, and the patients' expectations and preferences to make clinical decisions about the most appropriate treatment. Therefore, this curriculum will help you perform EBP by providing you with the current research evidence and helping you integrate it with your clinical experience and your patients' expectations and preferences.

Option 1: Share an example of when you have used evidence-based practice

Option 2: Ask participants to share an example of using evidence-based practice

Use the example to emphasize the key point.

Key point: Evidence-based practice is using research, your experience, and the client's preferences to make decisions about treatment.

SLIDE 4

We want to acknowledge that the information in this curriculum may be very different to what you have learned before. When you learn this new information, it may feel like it is in conflict with previous information you have learned. This can feel uncomfortable and threatening. You can think of it like the picture of the two bulls fighting. The old information and the new information can feel like they are fighting each other.

For example, in part one we will discuss the biomedical theory. Most likely you are mainly using the biomedical theory to treat your patients. This is the theory that most healthcare professional educational programs have been teaching. However, based on recent research, the biomedical theory is no longer accurate for treating pain. This curriculum will be based on new evidence-based theories. Part one will even inform you that the biomedical theory should no longer be used at all. As you are learning this new information, you may feel anxious or resistant to learning and trying new things. This is normal. But, if you take the time and effort to understand the new information and apply it in your work with patients, you will find that the new information can be integrated into what you already know and do. We are not asking you to throw out the information you already know or your clinical experience. But we will help you combine the new information with it. You can think of it as working to get the two bulls to be calm and alongside each other, just like in the picture.

Share your personal experience with learning this new information about pain.

SLIDE 5

In part one, we are going to discuss theories of pain. Theories are defined as a system of ideas to explain something. We all have theories that influence how we work with patients. For example, we have theories about how posture can affect someone's pain or how specific exercises will help with a specific problem. Our theories have a significant effect on how we assess and treat pain. So, we must make sure that the theories we use are appropriate, effective, and based in research.

We will describe the biomedical theory and the history of how this theory was developed. Then we will describe why this theory is no longer accurate based on research. Lastly, we will describe the current evidence-based theories including neuroplasticity, neurophysiology of pain, and the biopsychosocial theory. We will introduce these new theories in part one and you will learn how to use these theories as you complete the curriculum.

Ask participants to share examples of theories that influence how they treat patients. Use the examples to emphasize the key point.

Key point: Our theories have a significant effect on how we assess and treat pain. We must make sure that the theories that we use are appropriate, effective, and based in research.

SLIDE 6

We will start by defining the biomedical theory. This is also called the biomedical model. As this curriculum is discussing pain, we will focus on how the biomedical theory and other theories describe pain. However, healthcare professionals also use these theories to explain any disease or injury.

The biomedical theory describes that pain is a direct result of biological factors such as a tissue injury or a pathology in the tissue. When we use the term tissue, we are referring to any structure in the body including joints, ligaments, muscles, nerves, organs, etc. The biomedical theory explains pain like this: tissue injury equals pain; tissue injury causes pain; tissue injury is the only factor that causes pain. The biomedical model describes that if you treat the tissue injury and tissue pathology then the symptoms will decrease, and function will improve.

Research and clinical practice have shown that pain and disease are much more complex than the biomedical theory describes. The biomedical theory is not an effective theory to use when treating pain. In this curriculum you will learn the complexity of the pain experience.

Key point: The biomedical theory describes that pain is a direct result of biological factors such as a tissue injury or a pathology in the tissue. This theory is not accurate.

SLIDE 7

Let's look at an example. You will see how using a biomedical theory affects how the healthcare professional assess and treats pain. It may not be clear to you yet about why this approach is not accurate. The goal of sharing this example now is to demonstrate how our theories affect how we treat a patient. Soon we will show you this same example but with the use of the new and accurate theories.

Example: You have a 50-year-old male patient with bilateral knee pain. He tells you that his doctor said that he has osteoarthritis in both knees and that is why he has pain. You do an assessment and conclude that the osteoarthritis is the cause of the pain. Your treatment includes: 1. Educating the patient that osteoarthritis is a chronic condition so he will always deal with knee pain. 2. Educating the patient that he can manage his pain by avoiding certain activities in his daily life, 3. Using ultrasound to help with pain relief, and 4. Teaching the patient ROM and strengthening exercises to help with pain relief.

In this example the healthcare professional is applying the biomedical theory. This theory makes the healthcare professional conclude that the patient's pain is a direct result of osteoarthritis, a type of tissue injury. Also, the treatment plan is using the biomedical theory. This is clear because the healthcare professional is: 1. Focusing on managing pain and not treating the pain or making the person pain free, 2. Educating the patient that the pain will be permanent, and 3. Teaching the patient that some activities in daily life should be avoided as they are harmful and cause pain.

This example may sound very logical and similar to your work with patients, especially if you are currently using the biomedical theory. The biomedical theory has been traditionally taught in educational programs for healthcare professionals, nurses, doctors, and surgeons. Only recently have healthcare educational programs stopped teaching the biomedical theory and have started to teach the newest theories.

Research and clinical practice have shown that pain and disease are much more complex than the biomedical theory describes. Also, research has shown that a biomedical theory does not result in long term improvements in a person's ability to function and live their life to the fullest. The biomedical theory is not an effective theory to base our clinical treatment of pain on. In this curriculum you will learn how to use new theories.

We will return soon to this case example so that you can see how the biomedical theory is not sufficient.

Key point: Research and clinical practice have shown that pain and disease are much more complex than the biomedical theory describes. Also, research has shown that a biomedical theory does not result in long term improvements in a person's ability to function and live their life to the fullest. The biomedical theory is not an effective theory to base our clinical treatment of pain on.

SLIDE 8

We will now look at how the biomedical theory was developed and how research has developed the current theories of pain.

The biomedical theory of pain was started by Descartes explanation of pain in the 17th century. He described pain as a process that only occurred in the sensory nervous system. It was believed then that pain was experienced in the sensory system at the location of injury and then this pain message was sent directly to the brain. See the classic picture representing this theory. In the picture, there is a fire on the foot that causes a tissue injury and these pain signals are sent to the brain.

With this initial theory of pain, there was no understanding that psychological, social, or other factors could contribute to the pain experience. Pain was understood as purely a result of a stimulus to the sensory nervous system. This 17th century theory is the basis of the biomedical theory as it describes all disease and illness, including pain, as resulting from only biological processes.

This understanding of pain was maintained into the 1900s. In 1894 a researcher described that there were different types of sensory receptors in the peripheral nervous system. He described that there were unique sensory receptors for each type of stimulus including touch, temperature, pressure, and pain. This was integrated into the biomedical theory of pain by saying that pain receptors sent pain signals to the brain. You will learn soon that research has shown that this is not true. There are no pain receptors and there are no pain signals that get sent to the brain.

SLIDE 9

In the 1960s, a new theory of pain was described by the research named Melzack. The new theory was called the gate control theory of pain. You may know this theory as it is still commonly taught. The gate control theory of pain was the first theory that acknowledged that psychological and social factors could influence pain.

The basic idea of the gate control theory of pain is that there is a “gate” in the spinal cord that controls the pain messages sent to the brain. The brain can control this gate to increase or decrease the pain messages that the brain receives. The theory describes that negative emotional states, like anger and hopelessness, would open the gate which would increase the pain experience. The gate can be also closed by factors that decrease stress like positive social relationships and healthy habits. If the gate closes, the pain experience decreases.

The gate control theory of pain was the first theory that recognized the mind body connection and the interaction between biological, psychological, and social factors. However, current research shows that this theory does not completely and accurately describe the way that pain is experienced. Because we now know that there are not pain messages sent to the spinal cord and brain.

SLIDE 10

In conclusion, centuries of research and clinical experience was integrated into the biomedical theory of pain. However, current research strongly and without any doubt describes that the biomedical theory of pain is not accurate. As healthcare professionals, we must accept this and look to the new theories of pain.

SLIDE 11

As we discussed, the theories that we believe affect how we treat persons with pain. The biomedical theory has key ideas about pain that are wrong. If we apply these key ideas, our treatment of pain will not be as effective. The key ideas that are based in the biomedical theory and that are wrong include: 1. A person feels pain when pain signals are sent from the body to the spinal cord and brain, 2. There is a pain center in the brain which is responsible for pain, and 3. There are pain receptors in the body.

Participants may want to ask questions here about why and how the biomedical theory of pain is wrong. Do not take questions now about this because the rest of part one and part two will provide this detail.

You can say something like this to the participants: “We will now introduce the current evidence-based theories. You will learn how these key ideas from the biomedical theory are wrong. We will discuss these in great detail throughout the curriculum so that you can apply these theories in your work.”

SLIDE 12

There are three evidence-based theories that are based on current research. We must understand these so that we can use them when working with patients. The theories are neuroplasticity, neurophysiology of pain, and biopsychosocial. We will describe neuroplasticity in detail in part one. By the end of part one, you should be able to describe neuroplasticity. But we will only introduce the neurophysiology of pain and the biopsychosocial theory in part one, as we will go into greater detail on these topics in part two of this curriculum.

SLIDE 13

Neuroplasticity is the first theory we must understand. Neuroplasticity is defined as the nervous system's ability to change its structure and its function. The structure and function of the nervous system is not fixed. It changes throughout our entire lives. This process is what allows us to learn new movements, skills, and information. Neuroplasticity is what allows us to think new thoughts and to change our behavior. It is also what allows us to recover from injury or disease.

To understand neuroplasticity, we must recall the anatomy and physiology of the nervous system. The nervous system is made up of neurons. Neurons transmit and receive electrical signals. Neurons have three parts: dendrites, a cell body, and an axon. Signals are received through the dendrites of the neurons. Signals are sent as action potentials. The signal travels to the cell body and then to the axon and axon terminals. The signal then reaches the synapse. The synapse is the point between two neurons where signals are transferred from one neuron to another.

You can say something like this to the participants: "Neuroplasticity allows us to learn new things. You have all experienced this. Think of when you learned a new skill. It could be learning to type on a keyboard or kicking a football. Think of when you learned new information, like you are right now. Neuroplasticity is the reason that humans are able to learn new skills and new information. When we experience new things, many types of messages are received by the nervous system. The nervous system changes based on these messages."

SLIDE 14

A single neuron is not able to do anything. A neuron can only work when is connected to other neurons. Neural pathways are the tracks that connect one part of the nervous system with another part of the nervous system. The nervous system is made up of neural pathways throughout the brain, the spinal cord, and the peripheral nervous system. Neural pathways can be very simple and only include a few neurons or they can be very complex and involve hundreds of neurons.

After discussing the content of the slide, play the video.

After the video, ask a few participants to summarize the key points from the video. Write these on the flip chart.

Key points include the following: 1. The brain changes throughout our lives, 2. There are neural pathways for everything we do including thinking, feeling, and doing, 3. Pathways are strengthened when we use them often, 4. When we do something new, a new pathway is made, 5. Pathways can become stronger or weaker based on if we use them, and 6. We can all change how we think, feel or do by changing pathways which is also called rewiring the brain.

Tell the participants: This video focuses on the changes in the brain. But similar changes also occur in the spinal cord and the peripheral nervous system.

SLIDE 15

You can think of the nervous system as a series of walking trails in a village in the mountains. The trails run all through the village to connect the houses to each other, connect the houses to the market and mosque and also connect the village to the mountains via "goat trails". The trails are like neural pathways in the brain. Each neural pathway has a specific purpose just like each trail in the village has a specific purpose.

We can use this analogy to understand neuroplasticity. As people use a walking trail more often, the grasses and dirt get pushed down and the trail becomes easier to walk on. This is the same for a neural pathway. As you repeat an action, thought, or emotion, that specific neural pathway gets stronger and easier to use.

If people stop using a trail in the village, it gradually becomes difficult to use because grass grows over it and the dirt builds up. The same is true for neural pathways. If you stop using a neural pathway, like you stop doing a certain skill or thinking a certain thought, that neural pathway becomes weaker and it becomes more difficult to use it.

If a new house is built in the village, then they would create a new walking trail connecting that house to the other houses. At first, it takes a lot of effort to make the trail. You have to pull out the grasses and smooth out the dirt. But then as more and more people use the trail, it gets easier to walk on. This is the same in the nervous system. If you learn something new or have a new experience, a new neural pathway is created. As you practice the new skill, you keep using that neural pathway and making it stronger and easier to use.

As you walk through the village, you naturally use the trails that are the easiest to use. The nervous system is the same. It will naturally use neural pathways that are strong and have been used a lot in the past. It takes more effort for the nervous system to use a neural pathway that is new or that is not used very often.

Neuroplasticity is the process by which these trails or neural pathways form and become stronger or weaker based on how often they are used.

After discussing the content of the slide, ask the participants to share examples of neuroplasticity in their personal life or from their work with patients.

SLIDE 16

A key point to understand is that neuroplasticity is occurring at all ages and not just when we are children. Research shows that the changes happen more easily and at a greater rate when we are younger. But at all ages, our nervous system still changes in response to what it is exposed to.

We will now look at what actually happens in the nervous system when it changes. Changes can happen at many levels of the nervous system and can happen in the brain, spinal cord, and peripheral nervous system. This is a very complex process and it is not possible to provide comprehensive information in this curriculum. We will discuss changes specific to pain in part two.

The key point to understand is that the nervous system changes in many different ways and in many different locations.

Here is a general summary of the changes that occur in the nervous system. Changes occur in the brain, spinal cord, and peripheral nervous system.

Neural pathways

- ❖ Changes in the structure of the neural network to strengthen or weaken it - areas of the brain can actually be seen to get smaller when they are not used or get bigger when they are used often
- ❖ Changes in how a neural pathway works to strengthen or weaken it
- ❖ Formation of new neural networks
- ❖ Reorganization of neural networks that already exist

Synapses

- ❖ Changes in the structure of a synapse to strengthen or weaken it
- ❖ Changes in proteins and chemicals at the synapse to strengthen or weaken it

Axon

- ❖ Axons can grow or disappear
- ❖ Axons can change to form new connections or new neural pathways

Dendrites

- ❖ Changes in how the dendrites function to increase or decrease the strength of a synaptic connection
- ❖ An increase or decrease in the number of dendrites - dendrites can grow or disappear

Neuron

- ❖ Changes in the strength of the electrical signal in the neuron
- ❖ New neurons can grow in the adult brain - Research is limited but it has been shown that new neurons do consistently grow within specific areas of the adult brain. Look at this video for more information:
https://www.youtube.com/watch?v=B_tjKYvEziI

Other

- ❖ The cortex, or the grey matter in the brain, can increase or decrease in size
- ❖ Changes in chemicals and hormone levels in the nervous system
- ❖ Changes in nerve activity in regions of the brain
- ❖ Changes in the rate of sensor production to increase or decrease the number of sensors in the peripheral nervous system
- ❖ Changes in the sensitivity of sensors in the peripheral nervous system

Show the video before describing this list of changes in the nervous system. This will make it clearer.

The participants may ask a lot of questions about the science of these changes. The science is very complex, and it is not necessary to understand those details. Try to keep questions focused on relevant topics. You can tell the participants that they can learn more by looking at the videos and resources provided at the end of part one.

SLIDE 17

These various changes occur in our nervous system in response to what the nervous system is exposed to and experiences. Experiences can be thoughts, emotions, performing an action or behavior, learning information, forming a memory, or recalling a memory. Experiences that change the nervous system also include injuries like a CVA or a traumatic brain injury and diseases like peripheral neuropathy or cancer. And as you will learn in part two, pain is also a pathological state that may cause changes in the nervous system.

SLIDE 18

As a healthcare professional that work to improve the function of patients, whether you knew it or not, you have been using the theory of neuroplasticity to achieve improvements with your patients. For example, after a person has a CVA, neuroplasticity is the reason they can regain the ability to walk. If neuroplasticity did not occur, then we would never see patients improve after a CVA. Neuroplasticity is also the reason why having rehabilitation is important after an injury or when a person has a disease or illness. Rehabilitation gives the nervous system opportunities to experience new things and to practice skills which causes the nervous system to change.

SLIDE 19

Neuroplasticity is the theory that underlies we treat pain. We are going to talk in detail in part two about the changes that happen in the nervous system when a person experiences pain. We will also discuss the changes that happen as a result of the treatment of pain. We know that these changes occur because of neuroplasticity!

The key message is that the nervous system changes based on what it is exposed to and we, as healthcare professionals, can work with the nervous system in a way that improves a person's ability to function.

SLIDE 20

The neurophysiology of pain is the next evidence-based theory that we must understand. The neurophysiology of pain is defined as how the nervous system works when a person experiences pain. Part 2 covers the neurophysiology of pain in a lot of detail so we will not discuss it now. But know that the neurophysiology of pain is one of the three main theories that you should understand so that you can treat pain effectively.

Explain to the participants that we will describe the neurophysiology of pain in great detail in part two. But we want to start to introduce the idea now.

Play the video. After the video, ask a few participants to summarize the key points from the video. Write these on the flip chart. Key points include the following: 1. Pain is always produced by the brain, 2. Tissue damage is not the main problem when a person has chronic pain, 3. Most tissues heal within 3 to 6 months, 4. Sensitivity of the nervous system causes pain, 5. Retraining the brain and nervous system treats pain, 6. Active treatments are more effective than medications or surgery, 7. Thoughts, beliefs, stress, and emotions effect the nervous system and pain, 8. Nutrition and physical activity are important to treating pain, 9. Stressful times in our life can contribute to pain, and 10. Physical activity and movement is important to treating pain

SLIDE 21

The last theory that is important to understand is the biopsychosocial theory

The biopsychosocial theory describes that the pain experience involves an interaction of biological, psychological, and social factors that are unique to each person. The biomedical theory states that pain is caused by a tissue injury but the biopsychosocial theory states that pain results from a variety of factors from all three of these areas.

Biological factors are events in the body that activate sensors in our body. The biopsychosocial model describes that input from our body, like tissue damage, muscle tension, or inflammation, may contribute to pain. Psychological factors are our emotions but also the things we think, say, believe, and predict. Social factors are any interactions a person has with other people and the roles and responsibilities a person has in their life. The biopsychosocial theory states that pain is a result of the interaction of a variety of factors from all three of these areas.

As you explain the three areas, have participants give examples of factors for each area.

SLIDE 22

Let's look at an example of another human experience, eating a meal, to understand how pain involves biological, psychological, and social factors. The pleasure of eating a meal is influenced by biological, psychological, and social factors. Biologically, there is the smell of the food, the sensation of the food in our mouth, and the flavor of the food on our taste receptors. Those signals are sent to our brain and affect our experience. Psychologically, there is our beliefs and expectations about the food. For example, have you ever experienced eating a food that someone told you is the best in the city and that expectation made it taste better? Socially, often our enjoyment of eating a meal is influenced by our social environment. For example, have you experienced how food tastes better when you are with friends or family and in a fun environment rather than eating the exact same food by yourself? A person's experience of eating a meal results from the interaction of biological, psychological, and social factors. The same is true for a person's pain experience.

Eating a meal is a personal human experience that cannot be measured. Pain is also a personal human experience that cannot be measured. Pain is not like blood pressure or body temperature which can be measured and understood with a simple test. We cannot measure pain, but we can understand it by asking our patients about their pain experience. We can understand it by assessing the biological, psychological, and social factors that contributes to a person's pain experience. If we understand the factors contributing to a person's pain experience, then we can better help a person that is struggling with pain.

When describing the example of eating a meal, have participants share the factors from the biological, psychological, and social areas.

SLIDE 23

Remember our example that helped us understand the biomedical theory. We will now look at that same example to see how applying the biopsychosocial theory affects how a healthcare professional treats the same patient.

Example: You have a 50-year-old male patient with bilateral knee pain. He tells you that his doctor said that he has osteoarthritis in both knees and that is why he has pain.

You do an assessment and conclude that the person's pain experience includes the following:

- Biological factors: decreased active range of motion of bilateral knees, general weakness in the legs, poor endurance of leg muscles, mild swelling and inflammation of bilateral knees
- Psychological factors: patient believes that the pain is permanent and that it will not get better, patient is afraid to move their knees because they think the pain will get worse, patient is avoiding daily activities due to knee pain and fear of knee pain
- Social factors: patient is worried about not being able to work due to knee pain, patient takes care of his elderly mother who has severe knee pain

SLIDE 24

If you are using the biopsychosocial theory, you treat this patient by: 1. Educating the patient that the osteoarthritis are actually normal changes in the joints that happen with age, the pain is not permanent, and the pain is not something to be afraid of 2. ROM, strengthening, and endurance exercises, 3. Teaching the patient how to ice and do gentle ROM exercises at home to reduce swelling, and 4. Teaching the patient how to do daily activities so that he no longer avoids physical activity and active movement of the knees.

Review the treatment that was provided for this same patient when applying the biomedical theory. I think you can see that when applying the biopsychosocial theory, the exact same patient is seen in a very different way. For example, when applying the biopsychosocial theory, the healthcare professional gathers information in the assessment about more than just the biological factors. Also when applying the biopsychosocial theory, the treatment plan treats biological, psychological, and social factors.

This curriculum will prepare you with the ability to assess and treat biological, psychological, and social factors. You can use much of the knowledge and techniques that you already know but you should apply it using the new theories.

After explaining the treatments for the example, ask the participants to share how it is different than the treatment approach when using the biomedical theory. You can show slide 7 if it is helpful.

Use the discussion to emphasize the key points. Key points include the following: 1. Theories affect how we treat patients so we should use the evidence-based theories, and 2. When applying the biopsychosocial theory, the healthcare professional gathers information in the assessment about biological, psychological, and social causes of pain and then the treatment plan addresses biological, psychological, and social factors.

SLIDE 25

We have now discussed the three main theories we should use: neuroplasticity, neurophysiology of pain, and biopsychosocial. Based on these evidence-based theories of pain, we can define pain. The International Association for the Study of Pain (IASP) established this international definition of pain:

Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage.

Pain is no longer understood within a biomedical theory as a biological process that occurs due to tissue damage. Rather pain is a protective response that results in a sensory and emotional experience. Pain is experienced due to tissue damage or from what the brain perceives as danger to the tissues. This means that a person can experience pain without the body having tissue damage.

This will become clearer as we discuss the neurophysiology of pain in part two.

After reading the definition of pain, ask the participants to share how they would explain this in other words.

Use what the participants share to emphasize the key points. The key points include the following: 1. Pain is no longer understood within a biomedical theory as a biological process that occurs in response to tissue damage, 2. Rather pain is a protective response that results in a sensory and emotional experience, 3. Pain is experienced due to tissue damage or from what the brain perceives as danger to tissues.

SLIDE 26

In summary, the biomedical theory should no longer be used. Rather, we should use the theories of neuroplasticity, neurophysiology of pain, and biopsychosocial. These theories significantly change how we understand, assess, and treat pain. See the table below describing some of the significant changes in how we understand pain. We will discuss this in more detail in part 2.

Biomedical Theory – Outdated and not based in current research	Evidence-based Theories – Based in current research
A person feels pain when pain signals are sent from the body to the spinal cord and brain.	Danger messages are sent from the body to the spinal cord and brain. Pain is an output of the brain when it decides that there are more signs of danger than there are signs of safety.
There is a pain center in the brain.	Pain is an experience that involves many areas of the brain.
There are pain receptors in the body.	There are receptors in the body that can send danger messages.

The purpose of this slide is to show how we are changing our beliefs from a biomedical theory of pain to the evidence-based theories of pain. Don't worry about explaining the correct ideas in detail. Only introduce the correct ideas about pain. Tell the participants that part two discusses this in great detail.

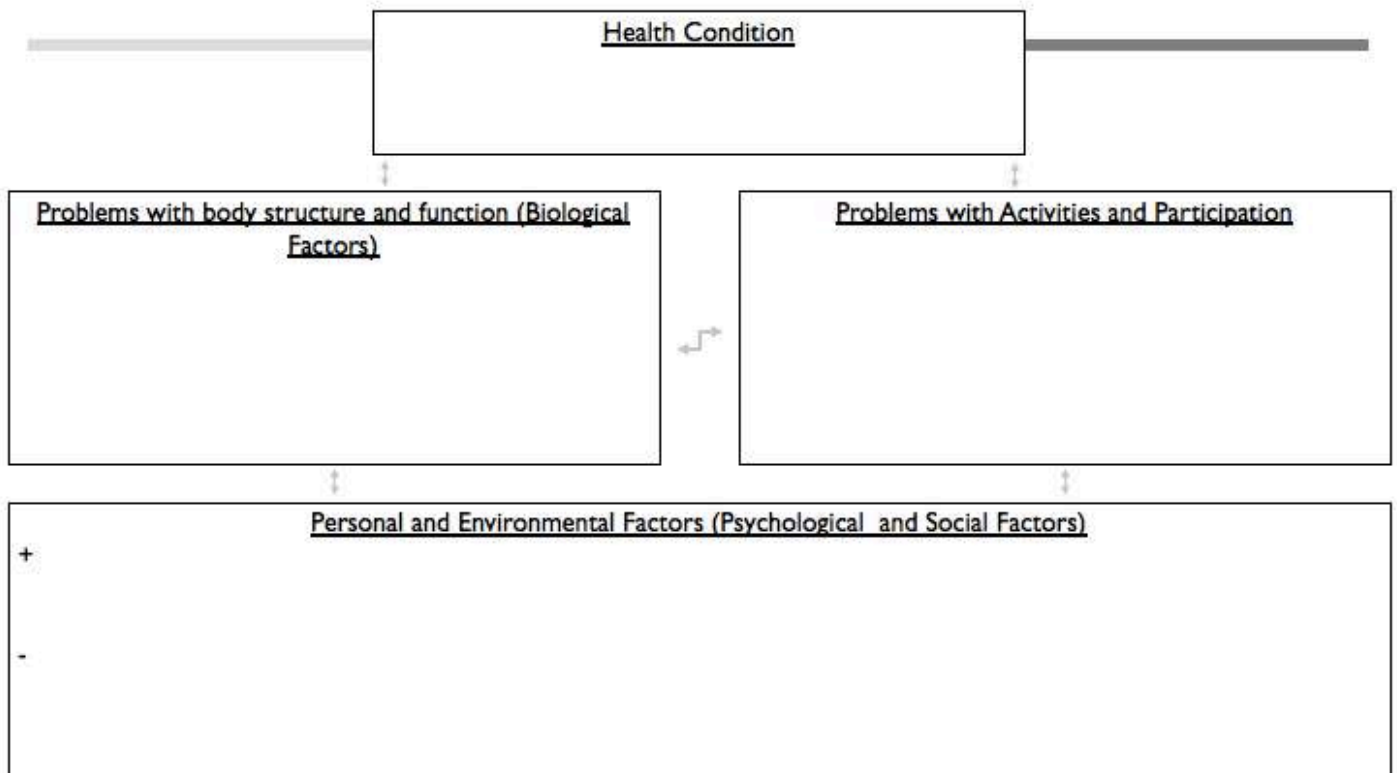
SLIDE 27

The last topic of part one to discuss is the International Classification of Functioning, Disability and Health, also called the ICF model. The ICF model was developed by the World Health Organization. It is a framework for describing health, function, and disability. It was developed so that healthcare professionals all around the world would have one way to organize and communicate information about a patient.

The ICF model is based on the biopsychosocial theory. The ICF model does not use the biomedical theory. The ICF model is a tool that can be used to apply the biopsychosocial theory in your work as a healthcare professional. We are introducing this model now. We will continue to use it throughout the curriculum. You will learn how to use the ICF model as a guide to assess and treat a patient.

SLIDE 28

Here is the ICF Model. It includes 5 boxes. There is space in each box so that you can write in the information about the patient. Notice how the biological, psychological, and social factors of the biopsychosocial theory are included in the ICF Model.



Introduce the title of each box. You do not need to describe what each one means as you will do that on the next slide.

Ask the participants to share what they think the arrows mean.

SLIDE 29

Here are key points to understand about the ICF model:

- The ICF model is based on the biopsychosocial theory. The ICF model includes biological, psychological, and social factors that all contribute to a person's ability to function.

The ICF model does not focus on the health condition or the medical diagnosis. Rather it makes us think about how that condition is affecting a person's ability to function and live their life fully.

- The ICF model focuses on person's ability to function in daily life and in a person's ability to do things in their life that are meaningful to them.
- A person's function is a result of an interaction between all of the parts included in the ICF model. So, if one factor is changed then the other factors will be changed too. That is why you will see the arrows on the model that connect all parts to each other.
- The ICF model can be used by all healthcare professionals and with all ages, all conditions, and in all settings.
- The ICF model includes positive and negative environmental and personal factors.
- The ICF model is used to gather all the essential information about your patient, organize this information, and help you create a treatment plan that will improve function.

SLIDES 30 AND 31

Key definitions to understand when using the ICF model:

- Disability: Decreased ability to participate fully in life due to biological, psychological, social, and environmental factors
- Functioning: The ability to participate fully in life due to biological, psychological, social and environmental factors
- Health condition: A disease, disorder, injury, medical condition, and/or medical diagnosis
- Body structure: Anatomical parts of the body - like organs, joints, and muscles
- Body function: Physiological functions of the body - like movement and digestion
- Problems with body structure and function: Problems in the body structure and/or function - biological factors from the biopsychosocial theory.
- Activity: Completing a task - like walking, moving from sitting to standing, and standing on one leg
- Participation: Participating in situations in life - like walking to the market, standing up from the couch, and walking upstairs in the house
- Problems with activity and participation: Problems in performing activities and participating in situations in life.
- Environmental factors: The physical, cultural, and social environment that the person lives in and includes both positive and negative factors - social factors from the biopsychosocial theory.

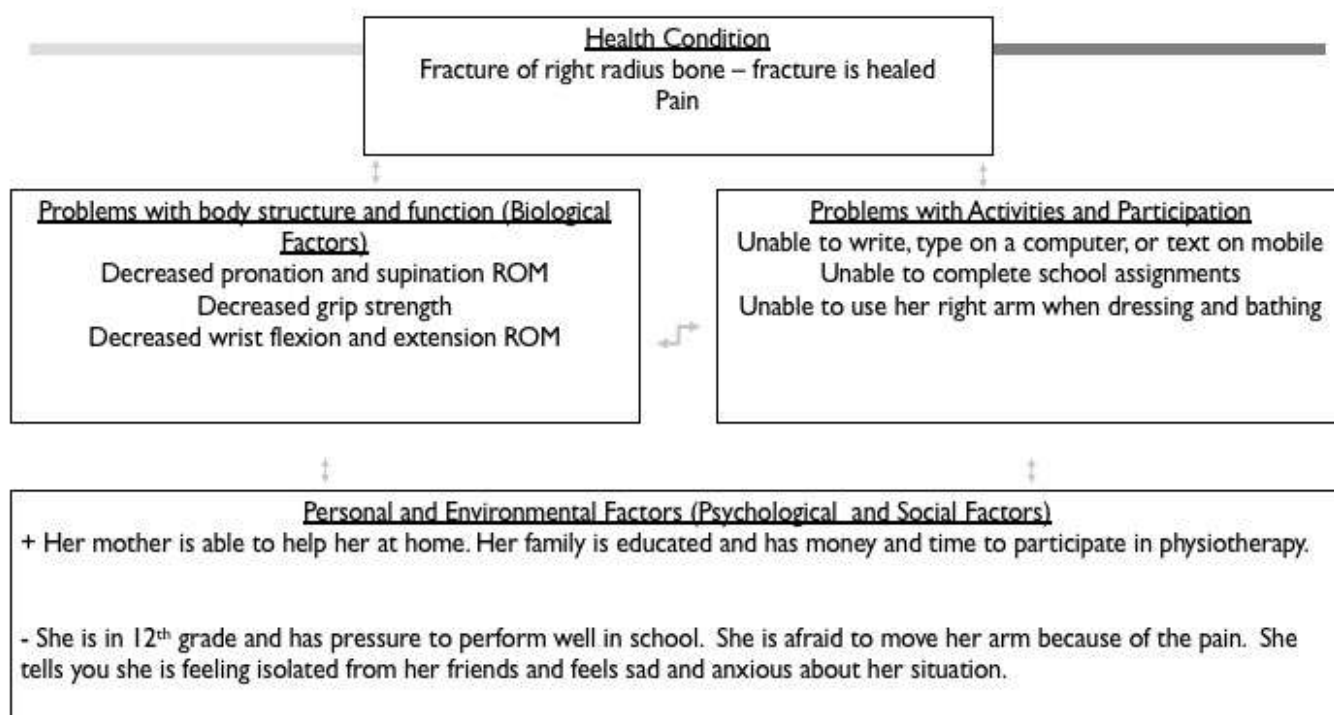
- Personal factors: The unique characteristics of the person and includes both positive and negative factors - the psychological factors from the biopsychosocial theory.

Provide the definition for each area of the ICF Model. Then have the participants share examples of what would be included in each area. Use this activity to help make sure it is clear how the information is organized.

SLIDE 32

Let's look at examples of the ICF model so that you can better understand it.

The patient is a 17-year-old girl that fractured her right radius bone from a fall on her bicycle. The physician has removed the cast and said that the fracture is healed. You organize the information you gathered during the assessment into this ICF model. Look at each box to understand how the information is organized.



Describe the example. Then ask participants to share other examples of what may be included in areas of the ICF model for this specific patient.

SLIDE 33

In summary, the ICF model is a tool that is based on the biopsychosocial model. It will help you gather and use all of the information you need to treat a patient. We will continue to use this model throughout the curriculum.

Have the participants form groups of 2-3 people. Each group should create an ICF model for a patient that they have worked with recently. They should fill in as much information as possible. If time allows, have a few groups share their ICF model with everyone. Use this as an opportunity to make sure everyone understands how to use the ICF model.

SLIDE 34

We learned about neuroplasticity and how when we learn something new, changes are made in our brain and nervous system. We also learned that these changes become stronger if we use the information more often. So, you need to use the new information and practice the new skills that you learn during this curriculum so that your neural pathways can become stronger. So, we will have homework at the end of every part. The homework will help you apply the information you learned to your work with patients. If you do the homework, you will get much more benefit from this curriculum.

The homework for part one is to complete the ICF model with at least 3 of your patients. Make sure to write down information in all of the areas. If you don't have information about your patient in some of the areas, then ask your patient for the information during their next session. This will help your treatment be more effective.

Ask the participants to bring their homework (the completed ICF models) with them to the next training session as we will use them in an activity.

Let the participants know that the post-test for part one will be done during the next training session. So they should study the information.

Take questions as time allows. Write down any questions that can be answered at a later time.

ADDITIONAL LEARNING RESOURCES

Video – Biomedical theory: <https://www.youtube.com/watch?v=sEGAU6D0A8>

Video – Understanding pain in less than 5 minutes: <https://www.youtube.com/watch?v=vdM4dHefA4w>

Video – Complexity of Pain

- Kudrish: <https://www.youtube.com/watch?v=N-PSad06kKk&t=10s>
- English with Arabic subtitles: <https://www.youtube.com/watch?v=Zv6RPoVZx9M>

Video – What is neuroplasticity: <https://www.youtube.com/watch?v=Zf9bG-C5W34>

Video - Neuroplasticity: <https://www.youtube.com/watch?v=ELpfYCZa87g>

Videos – ICF model:

- What is it: <https://www.youtube.com/watch?v=uoE1c4wBalo>
- Body structure and function: <https://www.youtube.com/watch?v=O2pRqr-THMs>
- Activity and Participation: <https://www.youtube.com/watch?v=4mHnLi6rJI>
- Contextual factors: <https://www.youtube.com/watch?v=HfYhpDPEqbE>
- How do the different parts of the ICF work together: <https://www.youtube.com/watch?v=jAV-HsROFmI>

Beyond Pain®

Part Two The Neurobiology of Pain



Funded by the IASP Developing Countries Project
Supported by DIGNITY – Danish Institute Against Torture
Organized by Wchan Organization

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Version May, 2020
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TWO - THE NEUROBIOLOGY OF PAIN

Estimated time to teach part two: 4.5 hours

Materials required:

- Flip chart and markers
- PowerPoint projector
- Speakers for videos to play with sound
- Internet to access videos
- Attendance sheet

SLIDE 1

In part two we will go into great detail about the neurobiology of pain. This is also called the neurophysiology of pain. You may already have some knowledge about pain biology, but we will focus on the evidence-based theory. You will learn why the older biomedical theory is not able to deal with the complexity of pain. Understanding the neurobiology of pain will also allow you to help people that are struggling with pain.

SLIDE 2

After completing part two, you should be able to:

1. Describe the biological process that happens as a person experiences pain
2. Define therapeutic neuroscience education
3. Describe the biological changes that increases the sensitivity of the nervous system
4. Describe the factors that contribute to the pain experience
5. Demonstrate the ability to educate a patient about the neurobiology of pain in a clear and simple way

SLIDE 3

The neurobiology of pain is defined as how the nervous system works when a person experiences pain. We are discussing the neurobiology of pain so that you can understand what is happening in the body of your patients. But we are also discussing the neurobiology of pain because you must understand this to be able to treat pain. Research has shown that teaching people about the biology of pain can help them better understand their pain and what they could do about it. This is called therapeutic neuroscience education or TNE. It is also called pain education. We will use the abbreviation TNE throughout this curriculum.

TNE is a form of education that aims to change a person's thoughts and beliefs about their pain by teaching them about the biology that contributes to pain. Persistent pain is pain that has lasted for greater than 6 months. TNE is very effective for helping people with persistent pain. TNE may also help a person that is experiencing acute pain to recover and not develop persistent pain. It does this by helping the person understand pain and avoid unhelpful behaviors that cause changes in the nervous system which then contributes to persistent pain. TNE is also very effective at treating disability that is related to pain.

TNE is not just educating a patient, providing advice, and giving recommendations. TNE is a treatment that has a direct effect on improving a person's ability to move and function. In this way, TNE is a treatment just like range of motion exercises or strengthening exercises are treatments.

An entire part of this curriculum is about TNE. You will develop the skills to use this TNE to help people recover from pain. You can only develop skills in TNE by first understanding the neurobiology of pain. You must understand the neurobiology of pain to be able to help people with their pain! It is just like how you need to understand the anatomy and biology of the muscles in order to teach patients stretching and strengthening exercises.

SLIDE 4

TNE is the process of teaching a person about the biology of pain. Research shows that persons of all educational levels are capable of understanding pain biology. Even children are capable of understanding the neurobiology of pain. TNE is a treatment that requires expert skills so that you can communicate a complex idea in simple and clear terms. By doing this, you can help a person who is struggling with thoughts, beliefs, and fears about pain. In other words, TNE changes the psychological factors, like emotions and thoughts, contributing to pain and by doing this, it treats pain. TNE is most effective when it uses stories, analogies, and metaphors that are relevant to the patient's experience, culture, and context. TNE is also more effective when a person uses visual aids like pictures or videos.

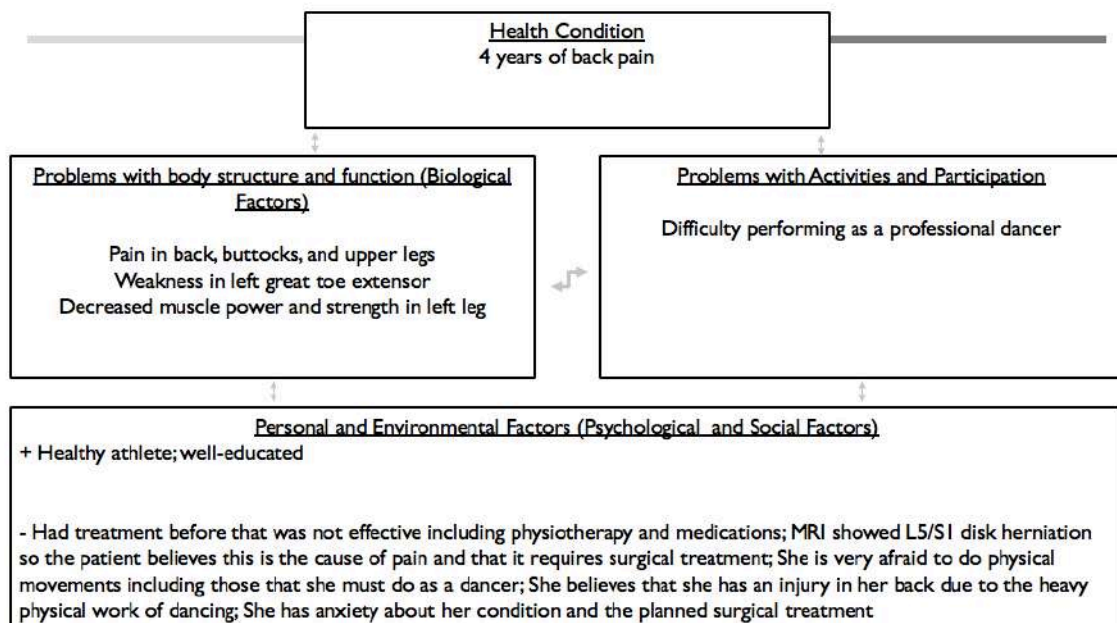
Show the video so that participants can see an example of TNE. After the video, ask the participants: "How is the way the physiotherapist explained pain different than how a lecturer or teacher would do it? How did the physiotherapist get the patient involved and engaged in learning about pain?"

SLIDE 5

We will not describe here why TNE works. We will discuss that in detail later because it will be clearer after you understand the neurobiology of pain. We are going to look at a case example from a research study so you can see that TNE is an effective treatment for pain. The title of the research study is "Preoperative therapeutic neuroscience education for lumbar radiculopathy: a single-case fMRI report." This study was published in 2015. (Louw, A., Puentedura, E. J., Diener, I., & Peoples, R.R. 2015)

SLIDE 6

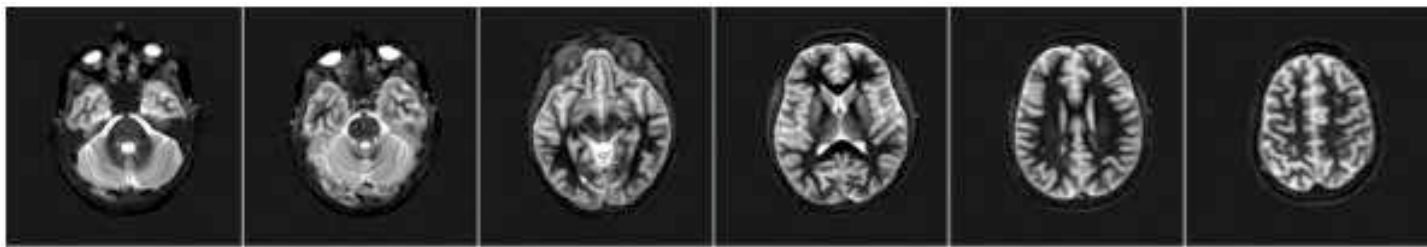
The ICF model below provides the information about the 30-year-old female patient from the research study. At the time of the assessment and treatment, this patient was scheduled to have back surgery in 2 weeks.



SLIDE 7

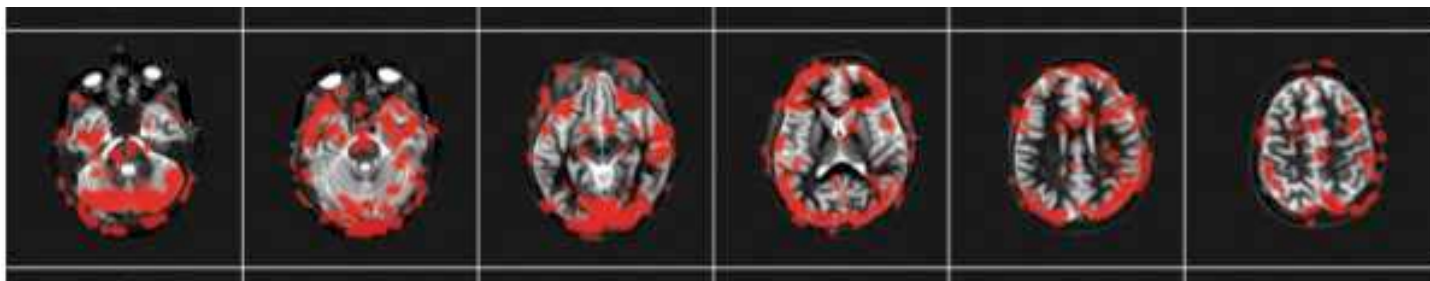
Functional Magnetic Resonance Imaging or fMRI was used in this study. fMRI allows scientists to look at the brain at the same time the person is doing cognitive activities, like thinking about something or watching something, or physical activities like moving a part of the body. fMRI shows activity in the brain by showing changes in blood flow. When an area of the brain is being used, blood flow increases in that area.

The image below is from the research study. It shows the brain of the female patient in the fMRI while she is relaxed and watching an enjoyable movie. Red areas will appear on the image when she is experiencing pain. As you can see, there are no red areas, so she is not experiencing pain at this time.



SLIDE 8

Next, while the patient stayed in the fMRI, she was asked to move her back in a way that usually caused her pain. When the patient did this movement, she reported that she felt pain. Below is the image of the brain while she was doing the painful movement. The red areas are the neural pathways that are involved in the pain experience. The red areas indicate that she is experiencing pain. The brain is more active, represented by red, and the patient reported increased pain.



SLIDE 9

The patient then got out of the fMRI and immediately received TNE in a private room and in a one-on-one session with a physiotherapist skilled in TNE. The TNE took 20 minutes. The goal of the TNE was to change thoughts and beliefs to decrease the patient's fear and anxiety of pain. Some of the ideas that were explained included anatomy and biology of the nervous system, changes that happen in the nervous system that can contribute to pain, research about disc herniations and surgical treatment, and ways to treat the pain by calming down the nervous system. The physiotherapist used pictures to explain these ideas. The patient actively participated in the TNE by sharing her experience, ideas, and questions.

Remind the participants of the video about TNE that they watched earlier. The TNE in this case study would have been very similar to this.

SLIDE 10

The patient received no other treatment except for the TNE. Immediately following the TNE, the patient returned to the fMRI. She did the exact same movement of her back that caused her pain before the TNE. You can see the image of her brain when she was doing the painful movement of her back. There are fewer red areas than when she did this movement before the TNE. The neural pathways involved in pain are less active. She reported experiencing less pain than before the TNE.



Also, immediately after the TNE, the patient had improved movement. This was shown by increased ROM during a straight leg raise and increased lumbar forward flexion ROM. She also completed questionnaires which showed decreased anxiety and fear about pain and movement and increased positive thoughts about her condition.

This demonstrates that TNE causes immediate changes in the functioning of the brain. TNE causes immediate changes in the neural pathways that are responsible for the pain experience. TNE causes changes in the nervous system that results in immediate improvements in pain and movement.

Explain the changes that happened after the TNE. Then ask the participants: “What can we conclude from what happened in this research study? What does it prove?”

Use their answers to emphasize the key point.

Key point: TNE causes immediate changes in the neural pathways that are responsible for the pain experience. TNE causes changes in the nervous system that results in immediate improvements in pain and movement.

SLIDE 11

This was an example of how TNE is one way of treating pain from the biopsychosocial theory. You will learn how to do TNE as a part of this curriculum. But now we will discuss the details of the neurobiology of pain. You must understand this well to be able to do TNE.

Throughout part 2, we will use analogies, stories, and metaphors to help you understand the neurobiology of pain. These will be similar to TNE that you will learn to use with your patients. Research has shown that people learn better when they can apply it to their lives and personal experiences. This is why we teach the neurobiology of pain in this way.

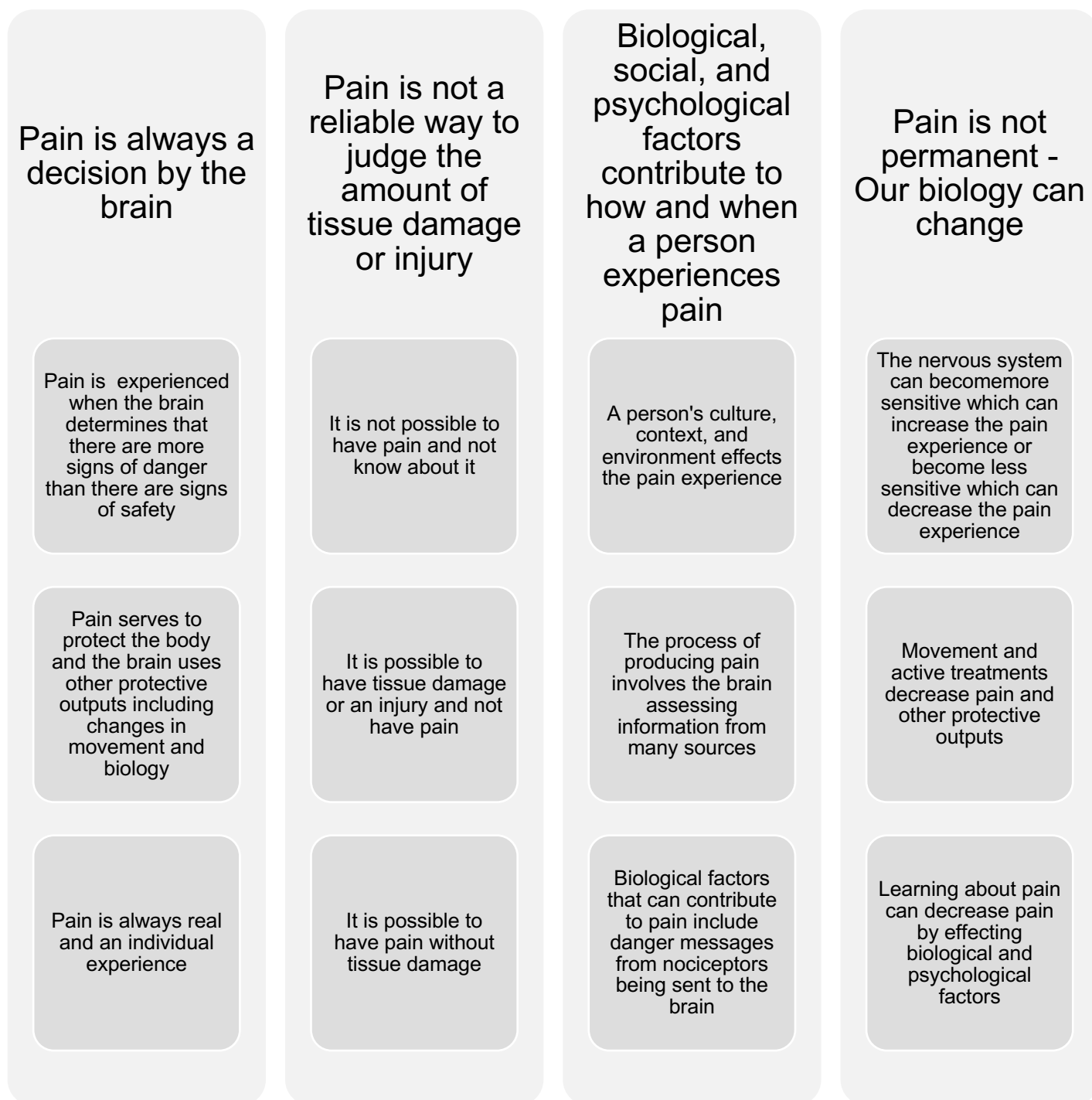
SLIDE 12

The table below provides a summary of the neurobiology of pain. This is the same knowledge that patients must understand through TNE. By the end of part 2, you should be able to explain the content of this chart.

This table is organized with four main points:

1. Pain is always a decision by the brain
2. Pain is not a reliable way to judge the amount of tissue damage or injury
3. Biological, social, and psychological factors contribute to how and when a person experiences pain
4. Pain is not permanent - Our biology can change

Each of the four main points has three facts underneath it. These facts support the main point. The facts must also be understood to fully understand the main point. To help you learn and organize the new information, you will see headers throughout this curriculum to tell you what main point we are discussing at that time.



Do not describe this table in detail as that is what you will be discussing for the remainder of part 2. But emphasize that the participants can use this table to make sure that they understand all of the key main about the neurobiology of pain.

SLIDE 13

Main Point: Pain is always a decision by the brain

Pain is always a decision by the brain. Pain is experienced when the brain determines that there are more signs of danger than there are signs of safety. The brain decides to produce pain as a way to protect. Pain serves to protect the body and the person. Pain acts as an alarm to let us know that there are signs of danger and that we need to protect ourselves. If we never experienced pain, we would have a lot of problems.

For example, if you step on a nail, it is important that you know about it. In this situation, pain is the alarm your brain uses to let you know that you stepped on a nail. Pain is the way the brain tells us that there is danger and that we need to protect ourselves. If you didn't experience pain, you may not know that you stepped on the nail. If you didn't know about that, you may continue walking which would make the injury worse. Or you may not take care of the injury so it would become infected and cause more problems. This example shows how the purpose of pain is to protect and the ability to experience pain is important.

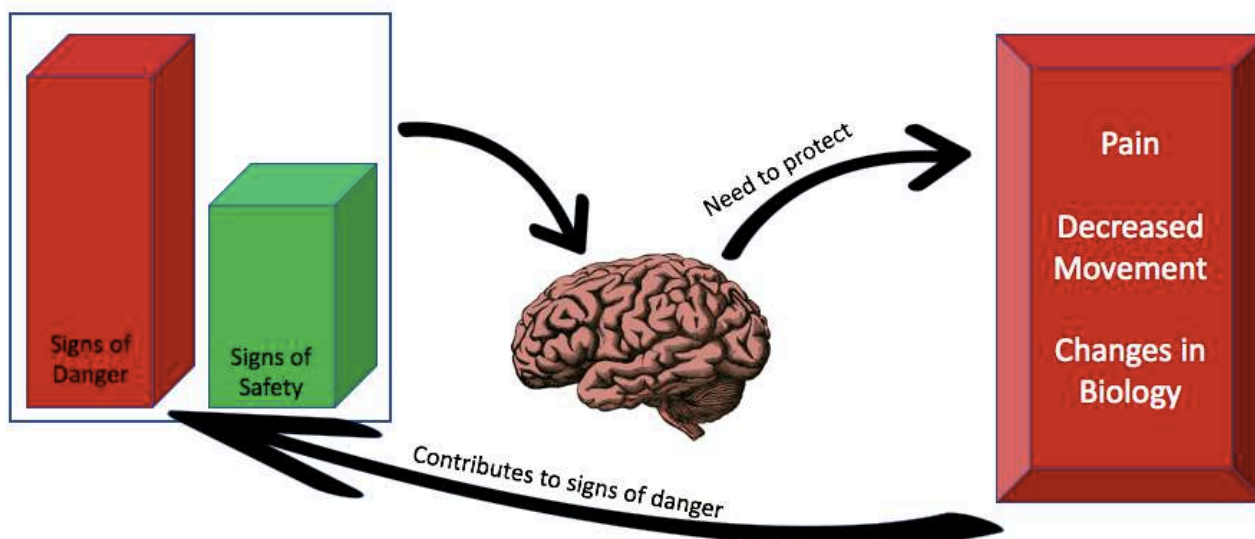
Ask the participants to share examples that show how pain protects and how the ability to experience pain is important.

SLIDE 14

Main Points: Pain is always a decision by the brain; Biological, social, and psychological factors contribute to how and when a person experiences pain

This is the process of how the brain makes the decision to produce pain:

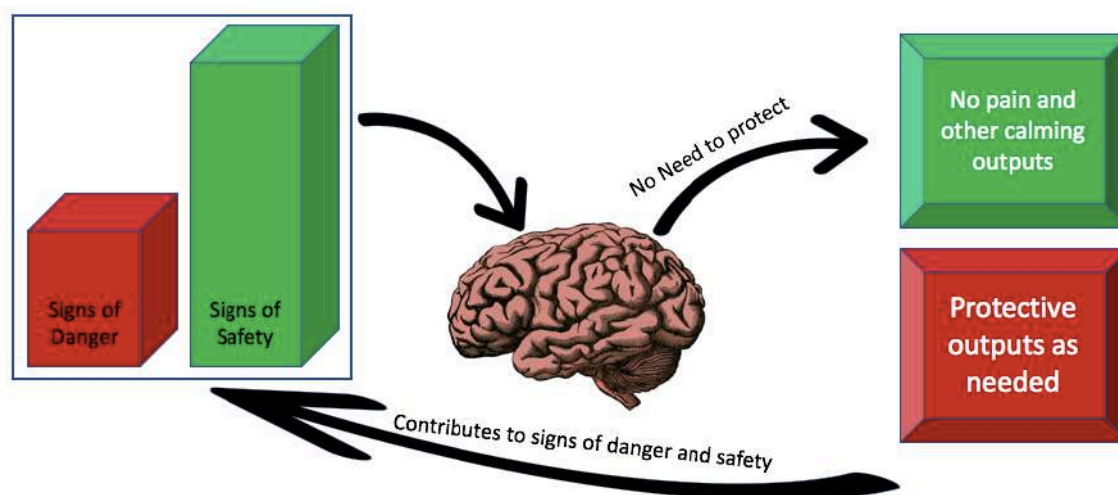
1. The brain receives information from many sources and processes this information in many different areas in the brain.
2. Then the brain has to make a decision based on all of the information that it received. The brain has to decide if we are safe or if we are in danger. The brain is making this decision every second of our lives.
3. When the brain judges that there are more signs of danger than there are signs of safety, it determines that there is a need to protect.
4. The brain produces specific outputs when it determines that there is a need to protect. One of those outputs is pain. This is because pain acts as an alarm to let us know that there are signs of danger and that we need to protect ourselves.
5. The brain also has other outputs causing decreased movement and changes in biology.
6. All of these outputs (pain, decreased movement, and changes in biology) then contribute to signs of danger. In that way, a cycle of danger and pain is formed.



SLIDE 15

Here is what happens when a person does not experience pain. The first 2 steps are the same as the steps described above. But the remaining steps are different because pain is not experienced.

1. The brain receives information from many sources and processes this information in many different areas in the brain.
2. Then the brain has to make a decision based on all of the information that it received. The brain has to decide if we are safe or if we are in danger. The brain is making this decision every second of our lives.
3. When the brain judges that there are more signs of safety than there are signs of danger, it determines that there is not a high need to protect.
4. The brain does not produce pain when it determines that there is not a high need to protect.
5. If the brain determines that there are some signs of danger, it may still produce some protective outputs but at the same time, choose not to produce pain. These other protective outputs prepare the body and mind for any potential danger. Or if the brain determines that there are high signs of safety, it will produce outputs that relax and calm the body.
6. All of these outputs then contribute to signs of danger or signs of safety and in this way, contribute to the cycle.



SLIDE 16

As point 5 describes above, if the brain does not produce pain, it can still produce other protective outputs.

Common protective outputs include the following:

- Increased muscle tension
- Increased speed of breathing
- Sweating
- Feeling of general discomfort, anxiety, or emotional stress
- Chest tightness
- Feeling alert of the environment including the physical space and the people around you

The brain may produce these protective outputs when there are some signs of danger, but those signs of danger are small so a very strong alarm in the form of pain is not needed. These are protective outputs also serve as an alarm and prepare us to be ready for danger, but they are not as powerful of an alarm as pain is.

For example, if a person reaches for a hot tea pot, as the increased temperature is experienced in the hand, the brain may cause increased muscle tension in the arm, an increased breathing rate, and increased alertness to the environment. These changes all serve to prepare the mind and body so that the person can protect themselves from getting burnt. But the person did not experience pain because the brain determined that based on the signs of safety and signs of danger, that the strong warning signal of pain was not necessary to protect the person in this situation. But if the person continued to move their hand to the tea pot or touched the tea pot, the brain would have more signs of danger than of safety, and the person would experience pain, along with the other protective outputs.

When the brain decides that there are high signs of safety, it can produce calming outputs which contribute to signs of safety. Common calming outputs include the following:

- Decreased muscle tension
- Decreased speed of breathing
- Deep breathing rather than breathing from the top part of the chest
- Feeling relaxed, calm, and comfortable

SLIDE 17

We said that the first step in the process of experiencing pain is that the brain receives information from many sources. These sources are the factors that can contribute to the pain experience. The factors that contribute to the pain experience include the following:

- Nociceptive pain and changes
- Neuropathic pain and changes
- Nociplastic pain and changes
- Body information
- Thoughts and beliefs
- Emotions
- Memories
- Environment
- Social and cultural context
- Behavior

As you may notice, these factors are from biological, social, and psychological areas. The biopsychosocial theory and the neurobiology of pain support each other.

Main point: Pain is not permanent - Our biology can change

All of these factors can be perceived by the brain as signs of danger or signs of safety. To treat pain, you change the brain and the nervous system so that it determines that there are more signs of safety than there are signs of danger. We know the neuroplasticity makes it possible to change the brain and the nervous system.

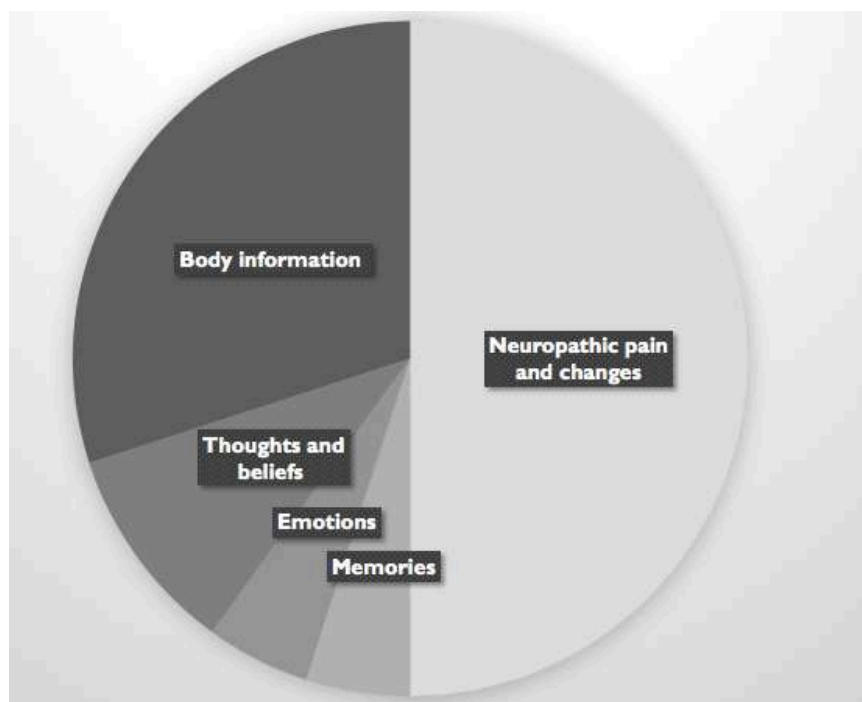
Have participants share examples of the different factors contributing to pain. We are going to discuss them in more detail later so don't worry about discussing the details now. The goal of this brief activity is to get the participants thinking about the factors.

SLIDE 18

Main Points: Pain is always a decision by the brain; Biological, social, and psychological factors contribute to how and when a person experiences pain

Each person's pain experience will have different factors contributing to it. We can use a pain chart to create a picture that represent the factors contributing to a person's pain experience. Let's look at an example of a pain chart so you can better understand this.

See the pain chart below. For this person, you can see there are five factors contributing to this person's pain experience. Neuropathic pain and changes and body information are the most significant contributors. But emotions, memories, and thoughts and beliefs are also contributing.



Each person will have a different pain chart. There is not a scientific way to measure the exact percentage of each factor that contributes to pain. But thinking about the factors contributing to the pain experience and organizing them in a pain chart allows you to better understand and help a person struggling with pain. We will discuss these factors in more detail throughout part 2. We will also use pain charts like this throughout the curriculum.

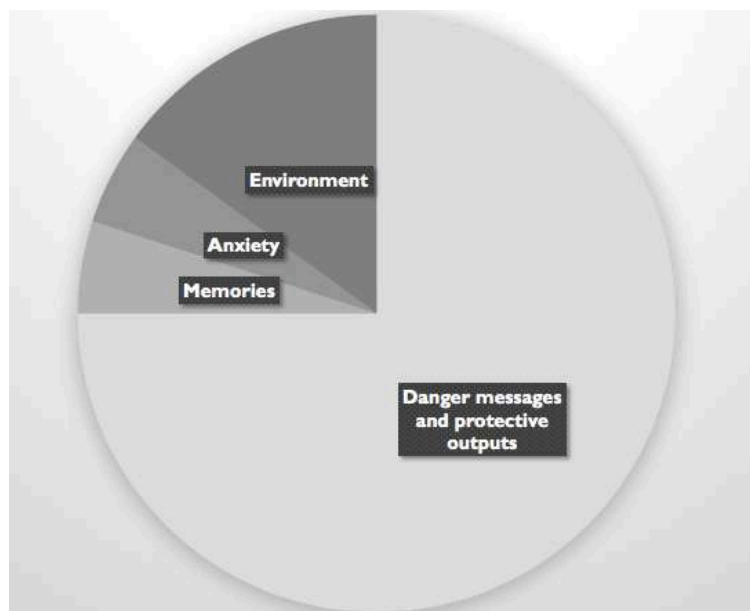
SLIDES 19 & 20

We are now going to use an example to apply the information you just learned about the biological process of experiencing pain.

General Process	The Process When You Step on a Nail
<p>1. The brain receives information from many sources and processes this information in many different areas in the brain.</p>	<p>1. The brain receives the following information:</p> <ul style="list-style-type: none"> -Danger messages from the sensory receptors in the foot -Information about the environment including that there are nails and sharp construction equipment laying on the floor -Memories from when you experienced similar pain from accidentally cutting your finger with a knife. But this is not a conscious memory. -Anxiety that you may have a serious injury
<p>2. Then the brain has to make a decision based on all of the information that it received. The brain has to decide if we are safe or if we are in danger. The brain is making this decision every second of our lives.</p>	<p>2. The brain decides that there are more signs of danger than there are signs of safety.</p>
<p>3. When the brain judges that there are more signs of danger than there are signs of safety, it determines that there is a need to protect.</p>	<p>3. The brain determines that you need to be protected from injury and danger.</p>
<p>4. The brain produces specific outputs when it determines that there is a need to protect. One of those outputs is pain. This is because pain acts as an alarm to let us know that there are signs of danger and that we need to protect ourselves.</p>	<p>4. Your brain sends nerve signals so that you experience pain in the bottom of your foot.</p>
<p>5. The brain also has outputs causing decreased movement and changes in biology.</p>	<p>5. The brain produces other protective outputs including:</p> <ul style="list-style-type: none"> • You stop walking • Muscles in your body become tense • You breathe faster • You lift your foot off of the ground • You become alert to the environment and the things that are going on around you • Your thoughts focus only on the present and what is going on in this moment
<p>6. All of these outputs (pain, decreased movement, and changes in biology) then contribute to signs of danger. In that way, a cycle of danger and pain is formed.</p>	<p>6. The brain continues to collect information. Now there are even more signs of danger than at the time you stepped on the nail. For example, there is pain in the bottom of your foot, your anxiety, the increased speed of your breathing, and the muscle tension in your body.</p> <p>The brain determines that there are more signs of danger than of safety, so the cycle of pain continues. You continue to experience pain in the bottom of your foot.</p>

SLIDE 21

Here is the pain chart for when you step on a nail as described above. You can see that the danger messages and protective outputs are the main factors contributing to pain. This is often the case when someone has an acute injury. But the environment, anxiety, and memories are still contributing to the pain experience as we described above.



Have the participants form groups of 3-5 people. Have each group do the following:

1. Think of a time when you were injured. Select one of the experiences from one of the members of the group to use as an example.
2. For the experience that you selected, write out the six steps that would happen. Use the table above as a guide. For step one, make sure to think about the specific information that the person's brain would have received in the specific example. To do this, look at the list of factors that can contribute to pain on slide 16. For step five, make sure to think about the specific outputs that would have happened in the person's specific situation.
3. Then create a pain chart that represents this pain experience.

Plan on about 15 minutes for the groups to work together. If there is additional time, have groups share their examples.

SLIDE 22

Main point: Pain is always a decision by the brain; Pain is not permanent - Our biology can change

Let's continue to use the nail example to understand how the biology of our bodies and our pain experience changes as tissue injuries heal.

The first few days after stepping on the nail, if you put a lot of weight on your foot, you would experience increased pain. This is your brain's way of protecting your foot so that the injury from the nail can heal. Pain is serving as an alarm to protect you.

After a couple weeks and as you took care of the nail injury, the pain would gradually decrease. This happens because the brain decides that there are more signs of safety than of danger and that the foot no longer needs protecting. You would start to naturally put more weight on your foot, and you wouldn't experience pain when you do that. But you may still experience pain in some situations like if you put hot water on your foot or jumped on your foot. By creating pain, the brain reminds you that you still need to protect that area so that it can heal fully.

But in about 1 to 2 months, the injury from the nail would be healed. You may still have a scar in that area, but a scar doesn't mean that there is an acute injury. A scar doesn't send danger messages to the brain. Your brain would determine that there are more signs of safety than of danger and that the foot no longer needs any protecting. So, you would no longer experience pain. You wouldn't even experience pain when hot water touches your foot or when you jump on your foot.

Option 1: Share a personal example of how pain and movement changes as an injury heals

Option 2: Ask the participants to share an example of how pain and movement changes as an injury heals

SLIDE 23

This is the process that happens when a person experiences a tissue injury. At first the brain produces pain, changes in movement, and changes in biology so that the area of the injury will be protected so that it can heal. As the tissue damage heals, the brain determines that there are more signs of safety than of danger, so the pain stops and the changes in movement and biology return to normal.

SLIDE 24

But sometimes the cycle of pain can continue even after the tissue injury is healed. This is what happens in people with persistent pain. Remember that persistent pain is pain that has been experienced for greater than 6 months.

Research has shown that all tissues and types of tissue injury heal within 6 months. But many people still experience pain years after an initial injury. In this situation, the receptors in the tissue are no longer sending danger messages to the brain because the tissue is healed. But the brain is receiving signs of danger from the other factors, so it continues to determine that the person still needs to be protected. So, the brain continues to produce pain.

We will soon learn the biological changes that happen in the nervous system in this situation. We will also learn how active treatments change the factors so that a person with persistent pain can become free of pain.

Option 1: share a personal example of a patient that you worked with that did not have any signs of tissue injury or damage but was still experiencing pain

Option 2: Ask the participants to share an example of a patient that you worked with that did not have any signs of tissue injury or damage but was still experiencing pain

SLIDE 25

Main point: Pain is always a decision by the brain; Pain is not a reliable way to judge the amount of tissue damage or injury

Now that we have discussed the biological process of experiencing pain, we will describe more details about the pain experience.

Because pain is always a decision by the brain, the following are true:

- It is not possible to have pain and not know about it
- It is possible to have tissue damage or an injury and not have pain
- It is possible to have pain without tissue damage
- Pain is always real and an individual experience

You must understand these statements fully so that you can treat pain by using the neuroplasticity, neurobiology of pain, and biopsychosocial theories. If you don't fully understand and believe in these statements, then your assessment and treatment of pain will not be as effective.

SLIDE 26

It is not possible to have pain and not know about it:

Remember the definition of pain: Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. Because pain is a sensory and emotional experience, it can only be experienced by a conscious and aware human.

Think about this example: When a person is having a surgery, pain is eliminated by making that person unconscious through anesthetic medications. In this situation, information is still being sent to the brain, but pain cannot be experienced because the person is not conscious to experience it. As pain is an output of the brain in a conscious and aware human, it is not possible to have pain and not know about it.

SLIDE 27

It is possible to have tissue damage or an injury and not have pain:

The brain produces pain when it determines that there are more signs of danger than there are signs of safety. Information from the body about tissue damage and injury is one of the factors that the brain uses to make the decision if we are safe or in danger. But remember the brain uses information from many other sources to make this decision like our environment, memories, and emotions. Because it uses a lot of different information, the brain can decide that there are more signs of safety than of danger, even when it has information that there is tissue damage or injury.

Everyone has experienced this. For example, have you ever had a bruise, but you don't feel pain and you don't remember how you got it? The bruise is a sign that there is tissue damage. But your brain took in all of the information and decided that you are safe. So, you never experienced pain.

Or think about a time when you accidentally cut yourself with a knife while preparing a meal. Most likely, you immediately experienced pain. But after perhaps a few hours or a few days, you no longer experienced constant pain. The tissue was still damaged, but the brain no longer determined that you needed protecting so it did not produce pain. But as you wash your hands under hot water, the cut begins to hurt again. At this moment, there were more signs of danger than safety, so your brain produced pain. And this pain helped you remember that you had a cut and to be careful as you wash your hands so that you don't damage the skin that is healing.

Ask the participants to share other examples of when a person can have tissue damage but no pain.

SLIDE 28

It is possible to have pain without tissue damage:

The brain produces pain when it determines that there are more signs of danger than there are signs of safety. Information about tissue damage and injury is one of the sources that the brain uses to make the decision if we are safe or in danger. But remember the brain uses information from many other sources to make this decision like our environment, memories, and emotions. So, the brain can decide that there are more signs of danger than of safety even when there is no tissue damage or injury.

Here is an example - Have you ever brought your hand close to a tea pot that you didn't know was hot? And as you brought it close and even before you touched it, you felt pain in your fingers. In this situation, there was no tissue damage. You did not burn your skin. But your brain used the following information:

- Memory: Memories of touching or being burnt from hot tea pots in the past
- Information from the environment: There is a tea pot sitting on a fire and there is the sound of the water in the tea pot boiling
- Body information: Increased temperature felt in your fingers

Based on this information, your brain decided that there are more signs of danger than of safety, so it produced pain. The brain also produced movement so you would pull your hand away from the hot tea pot. In this way, your brain protected you from injury.

Ask the participants to share other examples of when a person can have pain without tissue damage.

SLIDE 29

Pain is always real and an individual experience:

As we explained, pain is a sensory and emotional experience that only a conscious human can experience. Just like every person's physical body is different based on their experiences and their genetics, every person's brain is different based on their experiences and their genetics. Because pain is an output of the brain and every person has a unique and individual brain, every person's pain experience will be unique and individual. No two people will experience pain in the exact same way even if they have the same injury.

Even if there are no signs of tissue damage or injury, the pain experience is real. We learned that our brains often produce pain even when there is not any tissue damage. The pain will still be experienced. And the pain will often feel the same as the pain that the person experiences when there is tissue damage.

Sometimes when people first start learning these new ideas about the neurobiology of pain, they label some people as having "real pain" and some people as having "not real pain." This is wrong. All pain is real. It is also dangerous to label pain as not real because the patient may think that you don't trust them or that you think that they are exaggerating or that they are crazy. And none of these things are true when a person experiences pain. When a person is experiencing pain with no or a small amount of tissue damage, the person can be trusted. They are not exaggerating or lying, and they are not crazy. Based on the neurobiology of pain, they are experiencing pain because their brain has determined that there are more signs of danger than of safety. And as we will learn, there are changes in the nervous system that are contributing to the pain experience. In this curriculum, you will learn how to identify and describe the types of pain. You will also learn how to describe the factors that are contributing to pain. This will give you the accurate language to describe pain.

Ask the participants to share examples of how no two people will experience pain in the exact same way. This could be from their own personal experience or their family or their patients.

SLIDE 30

You should now understand that because pain is always a decision by the brain, the following are true:

- It is not possible to have pain and not know about it
- It is possible to have tissue damage or an injury and not have pain
- It is possible to have pain without tissue damage
- Pain is always real and an individual experience

From this, it can be concluded that pain cannot be trusted. Pain is not a reliable way to judge the amount of tissue damage or injury. The level of pain does not always indicate the level of tissue damage. For example, you can have mild pain and have severe tissue damage, or you can have severe pain and have mild tissue damage. Pain and tissue damage are not directly related because the neurobiology of pain is more complex than that.

As healthcare professionals that are treating pain, we must understand this and apply it to our work. If we cannot use the level of pain to determine the level of tissue damage, then we need other methods to understand the patient's condition. In this curriculum, you will learn these other methods. You will learn how to apply this when assessing and treating pain.

Do the following activity. This is a TNE that is designed to help patients learn that pain is not a reliable way to judge the amount of tissue damage.

On a flipchart, write down two columns across from each other. One column is the level of pain and one column is the level of tissue damage. Like this:

Severe Pain	Severe Tissue Damage
Medium Pain	Medium Tissue Damage
A Little Pain	A little Tissue Damage
No pain	No Tissue Damage

Encourage the group to discuss examples of painful experiences. For each example, they should select the level of pain and the level of tissue damage. Then for each example draw a line connecting the level of pain to the level of tissue damage. If the group needs help with examples, here are some you can use:

- Someone involved in a car crash that walks for miles with a broken leg to get help
- Soldiers in the battlefield
- Headache
- Phantom limb pain
- Cramp in toes or legs
- Paper cut or torn nail
- Toothache
- Burn
- Injured athletes that continue to play
- Ache in the buttocks from sitting on a hard chair
- Hit toe on a rock while walking
- Leg pain and numbness when sitting on the floor for a long time

When there have been enough lines creating a crisscross pattern, facilitate a discussion:

- ◆ What conclusions can we make based on what we see on this chart?
- ◆ How reliable is pain at telling us what is going on in the tissues?
- ◆ Does severe pain always mean that there is a severe injury?
- ◆ If you have pain, does that mean that you have a permanent and severe injury to your body and that you will always have pain?

During the discussion, highlight the key points that pain and tissue damage are not directly related and that pain is not a reliable way to judge the amount of tissue damage or injury.

SLIDE 31

Main point: Pain is always a decision by the brain; Biological, social, and psychological factors contribute to how and when a person experiences pain

The next step in understanding the neurobiology of pain is understanding how information from the body is sent to the brain and how the brain decides to produce pain.

Throughout the peripheral nervous system, there are many different types of sensors. Each type of sensor is sensitive to a different type of stimulus. There are sensors that are sensitive to chemicals. There are sensors that are sensitive to temperature. And there are sensors that are sensitive to mechanical pressure. There are also special neurons called nociceptors that are sensitive to signals from damaged tissue or the threat of damage. Nociceptors respond to mechanical, temperature, or chemical stimuli. Nociceptors are the sensors that are responsible for sending danger messages to the brain. Nociceptors are located throughout the body including in the skin, joints, and organs. Nociception is the word used to describe when nociceptors send danger messages to the brain.

There are no pain sensors. There are only danger sensors called nociceptors. The nociceptors send danger messages to the brain and then the brain determines if it will produce pain. As we described before, a person doesn't always experience pain even when danger messages are being sent from nociceptors to the brain.

To check their understanding, write the following statements on the flipchart. Then ask the participants to raise their hand if they think they are true. Have one of the participants explain why the statements are true. They can also share an example that demonstrates how each statement is true. Make sure participants understand this point clearly.

- You can have pain without nociception (true)
- You can have nociception without pain (true)

SLIDE 32

We will now describe the steps of how nociceptors send danger messages to the brain.

When neurons are at rest, they always have some electrical activity. This is called the resting level of excitement.

1. When a danger sensor (or any other sensor but we are focusing on danger sensors) is stimulated, it opens and lets positively charged particles into the neuron.
2. As more and more particles come into a neuron, a critical level of particles can be reached.
3. Once that critical level is reached, an electrical current travels up the neuron. This is called the action potential. One action potential carries one danger message.
4. After the action potential is released, the neuron returns back to its resting level of excitement.
5. This danger message, through the action potential, travels to the axon terminals.
6. It causes chemicals to be released in the synapse, or the gap between the two neurons. In this way, the danger message is sent from one neuron to the next.

SLIDE 33

Danger messages will be sent in this way through neurons from the initial sensor, to the spinal cord, and then to the brain. The brain then determines if there are more signs of danger or more signs of safety from all of the sources of information, including this danger message. If the brain decides that there are more signs of danger than of safety, the brain will create protective outputs including pain, changes in movement, and changes in biology. These outputs, including the changes in biology, become an input to the pain cycle.

SLIDE 34

We can combine what we just discussed about nociception with the process of experiencing pain that we described before. See the steps here. You should understand these steps well and be able to explain it in a clear and simple way.

1. When a danger sensor is stimulated, it opens and lets positively charged particles into the neuron.
2. As more and more particles come into a neuron, a critical level of particles can be reached.
3. Once that critical level is reached, an electrical current travels up the neuron. This is called the action potential. One action potential carries one danger message.
4. After the action potential is released, the neuron returns back to its resting level of excitement.
5. This danger message, through the action potential, travels to the axon terminals.
6. It causes chemicals to be released in the synapse, or the gap between the two neurons. In this way, the danger message is sent from one neuron to the next.
7. The brain receives this danger message and information from many other sources and processes this information in many different areas in the brain.
8. Then the brain has to make a decision based on all of the information that it received. The brain has to decide if we are safe or if we are in danger. The brain is making this decision every second of our lives.
9. When the brain judges that there are more signs of danger than there are signs of safety, it determines that there is a need to protect.
10. The brain produces specific outputs when it determines that there is a need to protect. One of those outputs is pain. This is because pain acts as an alarm to let us know that there are signs of danger and that we need to protect ourselves.
11. The brain also has other outputs causing decreased movement and changes in biology.
12. All of these outputs (pain, decreased movement, and changes in biology) then contribute to signs of danger. In that way, a cycle of danger and pain is formed.

Have the participants explain to the person sitting next to them the steps of how danger messages are sent from the body to the brain and how the brain can decide to produce pain. Then have a participant explain it to the group. Use this as an opportunity to check the group's understanding of this process.

SLIDE 35

As we said, the brain produces other protective outputs in addition to pain. These protective outputs can include biological changes that increase the sensitivity of the nervous system to danger messages.

When there are more signs of danger than there are of safety, the brain wants more information so that it can protect you. The brain will produce changes in the structure and function of the nervous system so that the brain will receive more information. In other words, the brain causes changes in biology to make the nervous system more sensitive to danger messages so that it can protect you from further damage or injury.

These changes are very helpful when you have tissue damage. For example, if you sprain your ankle, it is helpful for your brain to get more messages about the health of your ankle tissues. If the swelling increases in your ankle, your brain will receive more danger messages and will decide to produce pain. Pain will act as an alarm to alert you to danger. You will feel an increase in pain and then you can react by elevating and icing your ankle. By making the nervous system more sensitive, the brain is creating a situation where your ankle can heal.

The brain causes biological changes which makes the nervous system more sensitive to danger messages so that it will receive more danger messages which it can use to protect the tissue as it heals.

SLIDE 36

You can use this analogy to understand the purpose of biological changes - There is an owner of a big company. He found that one department of the company is not bringing in enough profit and this puts the entire company in danger of going out of business. In this situation, do you think the owner would want more information about this department? Yes! The owner would want to monitor this department very closely until the owner sees that it is consistently making profit. The owner would want to observe this department closely until it sees that it is no longer a threat to the company. To do this, the owner makes some changes. For example, he makes the workers in that department send daily reports about their work and their profits rather than the normal monthly reports.

The brain is just like the owner of this company. If the brain perceives that there is a danger, it will ask the body to send more reports, more messages, so that it can monitor the situation. Just like the owner will maintain these changes until the threat is no longer there, the brain will keep these changes until it determines that there is no longer a danger. Then the brain will return these changes back to normal just like the owner would go back to the normal monthly reporting system after the threat is resolved.

Explain that this is a TNE that can be used to explain to patients about how changes occur in the nervous system and how they can contribute to pain.

SLIDE 37

Similar to the owner of the company making changes to have more reports, the brain can cause biological changes so that it receives more danger messages. The brain will choose to cause these biological changes when it determines that there is a need to protect. Some of the biological changes that increase the sensitivity of the nervous system are nociceptive changes, neuropathic changes, and nociplastic changes. These are connected to the three types of pain that exist: Nociceptive, Neuropathic, and Nociplastic. Each type of pain has specific biological changes that occur in the nervous system. The steps for producing pain that we described above occur for all three types of pain. A person may have more than one type of pain at a time.

Nociceptive Pain: Pain associated with damage to the tissues. Sometimes this is also called acute pain. With nociceptive pain there are specific changes in the nervous system called nociceptive changes.

Neuropathic Pain: Pain associated with damage or disease to the central or peripheral nervous system. With neuropathic pain there are specific changes in the nervous system called neuropathic changes.

Nociplastic Pain: Pain that is associated with changes in the neurobiology of nociception and with no evidence of damage of the tissues or nervous system. With nociplastic pain there are specific changes in the nervous system called nociplastic changes.

Sometimes people use the term chronic pain or persistent pain. This refers to pain that has lasted longer than 6 months. We will use the term persistent pain in this curriculum as this is the new term that is preferred. Persistent pain could be one or all three types of pain. So persistent pain is not a diagnosis of the type of pain or changes in the nervous system but rather just explains the amount of time a person has had pain.

You will learn how to assess a patient and decide which type of pain and change they have, as well as the other factors that are contributing to the pain experience. Some of the treatments that you do will be different based on the type of pain and change and the other factors that are contributing to the pain.

SLIDE 38

We will now describe the biological changes that occur with nociceptive pain. These changes are called nociceptive changes. They increase the sensitivity of the nervous system.

Nociceptive changes - The brain makes the central and peripheral nervous system more sensitive through the following changes:

- Increasing the neurons' resting level of excitement
- Making the sensor stay open longer
- Increasing the rate of sensor production
- Increasing the effectiveness of danger neural pathways

The brain can make these changes in the body wherever it thinks will be helpful. For example, if you sprain your ankle, the brain will produce changes around your ankle but also probably in your foot and lower leg. This will allow the brain to monitor the area for any signs of danger.

We will discuss each of these nociceptive changes in detail. It is not realistic to describe the research that demonstrates these changes. We will just describe each change in brief detail so that you have enough information to use it in the assessment and treatment of patients.

SLIDE 39

The sensitivity of the nervous system is increased by increasing the rate of sensor production:

Remember that there are nociceptors (danger sensors) located throughout the body. Sensors are always dying and being replaced. This is normal. Nociceptive changes occur when the brain increases the speed at which the new nociceptor sensors are produced. This causes there to be more nociceptors. If there are more nociceptors, then more danger messages are sent to the brain.

SLIDE 40

The sensitivity of the nervous system is increased by making the sensors stay open longer:

Remember that when a nociceptor is stimulated, the sensor opens to allow positively charged particles to enter the neuron. If the sensor stays open for a longer period of time, more particles are allowed to enter the neuron. This causes more action potentials to travel up the neuron and bring the danger messages to the brain. By making this biological change, the brain receives more danger messages.

SLIDE 41

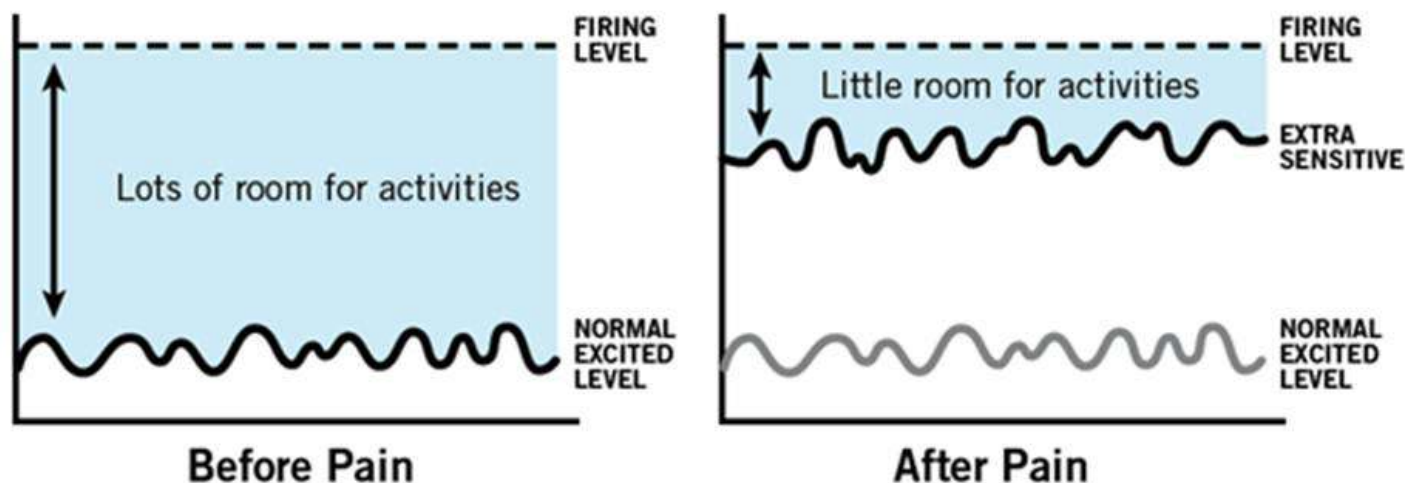
The sensitivity of the nervous system is increased by increasing the resting level of excitement of neurons:

To understand this biological change, we must remember that all neurons have a resting level of excitement. When a sensor opens it lets positively charged particles into the neuron. An action potential which carries the danger message is released once the critical level of positively charged particles is reached.

By increasing the resting level of excitement, a lesser amount of positively charged particles are needed to reach the critical level that sends the danger message. Therefore, it is easier to send a danger message, so danger messages are sent more frequently to the brain.

Remind them of the analogy about the owner of the company. By increasing the resting level of excitement, the brain gets more messages just like the owner of company got daily reports rather than the normal monthly reports.

SLIDE 42



Why Do I Hurt?; Louw 2013 OPTP

This diagram demonstrates how increasing the level of excitement increases the danger messages. The picture on the left represents the biology before pain and in a healthy nervous system. In this situation, the resting level of excitement in the neuron is normal. It takes a significant amount of stimulus for the critical level (firing level) to be reached which results in the danger message being sent. So, a person can participate in a lot of activities like movement and physical activities before that level is ever reached, causing a danger message to be sent to the brain.

The picture on the right is the nervous system after there have been biological change that increase the sensitivity of the nervous system. You can see that the resting level of excitement has increased from the normal level to an extra sensitive level. Now, it takes a small stimulus for the critical level (firing level) to be reached. In this situation, the messages to the brain are sent very easily and with a small amount of movement and physical activity.

For example, if you recently sprained your ankle, the brain would have produced nociceptive changes including increasing the resting level of excitement. When you move your ankle a small amount you provide a small stimulus to the nociceptors. Due to the nociceptive changes, only a small stimulus is now required to reach the critical level, a danger message is sent to the brain and it would produce pain. You would feel pain with a small amount of movement because of this change in nervous system.

SLIDE 43

Increasing the effectiveness of neural pathways that are responsible for protection also increases the sensitivity of the nervous system:

Remember that neural pathways are the tracks that connect one part of the nervous system with another part of the nervous system. Neural pathways each have their own responsibility and there are some that are designed for protection. Neural pathways that are responsible for protection will look at the information from the many sources and will determine if pain should be produced.

In response to the input of nociceptive pain, the brain can increase the effectiveness of these danger neural pathways. Remember that the reason the brain makes these changes is because it judges that there is a danger or a threat. Therefore, it is logical that the brain would increase the effectiveness of danger neural pathways so that it can protect you.

Before describing the content of this slide, ask a participant to summarize what they learned about neural pathways in part 1.

SLIDE 44

We have discussed the changes that occur in response to nociceptive pain. If a person has nociceptive pain, then nociceptive changes have occurred which increases the sensitivity of the nervous system to danger messages. Nociceptive pain and nociceptive changes are one of the factors that can contribute to the pain experience.

These changes happen with every acute injury from a small cut to a broken bone. They happen within minutes of an injury occurring. The brain produces these changes so that you can be protected. Specifically, it produces these changes in the area of the injury so that that area can be protected until it heals.

These changes help the injury be able to heal. As the injury heals, these changes gradually go back to their normal state. With time, simple activities like moving the finger, will not result in pain because the brain will have determined that there are more signs of safety than signs of danger. Pain is no longer needed to serve as an alarm because that part of the body no longer needs protection.

For example, if you get a small cut on your finger, the brain will perceive a danger. In response, the brain will want to protect you. The brain will increase the sensitivity of the nervous system by: 1. Increasing the number of nociceptive sensors in the finger, 2. Making the nociceptive sensors in the finger stay open longer, 3. Increasing the resting level of excitement of neurons in the finger, and 4. Increasing the effectiveness of neural pathways responsible for protective neural pathways associated with the finger. All of these changes increase the number of danger messages sent to the brain. So the brain will be more likely to determine that there are more signs of danger than there are signs of safety. This results in the person experiencing pain more often and with simple activities like movement of the finger.

With time the injury in the finger will heal. The brain will determine that the signs of safety are increasing, and the signs of danger are decreasing so you will feel pain less and less. And gradually the brain will reverse the nociceptive changes that increased the sensitivity of the nervous system. The nervous system will go back to its normal state. The brain will then receive less danger messages so it will be less likely to produce pain even with movement and use of the finger.

SLIDE 45

We have discussed the nociceptive changes that contribute to the pain experience. Now we will describe the nociplastic changes that can contribute to the pain experience. Nociplastic changes occur with nociplastic pain. Remember that nociplastic pain is pain that is associated with changes in the neurobiology of nociception and with no evidence of damage of the tissues or nervous system. Central sensitization is another term used to describe when the nervous system has increased sensitivity to danger message due to nociplastic changes.

The nociplastic changes that occur in response to nociplastic pain are the same as the nociceptive changes:

- Increasing the neurons' resting level of excitement
- Making the sensor stay open longer
- Increasing the rate of sensor production
- Increasing the effectiveness of danger neural pathways

SLIDE 46

The key difference between nociceptive changes and nociplastic changes is: Nociceptive changes occur when there is tissue damage that requires protection and nociplastic changes occur when there is no tissue damage or injury that requires protection.

Often nociplastic changes develop in the following way. A person has an acute injury with nociceptive pain and nociceptive changes. But rather than the nociceptive changes gradually reducing and going back to the normal state, the changes stay and even continue to become stronger. In this situation, the tissue injury is healed, but the changes in biology that increase the sensitivity of the nervous system remain. If the biological changes remain after the tissue is healed, they are then called nociplastic changes.

Just as with nociceptive changes, these nociplastic changes increase the danger messages sent to the brain. There will be danger messages coming from the nociplastic changes and from the other factors like emotions, memories, and body information. So in this situation, the brain is more likely to decide that there are more signs of danger than of safety and it will produce pain, even though there is not tissue damage.

When a person has persistent pain that has lasted over 6 months and there are no signs of nociceptive pain or neuropathic pain, it is likely that nociplastic changes are contributing to the pain experience. Nociplastic pain and changes does not mean an injury has not healed properly. Nociplastic pain means that nociplastic changes have occurred in the nervous system to make it more sensitive to danger messages.

Have the participants talk with the person next to them and explain the nociceptive and nociplastic changes that increase the sensitivity of the nervous system. Have a few participants share to check their understanding.

SLIDE 47

Nociplastic changes cannot be measured by a test like one can measure blood pressure. But there are signs and symptoms that can be assessed for. If these signs and symptoms are present, then you know that nociplastic pain and changes are contributing to the pain experience. We will now define these two signs and symptoms of nociplastic changes. Later in this curriculum, we will describe how to assess these so that you can assess and treat nociplastic changes.

Signs and symptoms of nociplastic pain and changes:

Allodynia: A person experiences pain with things that are normally not painful. For example, a person may experience pain with light touch of the skin, cold temperatures, or when their clothes touch their body. These are all things that would not cause pain normally. But a person with allodynia may experience pain with these things because the nociplastic changes have increased the sensitivity of the nervous system so much that even these inputs are determined by the brain to be a sign of danger.

Hyperalgesia: A person experiences more pain than expected from a thing that is usually painful. For example, if a person bumps their leg on the corner of a table, this would usually cause some pain. But someone with hyperalgesia will experience severe pain in this situation because the nervous system has increased sensitivity due to nociplastic changes. Another example is doing a stretch of the hamstring muscle. For most people this causes some discomfort and mild pain. But for someone with hyperalgesia, they will experience severe pain and the pain will last a long time due to the effect of the nociplastic changes. The nociplastic changes have increased the sensitivity of the nervous system so much that any mildly painful input is determined by the brain to be a significant sign of danger that requires a strong alarm in the form of a strong pain experience.

Ask the participants to share examples of allodynia and hyperalgesia. Make sure that you label each example correctly.

SLIDE 48

We will now describe the neuropathic changes that occur in response to neuropathic pain. Remember that neuropathic pain is pain associated with damage or disease to the central or peripheral nervous system. Neuropathic pain can be caused from conditions like diabetic peripheral neuropathy or a cut in a peripheral nerve from a traumatic injury.

The following are neuropathic changes that increase the sensitivity of the nervous system and can contribute to pain:

- Activation of action potentials with little or no stimulus
- Abnormal activity in axons that are not directly involved in the nervous system damage or disease
- Activation of immune cells in the area around the damage
- Increased effectiveness of danger neural pathways

We will describe each of these neuropathic changes in more detail now.

SLIDE 49

Activation of action potentials with little or no stimulus:

With this neuropathic change, many complex physiological changes happen that causes action potentials to be activated with little or no input. This can happen in many of the different types of sensors including nociceptors. Remember that a single action potential sends a single message. If action potentials are easily sent from nociceptors, without even any input, then the brain will receive many danger messages. This can contribute to the brain deciding that there are more signs of danger than there are signs of safety. In this way, a person can experience neuropathic pain even when not moving the affected body part.

SLIDE 50

Abnormal activity in axons that are not directly damaged by the nervous system damage or disease:

Axons in neurons that are near to the damaged part of the nervous system can develop abnormal activity. This abnormal activity can increase the sensitivity of the nervous system. In this way, a person may develop symptoms like pain and tingling in an area of the body that is near but not part of the damaged nervous system.

For example, if the L5 nerve is damaged, this can result in neuropathic pain and neuropathic changes. The person will feel pain and tingling along the part of the body that the L5 nerve is responsible for. But because of the abnormal activity in the axons, they may also feel pain outside of that specific area. They may feel it in an area that is larger than L5 area.

SLIDE 51

Activation of immune cells in the area around the damage:

Injuries in the peripheral nerves are associated with increased activity of immune cells in that area. This activity causes the nervous system to be more sensitive to nociception. In this way, nociceptors send more danger messages to the brain which increases the likelihood that the brain will produce pain.

SLIDE 52

Increased effectiveness of danger neural pathways:

Increasing the effectiveness of neural pathways that are responsible for protection also increases the sensitivity of the nervous system. Remember that neural pathways are the tracks that connect one part of the nervous system with another part of the nervous system. Neural pathways each have their own responsibility and there are some that are designed for protection. Neural pathways that are responsible for protection will look at the information from the many sources and will determine if pain should be produced.

In response to the input of neuropathic pain, the brain increases the effectiveness of these danger neural pathways. This involves changes in the peripheral nerves and also in the areas of the brain that are responsible for protection and for receiving messages from the damaged part of the peripheral nervous system.

Break up the participants into three groups. One group is assigned nociceptive pain changes. One group is assigned nociplastic pain and changes. One group is assigned neuropathic pain and changes. Each group should prepare a 3-minute presentation that explains the changes that increases the sensitivity of the nervous system specific to what they were assigned. Emphasize that each presentation should only be 3-minute because they are practicing how to explain the neurobiology of pain in clear and simple way for their patients. Provide the groups with 10 minutes to prepare the presentation. They can use a flip chart or other visual aide.

SLIDE 53

Main point: Pain is always a decision by the brain; Biological, social, and psychological factors contribute to how and when a person experiences pain

As we said, each person's pain experience is an individual experience. Biological, psychological, and social factors contribute to pain. We have described nociceptive pain and changes, neuropathic pain and changes, nociplastic pain and changes. We will now look in detail at the rest of the factors. This information will prepare you to be able to assess and treat all of the factors listed below.

- Nociceptive pain and changes
- Neuropathic pain and changes
- Nociplastic pain and changes
- Body information
- Thoughts and beliefs
- Emotions
- Memories
- Environment
- Social and cultural context
- Behavior

SLIDE 54

We will now describe how body information can contribute to the pain experience. We use the term body information to describe any information from the peripheral body that is sent to the brain except for nociception. Nociception, or danger messages, are considered with the nociceptive, nociplastic, and neuropathic changes.

Body information can be from the skin, joints, muscles, ligaments, or organs. When body information is sent to the brain, it is not sent as nociception or danger messages. Rather, for all of us, body information is always being sent to the brain from many different sensors and neural pathways and the brain then determines if it is a sign of danger or a sign of safety. The brain uses all the information that it has to make this decision. In this way, information from the body can contribute to the pain experience if the brain decides that it is a sign of danger.

SLIDE 55

Here is the body information that the brain is more likely to determine as a sign of danger. But a person often has many of these situations without experiencing any pain. If a person doesn't experience pain, then the brain decided that there are more signs of safety than there are signs of danger.

- Muscle spasm
- Muscle tightness / decreased muscle length
- Joint stiffness
- Decreased ROM
- Muscle weakness
- Poor muscular endurance
- Poor cardiovascular endurance
- Difficulty breathing
- Chest heaviness or tightness
- Dizziness
- Fatigue
- Restlessness
- Warm feeling
- Cold feeling
- Numbness
- Posture abnormalities
- Gait abnormalities
- Joint deformities
- Poor Sleep
- General deconditioning
- Problems with regulating arousal level
- Protective outputs

You probably already have the skills to assess many of the body information that is listed here. You will learn how to assess some of the unique ones in this curriculum. By treating the body information, it may decrease pain. If we were working in a biomedical theory, we would only look to treat the body information. But we know from the biopsychosocial theory and the neurobiology of pain theory that treating only body information is not enough to treat pain. You have to treat all of the factors that are contributing to a person's pain.

SLIDE 56

We will now describe how emotions can contribute to the pain experience. We all experience a wide range of emotions from joy, relaxation, excitement, anxiety, sadness, and fear.

Research has shown that emotions of fear, anxiety, and sadness share neural pathways with pain. In other words, part of the neural pathway that is responsible for pain is also responsible for producing these emotions. So, in this way, if a person has anxiety, sadness, or fear, they are more likely to experience pain. The brain determines that these emotions are signs of danger and therefore they contribute to the production of pain.

These are emotions that the brain is more likely to decide to be a sign of danger and can commonly contribute to the pain experience:

- Depression
- Anxiety
- General fear
- Fear of pain
- Nervousness
- Worrying
- Restlessness
- Stress
- Loneliness
- Social isolation

SLIDE 57

We can all experience negative emotions without having a significant emotional disorder or mental health problem. For example, it is normal for all of us to occasionally feel sadness, worry, stress or fear. But people can also develop mental health diagnoses like major depression, persistent anxiety, and post-traumatic stress disorder. These emotional disorders are complex and must be diagnosed by a trained physician. These emotional disorders prevent a person from functioning normally.

When people have mental health diagnoses like major depression, persistent anxiety, or post-traumatic stress disorder it is very common for them to also have persistent pain. For example, research has shown that up to 50% of people with persistent pain also have major depressive disorder. That means that if you see 10 patients that have pain for greater than 6 months, 5 of them likely have major depressive disorder.

As a healthcare professional, you can develop the skills to help people that are struggling with emotions that may be contributing to the pain experience. Also, as a healthcare professional, you may want to refer to a specialist to help a person with a mental health diagnosis. Later you will learn how to assess emotions that are contributing to the pain experience, when to refer to a specialist, and when and how to treat emotions contributing to the pain experience.

SLIDE 58

We will now describe how memories can contribute to the pain experience. Memories are stored in our brain within neurons and neural pathways. Our brain can use memories without us consciously thinking about them or even without us having the ability to recall them. Memories that increase the signs of danger can contribute to the pain experience. When you have tissue damage, these protective memories can be helpful as they cause pain and changes in movement and behavior which can protect the damaged area so that it can heal. But if there is no tissue damage that requires protection, protective memories can contribute to persistent pain.

Let's first look at an example where memories are decreasing the pain experience. There is a man that has worked in a tea shop for many years. He has handled many hot tea pots and tea cups. As he brings his hand close to a tea pot, he would not feel pain. He could even hold a hot tea pot without experiencing pain. For the man with the tea shop, the brain has decided that there are more signs of safety than of danger. His brain used the following information from his memories of touching hot tea pots and not being burned and memories of how long he can touch hot tea pots without getting injury. Because of his experience, his body is more accurate in knowing what he can do without getting an injury. So because of this experience and the memories of it, when he touches a hot tea pot, his brain determines that there are more signs of safety than of danger and he does not experience pain. But someone that has not had the experiencing of handling many hot tea pots and does not have these memories stored in his brain, would experience pain immediately upon touching the hot tea pot or even before touching it.

SLIDE 59

Memories about the following can commonly contribute to the pain experience:

- Experiencing pain
- Experiencing fear
- Traumatic experiences – an event that was unexpected and that caused the person to feel overwhelmed and in danger

For example, at a young age we all learned that tea pots on a fire or stove are hot and can burn us. We may have learned that by touching the pot and being burned or by our mother yelling at us to not touch the pot. This memory is stored in our brain. It may not be a conscious memory that you remember in detail. But your brain can still use this memory. Now, when you reach for a tea pot on the fire, this memory will be activated and used by the brain. The brain will use this memory and it determine that there is a sign of danger. Your brain's use of the memory is why you can feel pain when reaching for a tea pot but before you even touch the tea pot. In this example, your brain produced pain based on the protective memory so that the pain would warn you to not to touch the hot tea pot.

Here is another example of how memories contribute to the pain experience. You recently sprained your ankle. Now you put a lot of weight on that foot and you immediately experienced pain. This experience is now stored in your brain as a memory. So now your brain uses this memory. So, if you put a small amount of weight on your foot again, your brain may produce pain. In this situation, your brain is using the protective memory and it is contributing to the production of pain. The pain acts as an alarm to remind you to not put too much weight on your foot so that the ankle can heal. Also, remember that one of the outputs that the brain creates to protect the damaged tissue is changes in movement. In this example, the protective memory would also cause your brain to produce changes in movement. With an ankle sprain, you would naturally start limping to put less weight on your foot. This is not a fully conscious decision but rather your brain has produced changes in your movement so that the area that is damaged can be protected.

Ask the participants to share examples of how memories can contribute to the pain experience.

SLIDE 60

Memories of traumatic experiences can be very strong and can cause the brain to frequently judge memories to be signs of danger. It is also very common for a person to have had experienced pain during a traumatic experience and this makes it more likely that the traumatic memory will contribute to the pain experience.

For example, traumatic experiences can include a car accident, torture, fleeing as a refugee, walking long distances when forced to leave home due to violence, physical abuse, and sexual abuse. Neural pathways of the memories of traumatic experiences can often be very strong and effective and in this way, they can be strong contributors to the pain experience. We will discuss this in more detail later when we describe the unique considerations for treating pain in survivors of psychological trauma.

SLIDE 61

We will now describe how thoughts and beliefs can contribute to the pain experience. Throughout a person's life, they develop thoughts and beliefs about pain. This can develop through their culture, the things they read, what they see on television, their own personal experiences, learning about the experiences of others, and information that people they trust tell them. Healthcare professionals, like physicians, nurses, and physiotherapists, often contribute to the thoughts and beliefs a person has about pain.

Thoughts and beliefs about pain can be determined by the brain to be signs of danger or signs of safety. If they are determined to be signs of danger, then they contribute to the pain experience. We will call these unhelpful thoughts and beliefs. Unhelpful thoughts and beliefs contribute to the pain experience because the brain determines that they are signs of danger. Unhelpful thoughts contribute to pain by causing a fear of pain and movement, a desire to avoid pain and movement, and a hopelessness about pain.

SLIDE 62

Thoughts and beliefs that the brain often decides to be a sign of danger includes the following:

- My pain is a sign that something is seriously wrong
- My pain is permanent, and it will not get better
- There is nothing that I can do to decrease my pain
- I should avoid pain
- Movement and physical activity will make my pain worse
- Movement and physical activity will cause damage to my body
- Only surgery can fix this
- Medications are the only thing that will decrease the pain
- The crunching sound in my joints is not normal
- I have changes in my joints and my body that are not normal and that will always cause pain

SLIDE 63

Often, healthcare professionals, like physicians and physiotherapists, can contribute to unhelpful thoughts and beliefs. For example, the patient may say things like: "The doctor said I have the bones of an 80-year-old," or "The MRI showed that my knees are bone on bone," or "The physiotherapist said that if I am not careful about how I move my back, I could cause my back to go out of place and my disc to bulge out." These are examples of how healthcare professionals have created unhelpful and inaccurate thoughts and beliefs about a person's pain and health.

Later you will learn how to assess and treat unhelpful thoughts and beliefs that are contributing to the pain experience. As healthcare professionals, we can change a person's thoughts and beliefs about pain from signs of danger to signs of safety. In this way we can help people that are struggling with pain.

Have participants share unhelpful thoughts and beliefs that they commonly hear their patients share. If time allows, also have the participants share helpful thoughts and beliefs that would contribute to decreased pain.

SLIDE 64

Now we will describe how the environment contributes to the pain experience. The environment can be determined by the brain to be a sign of danger or a sign of safety.

Environmental factors that the brain will often decide are signs of danger include the following:

- Social isolation
- Poor support by family and friends
- Difficulty accessing medical treatment
- Stress
- Lack of economic security
- Lack of physical safety
- Difficulty doing things to care for their health and wellbeing

SLIDE 65

Research has shown that people that live in situations of ongoing stress and insecurity have high rates of persistent pain. For example, refugees are often living in a situation where they do not know their future, they have little freedoms, they have difficulty accessing treatment, and they may not be safe. Refugees in these situations have high rates of persistent pain. This makes sense when you understand the neurobiology of pain. The brain determines that the information from the environment has many signs of danger and that the person needs protecting. Therefore, the brain produces pain to alert the person to the danger in their environment, even if there is not any significant tissue damage.

Have participants share environmental factors that are common when working with their patients and that contribute to the pain experience.

SLIDE 66

We will now describe how the social and cultural context can contribute to the pain experience. Information about the culture and context is continuously sent to the brain and is also stored in the brain. The brain can determine if the culture and context are signs of danger or signs of safety. If the culture and context are determined to be signs of danger, then they contribute to the pain experience.

The social and cultural context is unique to each person and includes the following:

- Their cultural beliefs and practices
- The roles and responsibilities they have in the family, workplace, and community
- The people they spend time with and the thoughts, beliefs and behaviors of these people

SLIDE 67

Let's look at examples to demonstrate how the culture and context can contribute to the pain experience.

Have you ever noticed that when a very young child falls down, they will look to their mother or father for how they react, before reacting themselves? If their mother responds by running over, picking up the child, and asking in a nervous voice, "Are you ok? Does anything hurt?" The child will usually react by crying. But if the mother smiles at her child and encourages the child to get back up and continue to play, the child will not cry. In this example, the child has the same amount of mild tissue damage from the fall, but the child experiences different amounts of pain. It is not just that the child's behavior is different, but the child actually experiences different amounts of pain. In the first situation where the mother is upset, the mother's reaction tells the child's brain that there is danger, and this contributes to the pain experience. In the second situation, where the mother is calm and encouraging, the mother's reaction tells the child's brain that there is no danger so there is no need to produce pain. This is an example of how the people around you and their culture, thoughts, beliefs, and behaviors can contribute to your pain experience.

SLIDE 68

Here is the next example that shows how the roles and responsibilities that a person has in their family, workplace, and community can contribute to their pain experience. In this example, there is a 40-year-old man. He works as a surgeon. He is the only one that provides the money for his family which includes his wife, children, parents, and his wife's parents. Next week, he is scheduled to do a surgery for a very important person. If the surgery goes well, he will probably be promoted which will earn him more money and respect.

While working on his car at home, the surgeon injures his right thumb. At this time, the brain will take in information from all sources including his specific social and cultural context. In this situation, an injury to his thumb could make it difficult for him to earn money for his family. It could also make it difficult to perform the surgery well next week which could lead to him not getting the promotion. He also has a high status in his community because of his work as a surgeon which could be threatened by a serious injury to his thumb. His brain has all of this information about his specific context and will determine that there are signs of danger. The amount of damage to the thumb may be mild but he will experience significant pain. Also, he will experience more pain than if the same amount of damage happened in a different part of his body that would not affect his performance as a surgeon.

With the surgeon, his cultural context may also contribute to signs of danger. For example, perhaps in his culture it is the man's responsibility to provide money for the family and this contributes to the respect that he gets from others in his community. Or his culture may have beliefs about how if a person takes a day off work due to pain or injury, it is a sign of weakness and he wouldn't deserve to be promoted. These cultural beliefs are specific to his situation and could contribute to his pain experience.

Let's compare the surgeon's situation to a man that is 70 years old. This man is retired and lives with his son's family. He does not have significant responsibilities in his family. If he has the same injury to his right thumb as the surgeon, he would experience less pain than the surgeon because the brain has different information about the social and cultural context. The older man's context is that the injury would not cause him to be unable to take care of his family or to fulfill the responsibilities and roles that his family and community expect of him. So, the information about his culture and context are signs of safety and not signs of danger.

To be clear, the surgeon is not exaggerating the pain. His brain makes him feel more pain because in his social and cultural context, there are more signs of danger than in the situation of the older man. The surgeon's brain decides that he needs to be protected because there is a lot of threat in his social and cultural context. But the older man's brain decides that he is safe in regard to his social and cultural context, so he experiences less pain.

Have participants share examples of how the culture and context can contribute to the pain experience. Consider discussing an example of how a person's pain experience can be effected by having a relative that is disabled from pain.

Have the participants share the common cultural beliefs and practices about pain? Examples may include the use of medication to treat pain or the use of traditional healers.

SLIDE 69

Main point: Pain is not permanent - Our biology can change

We will now discuss how behavior can contribute to the pain experience. In addition to producing pain, the brain also produces changes in movement and behavior when it decides that we need protecting. These outputs then become inputs into the pain cycle. The most common behavior that contributes to pain is the avoidance of pain and the avoidance of movement that a person's brain thinks may cause pain.

When you injure an area of the body, it may be helpful to change how you do certain things that can increase pain, like how you move that part of your body. Your brain is producing pain so that you will avoid things that may cause further damage to the area. But gradually, as the tissue heals, you should move that part of the body more and more. This is an important part of healing. As you move and use that part of the body that had tissue damage, your brain receives information that the body part is healing. In this way, the brain starts to see that there are more signs of safety than of danger and the brain will produce less pain. It will also reverse the biological changes that increases the sensitivity of the nervous system.

Continuing to not move a body part after it is healing can contribute to persistent pain. By not using that part of your body, your brain does not receive information that this area is healing and that there are signs of safety. So, the brain continues to produce pain and biological changes. Avoiding movement causes other problems like muscle weakness and joint stiffness. This body information is then determined by the brain to be signs of danger. In this way, avoiding pain and movement rather than gradually increasing movement as an injury heals can cause acute pain to become persistent pain. Avoiding pain and avoiding movement that may cause pain can also contribute to nociceptive changes being replaced by nociplastic changes.

SLIDE 70

We have described in detail how the brain reviews information from many sources to determine if there are more signs of danger or signs of safety. Then the brain will produce pain and other outputs if it determines that there are more signs of danger than there are signs of safety. We learned that there are many factors that the brain considers when evaluating if the signs of danger and signs of safety. It is important to know that because of neuroplasticity; all of these factors can change from being signs of danger to being signs of safety. In this way, people struggling with pain have hope because it is possible for their nervous system to change so that the brain is more likely to determine that they are safe and as a result, they will have less pain and more ability to function in their daily life. This curriculum will give you the tools to help people with pain by providing active treatments that help with the many factors that contribute to the pain experience.

In part one, the participants were assigned homework which involved completing ICF models for their patients. Have the participants look at those ICF models and add in information about the factors that can contribute to the pain experience. They should add new details to the patient's ICF model based on their new understanding of the neurobiology of pain. Then have each participant create a pain chart that represents this same patient's pain experience.

If time allows, have some participants share their ICF models with the group.

SLIDE 71

You have now learned about the neurobiology of pain. It is a lot of new information. To understand the information fully so that you can use it to help people struggling with pain, you will need to study, read, watch videos, and discuss these ideas with colleagues. It is important to know that this information is new so many healthcare professionals do not know about it. Also, many things that you look up online about pain will be based in the biomedical theory and other old information. So, you have been provided links to additional learning resources that are based in the current research.

Your homework for part 2 involves two parts. 1. Practice explaining the neurobiology of pain to colleagues, family, and friends. This includes explaining the physiological process of how pain is experienced (slides 15 & 16) and the nociceptive, nociplastic, and neuropathic changes that increases the sensitivity of the nervous system and contributes to pain. 2. Complete ICF models and pain charts for patients that you are working with and include your new understanding of the neurobiology of pain. Consider what factors are contributing to the person's pain experience and include these in the ICF model and pain chart.

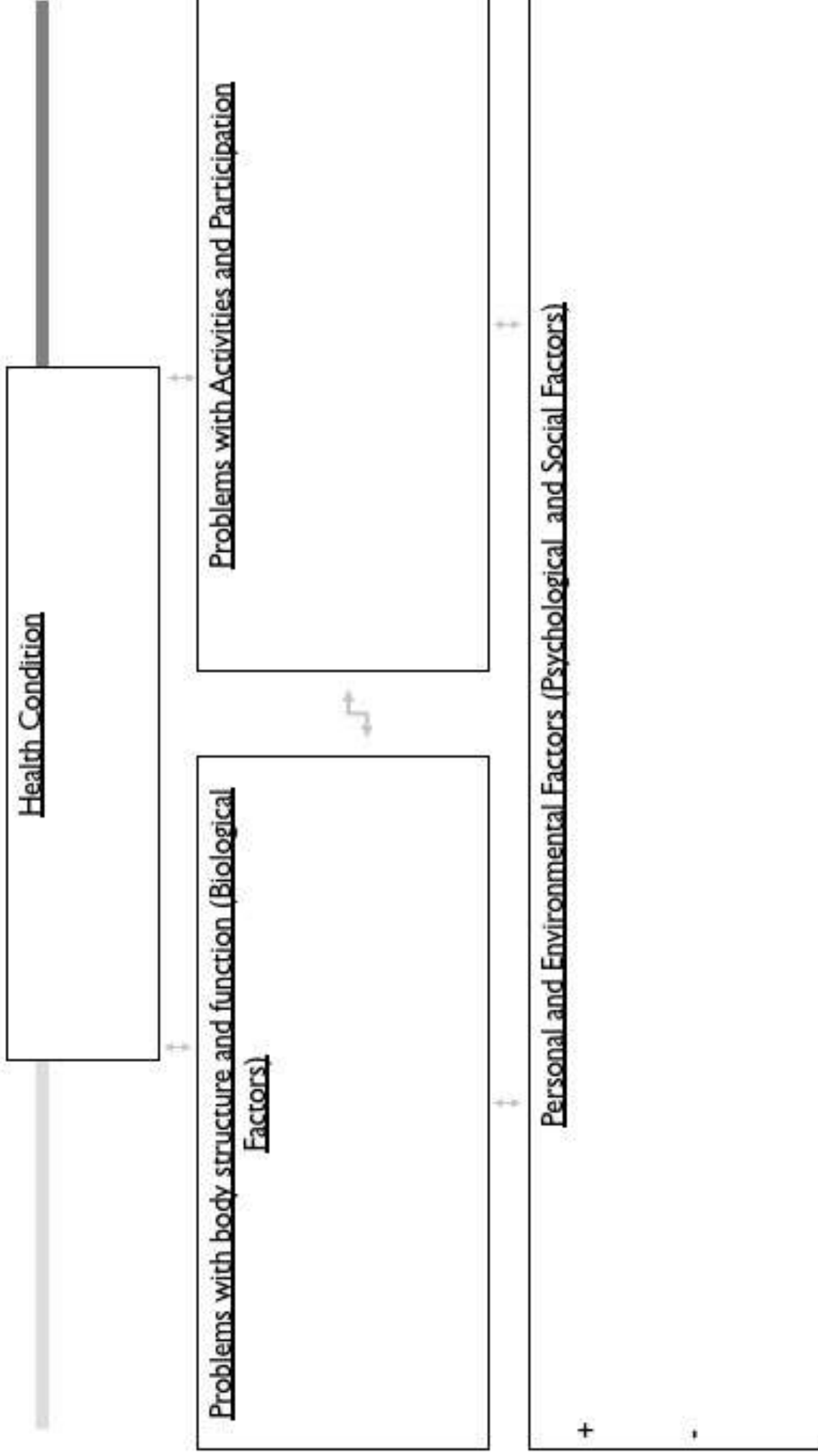
ADDITIONAL LEARNING RESOURCES

Video – Understanding pain in less than 5 minutes: <https://www.youtube.com/watch?v=vdM4dHefA4w>

Video – Complexity of Pain

- Kudrish: <https://www.youtube.com/watch?v=N-PSad06kKk&t=10s>
- English with Arabic subtitles: <https://www.youtube.com/watch?v=Zv6RPoVZx9M>

Video – TNE example: <https://www.youtube.com/watch?v=Crjb07FguDI&t=33s>



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Funded by the IASP Developing Countries Project
Supported by DIGNITY – Danish Institute Against Torture
Organized by Wchan Organization

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Version May, 2020
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PART THREE – BIOPSYCHOSOCIAL ASSESSMENT OF PAIN

Estimated time to teach part three: 7.5 hours

Materials required:

- Flip chart and markers
- PowerPoint projector
- Speakers for videos to play with sound
- Attendance sheet

SLIDE 1

In this part you will develop the skills and knowledge to do a biopsychosocial assessment of pain. The assessment occurs the first time that you work with the patient. It is designed to be completed by a physiotherapist. The goals of the assessment include the following:

- Identify the physiotherapy problems, including the factors contributing to their pain
- Establish goals for treatment
- Establish a treatment plan specific to the patient's problems and goals
- Develop a therapeutic relationship with the patient

In this part, you will learn how to use an assessment form. You can use this assessment form with any patients that have pain. It has been designed to be used with adults, but you can modify your approach to use it with children. It is important to use this assessment form because it supports you to provide treatment based in research evidence. The assessment form guides you to collect all of the information you need to understand what is contributing to person's pain and to establish specific goals and a treatment plan. You may or may not be familiar with using documentation like this assessment form. But after you practice using it, you will find that it is an important part of achieving good outcomes with people struggling with pain.

SLIDE 2

As we stated, one goal of the assessment is to identify the problems that the patient has. The first problem that you must determine is the type of pain that the patient has. If you remember from part 2, there are three types of pain and each type of pain is associated with biological changes.

Nociceptive Pain: Pain associated with damage to the tissues. Sometimes this is also called acute pain. With nociceptive pain there are specific changes in the nervous system called nociceptive changes.

Neuropathic Pain: Pain associated with damage or disease to the central or peripheral nervous system. With neuropathic pain there are specific changes in the nervous system called neuropathic changes.

Nociplastic Pain: Pain that is associated with changes in the neurobiology of nociception and with no evidence of damage of the tissues or nervous system. With nociplastic pain there are specific changes in the nervous system called nociplastic changes.

The assessment form that you are going to learn how to use will guide you to determine which type or types of pain and changes that a patient has. This will then direct the treatment that you provide as each type of pain requires a different treatment approach.

SLIDE 3

As also discussed in part 2 there are many factors that contribute to the pain experience. The assessment form that you will learn to use in this part guides you to collect information about the following factors that can contribute to the pain experience:

- Nociceptive pain and changes
- Neuropathic pain and changes
- Nociplastic pain and changes
- Body information
- Thoughts and beliefs
- Emotions
- Memories
- Environment
- Social and cultural context
- Behavior

The assessment form doesn't have you collect information in great detail about some of the factors because this is not realistic or necessary. But the treatment approaches for each type of pain that you will learn later are also designed to address all of these factors in detail.

SLIDE 4

As we stated, one goal of the assessment is to establish goals for treatment. Establishing goals for treatment is essential as it allows you to objectively assess whether the person is improving in ways that are meaningful. The assessment form guides you to establish goals that are focused on function and not on pain. Function includes being able to sleep well, move well, do physical activity, and do activities in daily life. We focus on function because research shows that treatment does not always eliminate pain completely, especially neuropathic and nociplastic pain. So, sometimes an effective treatment plan doesn't aim to eliminate pain but rather to stabilize pain. Stabilizing pain means that the person has the ability to live a full life and return to doing everything they want to be able to do in life, despite possibly still experiencing some pain. Research shows that if treatment can help a person achieve this, then with time, like months to years, nociplastic pain can be abolished as the changes in the nervous system are reversed.

The assessment form that you are learning how to use in this part guides you to collect information and then write goals that are based in function and that will be meaningful to the patient. You will then use this regularly to assess how the patient is progressing in these goals.

SLIDE 5

The third goal of the assessment is to establish an effective treatment plan. To design an effective treatment plan, you must first understand the problems the patient has and their goals for treatment. The assessment form that you will learn to use in this part guides you through this process. It will then guide you to select the best treatment plan, specific to the needs of the patient. You will apply the knowledge you already have about treatments to design an effective treatment plan. You will also learn how to use research-based treatment manuals to treat the three types of pain.

SLIDE 6

Before we describe exactly how to conduct the assessment, we will discuss the last goal of the assessment: Develop a therapeutic relationship with the patient. We will discuss how to purposefully develop a therapeutic relationship with the patient. You should apply these principles during the assessment and treatment sessions with every patient.

As we stated, one goal of the assessment is to develop a therapeutic relationship with the patient. A therapeutic relationship is the relationship between the patient and the healthcare professional which serves to support the patient's health and treatment outcomes. Research has shown that the therapeutic relationship is a major contributor to treatment outcomes. One research study explored the effect of the therapeutic relationship on treatment outcomes, including pain and disability, for patients receiving treatment from physiotherapists for low back pain. The study concluded that people that had a more positive interaction with the physiotherapist, had significantly better results including improved function and decreased pain than people that saw the interaction with the physiotherapist as neutral or negative. This means that the contact, trust, and interaction between you and your patients is of great importance if you want the treatment that you offer to have a valuable effect.

Have the participants discuss the following question in pairs for 3 minutes: What do you do to think is important in creating trust and a positive interaction between you and your patients?

Then have participants share their thoughts with the large group. You can write down what is shared on a flip chart so that the participants have a list of the important things to consider regarding the therapeutic relationship.

SLIDE 7

The therapeutic relationship is part an essential part of the therapeutic process where the patient gradually learns how to feel, think, and behave differently in relation to pain and their problems. We are going to discuss the following three things that are important in developing a therapeutic relationship:

- Open conversation
- Stress
- Body language

SLIDE 8

One aspect of the therapeutic relationship is open conversation. A conversation between people can be carried out as a closed conversation or an open conversation. A closed conversation is when one person lectures or tells the other person information or what to do, without allowing the other person to share what they think, know, or feel about the topic. An open conversation is where there is a discussion between the two people. An open conversation involves both persons speaking about equal amounts, asking each other questions, and both persons having opportunities to share their experiences and thoughts.

Even though you are the expert within your field of work, you must remember that the patient is always the expert on how they feel, who they are, and how a topic applies in their life. So, to increase the treatment effect it is important that the therapeutic process includes a conversation between two experts, the healthcare professional and the patient.

For example, it is very important that you do not correct the patient on what they think has an effect on their pain experience. You must acknowledge how they feel and how they understand it. TNE is an example where an open conversation enhances the treatment effect. One reason that TNE is effective is because it engages the patient in learning and understanding the topic in their daily life rather than being lectured about the theory. For example, TNE is designed to help guide patients to explore other ways of thinking about their pain experience without lecturing at them or saying that their thoughts are wrong.

SLIDE 9

Suffering from pain conditions contributes to an increased feeling of psychological stress. Psychological stress is common in daily life, but it can be overwhelming for people with financial difficulties, that live in situations where they are not safe and secure, and that have or are experiencing psychological trauma from war and conflict. The following are effects of psychological stress that influence the assessment and treatment of pain:

- Being stressed causes decreased concentration, so it is difficult to focus on a specific task or to follow what is being discussed during a conversation. So, if a person is stressed it may seem that they are not interested in what you are discussing or is not motivated to participate. But it may be that they are just having a difficult time concentrating.
- Research has shown that when people are stressed, they are not able to learn new information as easily. So if a person is stressed, it may take a person more time and practice to learn a new idea, a new movement, or a new exercise.
- Stress also causes changes in how the brain can think and organize information. So, it can be difficult for people that are stressed to communicate clearly what they have experienced and what they feel.
- Stress also causes changes in how the brain regulates emotions so people can more easily get angry, irritated, sad, or anxious and they also have a difficult time controlling their behavior when they are experiencing these emotions.

Have the participants discuss the following question in pairs for 3 minutes: What do you do to think you could do to support the therapeutic relationship when a person is suffering from high levels of stress?

Then have participants share their thoughts with the large group. You can write down what is shared on a flip chart so that the participants have a list of the important things to consider.

SLIDE 10

Here are some ways you can support the therapeutic relationship when a person is suffering from high levels of stress:

- Inform the patient of the structure for the treatment session or a specific treatment so it is easier for them to organize the information and to be less anxious – For example, at the beginning of the treatment session show the patient the outline of the activities and then return to this when you transition to the next activity.
- Provide the patient with many opportunities to learn new ideas, activities, or exercises – For example, you should not assume that if you did one TNE with a patient that they have learned that new idea. Often, a person will require many opportunities to learn a new idea or activity, so it is common to have to repeat TNE, reinforce the new idea during activities, and to practice an activity many times in the treatment sessions.
- If a person is having difficulty doing the home activity plan, recognize that stress may be a factor and work with the patient to find solutions and to set a realistic home activity plan.

SLIDE 11

Research shows that our body languages plays a major role in our communication with others, including during therapeutic relationships. So, it is important to be aware of what your own body language is communicating, as well as, to notice what the patient's body language is communicating. In an open conversation and when there is trust between two people, what is being discussed will make sense with the body language. But, if there is distrust or anxiety, then a person may say one thing, but their body language communicates that they feel differently.

Facilitate a discussion with the large group: If you ask a family member if they are ok, they may say yes but their body language may communicate that they are not ok. What things would you see in the body language in this situation?

Have participants share. This could include the following: lack of eye contact, crossing arms over body, head down, red spots on neck and chin, holding breath or fast breathing, a different tone of voice, or tense muscles in hands, jaw and shoulders.

Being aware of and responding to what is communicated in body language is very important in developing a positive therapeutic relationship. Here are two principles to follow and examples of how to apply these when working with patients:

- Be aware of your own body language and make sure it is consistent with what you are saying.
 - To encourage an open conversation, you should take an open posture that communicates interest in what the other person is sharing.
 - It is very helpful to verbalize your own frustration if you get a bit impatient or irritated with a patient or the situation. You could say something like this: "I can feel that I am getting a bit frustrated with myself, because I might not be explaining things in the right way to you or I might not have chosen an activity that you find relevant for you. Am I correct about this?"
- Respond to what the patient's body language is communicating - If you notice that the person's body language is communicating things like confusion, anger, annoyance, or poor concentration, then you must respond to this and not just continue doing what you are doing.
 - For example, if you notice the person seems to be having a difficult time concentrating, you can say something like this: "I sense that you are having a hard time concentrating which is normal. Let's stand up and do a little movement and drink some water and then we can come back to the activity."
 - For example, if you notice that a person is upset, angry, or annoyed, you may not understand why. But you do not want to ignore this. You can say something like this: "It seems like you may be feeling frustrated or upset. Could you share what it is that you are experiencing so that I can better understand how to support you?"

Facilitate a discussion with the large group on additional examples of how to apply these two principles.

SLIDE 12

A key part of creating a therapeutic relationship is establishing a therapeutic space. The therapeutic space is the physical environment where the assessment or treatment is held. Our physical environment is constantly influencing our emotions, thoughts, and general well-being. As we have learned, the environment is a factor in contributing to the pain experience. So, a healing environment can have a direct effect on the treatment outcomes. The design of clinics and treatment rooms may affect the therapeutic experience of patients and the experience of the healthcare professionals working in them.

Facilitate a discussion with the large group about what they think is important to consider when creating a therapeutic space. What should it contain? What should it not contain?

People may have different opinions, and this is normal.

SLIDE 13

While there is no single way to design or set up a therapeutic room or space, health professionals should be purposeful in creating a healing and comfortable therapeutic space. In general, the environment should be welcoming, comfortable, and feel safe and secure. It should also help a person stay focused on the conversations and activities. It may be difficult in some situations to do what is ideal for creating a therapeutic space, but you should purposefully do your best with the space and resources that you have.

Here are some key principles to follow when creating a therapeutic space:

- Privacy – One of the most important things for creating a therapeutic space is to create private space. A private space is one where the patient is confident that no other people can hear what is being shared or see what they are doing. A private space is important to decrease distractions, so concentration is improved, and it also allows the patient to feel safe talking and doing activities. Creating a private space can be challenging in some contexts but it is important to be creative and do your best to create this. If private space is available but not all of the time, you can consider what activities are most important to do in a private space. For example, it is best to always do the assessment in a private space. But some patients may feel comfortable doing exercises around other people.
- Family members – It can be helpful to include family members of the patient in treatment sessions and in the therapeutic space. But it can also disrupt the sessions and the effectiveness of treatment sessions. Make a purposeful decision in including or not including the family members and include the patient in this decision. It can often be very unhelpful to have children of the patient join them for the treatment session. The children can be distracting, and it can also make the patient not want to share everything openly. It can be sometimes be difficult to not include family members but if this is what is best, work with the patient to find a way to do this.
- Seating - You should not only have the treatment table for a patient to sit on because sitting on a treatment table is uncomfortable for the body and also makes people feel more anxious and uncomfortable. Make sure you have the appropriate number of chairs that you need so that the patient and any family members can sit comfortably. Arrange the chairs so that they are the appropriate distance from each other to have a conversation. Do not position yourself behind a desk or other structure. The chairs should be comfortable which usually means having a high and supportive back rest, arms rests, and a soft bottom. Chairs should also be stable so they should not have wheels or a very flexible back. But some people with pain, may want to lay down at times to be more comfortable so having a place to do this is important.
- Organized space - Keep the space and the things in it organized. Keep the space simple. Many things spread throughout the room or a feeling that the space is chaotic can be distracting for you and the patient.
- Clean space with fresh air - A therapeutic space needs to be clean. If the cleaning service is poor, you must clean the space yourself so that you and the patient feel comfortable. Fresh air and a good smell also make a positive difference. Recognize that some people with nociceptive pain will be sensitive to strong smells like an air freshener, perfume, or cleaner. Consider opening the windows for some time before a session, so the air will be fresh during the session.
- Soft Lights – The right lighting can make a significant impact on the therapeutic space. Many patients with nociceptive pain are sensitive to bright lights and it can increase symptoms. So, you want to have soft lights and ideally, have an option to create different amount of light based on what is needed. Consider having a lamp in the room so that you can turn off the overhead light if it is too harsh but still have enough light in the room.
- Noise – Try to limit the noise that comes into the room through walls, windows, and doors. If you cannot control the noise levels, it is helpful to say out loud to the patient when you recognize the noise. This can help the patient release the tension or stress that the noise may be causing. It also allows you and the patient to discuss if you should change anything so that the noise is less distracting.

SLIDE 14

We will now go through the assessment form so that you can learn how to use it. Being able to use this form correctly is key to providing the best treatment for people struggling with pain. So please put time and effort into learning this well.

Make sure the participants find the blank assessment form and the completed assessment form for the case example in their handouts. They should use these during the training.

SLIDE 15

Name of patient: _____	Age of patient _____
Date of assessment: _____	Name of physiotherapist: _____
Information about the patient: _____	

Before seeing the patient, fill out the information in this box which includes the name of the patient, the date of the assessment, and the name of the physiotherapist completing the assessment. If your workplace has a coding system for each patient, add the code number next to the name of the patient. Before seeing the patient, you should review any information that you have about the patient. This could be documentation from a physician, mental health professional, or other healthcare professional.

Read this section of the assessment form for the case example to introduce the patient to the participants.

SLIDE 16

1. Informed Consent

Today, we will do an assessment. It will take about 30 to 45 minutes. The assessment involves you telling me about any physical problems that you have, like pain, difficulty sleeping, and difficulty doing things in your daily life. I will use this information to diagnose the type of pain and the things that are contributing to the pain. I will write down information that you share on this form, but I will keep it private and not share it with anyone else. I will recommend the best treatment based on the results of this assessment. At the end of the assessment, we will make a plan together for the treatment. Do you have any questions?

Would you like to do the assessment now? Yes No

Informed consent is defined as the process of providing information to a patient about a healthcare intervention (any assessment, treatment, or test) and then asking the patient for permission to do this. Informed consent is the international standard and should be conducted in all fields of healthcare. Informed consent should be conducted before an assessment and before a treatment is started.

Informed consent involves the healthcare professional providing the patient with all of the information they need to make a decision about whether they want to participate in the intervention. This usually includes the following information:

- Purpose of the intervention (assessment or treatment)
- What the intervention will involve
- Benefits of the intervention
- Risks of in the intervention

In the assessment form, you are provided a script of the informed consent for the assessment. You can read this directly to the patient or summarize it for the patient. If you choose to summarize it for the patient, make sure to include all of the information.

After providing the information you then allow the patient to ask any questions. After answering, their questions, ask if they would like to do the assessment. This is where they are providing their permission or informed consent. Check the box on the form according to their answer. If they say no, then discuss the reasons why they do not want to participate and discuss other options for them.

For each section of the assessment you will demonstrate how to perform it. You will use the completed assessment form for the case example that is provided to you. Have one trainer be prepared to be the physiotherapist and have one trainer be prepared to be the patient. Make sure to be well prepared for your role so that you can demonstrate the assessment accurately.

Demonstrate this section using the case example.

SLIDE 17

2. What symptoms and problems are you having?

After explaining the plan for the assessment session with the patient, ask the patient: "What symptoms and problems are you having?" You will see that this is underlined on the assessment form. If text is underlined on the assessment form, then you are to directly ask the patient the question.

When asking the patient about their symptoms and problems, make sure to ask this in a way that the patient feels encouraged to share the details of their experience. It is important to not start with questions that have yes/no answers. For example, the question: Do you struggle with pain?, encourages the patient to say yes or no. It also makes the patient focus on only telling you about pain and not sharing the other symptoms or problems that they may have.

Write down what the patient shares with you on the lines of the assessment form. You will use this information later to develop the treatment plan.

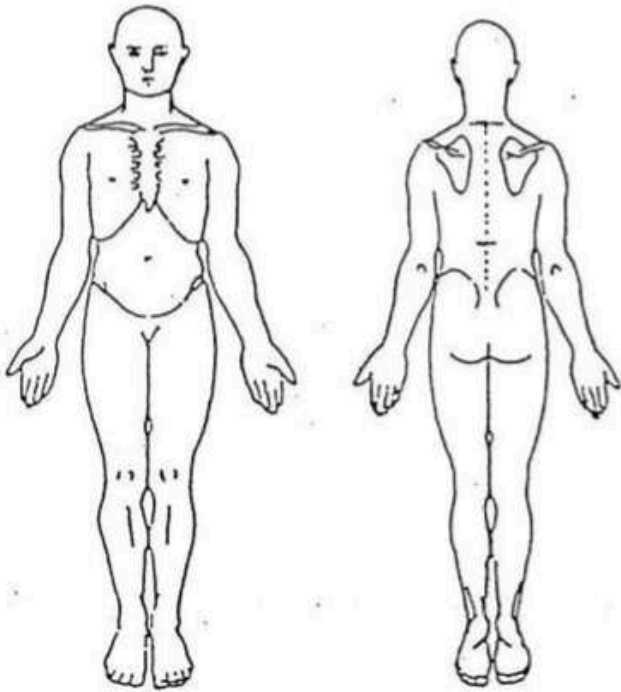
After asking this question, you must give the patient the time to share their experiences. Don't interrupt the patient to ask about specific details. You can ask about specific details later. Let the patient talk freely and write down notes so that you can remember to ask questions about details after they finish sharing. Make sure to show the patient that you are listening and that you are interested in what they are telling you. Simple ways to show that you are listening include the following:

- Nod your head as they are talking
- Say short phrases that show that you understand and also encourages the patient to continue talking like "I understand," or "Ok, I see" or "Al -hamdulillah" or "Basha" or "Insha'Allah"
- Maintain appropriate eye contact – Make sure to continue to have appropriate eye contact even when you are writing down information on the assessment form
- If the patient stops talking, ask questions that encourage the patient to share more details – "Can you tell me more about that?" or "Is there anything else that would be helpful for me to know?"

After you have given time for the patient to share their experiences, you can ask about any specific details. You can then ask questions that have a yes/no response or other short response. You can write information on the lines on the assessment form. Organize the information by numbering the problems or symptoms and then writing details about the problem. The patient may have many problems and symptoms. See the assessment form for the case as an example.

Demonstrate this section using the case example. Make sure to demonstrate the key principles described above. The patient should not just read the assessment form but share the information in the way that a patient would.

SLIDE 18



Mark on the body where the person experiences symptoms. Have the person show on their body or on the picture exactly where they feel the symptoms.

Use the different patterns to show the different symptoms.

Pain: ■■■■■ Numbness or tingling: // // // //

Discomfort: ●●●●

Complete the body chart. Ask the patient to show on their body exactly where they are feeling pain and any other symptoms. Then draw this on the body. Use solid pattern to indicate pain. Use lines to indicate numbness of tingling. Use dots to indicate discomfort. If the patient has other uncomfortable feelings, write down what the feeling is next to the body. This information is important because it will help you determine if the patient has nociceptive, neuropathic, or nociplastic pain and changes.

Demonstrate this section using the case example. Demonstrate how the physiotherapist should confirm the type of symptom in each area by asking: What do you feel in this area? Do you feel pain, tension, numbness, tingling, burning, or anything else?

SLIDE 19

3. Does the patient have any environmental or social factors that are contributing to their pain?

- Financial problems _____
- Unsafe living situation _____
- Difficult family situation _____
- Legal problems _____
- Other _____

The box on the assessment form indicates a decision that you need to make based on the information that the patient shared. You do not need to ask the patient this directly.

As we learned in part 2, environmental, social, and cultural factors contribute to the pain experience. So, you should identify if there are any factors in these areas that may be contributing to the pain experience. You do not have to ask about these directly, but you can listen for these as the patient tells you their problems. Then you can fill out this section. But if you think it is appropriate, you can also ask about these factors in a direct way to the patient. But it is important to word your questions in a respectful way so that the patient will feel comfortable telling you about these sensitive topics.

As a physiotherapist, you will probably not be able to directly affect these environmental and social factors. However, it is important to recognize them for the following reasons:

- It is your responsibility to refer the patient to other professionals that can help in these areas. We know that these factors can be significant contributors to pain. So, if your goal is to treat pain, then you must support the patient to access help for these situations.
- You can consider these factors in your treatment. For example, if a patient has environmental and social factors contributing to pain that may not change, you can expect that the improvements in pain may take more time than a patient without these contributing factors.

Demonstrate this section using the case example.

SLIDE 20

4. Do you experience any of the following things, when completing activities in your daily life like cooking, cleaning, shopping, walking, or working?

- Get tired very easily _____
- Feel the need to take rest breaks _____
- Shortness of breath that is uncomfortable _____
- Muscles feel tired and weak _____

This question allows you to determine if the patient has decreased endurance and decreased tolerance to activity. Endurance is defined as the ability of the cardiovascular and respiratory systems to maintain physical activity. Decreased endurance contributes to a decreased tolerance to activity, which means that the patient has a difficult time completing activities in their daily life. People with pain often develop decreased endurance due to high levels of inactivity. Physiotherapy treatments, like medium intensity physical activity and strengthening exercises, can have a direct impact on endurance and tolerance to activity so it is important to understand if this is a physiotherapy problem that should be addressed.

Ask the patient if they experience any of the situations while doing activities in their daily life. Check the box for any that apply. Write details on the lines.

Demonstrate this section using the case example. Demonstrate how you can use the information the patient already shared with you so that the patient doesn't feel like they are repeating themselves. For example, in the case the physiotherapist can say: "You already shared that you feel tired often. Do you also feel that you need to take a lot of rest breaks like when cooking or walking?"

SLIDE 21

5. Do you have any of the following?

- Unable to put weight on your arm or leg; recent fall or other traumatic event; swelling; redness (**Signs of a fracture – Send to a doctor immediately**)
- Fever; chills; unexplained weight loss; history of cancer; recent infections or illness (**Signs of a serious medical condition like infection or cancer – Send to doctor for evaluation before starting treatment**)
- Numbness in the groin, difficulty urinating, diarrhea or difficulty holding feces (**Signs of cauda equina syndrome / spinal cord injury – Send to doctor immediately for this medical emergency**)

Next, you will ask the patient about specific symptoms so that you can make sure that they don't have any medical conditions that are a medical emergency. Ask the patient directly if they have any of the symptoms. The bold text on the assessment forms describes what the symptoms indicate and what you should do.

Here is some information about the three medical emergencies that you are evaluating for.

Fracture:

- A sign of a fracture in the leg is being unable to put any weight on the leg. The patient will say that they cannot walk on the leg. If the patient has other injuries in the leg, standing or walking may be painful, but they will be able to do it.
- A sign of a fracture in the arm is being unable to put any weight on the arm. You can ask the patient to push their hand into the table. If they refuse or stop after just a small amount of pressure, then a fracture is likely. If the patient has other tissue injuries in the arm, then this may be painful, but they will be able to put weight through the arm.
- Fractures usually happen during a specific event like a fall, car accident, or other direct hit. But if a person has osteoporosis, they can get a fracture without a specific event.
- If a person has a fracture, they will feel pain in a very localized area. Often, there will be redness and swelling in that area.
- If there are signs of a fracture, then refer to a doctor immediately for treatment.

SLIDE 22

Infection or cancer:

- If a person has had cancer in the past, they are at a higher risk of having cancer again. Pain is often an initial sign of cancer. That is why it is important that you determine that the patient does not have any signs of cancer.
- Ask the patient if they have had a fever in the last month. A fever is defined as a body temperature of greater than 37 degrees. They will only know for certain if they had a fever if they took their body temperature with a thermometer. But they may report feeling like they had a fever and feeling other symptoms of illness like body aches and chills.
- Unexplained weight loss means that the patient has recently lost body weight, but they have not been trying to lose weight and they have not had any changes in their eating habits or their levels of physical activity that explains why the body weight was lost. Unexplained weight loss is a symptom of cancer and other serious conditions that require medical treatment.
- If a person has experienced infections and general illness in the last few months, this can be a sign of cancer or other serious medical condition.
- If the patient has fever or other symptoms of illness or infection, have the patient see a doctor within a week for a medical evaluation. Note, if the patient has a history of cancer and unexplained weight loss, then the risk of cancer is high. But generally, you can still finish the assessment and start treatment sessions with the patient as they are waiting for the medical evaluation.

SLIDE 23

Cauda equina syndrome / spinal cord injury:

- Cauda equina syndrome is a serious neurological condition where the lowest part of the spinal cord is compressed. Cauda equina syndrome is a type of spinal cord injury.
- Due to the nerves of the spinal cord being compressed a person with caudal equina syndrome will experience problems with controlling urination and pooping and will have numbness around the groin and genitals. They will also often have low back pain.
- A person can develop cauda equina syndrome gradually and without any traumatic event. It can be caused by tumors, infections, fractures, and other conditions.
- This is a rare condition, but it is very serious and requires immediate medical treatment.
- If a patient demonstrates these signs, have them go to the emergency room immediately.

Demonstrate this section using the case example. Emphasize that for this case it is important to determine if there are any signs of cancer as the patient is at an increased risk of cancer because she had it in the past.

SLIDE 24

6. Do you or have you had any of the following medical conditions?

- | | |
|---|---|
| <input type="checkbox"/> Heart conditions _____ | <input type="checkbox"/> Hernia _____ |
| <input type="checkbox"/> Hypertension _____ | <input type="checkbox"/> IBS _____ |
| <input type="checkbox"/> Diabetes _____ | <input type="checkbox"/> Bladder infections _____ |
| <input type="checkbox"/> Stroke _____ | <input type="checkbox"/> Allergies _____ |
| <input type="checkbox"/> Seizures _____ | <input type="checkbox"/> Anemia _____ |
| <input type="checkbox"/> Cancer _____ | <input type="checkbox"/> Any surgery _____ |
| <input type="checkbox"/> Asthma _____ | <input type="checkbox"/> Any other injuries or conditions _____ |
| <input type="checkbox"/> Arthritis (rheumatoid) _____ | _____ |
| <input type="checkbox"/> Osteoporosis _____ | _____ |

It is important that you understand the patient's medical history. This includes conditions that they have had in the past and conditions that they have now. This information is important for the following three main reasons.

1. You can understand what conditions may be contributing to pain and other symptoms - As we learned, body information can come from many sources and can contribute to pain. In this way, there are medical conditions that can contribute to pain. Here are some common medical conditions that contribute to pain:
 - If a person reports diabetes and has pain in their feet, peripheral neuropathy from diabetes may be contributing to neuropathic pain and changes.
 - Stroke can contribute to neuropathic pain and changes.
 - Cancer and cancer treatment can contribute to neuropathic and nociplastic pain and changes.
 - Rheumatoid arthritis can contribute to nociceptive and nociplastic pain and changes.
 - IBS or irritable bowel syndrome is a common condition that often occurs due to the changes in the nervous system that happen with nociplastic pain
 - Surgery, injuries, or other conditions can contribute to neuropathic and nociplastic pain and changes

SLIDE 25

2. You can identify if the patient would benefit from seeing a physician or other healthcare professional for any conditions.
 - It is your responsibility to make sure that the patient has access to treatment for all medical conditions. You do not have the responsibility to treat medical conditions like hypertension or diabetes. But it is your responsibility to support the patient to access medical treatment. So, if the patient has a medical condition that is not being treated, you should help them see a doctor. For example, if the patient reports having hypertension but they do not have a doctor seeing them regularly and making sure they have the appropriate medications, then you should help them see a doctor. Uncontrolled and untreated medical conditions will also contribute to pain and other symptoms. So, your work with the patient will be more successful if you help the patient get treatment for any conditions listed on the assessment form.

SLIDE 26

3. You can design the treatment plan to meet the needs of the patient. - It is your responsibility to consider the patient's needs when providing treatment. This includes modifying treatment so that it is appropriate for any medical conditions that they have. If you do not understand the medical condition and how it may affect a person, it is your responsibility to learn about it by asking the patient, reading information, or asking other healthcare professionals. If you are unsure if a medical condition places a person at risk during treatment, then discuss it with the patient's physician or other healthcare professional. Here are some considerations you must know:
 - Heart conditions – You must know if a person has any heart condition like history of heart attacks, cardiovascular disease, or chronic heart failure. If the patient has any of these heart conditions, you must be sure to not have the person exercise beyond a medium intensity. You will learn about this in the treatment manual. You may also want to check with their physician about any other precautions.
 - Hypertension – You should ask the patient if the hypertension is under control. If the patient is not sure, refer the patient to a physician for an evaluation.
 - Diabetes – You should ask the patient if they monitor and control their blood glucose. If the patient does not do this, refer the patient to a physician for treatment.
 - Stroke – A person may have problems with movement and cognition following a stroke. You need to consider this when selecting the best movements, activities, and exercises.
 - Seizures – You should be aware of what to do if a person has a seizure. It is important to know that physical activity and exercise do not cause or trigger seizures. It is safe to do physical activity and exercise with someone that has seizures.
 - Cancer – Research has shown that physical activity is safe and beneficial for people with cancer. If you are working with a patient that is currently receiving cancer treatment, it will be helpful to talk with a doctor to understand if there are any specific things to consider. But generally, physical activity, exercise, and the other active treatments that you provide for pain will be safe and beneficial. But it is important to avoid passive treatments like massage, ultrasound, electrical stimulation, and laser as they can negatively interact with the cancer and cancer treatment.
 - Asthma – Physical activity and exercise is helpful for people with asthma. But you may need to start at a low intensity and progress slowly to medium intensity. It is also important that the patient uses any medications that they have been prescribed.

- Osteoporosis – Osteoporosis is a weakening of the bone. It is different than rickets. Osteoporosis is common with elderly females, people that have had cancer and cancer treatment, and people with physical disabilities, like from cerebral palsy, that have prevented them from walking and moving. People with osteoporosis are at an increased risk for fractures. Osteoporosis can only be diagnosed with medical tests like an x-ray or dexta-scan. People with osteoporosis can get fractures from simple movements like lifting an object off the ground. Here are the guidelines to follow if a person has osteoporosis or is at a high-risk for osteoporosis:
 - Do not jump or do other high impact activities
 - It is safe and beneficial to do strengthening exercises. The best way to improve and maintain bone strength is to do strengthening exercises with weights or resistance bands and to put body weight through the arms and legs. But it is important to start with a small amount of weight and then gradually increase over many weeks. If you progress too quickly, you could cause a fracture.
 - It is important that any exercises or physical activities are done in a controlled way and with appropriate body alignment. Movements should be slow, smooth, and in control. For example, joints should not lock into extension when doing an exercise or when putting weight through them.
- Hernia – A hernia is when an organ is pushed through an opening in the wall of abdomen. If a patient has a hernia, it is important that they maintain breathing when moving and putting forth effort because this decreases the pressure in the abdomen. Generally, exercise and physical activity is safe as long as breathing is maintained but it is important to start with a low level of effort and slowly increase. As you do activity, monitor the hernia to make sure that it does not bulge out further.
- Allergies – It is important to be aware of any allergies so that you can make sure to not use anything that may cause an allergic reaction. Things to consider include latex which is found in medical gloves and resistance exercise bands and substances that are in lotions or oils that you may use.
- Anemia - Anemia is a condition where a person does not have enough red blood cells so not enough oxygen is transported throughout the body. Anemia can cause fatigue. Anemia can be caused by many things. Research has shown that physical activity and exercise is safe for people with anemia and that it can actually decrease the symptoms of anemia. You may need to progress physical activity more slowly in someone with anemia, but this is based on the person's tolerance.

SLIDE 27

Ask the patient if they have or have had any of the following conditions and then read each condition. If the patient has it or has had it in the past, check the box. Then write the details on the line. You may need to ask the patient more questions about the medical condition. You should collect enough information so that you can 1) understand if the condition is contributing to pain or other symptoms, 2) identify if the patient would benefit from seeing another healthcare professional regarding this condition, and 3) design the treatment plan to meet the needs of the patient.

It is important to recognize that patients sometimes diagnose themselves with a condition without seeing a physician and receiving a formal diagnosis. For example, it is common for patients to say they have a heart problem. Then when you ask them for more information, they tell you that they have chest pain so they must have a heart problem. But actually, they have never seen a doctor and have never been diagnosed. Chest pain could be caused by many different things and does not mean that a person has a heart problem. As this example demonstrates, it is important to understand how the patient was diagnosed.

Demonstrate this section using the case example. Demonstrate how to ask for follow up questions about hypertension, cancer, and anemia so that the patient shares all of the information.

SLIDE 28

7. Assessing for nociceptive pain and changes

Have you been experiencing pain for less than 6 months? Yes No

Has the pain and symptoms gradually improved? Yes No

Nociceptive Pain is pain associated with damage to the tissues. With nociceptive pain there are specific changes in the nervous system called nociceptive changes. To assess for nociceptive pain, you should ask the patient the following two questions:

- Have you been experiencing pain for less than 6 months?
 - Research has shown that all tissues and types of tissue injuries heal within 6 months. So, if pain continues after 6 months then then it must be neuropathic pain or nociplastic pain.
- Has the pain and symptoms gradually improved?
 - With nociplastic pain and changes, the pain and other symptoms, like swelling or difficulty moving the body part, will gradually get better over time. With neuropathic pain and nociplastic pain, the pain and symptoms will remain the same or will get worse over time.

Demonstrate this section using the case example. Demonstrate that if you already know the answer from what the patient previously shared you can just confirm with the patient or not even ask about it again.

SLIDE 29

8. Assessing for neuropathic pain and changes

Do you have or have you had any of the following problems?

Diabetes

Cancer

Injury to a nerve

Shingles (zona in Kurdish)

Neuropathic Pain is pain associated with damage or disease to the central or peripheral nervous system. With neuropathic pain there are specific changes in the nervous system called neuropathic changes. To assess for neuropathic pain, you need to determine if the patient has any damage or disease to the central or peripheral nervous system. You do this by asking about these four common conditions. Based on the previous questions in the assessment, you may already know if they have any of these conditions. But make sure you have details from the patient about any of these conditions so that you can determine if they are contributing to neuropathic pain and changes.

SLIDE 30

Diabetes:

- Diabetes can lead to diabetic neuropathy. With diabetes, especially poorly treated diabetes, there are high levels of sugar or glucose in the blood. This causes damage to the peripheral nerves throughout the body and usually people have symptoms in the feet and lower legs.
- Diabetic neuropathy has a standard pattern: the symptoms are in all parts of both feet and lower legs (below the knees). The symptoms in these areas include pain, numbness, tingling, cramps, muscle weakness, and decreased sensation, and increased sensitivity (light touch is painful). These changes lead to problems with walking, poor balance, and poor coordination. Diabetic neuropathy also increases the risk of infections and ulcers on the foot.
- Diabetic neuropathy can also affect other nerves in the body causing additional symptoms like problems with urination, constipation, poor vision, dizziness, increased heart rate, difficulty swallowing, and difficulty maintaining appropriate blood pressure and body temperature.
- If the patient has diabetes, look at the body chart that you completed with the patient to determine if the patient's symptoms are the same as the pattern of symptoms for diabetic neuropathy. If yes, then neuropathic pain and changes caused by diabetic neuropathy are likely.

SLIDE 31

Cancer:

- Cancer is the name for a variety of similar diseases. In all cancers, cells in the body grow abnormally. This results in cancer cells accumulating in the body. Cancer cells can contribute to neuropathic pain if the cancer cells are invading the nervous system.
- Cancer treatments also effect the nervous system. The most common cancer treatments are surgery, chemotherapy, and radiation therapy. It is common for surgical treatment of cancer to cause damage to nerves. In this way, neuropathic pain and changes can develop from the surgical treatment of cancer. Also, chemotherapy can cause a type of peripheral neuropathy that is called chemotherapy-induced peripheral neuropathy (CIPN). CIPN has a standard pattern: symptoms are in both hands and up to the middle of the lower arm and in both feet and up to the knees. Symptoms include pain, tingling, numbness, burning, weakness, cramps, and decreased sensation. The symptoms in the hands can lead to difficulty holding thing in their hands. The symptoms in the feet can cause difficulty walking, poor balance and poor coordination.
- If a patient had cancer, do the following to determine if the cancer or cancer treatment is contributing to the pain:
 - Did the pain and symptoms start before or after the cancer treatment?
 - What treatments did you have for the cancer?
 - If they had surgery to treat the cancer, try to determine if there was any nerve damage caused by the surgery. You can ask: Where was the surgery? What parts of the body, like nerves and muscles, were involved in the surgery?
 - If the patient had chemotherapy, then look at the body chart that you completed before with the patient. Determine if the pattern of the patient's symptoms is the same as the pattern for CIPN. If yes, then neuropathic pain and changes caused by CIPN are likely.

SLIDE 32

Injury to a nerve

- Injuries to a nerve can cause neuropathic pain and changes.
- Peripheral nerves can be injured from surgery, trauma to the nerve like in a car accident or work accident, carpal tunnel syndrome, tumor or mass in the nerves, and amputation. The pattern of symptoms with a peripheral nerve injury will be based on the specific nerve that is damaged. Symptoms include pain, numbness, tingling, burning, muscle weakness, and poor coordination.

- Nerves in the central nervous system (spinal cord and brain) can be damaged and can contribute to neuropathic pain throughout the body. Central nerves can be injured from spinal cord injuries, stroke/CVA, traumatic brain injury, tumor in the brain or spinal cord, multiple sclerosis, and Parkinson's disease. There is no specific pattern of symptoms. The symptoms can be localized to one area of the body or be spread throughout the body. Symptoms include pain, numbness, tingling, burning, muscle weakness, and poor coordination.
- If there is an injury to a nerve, then use the patient's body chart to determine if the injury to the nerve would be a logical cause for the pattern of symptoms that the patient has. If yes, then neuropathic pain and changes caused by an injury to a nerve are likely.

SLIDE 33

Shingles

- Shingles is an infection that is caused by a virus. The main symptom of shingles is a painful rash that is usually on the chest and stomach. Shingles requires medical treatment and will usually go away within a few weeks. But shingles can cause long-term damage to peripheral nerves and in this way contribute to neuropathic pain and changes.
- Neuropathic pain caused by shingles will be in the same area as the original rash. Symptoms in this area include pain, burning, tingling, itching, numbness, and a sensitivity to light touch.
- If the patient had shingles in the past, ask where the patient had the rash from shingles. If the rash was in the same area that the current pain and symptoms are, then neuropathic pain and changes caused by shingles are likely.

Demonstrate this section using the case example. Describe how it is important for this case to know if the patient had chemotherapy so that you can evaluate for CIPN.

SLIDE 34

9. Assessing for nociplastic pain and changes

Have you been experiencing pain for greater than 6 months? Yes No

Does the pain get worse in cold or hot temperatures? Yes No

Do you have any of the following problems?

- | | |
|---|---|
| <input type="checkbox"/> Headaches | <input type="checkbox"/> Difficulty concentrating or remembering things |
| <input type="checkbox"/> Difficulty sleeping | <input type="checkbox"/> Body feels stiff and achy |
| <input type="checkbox"/> Feel tired very easily | <input type="checkbox"/> Pain has spread to many areas of the body |

Nociplastic Pain is pain that is associated with changes in the neurobiology of nociception and with no evidence of damage of the tissues or nervous system. To assess for nociplastic pain, ask the patient the following questions:

- Have you been experiencing pain for greater than 6 months?
 - Research has shown that all tissues and types of tissue injury heal within 6 months. So, if pain continues after 6 months then it is due to neuropathic pain and changes or nociplastic pain and changes.

- Does the pain get worse in cold or hot temperatures?
 - This question is assessing for signs of allodynia. We described allodynia in detail in part 2. Allodynia is when a person experiences pain with things that are normally not painful. For example, a person may experience pain with light touch of the skin, cold temperatures, or when their clothes touch their body. These are all things that would not cause pain normally. But a person with allodynia may experience pain with these things because the nociplastic changes have increased the sensitivity of the nervous system so much that even these inputs are determined by the brain to be a sign of danger.
 - Patients with allodynia will often respond to this question with things like this: "I cannot stand being cold because the pain gets so bad, so I always have to sit near the heater." "Being outside in the summer is difficult for me because my pain will get worse." "My body is very sensitive to hot and cold water so taking a bath with cold water is very painful and will make my body hurt for hours."

SLIDE 35

To assess for nociplastic pain, ask the patient if they have any of the following problems?

Headaches, Body feels stiff and achy, Pain has spread to many areas of the body

- Headaches are very common in people with nociplastic pain and change. It is also common for people with nociplastic pain to say that it hurts everywhere and that their body feels stiff and achy.
- Nociplastic pain does not have a standard pattern like nociceptive pain and neuropathic pain. With nociplastic pain and changes, pain and symptoms will not be localized to one area. The location of the pain will not match to an injury of a specific tissue. In other words, you will not be able to explain the pattern of the pain with a musculoskeletal injury. Rather, the pain and symptoms will be widespread and throughout the body.
- For nociplastic pain, it is common for a patient to feel like the pain started in one area and then spread out to a larger area. It is also common for pain to move around the body. For example, the patient may say that for one week there is pain in the shoulders but then a week later the pain has moved to the hands.
- Nociplastic pain and changes present this way because the pain is not mainly caused by tissue damage like with nociceptive pain. But, nociplastic pain is caused by increased sensitivity of the nervous system as well as other contributing factors like emotions, memories, behavior, and numerous protective responses. In this way, the lack of a consistent pain pattern is logical.

Difficulty sleeping, Feel tired very easily, Difficulty concentrating and remembering things

- As we described in part 2, central sensitization occurs with nociplastic pain and changes. Central sensitization is another term used to describe when the nervous system has increased sensitivity to danger message due to nociplastic changes. The problems that you are asking about here are signs of central sensitization. With nociplastic pain and changes, the nervous system's increased sensitivity affects not only the neural pathways for pain but also the neural pathways for sleep, moods and emotions, and cognitive ability. So, with central sensitization you will see changes in sleep, energy levels, emotions like anger, depression, and anxiety, and with the ability to think clearly and to remember things.

Demonstrate this section using the case example. Demonstrate that if you already know the answer from what the patient previously shared you can just confirm with the patient or not even ask about it again.

SLIDE 36

10. Imaging and medical tests

Have you had any imaging for this problem like MRIs or x-rays? What were the results? _____

Have you had any other medical tests? What were the results? _____

Based on your clinical judgement, are the images and tests relevant to the pain experience? Yes No

Consider the following when making this decision:

The following results on images and tests are usually not relevant to the pain experience: osteoarthritis, disc prolapse/disc bulge/disc herniation, spondylolisthesis, degeneration of the vertebral discs, spinal stenosis/narrowing of the spinal canal, decreased fluid in the joint, osteophytes, cartilage damage, bone marrow lesions, meniscus tear in knee, rotator cuff tears, labral tears in shoulder or hip, joint degeneration, hip impingement, shoulder impingement

The following results on images and tests may contribute to neuropathic pain and changes: structures in the intervertebral space, structures in the spinal foramen space

Here you are asking the patient to tell you the results of any medical tests including MRIs, x-rays, CT scans, lab tests, cardiac tests, etc. The patient will be telling you their understanding of the results which may not be comprehensive. But, in most cases, this will provide you with enough information to determine the type of pain and the appropriate treatment plan.

The box indicates a decision that you need to make based on the information that the patient shared. There are many results of imaging and tests that are not relevant. In other words, they do not show evidence of a condition that is the cause of the pain.

Look at the assessment form to see the list of results on images and tests that are not relevant to the pain experience. Research has shown that all of these are normal changes that occur as the human body ages. We can think of these as wrinkles inside our body. Just as we have wrinkles that are normal changes in our skin as we age, we also have normal changes of the tissues inside our body as we age. These changes are normal, and they are not a primary cause of pain. For some patients, these changes are body information that the brain is perceiving as signs of danger. In this way, they can contribute to pain. But as pain is more complex and involves the contributions of many factors, treating this one biological change will not result in removing the pain.

A biomedical approach to treating pain often relies on the results of images and tests to determine the one single cause of pain. But as we discussed, the biopsychosocial theory and neurophysiology of pain describes that pain is more complex than this and that many factors contribute to pain, including changes in the nervous system that cannot be detected on an MRI or x-ray.

SLIDE 37

Spine – cervical, thoracic, and lumbar: Normal changes in the spine that occur with aging include disc degeneration, disc bulge/disc herniation, disc protrusion, annular fissure, stenosis, and arthritis.

- 37% of 20-year-olds without symptoms will have disc degeneration on imaging; 96% of 80-year-olds without symptoms will have disc degeneration on imaging
- 30% of 20-year-olds without symptoms will have a disc bulge on imaging; 84% of 80-year-olds without symptoms will have a disc bulge on imaging
- 29% of 20-year-olds without symptoms will have a disc protrusion on imaging; 43% of 80-year-olds without symptoms will have a disc protrusion on imaging
- 19% of 20-year-olds without symptoms will have an annular fissure on imaging; 29% of 80-year-olds without symptoms will have an annular fissure on imaging
- Lumbar disc herniations usually return to a healthy state on their own. Also, the more severe herniations are, the more likely it is to return to a healthy state.
- Changes that are labeled as arthritis are normal changes that occur with aging and that do not contribute to pain.
- People with similar low back pain symptoms have greater disability when they have received an MRI. In other words, function decreases after a person receives an MRI result because this increase fears, beliefs, and thoughts that contribute to pain.
- The American College of Physicians and the American Pain Society (authorities that regulate clinical practice in America) guidelines for low back pain report that imaging should not be used for persons with back pain except if there are signs of nerve compression (neuropathic pain and changes) or a serious medical condition like cancer, fracture, or cauda equina syndrome.

SLIDE 38

Shoulder: Normal changes in the shoulder that occur with aging include rotator cuff partial tears, AC joint degeneration or arthritis, fluid in the AC joint, cysts in the bones, cysts in the joints, changes in the tendons, tendonitis, labral tears, and bursitis

Elbow: Normal changes in the elbow that occur with aging include enthesopathy of the extensor carpi radialis brevis (ECRB) (also known as tennis elbow or inflammation of the extensor tendons), changes in other tendons of the elbow, and degeneration of bone, cartilage, and tendons.

SLIDE 39

Hip: Normal changes in the hip that occur with aging include labral tears, osteoarthritis, degeneration of cartilage, tears in ligamentum teres, cysts, bone edema, and various changes in the femur bone.

- 45% of people 18 to 25 years old and without pain have a hip labral tear on imaging
- 80% of people aged 55 years old and without pain have a hip labral tear on imaging
- 2-10% of children without pain will have a hip labral tear on imaging

Knee: Normal changes in the knee that occur with aging include arthritis, osteophytes, cartilage damage, bone marrow lesions, subchondral cysts, meniscal tears, degeneration of meniscus synovitis, tears in ligaments.

- 60% of people without knee pain and between the ages of 50-90 years old will have meniscus tears on imaging
- A systematic review of research concluded that people with knee osteoarthritis often do not have pain or disability. So, knee osteoarthritis on imaging should not be identified as the primary cause of pain in someone with knee pain.

Ankle: Normal changes in the ankle that occur with aging include bone marrow edema, lesions in the ligaments, and arthritis.

- In one study, 30% of people without any symptoms, had abnormal ankle ligaments on imaging that were the same as what would be seen when someone has a sprained ankle

Have the participants break up into groups of 3 to 4 people. Each group should do the following:

- Read the content in the curriculum.
- Select an imaging result that patients often tell you that they have. For example, disc prolapse, osteoarthritis, or meniscus tear. Try to make sure the groups select different things.
- Make a plan for how you would discuss this with the patient. What would you say to the patient to help them understand how the change affects their pain (or doesn't affect their pain). Try to do this in the style of a discussion and not lecturing.

If time allows, have some of the small groups present in front of the large group.

Demonstrate this section using the case example. Then describe how the results of the images are not relevant for this case because they do not indicate a specific nerve injury or other specific condition that would explain the pattern of pain and symptoms.

SLIDE 40

Often stress and emotions can affect pain and physical health. So, I will now ask you some questions about this.

11. Screening Tool for Depression

Over the last 2 weeks, how often have you had a problem with feeling little interest or pleasure in doing things?

- Not at all (0)
- Several days (1)
- More than half the days (2)
- Nearly every day (3)

Over the last 2 weeks, how often have you had a problem with feeling down, depressed or hopeless?

- Not at all (0)
- Several days (1)
- More than half the days (2)
- Nearly every day (3)

Total Score: _____ Is this 3 or more? Yes No

If yes, then the person may have depression that requires treatment. You should help the person see a mental health professional as soon as possible.

Most people feel symptoms of depression at some point in their lives. For example, you may feel sad, hopeless, and not motivated for a period of time but slowly it improves, and you get back to feeling like your "old self" again. Many people develop depression that is considered clinical which means that it interferes with their ability to function in daily life. Clinical depression needs a longer period of time to get back to normal again and often also needs mental help support or treatment.

Symptoms of depression and clinical depression are both very common in persons with persistent pain. This means that if a person is suffering from depression, they are more likely to develop persistent pain, than a person without depression. It also means that if a person is suffering from persistent pain, they are more likely to develop depression than a person without persistent pain. Sometimes people with persistent pain express feelings of stress and sadness, related to the consequences of living with pain and then these feelings of depression can develop into a clinical depression. In these ways, depression and persistent pain often occur at the same time.

Facilitate a discussion with the large group by asking the participants to share possible reasons why persistent pain and depression often occur at the same time.

SLIDE 41

The following are reasons why persistent pain and depression often occur at the same time:

- Decreased ability to perform activities in daily life
- Decreased ability to do what is expected of them at home, work, and in the community
- Poor sleep
- Worrying about the future
- Decreased physical activity
- Decreased social interactions
- Difficulty believing in a positive future and that the condition/s can or will change
- Lack of confidence in their ability
- Fatigue

SLIDE 42

When treating patients with persistent pain, health professionals must be able to identify signs of depression even when this is not the condition the patient is seeking treatment for. So, the assessment form includes a short screening tool for depression. It has two questions. The answers give you an indication of whether you need to refer the patient for a mental health assessment by a specialist.

This screening tool is a standard tool so it must be done just as it is written. If you do not do it just as it is written, the total score will not reliably tell you when to refer the patient. To do the depression screening tool, read the underlined statements to the patient exactly as they are written. Read the patient the four options and have them select the one that is true for themselves. Do not provide any additional explanation or examples. The patient may tell you information about the statement. Allow them to share this information but then ask them to select one of the answers. You cannot select an answer based on what the patient shares. The patient must select the answer. The patient bases their answer on their perspective and experience.

After the patient has answered the two questions, sum up the scores to get the total score. You sum up the scores by using the number that is after each answer.

If the total score is 2 or lower, the person is unlikely to have depression and you don't need to do anything.

If the total score is 3 or above, the patient may have depression. In this case, you should refer the patient to a mental health professional that has experience working with people with depression and pain. If you have a manager or supervisor, it is important that you discuss this referral with them. If a mental health professional is not available to refer to, determine who is most appropriate to support the patient in your context. It could be a physician or a trained nurse. It is your responsibility to help the patient understand why another healthcare professional may help them and how they can access this treatment. After making the referral, make sure to follow up with the patient about if they have seen the mental health professional and what their experience was.

If you notice signs of depression, but if the total score is less than 3, you can still decide to make a referral. It is important to always use your clinical judgement to support a patient to receive the support that they need.

Generally, you can make a referral for depression but also continue to provide the treatment for this patient as planned. Depression does not make it inappropriate or unsafe to provide treatment and it also does not make the treatment ineffective.

Demonstrate this section using the case example. Make sure it is clear how to score the questionnaire.

Have the participants discuss in pairs how symptoms of depression may make treatment more challenging and what you could do to address this.

Then have a few participants share their ideas with the large group.

SLIDE 43

The following are things to consider when working with someone that has symptoms of depression:

- Because of the effect of depression, it can be difficult for the patient to feel motivated and to have the energy to attend the treatment sessions and do the home activity plan. Things that can help with this include reminders on the patient's phone, providing written materials with pictures to hang at home, including family members in the home activity plan so they can do the activities together, and occasionally calling the patient to provide additional support.
- Set realistic goals with the patient so that they do not feel overwhelmed. In the beginning, focus on the patient just doing one or two things at home. Then this can be gradually increased as the patient develops the habit and also feels more confident.
- Focus on including physical activity into the person's normal routines in daily life. For example, walking outside may be easier for the person than doing strengthening exercises that are new to them. Also, sunlight and physical activity have a direct positive effect on symptoms of depression.
- It may take more time to progress from low intensity physical activity to medium intensity physical activity.
- Pain and depression both have negative effects on memory and concentration. So, speak slowly and only provide a small amount of information at one time. Do not lecture but rather discuss topics with the patient. Repeat information over multiple sessions. Provide multiple opportunities for the patient to practice new activities and exercises – even if the patient says that they don't need to practice.
- If you think that the patient is showing increasing signs of depression, sadness, fatigue or loss of motivation, then you can do the depression screening tool again. Based on the results of the screening tool, your observations, and what the patient shares, consider if additional mental health support and treatment would be beneficial.

SLIDE 44

12. Screening Tool for Anxiety

Over the last 2 weeks, how often have you had a problem with feeling nervous, anxious or on edge?

- Not at all (0)
- Several days (1)
- More than half the days (2)
- Nearly every day (3)

Over the last 2 weeks, how often have you had a problem with not being able to stop or control worrying?

- Not at all (0)
- Several days (1)
- More than half the days (2)
- Nearly every day (3)

Total Score: _____ Is this 3 or more? Yes No

If yes, then the person may have anxiety that requires treatment. You should help the person see a mental health professional as soon as possible.

Before sharing the content of this slide, facilitate a discussion in the large group with these two questions:

1. What is anxiety?
2. How is anxiety different than being afraid?

Anxiety is a normal and often healthy emotion. Our brain produces feelings of anxiety as a way to protect us, similar to how the brain produces pain to protect us. Feelings of anxiety let us know that there may be something wrong or that there may be something that could cause us harm.

Think about times when you felt anxiety like before taking an exam or giving a presentation. Anxiety can be described as a feeling of extreme nervousness. When we are anxious, changes occur in our body like our heart pounds and beats quickly, our hands sweat, and our voice trembles. When we are anxious we get think thoughts like "Will I survive this?" "This will never get better." "How can I get out of this situation?" "They will probably think I am stupid and not able to do it."

Feeling anxious at times is very normal. But anxiety is not healthy if it becomes a more permanent condition, where the person lives with a constant feeling of nervousness, alertness and worry. This is often called general anxiety. For some people, the general feeling of anxiety can sometimes quickly increase to the point that the person panics. People sometimes describes these short periods of intense anxiety as anxiety attacks or panic attacks.

There are many reasons why a person may develop general anxiety. Some people have genetics that make general anxiety more likely. Some people develop general anxiety after experiencing traumatic events.

Similar to depression, anxiety and persistent pain often occur at the same time. Research shows that anxiety has a significant impact on the amount of pain a person experiences. The more anxious a person is, the more pain they will experience. Also, it is common for people to have symptoms of depression and symptoms of anxiety at the same time.

Facilitate a discussion in the large group about the possible reasons why persistent pain and anxiety often occur at the same time.

SLIDE 45

The most important reason that anxiety and persistent pain occur together is that in both conditions, a fear avoidance strategy is used. A fear avoidance strategy means that the person avoids activities and situations that increase pain and feelings of anxiety. If this avoidance behavior continues for a long period of time the brain loses its ability to interpret accurately if a situation is actually dangerous. The brain loses its ability to determine if the body, the environment, or a situation actually present with signs of danger. When the brain loses this ability, it interprets most things as signs of danger and in this way contributes to continued pain and anxiety.

So, when treating and supporting patients with persistent pain, health professionals must be able to identify signs of anxiety even when this is not the condition the patient is seeking treatment form. The assessment form includes a short screening tool for anxiety. It has two questions. The answers give you an indication of whether you need to refer the patient for a mental health assessment by a specialist.

This screening tool is a standard tool so it must be done just as it is written. If you do not do it just as it is written, the total score will not reliably tell you when to refer the patient. To do the anxiety screening tool, read the underlined statements to the patient exactly as they are written. Read the patient the four options and have them select the one that is true for themselves. Do not provide any additional explanation or examples. The patient may tell you information about the statement. Allow them to share but then ask them to select one of the answers. You cannot select a score based on what the patient shares. The patient must select the answer. The answer is based on the patient's perspective and experience.

After the patient have answered the two questions, sum up the scores to get a total score. You sum up the score by using the number that is after each answer.

If the total score is 2 or lower, the person is unlikely to have anxiety and you don't need to do anything.

If the total score is 3 or above, the patient may have general anxiety. In this case, you should refer the patient to a mental health professional that has experience working with people with anxiety and pain. If you have a manager or supervisor, it is important that you discuss this referral with them. If a mental health professional is not available, determine who is most appropriate to support the patient in your context. It could be a physician or a trained nurse. It is your responsibility to help the patient understand why another healthcare professional may help them and how they can access this treatment. After making the referral, make sure to follow up with the patient about if they have seen the mental health professional and what their experience was.

If you notice signs of anxiety, but the total score is less than 3, you can still decide to make a referral. It is important to always use your clinical judgement to support a patient to receive the support that they need.

Generally, you can make a referral for anxiety but also continue to provide the treatment for this patient as planned. Anxiety does not make it inappropriate or unsafe to provide treatment and it also does not make the treatment in effective.

Demonstrate this section using the case example. Make sure it is clear how to score the questionnaire.

SLIDE 46

Have the participants discuss in pairs how symptoms of anxiety may make treatment more challenging and what you could do to address this.

Then have a few participants share their ideas with the large group.

For a person that has anxiety, it is very important that you constantly observe their body language. When a person is feeling anxious or developing an anxiety attack you will notice the following: breathing becomes faster and/or holding of the breath, sudden sweating, trembling or shaking of the hands or legs, tensing of muscles, they look distracted, talking fast and/or talking off topic, and poor eye contact.

If you notice sign of increased anxiety, you should respond to them and not just continue with what you have planned. You can use the following strategies to respond to signs of anxiety:

- Say out loud what you see. For example, you could say: "I notice that you are breathing faster. Is that also what you feel? Is there something we can do to make you feel more calm?"
- Guide the patient in belly breathing. You will learn how to do this in the treatment manual.
- Change the position of the patient. For example, if they are sitting ask them to stand to do something. Or if they are laying down, ask them to sit up.
- Sometimes a specific activity or topic may cause anxiety. You can ask the patient if they would prefer to take a short break or do a different activity for now and then return to that same activity later in the treatment session. It is important that you do not avoid the activity or topic completely as this promotes an unhealthy fear avoidance strategy.
- Have the patient walk or do some other type of gentle and pain-free movement.
- Do belly breathing yourself and make your voice slow and calm as you continue the activity. This will have a calming effect on the patient.
- Share with the patient that it is very normal to react with anxiety when they are in pain. Then discuss with the patient ways they can manage the anxiety so that they can continue to do the activity.

SLIDE 47

13. Screening for Post-Traumatic Stress Disorder (PTSD)

Often people experience stressful, frightening, and overwhelming experiences in their life like war, torture, violence, death of family members, abuse, or car accidents. These experiences can have an impact on pain and physical health. You don't need to share the details of any experiences, but have you ever experienced a traumatic event like this?

Yes _____ No

If the patient answers yes, then ask the following questions:

1. In the past month, have you had nightmares about the event(s) or thought about the event(s) when you did not want to?
 Yes No
2. In the past month, have you tried hard not to think about the event(s) or went out of your way to avoid situations that reminded you of the event(s)?
 Yes No
3. In the past month, have you been constantly on guard, watchful, or easily startled?
 Yes No
4. In the past month, have you felt numb or detached from people, activities, or your surroundings?
 Yes No
5. In the past month, have you felt guilty or unable to stop blaming yourself or others for the event(s) or any problems the event(s) may have caused?
 Yes No

Total number of yes answers: _____ Is this 3 or more? Yes No

If yes, then the person may have PTSD that requires treatment. You should help the person see a mental health professional as soon as possible.

We all experience traumatic events in our lives which are events that unexpected and that are difficult to cope with. For example, common traumatic events include the sudden death of a close family member, severe illness, or being in a car accident. It is normal to be affected by traumatic events. The stress, fear, anxiety, loss and hardship that we can feel after experiences that are traumatic, affect us both physically, emotionally, psychologically, and socially. It can take time to get back to feeling that our mind and body are normal and stable. It can take time to return to our normal sleeping habits and our normal social activities. It can take time to return to feeling like our body is restored and that we again feel safe and secure in our daily lives. It is normal for this process to take time after a person has experienced a traumatic event.

But sometimes there are so many events or the event is so severe or so painful that it causes the nervous system to become extra sensitive and to have difficulties processing information accurately. This is what happens in the mental health condition called post-traumatic stress disorder or PTSD.

Facilitate a discussion with the large group about what they think are the signs and symptoms of PTSD.

SLIDE 48

Signs of PTSD include the following:

- Changes in energy levels which can present as extreme nervousness, getting angry easily, lack of motivation to do anything, and/or difficulty feeling joy
- Flashbacks which are when the person feels like they are re-experiencing the traumatic event
- Dissociation which involves the person becoming disconnected and they stop responding to anything including you talking to them
- Symptoms of depression and/or anxiety
- Poor sleep including difficulty falling asleep, having nightmares, and experiencing anxiety attacks
- Poor concentration and memory
- Increased sensitivity to pain
- Difficulty feeling small changes in physical sensations like pain and muscle tension
- Difficulty noticing small changes in emotions and behavior

SLIDE 49

Just like anxiety and depression, it is common for PTSD and persistent pain to occur at the same time. So, when treating and supporting patients with persistent pain, health professionals must be able to identify signs of PTSD even when this is not the condition the patient is seeking treatment for. This is even more important if you work in regions where there are many people that experience traumatic experiences like war, violence, poverty, political instability, displacement, and migration.

The assessment form includes a short screening tool for PTSD. It has five questions. The answers give you an indication of whether you need to refer the patient for an assessment for PTSD by a specialist.

This screening tool is a standard tool so it must be done just as it is written. To do the PTSD screening tool, read the underlined statements to the patient exactly as it is written. First, you read the paragraph and ask the patient if they have experienced any traumatic events. The patient does not need to tell you details of the traumatic event. They don't even need to tell you what the event was. This is important to know because asking someone to describe a traumatic event can be harmful to the person and can result in severe reactions. So, the patient can just answer yes or no to this question. If the patient says no, then you do not need to ask the other five questions. If the patient says yes, then you ask the other five questions.

The patient should answer yes or no for each of the five questions. Do not provide any additional explanation or examples. The patient may tell you information about the statement. Allow them to share but then ask them to select one of the answers. You cannot select an answer based on what the patient shares. The patient must select the answer. The answer is based on the patient's perspective and experience.

After the patient have answered all of the five questions, count how many answers were "yes." If there are two or less "yes" answers, the person is unlikely to have PTSD and you don't need to do anything.

If there are three or more “yes” answers, the patient may have PTSD. In this case, you should refer the patient to a mental health professional that has experience working with people with PTSD. If you have a manager or supervisor, it is important that you discuss this referral with them. If a mental health professional is not available, determine who is most appropriate to support the patient in your context. It could be a physician or a trained nurse. It is your responsibility to help the patient understand why another healthcare professional may help them and how they can access this treatment. After making the referral, make sure to follow up with the patient about if they have seen the mental health professional and what their experience was.

If you notice signs of PTSD, but the patient does not answer yes to the screening questions, you can still decide to make a referral. It is important to always use your clinical judgement to support a patient to receive the support that they need.

Generally, you can make a referral for PTSD but also continue to provide the treatment for this patient as planned. PTSD does not make it inappropriate or unsafe to provide treatment and it also does not make the treatment ineffective.

Demonstrate this section using the case example. Make sure it is clear how to score the questionnaire.

SLIDE 50

Have the participants discuss in pairs how symptoms of PTSD may make treatment more challenging and what you could do to address this.

Then have a few participants share their ideas with the large group.

When working with people that have PTSD it is very important that you are aware of body language. Signs of PTSD reactions are similar to anxiety and include breathing becomes faster and/or holding of the breath, sudden sweating, trembling or shaking of the hands or legs, tensing of muscles, look distracted, talking fast and/or talking off topic, and poor eye contact.

If you notice signs a PTSD reaction or increased anxiety, you should respond to them and not just continue with what you have planned. You can use the following strategies to respond to signs of anxiety:

- Guide the patient in belly breathing.
- Give the patient the option to change position, walk around the room, or drink some water.
- Do belly breathing yourself and make your voice slow and calm as you continue the activity. This will have a calming effect on the patient.
- Sometimes a specific activity or topic may cause a PTSD reaction or anxiety. You can ask the patient if they would prefer to take a short break or do a different activity for now and then return to that same activity later. But it is important that you do not avoid the activity or topic completely as this promotes an unhealthy fear avoidance strategy.
- Have the patient walk or do some other type of gentle and pain-free movement.
- Share with the patient that it is very normal to react in this way after experiencing a traumatic event. Discuss with the patient what would be helpful to cope with this reaction so that they can continue to do the treatment.

If a person dissociates, they will suddenly disconnect and stop responding to you and other things in the environment. If this happens, do the following:

- Talk slowly but clearly to the patient. Continue to talk.
- Tell the patient where they are and who you are. Use their name often.
- Continue to tell the patient that they are safe.
- Do not touch the patient as this may scare them and increase the reaction.

If the person has increased signs of PTSD or any significant reaction in a treatment session and the person is unable to return to a stable state, then get support immediately. The person should not return home while having significant symptoms.

SLIDE 51

It is not appropriate, and it can be harmful to have the patient share their traumatic experiences with you, especially if they have PTSD. If a person doesn't have the ability to deal with the reactions that happen when talking about a traumatic event, it can have significant consequences like an extreme anxiety reaction, prolonged depression, and an increased risk of suicide. So, if the patient seems to have a desire to talk directly with you about their traumatic experiences, then do the following:

- Tell the patient that you are the specialist on pain and function and for you to help the patient, in the best way possible, we should concentrate on this.
- Tell the patient that you understand their need to share these experiences, but that you are not the right professional to share them with. Sometimes sharing these experiences without the right support can make people feel more upset and can be dangerous.
- Tell the patient that if they want to talk to someone about their traumatic experiences, you can help refer them to a mental health professional that is a specialist in this.

SLIDE 52

Examination

14. Have the patient do the following movements. Is the patient able to do these movements easily? If no, describe what challenges they have like weakness, decreased ROM, poor balance, pain, fear, anxiety, and protective responses.

Full squat Yes No _____

Bring both arms behind back Yes No _____

Stand on right leg for 5 seconds Yes No _____

Stand on left leg for 5 seconds Yes No _____

This is the objective part of the examination which means that you have the patient perform various movements and tasks. First, you will have the patient perform 4 movements which allows you to screen for a variety of problems including weakness, decreased ROM, poor balance, pain, fear, anxiety, and protective responses. You should demonstrate the movement for the patient and then have them perform it. Make sure to keep the patient safe from falling by standing next to them and providing support as needed. You can instruct the patient to only do the movement as much as they are comfortable. If they do not perform the full movement, ask the patient what it is that stops them from completing the movement like pain, joint stiffness, fear, or something else.

Full squat: The full squat is used because it allows you to do a general assessment of leg strength, balance, and back, hip, knee, and ankle active ROM. Also, research has shown that the ability to do a full squat without difficulty is associated with higher functional ability in daily life. Have the patient squat so that the knees are in full flexion. Write down what you observe on the line on the assessment form. The following are things to observe for as the patient does the full squat:

- Pain: The patient may report pain or demonstrate pain through facial expressions. You can ask the patient to show you where the pain is.
- ROM: Observe to see if the patient does full ROM in the back, knees, and ankles. Attempt to determine why the ROM is limited. ROM can be limited due to pain, fear, decrease in muscle length, or changes in the joint.
- Weakness: Weakness of the leg muscles may be noticed by the patient using one leg more than the other, difficulty returning to standing without hand support, decreased speed, and poor alignment of legs including the knees moving inwards.
- Fear, anxiety, and protective responses: Remember that emotions, including fear and anxiety, contribute to the pain experience and produce protective responses. Protective responses are changes in movement and behavior. So, it is important to observe for anything that indicates fear or anxiety about performing the movement. Common ways a patient may demonstrate fear and anxiety include the following: refuse to do the movement, move slowly, only move through part of the movement, say they are nervous or that they are afraid that the movement will cause pain or damage, increased speed of breathing, holding of the breath, increased muscle tension in body, making fists with the hands, facial expressions and grimacing of the face.
- Balance: You can observe the person's ability to maintain balance while that patient is doing the full squat. Look for any signs of loss of balance.

- **Quality of movement:** Quality of movement refers to the general assessment of how a person is moving. When observing the general quality of movement during a full sway, you should look at the following: equal weightbearing between both legs or are they placing more weight on one leg, alignment of the body, speed of movement, ease of movement, and whether the movement is smooth and fluid without any stops or pauses.

Demonstrate this section using the case example. The person that is acting as the patient should demonstrate the behaviors as described on the assessment form for this case. After doing the movement, ask the participants what they notice and what they would write down on the assessment form.

SLIDE 53

Bring both arms behind back: Have the patient touch both hands between their shoulder blades from the top and from the bottom. Have them perform both hands at the same time so that you can compare the two sides. This movement allows you to look at active ROM of both shoulders. Write down what you observe on the line on the assessment form. The following are things to observe for as the patient does this movement:

- **Pain:** Look for the same things as described above.
- **ROM:** Observe for differences in active ROM between the right and left side. You can use landmarks on the body to document any changes in ROM. For example: Right arm behind back: L1, behind head: T1.
- **Weakness:** Weakness of the muscles that stabilize and move the scapula may be observed. To assess for this, stand behind the patient and observe the movements of the scapula. The scapula should lay flat against the ribs during the moving and not stick out. If they stick out, this is a sign of weakness.
- **Fear, anxiety, and protective responses:** Look for the same things as described above.
- **Quality of movement:** The most common abnormality is poor movement of the scapula. To assess for this, stand behind the patient and observe the movement of the scapula. As the hands move from the top, the shoulder blades should move out. As the arms move from the bottom, the shoulder blades should move in. Notice, if there is decreased movement of the shoulder blades or if there is a difference between how the two shoulder blades move. Also observe for any catches in movement at the shoulder or shoulder blades like where there is a pause in the movement so that it is not fluid. Lastly, assess the patient's cervical and thoracic posture and note any flexion as this often contributes to shoulder problems.

Demonstrate this section using the case example. The person that is acting as the patient should demonstrate the behaviors as described on the assessment form for this case. After doing the movement, ask the participants what they notice and what they would write down on the assessment form.

SLIDE 54

Stand on right leg for 5 seconds; Stand on left leg for 5 seconds: Have the patient cross their arms across their chest. They can keep their eyes open. Ask them to stand on one leg at a time and count slowly to 5. Make sure to stand next to the patient so that you can prevent them from falling if they lose their balance. Write down what you observe on the line on the assessment form. The following are things to observe for as the patient does this movement:

- **Pain:** Look for the same things as described above.
- **Weakness:** Check to see if the patient is locking the knees into hyperextension. This is a sign of muscle weakness as they are trying to gain stability by locking the joint rather than using their leg muscles. If they do this, you can ask them to unlock the knee and then observe then have them repeat the balance activity.
- **Fear, anxiety, and protective responses:** Look for the same things as described above.
- **Quality of movement:** Observe the position of the knee as described above.
- **Balance:** This is used as a screen for balance. A loss of balance includes moving hands away from the chest, touching the foot down briefly for support, using hand support, or requiring your help. If the patient has a loss of balance in this position, then you should include treatments to improve balance as this will be contributing to their pain experience and ability to function in daily life.

Demonstrate this section using the case example. The person that is acting as the patient should demonstrate the behaviors as described on the assessment form for this case. Make sure to demonstrate hyperalgesia. After doing the movement, ask the participants what they notice and what they would write down on the assessment form.

SLIDE 55

15. Signs of nociplastic changes (allodynia and hyperalgesia)

- Patient experiences pain or an increase in pain when you lightly touch the area with pain
- Patient experiences significant pain with gentle active movements of the painful area
- Patient is afraid to move the area with pain

Recall from part 2 that allodynia and hyperalgesia are signs of nociplastic changes. Allodynia is when a person experiences pain with things that are normally not painful. Hyperalgesia is when a person experiences more pain than expected from a thing that is usually painful.

To assess for signs of these nociplastic changes, do the following procedures and check the appropriate boxes on the assessment form.

Using the body chart and what the patient already told you about their pain, select the area that causes the patient the most distress. Tell the patient that you would like to do a few simple things to evaluate this area. Explain what you will do before performing each activity.

Patient experiences pain or an increase in pain when you lightly touch the area with pain: Ask the patient to remove any clothing that may be on that area. Ask them if they have pain in the area right now. Then lightly touch the area with your finger or with a tissue. If the patient had pain in the area before the touch, ask the patient if the pain stayed the same or increased. If the patient did not have pain in the area before the touch, ask the patient if they felt pain during the touch. If the patient experienced pain or an increase in pain when you lightly touch the area, then check the box on the assessment form. This is a sign that indicates that it is likely that the patient has nociplastic pain and changes.

Demonstrate this section using the case example.

SLIDE 56

Patient experiences significant pain with gentle movements of the painful area: Ask the patient to actively move the area with pain and observe for signs of pain. Ask the patient to describe what they feel. If the patient states that they feel pain, ask if they feel any other sensations like tension, stretching, cold, warmth, etc. Write this information down because it will be helpful when providing treatments as one goal of treatment is to improve the person's ability to be aware of physical sensations other than pain. If you already observed this during a previous section of the assessment, then don't need to repeat this activity to determine if the patient experiences significant pain with gentle movements of the painful area.

This activity is looking for signs of hyperalgesia. It is your judgment to whether the patient has significant pain during the movement. To make this decision, consider what would be a normal amount of pain or discomfort with that movement. For example, if you do a stretch of the hamstring muscle, all humans will feel discomfort and pain. This is normal. But someone with hyperalgesia, will feel much more pain than a person with a healthy nervous system. Check the box on the assessment form if you determine that the patient experiences significant pain (more than what is expected) with gentle movement of the painful area.

Demonstrate this section using the case example. The person acting as the patient should demonstrate these as indicated on the case's assessment form. Make sure to demonstrate this also during the movements in the previous section.

SLIDE 57

Patient is afraid to move the area with pain: Remember that emotions, including fear, contribute to the pain experience, movement, and behavior. So, it is important to observe for anything that indicates fear or anxiety about performing the movement. Common ways a patient may demonstrate fear include the following: refuse to do the movement, move slowly, only move through part of the movement, say they are nervous or that they are afraid that the movement will cause pain or damage, increased speed of breathing, holding of the breath, increased muscle tension in body, making fists with the hands, and facial expressions and grimacing of the face. Ask the patient to do gentle active movement of the area with pain and observe for these things. If you already observed this during the previous movement or during a previous part of the assessment, then you can use those observations to make your decision. Check the box on the assessment form if you notice any signs of the patient being afraid to move the area with pain.

Demonstrate this section using the case example. The person acting as the patient should demonstrate these as indicated on the case's assessment form. Make sure to demonstrate this also during the movements in the previous section.

SLIDE 58

16. Active and passive ROM as needed

From the previous movements that you had the patient perform, you already completed a general ROM screen. If there are any significant ROM limitations, then you can measure the active and passive ROM at those specific joints. Write the details of these measurements in the space on the form.

Demonstrate this section using the case example. Ask the participants if they would measure any active or passive ROM for this case. Then demonstrate how to do this. Note, for this case it is not necessary to use a goniometer to measure it. Rather, you can estimate the amount of motion and use landmarks on the body as shown on the case's assessment form.

SLIDE 59

17. Sit to Stand Test

Use a straight back chair with a solid seat that is 40 cm high. Ask the patient to sit on the chair with arms folded across their chest. Give the patient these instructions: "Stand up and sit down as quickly as possible 5 times, keeping your arms folded across your chest."

Stop timing when the participant stands the 5th time.

Time: _____

Check which applies:

- Normal functional ability (less than 8 seconds)
- Decreased functional ability but no fall risk (8 to 12 seconds)
- Decreased functional ability and fall risk (12 seconds or more or unable to safely perform sit to stand without hand support or physical support)

The sit to stand test is a standardized tool. That means that many research studies have been completed to make sure that it measures functional ability and to establish what the score means. To be able to use the total time to determine functional ability as described in the check boxes, you must use a solid seat that is 40cm high. If you don't use the same height, then the total time cannot be used to determine functional ability.

Perform the following procedures to conduct the sit to stand test:

Demonstrate the sit to stand for the patient as described on the assessment form. Make sure to use a timer and don't just count the seconds as this won't be accurate. Encourage the patient to move as fast as they can. Stand by the patient to make sure you can prevent them from falling if they lose their balance. Start the timer when you say go and stop the timer with the patient sits back down on the fifth time. Write the time on the line on the assessment form. Then based on the total time, check the box that indicates the patient's functional ability.

Based on research, a person that completed it in less than 8 seconds has normal functional ability in daily life. A person that completes it within 8 to 12 seconds has decreased functional ability in daily life, but their balance is not significantly impaired, so they do not have an increased risk of falls. A person that completes it in 12 seconds or more or is not able to do it using their hands or physical help, has decreased functional ability in their daily life, poor balance, and has an increased fall risk. An increased fall risk places the person at a high risk of injuries from falls, like fractures which can lead to disability and death. If the patient has anything less than normal functional ability, the treatment plan should include treatments to improve balance and functional ability.

Demonstrate this section using the case example. Make sure to demonstrate correctly how to conduct this test. The patient should be prepared to move as the patient in the case example would.

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18. Other tests and observations

The tests and observations that are included in this assessment form should generally be enough to determine the type of pain and the appropriate treatment plan. But you still may choose to do additional tests. You can write any additional observations or the results of any additional testing in this space on the assessment form.

Demonstrate this section using the case example. Ask the participants if they would do any additional tests or write down any additional observations. Describe that for additional observations, you do not need to do any additional movements if you already observed these. You can just write them down in this section.

Describe and demonstrate the observations for this case.

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Outcome measures: Outcome measures are clinical tools that have been researched to make sure that they are valid and reliable. If an outcome measure is valid, that means that it measures what you think it measures. For example, a valid mouth thermometer provides body temperature, rather than the temperature in the mouth. If an outcome measure is reliable, that means that the measure will get the same result when completed by different people and at different times. For example, a reliable mouth thermometer will provide the same temperature if three different people use it on the same patient. The outcome measures that are included in this form have all been researched to be valid and reliable. So, you can trust the results to be accurate and meaningful. But outcome measures are only accurate if you complete them exactly as they are instructed. Therefore, it is important to follow the instructions for the outcome measures. If you do not, then the results are not accurate or meaningful.

Outcome measures are used for the following reasons:

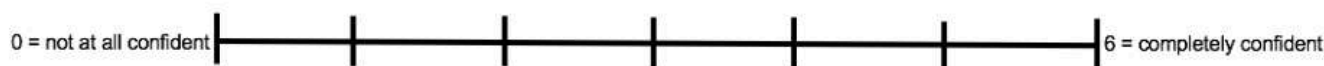
- Provide information to help determine the type of pain and changes
- Provide information to help design the most effective treatment plan
- Provide evidence of improvements by repeating the same outcome measures throughout the treatment sessions and comparing scores

SLIDE 62

Outcome Measures

19. I am going to read two statements to you. For each statement, score how confident you are right now. Give a score on a scale of 0 to 6, where 0 = not at all confident and 6 = completely confident

Show the patient the visual scale.



I can still accomplish most of my goals in life, despite the pain

- 0. Not at all confident
- 1.
- 2.
- 3.
- 4.
- 5.
- 6. Completely confident

I can live a normal lifestyle, despite the pain

- 0. Not at all confident
- 1.
- 2.
- 3.
- 4.
- 5.
- 6. Completely confident

Pain Self-Efficacy Questionnaire Score: _____

This is a standard outcome measure called the Pain Self-Efficacy Questionnaire-2. This short questionnaire measures the patient's ability to manage their pain and participate fully in life despite having pain. We use this questionnaire because we want to focus on improving function rather than on pain.

As we said, it is important to perform the outcome measure exactly as instructed. So, read the underlined statement to the patient. Show the patient the visual scale. This is important as patients will have a difficult time providing a score unless you use this visual scale. Then read the questions exactly as they are written. Do not provide any additional explanation or examples. The patient may tell you information about the statement. Allow them to share this information but then ask them to provide a score. You cannot select a score based on what the patient shares. The patient must select the score. The score is based on the patient's perspective and experience. So, it is normal that patients will each perceive the score differently.

Check the box for the score that they select for each statement. Then add the two numbers to get the "Pain Self-Efficacy Questionnaire Score." A higher score indicates that the patient has greater ability to manage their pain and participate fully in life despite having pain.

Demonstrate this section using the case example. Make sure to demonstrate correctly how to conduct this outcome measure.

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20. During the past month, how would you rate your sleep quality overall?

- Very good
- Fairly good
- Fairly bad
- Very bad

Research has demonstrated a strong connection between sleep and pain. Poor sleep is one factor that contributes to the pain experience. In part 2, we listed all of the factors that contribute to the pain experience including body information. We can list sleep as one of the aspects of body information. People that have poor sleep have higher rates of pain, as well as higher rates of emotional problems like depression and anxiety which also contribute to pain. Poor sleep has been shown to increase the sensitivity of the nervous system. As you have learned, increased sensitivity of the nervous system results in increased pain. Considering all of this, improving or maintaining healthy sleep is one of the factors that the treatment should address. The treatment manuals include treatments for improving sleep.

In the assessment form, there is a standard outcome measure to assess the quality of sleep. Read the question and the four options to the patient exactly as they are written. The patient must select one option. You cannot select the option based on what the patient shares.

Demonstrate this section using the case example. Make sure to demonstrate correctly how to conduct this outcome measure.

SLIDE 64

21. At least once a week, do you do any regular physical activity long enough to work up a sweat? This can be many different types of physical activities like walking fast, heavy work, cleaning, and exercise.

- Yes
- No

If yes, how many hours per week do you do these activities? _____

Research has demonstrated a strong connection between physical activity and pain. Low amounts of physical activity contribute to the pain experience. In part 2, we listed all of the factors that contribute to the pain experience, including behavior. We can list low physical activity as one of the aspects of behavior. Here are some key points from the research about physical activity and pain:

- People that do more regular physical activity have lower rates of persistent pain.
- People with persistent pain have lower levels of physical activity.
- Physical activity and exercise are effective clinical treatments to decrease pain and improve function.
- Physical activity decreases the sensitivity of the nervous system which has an effect on decreasing pain.
- Low levels of physical activity result in conditions that can contribute to pain like muscle weakness, poor cardiovascular endurance, poor muscular endurance, joint stiffness, and muscle tightness.
- Research based guidelines recommend that to achieve all of the health benefits of physical activity, adults should participate in at least 150 minutes of medium-intensity physical activity per week

SLIDE 65

In the assessment form, there is a standard question for assessing the level of medium-intensity physical activity a person participates in regularly. Read the question to the patient exactly as it is written. The question describes the detail about “working up a sweat” because this indicates that they are participating in medium intensity of physical activity and not low intensity physical activity.

If the patient says no, then check the box no and move to the next section of the assessment. If the patient says yes, then ask them to estimate how many hours per week they usually do these activities. Have them focus on the last 2 weeks and not what they used to do before the pain or other problems. The number of hours could be as low, .5 hours/30 minutes per week. The patient should tell you how much in total they do per week and not how long they do it for a single bout of activity. For example, if they work up a sweat when doing the 10-minute walk to their family’s house about 3 times per week, then this would be 1 hour per week (20 minutes round trip times by 3).

Demonstrate this section using the case example. Make sure to demonstrate correctly how to conduct this outcome measure.

SLIDE 66

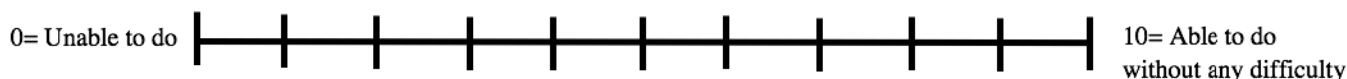
22. Think of three activities that you are unable to do or that you have difficulty doing because of pain and other health problems. For each activity, rate your current ability to do the activity on a scale of 0 to 10 where 0=unable to do and 10= able to do without any difficulty

Show the patient the visual scale.

Activity 1: _____ Score: _____

Activity 2: _____ Score: _____

Activity 3: _____ Score: _____



This is called the Patient Specific Functional Scale. It is a standard questionnaire. This is used to identify the functional activities that are most important to the patient. We use this because we want to focus on improving function rather than pain.

Make sure to complete this questionnaire per the instructions or it will not be accurate to show improvements. Read the statement on the form to the patient. Ask the patient to identify 3 functional activities that are difficult for them. The patient probably already shared things that are difficult for them throughout the assessment. You can ask them if they want to use those activities. If a patient has difficulty thinking of activities, you can list activities that patients with their similar problems will often have difficulty with. After the patient has identified the three activities, write them down on the lines on the assessment form. Then show the patient the visual scale. Have the patient provide a score for each activity. You cannot select a score based on what the patient shares. The patient must select the score. The score is based on the patient's perspective and experience. So, it is normal that patients will each perceive the score differently.

If the patient gives an activity a score of 9 or 10 then they are not having significant difficulty with it. So, you should have them think of a different activity that is more difficult.

Demonstrate this section using the case example. Make sure to demonstrate correctly how to conduct this outcome measure.

SLIDE 67

Complete the information below to select which type of pain and changes the patient has. Then complete the specific assessment for the type of pain and changes that the patient has. The patient may have more than one.

The final phase of the assessment involves you making a clinical decision about which type or types of pain a patient has. Then you complete an outcome measure specific to that type of pain to confirm whether or not your decision is accurate. It is common for a patient to have more than one type of pain. If this occurs, then you do the outcome measures for both and the treatment plan will address both.

SLIDE 68

Signs of nociceptive pain and changes – check those that apply to the patient

- The pain and symptoms are localized
- The pain pattern is related to a specific tissue injury or damage
- The patient has experienced pain for less than 6 months

Does the patient have nociceptive pain and changes? (A patient must have all three items)

- Yes** **No**

Determine if the patient has signs of nociceptive pain and changes. Based on the information that you collected in the assessment, check all the items that apply.

The pain and symptoms are localized: Look at the body chart on the assessment form to determine if the pain and symptoms are localized. Nociceptive pain is pain associated with damage to the tissues. With nociceptive pain, the primary factor contributing to the pain experience is tissue damage or injury. Because the primary factor contributing to the pain experience are danger messages from tissue damage, the pain is localized to one small area. There will not be multiple areas of pain. The pain will not be in a large region of the body. The pain will not be generalized.

The pain pattern is related to a specific tissue injury or damage: Look at the body chart and the information the patient told you, in combination with your knowledge of anatomy, to determine if the pain pattern is related to a specific tissue injury or damage. Because the primary factor contributing to the pain experience are danger messages from tissue damage, the pain pattern is related to a specific tissue. For example, an ankle sprain will have localized pain at the ankle ligament. For example, inflammation and irritation of the L5 joint will have localized pain at the L5/S1 joint.

The patient has experienced pain for less than 6 months: Look at section 7 of the assessment called "Assessing for Nociceptive Pain and Changes" to determine if the patient has experienced pain for less than 6 months. As all tissues heal within 6 months, so if pain continues after 6 months then tissue damage is no longer the primary factor contributing to the pain experience. So, it can only be considered nociceptive pain and changes if the pain has been experienced for less than 6 months.

Based on your clinical judgement, you need to determine if the patient has nociceptive pain and changes. For the patient to have nociceptive pain and changes, all three items must be true. If they are not true, then it is likely that the patient has neuropathic or nociplastic pain.

Demonstrate this section using the case example. Ask the participants to share which items apply for this patient. Then make sure it is clear how none of the items apply for this case.

- The patient's symptoms are not localized as shown on the body chart.
 - The pain pattern is not specific to an injury of a specific tissue like a rotator cuff tear or irritation at a joint in the spine.
 - The patient has had pain for about 2 years.
- The patient does not have signs of nociceptive pain and changes.

SLIDE 69

Signs of neuropathic pain and changes – check those that apply to the patient

- The pain and symptoms are along a nerve distribution
- The patient has a disease or injury of the nervous system and the pain pattern is related to it
- The pain and symptoms are described as burning, shooting, numbness, and tingling
- There are sensory changes like decreased sensation and muscle weakness that are along a nerve distribution
- Positive results on imaging and medical tests are relevant to the pain experience and an injury or disease of the nervous system

Does the patient have neuropathic pain and changes? (A patient must have the first two items)

- Yes No

Determine if the patient has signs of neuropathic pain and changes. Based on the information that you collected in the assessment, check all that apply.

The pain and symptoms are along a nerve distribution: Look at the body chart, in combination with your knowledge of anatomy, to determine if the pain pattern is along a nerve distribution. Neuropathic Pain is pain associated with damage or disease to the central or peripheral nervous system. So, the pain and symptoms must be specific to the damage or disease of the nerves. Study the anatomy of the nervous system, including the nerve distribution. You must know the nerve distributions to be able to determine if the body chart shows that pain and symptoms are along a nerve distribution. But remember that with neuropathic changes, the areas around the nerve that is irritated can become over sensitive. So in this way, there may be a larger area of pain than only the area where the nerve is known to supply.

The patient has a disease or injury of the nervous system and the pain pattern is related to it: Look at section 8 of the assessment called "Assessing for neuropathic pain and changes," to see if the patient has any disease or injury of the nervous system. If they do have a disease or injury of the nervous system, then it is important to determine if the pain and symptoms match the disease or injury of the nervous system. For example, a person may have diabetes and right calf pain. But this pattern of symptoms (right calf pain), does not match with the pain pattern for diabetic neuropathy. So, the pain is not likely to be caused by diabetic neuropathy.

The pain and symptoms are described as burning, shooting, numbness, and tingling: Look at the body chart to see how the patient described their pain and symptoms to determine if they experience burning, shooting, numbness, and/or tingling. Neuropathic pain is described differently than nociceptive or nociplastic pain. These types of symptoms are expected since tissue damage to the nerves are the primary contributing factor to neuropathic pain.

There are sensory changes like decreased sensation and muscle weakness that are along a nerve distribution: If you are able to assess for these sensory changes, do so in the objective examination. If you are unable to assess for these sensory changes, you can still use the other items to determine if a patient has signs of neuropathic pain and changes. As neuropathic pain is associated with damage or disease of the nervous system, there will often be sensory changes. Sensory changes include decreased light touch sensation, decreased temperature sensation, and muscle weakness. Sensory changes can also include signs of allodynia.

Positive results on image and medical tests are relevant to the pain experience and an injury or disease of the nervous system: Look at section 10 in the assessment called "Imaging and Medical Tests" to determine if the patient has had positive results on image and medical tests that are relevant to the pain experience and an injury or disease of the nervous system. Results on imaging and medical tests that indicate an injury or disease of the nervous system and are relevant to neuropathic pain include the following:

- Structures like in the intervertebral or spinal foramen space

Based on your clinical judgement, you need to determine if the patient has neuropathic pain and changes. For the patient to have neuropathic pain and changes, at least the first two items must be true. If they are not true, then it is likely that the patient has nociceptive or nociplastic pain.

Demonstrate this section using the case example. Ask the participants to share which items apply for this patient.

Then make sure it is clear how you use the information gathered on the assessment form to decide the following for this specific patient:

-The pain and symptoms are not along a nerve distribution because the pain is more generalized and doesn't follow the pattern of a specific nerve injury.

-The patient is likely to have damage to the nervous system due to the use of chemotherapy. However, the pain and symptoms are not what is expected with chemotherapy induced peripheral neuropathy (CIPN). Refer back to the section on CIPN if needed.

-The patient did describe numbness in the right hand so item three can be checked.

-The patient reported muscle weakness of the right hand and you observed generalized muscle weakness. But this muscle weakness is not specific to one nerve injury.

- The patient reported no tests or imaging related to neuropathic pain and changes

So, this patient does not have neuropathic pain and changes.

SLIDE 70

Signs of nociplastic pain and changes – check those that apply to the patient

- The pain pattern is not related to a specific tissue injury or damage
- The patient has experienced pain for more than 6 months
- The pain and symptoms are widespread and not localized
- The patient has other symptoms like fatigue, headaches, and/or difficulty thinking
- There are signs of allodynia and/or hyperalgesia
- There is a positive screen for PTSD, anxiety, and/or depression or other signs of emotional problems

Does the patient have nociplastic pain and changes? (A patient must have the first two items)

Yes

No

Determine if the patient has signs of nociplastic pain and changes. Based on the information that you collected in the assessment, check all that apply.

The pain pattern is not related to a specific tissue injury or damage: Look at the body chart and section 9 of the assessment called "Assessing for Nociplastic Pain and Changes" to determine if the pain pattern is not related to a specific tissue injury or damage. With nociplastic pain, the pain pattern will not be specific to tissue injury or damage because tissue injury is not contributing to the pain experience. In other words, the pain will not be logical or make sense to any tissue injury or damage.

The patient has experienced pain for more than 6 months: Look at section 9 of the assessment called "Assessing for Nociplastic Pain and Changes" to determine if the patient has experienced pain for less than 6 months. As all tissues heal within 6 months, if pain continues after 6 months, then the pain is either nociplastic or neuropathic pain.

The pain and symptoms are widespread and not localized: Look at body chart and section 9 of the assessment called “Assessing for Nociceptive Pain and Changes” to determine if the pain and symptoms are widespread. Nociceptive pain is pain that is associated with changes in the neurobiology of nociception and with no evidence of damage of the tissues or nervous system. With nociceptive pain, there are many contributing factors including information from the body, behavior, memories, thoughts and beliefs. Because of the variety of factors contributing to their pain and how they interact with each other in complex ways, the pain is usually not localized to one small area. Rather the pain will be widespread and there may be multiple areas of pain.

The patient has other symptoms like fatigue, headaches, or difficulty thinking: Look at what patient shared with you in section 2 of the assessment and at section 9 of the assessment called “Assessing for Nociceptive Pain and Changes” to determine if the patient has these other symptoms that indicate nociceptive changes. As we described earlier, with nociceptive pain and changes, the nervous system’s increased sensitivity affects not only the neural pathways for pain but also the neural pathways for sleep, moods and emotions, and cognitive ability. So, with nociceptive pain and changes, you will see changes in sleep, energy levels, emotions like anger, depression, and anxiety, and difficulty thinking clearly and remembering things.

There are signs of allodynia and/or hyperalgesia: Look at section 15 of the assessment called “Signs of Nociceptive changes (allodynia and hyperalgesia)” in the Examination section of the assessment. With nociceptive changes the nervous system has increased sensitivity to danger message which causes allodynia and hyperalgesia.

There is a positive screen for PTSD, anxiety, and/or depression or other signs of emotional problems: Look at sections 11, 12, and 13 for the screenings of depression, anxiety and PTSD, to determine if the patient has a positive screen for any of these emotional problems. With nociceptive pain and changes, emotions can be a primary contributor to the pain experience. Research has shown that emotional problems are associated with a high rate of nociceptive pain and changes. But it is possible for someone to have these emotional problems while also having nociceptive pain or neuropathic pain.

Based on your clinical judgement, you need to determine if the patient has nociceptive pain and changes. For the patient to have nociceptive pain and changes, at least the first two items must be true. If they are not true, then it is likely that the patient has nociceptive or neuropathic pain.

Demonstrate this section using the case example. Ask the participants to share which items apply for this patient.

Then make sure it is clear how you use the information gathered on the assessment form to decide the following for this specific patient:

- This patient’s body chart shows a pain pattern that is not related to any specific injury of a tissue. For example, the symptoms are not specific to a rotator cuff tear because this has localized pain.
- The patient has had the pain for about 2 years
- The pain and symptoms are widespread and in a large area as demonstrated by the body chart.
- The patient said that she has fatigue, headaches, and difficulty sleeping.
- The patient had signs of hyperalgesia.
- The patient had a positive screen for symptoms of depression.

This patient has signs of nociceptive pain and changes.

SLIDE 71

The previous section has guided you to determine which type of pain and changes the patient most likely has. The next step is to complete an outcome measure to confirm whether or not the patient has this type of pain.

If the patient is likely to have nociceptive pain and changes, conduct the assessment for nociceptive pain and changes.

If the patient is likely to have neuropathic pain and change, conduct the assessment for neuropathic pain and changes which includes the Pain Detect Questionnaire.

If the patient is likely to have nociplastic pain and changes, conduct the assessment for nociplastic pain and changes which includes the Central Sensitization Inventory.

SLIDE 72

ASSESSMENT FOR NOCICEPTIVE PAIN AND CHANGES

Examine the area where there is localized pain. Check which of the following the patient has in this area:

- Redness
- Swelling
- Warmth

If the patient has redness, swelling, and warmth, then the patient likely has nociceptive pain and changes that will benefit from the treatment approach for an irritated tissue (protect, move, elevate, ice compress)

If the patient does not have redness, swelling, and warmth, then the patient may have nociceptive pain and changes, but it does not require the treatment approach for an irritated tissue. See the treatment manual for an effective treatment plan.

The section is not a standard outcome measure. But it is a guide to determine the best treatment approach for nociceptive pain and changes. You should complete this if you have determined in the previous section that the person most likely has nociceptive pain and changes.

With nociceptive pain and changes, there will be localized pain. Examine the area with localized pain. Make sure to remove any clothing in the area and to have good lighting. You should also remove clothes on the opposite side so that you can compare the two sides. Examine the area and look for any redness in the skin and swelling. Compare the area to the other side as this will make it easier to determine if there is redness or swelling. Place the back of your hand against the area and feel the temperature of the skin. Do the same to the area on the opposite side to compare. You are feeling to see if there is warmth in the area with pain.

If the patient has redness, warmth, and swelling, they will benefit from the treatment approach for an irritated tissue. This treatment approach includes 5 components: protect, move, elevate, ice, compress. The treatment manual provides details in how to use this treatment approach.

If the patient does not have redness, warmth, and swelling then they may still have nociceptive pain and changes, but they do not require the treatment approach for an irritated tissue. The treatment manual provides details in the best treatment approach.

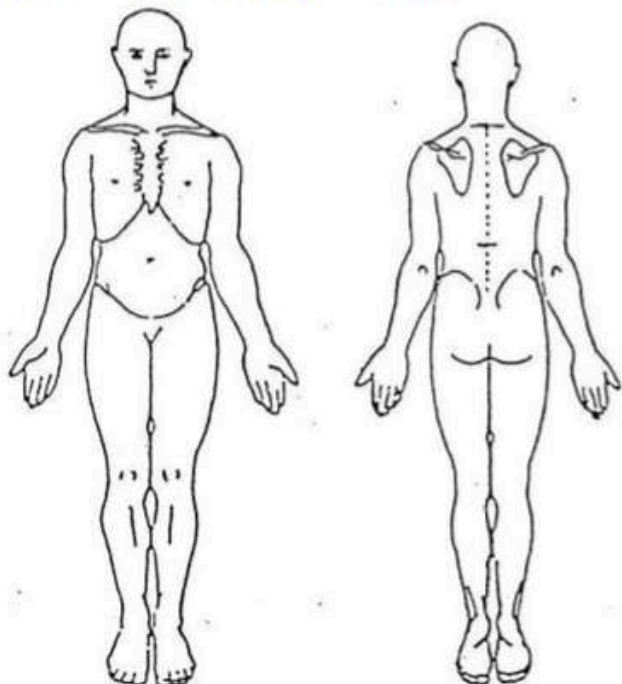
Note, you must be sure that the patient does not have neuropathic or nociplastic pain and changes before you can proceed with a treatment plan for nociceptive pain and changes.

The case does not have indications for assessment of nociceptive pain and changes. But an example of a completed form is included in the curriculum. Use this to demonstrate completing this assessment using a role play. But make sure they know that they would not do this for the case example.

SLIDE 73

ASSESSMENT FOR NEUROPATHIC PAIN AND CHANGES

Pain Detect Questionnaire – Section 1



Mark on the body the one main area of pain for this patient.

1. Does the pain spread from this main area to other regions of the body?

Yes No

If yes, draw where the pain spreads on the body.

If yes, score = 2

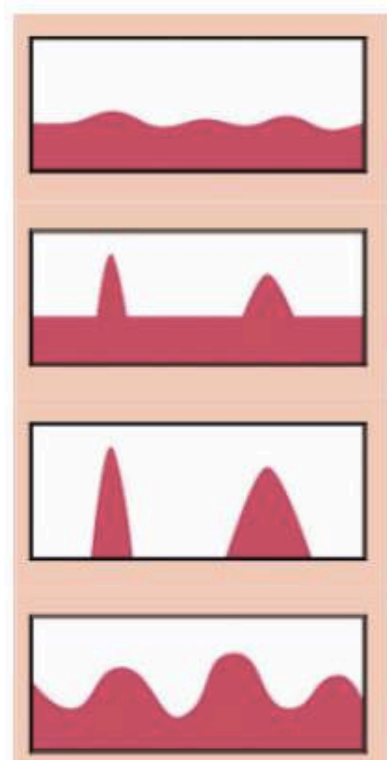
If no, score = 0

The Pain Detect Questionnaire is a standard outcome measure. It has been researched extensively. It is a clinical tool to assess if a patient has neuropathic pain and changes. You should complete the Pain Detect Questionnaire if you have determined in the previous section that the person most likely has neuropathic pain and changes.

The first part of the questionnaire involves completing a body chart. You already did this in the general assessment. But for this body chart, the patient should select one main area of pain. Have the patient show you on their body where that main area of pain is and then draw it on the body chart. Then read the question on the form: Does the pain spread from this main area to other regions of the body? Check yes or no based on the patient's response. Note the scoring in the box based on their answer. This will be important when determining the total score for the questionnaire.

The case does not have indications for neuropathic pain. But the participants have a completed Pain Detect Questionnaire in their training materials. Demonstrate administering this with the patient by using a role play. But make sure they know that they would not do this for the case example.

SLIDE 74



2. Which picture describes the pattern of pain that you feel?

- Continuous pain with small changes (Score of 0)
- Continuous pain with attacks of increased pain (Score of -1)
- Attacks of pain but no pain is felt in between the attacks (Score of +1)
- Attacks of pain and pain is felt in between attacks (Score of +1)

The next part is to ask the patient to select which picture describes the pattern of pain that they feel. Describe each picture using the words provided. The patient should then select which picture best describes their pain experience.

The case does not have indications for neuropathic pain. But the participants have a completed Pain Detect Questionnaire in their training materials. Demonstrate administering this with the patient by using a role play. But make sure they know that they would not do this for the case example.

SLIDE 75

Total score for section 1 = Score from question 1 _____ + Score from question 2 _____ = _____

Calculate the total score for section 1 by putting the score from question 1 in the first line and putting the score from question 2 in the second line. Then add these two number up to get the total score for section 1.

SLIDE 76

Pain Detect Questionnaire – Section 2

I am going to ask you questions about symptoms that people commonly have. For each symptom, we are focusing on the area of the body that you marked above. For each symptom, tell me how much you experience it. The options are never, hardly noticed, slightly, moderately, strongly, or very strongly.

Show the patient the visual scale.



Read the patient these words exactly as they are written. Make sure that they understand that they are only talking about the area that you selected on the body chart in question 1 of this questionnaire. Show the patient the visual scale and explain it to them.

Read each question exactly as it is written. Do not provide more explanation or examples. Have the patient provide a score for each question. You cannot select the score for the patient based on what the patient tells you. The patient must select the score themselves.

Add up the number of checks in each column and enter them in the table for "number of marks in each column." Then calculate the totals for each column by following the instructions on the table. Then add up the totals for each column to get the total score for section 2.

The case does not have indications for neuropathic pain. But the participants have a completed Pain Detect Questionnaire in their training materials. Demonstrate administering this with the patient by using a role play. But make sure they know that they would not do this for the case example.

SLIDE 77

Final Score for Pain Detect Questionnaire

Total score from Section 1 _____ + total score from Section 2 _____ = _____

Check which applies:

- Score of 0 to 15: Neuropathic pain and changes is unlikely
- Score of 16 to 38: Neuropathic pain and changes is likely and treatment for neuropathic pain and changes are likely to be effective

You will now calculate the final score. Put the total score of section 1 on the first line and the total score of section 2 on the second line. Add up these two numbers to get the final score for this questionnaire. Considering the final score, check which applies on the assessment form. A score of 0 to 15 indicates that it is unlikely that the patient has neuropathic pain and changes. A score of 16 to 38 indicates that it is likely that the patient has neuropathic pain and changes and that they will benefit from treatment focusing on neuropathic pain and changes.

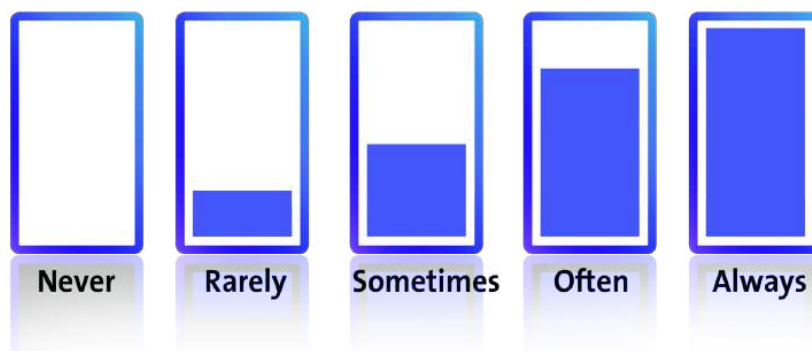
The case does not have indications for neuropathic pain. But the participants have a completed Pain Detect Questionnaire in their training materials. Demonstrate administering this with the patient by using a role play. But make sure they know that they would not do this for the case example.

SLIDE 78

ASSESSMENT FOR NOCIPLASTIC PAIN AND CHANGES**Central Sensitization Inventory – Part A**

For each statement that I read, tell me how often you experience it. Your options are Never, Rarely, Sometimes, Often, or Always.

Show the patient the visual scale.



The Central Sensitization Inventory, or CSI, is a standard outcome measure. It has been researched extensively. The CSI is a clinical tool to assess if a patient has nociplastic pain and changes. You should complete the CSI if you have determined in the previous section that the person most likely has nociplastic pain and changes.

As with the other outcome measures, you must do this exactly as instructed so that the result will be accurate and meaningful. Show the patient the visual scale and explain it to them. Read each statement to the patient exactly as it is written. Do not provide more details and do not give example. You cannot do these things because then the result of the outcome measure will not be accurate.

For each statement that you read, have the patient provide a score. Make sure that they can see the visual scale as this will make their scoring more accurate and consistent. The patient may tell you information when you read them the statement. Give them the space to share this. But then ask them to give the statement a score. You cannot select the score based on what the patient said. The patient must select the score. The score is based on the patient's perspective so differences in how patients perceive it are normal. Research has shown that this does not affect the accuracy of the outcome measure.

After the patient has provided a score for every question, add up the totals for each column. Never=0, Rarely=1, Sometimes=2, Often=3, Always=4. Then add up the total score.

If the total score is 25 or more, it is likely that the patient has nociplastic pain and changes.

Demonstrate this section using the case example. Make sure to demonstrate how to correctly administer this questionnaire. The person acting as the patient should answer as shown on the case's assessment form.

SLIDE 79

Are you able to commit to coming to treatment sessions regularly? Yes No

You want to understand if the patient is able and ready to commit to coming to treatment sessions regularly. You will use this information to create a realistic treatment plan.

Patients may have challenges to attend treatment sessions regularly. Common challenges include a lack of money or time. If the patient is not able to commit to sessions as frequently as you would like, try to modify the treatment plan. For example, consider providing a 1.5-hour session, 2 times a month rather than a 45 minutes session, 1-2 times per week. It is your responsibility to work with the patient to find a way where they can participate in the treatment sessions.

Demonstrate this section using the case example.

SLIDE 80

Tell the patient the results of the assessment and the treatment plan:

- Based on the assessment, you have a type of pain called _____
- Our focus will be on improving function and your ability to do things in your daily life. For example, we will focus on improving your ability to _____
- The pain and your ability to function will get better with treatments like _____
- The treatments will include teaching you things that you can do in your daily life to prevent pain and to cope with pain if it occurs again in the future.
- Do you have any questions or concerns?
- I recommend the following treatment plan:
 - Estimated total number of sessions: _____
 - Schedule of session / number of days per week: _____
- Does this treatment plan work for you?

Does the patient agree to this treatment plan? Yes No

This is the end of the assessment with the patient. After you finish the assessment you should discuss the treatment plan with the patient. The assessment form gives you an outline of the information that you should discuss with the patient. The lines indicate where you describe details specific to that patient.

This is a very important step because this is how you can motivate the patient to commit to the treatment plan. The patient needs to know that you understand the problem and that there is a specific treatment for it. This is also an opportunity for you to provide education so that the patient can begin to understand the type of pain. This discussion should also emphasize to the patient that it will take time and effort to reduce pain and improve function.

After the discussion, ask the patient if they agree to the treatment plan. Check the box according to their answer. If the patient says no, discuss with the patient any alternative options.

Demonstrate this section using the case example. Include details specific to this patient. Some details are included in the case's assessment form.

SLIDE 81

BIOPSYCHOSOCIAL TREATMENT PLAN

Name of patient: _____	Age of patient _____
Date of assessment: _____	Name of physiotherapist: _____

You should complete the treatment plan after the patient has left the assessment. The treatment plan is important for the following reasons:

- Organizes the information you gathered in the assessment to determine the problems to treat
- Provides a summary of the patient and treatment plan so that you can quickly look at the information when you are working with the patient or so that a colleague could quickly understand the patient if they needed to provide support
- Guides you to select the most effective treatment plan
- Identifies goals for the treatment
- Organizes the outcome measures so that you can measure progress throughout the treatment sessions

SLIDE 82

Physiotherapy Problems – Check the ones that apply to this patient

- Nociceptive pain and changes requiring the treatment approach for an irritated tissue
 Nociceptive pain and changes not requiring the treatment approach for an irritated tissue
 Neuropathic pain and changes
 Nociplastic pain and changes
 Decreased functional ability in daily life _____

 Poor sleep _____

 Little physical activity in daily life _____

 Decreased active or passive ROM _____

 Decreased strength _____

 Decreased endurance and tolerance to activity _____

 Poor balance _____

 Other _____

The first part of the treatment plan guides you to identify the physiotherapy problems for this patient. Physiotherapy problems are the problems that the patient has and which the treatment will aim to improve. It does not include problems that the patient has that may be contributing to the pain experience but are not likely to be improved by physiotherapy like financial situations or difficult family relationships.

Complete this list as follows:

- Nociceptive pain and changes requiring the treatment approach for an irritated tissue: Check this box if you determined that the patient has nociceptive pain and changes that requires a treatment approach for an irritated tissue
- Nociceptive pain and changes not requiring the treatment approach for an irritated tissue: Check this box if you determined that the patient has nociceptive pain and changes that does not require a treatment approach for an irritated tissue
- Neuropathic pain and changes: Check this box if you determined that the patient has neuropathic pain and changes
- Nociplastic pain and changes: Check this box if you determined that the patient has nociplastic pain and changes
- Decreased functional ability in daily life: Check this box if the patient reported any problems or difficulties with daily activities. Look at the Sit to Stand Test in section 17 and the functional scale in section 22 of the assessment to identify if the patient has a problem with decreased functional ability in daily life. Write down the activities that the patient has difficulty with. You can write down more than what was included on the functional scale.
- Poor sleep: Check this box if the patient said that they are having difficulty sleeping well. Look at section 20 of the assessment to get this information.
- Little physical activity in daily life: Check this box if in the patient reports that they do less than 150 minutes of medium-intensity physical activity per week. Look at section 21 of the assessment to get this information

- **Decreased active or passive ROM:** Check this box if the patient demonstrates changes in ROM that can be improved or maintained and are contributing to the pain experience or limiting the patient’s function in daily life. Write in the details of the ROM problems on the line. Look at section 16 of the assessment to get this information.
- **Decreased strength:** Check this box if the patient demonstrates decreased strength and it is contributing to their pain experience or limiting the patient’s function in daily life. Look at section 14 of the assessment to identify any muscular weakness.
- **Decreased endurance and tolerance to activity:** Check this box if the patient demonstrated decreased endurance and tolerance to activity and it is contributing to their pain experience or limiting the patient’s function in daily life. Look at the section 4 of the assessment to get this information.
- **Poor balance:** Check this box if you determined that the patient has poor balance which is contributing to the pain experience or limiting the patient’s function in daily life. Look at sections 14 and 17 of the assessment to get this information.
- **Other:** Check this box if the patient has other problems that you will address with treatment. Write the details of these problems on the line.

After explaining how to complete this section. Have the participants work in pairs to complete this section of the treatment plan without looking at the completed example. Then show the case’s completed assessment form and make it clear how the information gathered on the assessment form is used to complete this section.

SLIDE 83

Goals – Based on Outcome Measures					
Complete the details of this table by using the information on the assessment form. If a goal is not applicable to this patient, then leave it blank.					
Goal	First assessment	Second assessment	Third assessment	Fourth assessment	Check when the goal is achieved
	Date:	Date:	Date:	Date:	

The next section guides you to identify the goals for this patient. Complete the details of the table by using the information you wrote down on the assessment form. Not all of the goals will be applicable to all patients. So, if a goal is not applicable, then leave that row blank.

You can see that this document allows you to track the changes that the patient makes on the goals over 4 assessment times. You should write the date of the assessment in the space provided. The first assessment is the initial assessment with the patient. The second, third, and fourth assessments will occur throughout the treatment. The schedule for reassessment is described in the treatment plans but generally you should reassess progress on goals every 4 treatment sessions.

The column called “Check when the goal is achieved” should be checked with patient has achieved this goal. This will help you track what goals the patient has achieved and what goals you are continuing to work on.

Have the participants work in pairs to complete this section of the treatment plan without looking at the completed example. Then show the case’s completed assessment form and make it clear how the information gathered on the assessment form is used to complete this section.

SLIDE 84

Sit to Stand Test – Total Time

Goal=8 seconds or less

Use section 17 of the assessment to identify the patient's total time for the sit to stand test. For the initial assessment, write this number in the second column. If the patient already has a time of 8 seconds or less, then the patient is at a normal level of functional ability. In this case they do not need to work on this goal and you can check the box for "check when the goal is achieved."

SLIDE 85

Pain Self-Efficacy Questionnaire -Total Score

Goal=Increase total score as high as possible

Use section 19 of the assessment to identify the total score for the Pain Self-Efficacy Questionnaire. For the initial assessment, write this number in the second column. The goal is increasing the total score as high as possible. The highest possible score is 12. If the patient already has a score of 12, then you can you can check the box for "check when the goal is achieved."

SLIDE 86

During the past month, how would you rate your sleep quality overall?

Goal=Fairly good or very good

Use section 20 of the assessment to identify the patient's answer. For the initial assessment, check the appropriate box in the second column. The goal is to have a rating of fairly good or very good. If the patient already has one of these ratings, then you can you can check the box for the column "check when the goal is achieved."

SLIDE 87

At least once a week, do you do any regular activity long enough to work up a sweat? - Number of hours per week

Goal=at least 2.5 hours per week

Use section 21 of the assessment to identify the patient's answer. For the initial assessment, write in the number in second column. The goal is to do at least 2.5 hours per week. If the patient already does at least 2.5 hours of physical activity per week, then you can you can check the box for the column "check when the goal is achieved."

SLIDE 88

<p>Activity 1 - write the activity here and write the score for this activity in the boxes to the right</p> <hr/> <p>Goal=improve by at least 3 points</p>
<p>Activity 2 - write the activity here and write the score for this activity in the boxes to the right</p> <hr/> <p>Goal=improve by at least 3 points</p>
<p>Activity 3 - write the activity here and write the score for this activity in the boxes to the right</p> <hr/> <p>Goal=improve by at least 3 points</p>

Use section 22 of the assessment to identify the patient's three functional activities and their scores. Write the activities on the line in the first column and write the score in column two. The goal is for the score reported at the initial assessment to improve by at least 3 points during treatment. Research has shown that this is a meaningful improvement.

SLIDE 89

Central Sensitization Inventory - Total Score

Goal=total score of 15 or less

Use the section of the assessment called "Assessment for nociplastic pain and changes" to identify the total score on the Central Sensitization Inventory. Write the total score in column two. If you did not complete this outcome measure, then leave this blank. The goal is for the total score to be 15 or less. If the patient already has a score of 15 or less, then you can check the box for the column "check when the goal is achieved."

SLIDE 90

Patient has redness, swelling, and warmth

Goal= The patient no longer has these symptoms

Use the section of the assessment called "Assessment for nociceptive pain and changes" to identify if the patient has these symptoms. For the initial assessment, check the yes or no box in column 2. If you did not complete this section of the assessment, then leave it blank. The goal is for it to be No – the patient does not have these symptoms. If the patient already is no for this goal, then you can check the box for the column "check when the goal is achieved."

SLIDE 91

Treatments - Check the treatments that you plan to do with this patient

You should include treatments to address every physiotherapy problem that you selected for this patient. Write details of the treatments for those physiotherapy problems that do not have a treatment manual.

- Nociceptive pain and changes requiring the treatment approach for an irritated tissue: Based on treatment manual
- Nociceptive pain and changes not requiring the treatment approach for an irritated tissue: Based on treatment manual
- Neuropathic pain and changes: Based on treatment manual
- Nociplastic pain and changes: Based on treatment manual
- Decreased functional ability in daily life: Based on treatment manual
- Poor sleep: Based on treatment manual
- Little physical activity in daily life: Based on treatment manual
- Decreased active or passive ROM _____
- _____
- Decreased strength _____
- _____
- Decreased endurance and tolerance to activity _____
- _____
- Poor balance _____
- _____
- Other _____
- _____
- _____

The next section of the treatment plan guides you to identify the treatments that you will do for this patient. For the first 7 problems, there is a treatment manual provided. So, you do not need to write in any details but rather check that box which indicates that you will follow the treatment manual.

For the remaining problems, check the ones that require treatment. You should have treatments described for every problem that you selected in the Physiotherapy Problems section of the treatment plan. On the lines of the document, write in details of the treatments that you plan to provide to address that problem.

For example, for decreased active and passive ROM, if you wrote decreased active ROM of right knee extension in the physiotherapy problems section, then in this section you write treatment for this. The treatments for this example could be knee joint mobilization for knee extension, hamstring stretch, and prolonged stretch in knee extension with weight on thigh.

Have the participants work in pairs to complete this section of the treatment plan without looking at the completed example. Then show the case's completed assessment form and make it clear how the information gathered on the assessment form is used to complete this section. Emphasize that they should write in details of the specific treatments.

SLIDE 92

As you are considering what treatments to provide the patient, it is important to know the research about passive treatments.

Passive treatments include the following:

- Electrotherapy
- Hot pack
- Cold pack
- Ultrasound
- Light therapy
- Kinesiotape
- Laser
- Massage
- Joint mobilizations
- Passive stretching

Research supports the use of using manual therapy which includes soft tissue massage and passive joint mobilizations, in combination with TNE and the other active treatments described in the treatment manuals.

Research has shown that the other passive treatments listed above are not effective at treating pain, especially nociplastic pain. If you consider all of the factors that contribute to pain, passive treatments only impact the body information. Additionally, research has shown that they only have a short-term effect on body information. So, your patient may feel some short-term relief from passive treatments. But only providing passive treatments will not result in any long-term improvements.

Knowing that passive treatments have little effect, you may still choose to do them. For example, it may be appropriate to use a passive treatment, if the patient asks for a specific passive treatment and they have a strong belief that it will help. If you choose to provide a passive treatment, follow these guidelines:

- Spend the majority of the treatment session providing the active treatments described in the treatment manuals
- Only provide passive treatments during the first few treatment sessions
- Educate the patient that the entire treatment is working to provide them with the knowledge and skills to take care of themselves. So, we want to focus on active treatments they can use to manage any pain or other problems that may prevent them from doing activities in daily life.
- Educate the patient so that they understand that active treatments are an important part of treatment You can use this TNE to explain it.

Healthcare professional: If you have a leak in a water pipe in your house, the fastest and easiest way to fix it would be to put tape around it. But what do you think would happen over time? Have the patient share. With time, the water would wear away the tape and the leak would return. Also, if the leak continues, it could cause damage to other parts of your house like the walls or floors. You can think of passive treatments like that tape. They can help for a short period of time, but they don't actually fix the problem. Also, just like the tape, only using passive treatments can lead to other problems developing. Active treatments are like repairing the water pipe that has a leak. Just like repairing the water pipe takes more time, resources, and information, active treatments need more time and effort. But the active treatments result in long term improvements and will prevent other problems from developing.

Ask the participants to share if they would include any passive treatments for this case.

Then describe that based on research, for the case, passive joint mobilizations would be appropriate for the shoulder and thoracic spine. Passive joint mobilizations should be immediately followed by active movement of that area. Also, the patient should be educated that these mobilizations are only helpfully initially to get the joints moving again and to decrease the sensitivity of the nervous system. Then active movement of the area and exercise is most beneficial.

Massage may also be appropriate to the neck, upper back, and shoulder musculature if the patient has a preference for this. Massage should be immediately followed by active movement of that area. Also, the patient should be educated that massage is helpful in decreasing the sensitivity of the nervous system, but it is only helpful initially and then more active treatments will be better.

The patient did not request any other treatments so no additional passive treatments should be included in the treatment plan.

SLIDE 93

Would the patient benefit from seeing other professionals? - Check those that apply and write in the details

Note, imaging like an MRI or X-ray is not helpful or necessary when a person has pain except in two situations:

- 1) patient has neuropathic pain with signs of nerve compression or 2) patient has signs of a serious medical condition like a fracture, cancer, or cauda equina syndrome.

- Physician _____
- Equipment (walker, cane, etc.) _____
- Mental health professional _____
- Social worker _____
- Other _____

Actions that you took to make the referral _____

Date of when the patient saw the other professional _____

The next section of the treatment plan guides you to identify if the patient has any needs that require other healthcare professionals. It is your responsibility to know how to make referrals and to identify professionals to refer to.

Check on the form any referrals that would be beneficial to the patient. Then write in details on the line. It is your responsibility to work with the patient to help them see the recommended healthcare professional. Your support could include giving the patient the information of the healthcare professional and/or calling the healthcare professional yourself. It can be helpful to write a short note that the patient brings to the healthcare professional. The note can include information that would help the healthcare professional know what the patient needs. For example, you can write the details about what equipment the person needs. Or you can write information for the mental health professional about the results of the screenings for anxiety, depression, and PTSD.

On the form, write on the line the actions that you took to make the referral. There is also a line on the form that allows you to document the date when the patient saw the healthcare professional. This will help you remember to follow-up with the patient about their experience.

SLIDE 94

Physician:

- Look at section 6 to determine if the patient has any uncontrolled medical conditions that would benefit from support by a physician
- As described on the assessment form, you should not recommend imaging (MRI, CT scan, or X-ray) for pain conditions except for the following two conditions:
 - Patient has neuropathic pain with signs of nerve compression.
 - Patient has signs of a serious medical condition like a fracture, cancer, or cauda equina syndrome
 - The American College of Physicians and the American Pain Society Guidelines for diagnosis and treatment of low back pain state that images are not required for low back pain except if there are signs of nerve compression or a serious medical condition.
 - Based on these guidelines, you should only recommend a physician for imaging for a potential nerve compression if you have confirmed that the patient has neuropathic pain and changes. So, in addition to signs of neuropathic pain and changes, they should also have a total score 15 to 38 on the Pain Detect Questionnaire. If you refer for imaging for neuropathic pain, you can also continue to provide treatment for the same condition.
 - Based on these guidelines, you should refer for imaging if there are signs of a serious medical condition. Look at the section 5 of the assessment to determine if the patient has any signs of a serious medical condition.

SLIDE 95

Equipment: It is your responsibility to make sure that the patient has any equipment that they need to be able to do as much as they can in daily life and to remain safe. You should assess for any equipment needs including walker, cane, toilet seat, brace, orthotic, splint, etc.

Mental health professional: Look at sections 11, 12, and 13 of the assessment for the results of the screenings for depression, anxiety and PTSD. Follow the recommendations provided in these sections.

Social worker: We know that emotions and the environment and context contribute to the pain experience. Therefore, it is your responsibility to consider how these may be affecting the patients and to make referrals to support any challenges a patient may be experiencing in these areas. Their needs could include financial, legal, social support, housing, education, or anything else that is creating a stressful living situation. Refugees and people that are displaced in their own country are at a high risk for these types of needs. Often a social worker is the best professional to support these needs but there may be other professionals in your context.

Other: If the patient has any other additional needs, you can write the details here.

Ask the participants to share how they would complete this section of the treatment plan for the case.

Then describe that based on the screening for depression, it would be important to refer the patient to a mental health professional. Demonstrate how the physiotherapist should discuss this with the patient. It can be something like this: "You shared that some things today that makes me think that you may have feelings of depression and sadness. These are normal and many people experience these in their life. But it is helpful to have someone help with this because these emotions can contribute to your pain. Do you think they contribute to your pain?" Have patient share. "So, I can refer you to someone, like a counselor, that can help you with the feelings of depression and sadness. I have referred other patients there and they have had a good experience. It not only helped with the emotions, but it also helped with their pain and improved their ability to do things in their daily life. Are you interested in this?" Have the patient share. "Is it ok if I call the counselor and give them some basic information about you and your situation. Then they will call you and schedule an appointment. I will also give you their contact details so that you can follow up with them if they don't call you. Does that sound like a good plan? Do you have any questions?"

SLIDE 96

How many treatment sessions do you think this patient will need?

- 1 – 3
- 4 – 10
- 10 – 15
- 15 – 20
- Other _____

How often will this patient have a treatment session?

- 1 time every month
- 1 time every 2 weeks
- 1 time per week
- 2 times per week
- 3 times per week
- Other _____

This is the last section of the treatment plan. The form guides you to make two decisions about how the treatment will be carried out.

How many treatment sessions do you think the patient will need? This is your best guess at what the patient will need but it may change as you provide treatment. Some patients may meet the goals more quickly than anticipated or some patients may need more treatment sessions than you thought to meet the goals. You can base this decision on the type of pain the patient has, and the number of sessions included in the treatment manual for that type of pain.

How often will this patient have a treatment session? You should create a realistic plan for the patient. So, you should also consider the needs and preferences of the patient. For example, you may think it is best if the patient comes 2 times per week, but the patient may only be able to come 1 time every 2 weeks because of limited time or they have to travel long distances to the clinic.

Have the participants share how they would complete this section of the treatment plan for this patient. Explain that the nociplastic treatment manual includes 10 session but it may take more considering that this patient has symptoms of depression. Explain that for this patient, 1 time every 2 weeks is most appropriate because that is what she is able to commit to.

SLIDE 97

You now have the knowledge and basic skills to complete a biopsychosocial assessment of pain and to develop a biopsychosocial treatment plan. But you need to practice doing this so that you can further develop this ability. It is recommended that you now start using this assessment form with patients. If at first it seems too difficult to do with all of the patients that you see, set a realistic goal of how many times you will do it in a week. For example, you may set a goal of doing the biopsychosocial assessment and treatment plan five times per week. Then as you further develop the skills, get more comfortable with it, and become more efficient (it takes less time to do), then you can gradually increase until you are doing it with all patients.

If time allows, do this activity:

Have all of the participants fill out a blank assessment form to be used as a case example. To do this, it can be helpful for them to think of a patient that they have worked with and use this to fill out the form. They do not need to fill out the treatment plan.

Then have the participants form groups of 2. They will do the assessment in role play. One person will be the physiotherapist and one person will be the patient. If time allows, they can switch roles and also complete the treatment plan for the case. The trainers should move around the room and provide support as needed.

If time allows, bring the large group back together and ask if anyone has any questions after doing the role play. Use this an opportunity to make sure they understand how the assessment and treatment plan is conducted.

Inform the participants of their homework. Before next training session, every participant should complete a biopsychosocial assessment and treatment plan with at least 3 patients. They should bring the completed forms to the next training session.

ADDITIONAL LEARNING RESOURCES

- Therapeutic relationship: <https://www.youtube.com/watch?v=5Mzc2eUIWTO>
- Shared decision making: <https://www.youtube.com/watch?v=Cb8lehLcSIM>
- Active listening: <https://www.youtube.com/watch?v=nogoxMPOSNE>
- How trauma affects health: <https://www.youtube.com/watch?v=95ovIJ3dsNk&t=12s>
- How stress affects the mind and body: https://www.youtube.com/watch?v=CZTc8_FwHGM
- How stress affects the brain: <https://www.youtube.com/watch?v=WuyPuH9ojCE>
- Informed consent: <https://www.youtube.com/watch?v=mJ2GgOjatCA>
- Muscular endurance: <https://www.youtube.com/watch?v=W5w887QoXyk>
- Signs of cancer: <https://www.youtube.com/watch?v=V7EVkbAxP8E&t=38s>
- Cauda equina syndrome: https://www.physio-pedia.com/Cauda_Equina_Syndrome
- Exercise is medicine: <https://www.youtube.com/watch?v=vCi4s08BDGU>
- Chemotherapy induced peripheral neuropathy: <https://www.youtube.com/watch?v=Zki82j3SmMo>
- Working with persons with trauma: <https://www.youtube.com/watch?v=fWken5DsJcw>
- Depression and pain: <https://www.youtube.com/watch?v=onIlbTBzpw8>
- Example of how to help someone having an anxiety attack:
<https://www.youtube.com/watch?v=IAODG6KaNBc>
- PTSD: https://www.youtube.com/watch?v=b_n9qegR7C4
- Fear avoidance cycle: https://www.youtube.com/watch?v=7_edqph3Meg
- Outcome measures: <https://www.youtube.com/watch?v=UI6xpLLNGvY>
- Sit to stand test: <https://www.youtube.com/watch?v=4N4PhZlyYGM>
- Peripheral nerve testing: <https://www.raynersmale.com/blog/2015/1/17/sensation-testing-for-person-with-peripheral-lesion>
- Imaging: <https://www.painscience.com/articles/mri-and-x-ray-almost-useless-for-back-pain.php>

BIOPSYCHOSOCIAL ASSESSMENT OF PAIN

Name of patient: _____ Age of patient _____

Date of assessment: _____ Name of physiotherapist: _____

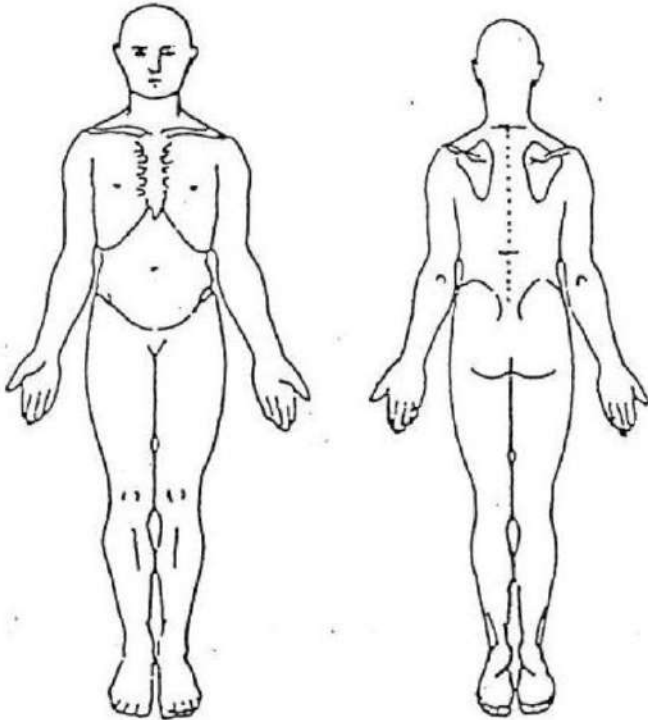
Information about the patient: _____

1. Informed Consent

Today, we will do an assessment. It will take about 30 to 45 minutes. The assessment involves you telling me about any physical problems that you have, like pain, difficulty sleeping, and difficulty doing things in your daily life. I will use this information to diagnose the type of pain and the things that are contributing to the pain. I will write down information that you share on this form, but I will keep it private and not share it with anyone else. I will recommend the best treatment based on the results of this assessment. At the end of the assessment, we will make a plan together for the treatment. Do you have any questions?



Would you like to do the assessment now? Yes No


2. What symptoms and problems are you having?



Mark on the body where the person experiences symptoms. Have the person show on their body or on the picture exactly where they feel the symptoms.

Use the different patterns to show the different symptoms.

Pain:  Numbness or tingling: 

Discomfort: 

3. Does the patient have any environmental or social factors that are contributing to their pain?

- Financial problems _____
- Unsafe living situation _____
- Difficult family situation _____
- Legal problems _____
- Other _____

4. Do you experience any of the following things, when completing activities in your daily life like cooking, cleaning, shopping, walking, or working?

- Get tired very easily _____
- Feel the need to take rest breaks _____
- Shortness of breath that is uncomfortable _____
- Muscles feel tired and weak _____

5. Do you have any of the following?

- Unable to put weight on your arm or leg; recent fall or other traumatic event; swelling; redness (**Signs of a fracture – Send to a doctor immediately**)
- Fever; chills; unexplained weight loss; history of cancer; recent infections or illness (**Signs of a serious medical condition like infection or cancer – Send to doctor for evaluation before starting treatment**)
- Numbness in the groin, difficulty urinating, diarrhea or difficulty holding feces (**Signs of cauda equina syndrome / spinal cord injury – Send to doctor immediately for this medical emergency**)

6. Do you or have you had any of the following medical conditions?

- | | |
|---|---|
| <input type="checkbox"/> Heart conditions _____ | <input type="checkbox"/> Hernia _____ |
| <input type="checkbox"/> Hypertension _____ | <input type="checkbox"/> IBS _____ |
| <input type="checkbox"/> Diabetes _____ | <input type="checkbox"/> Bladder infections _____ |
| <input type="checkbox"/> Stroke _____ | <input type="checkbox"/> Allergies _____ |
| <input type="checkbox"/> Seizures _____ | <input type="checkbox"/> Anemia _____ |
| <input type="checkbox"/> Cancer _____ | <input type="checkbox"/> Any surgery _____ |
| <input type="checkbox"/> Asthma _____ | <input type="checkbox"/> Any other injuries or conditions _____ |
| <input type="checkbox"/> Arthritis (rheumatoid) _____ | _____ |
| <input type="checkbox"/> Osteoporosis _____ | _____ |

7. Assessing for nociceptive pain and changes

Have you been experiencing pain for less than 6 months? Yes No

Has the pain and symptoms gradually improved? Yes No

8. Assessing for neuropathic pain and changes

Do you have or have you had any of the following problems?

- | | |
|-----------------------------------|--|
| <input type="checkbox"/> Diabetes | <input type="checkbox"/> Injury to a nerve |
| <input type="checkbox"/> Cancer | <input type="checkbox"/> Shingles |

9. Assessing for nociplastic pain and changes

Have you been experiencing pain for greater than 6 months? Yes No

Does the pain get worse in cold or hot temperatures? Yes No

Do you have any of the following problems?

- | | |
|---|---|
| <input type="checkbox"/> Headaches | <input type="checkbox"/> Difficulty concentrating or remembering things |
| <input type="checkbox"/> Difficulty sleeping | <input type="checkbox"/> Body feels stiff and achy |
| <input type="checkbox"/> Feel tired very easily | <input type="checkbox"/> Pain has spread to many areas of the body |

10. Imaging and medical tests

Have you had any imaging for this problem like MRIs or x-rays? What were the results? _____

Have you had any other medical tests? What were the results? _____

Based on your clinical judgement, are the images and tests relevant to the pain experience? Yes No

Consider the following when making this decision:

The following results on images and tests are usually not relevant to the pain experience: osteoarthritis, disc prolapse/disc bulge/disc herniation, spondylolisthesis, degeneration of the vertebral discs, spinal stenosis/narrowing of the spinal canal, decreased fluid in the joint, osteophytes, cartilage damage, bone marrow lesions, meniscus tear in knee, rotator cuff tears, labral tears in shoulder or hip, joint degeneration, hip impingement, shoulder impingement

The following results on images and tests may contribute to neuropathic pain and changes: structures in the intervertebral space, structures in the spinal foramen space

Often stress and emotions can affect pain and physical health. So, I will now ask you some questions about this.

11. Screening Tool for Depression

Over the last 2 weeks, how often have you had a problem with feeling little interest or pleasure in doing things?

- Not at all (0)
- Several days (1)
- More than half the days (2)
- Nearly every day (3)

Over the last 2 weeks, how often have you had a problem with feeling down, depressed or hopeless?

- Not at all (0)
- Several days (1)
- More than half the days (2)
- Nearly every day (3)

Total Score: _____ Is this 3 or more? Yes No

If yes, then the person may have depression that requires treatment. You should help the person see a mental health professional as soon as possible.

12. Screening Tool for Anxiety

Over the last 2 weeks, how often have you had a problem with feeling nervous, anxious or on edge?

- Not at all (0)
- Several days (1)
- More than half the days (2)
- Nearly every day (3)

Over the last 2 weeks, how often have you had a problem with not being able to stop or control worrying?

- Not at all (0)
- Several days (1)
- More than half the days (2)
- Nearly every day (3)

Total Score: _____ Is this 3 or more? Yes No

If yes, then the person may have anxiety that requires treatment. You should help the person see a mental health professional as soon as possible.

13. Screening for Post-Traumatic Stress Disorder (PTSD)

Often people experience stressful, frightening, and overwhelming experiences in their life like war, torture, violence, death of family members, abuse, or car accidents. These experiences can have an impact on pain and physical health. You don't need to share the details of any experiences, but have you ever experienced a traumatic event like this?

Yes _____ No

If the patient answers yes, then ask the following questions:

1. In the past month, have you had nightmares about the event(s) or thought about the event(s) when you did not want to?
 Yes No
2. In the past month, have you tried hard not to think about the event(s) or went out of your way to avoid situations that reminded you of the event(s)?
 Yes No
3. In the past month, have you been constantly on guard, watchful, or easily startled?
 Yes No
4. In the past month, have you felt numb or detached from people, activities, or your surroundings?
 Yes No
5. In the past month, have you felt guilty or unable to stop blaming yourself or others for the event(s) or any problems the event(s) may have caused?
 Yes No

Total number of yes answers: _____ Is this 3 or more? Yes No

If yes, then the person may have PTSD that requires treatment. You should help the person see a mental health professional as soon as possible.

Examination

14. Have the patient do the following movements. Is the patient able to do these movements easily? If no, describe what challenges they have like weakness, decreased ROM, poor balance, pain, fear, anxiety, and protective responses.

Full squat Yes No _____

Bring both arms behind back Yes No _____

Stand on right leg for 5 seconds Yes No _____

Stand on left leg for 5 seconds Yes No _____

15. Signs of nociplastic changes (allodynia and hyperalgesia)

- Patient experiences pain or an increase in pain when you lightly touch the area with pain
- Patient experiences significant pain with gentle active movements of the painful area
- Patient is afraid to move the area with pain

16. Active and passive ROM as needed

17. Sit to Stand Test

Use a straight back chair with a solid seat that is 40 cm high. Ask the patient to sit on the chair with arms folded across their chest. Give the patient these instructions: "Stand up and sit down as quickly as possible 5 times, keeping your arms folded across your chest."

Stop timing when the participant stands the 5th time.

Time: _____

Check which applies:

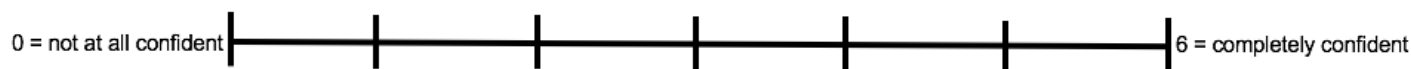
- Normal functional ability (less than 8 seconds)
- Decreased functional ability but no fall risk (8 to 12 seconds)
- Decreased functional ability and fall risk (12 seconds or more or unable to safely perform sit to stand without hand support or physical support)

18. Other tests and observations

Outcome Measures

19. I am going to read two statements to you. For each statement, score how confident you are right now. Give a score on a scale of 0 to 6, where 0 = not at all confident and 6 = completely confident

Show the patient the visual scale.



I can still accomplish most of my goals in life, despite the pain

- 0. Not at all confident
- 1.
- 2.
- 3.
- 4.
- 5.
- 6. Completely confident

I can live a normal lifestyle, despite the pain

- 0. Not at all confident
- 1.
- 2.
- 3.
- 4.
- 5.
- 6. Completely confident

Pain Self-Efficacy Questionnaire Score: _____

20. During the past month, how would you rate your sleep quality overall?

- Very good
- Fairly good
- Fairly bad
- Very bad

21. At least once a week, do you do any regular physical activity long enough to work up a sweat? This can be many different types of physical activities like walking fast, heavy work, cleaning, and exercise.

- Yes
- No

If yes, how many hours per week do you do these activities? _____

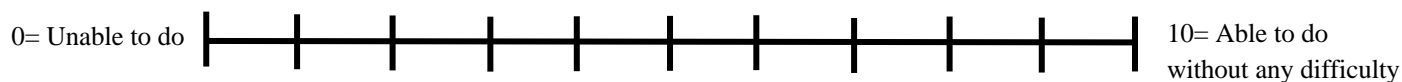
22. Think of three activities that you are unable to do or that you have difficulty doing because of pain and other health problems. For each activity, rate your current ability to do the activity on a scale of 0 to 10 where 0=unable to do and 10= able to do without any difficulty

Show the patient the visual scale.

Activity 1: _____ Score: _____

Activity 2: _____ Score: _____

Activity 3: _____ Score: _____



Complete the information below to select which type of pain and changes the patient has. Then complete the specific assessment for the type of pain and changes that the patient has. The patient may have more than one.

Signs of nociceptive pain and changes – check those that apply to the patient

- The pain and symptoms are localized
- The pain pattern is related to a specific tissue injury or damage
- The patient has experienced pain for less than 6 months

Does the patient have nociceptive pain and changes? (A patient must have all three items)

- Yes No

Signs of neuropathic pain and changes – check those that apply to the patient

- The pain and symptoms are along a nerve distribution
- The patient has a disease or injury of the nervous system and the pain pattern is related to it
- The pain and symptoms are described as burning, shooting, numbness, and tingling
- There are sensory changes like decreased sensation and muscle weakness that are along a nerve distribution
- Positive results on imaging and medical tests are relevant to the pain experience and an injury or disease of the nervous system

Does the patient have neuropathic pain and changes? (A patient must have the first two items)

- Yes No

Signs of nociplastic pain and changes – check those that apply to the patient

- The pain pattern is not related to a specific tissue injury or damage
- The patient has experienced pain for more than 6 months
- The pain and symptoms are widespread and not localized
- The patient has other symptoms like fatigue, headaches, and/or difficulty thinking
- There are signs of allodynia and/or hyperalgesia
- There is a positive screen for PTSD, anxiety, and/or depression or other signs of emotional problems

Does the patient have nociplastic pain and changes? (A patient must have the first two items)

- Yes No

Are you able to commit to coming to treatment sessions regularly? Yes No

Tell the patient the results of the assessment and the treatment plan:

- Based on the assessment, you have a type of pain called _____
- Our focus will be on improving function and your ability to do things in your daily life. For example, we will focus on improving your ability to _____
- The pain and your ability to function will get better with treatments like _____
- The treatments will include teaching you things that you can do in your daily life to prevent pain and to cope with pain if it occurs again in the future.
- Do you have any questions or concerns?
- I recommend the following treatment plan:
 - Estimated total number of sessions: _____
 - Schedule of session / number of days per week: _____
- Does this treatment plan work for you?

Does the patient agree to this treatment plan? Yes No

ASSESSMENT FOR NOCICEPTIVE PAIN AND CHANGES

Examine the area where there is localized pain. Check which of the following the patient has in this area:

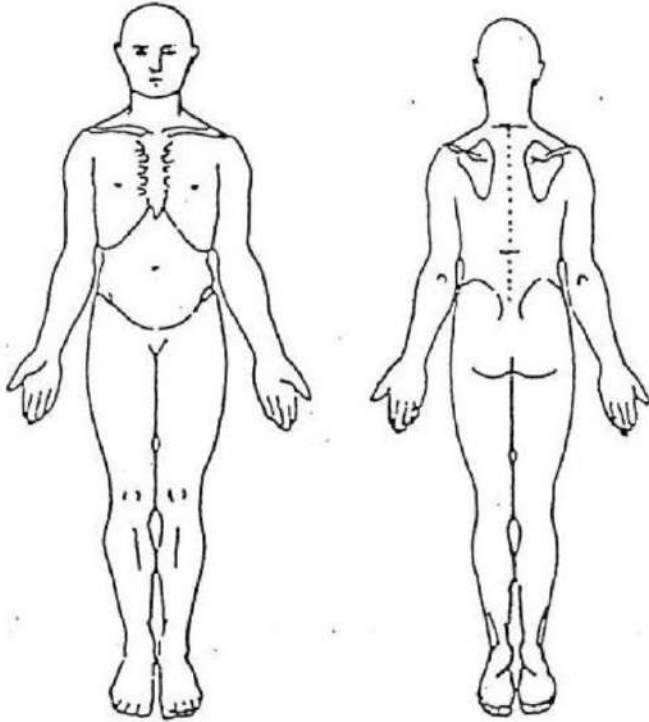
- Redness
- Swelling
- Warmth

If the patient has redness, swelling, and warmth, then the patient likely has nociceptive pain and changes that will benefit from the treatment approach for an irritated tissue (protect, move, elevate, ice compress)

If the patient does not have redness, swelling, and warmth, then the patient may have nociceptive pain and changes, but it does not require the treatment approach for an irritated tissue. See the treatment manual for an effective treatment plan.

ASSESSMENT FOR NEUROPATHIC PAIN AND CHANGES

Pain Detect Questionnaire – Section 1

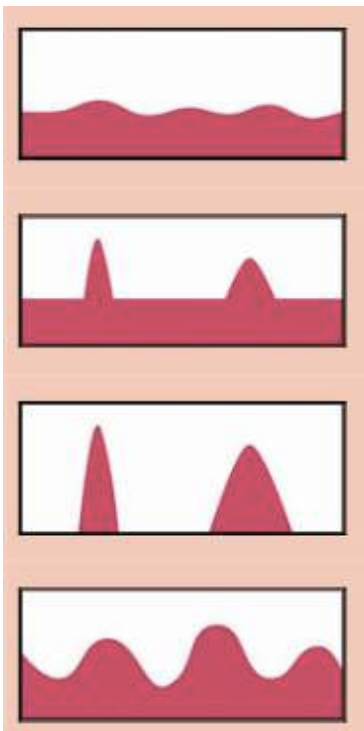


Mark on the body the one main area of pain for this patient.

1. Does the pain spread from this main area to other regions of the body?
 Yes No

If yes, draw where the pain spreads on the body.

If yes, score = 2
 If no, score = 0



2. Which picture describes the pattern of pain that you feel?

Continuous pain with small changes (Score of 0)

Continuous pain with attacks of increased pain (Score of -1)

Attacks of pain but no pain is felt in between the attacks (Score of +1)

Attacks of pain and pain is felt in between attacks (Score of +1)

Total score for section 1 = Score from question 1 _____ + Score from question 2 _____ = _____

Pain Detect Questionnaire – Section 2

I am going to ask you questions about symptoms that people commonly have. For each symptom, we are focusing on the area of the body that you marked above. For each symptom, tell me how much you experience it. The options are never, hardly noticed, slightly, moderately, strongly, or very strongly.

Show the patient the visual scale.



Pain Detect Questionnaire – Section 2

Item	Never	A ^{very} small amount	A small amount	A medium amount	A strong amount	A ^{very} strong amount
1. Do you have a burning feeling in this area?						
2. Do you have a tingling feeling in this area? This may feel like ants crawling on your skin.						
3. Is it painful in this area when something touches your skin lightly, like a blanket or a piece of clothing?						
4. In this area, do you have sudden pain attacks that feel like electric shocks?						
5. Does cold or heat on this area cause you to feel pain?						
6. Do you feel numbness in this area?						
7. Does slight pressure, like pushing on the skin with your finger, cause pain in this area?						
Number of marks in each column						
	Multiply by 0	Multiply by 1	Multiply by 2	Multiply by 3	Multiply by 4	Multiply by 5
Totals for each column						
Total Score for section 2 Add up the totals for each column						

Final Score for Pain Detect Questionnaire

Total score from Section 1 _____ + total score from Section 2 _____ = _____

Check which applies:

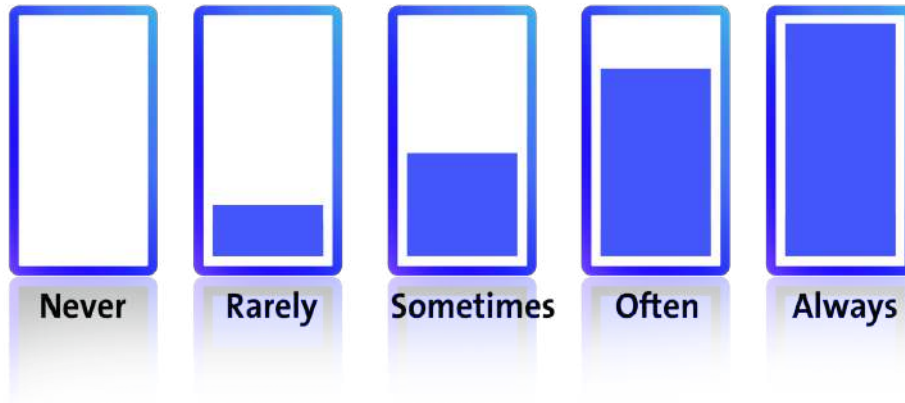
- Score of 0 to 15: Neuropathic pain and changes is unlikely
 Score of 16 to 38: Neuropathic pain and changes is likely and treatment for neuropathic pain and changes are likely to be effective

ASSESSMENT FOR NOCIPLASTIC PAIN AND CHANGES

Central Sensitization Inventory – Part A

For each statement that I read, tell me how often you experience it. Your options are Never, Rarely, Sometimes, Often, or Always.

Show the patient the visual scale.



Item	Never 0	Rarely 1	Sometimes 2	Often 3	Always 4
1. I feel tired and unrefreshed when I wake from sleeping.					
2. My muscles feel stiff and achy.					
3. I have anxiety attacks.					
4. I grind or clench my teeth.					
5. I have problems with diarrhea and/or constipation.					
6. I need help in performing my daily activities.					
7. I am sensitive to bright lights.					
8. I get tired very easily when I am physically active.					
9. I feel pain all over my body.					
10. I have headaches.					
11. I feel discomfort in my bladder and/ or burning when I urinate.					

Item	Never 0	Rarely 1	Sometimes 2	Often 3	Always 4
12. I do not sleep well					
13. I have difficulty concentrating.					
14. I have skin problems such as dryness, itchiness, or rashes.					
15. Stress makes my physical symptoms get worse.					
16. I feel sad or depressed.					
17. I have low energy.					
18. I have muscle tension in my neck and shoulders.					
19. I have pain in my jaw.					
20. Certain smells, such as perfumes, make me feel dizzy and nauseated.					
21. I have to urinate frequently.					
22. My legs feel uncomfortable and restless when I am trying to go to sleep at night.					
23. I have difficulty remembering things.					
24. I suffered trauma as a child.					
25. I have pain in my pelvic area.					
Totals for each column					
TOTAL SCORE					
A total score of 25 or more indicates that treatment for nociplastic pain and changes will be most effective					

BIOPSYCHOSOCIAL TREATMENT PLAN

Name of patient: _____ Age of patient _____

Date of assessment: _____ Name of physiotherapist: _____

Physiotherapy Problems – Check the ones that apply to this patient

- Nociceptive pain and changes requiring the treatment approach for an irritated tissue
- Nociceptive pain and changes not requiring the treatment approach for an irritated tissue
- Neuropathic pain and changes
- Nociplastic pain and changes
- Decreased functional ability in daily life _____

- Poor sleep _____

- Little physical activity in daily life _____

- Decreased active or passive ROM _____

- Decreased strength _____

- Decreased endurance and tolerance to activity _____

- Poor balance _____

- Other _____

Goals – Based on Outcome Measures

Complete the details of this table by using the information on the assessment form. If a goal is not applicable to this patient, then leave it blank.

Goal	First assessment Date:	Second assessment Date:	Third assessment Date:	Fourth assessment Date:	Check when the goal is achieved
Sit to Stand Test – Total Time Goal=8 seconds or less					<input type="checkbox"/>
Pain Self-Efficacy Questionnaire -Total Score Goal=Increase total score as high as possible					<input type="checkbox"/>
During the past month, how would you rate your sleep quality overall? Goal=Fairly good or very good	<input type="checkbox"/> Very good <input type="checkbox"/> Fairly good <input type="checkbox"/> Fairly bad <input type="checkbox"/> Very bad	<input type="checkbox"/> Very good <input type="checkbox"/> Fairly good <input type="checkbox"/> Fairly bad <input type="checkbox"/> Very bad	<input type="checkbox"/> Very good <input type="checkbox"/> Fairly good <input type="checkbox"/> Fairly bad <input type="checkbox"/> Very bad	<input type="checkbox"/> Very good <input type="checkbox"/> Fairly good <input type="checkbox"/> Fairly bad <input type="checkbox"/> Very bad	<input type="checkbox"/>
At least once a week, do you do any regular activity long enough to work up a sweat? - Number of hours per week Goal=at least 2.5 hours per week					<input type="checkbox"/>
Activity 1 - write the activity here and write the score for this activity in the boxes to the right _____ Goal=improve by at least 3 points					<input type="checkbox"/>
Activity 2 - write the activity here and write the score for this activity in the boxes to the right _____ Goal=improve by at least 3 points					<input type="checkbox"/>
Activity 3 - write the activity here and write the score for this activity in the boxes to the right _____ Goal=improve by at least 3 points					<input type="checkbox"/>
Central Sensitization Inventory - Total Score Goal=total score of 15 or less					<input type="checkbox"/>
Patient has redness, swelling, and warmth Goal= The patient no longer has these symptoms	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/>

Treatments - Check the treatments that you plan to do with this patient

You should include treatments to address every physiotherapy problem that you selected for this patient. Write details of the treatments for those physiotherapy problems that do not have a treatment manual.

- Nociceptive pain and changes requiring the treatment approach for an irritated tissue: Based on treatment manual
- Nociceptive pain and changes not requiring the treatment approach for an irritated tissue: Based on treatment manual
- Neuropathic pain and changes: Based on treatment manual
- Nociceptive pain and changes: Based on treatment manual
- Decreased functional ability in daily life: Based on treatment manual
- Poor sleep: Based on treatment manual
- Little physical activity in daily life: Based on treatment manual
- Decreased active or passive ROM _____
- _____
- Decreased strength _____
- _____
- Decreased endurance and tolerance to activity _____
- _____
- Poor balance _____
- _____
- Other _____
- _____

Would the patient benefit from seeing other professionals? - Check those that apply and write in the details

Note, imaging like an MRI or X-ray is not helpful or necessary when a person has pain except in two situations:

- 1) patient has neuropathic pain with signs of nerve compression or 2) patient has signs of a serious medical condition like a fracture, cancer, or cauda equina syndrome.

- Physician _____
- Equipment (walker, cane, etc.) _____
- Mental health professional _____
- Social worker _____
- Other _____

Actions that you took to make the referral _____

Date of when the patient saw the other professional _____

How many treatment sessions do you think this patient will need?

- 1 – 3
- 4 – 10
- 10 – 15
- 15 - 20
- Other _____

How often will this patient have a treatment session?

- 1 time every month
- 1 time every 2 weeks
- 1 time per week
- 2 times per week
- 3 times per week
- Other _____

BIOPSYCHOSOCIAL ASSESSMENT OF PAIN

Name of patient: Avan Age of patient 52 years

Date of assessment: October 22, 2019 Name of physiotherapist: Mohammed

Information about the patient: Right shoulder pain, had breast cancer surgery 3 years ago

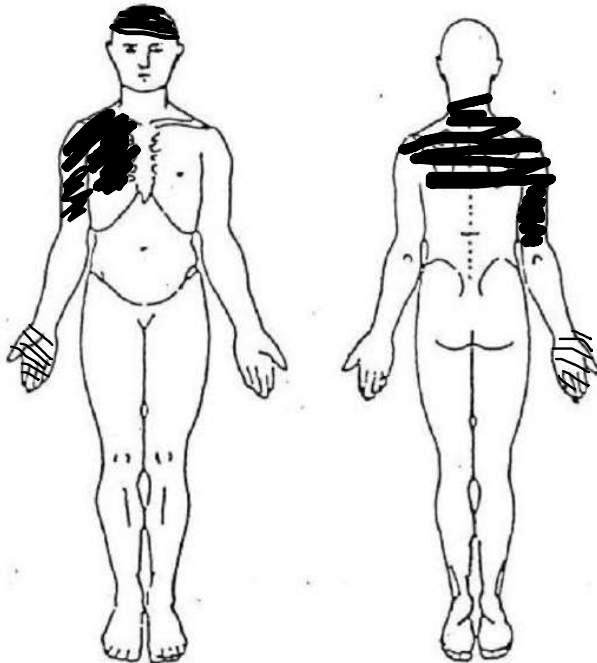
1. Informed Consent

Today, we will do an assessment. It will take about 30 to 45 minutes. The assessment involves you telling me about any physical problems that you have, like pain, difficulty sleeping, and difficulty doing things in your daily life. I will use this information to diagnose the type of pain and the things that are contributing to the pain. I will write down information that you share on this form, but I will keep it private and not share it with anyone else. I will recommend the best treatment based on the results of this assessment. At the end of the assessment, we will make a plan together for the treatment. Do you have any questions?

Would you like to do the assessment now? Yes No

2. What symptoms and problems are you having?

1. Pain in right shoulder and upper back: Started about 2 years ago after surgery for breast cancer in right breast. It hurts most of the time and it gets worse if I use my right arm. I sometimes feel like I can't breathe. Sitting by the heater makes it feel a little better. But nothing really helps.
2. Headaches: Headaches about two to three times per week. Sometimes it is so severe that I have to lay in bed for hours during the day. I don't know what causes them. They just happen.



3. Numbness in right hand: My right hand feels numb and weak. I feel like I have no strength in it.



4. Difficulty sleeping: The pain makes it difficult to fall asleep at night, so it takes me about 1 to 2 hours to fall asleep. I have to lay flat on my back because of the pain but this position makes it difficult for me to breathe. The pain wakes me up 3 to 4 times a night and it takes me at least 30 minutes to fall back asleep. I only get 4 to 5 hours of sleep every night

5. Functional problems: I live alone. My husband died fighting Saddam's regime. My son and his family live next door. I have needed my son's help a lot lately to clean the house and go shopping. Cooking is difficult but I still do it. I also take care of my son's baby. I have to hold him and carry him, but it makes my shoulder and back hurt so bad.

6. Fatigue: I feel tired all of the time. I don't ever want to do anything. My family goes on a lot of picnics but it's too difficult for me to go with them every time. I am just so tired. Everything makes me feel tired. And I get annoyed so easily.

Mark on the body where the person experiences symptoms. Have the person show on their body or on the picture exactly where they feel the symptoms.

Use the different patterns to show the different symptoms.

Pain:  Numbness or tingling: 

Discomfort: 

3. Does the patient have any environmental or social factors that are contributing to their pain?

- Financial problems _____
- Unsafe living situation _____
- Difficult family situation One son traveled tried to immigrate to Europe, but he is held in a detention center in Greece, she worries a lot about him and feels there is nothing that she can do
- Legal problems _____
- Other Husband is dead

4. Do you experience any of the following things, when completing activities in your daily life like cooking, cleaning, shopping, walking, or working?

- Get tired very easily _____ I am tired all of the time
- Feel the need to take rest breaks I have to rest when walking and cooking. I can only walk for 5 minutes and then I need sit.
- Shortness of breath that is uncomfortable I often feel like I can't breathe. It happens when I am walking and lying in bed.
- Muscles feel tired and weak _____ My right hand feels weak

5. Do you have any of the following?

- Unable to put weight on your arm or leg; recent fall or other traumatic event; swelling; redness (**Signs of a fracture – Send to a doctor immediately**)
- Fever; chills; unexplained weight loss; history of cancer; recent infections or illness (**Signs of a serious medical condition like infection or cancer – Send to doctor for evaluation before starting treatment**)
- Numbness in the groin, difficulty urinating, diarrhea or difficulty holding feces (**Signs of cauda equina syndrome / spinal cord injury – Send to doctor immediately for this medical emergency**)

6. Do you or have you had any of the following medical conditions?

- | | |
|--|--|
| <input checked="" type="checkbox"/> Heart conditions _____ | <input type="checkbox"/> Hernia _____ |
| <input type="checkbox"/> Hypertension <u>Doctor told me one year ago. I don't take medicine.</u> | <input type="checkbox"/> IBS _____ |
| <input type="checkbox"/> Diabetes _____ | <input type="checkbox"/> Bladder infections _____ |
| <input type="checkbox"/> Stroke _____ | <input type="checkbox"/> Allergies _____ |
| <input type="checkbox"/> Seizures _____ | <input checked="" type="checkbox"/> Anemia <u>I had severe anemia when I had cancer. I probably still have it.</u> |
| <input checked="" type="checkbox"/> Cancer <u>Right breast cancer 2 years ago. Now cured.</u> | <input type="checkbox"/> Any surgery _____ <u>Right breast, full mastectomy</u> |
| <input type="checkbox"/> Asthma _____ | <input type="checkbox"/> Any other injuries or conditions _____ |
| <input type="checkbox"/> Arthritis (rheumatoid) _____ | |
| <input type="checkbox"/> Osteoporosis _____ | |

7. Assessing for nociceptive pain and changes

Have you been experiencing pain for less than 6 months? Yes No

Has the pain and symptoms gradually improved? Yes No

8. Assessing for neuropathic pain and changes

Do you have or have you had any of the following problems?

- Diabetes
- Cancer *chemotherapy*
- Injury to a nerve
- Shingles (zona in Kurdish)

9. Assessing for nociplastic pain and changes

Have you been experiencing pain for greater than 6 months? Yes No

Does the pain get worse in cold or hot temperatures? Yes No

Do you have any of the following problems?

Headaches

Difficulty sleeping

Feel tired very easily

Difficulty concentrating or remembering things

Body feels stiff and achy

Pain has spread to many areas of the body

10. Imaging and medical tests

Have you had any imaging for this problem like MRIs or x-rays? What were the results? _____

I had an MRI of the right shoulder. The doctor said that there is decreased fluid in the shoulder joint. He said that there the joint has arthritis and it looks like that of a 90-year-old woman.

Have you had any other medical tests? What were the results? _____ Not for the shoulder pain. _____

Based on your clinical judgement, are the images and tests relevant to the pain experience? Yes No

Consider the following when making this decision:

The following results on images and tests are usually not relevant to the pain experience: osteoarthritis, disc prolapse/disc bulge/disc herniation, spondylolisthesis, degeneration of the vertebral discs, spinal stenosis/narrowing of the spinal canal, decreased fluid in the joint, osteophytes, cartilage damage, bone marrow lesions, meniscus tear in knee, rotator cuff tears, labral tears in shoulder or hip, joint degeneration, hip impingement, shoulder impingement

The following results on images and tests may contribute to neuropathic pain and changes: structures in the intervertebral space, structures in the spinal foramen space

Often stress and emotions can affect pain and physical health. So, I will now ask you some questions about this.

11. Screening Tool for Depression

Over the last 2 weeks, how often have you had a problem with feeling little interest or pleasure in doing things?

- Not at all (0)
- Several days (1)
- More than half the days (2)
- Nearly every day (3)

Over the last 2 weeks, how often have you had a problem with feeling down, depressed or hopeless?

- Not at all (0)
- Several days (1)
- More than half the days (2)
- Nearly every day (3)

Total Score: _____4_____ Is this 3 or more? Yes No

If yes, then the person may have depression that requires treatment. You should help the person see a mental health professional as soon as possible.

12. Screening Tool for Anxiety

Over the last 2 weeks, how often have you had a problem with feeling nervous, anxious or on edge?

- Not at all (0)
- Several days (1)
- More than half the days (2)
- Nearly every day (3)

Over the last 2 weeks, how often have you had a problem with not being able to stop or control worrying?

- Not at all (0)
- Several days (1)
- More than half the days (2)
- Nearly every day (3)

Total Score: _____ 2 _____ Is this 3 or more? Yes No

If yes, then the person may have anxiety that requires treatment. You should help the person see a mental health professional as soon as possible.

13. Screening for Post-Traumatic Stress Disorder (PTSD)

Often people experience stressful, frightening, and overwhelming experiences in their life like war, torture, violence, death of family members, abuse, or car accidents. These experiences can have an impact on pain and physical health. You don't need to share the details of any experiences, but have you ever experienced a traumatic event like this?

Yes _____ husband's death, saddam's regime _____ No

If the patient answers yes, then ask the following questions:

1. In the past month, have you had nightmares about the event(s) or thought about the event(s) when you did not want to?
 Yes No
2. In the past month, have you tried hard not to think about the event(s) or went out of your way to avoid situations that reminded you of the event(s)?
 Yes No
3. In the past month, have you been constantly on guard, watchful, or easily startled?
 Yes No
4. In the past month, have you felt numb or detached from people, activities, or your surroundings?
 Yes No
5. In the past month, have you felt guilty or unable to stop blaming yourself or others for the event(s) or any problems the event(s) may have caused?
 Yes No

Total number of yes answers: _____ 2 _____ Is this 3 or more? Yes No

If yes, then the person may have PTSD that requires treatment. You should help the person see a mental health professional as soon as possible.

Examination

14. Have the patient do the following movements. Is the patient able to do these movements easily? If no, describe what challenges they have like weakness, decreased ROM, poor balance, pain, fear, anxiety, and protective responses.

Full squat Yes No _____ Moves slowly _____

Bring both arms behind back Yes No _____ Decreased active ROM in both arms (Right greater than left), says she is afraid it will make the pain worse, holding her breath _____

Stand on right leg for 5 seconds Yes No _____

Stand on left leg for 5 seconds Yes No _____

15. Signs of nociplastic changes (allodynia and hyperalgesia)

- Patient experiences pain or an increase in pain when you lightly touch the area with pain
- Patient experiences significant pain with gentle active movements of the painful area
- Patient is afraid to move the area with pain

16. Active and passive ROM as needed

Right shoulder: flexion = 120 degrees, extension = normal, behind head= base of head, behind back= sacrum

Left shoulder: flexion= 150 degrees, extension = normal, behind head=T1, behind back= L2

Decreased neck active ROM in all directions. She moves slowly when doing this and holds her breath

17. Sit to Stand Test

Use a straight back chair with a solid seat that is 40 cm high. Ask the patient to sit on the chair with arms folded across their chest. Give the patient these instructions: "Stand up and sit down as quickly as possible 5 times, keeping your arms folded across your chest."

Stop timing when the participant stands the 5th time.

Time: _____ 10 _____

Check which applies:

- Normal functional ability (less than 8 seconds)
- Decreased functional ability but no fall risk (8 to 12 seconds)
- Decreased functional ability and fall risk (12 seconds or more or unable to safely perform sit to stand without hand support or physical support)

18. Other tests and observations

Posture: Forward shoulders in sitting and standing, flexion in thoracic in sitting and standing

Decreased arm swing when walking

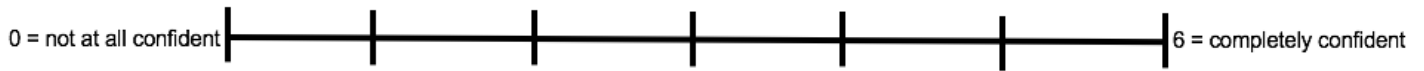
Holds her right arm close to her body most of time

Increased muscle tension in both arms and upper back

Outcome Measures

19. I am going to read two statements to you. For each statement, score how confident you are right now. Give a score on a scale of 0 to 6, where 0 = not at all confident and 6 = completely confident

Show the patient the visual scale.



I can still accomplish most of my goals in life, despite the pain

- 0. Not at all confident
- 1.
- 2.
- 3.
- 4.
- 5.
- 6. Completely confident

I can live a normal lifestyle, despite the pain

- 0. Not at all confident
- 1.
- 2.
- 3.
- 4.
- 5.
- 6. Completely confident

Pain Self-Efficacy Questionnaire Score: _____ 5 _____

20. During the past month, how would you rate your sleep quality overall?

- Very good
- Fairly good
- Fairly bad
- Very bad

21. At least once a week, do you do any regular physical activity long enough to work up a sweat? This can be many different types of physical activities like walking fast, heavy work, cleaning, and exercise.

- Yes
- No

If yes, how many hours per week do you do these activities? _____ 30 minutes (carrying grandson) _____

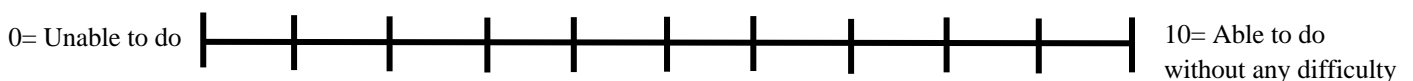
22. Think of three activities that you are unable to do or that you have difficulty doing because of pain and other health problems. For each activity, rate your current ability to do the activity on a scale of 0 to 10 where 0=unable to do and 10= able to do without any difficulty

Show the patient the visual scale.

Activity 1: _____ cooking _____ Score: _____ 6 _____

Activity 2: _____ carrying and holding grandson _____ Score: _____ 4 _____

Activity 3: _____ shopping _____ Score: _____ 0 _____



Complete the information below to select which type of pain and changes the patient has. Then complete the specific assessment for the type of pain and changes that the patient has. The patient may have more than one.

Signs of nociceptive pain and changes – check those that apply to the patient

- The pain and symptoms are localized
- The pain pattern is related to a specific tissue injury or damage
- The patient has experienced pain for less than 6 months

Does the patient have nociceptive pain and changes? (A patient must have all three items)

Yes No

Signs of neuropathic pain and changes – check those that apply to the patient

- The pain and symptoms are along a nerve distribution
- The patient has a disease or injury of the nervous system and the pain pattern is related to it
- The pain and symptoms are described as burning, shooting, numbness, and tingling
- There are sensory changes like decreased sensation and muscle weakness that are along a nerve distribution
- Positive results on imaging and medical tests are relevant to the pain experience and an injury or disease of the nervous system

Does the patient have neuropathic pain and changes? (A patient must have the first two items)

Yes No

Signs of nociplastic pain and changes – check those that apply to the patient

- The pain pattern is not related to a specific tissue injury or damage
- The patient has experienced pain for more than 6 months
- The pain and symptoms are widespread and not localized
- The patient has other symptoms like fatigue, headaches, and/or difficulty thinking
- There are signs of allodynia and/or hyperalgesia
- There is a positive screen for PTSD, anxiety, and/or depression or other signs of emotional problems

Does the patient have nociplastic pain and changes? (A patient must have the first two items)

Yes No

Are you able to commit to coming to treatment sessions regularly? Yes No

I can come once or twice per week. My son's wife said that she can drive me here.

Tell the patient the results of the assessment and the treatment plan:

- Based on the assessment, you have a type of pain called _____ Nociplastic pain and changes _____
- Our focus will be on improving function and your ability to do things in your daily life. For example, we will focus on improving your ability to cook, clean, walk, go shopping, sleep well, and taking care of your grandson
- The pain and your ability to function will get better with treatments like like active movements of the arm, neck and back, exercises for the arm, relaxation exercises, activities so that you can learn about why you have pain, training so that you can learn how to more easily do things in your life like shopping
- The treatments will include teaching you things that you can do in your daily life to prevent pain and to cope with pain if it occurs again in the future.
- Do you have any questions or concerns?
- I recommend the following treatment plan:
 - Estimated total number of sessions: 10-15
 - Schedule of session / number of days per week: _____ Once or twice per week _____
- Does this treatment plan work for you?

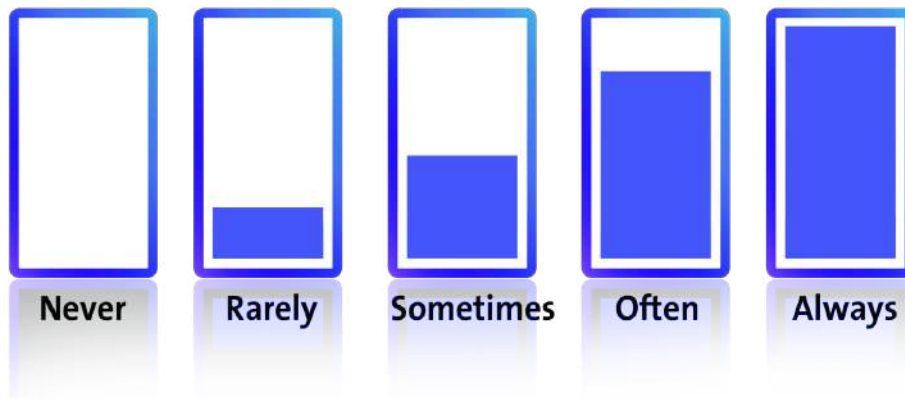
Does the patient agree to this treatment plan? Yes No

ASSESSMENT FOR NOCIPLASTIC PAIN AND CHANGES

Central Sensitization Inventory – Part A

For each statement that I read, tell me how often you experience it. Your options are Never, Rarely, Sometimes, Often, or Always.

Show the patient the visual scale.



Item	Never	Rarely	Sometimes	Often	Always
	0	1	2	3	4
1. I feel tired and unrefreshed when I wake from sleeping.					X
2. My muscles feel stiff and achy.			X		
3. I have anxiety attacks.		X			
4. I grind or clench my teeth.	X				
5. I have problems with diarrhea and/or constipation.	X				
6. I need help in performing my daily activities.				X	
7. I am sensitive to bright lights.				X	
8. I get tired very easily when I am physically active.				X	
9. I feel pain all over my body.		X			
10. I have headaches.				X	
11. I feel discomfort in my bladder and/ or burning when I urinate.	X				

Item	Never 0	Rarely 1	Sometimes 2	Often 3	Always 4
12. I do not sleep well					×
13. I have difficulty concentrating.				×	
14. I have skin problems such as dryness, itchiness, or rashes.		×			
15. Stress makes my physical symptoms get worse.				×	
16. I feel sad or depressed.				×	
17. I have low energy.					×
18. I have muscle tension in my neck and shoulders.					×
19. I have pain in my jaw.	×				
20. Certain smells, such as perfumes, make me feel dizzy and nauseated.			×		
21. I have to urinate frequently.			×		
22. My legs feel uncomfortable and restless when I am trying to go to sleep at night.		×			
23. I have difficulty remembering things.			×		
24. I suffered trauma as a child.			×		
25. I have pain in my pelvic area.		×			
Totals for each column	0	5	10	21	16
TOTAL SCORE				52	
A total score of 25 or more indicates that treatment for nociplastic pain and changes will be most effective					

BIOPSYCHOSOCIAL TREATMENT PLAN

Name of patient: Avan Age of patient 52

Date of assessment: October 22, 2019 Name of physiotherapist: Mohammed

Physiotherapy Problems – Check the ones that apply to this patient

- Nociceptive pain and changes requiring the treatment approach for an irritated tissue
- Nociceptive pain and changes not requiring the treatment approach for an irritated tissue
- Neuropathic pain and changes
- Nociplastic pain and changes
- Decreased functional ability in daily life cooking, cleaning, taking care of grandson, walking, shopping, going on picnics with family
- Poor sleep 4 to 5 hours of sleep per nights, takes 1-2 hours to fall asleep, wakes up 3 to 4 times per night
- Little physical activity in daily life Only physical activity is carrying grandson. Does not walk outside unless very necessary
- Decreased active or passive ROM Right and left shoulder (right greater than left) flexion, internal rotation, externa rotation; neck in all directions
- Decreased strength Right arm and hand due to not using it; generalized decreased strength due to low amounts of activity
- Decreased endurance and tolerance to activity tires easily with functional activities; can only walk 5 minutes before needing to rest
- Poor balance
- Other Symptoms of depression; decreased mobility of thoracic spine (flexed posture)

Goals – Based on Outcome Measures

Complete the details of this table by using the information on the assessment form. If a goal is not applicable to this patient, then leave it blank.

Goal	First assessment Date: 22/10/19	Second assessment Date: 6/11/2019	Third assessment Date: 2/12/2019	Fourth assessment Date: 13/2/2020	Check when the goal is achieved
Sit to Stand Test – Total Time Goal=8 seconds or less	10	10	7.2	7.0	✗
Pain Self-Efficacy Questionnaire -Total Score Goal=Increase total score as high as possible	5	7	9	10	<input type="checkbox"/>
During the past month, how would you rate your sleep quality overall? Goal=Fairly good or very good	<input type="checkbox"/> Very good <input type="checkbox"/> Fairly good <input checked="" type="checkbox"/> Fairly bad <input type="checkbox"/> Very bad	<input type="checkbox"/> Very good <input checked="" type="checkbox"/> Fairly good <input type="checkbox"/> Fairly bad <input type="checkbox"/> Very bad	<input type="checkbox"/> Very good <input checked="" type="checkbox"/> Fairly good <input type="checkbox"/> Fairly bad <input type="checkbox"/> Very bad	<input type="checkbox"/> Very good <input checked="" type="checkbox"/> Fairly good <input type="checkbox"/> Fairly bad <input type="checkbox"/> Very bad	✗
At least once a week, do you do any regular activity long enough to work up a sweat? - Number of hours per week Goal=at least 2.5 hours per week	20 minutes	30 minutes	50 minutes	65 minutes	<input type="checkbox"/>
Activity 1 - write the activity here and write the score for this activity in the boxes to the right ____cooking_____ Goal=improve by at least 3 points	6	7	8	9	<input type="checkbox"/>
Activity 2 - write the activity here and write the score for this activity in the boxes to the right ____carrying and holding grandson_____ Goal=improve by at least 3 points	4	5	6	8	<input type="checkbox"/>
Activity 3 - write the activity here and write the score for this activity in the boxes to the right ____shopping_____ Goal=improve by at least 3 points	0	0	3	5	<input type="checkbox"/>
Central Sensitization Inventory - Total Score Goal=total score of 15 or less	52	40	27	17	<input type="checkbox"/>
Patient has redness, swelling, and warmth Goal= The patient no longer has these symptoms	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/>

Treatments - Check the treatments that you plan to do with this patient

You should include treatments to address every physiotherapy problem that you selected for this patient. Write details of the treatments for those physiotherapy problems that do not have a treatment manual.

- Nociceptive pain and changes requiring the treatment approach for an irritated tissue: Based on treatment manual
- Nociceptive pain and changes not requiring the treatment approach for an irritated tissue: Based on treatment manual
- Neuropathic pain and changes: Based on treatment manual
- Nociceptive pain and changes: Based on treatment manual
- Decreased functional ability in daily life: Based on treatment manual
- Poor sleep: Based on treatment manual
- Little physical activity in daily life: Based on treatment manual
- Decreased active or passive ROM Shoulder mobilizations, thoracic mobilizations, right and left shoulder ROM and stretching exercises, active neck ROM and stretching exercises, active ROM and stretching for thoracic spine, stretching for chest
- Decreased strength weightbearing exercises on arms, increase use of right arm in daily life, strengthening exercises for the hand, walking program and increased physical activity for generalized weakness
- Decreased endurance and tolerance to activity walking program, medium intensity physical activity, functional training for going shopping and for cleaning
- Poor balance _____
- Other depression will improve with nociceptive treatment manual; passive and active mobilizations of thoracic spine

Would the patient benefit from seeing other professionals? - Check those that apply and write in the details

Note, imaging like an MRI or X-ray is not helpful or necessary when a person has pain except in two situations:
 1) patient has neuropathic pain with signs of nerve compression or 2) patient has signs of a serious medical condition like a fracture, cancer, or cauda equina syndrome.

- Physician _____
- Equipment (walker, cane, etc.) _____
- Mental health professional _____ symptoms of depression _____
- Social worker _____
- Other _____

Actions that you took to make the referral _____ called counselor and made referral, patient knows about appointment

Date of when the patient saw the other professional _____

How many treatment sessions do you think this patient will need?

- 1 – 3
- 4 – 10
- 10 – 15
- 15 - 20
- Other _____

How often will this patient have a treatment session?

- 1 time every month
- 1 time every 2 weeks
- 1 time per week
- 2 times per week
- 3 times per week
- Other _____

ASSESSMENT FOR NOCICEPTIVE PAIN AND CHANGES

Examine the area where there is localized pain. Check which of the following the patient has in this area:

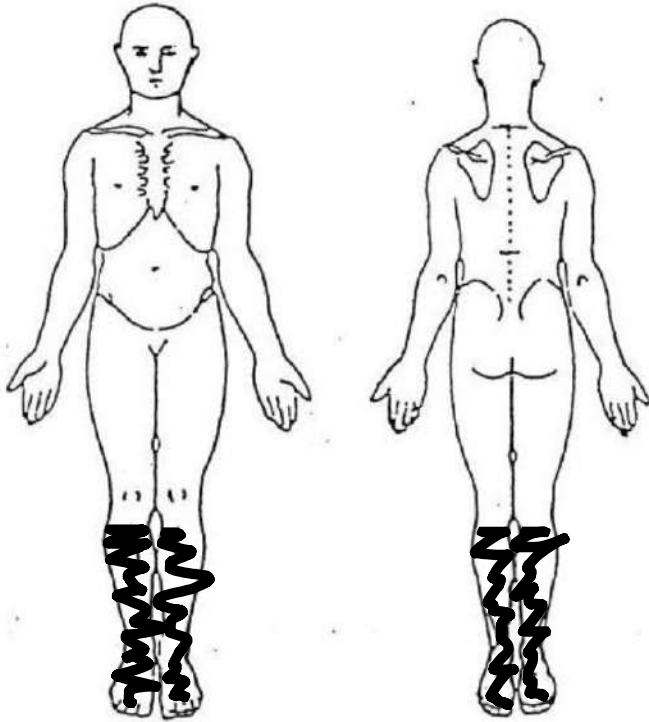
- Redness
- Swelling
- Warmth

If the patient has redness, swelling, and warmth, then the patient likely has nociceptive pain and changes that will benefit from the treatment approach for an irritated tissue (protect, move, elevate, ice compress)

If the patient does not have redness, swelling, and warmth, then the patient may have nociceptive pain and changes, but it does not require the treatment approach for an irritated tissue. See the treatment manual for an effective treatment plan.

ASSESSMENT FOR NEUROPATHIC PAIN AND CHANGES

Pain Detect Questionnaire – Section 1



Mark on the body the one main area of pain for this patient.

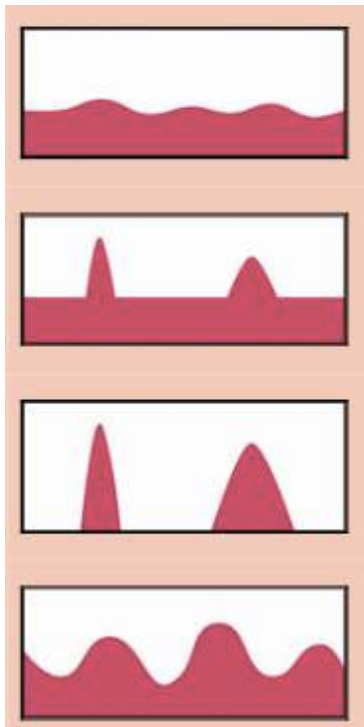
1. Does the pain spread from this main area to other regions of the body?

Yes No

If yes, draw where the pain spreads on the body.

If yes, score = 2

If no, score = 0



2. Which picture describes the pattern of pain that you feel?

Continuous pain with small changes (Score of 0)

Continuous pain with attacks of increased pain (Score of -1)

Attacks of pain but no pain is felt in between the attacks (Score of +1)

Attacks of pain and pain is felt in between attacks (Score of +1)

Total score for section 1 = Score from question 1 0 + Score from question 2 1 = 1

Pain Detect Questionnaire – Section 2

I am going to ask you questions about symptoms that people commonly have. For each symptom, we are focusing on the area of the body that you marked above. For each symptom, tell me how much you experience it. The options are never, hardly noticed, slightly, moderately, strongly, or very strongly.

Show the patient the visual scale.



Pain Detect Questionnaire – Section 2

Item	Never	A ^{very} small amount	A small amount	A medium amount	A strong amount	A ^{very} strong amount
1. Do you have a burning feeling in this area?				✗		
2. Do you have a tingling feeling in this area? This may feel like ants crawling on your skin.					✗	
3. Is it painful in this area when something touches your skin lightly, like a blanket or a piece of clothing?			✗			
4. In this area, do you have sudden pain attacks that feel like electric shocks?			✗			
5. Does cold or heat on this area cause you to feel pain?			✗			
6. Do you feel numbness in this area?					✗	
7. Does slight pressure, like pushing on the skin with your finger, cause pain in this area?			✗			
Number of marks in each column	0	0	4	1	2	0
	Multiply by 0	Multiply by 1	Multiply by 2	Multiply by 3	Multiply by 4	Multiply by 5
Totals for each column	0	0	8	3	8	0
Total Score for section 2 Add up the totals for each column	19					

Final Score for Pain Detect Questionnaire

Total score from Section 1 1 + total score from Section 2 19 = 20

Check which applies:

Score of 0 to 15: Neuropathic pain and changes is unlikely

Score of 16 to 38: Neuropathic pain and changes is likely and treatment for neuropathic pain and changes are likely to be effective

Beyond Pain®

Part Four The Biopsychosocial Treatment of Pain



Funded by the IASP Developing Countries Project
Supported by DIGNITY – Danish Institute Against Torture
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Version May, 2020
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TREATMENT MANUAL – NOCIPLASTIC AND/OR NEUROPATHIC PAIN AND CHANGES

This treatment manual is designed to treat nociplastic pain and changes and/or neuropathic pain and changes. You may have to modify it for the context that you work in. Here are some general recommendations for applying this treatment manual:

- Use the form called “Treatment documentation for nociplastic and/or neuropathic pain and changes.” This document provides an outline of what treatments should be included in each treatment session. It also guides you to record important information about the patient during every treatment session.
- The treatments as described on the “Treatment documentation for nociplastic and/or neuropathic pain and changes” are in a very specific order. The order of the treatments is based on research. So, it is best to keep the order of these treatments as described in the form.
- If you don’t have time to do all of the treatments recommended for a specific session, then do the treatments in the following session. You don’t want to skip treatments. So, it will be more effective to spread the content of the treatments over more than the 10 sessions.
- Make sure you are prepared before each treatment session. This means that you are comfortable providing each treatment, you have the resources you need to do each treatment, and you have the information you need to focus the treatment on the patient’s specific needs.
- Nociplastic and neuropathic pain and changes take time to reverse. Therefore, it may be best to do one session per week over a span of 10 weeks. However, you will have to decide what is best in your context and for each patient.
- The manual is designed to give you background information for each treatment and then to provide you details of the treatment.
- You may have to modify the treatment if you are working with a patient that has nociplastic pain and changes, as well as, another type of pain, like nociceptive or neuropathic pain. See the neuropathic manual for guidance on how to modify treatment slightly to address this type of pain. The symptoms from nociceptive pain and neuropathic pain will improve with the treatments included in this manual. So, if a patient has more than one type of pain, after you have finished the treatment sessions for nociplastic pain and changes as described in this manual, you can do a reassessment. Then you can provide treatment specific to the remaining symptoms and types of pain.

SESSION 1

Session 1 should include the following treatments. You could provide the first three to four treatments immediately following the assessment with the patient rather than in a separate session. This can be helpful as the patient will value getting a treatment the first time that they meet with you.

- Check-in
- TNE: *Neuropathic pain (if applies)*
- TNE: Stepping on a nail
- Sensory discrimination
- Belly breathing
- Finding comfort in sitting
- Home activity plan

- Passive treatments (only if requested)

Help the participants understand the structure of the manual. For each session, the manual provides details on each treatment. For each treatment, there is 1) Background Information and 2) Treatment Details.

The background information provides any theory and research evidence that you must know to provide this treatment. A treatment will not include a section for Background Information if the information was already discussed previously in the manual.

The treatment details include 1) Goals of treatment, 2) Key points, and 3) the description of the treatment which includes any resources, like scripts, needed for providing the treatment.

CHECK-IN

Background Information:

Every treatment session should start with a check-in. The check-in involves asking the patient the following two questions.

- What has gone well since the last time we met?
- How did the home activity plan go?

What has gone well since the last time we met?

It is important to focus this discussion on improvements and on positive changes in functional ability. You do not want to focus this discussion on pain. So, you do not want to ask about changes in pain, the amount of pain felt, what activities caused pain, or other things that focus on the pain experience. The patient will naturally share these with you. But you do not want to focus this discussion on pain.

If you focus the discussion on pain, then you are strengthening the neural pathways of the pain experience and in this way increasing the likelihood that someone will experience pain. One of the overall treatment goals is to create new neural pathways and to strengthen existing neural pathways that are responsible for feelings of comfort. One way to do this is to focus the check-in discussion on functional ability, activities, and positive changes. You should also celebrate with the patient when there are improvements in movement and function, even if they are small. Sometimes the patients may have difficulty noticing improvements. So, you may need to listen and observe for improvements in movement and function and then tell the patient what you have noticed.

How did the home activity plan go? -

At the end of every session, the patient will have a home activity plan which will include physical activities, techniques, and exercises that they should do at home. It is important to allow the patient time to tell you about how the home activity plan went since the last session. It is your responsibility to provide enough education and support so that the patient can successfully do the home activity plan.

You can start this check-in question by first summarizing the home activity plan that was set during the last session. It is best to ask the patient to summarize the home activity plan rather than you summarizing it for the patient. This will help the patient be more active in their treatment. Also, you will be able to see if they understood and completed the home activity plan as you had discussed in the last session.

As described above, you should not focus this discussion on the amount of pain the patient experienced during the home activity plan. Rather, you should focus on if the patient was able to do the home activity plan, what improvements they saw, and what challenges they faced. Make sure to recognize improvements and celebrate these with the patient.

If the patient expresses challenges doing the home activity plan, discuss this with them and come up with solutions together. For example, if the patient says that they do not have time to do the activities, help them come up with a plan for exactly when to do the activities so they fit into their daily life. For example, they could do some activities while watching television at night and some activities while laying down in bed to sleep. Or you can plan to make changes to the home activity plan at the end of the treatment session so it better fits into their daily life.

If a patient tells you that they experienced pain during the home activity plan, provide TNE to the patient. For example, tell the patient that some pain and discomfort is very normal and reassure them that they are not doing any damage to their body during the activities. You can help them remember TNE that you previously shared with them like the stuck window analogy. Also, you need to focus on creating a home activity plan that is the appropriate level of challenge for this patient. You will learn more about this in this manual. By doing this, you should create a plan that the patient feels comfortable doing even if they experience some pain during it.

Treatment Details:

Goals of Treatment – Check-in:

- Strengthen neural pathways responsible for functional ability and comfort
- Recognize the patient's improvements and efforts
- Provide support to increase the patient's ability to do the home activity plan
- Understand the patient's ongoing physiotherapy problems

Key Points – Check-in:

- Make sure to document what the patient shares with you on the treatment session documentation form
- Do not focus on discussing pain but rather focus on functional ability
- Provide support and education to the patient so that they can do the home activity plan
- Listen to the patient and notice any thoughts, beliefs, and emotions that may be contributing to the pain experience and that you should address during the treatment

The check-in involves discussing the following two questions with the patient.

1. What has gone well since the last time we met?
2. How did the home activity plan go?

For some of the sections, you will demonstrate the treatment for the patient from the case example during Part 3. Before demonstrating the check-in, have the participants summarize the case that was used in part 3 by using the ICF model. Have one of the participants write the ICF model on the flipchart and complete it with the group of participants.

Then demonstrate the check-in. Have one trainer be prepared to be the physiotherapist. Have one trainer be prepared to be the patient based on the case example from part 3.

TNE: NEUROPATHIC PAIN (IF APPLIES)

If the patient has neuropathic pain and changes, do this TNE. See the neuropathic manual for the script for this TNE.

TNE: STEPPING ON A NAIL

Background Information:

We discussed therapeutic neuroscience education (TNE) in part 2. We will summarize the key information about TNE here so that you can be prepared to provide this treatment.

In a large group discussion, have the participants share what they recall about TNE - What is it? How is TNE different than teaching or giving recommendations to a patient?

TNE is a form of education that aims to change a person's thoughts and beliefs about their pain by teaching them about the biology that contributes to pain. Persistent pain is pain that has lasted for greater than 6 months. TNE is very effective for helping people with persistent pain. TNE may also help a person that is experiencing acute pain to recover and not develop persistent pain. It does this by helping the person understand pain and avoid unhelpful behaviors that cause changes in the nervous system which then contributes to persistent pain. TNE is also very effective at treating disability that is related to pain.

TNE is not just educating a patient, providing advice, and giving recommendations. TNE is a treatment that has a direct effect on improving a person's ability to move and function. In this way, TNE is a treatment just like range of motion exercises or strengthening exercises are treatments.

Research shows that TNE has a positive effect on all of the following factors that contribute to the pain experience:

- Nociceptive pain and changes
- Neuropathic pain and changes
- Nociplastic pain and changes
- Body information
- Thoughts and beliefs
- Emotions
- Memories
- Environment
- Social and cultural context
- Behavior

TNE has this significant and overall effect by increasing movement and reversing changes in biology that contribute to the pain experience. In this way, TNE increases signs of safety. Then the brain can determine that there are more signs of safety than of danger so that the brain will not produce pain.

TNE is the process of teaching a person about the biology of pain. Research shows that persons of all educational levels are capable of understanding pain biology. Even children are capable of understanding the neurobiology of pain. TNE is a treatment that requires expert skills so that you can communicate a complex idea in simple and clear terms. By doing this, you can help a person who is struggling with thoughts, beliefs, and fears about pain. In other words, TNE changes the psychological factors, like emotions and thoughts, contributing to pain and by doing this, it treats pain. TNE is most effective when it uses stories, analogies, and metaphors that are relevant to the patient's experience, culture, and context. TNE is also more effective when a person uses visual aids like pictures or videos.

The table below provides a summary of the neurobiology of pain. This is the same knowledge that patients must understand through TNE.

This table is organized with four main points:

1. Pain is always a decision by the brain
2. Pain is not a reliable way to judge the amount of tissue damage or injury
3. Biological, social, and psychological factors contribute to how and when a person experiences pain
4. Pain is not permanent - Our biology can change

Each of the four main points has three facts underneath it. These facts support the main point. The facts must also be understood to fully understand the main point. For each TNE, this manual will describe which of the four points the TNE is discussing. Each TNE is also addressing specific facts but to make it simple, we will just list which of the four points are being addressed.

Pain is always a decision by the brain

Pain is experienced when the brain determines that there are more signs of danger than there are signs of safety

Pain serves to protect the body and the brain uses other protective outputs including changes in movement and biology

Pain is always real and an individual experience

Pain is not a reliable way to judge the amount of tissue damage or injury

It is not possible to have pain and not know about it

It is possible to have tissue damage or an injury and not have pain

It is possible to have pain without tissue damage

Biological, social, and psychological factors contribute to how and when a person experiences pain

A person's culture, context, and environment effects the pain experience

The process of producing pain involves the brain assessing information from many sources

Biological factors that can contribute to pain include danger messages from nociceptors being sent to the brain

Pain is not permanent - Our biology can change

The nervous system can become more sensitive which can increase the pain experience or become less sensitive which can decrease the pain experience

Movement and active treatments decrease pain and other protective outputs

Learning about pain can decrease pain by effecting biological and psychological factors

Treatment Details:

Goals of the treatment- TNE: Stepping on a Nail

The "Stepping on a Nail" TNE aims to help the patient understand the following points:

- Pain is always a decision by the brain
- Pain is not a reliable way to judge the amount of tissue damage or injury
- Biological, social, and psychological factors contribute to how and when a person experiences pain
- Pain is not permanent - Our biology can change

Key points – TNE: Stepping on a Nail

- Do not lecture at the patient. Rather engage the patient in a discussion.
- Use the picture provided with the TNE.
- Make sure to use the words "danger messages" and not "pain signals."

Healthcare professional: *Show photo of nail. If I was walking along and I stepped on a rusted nail right now, how would I know about it?* Patient: You would feel pain in the bottom of your foot.

Healthcare professional: *In this situation, why is it important to feel pain? What does the pain tell me to do?* Patient: To look at your foot and take care of the problem. Like take the nail out of your foot and get a tetanus shot.

Healthcare professional: *Exactly. So, from that example, what is the purpose of pain?* Patient: To protect you. To tell you that you need to take care of yourself.

Healthcare professional: *Yes, do you see how pain can be helpful and that it often serves to protect you?* Patient: Yes, that makes sense.

Healthcare professional: *Now, let's go back to the moment that I stepped on the nail. Let's think about how I know that there is a nail in my foot. The human body contains over 400 nerves. Show picture of nervous system. You can see here that there are nerves in every part of your body that connect to the spinal cord and then to your brain. The nerves in your foot and the rest of your body are always on and sending messages to the brain about your body. They send messages about things like how you are moving and your body temperature.*

Now, as I was walking and then stepped on the nail, the nerves in my foot are activated. The alarm system in my body is activated. The alarm goes off and sends a danger message through my nerves, from my foot to my spinal cord and then on to my brain. Once my brain gets the danger message, it looks at all of the information it has. My brain doesn't just look at that single danger message. It looks at my memories, other sensations in your body, and even what is going on in the environment around me. The brain does this to decide if there is a danger. If my brain decides that there is danger and that it needs protecting, my brain then may choose to produce pain. The brain is the only part of my body that can cause me to experience pain. The nerves in my feet, or back, or anywhere in my body only communicate messages to my brain and my brain decides what to do with all of the messages.

Healthcare professional: *In this situation where I stepped on the nail, do you think that my brain would decide that there is danger?* Patient: Yes.

Healthcare professional: *And if the brain decides that there is danger, what will I experience?*

Patient: Pain

Healthcare professional: *Exactly. Pain is one way that the brain alerts you to danger. Is that clear? Allow the patient to ask questions and make sure it is clear.*

Healthcare professional: *So, if I was walking and experienced pain in my foot, what would I do?*

Patient: Stop walking, look at the foot.

Healthcare professional: *Exactly, the brain produced pain to help me realize that I may have problem to address. So, I could remove the nail, bandage the wound, and get a tetanus shot.*

Healthcare professional: *Now, let's say I was crossing a busy street when I stepped on the nail. At the very same time that I stepped on the nail, I see that a car is moving towards me at a very fast speed and it seems like they are going to hit me. Show picture. Do you think that my brain will think it is more important to stop and look at my foot or run across the street to avoid getting hit by the car?* Patient: Run across the street to avoid getting hit by the car.

Healthcare professional: *Exactly. The brain is always taking in a lot of information and it is always trying to protect us. So, as I stepped on the nail and the car is racing towards me, would I experience pain in my foot in that moment?*

Patient: Probably not a lot of pain because you will focus on running across the street to avoid getting hit by the car.

Healthcare professional: *Exactly. My brain would say that getting across the street is more important than the danger message coming from my foot. When do you think I would start to feel pain in my foot?* Patient: After you get across the street.

Healthcare professional: *Yes. Once my brain decides that the car is no longer a danger to me, it will turn its attention to the danger messages from my foot. So, at that time, my brain will use pain as an alarm to let me know that there may be something dangerous going on. Based on that story, do you think that the environment, or what is going on around us, affects our pain experience?* Patient: Yes. We may feel more or less pain based on what is happening around us.

Healthcare professional: *Whether we experience pain or not depends on many different factors like what is happening in the environment around us.*

Healthcare professional: Now, let's say we took the nail out and bandaged the wound. After that, what should the activity of the alarm system in my body do? Would it go up or down? Patient: Go down.

Healthcare professional: Exactly. Initially, for the first few days, my foot will be sensitive. I won't want to put as much weight on it. I won't want to run. And I will feel pain or discomfort occasionally. This is normal and serves to protect the area so it can heal well. Right? Patient: Yes.

Healthcare professional: What should happen after 1-2 months? Should the alarm system still be sensitive? Should I still feel pain with every step? Patient: No, the pain should go down. It should start to feel normal again.

Healthcare professional: Exactly, the alarm system will calm down to its original level. That is what happens in an acute injury, like stepping on a nail. The brain decides to produce pain to make sure that I take care of the injury and then the alarm system gradually returns to normal when there is no longer a danger. So, I will no longer experience pain or discomfort and my walking and overall function will return to normal.

However, here is an important point. With one in four people, the alarm system will activate after an injury or stressful time, but then never calm down to the normal level. It remains extra sensitive. What do you think happens if a body's alarm system remains extra sensitive? Patient: The person will feel pain.

Healthcare professional: With the alarm system being extra sensitive, it does not take a lot of movement, stress or activity to activate the alarm system. This can cause pain that lasts for months to years even after the initial tissue injury has healed. So, the cause of persistent pain is an extra sensitive nervous system. Our goal in treatment is to calm the nervous system down and to address any problems that may be making the nervous system very sensitive. Give examples of this that are specific to the patient.

Adapted from: <http://www.instituteforchronicpain.org/treating-common-pain/what-is-pain-management/therapeutic-neuroscience-education>

Do big group role play for this TNE. You will use big group role play often. Explain to the participants how to do big group role play.

Have one trainer be the physiotherapist and one trainer be the patient, based on the case example from part 3. Use the script in this manual for the role play. Tell the participants that it is helpful to use the script when working with patients because then you know that you are communicating the information fully. As you demonstrate, the participants can follow along with the script. Describe to the participants that all of the scripts have the words of the healthcare professional in blue and the words of the patient in black.

After demonstrating, ask the participants to share how each key point was addressed in the TNE. For example, the key point; Biological, social, and psychological factors contribute to how and when a person experience pain, was demonstrated by discussing how a person would not feel pain if their brain was focused on preventing a car from hitting them.

Have the participants share any other observations. Provide your own observations as appropriate. Use this an opportunity to emphasize the key points, answer any questions, and to correct any misunderstandings.

Do small group role play for this TNE. You will use small group role play often to allow the participants to learn new skills. Have the participants break up into small groups. Explain to the participants how to do the small group role play.

For this TNE small group role play, have the participants read the script to themselves before doing the role play. Then, they should do the role play and they should use the script during the role play.

Have some participants share what they observed during the small group role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

SENSORY DISCRIMINATION

Background Information:

Sensory discrimination is the ability to identify the exact location of a sensory stimulus and to differentiate different sensory stimuli. For example, it is the ability to know that something soft lightly touched your right elbow. It is the ability to be aware that you stepped on something sharp at a very specific and localized point on the heel of your right foot.

Research has shown that people with persistent pain, both nociplastic pain and neuropathic pain, have poor sensory discrimination. Poor sensory discrimination in conditions of persistent pain is primarily caused by changes in the neural pathways of the brain that are responsible for processing sensory information. In some persistent pain conditions, poor sensory discrimination occurs at the area of pain but also in other areas of the body that are not painful. In other words, changes in the nervous system that occurs with persistent pain, results in poor sensory discrimination throughout the body, with a greater effect in the area of pain. Research has shown that changes in the nervous system can be reversed to restore normal sensory discrimination. Restoration of normal sensory discrimination has been shown to decrease pain and improve a person's ability to function in daily life.

Treatment Details:

Goals of the treatment – Sensory Discrimination

- Provide opportunities for the patient's nervous system to develop improved sensory discrimination

Key points – Sensory Discrimination

- Use a variety of materials so that the patient is exposed to many different textures
- Do not rush through the process. The patient needs to be exposed to the sensations many times for the changes in the nervous system to occur.
- Have the patient describe what they feel in words and also create an image in their mind of where and how they are being touched. This promotes the changes in the nervous system that are necessary for restoring normal sensory discrimination.

Healthcare professional: Information is sent from the body to the brain through nerves. The brain processes this information and then decides what to do with it. When a person has pain, changes happen in the nervous system, so this process is no longer working correctly. One way that it doesn't work correctly is that the brain has difficulty identifying where exactly the body was touched. The brain also has difficulty knowing what is touching the body. You will experience this as we do this exercise. When the brain has difficulty with processing sensory information like this, it contributes to increased pain. So, we are going to do an exercise now that will reverse these changes. This exercise helps to restore the brain's ability to correctly process sensory information. By doing this, it will help to decrease pain and improve your ability to function in daily life.

Do the following:

1. Identify the area where you will do the sensory discrimination. Use the patient's body chart that was completed in the initial assessment to identify the area to focus on. You should focus on the area that causes the patient the most distress.
2. Prepare a variety of materials with different textures. Make sure all of the materials are cleaned with disinfectant before use. Materials to use can include the following:
 - Tissue
 - Soft towel or blanket
 - Rough towel or blanket
 - The metal end of a reflex hammer
 - The rubber end of a reflex hammer
 - Pointy end of a paper clip
3. Have the patient look at the area as you touch each material to it. Ask the patient to bring their attention to the area and notice what it feels like. Have the patient describe what it feels like. You should touch in different spots in the area. Ask the patient to create an image in their mind of the specific spot that is touched.
4. Repeat with the materials and in a random order for 1 to 2 minutes.
5. Then have the patient close their eyes or look away from the area. Touch each material to the area and have the patient say which material is touching them. After they respond, have them look as you continue to touch the material to the area. They can see if they were correct. Continue touching the area with the materials as they look so as to help their brain make new neural pathways related to the sensation. Explain how the changes in the nervous system are making it difficult for them to do this correctly every time. But with practice, the nervous system will learn and improve.

6. Repeat with the materials in a random order for 3 to 4 minutes.

7. Discuss with the patient that they should do this at home. Help the patient understand that it takes a lot of practice for the brain to change so it is important to do this at home. At home they can select different materials. They can have a family member help and do it just as you did it with them. If that is not possible, they can also do it by themselves. They should look at the area while they are touching the material to their skin, they should notice how each material feels different. In their mind, they can describe how each material feels. It is recommended to do this activity for 2 to 4 minutes per day for 2 to 4 times per day. But discuss a realistic plan with the patient.

Do big group role play for this treatment.

Have one trainer be the physiotherapist and one trainer be the patient, based on the case example from part 3. Use the script and guide in this manual for the role play. As you demonstrate, the participants can follow along with the script.

After demonstrating, ask if the participants have any questions. Use this an opportunity to emphasize the key points, answer any questions, and to correct any misunderstandings.

Then do small group role play. Have the participants read the script to themselves before doing the role play. Then, they should do the role play and they should use the script during the role play.

Have some participants share what they observed during the small group role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

BELLY BREATHING

Background Information:

Belly breathing is also called diaphragmatic breathing. We use the term belly breathing with patients so that we avoid using technical language. We also don't use the word deep breathing because this often encourages an incorrect breathing pattern.

Belly breathing is the pattern of breathing that is used by all humans. Just like all humans use a similar movement pattern for walking, all humans use a similar movement pattern for breathing. The diaphragm is the primary muscle used during belly breathing. The diaphragm is at the bottom of the chest and separates the chest from the abdomen. It is attached to the lower ribs, the sternum, and several lumbar vertebrae.

When inhaling, air is brought in through the nose or mouth. The air travels down the trachea into the lungs. Oxygen moves from the air into the cells of the lung. Carbon dioxide moves out from the cells of the lungs and into the air that will be exhaled.

During inhalation, the following happens in the body:

- The diaphragm muscle contracts and moves down
- The stomach moves out
- The muscles between the ribs contract and move the ribs up and out so that the cavity in the chest gets larger
- The lungs get larger
- The muscles of the upper chest and shoulders are relaxed

When exhaling, carbon dioxide is moved from the cells of the lungs and out through the nose or mouth. When exhaling the following happens in the body:

- The diaphragm muscle relaxes and moves up
- The stomach moves in
- The muscles between the ribs relax, causing the ribs to return to their starting position and the cavity in the chest to returns to its starting position
- The lungs return to their starting position
- The muscles of the upper chest and shoulders are relaxed

Lead the participants in belly breathing so they can experience what happens in the body when using this pattern. Have the participants sit reclined in their chairs. Make sure to speak slowly and to take your time. The participants, just like patients, need time to experience this.

Have the participants place their hands on their stomachs. Ask them to turn their attention to their breathing but don't try to change anything. Just feel how they are feeling. Allow one minute to experience this.

Then instruct the participants to breathe in so that the belly moves out. Then breathe out, so the belly moves in. Encourage them to breathe at whatever speed and depth that feels comfortable.

As the participants continue to breathe in a belly breathing pattern, say the following statements. This helps the participants bring their attention to what happens as they breathe in a belly breathing pattern:

- As you breathe in, feel your belly move out, away from your back.
- As you breathe in, feel your lower ribs move out. You can place your hands on your lower ribs to feel this.
- As you breathe in, feel your lungs get larger.
- As you breathe in, the muscles of the upper chest, shoulders, and neck should be relaxed.
- As you breathe in a normal amount of air, the upper chest should not move. The movement should only be at your belly and lower ribs.

- As you breathe out, feel your belly move in, towards your back.
- As you breathe out, feel your lower ribs move in. You can place your hands on your lower ribs to feel this.
- As you breathe out, feel your lungs get smaller and return to their original position.
- As you breathe out, the muscles of the upper chest, shoulders, and neck should be relaxed.
- As you breathe out, the upper chest should not move. The movement should only be at your belly and lower ribs.
- As you breathe out, notice how the muscles of your ribs relax. The diaphragm also relaxes as you breathe

Belly breathing is the natural pattern of breathing for all humans. However, often people will develop an unnatural pattern. This is just like how people sometimes develop unnatural walking patterns that are different from the natural pattern of walking that all humans share.

The most common unnatural breathing pattern is called upper chest breathing. People often develop upper chest breathing when they have pain, ongoing stress in their lives, anxiety, depression, and post-traumatic stress disorder.

Demonstrate an upper chest breathing pattern. Have the participants tell you what they see in the body. Then have the participants purposefully breathe in this pattern so they can feel the difference between upper chest breathing and belly breathing. Say the following statement so the participants can bring their attention to what happens as they breathe in this pattern:

- As you are breathing in, you may feel your chest move up and out, your shoulders rise up, and your upper back arch backwards.
- Notice the muscle tension that is created in your shoulders, neck, and chest as you breathe in this pattern.
- Notice how the belly doesn't move in or out when you are breathing in this pattern.
- Notice how you take small and fast breaths.

During an upper chest breathing pattern, the following happens in the body:

- The belly does not move in or out.
- The lower ribs do not move out.
- The thoracic spine extends while breathing in and flexes while breathing out.
- Muscle tension increases in the shoulders, chest, and neck.
- The upper chest and upper ribs move up and out while breathing in and then returns to their starting position while breathing out.
- The breaths are usually shorter, less deep, and faster than when using a belly breathing pattern.

Belly breathing has a positive effect on the following factors that can contribute to the pain experience:

- Nociceptive pain and changes
- Neuropathic pain and changes
- Nociplastic pain and changes
- Body information
- Emotions
- Behavior

Research has also shown belly breathing to have the following positive effects.

- Decreases pain (nociplastic, nociceptive, and neuropathic pain)
- Contributes to reversing changes in biology that contribute to nociplastic pain
- Decreases feelings of anxiety and depression
- Decreases symptoms of post-traumatic stress disorder
- Decreases headaches
- Decreases fear of pain and movement
- Decreases shortness of breath
- Decreases risk of cardiovascular disease
- Improves ability during functional tasks like walking, stair climbing, and lifting heavy objects
- Improves sleep overall and helps people fall asleep

Have all of the participants stand in two lines facing each other. Each person should be standing across from another person. Have the participants in one line do belly breathing. The person across from them should observe and see if the other person is doing the belly breathing correctly and give the person feedback and support to make sure they are doing it correctly. Then have the other line of participants do the breathing. Trainers should move around the room and provide support. You can stop the group and use someone as an example to demonstrate common mistakes that you are observing.

This learning activity is very important because often people think that they are doing the breathing pattern correctly, but they are not. We must be able to demonstrate belly breathing correctly so that we can teach patients correctly. Also, we must have the skills to assess if our patients are doing it correctly and if not, provide support to help them learn.

Treatment Details:

Goals of the treatment – Belly Breathing

- Provide education to the patient about how and why belly breathing is helpful for them
- Teach the patient how to do belly breathing with a correct pattern
- Give the patient the skills to do belly breathing at home as to have a positive effect on the factors contributing to pain

Key points – Belly Breathing

- If you are encouraging a patient to use breathing as a treatment at home, then it is necessary to teach the patient the correct breathing pattern. If you don't teach them the correct breathing pattern, then you are encouraging them to use the upper chest breathing pattern which will contribute to continued problems.
- Make sure to take enough time to do this correctly. It can often take 20 minutes to learn at first and multiple sessions with you for a patient to learn how to consistently do the breathing pattern correctly.
- If the patient is having a difficult time learning the pattern, have the patient walk around the room or in place for a minute. Then return to doing the belly breathing. This can help because it increases the rate of breathing and helps them focus their attention again.
- As they do belly breathing, the patient should not be looking at you. The patient can close their eyes or focus their eyes on a spot above them.

Healthcare professional: We are now going to do a very important treatment. I am going to teach you belly breathing exercises. They are very simple, but they have a significant impact on improving pain and function. Give a personal example of how you have seen this positively affect other patients you work with.

Healthcare professional: How do we breathe when we are scared, in pain, or upset? Demonstrate by breathing short and fast and breathing with your shoulders and upper chest. Have the patient tell you what they see. When we have pain or are upset, our breathing gets faster and we take short breaths. Also, we breathe by moving our upper chest and shoulders.

Healthcare professional: How do we breathe when we are calm and relaxed? Have you ever watched a baby breathing? What part of their body moves when they breathe? Demonstrate by breathing with relaxed shoulders and moving your stomach moving in and out. Have the patient tell you what they see. When we are calm and relaxed our breathing is slow and long. We take deeper breaths. We breathe with muscles that make our stomach move in and out rather than moving our upper chest and shoulders.

Healthcare professional: As we said, when we have pain or are upset our breathing gets faster and we move our shoulders and upper chest. This is normal. All humans do this when upset, in pain, or scared. When we breathe in this way, our brain gets information that we are in danger. This is helpful when there are dangers, but it can cause problems if we breathe like this most of the time. It can cause problems if we don't breathe in a relaxed and calm way throughout our daily life.

Healthcare professional: For people that have been experiencing pain, it is common for them to get stuck breathing from their upper chest. When we breathe in this way, hormones are released that actually make us more sensitive to pain. These hormones also increase the tension in our muscles. Have you experienced this by feeling muscle tension or pain in your shoulders or neck or experiencing headaches? Have the patient share. These hormones also make us alert and can make it difficult for us to fall asleep. Have you experienced this? Have the patient share. These hormones also can make us feel anxious, nervous, or make us get angry with others more easily. Have you experienced this? Have the patient share. Breathing from our upper chest can contribute to us feeling tired most of the time and making it difficult for us to feel motivated to activities in daily life. Have you experienced this? Have the patient share.

Healthcare professional: As you can see, how we breathe, has an effect on pain. But it also has a significant effect on our body, our emotions, and how we interact with others. So, I am going to teach you how to breathe from your belly. When we breathe in this way, positive hormones are released that decreases our sensitivity to pain, helps us sleep, helps us feel calm and relaxed, relaxes our muscles, gives us more energy, and decreases pain.

Healthcare professional: First, you will watch me breathing and then you will try it. Lay down and make sure the patient can see your face and stomach. Place a cup, pack of tissues, or other light object on your stomach so that the movement can be seen clearly.

Healthcare professional: When you breathe in, your stomach should move out, like this. Demonstrate. When you breathe out, your stomach should move in, like this. Demonstrate. You don't need to take long or deep breaths. Just do whatever feels comfortable. The key is to have your shoulders and upper chest relaxed and have your stomach moving in and out. Try to breathe in and out through your nose. The nose is designed to filter and clean the air coming in, so it is better than breathing in through your mouth.

Have the patient lay down. Take the time to help them find a comfortable and supported position. It will be easier for them to learn belly breathing, if their body is supported and they can relax their muscles. Put a pillow under the knees and in a way that they can completely relax their legs. You can also place pillows under their arms so they can be supported and fully relaxed.

Place a cup, pack of tissues, or other light object on the patient's stomach so that the movement can be seen clearly. Bring their attention to their stomach. Have them practice breathing in and seeing that the stomach moves out. Don't have them breathe in deeply. They should breathe in a comfortable amount. Provide them with help to learn the pattern.

Once they are doing belly breathing in the correct pattern, have them do this for a few minutes. If they are comfortable, they can close their eyes while they do it for a few minutes.

Healthcare professional: What are you experiencing? What do you feel in your body? What emotions do you feel? Have the patient share.

If needed, explain that sometimes people can feel dizzy: Sometimes people feel dizzy or uncomfortable at first. Our bodies have become used to breathing with short breaths and from our upper chest. So, when we change this pattern, different hormones are released and the level of oxygen changes. So, we can feel dizzy or other sensations. This will improve as you practice, and the body gets used to this breathing pattern again.

If needed, explain that sometimes people find this difficult: Sometimes people feel emotional when doing this. When we allow our body to relax and feel safe, sometimes people will feel a release of emotions. This is ok. Do not try to stop that. You can tell me if you are experiencing this.

If needed, explain that sometimes people can feel pain: Sometimes people will feel pain or have a difficult time focusing their attention away from pain and to their breathing. This is normal. But one goal of belly breathing is to help you learn how to focus attention away from pain. This is a way to decrease the sensitivity of the nervous system. So, with practice, you will find it easier to focus on the belly breathing and to ignore other messages from your body. This will help decrease pain in your daily life.

Then bring the patient's attention to their shoulders and upper chest. Have them move their shoulders down away from their ears and then relax. Then repeat the belly breathing while keeping the shoulders and upper chest relaxed.

Healthcare professional: What are you experiencing? Do you feel less tension in your muscles and body? Have the patient share.

Healthcare professional: Now, let's try breathing for a specific period of time. You are going to breathe in for a count of 3 and then breathe out for a count of 3. Breathe in through your nose and feel your stomach move out...1, 2, 3. Breathe out through your nose or mouth and feel your stomach move in...1, 2, 3. Let's do it together. Count out loud in a calm and slow voice. Repeat at least 5 -10 times. Observe the patient and make sure they are doing the breathing correctly. If they are not, stop the counting exercise and work on the breathing pattern again.

Healthcare professional: Often when we bring our attention to our breathing and our body, our body and mind start to become calmer and we start to notice other feelings in our body. Did you notice any other feelings besides pain? Like feeling cold, warm, relaxed, tired, focused, or comfortable. Have the patient share.

Healthcare professional: It is easiest to learn this breathing pattern when we are laying down. But we also want to be able to do this while standing and moving. So, let's stand up and see if you can do the belly breathing in standing.

Have the patient stand. Make sure that the patient has their knees slightly bent, and not locked. If standing is too difficult, the patient can stand and lean against the wall. While in standing, have the patient place their hands on their stomach, just over the belly button. Ask them to shake their shoulders and then relax them. Bring their attention to their hands. As they breathe in, their hands should move out or forward. As they breathe out, their hands should move in, or towards their spine. They do not need to breathe deeply. They should breathe in a comfortable way. Breathe in this way many times. Observe the patient and make sure that they are doing the breathing correctly.

Then have the patient remove their hands from their stomach. Again, have them shake their shoulders to relax them. Bring their attention to their stomach. As they breathe in, their stomach should move out or forward. As they breathe out, their stomach should move in, or towards their spine. Their shoulders and upper chest should not be moving. Allow the patient to breathe in this way many times. Observe the patient and make sure they are doing the breathing correctly.

Healthcare professional: What did you experience? Have the patient share.

Have the patient sit and discuss the use of belly breathing with them.

Healthcare professional: How do you think belly breathing will help you? Have the patient share. **When do you think it will be helpful for you to do belly breathing?** Have the patient share. **Belly breathing is helpful when you feel pain or when you are feeling angry, nervous, or tired. But belly breathing can be effective at preventing all of these things too. So, it is helpful to do belly breathing many times a day and throughout the day. Some people I work with always do it when they wake up but before they get out bed, every time they sit down for a meal, and when they lay down in bed for sleep. When do you think it will be the best time for you to do it in your daily life?** Have the patient share. Help them commit to a plan to do belly breathing regularly. Give them the handout for belly breathing. Write their plan on the handout as a reminder.

Use the powerpoint slide to highlight the components of the treatment. This will help the participants learn and remember the key parts of the treatment.

Demonstrate the treatment - Have one participant volunteer to be the patient. Have this participant come to the front of the room. Have several chairs and a floor mat or treatment bed to use. Explain to the participants that you will now demonstrate how to do this treatment with a patient. They can see the script for this activity in this treatment manual. Use the script while you demonstrate.

Do small group role play. Provide each group with a floor mat to use. The participants should read the script to themselves and then use it as they are doing the role play. Make sure that the participants discuss with each other on what went well and what could have gone better.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

FINDING COMFORT IN SITTING

Background Information:

This information applies to the finding comfort exercise which is done in a variety of positions. This treatment manual includes a finding comfort exercise in sitting, laying down, and standing.

Finding comfort exercises may have a positive effect on all of the following factors that contribute to the pain experience:

- Nociceptive pain and changes
- Neuropathic pain and changes
- Nociplastic pain and changes
- Body information
- Thoughts and beliefs
- Emotions
- Memories
- Behavior

As you have learned, when the brain determines that there are more signs of danger than of safety, the brain produces protective outputs. Protective outputs include decreased movement and increased muscle tension. These two protective outputs then contribute to signs of danger. In this way, a cycle of persistent pain can be maintained. Finding comfort exercises provides the patient with an experience to become aware of these protective outputs. By becoming aware they can then choose to use other ways of holding and moving the body which can change these protective outputs. In this way, the finding comfort exercises may decrease the sensitivity of the nervous system and increase the signs of safety that the brain receives.

As we learned, one way that the brain protects us is by creating changes in the nervous system so that it receives more danger messages. Remember the analogy from part 2, where the owner of the big company asks to receive daily reports. These changes increase the sensitivity of the nervous system and often result in a person only being able to experience pain. The neural pathways for pain are very strong, while the neural pathways for other sensations are weak and rarely used. This results in the patient having low awareness of other physical sensations like muscle tightness, joint stiffness, increased muscle tension, stretch, and a desire to move. The tissues of the body want blood flow, space, and movement. These other physical sensations are messages to the brain, so the brain knows it needs to create blood flow, space, and movement for the tissues. But if a person is unaware of these sensations, then they are not able to respond to them. In this way, the tissues of the body don't get the movement, space, and blood flow that they need. And this can result in increased danger messages to the brain which contribute to pain. Finding comfort exercises act to restore the person's awareness of physical sensations and helps them develop the skill of changing their position and movement to give the body the blood flow, space, and movement that it needs.

The finding comfort exercises also have a general relaxation effect which decreases the sensitivity of the nervous system. When guiding these exercises, it is important to create a calming atmosphere. Be aware of your body postures and gestures so that they are calming and not energetic. Be aware of the tone, speed, and volume of your voice so that it is calming. It is best to do this exercise in a private room so that the patient feels secure and they can bring their attention more easily to their body.

Treatment Details:

Goals of the treatment – Finding comfort in sitting

The finding comfort in sitting exercise aims to help the patient understand the following points:

- Pain is always a decision by the brain
- Pain is not permanent - Our biology can change
- Increase awareness of their body and the different physical sensations
- Provide an opportunity for them to learn that they have control of their body and that they can create more comfort

Key points – Finding comfort in sitting

- Do not lecture at the patient. Rather engage the patient in a discussion.
- Ask the patient many times to share what they feel and how different positions feel different. Guide the patient to focus attention on other sensation besides pain. This is important to increasing the awareness of the physical sensations.
- When a patient is first learning to do this exercise, it is helpful to use a chair that has arm rests and a high back. Have a platform ready to use if the persons' feet do not comfortably rest on the ground. But this exercise can be done when sitting on any surface.
- Support the patient to learn how to do this exercise on their own
- Reinforce that there is not one right posture or position – The position of comfort changes for each person and in each moment.
- Create a calming environment.

Healthcare professional: We are now going to do an exercise called finding comfort in sitting. This exercise will teach you how to find a position of comfort in sitting. There is no right or wrong way of sitting. Rather what is best and most comfortable for our body can change from minute to minute. When you are sitting, do you sometimes feel like you want to change your position? Like shift your weight on bottom? Have the patient share. This is very normal and healthy. The tissues in our body all want blood flow, space, and movement. Making small changes in how one sits gives the tissues this blood flow, space, and movement. Often people that struggle with pain have less movement and are more stiff and rigid when sitting. They can get stuck in only sitting in certain ways. People that struggle with pain often forgot how to listen to their body and make small adjustments to how they are sitting. These things can contribute to pain. Have you experienced this? Have the patient share. We are now going to do the exercise. I hope that you learn how to do this on your own so that you can do this in your daily life.

Make yourself as comfortable as you possibly can in your chair. There is no right or wrong way to sit. Just take whatever sitting position feels most comfortable right now. Give the patient time to do this. Now we are going to work together so that you can learn how to find the most comfortable position for your body. We will start with the legs and move up towards your head. Is it ok if I touch your leg by your knee and move it gently? Allow the patient to answer. If the patient is comfortable with it, place your hand just above the knee of one of the legs. Using your hand, gently and rhythmically move the leg in and out. Create hip internal and external rotation and hip abduction and adduction. Feel the amount of tension and resistance to movement.

Healthcare professional: As I move your leg, what does your leg feel like. Does it feel relaxed and loose or does it feel tight or feel like there is pulling or resistance? Does it feel different when I push in vs. when I push out? Can you feel how when I do this, there is tension and resistance? Ask the patient some of the questions and have them respond.

Now I am going to change the position of the leg and we will see if we can find the position where there is the least amount of tension, pulling, and resistance. We will call this the position of comfort. Is it ok if I move your leg? Change the position of the leg. Use the gentle movement to test the position. Ask the patient what they feel in each position. The goal is to find the position where the leg moves easily and there is the least amount of pulling, tension, and resistance. When changing the position of the leg, change the amount of knee flexion, hip internal and external rotation, and hip abduction and adduction.

Once you find the position of the leg that is most comfortable ask the patient to feel it with their own hand. Take your own hand and move the leg in and out. You can feel it for yourself. What does it feel like? How is it different then when we did it in the first position? Have the patient share. Now can you do the same thing for your other leg? Can you find the position of comfort for this leg? It may or may not be the same position as the leg we just did. Have the patient do this. They should try different positions of the leg and use the gentle movement to assess it. Provide help only if they need it.

Healthcare professional: Before we started this exercise, were you aware of this muscle tension in your legs? Have the patient share. Tension is not a bad thing. We need an appropriate amount of tension in our muscles to stay sitting and to move. But if the body maintains a lot of tension for long periods of time it may contribute to pain and discomfort. If you are sitting for a long time, do you think having this muscle tension in your legs could contribute to pain, fatigue, or discomfort? Have the patient share. So, this exercise is helping you be more aware of the sensations in your body like tension, pulling, and resistance. When you become aware of it, you can then do something to change it. Just like how you changed the position of your legs to create more softness and comfort.

Now stand up and sit back down. Have the patient do this. You are now going to find the position of comfort for your legs again. Remember that there is no wrong or right position. You are just finding whatever feels most comfortable for you in this moment. Give them time to do this. Only provide help if they are not understanding how to do this.

Now we are going to find the position of comfort for your low back. We are often told that we should sit very tall and that this is the best position for our back. Have you heard this before? Have the patient share. Well, this is not true. Sitting tall and upright is appropriate at times and won't cause any damage to the back. But it does require a lot of effort and the muscles need to work very hard to hold you in that position. Would you agree with this? Have the patient share. So just like we did with the legs, you are going to learn how to find the position of comfort for your low back. To do this, keep your legs where they are and sit tall so your back arches. Have the patient do this. What does this feel like? Have the patient share. Now move your bottom forward and let your back slouch. What does this feel like? Have the patient share. There is a position somewhere in between these two positions that is the position of comfort. To find it, move your bottom back a little bit. What does this feel like? Have the patient share. Now, continue to move your bottom back and forward until you find the position that feels the most comfortable to you. In the position of comfort, you will probably feel supported by the chair and you may feel like you don't need to put too much effort in to sitting. Also, it's the position where you feel the least amount of tension or pull. Have the patient find their position of comfort.

Often, we are hold in our belly without even noticing it. So, let your belly go forward and let it be big. Have the patient do it. What does that feel like? It can sometimes feel strange to let your belly get big. Were you holding your belly in? Was their tension in your muscles across your belly? Have the patient share. Focus on your belly again and try to release the tension and let your belly be loose.

Now you are going to find the position of comfort for your chest and upper back. Keep your legs and bottom where they are. Raise your chest as high as you can. Have the patient do this. Now, lower your chest as low as you can. Have the patient do this. What differences do you feel between these two positions? Have the patient share. There is a position of comfort somewhere between those two positions. See if you can find it. The position of comfort will usually feel like you are supported by the chair and that your body is not working too much to sit. Also, it's the position where you feel the least amount of tension or pull. Have the patient find their position of comfort.

Now you are going to find the position of comfort for your shoulders. Start with one shoulder. Bring your shoulder forward as far as you can. Have the patient do this. Now bring your shoulder as far as back as you can. Have the patient do this. There is a position of comfort somewhere between those two positions. See if you can find it. Have the patient find the position of comfort for the shoulder and arm. The patient can also change the position of their elbow and hands during this.

Repeat for the other shoulder. You can use pillows to support the arms if the patient is having a difficult time finding the position of comfort. Sometime patients are not able to move their shoulder blade on top of their rib cage. They may just move the rib cage and shoulder together. If the patient is moving the shoulder blade and rib cage together, you can help them experience moving their shoulder blade separately from their rib cage. To do this, place one of your hands on the front of the shoulder and one on the shoulder blade. Guide the shoulder blade forward and back. Ask the patient to see if they can feel the difference between this movement and the movement they were doing before. Then ask them to help you do the movement and gradually decrease your how much your hands are helping until they are doing the movement on their own.

Now you are going to find the position of comfort your neck. Bend your neck forward to bring your chin to your chest. Notice how that feels. Bend you neck back to look up at the ceiling. Notice how that feels. Now gradually move your neck forward and backwards, making the amount smaller and smaller each time. Demonstrate. Do this until you find the position of comfort for your neck. The position of comfort may feel like your head is able to easily rest on top of your body and the muscles are not working too hard to keep your head upright. Have the patient find the position of comfort for their neck.

Now move your attention through your body. Does each part of your body still feel like it is in the position of comfort. If not adjust the position again and find the position of comfort. Start with your legs. Bring your attention there. Then your low back. Your upper back. Your shoulders and arms. Your neck. Allow the patient to have time at each area of the body to bring their attention to it and to change the position if needed.

You have learned how to do belly breathing. So now let's do belly breathing while sitting in this position of comfort. You do not need to breathe deeply. Just breathe comfortably. Focus on your belly moving out as you breathe in. And then feel your belly move in as you breathe out. Feel the tension release as you breathe out. Guide the patient to do belly breathing for at least 10 breaths. What do you feel? Have the patient share. Do you think that this exercise will be helpful for you? Have the patient share. Do you think you can do this exercise at least 1 time a day? Have the patient share. Discuss a realistic plan for doing this in their daily life.

Do big group role play for this treatment.

Have one trainer be the physiotherapist and one trainer be the patient, based on the case example from part 3. Use the script and guide in this manual for the role play. As you demonstrate, the participants can follow along with the script.

After demonstrating, ask if the participants have any questions. Use this an opportunity to emphasize the key points, answer any questions, and to correct any misunderstandings.

Then do small group role play. Have the participants read the script to themselves before doing the role play. Then, they should do the role play and they should use the script during the role play.

Have some participants share what they observed during the small group role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

HOME ACTIVITY PLAN

Background Information:

A main goal of treatment, especially for nociplastic pain and persistent pain, is to provide the patient with the knowledge and skills to deal with pain, to be active, and to function in daily life. So, one of the most important things that you can do is to support the patient to do a home activity plan. A home activity plan is more than just a home exercise program. A home activity plan addresses all areas of daily life.

So, it can include exercises, relaxation techniques, breathing exercises, physical activities, functional activities, sleeping strategies, and strategies to be functional in daily life.

One of the most common frustrations that healthcare professionals have when working with people with pain is that they feel that the patient is not motivated and does not follow the recommendations provided. So, we are going to provide some information here so that you can understand why it is difficult for patients to be motivated and to follow recommendations. You will also learn ways to best support your patients in following a home activity plan.

It is important to recognize that when you ask a patient to do a home activity plan, you are asking them to change their behavior. And changing behavior is a difficult thing for all humans to do. It takes time, energy, and patience from both yourself and the patient to change behaviors.

Do partner discussion: Think of a time when you have tried to change a behavior and what your experience was. It could be when you tried to change what you were eating, to stop smoking, to exercise more, to study differently in school, or anytime you tried to change a habit to be healthier. Have the participants talk with the person sitting next to them about a time when they tried to change a behavior to be healthier. Ask them to describe the challenges they experienced with this.

As a big group, have a few participants share what they discussed. Emphasize how we have all experienced how changing behaviors is difficult.

Research has shown that all humans experience the same stages of change when trying to change behaviors in their life. These are called the "Stages of Change."

See the table below. For each stage of change, there is a general description. Also, an example of each stage is described in the column on the right. The example is related to a person trying to do medium intensity physical activity for at least 150 minutes per week.

Name of the stage	Description of the stage	Example
Pre-thinking	The person does not acknowledge that there is a problem or that the behavior needs to be changed	The person does not know the benefits of physical activity, the negative effects of inactivity, or the recommendations for physical activity. They may not be interested in learning information about physical activity. They may be defensive and give reasons why it is not possible for them to be physically active.
Thinking	The person acknowledges the problem but does not want to make a change	The person knows they should be more physically active because it will help them. But they are not ready to make any changes for this in their daily life. They will be open to learning more information about physical activity, but they will not follow any recommendations about this.
Preparation	The person has made a commitment to change the behavior	The person is committed to being more physically active, but they have not made any changes in their daily life. They may say things like, "I know I need to be more active, but I don't know how" or "What activities will be good for me to do?" This person will show interest in the recommendations about physical activity and will seem motivated to be more physically active. But they will not make any changes in their behavior, like by being more physically active.
Action	The person believes they have the ability to change the behavior and they are doing things to change it	The person makes a plan on how to be physically active for 150 minutes per week. They will try to do their plan and do more physical activity. But they will still struggle with following the plan. For example, the person may only do 80 minutes of medium intensity physical activity per week.
Maintenance	The person is able to maintain the new behavior	The person is able to consistently do medium intensity physical activity for 150 minutes per week. They can continue to do this even when they have challenges like pain or limited time.

These are the stages of change that all humans experience as they want to change a behavior. This is not a linear process but rather a cycle. People often move between the stages. For example, a person may be in the action stage where they are doing regular physical activity. But then the person may go back to the preparation stage where they are not being as physically active, but they are thinking about how to be physically active again.

Partner discussion: Have the participants talk with the person sitting next to them. Ask them to discuss the following:

- Think of a patient you are working with and describe a behavior that they are trying to change
- For that patient, determine what stage of change they are in for this specific behavior
- For that patient, how do you know that they are in this stage? What is the patient saying or doing that lets you know that they are in this stage?

As a big group, have a few participants share their examples with the group. Use this as an opportunity to clarify the stages of change and to answer any questions about it.

People with pain often have a lot of behaviors that would be helpful to change. This can include being physically active, doing exercises and movements, using strategies to manage pain like breathing and relaxation exercises, changing the way they do activities in their daily life, changing what they eat, changing their sleep routine, changing their behavior when they experience pain, and many more. It is your role to help the patient move towards and remain in the maintenance stage for healthy behaviors. To do this, it is helpful to recognize the stage of change the person is in for any specific behavior that you are focusing your treatment on. Then, you can be more effective at helping the patient make changes in their behavior. See the table below for the things that can be helpful in each stage of change. The example in the left column uses the example of doing 150 minutes of medium intensity physical activity per week.

Name of the stage	Things that can be helpful	Example
Pre-Thinking	<p>Provide education about the behavior including the benefits, risks, and recommendations</p> <p>Ask the patient to share how the behavior affects them</p>	<p>Provide education about the benefits of physical activity, the risks of inactivity, and the physical activity recommendations. Make the education specific to patient's experiences and problems.</p> <p>Ask the patient to share their previous experience with physical activity or examples of people in their life that have had positive effects from being physically active.</p>
Thinking	<p>Discuss the positive effects of changing the behavior and the negative effects of not changing the behavior</p> <p>Discuss reasons why it may be difficult to change the behavior and discuss solutions to these challenges</p>	<p>Ask the patient to share what they think will happen if they are more physically active. Ask the patient to share what they think will happen if they continue to be inactive.</p> <p>Ask the patient to share the things in their life that make it difficult to be physically active. Discuss solutions to these challenges so that patient sees a way to overcome them.</p>

Preparation	<p>Identify a realistic goal and make a detailed plan on how to achieve this goal.</p> <p>The initial goal should be small and easily achieved.</p> <p>Make a plan for what to do if the person experiences challenges like pain.</p>	<p>Have the patient identify a goal that is realistic for them to achieve right now. For example, the physical activity recommendations of 150minutes per week may not be realistic. So, they can set a goal of 15 minutes per week.</p> <p>Create a plan specific to the person's daily life and needs. For example, the patient can set specific times when they can be physically active. For example, if they already walk to their mother's house three times a week, they can plan to walk at a faster speed. They can plan to do sit to stand exercises every night for 3 minutes while watching television.</p> <p>In the plan, discuss what to do when they have challenges that are specific to their life. For example, what do they do if they have an increase in pain or if they become too busy to walk to their mother's house.</p>
Action	<p>Help the patient see their successes by sharing them with you</p> <p>Discuss ways that they could have family or friends support them to continue the behavior</p>	<p>During every session, have the patient tell you about the physical activity that they did. Provide encouragement and discuss any challenges they faced.</p> <p>Encourage the patient to share their plan with a family member or friend. They can even ask someone to do the physical activities with them. For example, they can ask a family member to walk with them regularly.</p>
Maintenance	<p>Make a plan for what to do when there are challenges</p>	<p>Discuss a detailed plan for what to do when the patient faces challenges maintaining the regular physical activity. Have the patient identify both the challenges and solutions.</p> <p>If their treatment is finished, encourage the patient to come see you again if they face any challenges in being physically active.</p>

Partner discussion: Have the participants talk with the person sitting next to them. Ask them to discuss the following: Think of the same patient that you discussed in the previous activity. Considering the stage of change that they are in, what can you do to help them move to the next stage? Be specific.

In the big group, have a few participants share their examples with the group. Use this as an opportunity to clarify the stages of change and to answer any questions about it.

Considering how all humans move through the stages of change, supporting a patient to follow a home activity plan can be challenging. The following are general ways to support a patient to follow a home activity plan:

- Provide education – The patient must understand why the things in the home activity plan are important and helpful for their specific situation.
- Start small – Make a simple plan and only start with a couple of activities so that the patient can be successful.
- Make a home activity plan that is meaningful to the patient – Explore options: People only change behaviors when they believe it is important and meaningful so the patient must understand why the home activity plan will help with the things that they care about. Discuss this with the patient and explore options together with the patient to determine the most meaningful activities to include in the home activity plan.
- Practice – You must practice any exercise, activity, or technique with the patient in the clinic so that the patient can learn how to do it correctly, feel confident doing it, and so you can provide education or modifications if there are any challenges.
- Recognize and celebrate when the patient does any of the home activity plan – Since behavior change is difficult, it is important to recognize when a patient makes even small changes towards maintenance.

Treatment Details:

Goals of treatment – Home Activity Plan:

- Develop a plan that is meaningful to the patient and that will provide them with ways to manage pain and improve function in their daily life

Key points – Home Activity plan:

- This should be a discussion. Your goal is to have the patient determine the most realistic and effective home activity plan.
- Make sure that the patient understands why the activities will help their specific problems and concerns
- Allow the patient to set the details of the plan so that it is realistic for them
- Provide handouts for the patient to take home so that it can be a reminder of the home activity plan
- Include activities in the home activity plan that the patient learned in this session and previous sessions

Here is an example of how to discuss the home activity plan with the patient:

Healthcare professional: You have been living with pain for a long time, so it will take time to improve. It also takes effort. But the end result is worth it. You can think about it like this. Are the best meals that you eat, the one that you pick up from the fast food restaurant? Or are the best meals the ones that you spend hour preparing or that your family spends hours preparing? Have the patient share. The best things in life take time and effort. If we want to improve your situation, then you need to put in the time and effort needed. Only coming here for treatment with me is not enough. You also need to do activities at home. So, each session, we will make a home activity plan together.

Today you learned how to do the breathing exercise. When did you decide to do it regularly? Have the patient share the plan that they already made previously. **Today you learned how to find comfort in sitting. How often can you do this technique at home?**

After the discussion, have the patient summarize the plan for you. Have the patient demonstrate any exercises, techniques, or physical activities that they will do at home. This will help them remember it. You can also record them doing each exercise or physical activity on their phone so that it will remind them. Provide them with any handouts related to the home activity plan.

Write down the plan in your documentation so you can follow up during the next session. End the session by telling the patient the plan for the next session.

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PASSIVE TREATMENTS

As we described in part 3 of the training curriculum, research does not recommend the use of most passive treatments to treat pain. Consider this when determining if passive treatments will be included in the

If you choose to provide a passive treatment, follow these guidelines:

- Spend the majority of the treatment session providing the active treatments described in this manual
- Only provide passive treatments during the first few treatment sessions
- Educate the patient that the entire treatment is working to provide them with the knowledge and ability to take care of themselves. So, we want to focus on active treatments they can use to manage any pain or other problems that may prevent them from doing activities in daily life.
- Educate the patient so that they understand that active treatments are an important part of treatment.

ADDITIONAL LEARNING RESOURCES

Video for belly breathing: <https://www.youtube.com/watch?v=0Ua9bOsZTYg>

Video about the effect of belly breathing: <https://www.youtube.com/watch?v=1sgb2cUqFiY>

Article and video for finding comfort in sitting: <https://www.dynamicprinciples.com/finding-ease-part-2-sitting/>

SESSION 2

Session 2 should include the following treatments.

- Check-in
- TNE: Temperature warning light
- Sensory discrimination
- TNE: Stuck window
- Active Movement of an area with pain - progress
- Square breathing
- Home activity plan

- Passive treatments (only if requested)

CHECK-IN

Treatment Details - See details above in the description for session one
The check-in involves discussing the following two questions with the patient.

1. What has gone well since the last time we met?
2. How did the home activity plan go?

TNE: TEMPERATURE WARNING LIGHT

Treatment Details:

Goals of the treatment – Temperature Warning Light

The “Temperature Warning Light” TNE aims to help the patient understand the following points:

- Pain is always a decision by the brain
- Pain is not a reliable way to judge the amount of tissue damage or injury
- Pain is not permanent - Our biology can change

Key points – Temperature Warning Light

- This information covered in this TNE is very important for the patient to understand. At the end of the TNE, check the patient’s understanding by asking questions and having them summarize what they learned.
- Do not lecture at the patient. Rather engage the patient in a discussion.
- Use the pictures provided with the TNE.

Healthcare professional: We are going to use an analogy now to understand how the nervous system can become oversensitive and this can contribute to pain. You are driving your car and suddenly smoke starts coming out the engine. What would you do? Patient: Pull over and see what the problem is.

Healthcare professional: What could the problem be? Patient: The engine is overheating

Healthcare professional: Exactly. If the engine seems to be overheating, what would you do? Patient: You use water and coolant and wait some time before you drive again.

Healthcare professional: Exactly. Now, there should a warning light, like this, that turns on when the car overheats.

Show picture. But in this story, the warning light never turned on. So, what would you do? Patient: Take the car to a mechanic and fix the temperature warning light.

Healthcare professional: Exactly. So, let’s say that you do this. You take the car into a mechanic and they fix the warning light so it should now detect any significant changes in temperature. This will make the light turn on because the car overheats. Now, you are back on the road and driving along. After 10 minutes on the road, the warning light turns on. You don’t notice anything else, but you pull over. You check under the hood, but you don’t see anything wrong. You put in some water and coolant just in case. You get back in the car and drive for another 5 minutes and the warning light turns on again. Again, you pull over, check under the hood but you don’t see any problems. What do you think is wrong? What is going on? Patient: The temperature warning light is broken. It is turning on when there is nothing wrong.

Healthcare professional: Exactly, in other words, the temperature warning light is too sensitive. It is telling you danger, before there is any problem. It is telling you that there is a danger, before you need to worry about it or take any action. It is too sensitive. Can you see that? Have the patient share.

Healthcare professional: This is the same thing that can happen in our bodies. Our nervous system can become too sensitive and produce pain as a warning light or an alarm. When the body's warning light, like pain, turns on, you think that there must be something wrong. So, you go to see doctors and you worry about what could be wrong with you. You stop moving and using that part of your body because you are worried that something is wrong. But just like the over sensitive car warning light, our body's alarm system can become too sensitive. If a person's alarm system in their body is too sensitive, do you think that every pain would indicate that they have damage in their tissues? Patient: No, their body could just be too sensitive.

Healthcare professional: Exactly, the alarm system is too sensitive. Do you think pain always indicates a medical condition, like a severe disc injury, heart disease or cancer? Patient: No, my body could just be too sensitive.

Healthcare professional: Exactly. And based on the assessment with you, it is clear that your nervous system is too sensitive. The alarm system in your body is too sensitive and therefore you are experiencing pain. The sensitivity is caused by real changes in your nervous system. So, we are going to work together to help restore the alarm system back to normal, to decrease the sensitivity. There are things that are making your nervous system even more sensitive like not moving your body and worrying about the pain and what could be wrong. Instead of focusing on fixing tissues, we will work on a variety of strategies to help calm down your nervous system, which will steadily help you move more, experience less pain and return to your previous ability to function in daily life. We can do this through movement, exercise, thinking differently about our bodies and not avoiding activities. Do you have any questions or thoughts? Have the patient share.

Demonstrate this in a role play for the big group.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

SENSORY DISCRIMINATION

Goals of the treatment – Sensory Discrimination

- Provide opportunities for the nervous system to develop improved sensory discrimination

Key points – Sensory Discrimination

- Do not rush through the process. The patient needs to be exposed to the sensations many times for the changes in the nervous system to occur
- Have the patient describe what they feel in words and also create an image in their mind of where and how they are being touched. This promotes the changes in the nervous system that are necessary for restoring normal sensory discrimination.

1. Identify 4 to 7 spots in the area. Select 4 to 7 spots in the area and name these with the patient. Have the patient look at the area as you touch the specific spot and name it. For example, if you were doing the foot, you could name the specific spots as heel, big toe, little toe, top of foot, arch of foot, and base of toes.
2. Have the patient look at the area while you touch it. As you touch each of the specific spots that you named, the patient should say the name of the spot. You can use your finger or any material to touch the spots. Touch the specific spots in a random order. The goal of this step is to make sure that the patient learns the name of each spot and that they are creating new neural pathways for the sensory stimulation that you are providing.
3. Then have the patient close their eyes or look away from the area. Touch each area and have the patient say the name of the specific spot that you are touching. After they respond, have them look as you touch the same spot so that they can see if they were correct. Continue touching the spot as they look so as to help their brain make new neural pathways related to the sensation and the specific location.
4. Continue for 2 to 4 minutes.
5. Discuss with the patient that they should do this at home. At home they can have a family member help them do this activity just as you did it with them. Or, if this is not possible, the patient can do it by themselves. If they do it by themselves, they should name specific spots in the area. The spots can be different than the spots you named in the session. Then they should look away from the area as they touch the area with their finger or another material. As they are touching the spot, they should say the name of the spot and try to picture it in their mind. It is most helpful to do this for 2 to 4 minutes per day for 2 to 4 times per day. But discuss a realistic plan with the patient.

TNE: STUCK WINDOW

Treatment Details:

Goals of the treatment – TNE: Stuck Window

The “Stuck Window” TNE aims to help the patient understand the following points:

- Pain is not a reliable way to judge the amount of tissue damage or injury
- Pain is not permanent - Our biology can change

Key points – TNE: Stuck Window

- Do not lecture at the patient. Rather engage the patient in a discussion.

Healthcare professional: Let's discuss an analogy to understand how our bodies benefit from movement. Think about a window that hasn't been opened for a long time. What would happen when you try to open it?

Patient: It would be difficult to open. It would make sounds.

Healthcare professional: Yes, and this is similar to our body. Often when we feel pain, we stop moving that part of our body. Have you experienced that? Have the patient share.

Healthcare professional: So, let's think of our body part like that window that hasn't opened for some time. If we don't move a part of our body for some time, even for just a day, you may feel like that part of your body is stiff and doesn't move easily. It may make sounds like a cracking or grinding sound. And you may feel pain or discomfort. This is a normal experience when we haven't moved part of your body for some time. The pain, discomfort, and sounds do not indicate that there is an injury or damage in that area. Does that make sense? Have the patient share.

Healthcare professional: If you think back to the window, how would you fix the window that is difficult to open? How would you make it easier to open? **Patient:** Open and close it many times. Use some oil to help it slide open and closed.

Healthcare professional: Yes, and the same things are true for our body. As we move the body part many times, like our knee joint or our back, it will get easier to move. Also, just like an oil can help the window open more easily, our body naturally makes oil in our joints to help them move more easily. This oil gets released in our joints when we move the joint. If we don't move the joint, the body doesn't make this oil. So, what would happen to the oil in the joints if you don't move the joint for some time? **Patient:** There would be less oil.

Healthcare professional: Exactly. But if you start to move and use that part of your body again, your body will naturally release the oil into the area, and it will be easier to move. What can we conclude about the effect of movement on a part of our body, like a joint? **Patient:** If we move that part of our body, it will make it easier to move.

Healthcare professional: Exactly. If a person feels pain, they often stop moving that part of the body. This can make it feel stiffer and can cause more pain. But we can gradually start moving the body part again. This will help the body release oil to make it move more easily. And with time, the movement will help to decrease the pain and discomfort.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

ACTIVE MOVEMENT OF AN AREA WITH PAIN

Background Information:

As we have discussed, moving an area with pain is an important part of treating the pain. Active movement of an area with pain has a positive effect on the following factors that contribute to pain:

- Nociceptive pain and changes
- Neuropathic pain and changes
- Nociplastic pain and changes
- Body information
- Thoughts and beliefs
- Emotions
- Memories
- Behavior

Active movement of an area with pain has these positive effects because it increases the signs of safety for the brain, so the brain is more likely to determine that there are more signs of safety than of danger. In this way, active movement of an area with pain is one way to treat pain.

Active movement of an area with pain also has the following effects:

- Reverses the biological changes that occur with nociplastic pain
- Improves body information that may be contributing to signs of danger like joint stiffness, muscle weakness, decreased muscle length, and decreased muscular endurance
- Provides positive experiences to change unhelpful thoughts and beliefs about pain and movement
- Decreases fear of pain and fear of movement
- Creates new memories of moving the area and not experiencing pain or feeling out of control
- Allows the person to feel comfortable doing more movement and physical activity in daily life

The fear avoidance cycle is important to understand when using active movement of an area with pain. The fear avoidance cycle includes the following steps:

- Pain experience
- Unhelpful thoughts and beliefs about pain
- Avoid pain and things that could cause pain
- Biological changes and decreased movement

This cycle will continue unless the person experiences something to break the cycle. Active movement of an area with pain works to stop this cycle so that the person no longer avoids pain and things that cause pain.

Here is an example of how the fear avoidance cycle contributes to pain.

- Pain experience: A person wakes up with pain and stiffness in their neck.
- Unhelpful thoughts and beliefs about pain: The person thinks: "I must have a disc bulge in my neck like my mother had," "This is going to get worse," "It hurts so bad and there is nothing that I can do about it," and "Moving my neck will make it worse."
- Avoid pain and things that could cause pain: The person stops moving their neck. The person doesn't go to work but rather lays in bed all day because they think this is the best thing for the pain.
- Biological changes and decreased movement: Because of the unhelpful thoughts and beliefs and the decreased movement, nociceptive changes occur which increase the sensitivity of the nervous system. The brain produces protective outputs including decreased movement and increased muscle tension.
- Pain experience: The biological changes and protective outputs contribute to the pain experience, so the cycle continues.

We will use the same example to see how the fear avoidance cycle can be stopped so the person can recover.

- Pain experience: A person wakes up with pain and stiffness in their neck.
- Helpful thoughts and beliefs about pain: The person thinks "I must have slept on my neck wrong so my joints and muscles are stiff," "This is not permanent," and "The pain will go away gradually if I keep moving my neck, do some stretches, and do some self-massage."
- Does not avoid pain and things that could cause pain: The person moves their neck and does neck stretches. They go to work and do all of their normal activities.
- No biological changes or decreased movement: Because of the helpful thoughts and beliefs and the continued movement, nociceptive changes do not occur, so the sensitivity of the nervous system does not increase. The brain may still produce some protective outputs like increased muscle tension. But with continued movement, the brain will see more signs of safety than of danger so it will stop producing protective outputs.
- Pain experience: The nervous system does not become over sensitive, so gradually the pain experience will stop.

Active movement of an area with pain is effective only when applied correctly. By slowly exposing an area of pain to movement, we are "retraining the brain." Or in other words, we are creating new neural pathways that have less danger signals. This results in an increased pain experience and improved function in daily life.

Here are key principles to follow when doing active movement of an area with pain:

- For all of the movements, you want to find the right speed. For some patients it will be more difficult and more painful to do slow movements and for others it will be better to move slow. Explore this with the patient and agree on a speed that feels the most comfortable for the patient. Evaluate and adjust speed as treatment progresses.
- For all movements, they should be performed rhythmically. When you are helping the patient learn the movement, help them learn how to do it in a rhythmic movement. This helps decrease muscle tension and other protective outputs.
- For all movements, the patient should continue to belly breathe. Holding the breath or doing upper chest breathing increases the sensitivity of the nervous system and increases feelings of fear and anxiety. It can be helpful to first do belly breathing and then add the movement with the belly breathing.

- For all movements, the patient must practice it with you. It can be helpful to first demonstrate the movement so they can see how to belly breathe and perform the movement rhythmically. The patient must know that they can do this movement and that it will not cause significant pain or anxiety. So, it is essential that the patient practices the movement with you just as they will do it at home (the same repetitions, speed, etc.).
- For all movements, the patient must do them at home. The goal of this exercise is that the person and their nervous system is exposed to the movement many times so that it can learn that it is not a danger that needs to be avoided. The following are ways to help the patient feel comfortable doing the movement at home: Practicing the movement with the patient, provide encouragement and helpful thoughts, discuss any worries or fears that they have about doing this at home, and discuss a realistic plan for doing it at home.

Treatment Details:

Goals of the treatment – Active movement of an area with pain

- Decrease fear and anxiety of pain and movement
- Promote helpful thoughts and beliefs
- Decrease biological changes and protective outputs
- Decrease sensitivity of the nervous system
- Increase strength, mobility, and physical functioning of that area
- Guide the patient to do active movement of an area with pain at home on a regular basis

Key points – Active movement of an area with pain

- Work with the patient to find the movement and way to do the movement (speed, repetitions, ROM) that they feel comfortable to do at home on a regular basis
- Practice the movement with the patient
- Guide the patient to continue to belly breathe
- Create a calming environment as to decrease fear and anxiety
- Perform the movement rhythmically

1. Provide education as described in the script below.
2. Determine which part of the body you will focus on. If a person has multiple areas of pain, ask them to choose which area they would like to focus on first.
3. Determine the persons current ability in the selected area. Show the patient the handout of movements for the specific area of the body. Demonstrate each movement. Then ask the patient which one they think they could feel comfortable doing right now. If you are doing an area of the body that does not have a handout, you can create a series of movements that get progressively more difficult.
4. Do the following steps for the selected movement:
 - Demonstrate the movement with belly breathing and rhythmic movements
 - Have the patient do 1-2 repetitions of the movement in a way that feels comfortable for them
 - Ask the patient how many repetitions they think they could do comfortably
 - Have the patient do the active movement for the number of repetitions that they selected. Guide the patient to find the ROM and speed of movement that is most comfortable for them. Guide the patient to continue to breathe and to keep the movement rhythmic.
5. Discuss with the patient the plan for doing this movement at home. It is important to do the movement frequently, like 3 to 4 times per day. Guide the patient to think about how they could remember to do this and how they could do it in their daily life.
6. Help the patient understand that they should perform this active movement even if they feel pain and discomfort. Reassure the patient that pain during this movement does not mean that there is any tissue damage. Remind them of the key points from the stuck window TNE. The patient should be moving below their maximum level of ability so it should be possible for them to do this movement regularly without it increasing pain significantly. If at home the movement is increasing the pain too much, the patient can decrease the number of repetitions or the ROM. But they should not stop doing the movement regularly.

Use this script for providing education:

Healthcare professional: As we just described with the example of a stuck window, if a person has felt pain, we often stop moving that part of the body. This can make it feel stiffer and can cause you to experience more pain. But we can gradually start moving the body part again. This will help the body release oil to make it move more easily. And with time, the movement will help to decrease the pain and discomfort.

In the beginning it is very natural to feel afraid of using the body part that is in pain, but by taking it slowly and step by step, and doing a little bit every day, - you will soon feel more confident that the movements are not harmful. You will slowly experience that through moving you feel stronger, more energy, and that it is easier to do activities in your daily life. Also, by gradually moving the body part you will feel less pain and discomfort. So now we are going to start moving a part of your body that has pain. We are going to work together to find the movement that works well for you. Our goal is to find the movement that you will feel comfortable doing many times a day until our next session. So, the movement should not be too difficult or too painful. But it may cause some pain and discomfort, because it is like we are opening and closing a stuck window.

Use this script for discussing with the patient the plan for doing this movement at home:

Healthcare professional: As we learned when talking about the stuck window example, the first step is to get your body moving. We have now found the movement that is best for you right now. It is best to do this movement many times in a day. How many times do you think you could do this movement? Have the patient set the goal for the repetitions and number of times per day they will do this exercise. It is important that the patient starts by planning to do slightly less than they are able to do. This means they start at a level below that they are able and do slightly less repetitions than they are able to do. This gives the brain the time to create new understandings of the signals that it gets from the body structures.

Use the handouts with the pictures for each area of the body. See below for a description of each area of the body.

Back

- Level 1: Lay on your back. Bring one knee to your chest one at a time. Then bring both knees to your chest.
- Level 2: Lay on your stomach. Place your hands on the floor by your shoulders. Straighten your arms so you bring your chest off the ground. Let your back and buttocks muscles relax. Then return your body to rest on the ground.
- Level 3: Lay on your back. Bend your knees and place both feet on the ground with your toes facing forward. Now, move both knees to the side, towards the floor. Keeping both feet on the ground. Do this rhythmically from left to right. You should feel rotation in your lower back.
- Level 4: Lay on your back. Have your legs straight. Lift one leg up towards the ceiling while keeping the knee straight and the toes pulled towards your face. Slowly lower it back to the ground. Do the same on the other side.
- Level 5: Sit on chair with both feet firmly on the ground and with an upright relaxed posture. Place both hands on your thighs. Now, slide the right hand towards the right knee and then return it to the starting position. Then slide your left hand towards the left knee. As you do this, you should feel your lower back rotate. Make sure that the rotation movement is from your lower back and not just your upper back and shoulders.
- Level 6: Stand firmly on the ground with feet a bit apart, toes facing forward. Lift your right knee up so that you form a 90-degree angle in your hip. Have your left hand or elbow meet the knee as it reaches the full movement. Return to the starting position. Do the same movement but with the left knee meeting the right hand. Make sure that you rotate in your lower back and not just your upper back and shoulders.
- Level 7: Stand in a comfortable position. Bend forward and touch your toes. Slowly come up to a standing position. Place your hands on your low back and arch your back backwards so that you are looking up at the ceiling. Return to the standing position.

Knee

- Level 1: Lay on your back with your legs straight. Bring the heels of your legs up towards your bottom. Then straighten your legs fully.
- Level 2: Sit in a comfortable position. Straighten the knee and then return the foot to the floor.
- Level 3: Stand in a comfortable position. Bend and straighten your knees a small amount.
- Level 4: Stand in a comfortable position. Bring one knee up towards your chest. Then rest it back on the ground. Make sure to not lock the knee straight when it is standing on the ground.
- Level 5: Stand in a comfortable position. Hold on lightly to the back of a chair for support. Squat down halfway and then return to standing.
- Level 6: Stand in a comfortable position. Squat fully down and return to standing.
- Level 7: Stand in a comfortable position. Move to sitting on the floor. Return to standing. You can move in whatever way feels comfortable. Try not to use anything but the ground for support.

Neck

- Level 1: Sit upright in a comfortable chair. Try to have your back and arms supported by the chair. Move your head up and down rhythmically as if saying yes. Move your head left to right rhythmically as if saying no.
- Level 2: Sit upright in a comfortable chair. Try to have your back and arms supported by the chair. Turn your head to the left so that you are looking over your shoulder. Then turn your head to the right so you are looking over your shoulder.
- Level 3: Sit upright in a comfortable chair. Try to have your back and arms supported by the chair. Bring your right ear towards your right shoulder. Then bring your left ear towards your left shoulder.
- Level 4: Sit upright in a comfortable chair. Try to have your back and arms supported by the chair. Bring your head back so that you are looking at the ceiling. Then bring your head forward so that your chin touches your chest.
- Level 5: Sit upright in a comfortable chair. Try to have your back and arms supported by the chair. Move your head in a circle so that it moves in all directions.
- Level 6: Stand in a comfortably position. Hold your arms out to the side. Turn your body and head to the right. Try to look behind you and reach your right arm behind you. Return to the starting position. Then turn your body and head to the left. Try to look behind you and reach your left arm behind you.
- Level 7: Stand in a comfortably position. Bring your head back so that you are looking at the ceiling while also raising your arms up and reaching back. You should be able to look at your hands while you do this. Then bring your head forward so that your chin touches your chest while also bringing your arms down and behind you.

Shoulder

- Level 1: Stand in a comfortable position. Have your arms relaxed by your side. Move your weight from your heels to your toes. As you rhythmically move on your feet, let your arms gently swing by your side. The goal is to let your arms gently move forwards and backwards.
- Level 2: Sit in a comfortable position and with your arm supported by a table. Sit close to the table so the arm is fully supported. Move the shoulders up and down like in a shoulder shrug. Move the shoulders in a circle.
- Level 3: Sit in a comfortable position. Hold your arms by your side so that the elbows are bent, and the palms of the hands are turned up. Keep the hands open and relaxed. Move your hands out, away from your body. Return to the starting position. Move your hands in, towards your body.
- Level 4: Sit or stand in a comfortable position. Clasp your hands together. Keep your thumbs pointing up. Bring your arms up over your head and then back down.
- Level 5: Stand in a comfortable position with your arms by your side and your palms facing your body. Bring your arms forward and over your head.
- Level 6: Stand in comfortable position. Reach your hands behind your back. Then reach your hands behind your neck.
- Level 7: Stand in a comfortable position with your arms by your sides. Move your arms in forward circles. Move your arms in backwards circles.

SQUARE BREATHING

Background Information:

At this point, you have taught the patient how to do belly breathing. Now you will teach them how to do square breathing. This technique has a person do square breathing but in a structured pattern. This is a progression from simply doing belly breathing. Square breathing also uses a visual cue which can help many people better learn how to control belly breathing and how to stay focused on their breathing.

Treatment Details:

Goals of the treatment – Square breathing:

- Provide education to the patient about how and why belly breathing and square breathing is helpful for them
- Teach the patient how to do square breathing with a correct pattern
- Give the patient the skills to do square breathing at home as to have a positive effect on the factors contributing to pain

Key points – Square breathing:

- If you are encouraging a patient to use breathing as a treatment at home, then it is necessary to teach the patient the correct breathing pattern. If you don't teach them the correct breathing pattern, then you are encouraging them to use the upper chest breathing pattern which will contribute to continued problems.
- If the patient is not able to maintain the belly breathing pattern during square breathing, return to normal belly breathing. Do not progress to square breathing. Have the patient continue to do belly breathing at home. And do square breathing in a future session.
- Make sure to take enough time to do this correctly.

Healthcare professional: Last session, we learned how to do belly breathing. Can you demonstrate belly breathing for me? If the patient is having difficulty performing the correct pattern, take time to help the patient learn the correct pattern.

Healthcare professional: We are now going to use belly breathing in a specific technique. This technique is called square breathing. This technique will help you learn how to control your breath more. It also helps people learn how to stay focused on their breath rather than thinking about other things or paying attention to other sensations in their body.

Have the patient sitting or lying down. In sitting or lying down, they should be able to be in a supported and relaxed position. Choose whichever position allows the patient to have the best breathing pattern.

Demonstrate for the patient before they do it. Draw a square in front of you with your finger as you do belly breathing. As you move your finger up, you inhale. As you move your finger across, you hold the breath. As you move your finger down, you exhale. As you move your finger across to complete the square, you hold the breath. Repeat. Each side of the square is even which means each phase of the breath is done for the same amount of time. Starting at a count of 3 for each side of the square is usually effective for most patients. You can increase or decrease the count of each side based on the patient's ability.

Have the patient do the breathing as you draw the square in front of them. Make sure that they are doing a belly breathing pattern. Practice this. Then ask them to draw the square with their finger. Practice this. Then ask them to do it while drawing the square in their head only. Practice this.

Discuss the following with the patient so that they will include the breathing activity for the home activity plan:

- What did you experience during square breathing?
- Do you remember the benefits of breathing and square breathing?
- Do you find belly breathing by itself or square breathing more beneficial for you?
- What type of breathing will you do at home and when will you do it?

Demonstrate this in a role play for the big group.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

HOME ACTIVITY PLAN

Treatment Details - See details above in the description for session one

The home activity plan involves developing a plan that is meaningful to the patient and that will provide them with ways to manage pain and improve function in their daily life. Make sure to write down the plan in your documentation so you can follow up during the next session.

ADDITIONAL LEARNING RESOURCES

- Square breathing: <https://www.youtube.com/watch?v=AO4jxlpw0Rk>
- Simple video to guide Square Breathing: <https://www.youtube.com/watch?v=YFdZXwE6fRE>

SESSION 3

Session 3 should include the following treatments:

- Check-in
- TNE: Cross chart
- TNE: Lion
- Active Movement of an area with pain - progress
- Finding comfort in laying down
- Muscle relaxation
- Home activity plan

- Passive treatments (only if requested)

CHECK-IN

Treatment Details - See details above in the description for session one

The check-in involves discussing the following two questions with the patient.

1. What has gone well since the last time we met?
2. How did the home activity plan go?

TNE: CROSS CHART

Treatment Details:

Goals of the treatment – TNE: Cross Chart

The “Cross Chart” TNE aims to help the patient understand the following points:

- Pain is not a reliable way to judge the amount of tissue damage or injury

Key points – TNE: Cross Chart

- Be prepared with a large piece of paper, flipchart, or a marker board to write on.
- Do not summarize the key points for the patient. Rather ask the questions and have the patient come to the conclusions.

Write down two columns with the words lining up across from each other. Like this:

Column One:

Severe Pain
Medium Pain
A little Pain
No Pain

Column two:

Severe tissue damage
Medium tissue damage
A little tissue damage
No tissue damage

Ask the patient to discuss examples of painful experiences. For each experience the patient should select a level of pain a person would experience and the level of tissue damage. For each pain experience, draw a line connecting the level of pain to the level of tissue damage. For example, for a headache you can draw a line between no tissue damage and medium pain. If the patient doesn't naturally include examples of non-linear connections, then offer some of the following examples and ask the clients to select the level of pain and tissue damage present for each experience:

- Someone involved in a car crash that walks for miles with a broken leg to get help
- Soldiers in the battlefield
- Headache
- Phantom limb pain
- Muscle cramp in toes or legs
- Paper cut
- Torn nail
- Toothache
- Burn
- Injured athletes that continue to play
- Buttock ache from sitting on a hard chair
- Stubbed toe
- Leg pain and numbness when sitting on the floor for a long time

When there have been enough lines put onto the chart in a crisscross pattern, ask the patient the following questions:

- What conclusions can we make based on what we see on this chart?
- How reliable is pain at telling us what is going on in the tissues?
- Does severe pain always mean that there is a severe injury?
- If you have pain, does that mean that you have a permanent injury to your body and that you will always have pain?

Demonstrate this in a role play for the big group.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

TNE: LION

Treatment Details:

Goals of the treatment – Lion

The “Lion” TNE aims to help the patient understand the following point:

- Pain is not a reliable way to judge the amount of tissue damage or injury
- Biological, social, and psychological factors contribute to how and when a person experiences pain
- Pain is not permanent - Our biology can change

Key points – Lion

- Do not lecture at the patient. But have the patient share their experiences.
- Help the patient make the connection that other physical and emotional symptoms that they are experiencing are caused by an oversensitive nervous system.

Healthcare professional: We are going to discuss now how our minds and bodies react to stress and how this can contribute to pain. If a lion walked into the room right now, our mind and body would react. What do you think would happen in our bodies? Have the patient share

Healthcare professional: These changes in our body happen because our brain makes an assessment. It assesses that 1: there is a lion, 2: the lion is dangerous, and 3: we need to protect ourselves. Because our brain decides that there is danger, our brain causes these changes in our body to make sure we can protect ourselves from the lion. Like you said, our muscles would get tense, our heart would beat fast, our breathing would become short. If our brain decides that this lion is dangerous, what do you think our mind would focus on? Would our mind start thinking about what to eat for dinner or about what happened yesterday at the football game? Have the patient share. The only thing the mind will think about is how to keep you safe and how to get away from the danger. Our mind would become very alert.

Healthcare professional: This response by the body and mind is normal and helpful because it gets us ready to protect ourselves from the danger of the lion. These are helpful changes when there is actually a lion chasing us or when we are in real danger. But what should happen to our mind and body once the lion goes away? Once we are safe? Have the patient share. Once the lion goes away, our mind and body should return to a normal, calm state. But sometimes there are things in our lives that are like lions. You may have lions in your life. It may be the things that happened to you in the past, your current situation in daily life, or your fears about the future. These can all be like lions. They follow you around, they chase after you, and cause your mind and body to react like a lion is chasing you. Do you experience this? Do you ever feel that your mind and body is acting as though you are in danger? Have the patient share

Often when lions are chasing us, we can experience pain in our body. When lions are chasing us, our nervous system becomes over sensitive. And we learned that an over sensitive nervous system contributes to pain. An over sensitive nervous system can make us feel a lot of other physical and emotional discomfort. I wonder if you experience any of these symptoms of an over sensitive nervous system. Read the list and have the patient share what they have experienced.

- Crying often
- Yelling at people
- Fighting with people
- Feeling unable to control your anger
- Insulting people
- Wanting to be alone
- Avoiding social activities
- Feeling emotionally numb so that you don't feel any emotions. Things that usually would bring you joy, no longer make you feel joy.
- Feeling like you will faint
- Not wanting to talk to anyone
- Feeling disconnected from the world, like you are outside your body and you are watching a movie of your life
- Headaches
- Chest pain or chest heaviness
- Overthinking
- Problems with sleep
- Feeling tired all of the time
- Not motivated to do anything

Healthcare professional: These are the common experiences that we all have when we have a lion chasing us. These are common experiences when the nervous system is too sensitive. You can see how lions are affecting you. Lions are those things from your past, the current stress in your daily life, and your worries about the future. We cannot take all of the lions away. For example, we cannot change the past. And you don't have control over everything that happens to you now or in the future. But you can learn ways to tame the lion so that it is no longer a danger. You can learn ways to decrease the effect that the lion has on you. You can make the lion become a small kitten that is no longer dangerous.

Right now, you may feel that you cannot control your mind, thoughts, or your body. You may feel like the lion is chasing you all of the time. In this treatment, you will learn ways to tame the lion, so it is no longer a danger to you. You will learn ways to control your mind, thoughts, and body. You will learn ways to help your mind and body be calm and relaxed.

Taming a lion takes time, effort, and techniques. This is also true for taming your mind and body. It takes time and you will need to practice the techniques to see an effect. Do you have any thoughts or questions? Have the patient share.

ACTIVE MOVEMENT OF AN AREA WITH PAIN - PROGRESS

Treatment Details:

Goals of the treatment – Active movement of an area with pain

- Progress the movement so the patient is gradually doing more active movement of an area with pain at home on regular basis
- Decrease fear and anxiety of pain and movement
- Promote helpful thoughts and beliefs
- Decrease biological changes and protective outputs
- Decrease sensitivity of the nervous system
- Increase strength, mobility, and physical functioning of that area
- Guide the patient to do active movement of an area with pain at home on a regular basis

Key points – Active movement of an area with pain

- Work with the patient to find the movement and way to do the movement (speed, repetitions, ROM) that they feel comfortable to do at home on a regular basis
- Practice the movement with the patient
- Guide the patient to continue to belly breathe
- Create a calming environment as to decrease fear and anxiety
- Perform the movement rhythmically

To progress the active movement, follow these steps:

1. During every treatment session, assess the movement by asking the patient to demonstrate the movement and by discussing with them how they did the movement at home.

Assess the following:

- a. The level of the movement – Have the patient demonstrate how they have been doing the movement
- b. The amount of sets per day the patient is doing the movement on average
- c. The number of repetitions the patient is doing the movement on average
- d. Was the patient able to do the movement at home as planned even when they felt pain and discomfort

2. Progress the active movement. The active movement can be progressed by keeping the same movement but increasing the ROM, sets, or repetitions. Or the active movement can be progressed by moving to the next level of the movement as shown in the active movement handouts. You and the patient can make this decision together.
3. Do the following steps for the selected movement:
 - a. Demonstrate the movement with belly breathing and rhythmic movements
 - b. Have the patient do 1-2 repetitions of the movement in a way that feels comfortable for them
 - c. Ask the patient how many repetitions they think they could do comfortably
 - d. Have the patient do the active movement for the number of repetitions that they selected. Guide the patient to find the ROM and speed of movement that is most comfortable for them. Guide the patient to continue to breathe and to keep the movement rhythmic.
4. Discuss with the patient the plan for doing this movement at home. At home, the patient can do all the movements they have worked on together in a series. They can start with the easier movements and then finish with the current active movement. It is important to do the movements frequently, like 3 to 4 times per day. Guide the patient to think about how they could remember to do this and how they could do it in their daily life.
5. Help the patient understand that they should perform this active movement even if they feel pain and discomfort. Reassure the patient that pain during this movement does not mean that there is any tissue damage. Remind them of the key points from the stuck window TNE. The patient should be moving below their maximum level of ability so it should be possible for them to do this movement regularly without it increasing pain significantly. If at home the movement is increasing the pain too much, the patient can decrease the number of repetitions or the ROM. But they should not stop doing the movement regularly.

Points to consider when progressing active movement:

- Some patients might not reach level 7. But some patients will be able to go beyond level 7. Some patient will challenge themselves by starting more complex movements like sports, dance, or heavy work.
- Sometimes the patients have been suffering from persistent pain for a long time. This can, in some cases, cause the patient to develop very strong fear avoidance strategies. In other words, they are stuck in the fear avoidance cycle. This means the brain is interpreting even the slightest movement as strong signs of danger. Strong fear avoidance strategies are more common in persons that are affected by psychological trauma or that have general anxiety. The best way to support patients with strong fear avoidance strategies is to start at a very low level and progress it very very slowly.
- If a patient has strong fear avoidance strategies, before doing level 1 which involves active movement of the area of pain, you can start by moving other body parts not in the area of pain. This will take the focus away from the painful body part and will help decrease fear and anxiety of movement and physical activity. The brain will perceive this as a sign of safety so the sensitivity of the nervous system will decrease. For example: If the patient experiences persistent pain mainly related to the left shoulder then you start movements of the right shoulder only. After one week, you progress to 10 repetitions with the right shoulder and 2 repetitions with the left shoulder. Continue to progress in this so that they are slowly being exposed to more movement of the painful area.

FINDING COMFORT IN LAYING DOWN

Treatment Details:

See background information about this treatment in session one, under the “Finding Comfort in Sitting” exercise.

Goals of the treatment – Finding comfort in laying down

The finding comfort in laying down exercise aims to help the patient understand the following points:

- Pain is always a decision by the brain
- Pain is not permanent - Our biology can change
- Increase awareness of their body and the different physical sensations
- Provide an opportunity for them to learn that they have control of their body and that they can create more comfort

Key points – Finding comfort in laying down

- Have many pillows available to use as support for arms and legs.
- Do not lecture at the patient. Rather engage the patient in a discussion.
- Ask the patient many times to share what they feel and how different positions feel different. Guide the patient to focus attention on other sensation besides pain to increase their awareness of the physical sensations.
- Support the patient to learn how to do this exercise on their own
- Reinforce that there is not one right posture or position – The position of comfort changes for each person and in each moment.
- Create a calming environment.

Healthcare professional: We have done the finding comfort in sitting exercise. Have you been doing that at home? What have you experienced? Have patient share. Now we are going to do the finding comfort in laying down exercise. As we have learned, our brain always wants to protect us. Pain is one way that it protects us. But the brain also produces other changes in our body to protect us. For example, the brain can produce increased muscle tension, changes in how we breathe, and cause us to have decreased movement. Have you experienced any of these? Have the patient share.

This exercise will help you become more aware of these protective changes and also learn how to change them. By changing them, you are helping your brain see that you do not need as much protection. And in this way, we can decrease the sensitivity of the nervous system, which we learned contributes to pain.

Have the patient lay down. Shoes can be on or off based on what they prefer. Place a pillow under their head but make sure it is only supporting their head and not their shoulders. The neck should be in a neutral position. Place pillows or a wedge under the legs so that the legs are elevated and the knees are bent.

Healthcare professional: Make yourself as comfortable as you can. We want to bring your attention to your body and help you learn how to make small changes in your position. We will start at the legs and find the position of comfort. And then we will move up to other areas of your body. We will use lots of pillows. But you don't need to do this at home. It just helps to use pillows at first so you can really feel the differences and become more aware of the changes in physical sensations.

Bring your attention to your right thigh and hip. I am going to place my hands on your knee and gently move your leg. Is that ok? Have patient answer. Place your hands around the knee and move the leg inwards, in a gentle rhythmic movement. Pay attention to what that feels like as I move your leg in. Now pay attention to what it feels like as I move your leg out. Move the legs outwards, in a gentle rhythmic movement. Is there one way that feels like there is less resistance and tension. Is there one direction that feels freer? Have the patient share. Move the leg in the direction that they report feels freer. Then rhythmically move the leg again towards the direction that had more resistance. Does that feel more comfortable? Is there less tension? Have the patient share. If the leg still has resistance, continue to change the position of the leg until you find the position of comfort. You can change the amount of knee flexion, hip abduction, and hip rotation. Sometimes the legs need to be spread wide to find the position of comfort so be prepared with lots of pillows to support the legs.

Put the patient's legs back in the middle. Now you find the position of comfort for each leg without my help. You can do the rhythmic movement of your legs on your own to test which position is the most comfortable. Give the patient time to do this. If they are having difficulty feeling the difference, you can repeat the above procedure to give them another experience of feeling the different sensations in different positions.

Now we will find the position of comfort for the low back. We often hold tension in our back without being aware of it. So, this will help you become aware of that tension and learn how to make small changes in your position to find comfort. Bring your attention to your low back. Do you feel any tension or pressure? Have the patient share. If this is a painful area for them, try to have them notice sensations other than pain. You can change the position of your back by keeping your legs where they are and moving your bottom closer to the pillows that are supporting your legs. Try that now. Have the patient do this. Now what do you feel in your low back? Did the tension change? Have the patient share. Move your bottom until you find the position of comfort. Give the patient time to do this. Bring your attention to your legs again and check if they are still in a position of comfort. Make any changes in the position that feels best for you in this moment. Give the patient time to do this.

Now bring your attention to your belly. Often, the muscles in the belly will have tension. When the belly muscles are tense, it increases the sensitivity of the nervous system. Do a few belly breaths where your belly goes out when you breathe in. Have the patient do this. Was there tension in your belly before you did the belly breathing? Do you feel a difference after doing the belly breathing? Have the patient share.

Now bring your attention to your upper back. Move your upper back a little and see if you can find the position where it feels supported by the table. Try to let your back be heavy on the table. Give the patient time to do this.

Now we will find the position of comfort for your shoulders and arms. I am going to move your arm into different positions. Pay attention to what each position feels like and we will find the position of comfort. Pick up that patient's arm and move at it at the shoulder joint and elbow joint. You can change the amount of shoulder flexion, shoulder rotation, and elbow flexion. The hand should be open and relaxed. As you move the arm, feel the changes in tension and resistance. Find a position that has a lot of tension: In this position, notice what it feels like. Find a position that has low tension: In this position, notice what it feels like. Did you feel a difference between the two positions? What feels more comfortable? Have the patient share. Use pillows to keep the arm in the position of comfort. If you have a difficult time feeling the difference in tensions, then move the arm into different positions and ask the patient to say what feels the most comfortable.

Repeat for the other arm. The position of comfort for the two arms may not be the same.

Now we will find the position of comfort for the neck. The muscles of the neck will often work harder than they need to, if the head and neck are not supported by the surface you are laying on. So, we are going to use some towels to make the neck feel supported. First, I am going to place my hand on the top of your head and gently move your neck, similar to how I did with your legs. Place one hand on top of the head and do a gentle rhythmic side to side movement. Notice what this feels like. Notice any resistance or if any muscles tighten. Put the towels under the neck. Observe the tension in the neck. The goal is that the neck has a supportive surface to rest fully on. After the towels are in place, move the head again. Does this feel different? Have the patient share.

Place your hand under the pillow so that you are supporting their head. Explore both flexion and extension of the neck. As you change the position of the neck, move the head and ask the patient which position feels the most comfortable. When you find the position of comfort, use towels under the pillow to maintain that position.

Now we have finished. What do you feel? Have the patient share.

The goal is that you do this at home. You do not need to use all of the pillows and towels. Rather, you focus on bringing your attention to parts of your body and then make small changes in the position to find what is the position of comfort in that moment.

Once you find the position of comfort, you can do belly breathing while in this position. Take a minute to do belly breathing now. Give the patient time to do this. What did you experience? Have the patient share.

Do you think this will be helpful for you to do at home? When do you think it is realistic for you to do this at home? Discuss with the patient.

Demonstrate this in a role play for the big group.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

MUSCLE RELAXATION

Background Information:

This technique is a progressive muscle relaxation exercise. There are several different progressive muscle relaxation exercises with different scripts. This one is adapted from the Mitchell Method of Physiological Relaxation. All of the progressive muscle relaxation exercises have similar procedures and the same goal.

Research shows that this muscle relaxation exercise has a positive effect on all of the following factors that contribute to the pain experience:

- Nociceptive pain and changes
- Neuropathic pain and changes
- Nociplastic pain and changes
- Body information
- Thoughts and beliefs
- Emotions
- Memories
- Behavior

As we discussed, with nociplastic pain, the nervous system is oversensitive. This results in protective responses like increased muscle tension. Another common protective response that is produced by an oversensitive nervous system is a closed posture. A closed posture involves a flexed spine so that the body takes up a small amount of space. Often the head is flexed down, the arms are crossed over the body, and the hands are clenched into fists. When a person is in a closed posture, hormones are released that increase feelings of stress and increase the sensitivity of the nervous system.

This muscle relaxation exercise guides patients to move into an open posture, or the opposite of the closed posture. When a person moves into an open posture, hormones are released that calm the nervous system. In this way, this muscle relaxation exercise directly treats the nociplastic pain and changes. Also, because of this effect, many people find it an effective way to improve sleep. Specifically, many people use this exercise when they lay down in bed so that they can fall asleep easily.

This muscle relaxation exercise guides the patient to move their attention through different parts of their body. You will guide them to focus on one part of the body at a time. They will contract the muscles in one part of the body and then relax the muscles. Research has shown that purposefully contracting a muscle group and then relaxing it results in decreased muscle tension and pain. Also, when a muscle is contracted into a specific movement, the muscles that do the opposite movement relax. So, the movements included in the muscle relaxation exercise are all moving into an open posture, so that the muscles that were holding a closed posture can relax.

Also, by focusing attention on different areas of the body and contracting specific muscle groups, the patient will develop increased body awareness. Improved body awareness can have the following effects:

- Decrease pain
- Decrease protective responses
- Develop the ability to feel other sensations in the body besides pain
- Develop the ability to differentiate sensations in the body so that everything is not perceived as pain. For example, the patient can feel discomfort from stretching, muscle tension, and heaviness
- Develop the ability listen to their body, so they can respond when the body needs self-treatment. For example, with improved body awareness, a patient can detect increased muscle tension before it develops into pain. Then they can use a self-treatment like self-massage, stretching, or movement to address the increased muscle tension. In this way, the patient can better prevent pain and they will experience less pain.

When guiding the patient through the exercise, it is essential that you create a safe, secure, and calming environment. Here are things that help to create a calming environment so that the patient can get the most benefit from this exercise:

- You should sit and not stand. You should remain in one place and not be moving in the room.
- Sit near the feet of the patient so they can see you if they open their eyes.
- Use a calm and slow voice. Do not talk loudly. But make sure the patient can hear you easily.
- If the patient feels comfortable with it, turn the lights down or off.
- Make sure that you will not be interrupted when doing this. So, close the door to the treatment room and have a way so that other staff know that they should not enter. If you are in a more public space, do your best to create a safe environment where you will not be interrupted.
- Do not touch the patient once you are guiding them in the exercise. You can touch them as you are teaching them the movements. But do not touch them once you start the guided exercise because this will increase the body's level of alertness which will prevent the patient from getting the full benefits of this exercise.
- Use appropriate music in the background. Do not use music with lyrics. See the section of additional learning resources for links to appropriate music.

Treatment Details:

Goals of the treatment – Muscle Relaxation

- Decrease the sensitivity of the nervous system
- Increase body awareness
- Teach the patient a technique to use at home to improve sleep, decrease pain, and decrease the sensitivity of the nervous system
- Decrease muscle tension and other protective responses

Key points – Muscle Relaxation

- Do this in with the patient laying down if possible. Most people do not find as much effect when they are in sitting because they cannot relax as fully. But you can do this in sitting rather than lying down. In sitting, you do the same movements except they will look slightly different since you are sitting in a chair. If you do this in sitting, make sure that the patient's arms and legs are fully supported. Do the finding ease in sitting exercise to make sure the patient is in the most comfortable and supported position before starting the muscle relaxation exercise.
- Make sure to take time to discuss with the patient after doing the muscle relaxation technique. The discussion is just as important as doing the actual exercise because it increases the patient's awareness of their body, helps them recognize other sensations than pain, and supports the patient to do the exercise at home.
- Create a secure and calming environment.

Healthcare professional: Now we are going to do a muscle relaxation exercise. Recall that we described that your nervous system is oversensitive, like the temperature warning light in the car. This exercise is very effective at decreasing the sensitivity of the nervous system. Also, if you recall how we talked about how stress, or lion in our lives, can increase the sensitivity of the nervous system and cause our mind and body to always be alert. This exercise helps to calm the mind, body, and the nervous system. So, in this way it decreases pain, decreases muscle tension, and helps people fall asleep quickly.

During this exercise, you will lay down. I will guide you to do certain movements of your body so that the muscles contract in that area. After each contraction, you will relax that part of your body. You will contract each muscle for about 5 seconds and then you will relax it. The first step is for me to teach you the movements. So, I will demonstrate these and then you will practice them. After you understand the movements, I will guide you through the muscle relaxation exercise. Does this sound ok with you?

Lay down and have the patient observe you. Go through each of the movements so the patient can see them. The movements are listed here. The movements should be performed in this order:

1. Move the shoulders down away from the ears
2. Press the back of your hands into the ground and open your hands as wide as you can.
3. Turn your hips out so your feet point out.
4. Point the toes down and away from your body
5. Lift your chest up and let your back arch
6. Push your head back and into the ground
7. Close your eyes tight and tighten all of the muscles in your face

If the patient is not laying down already, have the patient lay down and do the exercise called finding comfort in the laying down position.

Once the patient is comfortable, go through the movements with them. Help the patient learn the movements. For each movement, they do not need to a very strong contraction. Rather the muscle contraction should be about half of their maximum level.

After the patient understand the movements, set up the environment to be secure and relaxing. Ask the patient if it is ok to turn the lights down or off. Make sure that you will not be interrupted. You can put on simple instrumental music or nature sounds on low in the background.

Healthcare professional: Now, I am going to lead you through the relaxation exercise. If you are comfortable, you can close your eyes. Or you can look up and keep your eye fixed on a point. I will not touch you during this. I will just talk and lead you through the movements. I will encourage you to breathe. As you are breathing, focus on doing the belly breathing pattern that you have learned. During this exercise, focus your attention on your body and the movement. But do not worry about doing the movement perfectly.

Read the script in a slow, quiet, and calming voice. Do not touch the patient during this. Do not try to correct the patient's movements, even if it is not perfect. This will disturb their focus and could cause them to feel startled and unsafe.

Feel your body lying on the surface. Feel your body become heavy. Feel that it is supported by the surface underneath you.

Take a breath, feeling your belly move up towards the ceiling. Breathe at whatever speed is comfortable for you. Feel the air come in your nose. As you breathe out, feel your body relax and get heavy. Feel your body sink into the surface.

Move your shoulders down and away from your ears. Pull the shoulders down. You don't need to use too much force. Feel the shoulders moving down. Feel your hands moving down.

Relax. Allow your arms to relax fully and become heavy.

Take a breath in and out. Feel your stomach moving up and down.

Press the back of your hands into the ground and open your hands as wide as you can. Feel your fingers spread out. Feel the strength in your arms.

Relax. Allow your arms to relax fully and become heavy.

Take a breath in and out.

Turn your hips out. Feel your feet turning out. Feel your hips opening up.

Relax. Allow your legs to relax fully and become heavy.

Take a breath in and out.

Point your toes down and away from your body. You don't need to use too much force. Find the amount of force that feels comfortable to you. Feel the strength in your legs.

Relax. Allow your legs to relax fully and become heavy.

Take a breath in and out.

Lift your chest up and let your back arch. Feel your chest open up. Feel your chest lift towards the ceiling.

Relax. Allow your back to relax fully and become heavy.

Take a breath in and out.

Push your head back and into the ground.

Relax. Allow your head to relax fully and become heavy.

Take a breath in and out.

Close your eyes tight and tighten all of the muscles in your face. Feel your entire face get tight.

Relax. Bring your attention to your eyes and have them relax fully. Bring your attention to your forehead and have it relax fully. Bring your attention to your lips and mouth and have them relax fully.

Take a breath in and out. I will remain quiet for about 10 seconds. As I do, focus on your breathing. Breathe in and out, with your belly moving up and down. When you are ready, you can open your eyes and sit up.

Facilitate a discussion with the patient using the following questions:

- What did you experience in your body?
- What did you experience in your mind and in your thoughts?
- When do you think this would be helpful to do?
- When do you plan to do this at home?

Demonstrate this in a role play for the big group.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

HOME ACTIVITY PLAN

Treatment Details - See details above in the description for session one

The home activity plan involves developing a plan that is meaningful to the patient and that will provide them with ways to manage pain and improve function in their daily life. Make sure to write down the plan in your documentation so you can follow up during the next session.

ADDITIONAL LEARNING RESOURCES

- Finding comfort in laying down – includes a video at the end of the post: <http://www.dynamicprinciples.com/finding-ease-part-1/>
- Video of the muscle relaxation technique in the manual: <https://www.youtube.com/watch?v=f5aeXIKRgeA>
- A slightly different muscle relaxation technique in sitting: <https://www.youtube.com/watch?v=9x3tI81NW3w>
- Another simple muscle relaxation technique in sitting: <https://www.youtube.com/watch?v=t3uK039WdaM>
- Music for muscle relaxation: <https://www.youtube.com/watch?v=tznLqvWEnRo>
- Nature sounds for muscle relaxation: <https://www.youtube.com/watch?v=ySL3NIIIhfA>
- Water sounds for muscle relaxation: <https://www.youtube.com/watch?v=f77SKdyn-1Y>

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SESSION 4

Session 4 should include the following treatments:

- Check-in
- Reassess goals
- TNE: Cup of Water
- TNE: Factors contributing to sensitivity
- Muscle relaxation
- Active Movement of an area with pain - progress
- Home activity plan

CHECK-IN

Treatment Details - See details above in the description for session one
The check-in involves discussing the following two questions with the patient.

1. What has gone well since the last time we met?
2. How did the home activity plan go?

REASSESS GOALS

Background Information:

Reassessing a patient's goals is an important part of treatment for the following reasons:

- The patient can recognize their improvements and the results of their time and effort with the treatments and home activity plan
- The patient can recognize what they still need to work on so that they can stay motivated to continue treatment and a home activity plan
- You can see, in an objective way, if the treatment is having positive effects
- You can identify the ongoing problems so that you can focus the treatment session to better address these

When you complete the outcome measures to reassess the goals, make sure to follow the procedures so that you get meaningful and accurate results. Recall that in part 3, we discussed how outcome measures must be performed exactly as they are designed in order to be accurate and meaningful. So, as you reassess goals, make sure to follow the procedures for each outcome measures as they were described in part 3. If you do not follow these procedures, then the results of the re-test will not be accurate. You may see improvements when there are none. Or you may see continued problems when the patient has actually improved.

Treatment Details:

Goals of the treatment – Reassess Goals

- Assess progress - what is improving and what is not improving
- Help the patient recognize their improvements and what they need to continue to work on
- Gather information so you can make the treatment plan specific to the needs of the patient

Key points – Reassess Goals

- Use the patient's assessment form. Go to the section of the treatment plan called "Goals – Based on Outcome Measures." After the assessment, you completed this section. Now, you will re-test for all of the goals that were included in this patient's treatment plan. All patients will have the following goals for you to re-test:
 - Sit to Stand Test – Total Time
 - Pain Self-efficacy Questionnaire – Total Score
 - During the past month, how would you rate your sleep quality overall?
 - At least once a week, do you do any regular activity long enough to work up a sweat? – Number of hours
 - Activity 1
 - Activity 2
 - Activity 3

If you are treating nociplastic pain and changes, then you also have the Central Sensitization Inventory to re-test.

For the re-assessment, you will complete it just as you did during the initial assessment. Refer back to part 3 to recall how to administer each of these outcome measures.

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On the treatment plan document, there is a column titled "Second Assessment." You should write the date and the results of the re-assessment in this column. Then evaluate the progress for each goal. In the first column, what should be achieved for each goal is identified for you. For example, in the Sit to Stand test, the goal is 8 seconds or less because this reflects normal functional ability. For each goal, evaluate if the patient has achieved it. If they have achieved it, then check the box of the last column called "Check when the goal is achieved."

After you have completed the reassessment of goals, discuss the following information with the patient:

- Improvements on goals
- What goals have been achieved and what that means
- What goals still need to be worked on
- How to continue to work on the remaining goals (treatment sessions and the home activity plan)

The final step is to ask the patient for how they feel they have improved and what they feel they are still having problems with. Write this down on the treatment documentation. Also write down a summary of the results of the goal reassessment on the treatment documentation.

Use the slides to show the example of the completed forms for the case example. You do not need to role play this section as they have already practiced administering the outcome measures.

TNE: CUP OF WATER

Treatment Details:

Goals of the treatment – Cup of Water

The "Cup of Water" TNE aims to help the patient understand the following points:

- Pain is always a decision by the brain
- Pain is not a reliable way to judge the amount of tissue damage or injury
- Biological, social, and psychological factors contribute to how and when a person experiences pain
- Pain is not permanent - Our biology can change

Key points – Cup of Water

- Have the cups of water that you need for the demonstration prepared before the treatment session
- Do not lecture at the patient. Rather engage the patient in the activity and discussion.
- Connect this TNE to the points made with previous TNE like the "temperature warning light"

Healthcare professional: First, let's review what we already learned about pain. Do you remember how messages from our body get to our brain?

Patient: Yes, through our nerves.

Healthcare professional: Exactly. Our body sends messages to our brain through the nerves. Once the brain receives the message, does it always produce pain? Does it always turn on the alarm system?

Patient: No, not always.

Healthcare professional: Correct. The decision to produce pain is always made by your brain. If your brain evaluates everything and thinks that you are in danger or that you are facing a threat, it will turn on the alarm by making you experience pain. Your brain determines if you experience pain! So, your brain can receive that same message from your body, determine that everything is safe and not turn on the alarm. Then you won't experience pain.

Does that make sense? Have the patient share.

Healthcare professional: Great. In a previous session we talked about how sometimes our body and brain can be too sensitive. It can be like a car temperature warning light that is too sensitive. It goes off when there is not a problem. And that our bodies sometimes are similar to this. They are too sensitive, so we experience a lot of pain. Do you recall this?

Have the patient share.

Healthcare professional: Let's understand how the brain uses information to decide if it should turn on this alarm. By understanding this, we can learn how to reset the alarm to a normal sensitivity so that we can help our bodies function again. Many factors can make our brain and body more sensitive to pain. There are also things that can make our brain and body less sensitive to pain.

Have 2 cups sitting on a deep plate to prevent water from going on the ground during the activity. Have one large cup and one smaller cup. The small cup should be clear and transparent. Fill the large cup with water or a colored liquid to make it easier to see. Make sure that the patient can see the cups and what you are doing.

Healthcare professional: The level of the water in this glass (point to smaller glass) indicates the level of stressors, or the things that make us more sensitive to pain. These can be like the lions in our lives that we talked about earlier. As the water level increases from more stressors, our sensitivity to pain increases. Start pouring water into the small cup from the large cup. Our brain takes information in from many different sources like our body, our memories, our emotions, and the environment. If the brain has too many stressors it will perceive that there is danger or a threat. Pour water into the smaller glass so that it overflows. If this happens, what do you think we will experience?

Patient: We will feel pain, overwhelmed, or upset.

Healthcare professional: Exactly. If there are too many stressors, then we become very sensitive to pain and discomfort. So, if our cup overflows with water, we experience pain. Does that make sense? Have the patient share.

Healthcare professional: So, let's take a look at an example. Let's see how you can develop increased sensitivity of the nervous system why you then may start to experience pain.

For this example, you start with an empty cup. Show cup. So, you don't have any pain. Then you have some stressors. Pour a small amount of water in the cup for each stressor that you describe. You only sleep 4 hours, you are worrying about your family, you have an argument with a friend, you are feeling frustrated at work, you are thinking about the challenges in your life, you are feeling ashamed about something you did, you are not eating a healthy meal, you did not exercise or have any physical activity recently, you cannot find anything meaningful and enjoyable to do, you are afraid to feel physical pain again. Stop filling the cup right before it overflows. You have all of these stressors in your day that filled your cup. Is your sensitivity to pain increased or decreased now?

Patient: Increased. The water level is high.

Healthcare professional: Exactly. The sensitivity is increased. You may not feel pain right now because the cup is not overflowing. But what happens if you walk up the stairs and the nerves in your leg sends a danger message to your brain? It is an additional stressor. Fill the cup so it overflows. So, what would happen?

Patient: I would feel pain in my legs.

Healthcare professional: Exactly, because all of those stressors combined and filled your cup, you only needed a small amount of a stressor to experience pain. Do you think there is anything wrong in the leg?

Patient: No. Maybe not. My body is just too sensitive. I had too many other things happen to me.

Healthcare professional: Correct. There was no tissue damage or injury in your leg. Rather, your brain was overwhelmed with the stressors and turned on the alarm, the pain. Does that make sense? Have the patient share.

Now let's look at what happens if you have a body and brain that has normal sensitivity.

Start with an empty cup. Everyone has stressors. Pour in water for each. So maybe you have an argument with your colleague, poor eating habits, low physical activity. The cup should only be partially full. But you also have some positive things that you do to decrease sensitivity. Pour out a small amount of water for each one you say. You enjoyed a conversation with a friend, you got 8 hours of quality sleep the night before. Do you see how the sensitivity can increase or decrease by what you do?

Patient: Yes. Some things will decrease the water level, the sensitivity.

Healthcare professional: Correct. Now, if you were to go up the stairs and the nerves send the very same message to their brain as in the previous example, what do you think will happen? Will you experience pain? Pour in a small amount of water so the cup is half full.

Patient: No, the cup is not full.

Healthcare professional: Exactly, your body is not too sensitive. You would have to experience more than just the sensations that you get when climbing stairs in order for your cup to overflow.

Based on this, can you control the sensitivity of our body to pain?

Patient: Yes.

Healthcare professional: Exactly, even if you have had pain for a long time, you can do things to change that. You have the control to increase or decrease the sensitivity to pain. We are working together to decrease the sensitivity of your nervous system so you will experience less pain and so you can be more functional. Do you have any thoughts or questions about that? Have the patient share.

Demonstrate this in a role play for the big group.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

TNE: FACTORS CONTRIBUTING TO SENSITIVITY

Treatment Details:

Goals of the treatment – Factors Contributing to Sensitivity

The “Factors Contributing to Sensitivity” TNE aims to help the patient understand the following points:

- Biological, social, and psychological factors contribute to how and when a person experiences pain
- Pain is not permanent - Our biology can change

Key points – Factors Contributing to Sensitivity

- Do the movements of the activity with the patient so that they will feel more comfortable moving
- Movements are included in the TNE to encourage the patient’s engagement and to encourage movement. You can select different movements if the ones described are too difficult for the patient.
- Use the pictures provided with the TNE. You can add pictures based on the patients that you work with.

Healthcare professional: I am going to describe many different factors that could either increase or decrease the sensitivity of our body to pain. After I describe a factor, you should decide if you think it would increase or decrease the sensitivity, would it put water in the cup, or would it take water out of the cup? If you think it will increase the sensitivity or the water level, then you do this with your body. Demonstrate: wide stance, stand on tip toes, arms outstretched like the victory pose. If you think it will decrease the sensitivity of the water level, then you do this with your body. Demonstrate: squat with arms outstretched to the side. I will do this with you too. It is normal that people respond differently to each factor. So, I may think one thing will increase sensitivity for me and you may think the same thing will decrease sensitivity for you. I will help you understand each factor and its effects.

Perform the following:

1. Show the picture of the factor and explain what it represents.
2. Ask the patient to move their body to indicate if it “increases” or “decreases” the sensitivity of the nervous system
3. Ask the patient to explain why the factors affects them in this way. Keep this brief. Do this for only some of the factors
4. After you have done many of the pictures, ask the patient to come up with their own ideas on what factors increase and decrease the sensitivity of the nervous system

Healthcare Professional: So now that we understand many of the factors that may increase or decrease sensitivity to pain, we can start to control it. We are going to continue to learn ways to decrease the sensitivity, to take control of this. What have you already learned in these treatment sessions that helps decrease the sensitivity of your nervous system? Have the patient share.

Demonstrate this in a role play for the big group. All of the participants can act as patients as you do it together.

If time allows, do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

MUSCLE RELAXATION

Treatment Details:

Goals of the treatment – Muscle Relaxation

- Decrease the sensitivity of the nervous system
- Increase body awareness
- Teach the patient a technique to use at home to improve sleep, decrease pain, and decrease the sensitivity of the nervous system
- Decrease muscle tension and other protective responses

Key points – Muscle Relaxation

- You are repeating the muscle relaxation exercise again in this session to help the patient learn how to do it at home. Also, people often find that it is more effective initially when someone else guides them through it.
- Do this in with the patient laying down if possible. Most people do not find as much effect when they are in sitting because they cannot relax as fully. But you can do this in sitting rather than lying down. In sitting, you do the same movements except they will look slightly different since you are sitting in a chair. If you do this in sitting, make sure that the patient's arms and legs are fully supported. Do the finding ease in sitting exercise to make sure the patient is in the most comfortable and supported position before starting the muscle relaxation exercise.
- Make sure to take time to discuss with the patient after doing the muscle relaxation technique. The discussion is just as important as doing the actual exercise because it increases the patient's awareness of their body, helps them recognize other sensations than pain, and supports the patient to do the exercise at home.
- Create a secure and calming environment.

Ask the patient if they used the muscle relaxation exercise at home. If they did, discuss what they experienced. If they did not, discuss why not and discuss ideas for how they can do the exercise at home.

Discuss with the patient how this exercise is related to what you discussed in the TNE. For example, this exercise is one way to empty your cup so that the nervous system is less sensitive.

Review the movements of the exercise. If the patient continues to struggle with doing belly breathing, use this time to work on belly breathing, before doing the muscle relaxation exercise.

Set up the environment to be secure and calming. Have the patient use the finding comfort in laying down exercise to find a comfortable position. Use the same script as described above in session 3.

After the exercise, discuss the following questions with the patient:

- What did you experience?
- Do you feel comfortable doing this on your own at home?
- When will you do this at home?

ACTIVE MOVEMENT OF AN AREA WITH PAIN - PROGRESS

Treatment Details – See details in session 3

Goals of the treatment – Active movement of an area with pain

- Progress the movement so the patient is gradually doing more active movement of an area with pain at home on regular basis
- Decrease fear and anxiety of pain and movement
- Promote helpful thoughts and beliefs
- Decrease biological changes and protective outputs
- Decrease sensitivity of the nervous system
- Increase strength, mobility, and physical functioning of that area
- Guide the patient to do active movement of an area with pain at home on a regular basis

Key points – Active movement of an area with pain

- Work with the patient to find the movement and way to do the movement (speed, repetitions, ROM) that they feel comfortable to do at home on a regular basis
- Practice the movement with the patient
- Guide the patient to continue to belly breathe
- Create a calming environment as to decrease fear and anxiety
- Perform the movement rhythmically

HOME ACTIVITY PLAN

Treatment Details - See details above in the description for session one

- The home activity plan involves developing a plan that is meaningful to the patient and that will provide them with ways to manage pain and improve function in their daily life. Make sure to write down the plan in your documentation so you can follow up during the next session.
- Focus the home activity plan on the results of the goal reassessment that you did in this session. Make sure to include activities that will help to improve areas that are still problems.

SESSION 5

Session 5 should include the following treatments:

- Check-in
- TNE: Wrinkles
- TNE: The electrical system
- Active Movement of an area with pain - progress
- Intervals of medium intensity physical activity
- TNE: Sleep and Pain
- Body scan
- Home activity plan

CHECK-IN

Treatment Details - See details above in the description for session one
The check-in involves discussing the following two questions with the patient.

1. What has gone well since the last time we met?
2. How did the home activity plan go?

TNE: WRINKLES

Treatment Details:

Goals of the treatment – Wrinkles

The “Wrinkles” TNE aims to help the patient understand the following points:

- Pain is always a decision by the brain
- Pain is not a reliable way to judge the amount of tissue damage or injury
- Results of imaging do not show what is causing the pain

Key points – Wrinkles

- The script includes information about disc prolapse and osteoarthritis. But you should make this specific to the image results that the patient has received. For example, if the patient has had imaging that said that there is cartilage degeneration in the knees, then change the TNE to focus on this. You can refer back to the information provided in part 3 about imaging to make sure you include the correct information.
- This is an important point for patients to believe. Research has shown that the belief that specific tissues are damaged and causing pain, contributes significantly to persistent pain and disability. So, make sure to spend time and effort to make this point clear.
- It often takes people time and multiple episodes of education to believe this point. Therefore, you may want to return to this point in many of the sessions.

Healthcare professional: You told me that you had MRIs or Xrays that showed changes in your body like a disc prolapse or osteoarthritis. Is that correct? Have the patient share so that you can focus the TNE on the specific imaging results that they had.

Healthcare professional: It is important for you to know that research has shown that these changes are very normal. Disc prolapses also show on MRI images with people that have no pain. Osteoarthritis in the knees will show on MRI images with people that have no pain. Add other imaging results based on the experiences of the patient.

If you take ten people that do not have back pain and do an MRI Image, at least 4 of them will show a disc prolapse. If you take ten people that do not have knee pain and do an MRI image, at least 8 will show knee osteoarthritis. Draw 10 stars or other shape to represent 10 people. Then as you explain each point, circle the amount that will show the image but will not have pain. For example, for knee osteoarthritis you would circle 8 of the stars. **What do you think we can conclude from this?** Patient: Just because an MRI shows a disc prolapse or knee osteoarthritis, you don't have to have pain. These are normal changes.

Healthcare professional: Exactly. These changes do not indicate a problem or a cause of pain. We know that bulging discs and osteoarthritis are often normal changes in our body. You can think of these changes like wrinkles. As we get older, we all get wrinkles on our skin, right? Patient: Right.

Healthcare professional: Are wrinkles normal? Patient: Yes.

Healthcare professional: Do wrinkles cause any problems? Patient: No.

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Healthcare professional: Exactly. Wrinkles are normal changes in our body. We now understand that osteoarthritis and disc prolapse are normal changes in our body, just like wrinkles. And just like wrinkles, they do not cause any problems and they are not the source of the pain.

Healthcare professional: Do you have any questions or thoughts? Have the patient share.

TNE: THE ELECTRICAL SYSTEM

Treatment Details:

Goals of the treatment – The Electrical System

The “Electrical System” TNE aims to help the patient understand the following points:

- Pain is not a reliable way to judge the amount of tissue damage or injury
- Results of imaging do not show what is causing the pain

Key points – The Electrical System

- Review the key points from the “Wrinkles” TNE first. Remember that the patient may need several opportunities to really believe this point.
- The script includes information about disc prolapse and osteoarthritis. But you should make this specific to the image results that the patient has received. For example, if the patient has had imaging that said that there is cartilage degeneration in the knees, then change the TNE to focus on this. You can refer back to the information provided in Part 3 about imaging to make sure you include the correct information.
- Use the discussion at the end of the TNE to evaluate how the patient’s thoughts and beliefs about pain has changed. Also use it to evaluate what thoughts and beliefs are continuing to contribute to the pain experience. You can use this information to focus the treatment plan effectively.

Healthcare professional: We just concluded that many changes seen on MRIS are like wrinkles on our skin and do not show what is causing pain. Then, you may wonder why doctors tell you that these changes that are seen on imaging tests are the cause of your pain. Did you have a doctor tell you anything like this? Have the patient share.

Healthcare professional: Let’s look at an example so that we can understand this. The information that these changes, like disc prolapse and osteoarthritis, are normal changes and are not related to pain is new information. Many doctors don’t have this information yet or are not applying this information to their work with patients. It would be similar to this situation: A foreigner moved here and rented a house. During their first day in their new home, the power cuts out. They assume something is wrong with the home’s electrical system. So, they look at the circuit breakers and find that one is tripped. So, they fix it. But the electricity still doesn’t turn on. What do you think is the problem?

Patient: The national power company stopped supplying electricity or something is wrong with the source of the electricity.

Healthcare professional: Exactly. The problem was with the larger system, the national power company. So even if the person fixed the circuit breaker, it would not fix the problem. Doctors can be like this foreigner. If you see a doctor because you have pain, they interpret that the changes on the MRI, like a disc prolapse or osteoarthritis, is the problem and the cause of pain. So, they try to fix it, like with surgery. But often the problem is with the bigger system, so just fixing the disc prolapse doesn’t fix the problem. It doesn’t take away the pain. This is just like how fixing the circuit breaker doesn’t fix the electrical problem in the home. We know that changes in an MRI, like disc prolapse or osteoarthritis, do not show the actual problem but rather normal changes. So, what should we think if a doctor has told us that these changes are the cause of our pain? Patient: We can ignore them. We have to look at the other problems or causes of the pain.

Healthcare professional: Yes, if you have been told by a doctor that you have these changes, you can think that this does not mean that I must have pain. So, then the question is, what is causing the pain? Do you recall we talked about how the sensitivity of the nervous system can increase and contribute to pain? Do you recall the factors in your life that can increase our sensitivity to pain?

Make this discussion specific to the patient and the factors contributing to their pain experience. Based on what you determined during the assessment, discuss with the patient causing their pain like increased sensitivity of the nervous system, stiff joints and muscles, muscle weakness, thoughts and beliefs about pain, etc.

Have the patient explain what they believe is the cause of their pain. This is a great opportunity for you to see how the patient’s thoughts and beliefs have changed and what thoughts and beliefs they may still have that are contributing to the pain experience.

Do small group role play for the Wrinkles and The Electrical System TNE. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

ACTIVE MOVEMENT OF AN AREA WITH PAIN - PROGRESS

Treatment Details – See details in session 3

Goals of the treatment – Active movement of an area with pain

- Progress the movement so the patient is gradually doing more active movement of an area with pain at home on regular basis
- Decrease fear and anxiety of pain and movement
- Promote helpful thoughts and beliefs
- Decrease biological changes and protective outputs
- Decrease sensitivity of the nervous system
- Increase strength, mobility, and physical functioning of that area
- Guide the patient to do active movement of an area with pain at home on a regular basis

Key points – Active movement of an area with pain

- Work with the patient to find the movement and way to do the movement (speed, repetitions, ROM) that they feel comfortable to do at home on a regular basis
- Practice the movement with the patient
- Guide the patient to continue to belly breathe
- Create a calming environment as to decrease fear and anxiety
- Perform the movement rhythmically

INTERVALS OF MEDIUM INTENSITY PHYSICAL ACTIVITY

Background Information:

An important part of treating pain is increasing the amount of physical activity a person does on a regular basis. Physical activity can be defined as any activity where the body moves, and energy is used. Exercise is a type of physical activity that involves structured and repetitive movements that are working towards a goal like improving strength.

Research shows that physical activity has a positive effect on all of the following factors that contribute to the pain experience:

- Nociceptive pain and changes
- Neuropathic pain and changes
- Nociplastic pain and changes
- Body information
- Thoughts and beliefs
- Emotions
- Memories
- Behavior

Physical activity also has the following benefits:

- Improves sleep
- Decreases symptoms of depression, anxiety, and post-traumatic stress disorder
- Improves a person's ability to manage stress
- Decreases risk of cancer, heart disease, diabetes and other chronic diseases
- Improves a person's ability to function in daily life

The international recommendation for physical activity for adults is to be physically active at a medium intensity for at least 150 minutes per week which is about 25 minutes per day. Research has shown that this is the minimum amount that is required to get the most health benefits. The 25 minutes per day doesn't have to be completed at one time during the day, but it can be spread throughout the day. The time can also be spread throughout the week to achieve at least 150 minutes of medium intensity physical activity per week.

The participants must memorize the physical activity recommendations. Emphasize this with them. Have the whole class repeat out loud the recommendations while in standing. They can repeat this: 150 minutes of medium intensity physical activity per week which is about 25 minutes per day.

There are three levels of intensity for physical activity: low, medium, and high. The recommendations state that a person should be physically active at a medium intensity for 150 minutes per week. When a person is being physically active at a medium intensity, they will experience positive changes in their body like their heart will beat faster, their breathing will become faster and shorter, and they will sweat. These are normal and positive changes that happen as the body moves.

The same physical activity will create different responses in different people based on their health and how active they are in daily life. So, if two people do the exact same activity, they may each experience a different level of intensity. For example, if a professional football player climbs a flight of stairs, he will not reach medium intensity. But if an inactive person, like an older person that spends most of their time sitting at home, climbs the same flight of stairs at the same speed, they will probably experience a medium to high intensity level of physical activity. This is an example of how the same physical activity can create different responses based on a person's health.

The talk test is a tool that was developed to help identify the level that a person is being active at. To do the talk test, a person talks while doing the physical activity. Their talking pattern and breathing pattern can be observed. The healthcare professional should be able to observe the patient and identify the level of physical activity that the patient is performing. The patient should also learn to do this themselves so they can achieve the medium intensity physical activity in their daily life.

The following are guidelines that can be used with the talk test to determine the level of intensity that the person is working at:

- Low intensity: Able to talk comfortably and without any changes in the pattern of talking or in the pattern of breathing
- Medium intensity: Able to talk in full sentences but not smoothly or comfortably because they are breathing heavily, they are unable to sing
- High intensity: Able to only say words one at a time because they are breathing very heavily

You should use the talk test while doing medium intensity physical activity with the patient so you can be sure to achieve the right level of intensity. You should also teach your patients how to use the talk test to make sure that they achieve medium intensity physical activity while being active at home. This is important because often people will do activities and exercise for health benefits, but they will be doing them at too low of an intensity to get all of the benefits. For example, if a person chooses to walk for exercise, they often walk too slow so that they never reach a medium intensity. But if a person understands the physical activity recommendations and how to use the talk test, then they are able to push themselves to a medium intensity level and get the most benefits from physical activity.

Lead all of the participants through 30 sit to stand exercises. Have everyone count out loud as a group. During the exercise, tell the participants to pay attention to their talking and breathing pattern and to use the talk test to identify what level of physical activity they are participating in.

Immediately after 30 repetitions, have the participants continue to do sit to stand exercises while having a conversation with the person sitting next to them. Each pair can use the talk test to determine which level of physical activity that each person is participating at.

Have the participants sit. Ask some of the participants to share the levels of physical activity that they achieved and how they knew that. Use this as an opportunity to make sure they understand the levels of intensities and the how to use the talk test.

One of the main goals of performing medium intensity physical activity during the treatment session is for the patient to develop the knowledge and skills to participate in an average of 150 minutes of medium intensity activity per week. To achieve this, the treatment sessions must include the components described here and all of these components are included within this treatment manual:

- Understand physical activity, its benefits, and the physical activity recommendations
- Learn how to use belly breathing while being active
- Experience participating in medium intensity physical activity without significant pain or other problems
- Experience noticing the positive physical changes that happens during medium intensity physical activity like increased heart rate, heavy breathing, and sweating
- Understand the talk test and how to use it
- Develop a realistic plan for including regular medium intensity physical activity into their daily life

You are responsible for creating an opportunity for the patient to experience participating in medium intensity physical activity without significant pain or other problems. To do this, it is important to select the best way for the patient to do medium intensity physical activity. You must remember that the primary goal of this treatment is to achieve medium intensity physical activity. The primary goal is not, for example, to do active movement of an area with pain or to strengthen muscles. Therefore, you want to select an activity that the patient can do to achieve medium intensity physical activity. For example, if a patient has significant pain while walking then they are probably not going to be able to walk fast enough to achieve medium intensity or long enough to achieve 25 minutes per day. Therefore, it would be better to select a different activity for that patient like sit to stands from a chair.

Here are some options for performing medium intensity physical activity:

- Stationary bike
- Walking on treadmill or on ground
- Sit to stands from chair
- While standing, bouncing with small knee ROM while also swinging the arms
- Marching with high knees in sitting and with or without arm movements
- Marching with high knees in standing and with or without arm movements
- Laying on back and moving arms while also marching the legs up and down
- Partial or full squats
- Climbing stairs
- Moving from standing to sitting on the floor

When selecting the activity, consider the following:

- It should not cause significant pain or discomfort that will prevent the patient from doing it.
- It should not be the same activity that the patient does for the active movement of an area of pain.
- The patient must be able to do the activity at a high enough speed and repetitions to achieve medium intensity.
- Start with a realistic goal for the length of time the patient should perform the physical activity.
 - To determine what is the realistic goal, identify the best movement. Then have the patient do the movement to the point that medium intensity is achieved. Then ask the patient, how long or how many repetitions they think they could do at this intensity. Start with this level or slightly below this level as the goal.

The goal is to achieve medium intensity. Use the talk test to evaluate if the patient is achieving medium intensity. You can do the following things to increase or decrease the level of intensity:

- Change speed of the movement or activity
- Use weights
- Change the challenge specific to the activity – For example, to make sit to stands from a chair more challenging, use a lower chair. To make punching the arms forward more challenging, use hand weights.

Treatment Details:

Goals of treatment:

- Understand physical activity, its benefits, and the physical activity recommendations
- Develop the knowledge and skills to participate in an average of 150 minutes of medium intensity activity per week
- Learn how to use belly breathing while being active
- Experience participating in medium intensity physical activity without significant pain or other problems
- Experience noticing the positive physical changes that happens with medium intensity physical activity like increased heart rate, heavy breathing, and sweating

Key points:

- Make sure to select an activity that the person can achieve medium intensity physical activity without significant pain or other problems.
- If needed, the level of intensity can be kept at low intensity for this first treatment session. This may be needed if the person demonstrates a lot of fear and avoidance associated with the movement or with changes in breathing that occur with medium intensity.
- Make sure to discuss the plan for physical activity at home with the patient. They should set a realistic goal. Starting with a small amount of physical activity is ok. The goal is to get the patient moving more and starting to be more physically active.

Healthcare professional: We are going to talk about physical activity. Physical activity can be defined as any activity where we move our body and it uses energy. Exercise is a type of physical activity that involves structured and repetitive movements that are working towards a goal like improving strength. Can you share examples of exercise? Have patient share. Can you share examples of physical activity? Have patient share.

Physical activity and exercise are often described as a medicine because they have so many benefits. Physical activity is an effective treatment for pain. When you are physically active, the body releases natural pain killers. Research has shown that these natural pain killers are more effective than pain medications. Physical activity also has many other health benefits like improving a person's ability to do activities in daily life and decreasing the risk of heart attacks and diabetes. Physical activity is really one of the most powerful things we can do to help us live a healthy and full life. How do you think physical activity could be beneficial to you? Have patient share.

To get the most benefit from physical activity, a person should be physically active at a medium intensity. When a person is being physically active at a medium intensity, they will experience positive changes in their body like their heart will beat faster, their breathing will become faster and shorter, and they will sweat. Have you experienced these changes when you are physically active? Have patient share. These are normal and positive changes that happen as the body moves. When you experience these positive changes, you know that you are having a healthy effect on your body. We will now do some physical activity so that you can experience these positive changes that happen in the body. While you are being active, I will ask you some questions so you can notice the different sensations in your body.

1. Perform 2 minutes of medium intensity physical activity. Use the talk test to make sure that the patient is achieving medium intensity. Increase or decrease the challenge as needed to keep the level at medium intensity.

Ask the patient the following questions to turn their attention to their body. Make sure the patient keeps doing the physical activity as they answer the questions. Having the patient answer the questions as they are being active allows you to use the talk test to determine the level of intensity that the person is experiencing. There is no right or wrong answer to these questions. The goal of asking these questions is for the patient to develop awareness of their body and the ability to notice physical feelings in their body, besides pain. Make sure to remind the patient that all of these changes are very normal, and they are a sign that you are being physically active.

- a. How is your breathing changing?
 - b. Where do you feel the breathing? Is it mainly in your stomach, your chest, your nose, or your mouth?
 - c. Are you sweating?
 - d. How is your heart rate changing?
 - e. What thoughts are you having? Do you feel focused or distracted?
 - f. What feelings do you have in your body?
 - g. Do you feel warm or cold?
 - h. What do you feel in your muscles?
2. Stop doing the physical activity. Guide the patient to perform belly breathing in sitting or standing until their breathing returns to normal.
 3. After the belly breathing, ask the patient the following questions. The goal of asking these questions is for the patient to develop awareness of their body and the ability to notice physical feelings in their body, besides pain.
 - a. What is your breathing like now?
 - b. What physical feelings do you have in your body and where do you feel them? Is it warm, cold, energized, tight, loose, calm, or stressed?
 - c. What thoughts do you have about your body?
 - d. What does your mind feel like? Focused, distracted, anxious, calm, cognitively energized, cognitively tired?
 4. Repeat this cycle at least 3 times. Make sure to do belly breathing after each round of physical activity. Make sure to continue to ask the patient questions that bring their awareness to their body.

Healthcare professional: You just did a total of 6 minutes of physical activity. Do you think you could do this same physical activity at home? How many minutes do you think you could do this physical activity at home for? Discuss with the patient. Have the patient set the plan for the home activity plan.

As a large group, the trainers should demonstrate one round of physical activity and belly breathing treatment as described above. All of the participants can participate in the physical activity. But have one participant up front and answering the questions as though they are the patient.

Partner discussion: In pairs, the participants should describe a patient that they are working with. Then discuss what are two options for performing medium intensity physical activity that would be appropriate for this patient.

As a large group, have a few participants share what they discussed in pairs

Then have a participant come to the front of the large group and lead everyone through the physical activity that they selected for their patient. Have the person leading the activity continue speaking by asking the group the questions for the activity. Everyone should use the talk test to determine what level of intensity the leader reaches. As they all continue the physical activity, have the participants share ideas of how to increase the challenge so that it is reached. For example, they can move faster or change the movement. Do one of the suggested changes and again use the talk test to evaluate the intensity that is reached.

If time allows, repeat this for a different patient example and with a different participant leading the group.

TNE: PAIN AND SLEEP

Background Information:

As you may recall learning in part 3, research has demonstrated a strong connection between sleep and pain. Poor sleep is one factor that contributes to the pain experience. People that have poor sleep have higher rates of pain, as well as higher rates of emotional problems like depression and anxiety which also contribute to pain. Poor sleep has been shown to increase the sensitivity of the nervous system. As you have learned, increased sensitivity of the nervous system results in increased pain.

It is recommended that adults get 7 to 9 hours of uninterrupted sleep per night. A person experiences poor sleep if they regularly get less than the recommended amount of sleep and/or they regularly do not feel rested when they wake up. A person may have poor sleep because they have difficulty falling asleep, difficulty staying asleep, or they don't allow themselves to have the full amount of time required to sleep.

Poor sleep can contribute to the following:

- Pain
- Weak immune system
- Increased infections and illnesses
- Increased risk of cancer
- Unhealthy weight loss or gain
- Poor memory
- Feelings of anxiety and depression
- Fatigue and low energy
- Feeling irritable
- Difficulty thinking and making decisions

Treatment Details:

Goals of the treatment – Pain and Sleep

The “Pain and Sleep” TNE aims to help the patient understand the following points:

- Understand the relationship between pain and sleep
- Biological, social, and psychological factors contribute to how and when a person experiences pain
- Pain is not permanent - Our biology can change

Key points – Pain and Sleep

- Allow the patient to share their experiences so they can better understand this point
- Have the patient think of ideas of ways that may help them sleep rather than you providing them with the solutions

Healthcare professional: Today we are going to talk about sleep. Having good sleep is very important and affects us in many ways. When you don't sleep well, what do you notice in your body? Do you have more pain, muscle tension, headaches, or get physically tired very easily? Have the patient share.

Healthcare professional: When you don't sleep well, what do you notice happens to your mind? Is it difficult to think clearly, difficult to remember things, or do you get cognitively tired very easily? Have the patient share.

Healthcare professional: When you don't sleep well, what happens to your emotions? Do you feel anxious, depressed, or sad? Do you get angry and annoyed at people more easily? Do you yell at people or have difficulty controlling your anger? Have the patient share.

Healthcare professional: You have experienced how sleep has a significant effect on many areas of your life. Research also shows that sleep affects pain. Poor sleep increases the sensitivity of the nervous system and we know that this causes increased pain. So, if we want to treat pain, we need to make sure you can have good sleep. Have the patient share.

Healthcare professional: Many of the treatments that we have done so far should have a positive effect on sleep. Have you seen any changes in your sleep since beginning treatment? Have the patient share. Is there anything from the treatment sessions that you think has greatly affected your sleep? Have the patient share. Since we know it is important to have good sleep, is there anything you can continue to do to help you sleep well? Have the patient share.

Healthcare professional: In a future session, we will discuss healthy habits you can do to maintain good sleep. The activities on your home activity plan, including the breathing exercises, the muscle relaxation exercise, and physical activity will continue to help improve sleep. Gradually, you will find that you will have healthy and regular sleep.

BODY SCAN

Background Information:

The body scan is a mindfulness exercise. There are many different mindfulness exercises including a well-research program called Mindfulness Based Stress Reduction. Research shows that mindfulness exercises can have a positive effect on all of the following factors that contribute to the pain experience:

- Nociceptive pain and changes
- Neuropathic pain and changes
- Nociplastic pain and changes
- Body information
- Thoughts and beliefs
- Emotions
- Memories
- Behavior

Mindfulness exercises aim to have the following effects:

- Calm the nervous system
- Decrease unhealthy repetitive thinking about pain and problems associated with pain
- Decrease avoidance of pain and movement
- Increase awareness of other physical sensations besides pain
- Improve a person's emotional response to pain
- Decrease emotional stress and the impact it has on the pain experience
- Decrease symptoms of anxiety, depression, and PTSD
- Increase awareness of emotions and thoughts
- Improve thinking and memory
- Improve ability to regulate energy levels and emotions
- Decrease heart rate, blood pressure, and muscle tension
- Decrease hormones that contribute to emotional stress and pain
- Decrease fatigue

Mindfulness exercises involve purposefully bringing the attention to the present state of the body and mind and accepting it, without trying to change it. Mindfulness exercises involve focusing on the present moment and what you are experiencing rather than thinking about the past, thinking about the future, or thinking about other thoughts not related to your current experience.

The following are principles to follow when doing a mindfulness technique, including the body scan:

- Create a calm and secure environment with your voice, body, and the space or room
- Do your best to make sure that you are in a private space and that you will not be interrupted while doing this exercise
- Do not touch the patient when guiding them through this exercise as this could startle them and increase the alertness of the mind and body
- People will often find it easiest to focus when in a laying down position, but mindfulness exercises can be done in any position
- Bringing the attention to the breath is an easy way to help the person stay in the present moment
- You and the patient should not judge their experience. For example, they should not judge the sensation of pain by thinking "I have this pain and it is bad." Rather, the pain should just be recognized and accepted. The exercise helps guide the patient to do this.
- If a person's attention moves away from the present moment, they should know that it is ok and normal. In that situation, they should just try bringing their attention back to the present moment. They should try to bring their attention back to their breath.

Treatment Details:

Goals of the treatment – Body Scan

- Calm down the nervous system
- Address factors contributing to pain including emotions, thoughts, avoidance behavior, and emotional stress
- Teach the patient the body scan so that they can do it at home
- Increase awareness of the physical sensations in their body
- Increase awareness of their thoughts and emotions

Key points – Body Scan

- Create a private, safe, and calming environment with your voice, body, and the space or room
- Frequently ask the patient to bring their attention to their breath as a way to help them stay in the present moment

Have the patient find a comfortable position. This can be done in sitting or laying down. Have the patient use the finding comfort in sitting exercise or finding comfort in laying down exercise before starting the body scan.

Use the below script to guide the patient through the body scan. When there are dots like this.....that is to remind you to wait and not talk. You want to leave a space where you are not talking so that the patient can have time to do what you are guiding them to do.

Healthcare professional: I am going to lead you through the body scan exercise now. It can help calm down the nervous system which can decrease pain, improve sleep, improve thinking, and decrease other symptoms like headaches or fatigue. As you are laying there, you will hear my voice. You just need to pay attention to my voice and do as my words say. Try to stay focused on my words and stay in the present movement. If I ask any questions, answer only in your mind. I will frequently tell you to breathe so when you do, try to use a belly breathing pattern. I will not touch you during this exercise. If you are comfortable, you can close your eyes. Or you can leave your eyes open and have your eyes softly fixed on a spot in front of you. Are you ready? Have the patient share.

Just notice how you are feeling in this moment. Without trying to change anything, observe what is happening in your body.....Without trying to change anything, observe what is happening in your mind.....Our minds are not separate from our bodies. When our mind is tense and stressed out, our bodies become tense and stressed out. But when we let our bodies relax, that sends a message to our minds to relax as well.

Bring your attention to your body.....Feel the contact of your body with the floor....Notice what this feels like....Does this feel the soft?.....Does this feel cold?....Whatever you feel is OK.

Bring your attention to your left leg.....How does your left leg feel right now in this moment?....Does it feel hot? Cold?.... Itchy?.... Tense?Do you have trouble feeling anything at all?....Whatever the leg feels like right now is ok. Just bring your attention to your leg.

If your leg is feeling tight or tense, see if you can soften it just a little.....If that doesn't happen, that's OK too.....Just let the sensations be, and just bring your attention to them.....Whether you are experiencing a pleasant sensation, like relaxation or strength, or an unpleasant sensation, like stress or pain, whatever is happening for you right now is OK....you don't have to change anything....you can just fully accept it in this moment.

We practice giving each part of our body with our love and attention. We can do this by reminding ourselves to smile to each part of our body or each sensation.....As you breathe in and out, you can say to yourself silently, Breathing in, I am aware of my leg (or pain in my leg).....Breathing out, I smile to my leg....

If you have a sensation in your body, notice it.....Bring all of your attention to it...How does it change when you bring your attention to it?...What happens?...Does it get more intense? Less intense?...What thoughts do you think as you become aware of the sensation?...What emotions do you feel as you become aware of the sensation?...See if your mind has a habit of creating any stories about this sensation or any emotional resistance like anger, frustration, or denial.....See if these habits might be pulling you away from the present moment...See if you are having difficulty keeping your attention on this sensation in your body just as it really is right here and now.

Whatever is happening for you is OK....There is no need to change or judge anything....You can simply observe what is happening in your mind and emotions and then bring your attention back to the present moment....back to your body, ...Bring your attention to your mind and body with kindness and compassion for yourself.

Repeat for different parts of the body

Now let your attention spread throughout your entire body, allowing every part to be relaxed, feel heavy, and soft....Feel your entire body sinking into the floor.....Where is most of your tension stored?...What part of your body is most relaxed?

Take a deep breath in.... now exhale.....Breathe in.... and out....Continue to breathe slowly, smoothly.

Now continue this relaxation while also observing your bodyDo not try to make anything happen....Notice how your whole body feels...Just be aware and dont try to change anything....Simply take note of how your body feels.

Take a few moments now to think about the pain you experience....You may not be in pain right now.....Just observe the state of your pain in this moment....Bring your attention to the way your body feels right now....The way your body feels is always changing....The way you feel is different from moment to moment.....A moment from now, you will feel slightly different from the way you feel right now.....Just bring your attention to your body.

Although pain is unwanted and difficult to tolerate, try for the next few moments to accept your pain just as it is....Accept the way you are feeling right now physically and emotionally..... whether positive or negative..... allow your body and mind to just be....Accepting..... Being aware of it....Not trying to change anything....Just accepting things as they are

Listen to my words. You can repeat them to yourself quietly out loud or in your mind. I accept myself....I accept this pain I experience..... I accept all of it.... I accept it.... I am letting go of the need to control or to change in this moment.....I accept the pain.....I release myself from the need to do anything right now, except just be.....I accept myself.....

Now that you have repeated some affirmations, just relax for a few moments, and let go. Just be.....There is nothing you need to be doing in this moment, besides accepting this moment just as it is.

Observe again your pain.... and notice it....Is the pain any different now?.....See if you are able to transform the feeling, just a little.....Picture the pain.... notice its exact location. Imagine that instead of pain, this area feels warm..... even a little bit warm.... as if you are sitting next to a nice warm heater...

Now focus in on this area, and imagine a slightly different feeling....You can pick any feeling that feels comfortable for you. You may wish to imagine the sensation of pleasant tingling... cold... or soft but firm, comfortable pressure.....Imagine this sensation now. Imagine the sensation replacing just a tiny bit of the pain..... and then a tiny bit more of the pain..... more and more.....Feel this new sensation growing..... pleasantly.... providing some relief..... allowing you to relax.....

Take a deep breath in..... and out.....in..... and out.....in..... out.....Continue to breathe slowly and rhythmically.

Now, we will focus on the word calm. This is your focus word.....Focus your attention on this word with each breath. Every time your thoughts move away from the present, bring your attention back to the word calm. Don't worry about making anything happen. Whatever happens is right for you at this moment.

Try to be aware of what is going on in your mind and body and accept it.... Just accept the state you are in, and continue to focus your mind on the word "calm." Repeat the word every breath.

Breathe in..... calm. Breathe out.... calm....In.... calm...Out... calm

Continue to repeat this word in your mind, focusing your attention on this word whenever your thoughts move away from this present moment.....Keep repeating the word "calm.".....Keep bringing your attention to your breath and to this word.

Notice how your body feels, now....See how relaxed your muscles are.....Notice how calm your mind is...Enjoy this feeling of relaxation for a few moments more.....You can keep this feeling of relaxation with you as you return to your regular activities.....Memorize this peaceful, relaxed feeling, so you can return to this state whenever you need to.

Slowly reawaken your body now....Take a deep breath in.... and out....Feel your mind and body becoming more awake and alert....Move your arms and legs, and stretch your muscles to let them reawaken from this relaxation....When you are ready, you can open your eyes and sit up.

Discuss the following with the patient:

- What did you experience?
- We focused on becoming aware of sensations and then accepting them, including pain. What was this like for you?
- Do you think this exercise would be helpful for you?
- When could you do this exercise at home and in your daily life?
- Let's write down the key points together about how to do this exercise so you can remember how to do this on your own at home. (do this with the patient)

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

HOME ACTIVITY PLAN

Treatment Details - See details above in the description for session one

The home activity plan involves developing a plan that is meaningful to the patient and that will provide them with ways to manage pain and improve function in their daily life. Make sure to write down the plan in your documentation so you can follow up during the next session.

ADDITIONAL LEARNING RESOURCES

- Text about Knee crepitus: https://www.physio-pedia.com/Knee_Crepitus
- Video: Why your knees crack: <https://www.youtube.com/watch?v=NOOZZgh5z8I>
- Video: Why do your knuckles pop: <https://www.youtube.com/watch?v=ljiKUmfaZr4>
- Video: The importance of intensity in physical activity: <https://www.youtube.com/watch?v=OMn8Tq5Eyao&t=35s>
- Video: Social and emotional benefits of physical activity / exercise: <https://www.youtube.com/watch?v=sNIOsNI-o6O&t=36s>
- Video: TedTalk - The brain-changing benefits of exercise: <https://www.youtube.com/watch?v=BHY0FxoKZE>
- Video: Benefits of exercise on the brain and body – why you need exercise: https://www.youtube.com/watch?v=yTL_bNvXJ9s&t=254s
- Video: Physical activity guidelines – Move more: <https://www.youtube.com/watch?v=ng4yg5lY6oQ>
- Video: Physical activity guidelines: https://www.youtube.com/watch?v=G2HU4NJ_M3c
- Video: What causes insomnia: https://www.ted.com/talks/dan_kwartler_what_causes_insomnia
- Video: What would happen if you didn't sleep: https://www.ted.com/talks/claudia_aguirre_what_would_happen_if_you_didn_t_sleep
- Video: Benefits of a good night sleep https://www.ted.com/talks/shai_marcu_the_benefits_of_a_good_night_s_sleep
- Video: Tedtalk about sleep https://www.ted.com/talks/matt_walker_sleep_is_your_superpower
- Video: How poor sleep increases sensitivity of the nervous system to pain https://www.eurekalert.org/pub_releases/2019-01/uoc--slh012419.php
- Article – Pain and sleep: <https://www.painscience.com/articles/insomnia-until-it-hurts.php>
- Video - What is mindfulness: <https://www.youtube.com/watch?v=AWJUv1IH-Ng>
- Video - Mindfulness Based Stress Reduction: https://www.youtube.com/watch?time_continue=1&v=F2LebuLJmmA
- Video - Mindfulness and chronic pain: <https://www.youtube.com/watch?v=KqS9qHEWnaA>
- Video - Body scan guide: <https://www.youtube.com/watch?v=TOnuKBVOS7M>
- Video – Pain body scan mindfulness exercise: <https://www.youtube.com/watch?v=iOBAzVrp8vk>

SESSION 6

Session 6 should include the following treatments:

- Check-in
- TNE: Posture
- Finding comfort in standing
- Functional training
- TNE: Sounds in the Joint
- Intervals of medium intensity physical activity
- Body Scan
- Home activity plan

CHECK-IN

Treatment Details - See details above in the description for session one
The check-in involves discussing the following two questions with the patient.

1. What has gone well since the last time we met?
2. How did the home activity plan go?

TNE: POSTURE

Background Information:

When using a biomedical approach to treatment, it is common for healthcare professionals to teach patients what are “good” and “bad” postures. It is common to tell patients the postures and movements they should avoid because they may cause injury or tissue damage. It is common to tell patients that they must move in a specific way or they will cause damage to the body. For example, you must lift a box up off the floor in this specific way or you must sit in this specific way, or you will cause damage to your back and you will develop back pain. This way of educating about posture is very common. But this is based in the biomedical theory. This way of educating about posture and treating pain is not accurate or effective for treating pain, preventing pain, and improving functional ability.

Here is information about posture based on the newest research. It is based in the biopsychosocial theory.

- “Good posture” does not exist. Research has not found a connection between a specific posture and no pain or symptoms. In other words, research has not found any evidence that a “good posture” exists.
- Holding any one posture for a long period of time contributes to pain. Research has shown that holding postures, not moving the body, and not using a variety of postures can contribute to pain. Even if you hold a “good posture” for a period of time (which is different for every person), then you will most likely start to feel discomfort and pain.
 - There are sensors in the body that evaluate the levels of acid in the tissues of the body. If someone doesn’t move their body, then acid levels increase in that area, and these sensors send danger messages to the brain. When the brain gets these messages, it will often decide to produce feelings of discomfort or pain. This doesn’t indicate a sign of tissue injury. Rather, it is the body’s way of telling you to move and change your position or posture.
- “Bad posture” is never a main factor contributing to pain. Research has shown that people in pain often decrease the number of and variations in their movement patterns and postures. And this is usually a contributing factor to pain. But having bad posture is not a main factor contributing to pain.
- Moving the body and having a variety of postures contributes to decreased pain and discomfort. Research has shown that the focus should not be on using a “good posture” but rather using a variety of postures and not remaining fixed in any one posture for a long period of time. The tissues in the body want blood flow, movement, and space. So, moving the body and having a variety of postures gives the tissues what they need.
- Often things in the environment, like social and cultural expectations, contribute to our postures and how we move. Consider the expectations of sitting posture when family members visit your house or the expected position for standing when greeting people in a funeral. Recognizing how social and cultural expectations influence our postures and movements, can help us find ways to meet these expectations but still remain in comfortable postures and movements

Based on this research, you should do the following when treating pain and discussing posture:

- Have the patient do the “finding comfort in sitting” and “finding comfort in laying down” and “finding comfort in standing” exercises so that they can learn how to find comfort in different positions and postures.
- Encourage the patient to always try to be in the posture that feels most comfortable for them at any given moment.
- Provide opportunities for the patient to experience open postures and postures with good alignment as often people will find these comfortable and they can contribute to less pain, decreased sensitivity of the nervous systems, and improved functional ability.
- Have the patient practice functional activities and help them to find the most comfortable position for the activity. You can provide guidance by saying, “Many people find this posture comfortable when doing this activity.” For example, when lifting a box from the floor: “Many people find it more comfortable to bend the knees and squat rather than lifting with straight legs and from the back.” Have the patient do the functional tasks in different postures and movement patterns and then have the patient make a decision about what feels best for them.
- Focus on promoting thoughts and beliefs that increase the patient’s willingness to move and be physically active and decreases fear of movement.
- Improve the patient’s body awareness so they can listen to their body when it is telling them to move, change positions, or be in a different posture. Treatments that help with this include muscle relaxation, body scan, belly breathing, and medium intensity physical activity.
- Focus treatment on giving a person more options for movement, postures, and positions.
- Discuss the cultural and social expectations of posture and how this contributes to the patient’s pain experience.
- Help the patient to set up their environment, like office desk or kitchen, so they can be comfortable and supported during daily activities. But also help them know how to include variations in their postures, movements, and positions during these daily activities.

Based on this research, you should not do the following:

- Do not tell the patient to avoid certain positions, postures, or movements. This increases fear about movement and makes the patient avoid movements and physical activity. Increased fear of movement and decreasing movement and physical activity contributes to increased pain and increased sensitivity of the nervous system.
- Do not tell the patient that there are specific postures which are the best for preventing pain and injury.
- Do not tell the patient that if they move in a specific way, that they will have pain and cause an injury. For example, don’t say that if you lift a box in the wrong way, you will cause a disc prolapse to occur and you will have back pain.
- Do not say anything that increases fear of movement or decreases a person’s willingness to move their body.
- Do not focus treatment on the patient having one good posture but rather on their ability to find the postures and movement patterns that are best for them.
- Do not encourage one specific posture during daily activities like when working at an office desk or working in the kitchen.

Treatment Details:

Goals of the treatment – Posture

The “Posture” TNE aims to help the patient understand the following points:

- Comfort in posture, positions, and movements are the focus and not holding the body in one perfect way
- There is no one ideal and fixed posture
- Changing posture and having a variety of postures is normal and healthy

Key points – Posture

- The script includes many opportunities for the patient to share. Engage them in this discussion so that they can better understand and believe this idea.
- The patient should be independent in the “Finding comfort in sitting” exercise. So do not provide them with support to do this unless they really have not learned yet how to do it. If they are not independent in this exercise yet, include it in the home activity plan.

Healthcare professional: Before we discuss the next topic, I want you to “find comfort in sitting.” Have the patient do the “finding comfort in sitting” exercise that was done in previous sessions. Only support the patient in doing this if they do not know how to.

Healthcare professional: We are going to discuss posture. What do you know about posture? Have the patient share. Posture is the position that we hold our body in. We can have sitting postures or standing postures. We also have certain postures we use when lifting something or when working in the kitchen to prepare a meal. Sometimes people say that there are good postures and that there are bad postures. Sometimes people say that if you use bad postures it will cause injuries and pain. Have you heard anything like this?

Have the patient share. We now know that there is no such thing as good posture or bad posture. In other words, using a perfect posture will not help to decrease pain or prevent pain and injury. Rather, we should focus on helping you learn how to find the most comfortable posture in any position or during any task. We also want to focus on helping you learn how to move and use a variety of postures during your daily activities. These are the things that will decrease pain and prevent pain and injury.

Healthcare professional: Let's look at examples in daily life that help us know that there are not any perfect postures. When we sleep, do most people stay in the same position for the entire night?

Patient: No, most people move and change their position. They don't even wake up when they move.

Healthcare professional: Right, so the body naturally moves and changes positions, even when sleeping. Have you ever been sitting for a long time and then you start to feel uncomfortable? Like maybe you feel an ache in your bottom or your legs start to tingle? Have the patient share. These are all normal experiences. They do not indicate that there is anything wrong with your body. Rather, these physical feelings are the brain's way of telling you to move and change the posture or position that you are in. Tissues in our body want blood flow, movement and space. These physical feelings are your brain's ways of saying move and give the tissues these things. So, if this is true, what should we do when we feel these feelings?

Patient: We should change our posture. We should find a new posture or position that is comfortable.

Healthcare professional: If we feel pain or discomfort, we should move our body and find a new position or posture that is comfortable. We should listen to our body and respond to it. Often if you have had pain for a long time, you stop listening to the messages from your brain, except for pain. You can only feel pain and you have a difficult time noticing other sensations like increased muscle tension, stiffness, ache, tingling, or a desire to move. Often the brain will send signals for these other sensations before sending signals to produce pain. But if you don't listen to these initial messages, like you don't move and change postures, then the brain will send a stronger message in the form of pain. Does that make sense? Have you experienced that? Have the patient share.

Healthcare professional: To improve your ability to listen to your body, many of the treatments that we have done together have worked on improving your body awareness. This includes your ability to notice other sensations besides pain. Have you noticed changes in this? Do you now notice other sensations in your body besides pain? Have the patient share.

Healthcare professional: Before we started talking, you found the most comfortable position in sitting. Now, I want you to turn your attention to your body again. Is this position still comfortable? If not, find that comfortable position. Have the patient do this. Do not provide help. Did you change your sitting posture? Have the patient share what they changed. This demonstrates how we don't have one good posture that we should use all of the time. But rather, the most comfortable posture changes for us. You can learn to listen to the messages your brain sends, so that you can always find the most comfortable posture at any time. This will work to decrease the sensitivity of the nervous system and to decrease your pain. Does that make sense? Do you have any questions? Have the patient share.

Healthcare professional: Often the environment that we are in has an effect on our posture and positions. For example, are there expectations on how you should sit when someone visits your home for tea? Have the patient share. Are there specific ways you should sit during a work meeting with your supervisors? Have the patient share. What about when you are riding in a taxi and sitting next to someone that you don't know? Have the patient share. Is there a specific way that you should stand when greeting people at your family member's funeral? Have the patient share. Do you have other examples of how the environment affects your posture and how you move? Have the patient share. In many of these situations, you are expected to hold a specific posture for a very long time, and you are encouraged not to move or change your position. This can contribute to discomfort and pain. What do you think you could do in these situations to try to have variety of postures and positions? Discuss with the patient. Focus on a situation that the patient is in most frequently. Discuss solutions with the patient that will allow them to be socially appropriate in the situation but also achieve a variety of postures and movements.

Healthcare professional: How can you apply what we just talked about in your daily life? Discuss with the patient. Help them come to the key points and to identify specific things that they can do in their daily life regarding posture and positioning.

Healthcare professional: Today and in future treatment sessions we will work on specific functional tasks that are difficult for you to do in your daily life. Rather than teaching you one perfect way to do these tasks, we will work together to find what is comfortable for you and to explore different options of doing the task. Provide the patient with an example based on a functional task that is difficult for them.

Demonstrate this in a role play for the big group.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

FINDING COMFORT IN STANDING

Treatment Details:

Goals of the treatment – Finding comfort in standing

The finding comfort in standing exercise aims to help the patient understand the following points:

- Pain is always a decision by the brain
- Pain is not permanent - Our biology can change
- They have control of their body and can create more comfort

Key points – Finding comfort in standing

- Connect the content from the posture TNE with this activity
- Do not lecture at the patient. Rather engage the patient in a discussion and have them experience the activity.
- Ask the patient many times to share what they feel and how different positions feel different. Guide the patient to focus their attention on other sensation besides pain. This is important to increasing the awareness of the physical sensations.
- Space where a person can walk at a normal speed.
- Support the patient to learn how to do this exercise on their own
- Reinforce that there is not one right posture or position – The position of comfort changes for each person and in each moment.
- Create a calming environment.

Healthcare professional: We have done the finding comfort in sitting and laying down exercises. Have you been doing these at home? What have you experienced? Have patient share. Now we will do the finding comfort in standing. Standing is an important position to know how to find comfort because we stand while doing activities in our daily life.

First, you will walk while focusing your attention on your feet. This is a way to help increase your awareness of the sensations of your feet. Walk normally. As you walk, focus your attention on the bottom of your feet. Have the patient walk. As they walk, say the following statements. Give a few seconds after each statement so that the patient can do as you ask. The patient should not answer you but just think about it.

- Bring your attention to the bottom of your feet.
- Notice if you put more weight on your right leg or if you put more weight on your left leg?
- Focus on one foot, where is the most pressure on your foot? Is it in the heel, your toes, the inside of your foot, or the outside of the foot?
- Now focus on the other foot, where is the most pressure in that foot? Is it in the heel, your toes, the inside of your foot, or the outside of the foot?

Now you can stop walking. Could you feel differences as you brought your attention to your feet? What did you notice? Have the patient share.

Now that you have increased awareness of the feet, we will find the position of comfort in standing. Stand in one place. Make yourself as comfortable as possible in standing. Give patient time to do this. Keep your attention on how the bottom of your feet feel. Shift your weight from your heels to your toes. Demonstrate and then give the patient time to do this. What do you notice when doing this? Have the patient share. Now shift your weight from side to side. Demonstrate and then give the patient time to do this. What do you notice? Is there a difference between your right and left? Have the patient share. Now shift your weight in a circle. Demonstrate and then give the patient time to do this. What do you notice? Is there a difference between your right and left feet? Have the patient share.

We are now going to find the position of comfort for your feet. When we are standing, there are three points on each foot that make contact with the ground. The bottom of the big toe, the bottom of the little toe, and the heel. Point these points out on the foot. Starting with one leg, change the position of your foot and find the position where there is even contact on all three points. Find the position where the entire foot feels supported. You can move your entire leg in and out. You can rotate your foot in and out. Demonstrate these movements. Give the patient time to find the position of comfort. Repeat on the other leg.

Now stay in this position and lock your knees. Demonstrate. Have the patient do this. Now, shift the weight in a circle on your feet like we did in the beginning. Notice what this feels like. Demonstrate. Have the patient do this. Now, unlock your knees. Again, shift the weight in a circle on your feet. Demonstrate. Have the patient do this. What differences do you feel between these two positions of the knees? Have the patient share. Usually with the knees unlocked, a person will feel decreased resistance and more freedom in the legs. Now keep your feet where they are and find the position of comfort for your knees. Find the amount of bend in the knees that feels the best for you.

Keeping your knees and feet where they are, we will now find the position of comfort for the hips. Focus your attention on your hips. Move your hips forwards, backwards, and left and right. Notice the difference in each position. Find the position where the hips feel comfortable. Demonstrate. Give the patient time to find the position of comfort.

Now we will find the position of comfort for the low back. Just like we did in the finding comfort in sitting exercise, lets experience the two extreme positions of the low back. First, arch your low back. Notice how this feels. Demonstrate. Have the patient do this. Now round your low back. Notice how this feels. Demonstrate. Have the patient do this. The position of comfort in the low back is somewhere between these two positions. The muscles will still be active in your low back when you are in the position of comfort. But focus on finding the position of the low back where it feels like there is the least amount of resistance, pulling, or tension. There is no right or wrong position. Just find what is the best for you in this moment.

Now remember that we often hold a lot of tension in the muscles across our belly. So, try to release your belly and let it fall forward and out. Have the patient do this. This can sometimes feel strange. Does it feel strange for you? Have the patient share. Take a couple belly breaths and focus on your belly moving out as you inhale. Have the patient do this.

Now we will find the position of comfort of your upper back. Bring your chest all the way up. Notice how this feels. Demonstrate. Have the patient do this. Bring your chest all the way down and round your back. Notice how this feels. Demonstrate. Have the patient do this. The position of comfort is somewhere between these two positions. The position of comfort is where the muscles are working but they are working with the least amount of effort. The position of comfort is where the body feels balanced over your feet. Give the patient time to find the position of comfort for the upper back.

Now we will find the position of comfort for your neck and head. Bring the head all the way forward so your chin moves to your chest. Demonstrate. Have the patient do this. Bring the head all the way back so you are looking at the ceiling. Demonstrate. Have the patient do this. Continue to move the head forward and backwards but decreasing the amount of movement each time until you find the position of comfort. Demonstrate. The position of comfort is where the muscles are working but they are working with the least amount of effort. The position of comfort is where the head feels balanced over your body. Give the patient time to find the position of comfort for the head and neck.

Now we will find the position of comfort for your shoulder blades. Bring one shoulder blade all the way forward. Demonstrate. Have the patient do this. Bring the shoulder blade all the way back. Demonstrate. Have the patient do this. The position of comfort is where the muscles are working but they are working with the least amount of effort. The position of comfort is where there is the least amount of tension in your shoulders and arms. Give the patient time to find the position of comfort for the head and neck. Repeat on the other side.

Now bring your attention to your breath. Do a couple of belly breaths. Give the patient time to do this.

You are now in the position of comfort in standing. What do you feel? Have patient share. This position of comfort can be helpful to use when preparing to do activities in standing like washing dishes or standing at work. What activities do you do that require you to stand for a long period of time? Have the patient share. Do you think you could do the finding comfort in standing activity before doing the activity? Discuss with the patient.

Demonstrate this in a role play for the big group.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

FUNCTIONAL TRAINING

Background Information:

The overall goal of treatment is to improve the patient's function. So, you need to focus on improving a person's ability to do specific activities in their daily life. Functional training involves restoring a person's ability to do functional activities in their daily life by gradually and repetitively doing steps of the activity over a period of time. This treatment is adapted from the treatment approach called graded activity.

Research shows that functional training has a positive effect on all of the following factors that contribute to the pain experience:

- Nociceptive pain and changes
- Neuropathic pain and changes
- Nociplastic pain and changes
- Body information
- Thoughts and beliefs
- Emotions
- Memories
- Behavior

Functional training is effective because it guides the patient to gradually perform the steps in a functional activity until the patient is able to perform the full functional activity on a regular basis. In doing so, functional training has the following effects:

- Decreases the sensitivity of the nervous system
- Decreases fear and avoidance of movement and activities
- Increase the strength and mobility that is required to do a specific functional activity
- Allows the patient to develop awareness of how to move during an activity so that it will be most comfortable for them at any given moment

Key principles when doing functional training:

- Don't focus on pain. Focus on function.
 - The patient will most likely feel some pain and discomfort during the functional activity. The goal is to select a step of the activity where the pain does not significantly increase and that the patient feels comfortable doing it even if they have some pain.
 - It can be helpful to plan breaks with belly breathing during a functional activity. Short breaks to do belly breathing can help the nervous system remain calm which will help decrease pain and improve ability during the functional activity.
 - It takes time for the nervous system to calm down and not be oversensitive. This is especially true when a patient is doing an activity that they have feared for some time and that they have avoided. But with time and gradually doing the activity, the nervous system will calm down and they will experience less pain and discomfort.
- Guide the patient to find different postures and different ways of moving during the functional activity.
 - Recall what was discussed about posture. There is no ideal posture for any activity. Based on what you know about postures and movement patterns during activities, like lifting, you can help the patient try different options. Often people will feel most comfortable when using open postures and when maintaining body alignment. But allow the patient to explore the postures and movement options and decide what is most comfortable to them. Do not create fear and avoidance by saying that they must move in one specific way.
- Patient should do the activity nearly every day.
 - It is important for the patient to do the specific step of the activity every day. This regular experience is how the nervous system will learn that this activity and movement is no longer a threat. And in this way, the nervous system will calm down and the brain will produce less pain and protective responses during the functional activity.
 - If the patient has increased fear and anxiety during the functional activity, encourage them to take a short break and do belly breathing. This will help calm the nervous system and help the brain understand that the activity is not dangerous. They can then return to the activity.

Treatment Details:

Goals of treatment:

- Improve the patient's ability to function in daily life
- Decrease the sensitivity of the nervous system
- Decrease fear and avoidance of movement and functional activities
- Increase the strength and mobility required to do a specific functional activity
- Provide the patient with the opportunity to experience a variety of postures and movements and give them the ability to identify what is best for themselves at any given moment

Key points:

- Complete the functional training handout with the patient. Give one copy to the patient and keep one copy for yourself to use in future treatment sessions.
- Before the treatment session, review the patient's treatment plan and identify the three functional activities that they set goals for using the functional scale. You will find these in the treatment plan in the section called "Goals – Based on Outcome Measures."
- Don't focus on pain. Focus on function.
- Explore different variations of postures and movement patterns when doing the functional activity and guide the patient to find what is most comfortable.
- Make sure to have the patient choose which step of the activity they can commit to doing nearly every day. You should not make the decision for them.
- Help the patient understand how short breaks with belly breathing can help calm the nervous system so that they can continue to do the functional activity

Here are the steps for this treatment. Below you will find a script and more details on how to perform each step.

1. Tell the patient about the treatment.
2. Re-assess the patient's ability on functional activities by administering the functional scale again.
3. Have the patient select one activity to focus on.
4. Discuss the details of the activity with the patient.
5. Break the activity down into steps which can gradually help the patient perform the functional activity.
6. Demonstrate each step of the activity and have the patient identify which step they think they could start with.
7. Do the step of the activity that the patient selected.
8. Discuss how short breaks with belly breathing can be helpful.
9. Have the patient set the home activity plan for this step.

Tell the patient about the treatment

Healthcare professional: We are now going to work on specific activities that you do in your daily life that are difficult for you. The first goal is that you can do the activity without significantly increasing your pain and without significant difficulty. Then over time, as you continue to do this activity regularly, your nervous system will no longer be sensitive to the activity. So, in this way, you will develop the ability to do the activity without causing pain. Does that make sense? Have the patient share.

Re-assess the patient's ability on functional activities by administering the functional scale again.

Healthcare professional: At the assessment you identified three activities that you had difficulty with and scored them on a scale. We are going to do this again so we can see what activities continue to be difficult for you.

Administer the functional scale for the same three activities as done in the assessment. Document this on the treatment plan document and treatment session document. If the patient has a score of 10 for any activity, then this activity does not require any functional training. If the patient scores 10 on all three of the activities from the assessment, ask the patient if there are any other activities in their daily life that they have difficulty doing. If the patient identifies a new activity, administer the functional scale and document this on the treatment session document and the treatment plan document.

Have the patient select one activity to focus on.

In this session, only address one functional activity. This will allow the patient to commit to practicing the activity at home. Of the activities described on the functional scale, have the patient select the activity that is most important to them.

Discuss the details of the activity with the patient.

Discuss the one activity with the patient to make sure you understand the details of the activity. For example, if the patient says walking for the activity, you need to get more information like the following: Where would they like to walk? Would they be walking on flat surfaces or hills? For how long would they need to walk? What activity are they doing when walking like are they shopping and carrying shopping bags?

Break the activity down into steps which can gradually help the patient perform the functional activity.

You need to break the activity down into steps that will progressively get more difficult. The last step is the full functional activity as the patient described to you. Write the steps down for the patient and for yourself. Make sure to keep this as you will use it to progress functional training in future treatment sessions.

Here are some guidelines to follow when breaking the activity down into steps:

- Consider all aspects of the activity. For example, if the goal is climbing stairs then consider the following: how many stairs, with or without a handrail, a normal pattern or a pattern where they step with both feet on a stair, while carrying something, how many times a day, etc. All of the aspects that are important in the patient's ability to do this activity in their life should be included into the steps.
- You can include as many steps as appropriate. For example, some activities may have 3 steps and some activities may have 10 steps.
- The steps in the activities should be able to be performed by the patient at home. So, make sure that they can practice it at home. For example, don't include a stationary bike as one of the steps if the patient does not have access to a stationary bike at home.

Here are two examples of breaking a functional activity down into steps:

Functional activity: Walking 10 minutes to the bazaar, shopping, and then carrying shopping bags while walking back home. The walking is on flat ground and in busy areas of the bazaar. Total walking time is 30 minutes.

- Step 1: Walk outside for 10 minutes
- Step 2: Walk outside for 15 minutes
- Step 3: Walk outside for 20 minutes and carry bags for 5 minutes of that time
- Step 4: Walk outside for 25 minutes and carry bags for 10 minutes of that time
- Step 5: Walk outside for 30 minutes and carry bags for 15 minutes of that time
- Step 6: Do the full functional activity

Functional activity: Climbing 2 flights of stairs (25 steps), 4 times per day without using a handrail and in a normal pattern

- Step 1: Marching in place for 25 repetitions
- Step 2: Step-ups on one step for 25 repetitions
- Step 3: Climbing up and down 5 steps with a handrail and in a normal pattern – 2 times per day
- Step 4: Climbing up and down 10 steps with a handrail and in a normal pattern – 2 times per day
- Step 5: Climbing up and down 10 steps without a handrail and in a normal pattern – 2 times per day
- Step 6: Climbing up and down 20 steps without handrail and in a normal pattern – 2 times per day
- Step 7: Climbing up and down 25 steps without handrail and in a normal pattern – 2 times per day
- Step 8: Do the full functional activity

Demonstrate each step of the activity and have the patient identify which step of the activity they think they could start with.

Healthcare professional: Now that we know what activity we want to work on, we are going to find the level of the activity that you can do right now. Then gradually over the next few weeks, we will progress it so you can eventually do the full activity. I have broken the activity down into steps. Each step adds a little more difficulty. We want to identify which step of the activity you feel comfortable doing every day. This means that you have to feel confident that you can do this activity right now even if you are having a bad day where your pain is really high, you are tired, and you have other symptoms. This is important because by doing the activity every day, you are treating your nervous system. Remember, that your nervous system is oversensitive and is afraid of this activity. One way to teach the nervous system that it doesn't need to be afraid of the activity is by doing the activity every day. By doing the activity every day, the nervous system learns that the activity is not dangerous. And this will decrease the pain that you experience.

But we need to pick the right level of activity, so that it does not increase the pain significantly. It will be normal to feel some pain and discomfort during the activity. But we will pick the level of activity, where you are not afraid that it will cause a significant increase in pain or other symptoms. I will describe and demonstrate the steps of the activity now and then you can select which step you want to start with.

Demonstrate and discuss each step so that the patient understands what each step involves. Then ask the patient to select which step they think they could start with. They should select the step that they feel comfortable doing every day during the next week, even when they have a day with very high pain and symptoms.

Do the step of the activity that the patient selected.

It is very important that you do the step that the patient selected while they are with you in the treatment session. This will allow the patient to know that they are capable of doing it which increases the likelihood that they will do it at home.

Guide the patient to explore different postures and movement patterns when doing the activity. Ask the patient to describe what they feel during the different postures and movement patterns. This helps the patient become aware of different sensations and how they can change how they do an activity to create more comfort.

Guide the patient to use the posture and movement pattern that is the most comfortable for them in that moment.

While the patient is doing the activity, remind them that some pain and discomfort is normal. The goal is that they are not experiencing so much pain and discomfort that they will want to avoid the activity or that they will be afraid to do this activity every day at home.

If the patient demonstrates significant difficulty with this step of the activity, the patient may want to choose to do a previous step.

If the patient demonstrates signs of increased pain or anxiety, take a short break and do belly breathing. And then return to the activity.

Discuss how short breaks with belly breathing can be helpful.

Healthcare professional: Sometimes when doing the functional activity, the sensitivity of the nervous system may increase. If this happens, what do you think you will feel? Have the patient share. You may feel anxiety, increased muscle tension, difficulty breathing, or increased pain. If you start to notice these changes, you don't want to stop the activity completely because this will tell your brain and nervous system that the activity is dangerous. But it can be helpful to take a short break and do belly breathing. The belly breathing will calm down the nervous system which will reduce the symptoms you may feel. Then you should immediately return to doing the activity.

Have the patient set the home activity plan for this step.

To set the home activity plan for this step of the functional activity, discuss the following questions with the patient:

- What did you experience when you did the activity just now?
- Do you think you can do this activity every day until your next treatment session?
- Do you think you will be able to do this activity even if you have a bad day where your pain and other symptoms are high?
- When exactly during your day will you do this activity?

If the patient does not feel confident doing this activity every day, then have the patient select a different and less challenging step. Have the patient do this step with you. Then have the same discussion about doing this step every day.

Demonstrate this in a role play for the big group.

Have each participant select a functional activity that they think will be common with their patients. Then have them write down the steps of this functional activity. Give the participants time to do this. Have a few participants share this with the large group.

Do small group role play. They can use the functional activity and steps that they just created. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

TNE: SOUNDS IN THE JOINT

Background Information:

Research has shown that crepitus, or sounds in a joint during movement, are very common and do not indicate any problem that could be contributing to pain. For example, crepitus in the knee is present in 99% of the population. So, sounds in the joint have no connection to pain or tissue damage.

Research has also shown that if people believe that the sounds in a joint are a sign of tissue damage, then they feel more pain in that joint, move the joint less, and avoid moving and using that joint. This is an example of how beliefs about pain can contribute to increased pain and decreased functional ability.

Based on this, it is important for the patient to understand that sounds in the joint are normal and that they do not indicate a problem or a cause of a pain.

Treatment Details:

Goals of the treatment – Sounds in the Joint

The “Sounds in the Joint” TNE aims to help the patient understand the following point:

- Sounds in your body during movement, including in the joints, are normal and do not indicate a problem or something that could be causing pain

Key points – Sounds in the Joint

- Discuss this with the patient to help them understand and believe this point

Healthcare professional: Just as we know that changes in imaging are normal, we also know that sounds coming from the joints are normal. Do you sometimes hear sounds coming from your joint when you move it? Does that make you worried that something is wrong? Have the patient share. I want to tell you that this sound is very normal and common. It is not a sign of damage or injury in your body. You can think of it like this. Your joints are two bones coming together. Just like this pen has two parts coming together, the pen and the cap. Show the pen, or you can use some other visual aide. When the two parts rub against each other, a sound is naturally made. Like this. Demonstrate with the pen and cap or another visual aide. Can you see how it is natural and normal for sounds to be made by our joints and that we don't need to be concerned about it? Give time for the patient to discuss this with you.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

INTERVALS OF MEDIUM INTENSITY PHYSICAL ACTIVITY

Treatment Details:

Goals of treatment:

- Understand the talk test and practice using it
- Learn how to use belly breathing while being active
- Experience participating in medium intensity physical activity without significant pain or other problems
- Experience noticing the positive physical changes that happen with medium intensity physical activity like increased heart rate, heavy breathing, and sweating

Key points:

- You want to help the patient be able to independently move at a medium intensity. This means that you should help them understand how they can use the talk test and how they can modify an activity
- Make sure to select an activity that the person can achieve medium intensity physical activity without significant pain or other problems
- Make sure to discuss the plan for physical activity at home with the patient. They should set a realistic goal. Starting with a small amount of physical activity is ok. The goal is to get the patient moving more and starting to be more physically active.

Healthcare professional: Last time we talked about physical activity. We also practiced physical activity. Were you able to do physical activity at home as you had planned? Have the patient share. We also talked about how physical activity should be at a medium intensity to get the most benefits from physical activity. Do you remember the changes we notice when we move our body at a medium intensity? Have the patient share.

So today I am going to teach you a way to tell if you are doing medium intensity physical activity. It is called the talk test. To do the talk test, you pay attention to your breathing and to your ability to talk while doing the physical activity. When you are moving at a low intensity, you can talk comfortably, and you won't have any changes in the pattern of talking or in the pattern of breathing. When you are moving at a medium intensity, you can still talk full sentences, but you cannot talk smoothly or comfortably. Your breathing is heavy and prevents you from talking normally. You also won't be able to sing when moving at a medium intensity. This is how you will know that you are moving at a medium intensity. If you start moving at a high intensity, then you will only be able to say one word at a time because you are breathing very heavily. Let's do some physical activity now. We will use the talk test to make sure you get to a medium intensity.

Perform 2.5 to 3 minutes of medium intensity physical activity. As the patient is doing the physical activity, guide the patient to use the talk test to determine if they are moving at a medium intensity. Guide the patient think about how to increase or decrease the challenge as needed to keep the level at medium intensity.

Stop doing the physical activity. Guide the patient to perform belly breathing in sitting or standing until their breathing returns to normal. After the belly breathing, ask the patient questions to help the patient to develop awareness of their body and the ability to notice physical feelings in their body, besides pain.

Repeat this cycle at least 3 times. Guide the patient become independent in using the talk test and changing the physical activity to maintain a medium intensity.

Healthcare professional: You just did a total of ____ minutes of physical activity. Do you think you could do this same physical activity at home? How many minutes do you think you could do this physical activity at home for? Do you feel comfortable using the talk test when doing physical activity at home? Discuss with the patient. Have the patient set the plan for the home activity plan.

BODY SCAN

Treatment Details:

Goals of the treatment – Body Scan

- Calm down the nervous system
- Address factors contributing to pain including emotions, thoughts, avoidance behavior, and emotional stress
- Teach the patient the body scan so that they can do it at home
- Increase awareness of the physical sensations in their body
- Increase awareness of their thoughts and emotions

Key points – Body Scan

- Create a private, safe, and calming environment with your voice, body, and the space or room
- Frequently ask the patient to bring their attention to their breath as a way to help them stay in the present moment

Healthcare professional: Last session we did the body scan exercise. Did you do this at home? What did you experience? Did you have any challenges? Have the patient share. Today I will guide you through the body scan exercise again. This will help calm the nervous system and also help you remember how to guide yourself through this exercise at home.

Have the patient find a comfortable position. This can be done in sitting or laying down. Have the patient use the finding comfort in sitting exercise or finding comfort in laying down exercise before starting the body scan.

Use the script provided in session 5.

After the exercise, discuss the following with the patient:

- What did you experience?
- Was your experience this time different than the previous session or when you did it at home?
- We focused on becoming aware of sensations and then accepting them, including pain. What was this like for you?
- Do you think this exercise would be helpful for you?
- When could you do this exercise at home and in your daily life?
- Would anything help you be able to do this at home?

HOME ACTIVITY PLAN

Treatment Details - See details above in the description for session one

- The home activity plan involves developing a plan that is meaningful to the patient and that will provide them with ways to manage pain and improve function in their daily life. Make sure to write down the plan in your documentation so you can follow up during the next session.

ADDITIONAL LEARNING RESOURCES

- Blog post about posture and pain: <https://www.dynamicprinciples.com/finding-ease-part-1/>
- Blog post about posture and pain: <https://www.dynamicprinciples.com/finding-ease-part-2-sitting/>
- Short article about posture and pain: <https://cor-kinetic.com/the-definitive-guide-to-posture-pain-in-3-minutes-flat/>
- Functional training and graded activity: https://www.youtube.com/watch?v=WFs_4XOLSuI

SESSION 7

Session 7 should include the following treatments:

- Check-in
- Functional training
- Intervals of medium intensity physical activity
- TNE: Sleep habits
- Strengthening and stretching exercises
- Home activity plan

CHECK-IN

Treatment Details - See details above in the description for session one
The check-in involves discussing the following two questions with the patient.

1. What has gone well since the last time we met?
2. How did the home activity plan go?

FUNCTIONAL TRAINING

Treatment Details:

Goals of treatment:

- Improve the patient's ability to function in daily life
- Decrease the sensitivity of the nervous system
- Decrease fear and avoidance of movement and functional activities
- Increase the strength and mobility required to do a specific functional activity
- Provide the patient with the opportunity to experience a variety of postures and movements and give them the ability to identify what is best for themselves at any given moment

Key points:

- Use the functional training handout that you completed with the patient during last session.
- Don't focus on pain. Focus on function.
- Explore different variations of postures and movement patterns when doing the functional activity and guide the patient to find what is most comfortable.
- Make sure to have the patient choose which step of the activity they can commit to doing nearly every day. You should not make the decision for them.
- Help the patient understand how short breaks with belly breathing can help calm the nervous system so that they can continue to do the functional activity

Here are the steps for the functional training treatment in this session. This is a progression from the functional training treatment completed in the previous session. Below you will find more details on how to perform each step.

1. Discuss with the patient what they experienced when doing the step of the functional activity at home
2. Have the patient decide the step of the activity that they will now do at home
3. Do the step of the activity that the patient selected
4. Have the patient set the home activity plan for this step

Discuss with the patient what they experienced when doing the step of the functional activity at home

Ask the patient to share what they experienced when doing the step of the activity at home. You should discuss the following with the patient: 1) how often did you do the activity?, 2) did you have any challenges?, 3) did you do the activity even when you were not feeling good or had pain?, 4) what went well when doing the activity?, and 5) did you take short breaks and do belly breathing during the activity?

Have the patient decide the step of the activity that they will now do at home.

With the patient, discuss and demonstrate the steps of the activity that you developed during last session. Use the handout that you and the patient completed during the last session during this discussion. Then have the patient select which step of the activity they think is realistic for them to do at home regularly until next treatment session.

The goal is to gradually progress in the steps of the activity. If the patient regularly performed the step of the activity since last treatment session, the patient is probably ready for the next step. The patient may even select a few steps above the step that they did. They can do this if they feel comfortable and confident about performing that specific step. But if the patient had challenges doing the activity regularly at home then they may want to continue doing the same step or even choose to do a previous step of the activity.

Do the step of the activity that the patient selected.

It is very important that you do the step that the patient selected while they are with you in the treatment session. This will allow the patient to know that they are capable of doing it which increases the likelihood that they will do it at home.

Guide the patient to explore different postures and movement patterns when doing the activity. Ask the patient to describe what they feel during the different postures and movement patterns. This helps the patient become aware of different sensations and how they can change how they do an activity to create more comfort.

Guide the patient to use the posture and movement pattern that is the most comfortable for them in that moment.

While the patient is doing the activity, remind them that some pain and discomfort is normal. The goal is that they are not experiencing so much pain and discomfort that they will want to avoid the activity or that they will be afraid to do this activity every day at home.

If the patient demonstrates significant difficulty with this step of the activity, the patient may want to choose to do a previous step.

If the patient demonstrates signs of increased pain or anxiety, take a short break and do belly breathing. And then return to the activity.

Have the patient set the home activity plan for this step.

When discussing the home activity plan for this step with the patient, include the information that the patient shared with you about doing the step at home. To set the home activity plan for this step of the functional activity, discuss the following questions with the patient:

- What did you experience when you did the activity just now?
- Do you think you can do this activity every day until your next treatment session?
- Do you think you will be able to do this activity even if you have a bad day where your pain and other symptoms are high?
- What challenges did you have last time with doing the activity at home and what can you do to overcome these challenges?
- When exactly during your day will you do this activity?

If the patient does not feel confident doing this activity every day, then have the patient select a different and less challenging step. Have the patient do this step with you. Then have the same discussion about doing this step every day.

INTERVALS OF MEDIUM INTENSITY PHYSICAL ACTIVITY

Treatment Details:

Goals of treatment:

- Understand the physical activity recommendations
- Understand the talk test and practice using it
- Learn how to use belly breathing while being active
- Experience participating in medium intensity physical activity without significant pain or other problems
- Experience noticing the positive physical changes that happens with medium intensity physical activity like increased heart rate, heavy breathing, and sweating

Key points:

- Make sure to discuss the plan for physical activity at home with the patient. They should set a realistic goal. Starting with a small amount of physical activity is ok. The goal is to get the patient moving more and starting to be more physically active.
- You want to help the patient be able to independently move at a medium intensity. This means that you should help them understand how they can use the talk test and how they can modify an activity.
- Make sure to select an activity that the person can achieve medium intensity physical activity without significant pain or other problems

Healthcare professional: Last time we talked about physical activity and you learned how to use the talk test. We also practiced physical activity. Were you able to do physical activity at home as you had planned? Did you use the talk test? Were you able to achieve medium intensity when doing the physical activity at home? Have the patient share.

Now I want to tell you about the recommendations for physical activity. Research has been done to see how much physical activity adults need on a regular basis to prevent pain, emotional problems, and diseases like cancer and heart disease. Based on this research, there are international recommendations for physical activity. Use **handout**. The recommendation is that all adults do at least 150 minutes of medium intensity physical activity per week. This is about 25 minutes of medium intensity physical activity per day. The activity does not all need to be at one time. It can be spread out over the day and week. Notice that the recommendation is for time – 150 minutes, and intensity- medium intensity. You now know how to use the talk test to assess if you are doing medium intensity physical activity. When doing medium intensity physical activity, what will your talking and breathing be like? Have the patient share.

What do you think are examples of medium intensity physical activities that you do in your daily life? It could be walking, gardening, exercises, physical work, cleaning. Discuss with the patient. Write down what activities they do and the amount of time they usually do it. Then show the patient how many minutes of physical activity they are doing per week.

It may seem unrealistic for you to do 150 minutes of medium intensity physical activity per week. That is ok. Your focus should be on moving more! Don't focus on having to exercise every day. Just focus on moving more. Focus on doing a little bit more movement than you would normally do. Research shows that this approach of moving more has a significant effect on your health, including reducing pain. So, what do you think you could do in your daily life to move more? What are small changes you can make? For example, can you walk somewhere rather than driving, or do gardening every week, or climb the stairs at work rather than using an elevator. Discuss with the patient. The goal is that they select a few small things they can do in their daily life to move more.

Perform 3 to 5 minutes of medium intensity physical activity. Guide the patient to use the talk test to determine if they are moving at a medium intensity. Guide the patient to think about how to increase or decrease the challenge as needed to keep the level at medium intensity.

Stop doing the physical activity. Guide the patient to perform belly breathing in sitting or standing until their breathing returns to normal. After the belly breathing, ask the patient questions to help the patient to develop awareness of their body and the ability to notice physical feelings in their body, besides pain.

Repeat this cycle at least 2 times. Guide the patient to become independent in using the talk test and changing the physical activity to maintain a medium intensity.

Healthcare professional: You just did a total of ____ minutes of physical activity. Do you think you could do this same physical activity at home? How many minutes do you think you could do this physical activity at home for? Discuss with the patient. Have the patient set the plan for the home activity plan.

Do role play for the big group to demonstrate using the physical activity handout to create a plan with the patient to move more.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play. To save time, do not have the groups do the actual physical activity.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

TNE: SLEEP HABITS

Background Information:

Sleep hygiene is defined as the daily habits that are necessary to have good sleep at night and to feel energized and alert during the day. We are using the term sleep habits when discussing sleep hygiene.

Many of the daily sleep habits relate to helping the body keep its internal clock regulated. This internal clock is also called the circadian rhythm or sleep-wake cycle. The body has an internal clock that determines when it is time to be asleep and when it is time to be awake. Many different chemicals and hormones in the body work to regulate this internal clock. When people have pain, the nervous system is oversensitive, and this causes disruptions in the internal clock. So, as the patient does activities to calm down the nervous system, the internal clock will become more regulated and their sleep will often improve. In addition to an over sensitive nervous system, many other things can cause disruptions to the body's internal clock. Sleep hygiene are the daily habits that a person can do to help restore the body's internal clock and, in this way, improve sleep.

Here are the daily habits that help restore and maintain the body's internal clock so that a person can have good sleep:

- Only nap for about 30 minutes during the day - Naps during the day can be helpful for improving mood and energy levels. But if a person naps for too long, then it can make it difficult to sleep at night.
- Be physically active during the day – Being physically active during the day releases hormones that positively affect the body's internal clock. Also, physical activity uses energy so that when someone lays down to sleep, their body and mind will feel tired.
- Avoid foods at night that disrupt sleep – Foods can often cause indigestion or heartburn which makes it difficult to sleep. People should avoid having food or drink at night that will cause them any sleep problems. Foods that may disrupt sleep include heavy or fatty foods, spicy food, and caffeine like tea and soda pop.
- Be exposed to natural light during the day - Natural light helps to maintain the body's internal clock because it causes the body to release the appropriate hormones.
- Keep a regular bedtime routine – People can have a set of activities that they do every night before going to sleep. For example, a person may wash their face, brush their teeth, read, and then lay down in bed and do a relaxation exercise. If a person does this every time before sleep, it helps the body prepare for sleep and release calming hormones so that they can fall asleep more easily.
- Make a schedule for nighttime sleep and daytime naps and stick to that schedule – It is important to follow a regular sleep schedule to maintain the body's internal clock. A person should stick to the schedule even when they don't have any tasks, like work, to wake up for.
- Use breathing and relaxation exercises when laying down to sleep – These exercises calm down the nervous system so that it will be easier for a person to fall asleep.
- Keep the room where a person sleeps dark and cool – A cool room causes the body to release hormones that promote sleep more than a warm room does.
- Don't do any activities in the bed except sleep and sex – If a person does other activities in bed, then the body does not associate the bed with sleeping. In this situation, the body can become more alert when the person is trying to sleep.
- Use strategies to control worrying and thinking - If a person tends to worry and think as they lay down to sleep, use relaxation techniques to help calm the mind and prepare them for sleep. Also, writing down worries and plans for the next day before going to sleep can help calm the mind.
- Avoid artificial light from screens for one hour before bed – Artificial light from screens causes hormones to be released that make the body more alert. Artificial light from screens include television, computers, tablets, and mobile phones.

Treatment Details:

Goals of the treatment – Sleep Habits

The "Sleep Habits" TNE aims to help the patient understand the following point:

- The habits that they can do in their daily life to maintain good quality sleep

Key points –Sleep Habits

- Have the patient share their ideas about how to maintain good sleep. After this discussion, you can then provide the handout and additional information that they did not know. This is more effective then telling the patient all of the information directly.

Healthcare professional: In a previous session, we discussed how pain and sleep are related. What do you remember about pain and sleep? Have patient share. How has your sleep been lately? Have the patient share.

Because sleep is so important to our physical and emotional health, we want to do everything that we can to maintain good sleep. We have worked together to calm your nervous system down which helps to improve sleep. Now we are going to talk about other things that you can do to improve your sleep or maintain good sleep.

The body has an internal clock that regulates when you should be awake and when you should be asleep. This is why you start to feel sleepy as your normal bedtime gets closer. The body's internal clock is controlled by hormones and chemicals in the body. Often, these get disrupted when a person has pain and an over sensitive nervous system. When the body's internal clock gets disrupted, people can have problems with falling asleep, staying asleep, feeling rested after sleeping, and feeling energized and alert during the day. Many of the treatments we have done, like physical activity and muscle relaxation, have helped to restore your body's internal clock. But there are more things that you can do to keep your internal clock working well so that you can sleep well. Do you have any question about the body's internal clock before we talk about what you can do to keep your internal clock working well? Have the patient share.

You probably already know many things that help you sleep well. What are things that you do that help you sleep well? Have the patient share. Discuss what they share and encourage them to continue doing the things that help.

Are there any things in your life that you notice makes it more difficult for you to sleep well? For example, if people don't get enough physical activity, they may find it difficult to fall asleep. Or if people eat too much food at night then some may find it difficult to fall asleep. Have the patient share. Discuss what they share and encourage them to be aware of these things in their daily life so that they can help themselves sleep better.

As you shared, you know many things that can help improve your sleep quality. This handout also provides some more ideas. We can discuss them and see if anything else would be helpful for you to do. You can take this handout home with you so you can circle the things on this handout that you would like to try doing to improve or maintain good sleep. Use the handout and discuss the points with the patient. Have the patient circle any of the habits that they would like to start doing to improve or maintain good sleep.

Demonstrate this in a role play for the big group.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

STRENGTHENING AND STRETCHING EXERCISES

Background Information:

Strengthening exercises can be defined as repetitive movements that aim to improve the strength of muscles.

Stretching exercise can be defined as repetitive movements that aim to improve the mobility of an area including the joints, muscles, and nerves in that area.

Research shows that strengthening and stretching exercises have a positive effect on all of the following factors that contribute to the pain experience:

- Nociceptive pain and changes
- Neuropathic pain and changes
- Nociplastic pain and changes
- Body information
- Thoughts and beliefs
- Emotions
- Memories
- Behavior

Strengthening and stretching exercises are introduced specifically in this session and not in an earlier session. This is because the following must happen before a patient can successfully do stretching and strengthening exercises:

- Calm down the nervous system so that it is no longer over sensitive
- Decrease the person's fear and avoidance of pain and movement
- Understand the neurobiology of pain through TNE so that the brain will not perceive pain or discomfort as a sign of danger during the exercises
- Improve body awareness
- Learn things that can be done to control the amount of comfort that is felt including using variations in postures and movement patterns and belly breathing

So, it is important that the patient has participated in the other treatments included in the previous treatment sessions, before they do strengthening and stretching exercises.

Developed by Dr. April Gamble DPT, PT

Director of ACR - The American Center for Rehabilitation

Strengthening and stretching exercises are a way to prevent and address pain. After treatment ends, it will be normal for the patient to occasionally experience episodes of pain. So, the patient can learn strengthening and stretching exercises as a way to prevent and manage these episodes of pain on their own.

Treatment Details:

Goals of treatment:

- Improve the patient's strength and mobility to better perform functional activities in daily life
- Teach the patient exercises that can be used to prevent and manage pain at home
- Improve body awareness and the patient's ability to differentiate normal physical sensations from pain
- Decrease the sensitivity of the nervous system
- Decrease fear and avoidance of movement, activity, and exercise
- Introduce exercises into the home activity plan

Key points:

- Make sure to educate the patient about normal muscle soreness
- Select exercises based on the patient's physiotherapy problems
- Select some exercises for doing only during the treatment session and select some exercises for doing at home
- Make sure that the patient breathes during the exercises

Review the patient's physiotherapy problems on the treatment plan. Identify any muscle weakness and ROM limitations. Select stretching and strengthening exercises based on this information. Due to the effects of the previous treatment, the patient should be comfortable doing exercises that involve moving the area with pain.

You can select some exercises that you will only do during the treatment session. But you should also select 2-3 exercises that the patient can do at home as part of their home activity plan. These exercises for the home activity plan should be simple and realistic for the patient to do at home. Therefore, do not ask the patient to use any equipment in the exercise that they would not have access to at home.

The patient should breathe during the exercise. Breathing during the exercise ensures that oxygen is delivered to the body as needed. This will help a person perform better and help to decrease discomfort in the muscles. The patient should use a belly breathing pattern. It is best to breathe out when doing the most difficult part of the exercise and breathe in during the least difficult part of the exercise. Many people will hold their breath when they do something difficult or if they are concentrating. So, you will need to guide the patient to be aware of their breathing pattern while doing the exercise.

Strengthening and stretching exercises are a great opportunity to improve a patient's body awareness and their ability to differentiate normal physical sensations from pain. While the patient is doing an exercise, ask them questions about what they feel in their body. For example: What sensations do you feel in your body? Warmth, tension, power, stretching, pull, tightness, etc. Where exactly do you feel these sensations?

HOME ACTIVITY PLAN

Treatment Details - See details above in the description for session one

- The home activity plan involves developing a plan that is meaningful to the patient and that will provide them with ways to manage pain and improve function in their daily life. Make sure to write down the plan in your documentation so you can follow up during the next session.

ADDITIONAL LEARNING RESOURCES

- Video - Sleep hygiene: <https://www.youtube.com/watch?v=ACmUi-6xkTM>
- Video – Tedtalk - Understanding How do I sleep better: https://www.youtube.com/watch?v=WNj1Y11t_x8
- Video – Circadian rhythm: <https://www.youtube.com/watch?v=2BoLqqNugwA>
- Video – How to fix your sleep schedule: <https://www.youtube.com/watch?v=iMfsa7ntJZE>
- Video – Healthy circadian rhythms: <https://www.youtube.com/watch?v=erBJuxVR7IE>
- Video – Collaborative goal setting: <https://www.youtube.com/watch?v=NgBxkvIjQXO>

SESSION 8

Session 8 should include the following treatments:

- Check-in
- Reassess goals
- TNE: Speedometer
- Functional training
- Intervals of medium intensity physical activity
- Strengthening and stretching exercises
- Home activity plan

CHECK-IN

Treatment Details - See details above in the description for session one
The check-in involves discussing the following two questions with the patient.

1. What has gone well since the last time we met?
2. How did the home activity plan go?

REASSESS GOALS

Treatment Details – See details above in the description for session four

Goals of the treatment – Reassess Goals

- Assess progress - what is improving and what is not improving
- Help the patient recognize their improvements and what they need to continue to work on
- Gather information to make the treatment plan specific to the needs of the patient – This is session 8 of a planned 10 sessions. So, it is important to assess what problems remain so that you can address them in the last few sessions.

Key points – Reassess Goals

Use the patient's assessment form. Go to the section of the treatment plan called "Goals – Based on Outcome Measures." You completed this section after the assessment and during treatment session 4. Now, you will re-test for all of the goals that were included in this patient's treatment plan. All patients will have the following goals for you to re-test:

- Sit to Stand Test – Total Time
- Pain Self-efficacy Questionnaire – Total Score
- During the past month, how would you rate your sleep quality overall?
- At least once a week, do you do any regular activity long enough to work up a sweat? – Number of hours
- Activity 1
- Activity 2
- Activity 3

If you are treating nociplastic pain and changes, then you also have the Central Sensitization Inventory to re-test.

For the re-assessment, you will complete it just as you did during the initial assessment. Refer back to part 3 to recall how to administer each of these outcome measures.

TNE: SPEEDOMETER

Treatment Details:

Goals of the treatment – Speedometer

The "Speedometer" TNE aims to help the patient understand the following points:

- Biological, social, and psychological factors contribute to how and when a person experiences pain
- Pain is not permanent - Our biology can change
- Ways to manage stress and responses to challenges in daily life so that the nervous system does not become oversensitive

Key points –Speedometer

- Have the patient share their experiences. The goal is to help the patient become aware of how they can control the mind and body's response to stress. The patient must think about this and make decisions in their daily life. So, make sure the patient talks and shares and that you do not give the solutions to the patient.
- Use the picture of the speedometer.

Healthcare professional: We have learned in previous sessions that stress in our daily life affects the amount of pain that you experience. If needed, remind the patient of the "Cup of water" TNE. Do you have any examples of how stress or difficult things in your life affect your pain? Have the patient share.

Healthcare professional: Our emotions and our stress can affect pain because it can contribute to the sensitivity of the nervous system. If the sensitivity of the nervous system increases, what will happen to your pain? Have the patient share. If emotions and stress increase the sensitivity of the nervous system, then we will be more sensitive to pain and will experience more pain. As we learned, an oversensitive nervous system can also cause other problems like fatigue, headaches, difficulty controlling anger, and difficulty interacting with family. We are going to use an example now so you can become more aware of what happens when you are stressed. Then you can know how to deal with stress so that it won't have a negative effect on your life.

Healthcare professional: What do you know about a speedometer? Show the picture and have the patient share. The speedometer tells us how fast the car is moving. Our minds and bodies are similar to a car. We can go different speeds. And often stress, pain, and challenges in life can make us move too slow or too fast. Here is a picture of a speedometer. You can see that this speedometer has 4 areas. The blue area is when you go too slow. Why is it not helpful when a car goes too slow? Patient: You can't get to where you need to go in time, you may annoy other drivers, can't get things done, car is not very useful. When our bodies and minds are in the blue area, we also are not moving fast enough. This is when we feel tired, numb, we just want to be alone, and we are not motivated to do anything. We may feel afraid and cautious, so we avoid doing things, even things we usually enjoy. Have you experienced anything like this? What do you experience when you are in the blue area? Have the patient share what they experience when they are in the blue area. You can write this down on the speedometer.

Healthcare professional: How do we make a car go faster? Patient: Use the gas pedal. Just like in a car, we can change the speed of our body and mind to move from the blue area to the green area. The green area is just the right amount of speed. One way that we can move from the blue area to the green area is through physical activity and exercise. When you did physical activity in the treatment session or at home, could you feel your mind and body gain energy? Could you feel it move from the blue to the green? Have the patient share.

Healthcare professional: Then we have the red area. This is when the car is going too fast. What happens if the car goes too fast? Patient: You could get in an accident, hit other cars, cannot control the car, or get into trouble. If you go too fast then you cannot control the car and you will get into an accident or into trouble. The same is true for our mind and body. If we are going too fast, then we cannot control our actions. We may fight or yell, feel restless, feel angry, or feel like you cannot think clearly or communicate with others clearly. Have you experienced this? What do you experience when you are in the red area? Have the patient share what they experience when they are in the red area. You can write this down on the speedometer.

Healthcare professional: We also have a yellow area which is the warning area. This is before you get to the red area. With a car, if you start to go too fast, you start to notice that your car shakes or your wheels slide as you make a turn. In our body and minds, we also have changes when we get to the yellow area to warn us that we are about to go too fast. These changes tell us to slow down, to do something to stop ourselves from getting into the red area. Do you experience any warning signs before moving towards the red area? Some people experience headaches, feeling irritable, or wanting to be alone and not talk to anyone. Have the patient share what they experience when they are in the yellow area. You can write this down on the speedometer.

Healthcare professional: Just like a car, we can control our speed. Our goal is to stay in the green area. In a car the green area is the speed that is just right. You can go fast enough to get where you need to go but not too fast so that you can stay safe. The green area is when our body and mind feel calm and relaxed, you feel that you can concentrate and think clearly. You are not too slow like in the blue area or too fast like in the red area. When you are in the blue, yellow or red area, the nervous system is oversensitive, and this can contribute to pain.

Healthcare professional: What are things in your life that move you from the green area into the blue, yellow, or red area? It could be specific situations, like conflict with a family member, or it could be challenges in daily life like not having enough money or not working. Have the patient share.

Healthcare professional: What are things that you can do when you are in the yellow or red area to bring yourself back to the green area? This could be things like the muscle relaxation exercise, belly breathing, physical activity, going on a walk, talking with someone you trust, or cooking. Each person will have different things that will help them. What would help you move from the red or yellow area back to the green area? Have the patient share. Discuss these with the patient. Write them down on the speedometer.

Healthcare professional: What are things that you can do when you are in the blue area to bring yourself back to the green area? This could be things like the muscle relaxation exercise, belly breathing, physical activity, going on a walk, or doing something you enjoy like reading. Each person will have different things that will help them. What would help you move from the blue area back to the green area? Have the patient share. Discuss these with the patient. Write them down on the speedometer.

Healthcare professional: Now you have a better understanding of how to control your mind and body so that stress and challenges won't affect you so much. Take this speedometer home and keep it somewhere that you will see it often. It will help you remember how you can control your response to stress and challenges. Give patient the completed handout. Keep a copy of the handout in the patient's file. By being active in doing these things, you will help to keep your nervous system from becoming over sensitive again. And in this way, you can prevent pain and other problems. Do you have any questions or thoughts? Have the patient share.

Demonstrate this in a role play for the big group. Have the participants fill out a speedometer for themselves as you demonstrate this TNE.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

FUNCTIONAL TRAINING

Treatment Details – see more details above in session 7

Goals of treatment:

- Improve the patient's ability to function in daily life
- Decrease the sensitivity of the nervous system
- Decrease fear and avoidance of movement and functional activities
- Increase the strength and mobility required to do a specific functional activity
- Provide the patient with the opportunity to experience a variety of postures and movements and give them the ability to identify what is best for themselves at any given moment

Key points:

- Use the functional training handout that you completed with the patient during last session.
- Don't focus on pain. Focus on function.
- Explore different variations of postures and movement patterns when doing the functional activity and guide the patient to find what is most comfortable.
- Make sure to have the patient choose which step of the activity they can commit to doing nearly every day. You should not make the decision for them.
- Help the patient understand how short breaks with belly breathing can help calm the nervous system so that they can continue to do the functional activity

Here are the steps for the functional training treatment in this session. This is a progression from the functional training treatment completed in the previous session. See more details on how to complete these steps above in session 7.

1. Discuss with the patient what they experienced when doing the step of the functional activity at home
2. Have the patient decide the step of the activity that they will now do at home
3. Do the step of the activity that the patient selected
4. Have the patient set the home activity plan for this step

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INTERVALS OF MEDIUM INTENSITY PHYSICAL ACTIVITY

Treatment Details:

Goals of treatment:

- Understand physical activity, its benefits, and the physical activity recommendations
- Learn how to use belly breathing while being active
- Experience participating in medium intensity physical activity without significant pain or other problems
- Experience noticing the positive physical changes that happens during medium intensity physical activity like increased heart rate, heavy breathing, and sweating
- Understand the talk test and practice using it
- Develop a realistic plan for including regular medium intensity physical activity into their daily life

Key points:

- Make sure to discuss the plan for physical activity at home with the patient. They should set a realistic goal. Starting with a small amount of physical activity is ok. The goal is to get the patient moving more and starting to be more physically active.
- You want to help the patient be able to independently move at a medium intensity. This means that you should help them understand how they can use the talk test and how they can modify an activity.
- Make sure to select an activity that the person can achieve medium intensity physical activity without significant pain or other problems

Healthcare professional: Last time we talked about the recommendation for physical activity. Do you remember how many minutes of physical activity every adult should do? Have the patient share. The recommendation is that all adults do at least 150 minutes of medium intensity physical activity per week. But we also talked about how it may be difficult to do this amount right now. So, our goal was to move more. You had ideas of how you could move more in your daily life. Were you able to do any of these? Do you feel that you moved more since last treatment session? Have the patient share. Use the handout that the patient completed during the last session to guide this discussion. What challenges did you have to moving more? Have the patient share. Discuss solutions to the challenges.

Healthcare professional: We are going to continue to do medium intensity physical activity in our treatment sessions. We are progressively increasing the amount of time that you do so that it will be easier for you to do physical activity and to move more in your daily life.

Perform 5 to 7 minutes of medium intensity physical activity. You can change the method of physical activity that you have done so the patient can experience something new. Guide the patient to use the talk test to determine if they are moving at a medium intensity. Guide the patient to think about how to increase or decrease the challenge as needed to keep the level at medium intensity.

After the physical activity, ask the patient to perform belly breathing in sitting or standing until their breathing returns to normal.

Repeat this cycle at least 2 times. Guide the patient to become independent in using the talk test and changing the physical activity to maintain a medium intensity.

Healthcare professional: You just did a total of ____ minutes of physical activity. Do you think you could do this same physical activity at home? Discuss with the patient. Have the patient set the plan for the home activity plan.

STRENGTHENING AND STRETCHING EXERCISES

Treatment Details – See more details in session 7

Goals of treatment:

- Improve the patient's strength and mobility to better perform functional activities in daily life
- Teach the patient exercises that can be used to prevent and manage pain at home
- Improve body awareness and the patient's ability to differentiate normal physical sensations from pain
- Decrease the sensitivity of the nervous system
- Decrease fear and avoidance of movement, activity, and exercise
- Introduce exercises into the home activity plan

Key points:

- Progress the exercises if the patient had a good response from the previous session
- Make sure to educate the patient about normal muscle soreness
- Select exercises based on the patient's physiotherapy problems
- Select some exercises for doing in the clinic and select some exercises for doing at home
- Make sure that the patient breathes during the exercises
- To increase body awareness, ask the patient questions about what they are feeling in their body as they are doing the exercises

Ask the patient to share what they experienced when performing the strengthening and stretching exercises at home. Discuss any challenges that they had. This is an important opportunity to assess if the patient continues to have any unhelpful thoughts or beliefs that are making them avoid exercise, movement, or physical activity.

If the patient had a good response to the stretching and strengthening exercises in the last session, you can progress the same exercises. You can progress the exercises by increasing the number of repetitions, increasing the resistance or weight, increasing the time, increasing the speed of the movement, etc.

If the patient had difficulties with the exercises, like significant pain or avoidance of the exercise, then maintain the same exercise or change them to be more appropriate. In this situation, you should not progress the exercises to increase the level of difficulty.

You can also include other exercises to address any remaining physiotherapy problems like poor balance. Review the patient's treatment plan and reassessment of goals that you completed during session this session to determine if any additional exercises should be included.

HOME ACTIVITY PLAN

Treatment Details - See details above in the description for session one

- The home activity plan involves developing a plan that is meaningful to the patient and that will provide them with ways to manage pain and improve function in their daily life. Make sure to write down the plan in your documentation so you can follow up during the next session.

SESSION 9

Session 9 should include the following treatments:

- Check-in
- TNE: The common cold
- Functional training
- Intervals of medium intensity physical activity
- Strengthening and stretching exercises
- Home activity plan

CHECK-IN

Treatment Details - See details above in the description for session one
The check-in involves discussing the following two questions with the patient.

1. What has gone well since the last time we met?
2. How did the home activity plan go?

TNE: THE COMMON COLD

Treatment Details:

Goals of the treatment – The Common Cold

The “The Common Cold” TNE aims to help the patient understand the following points:

- Pain is always a decision by the brain
- Pain is not a reliable way to judge the amount of tissue damage or injury
- Biological, social, and psychological factors contribute to how and when a person experiences pain
- Pain is not permanent - Our biology can change

Key points –The Common Cold

- At the end of the TNE, have the patient summarize what they understand. This TNE brings together many of the key points from other TNE. So, the patient’s summary will allow you to assess their comprehension of the key facts about pain.

Healthcare professional: Have you had periods of time in the past where you had pain, like in your back or neck but then it just went away on its own? Have the patient share. These episodes of pain are very normal. All people experience them. Episodes of pain are similar to the common cold. Do all people experience a cold at some point in their life? Patient: Yes

And most people experience the common cold many times throughout their lives, right? Patient: Yes. This is just like having episodes of pain. It is normal to have physical pain multiple times throughout your life. When you have a cold, does it usually go away with time? Patient: Yes. This is also true for episodes of pain. If we take care of our body, the pain will go away with time.

Healthcare professional: If we remember what we have learned about pain, do you think that these episodes of pain indicate an injury to the body? Patient: No. Pain doesn’t always mean that there is an injury. Exactly. Having episodes of pain does not mean that there is an injury in the body. It is similar to having the common cold. For example, the symptoms of the common cold do not indicate that someone has something serious that requires a lot of medical treatment, like cancer. The common cold is just a simple everyday problem that resolves if you take care of yourself. Episodes of pain are also a simple everyday problem that can resolve if you take care of yourself.

Healthcare professional: When you have an episode of pain, what have we learned could help resolve this? Have the patient share. Help them understand how all of exercises and techniques that they have learned in the treatment sessions will be helpful when they have an episode of pain. All of those things are ways that you can help take care of an episode of pain. Exercises and movement will help the pain resolve with time.

Healthcare professional: How would you summarize what we just discussed? Have the patient summarize this as it will allow you to see if they have healthy thoughts and beliefs about pain.

Demonstrate this in a role play for the big group.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

FUNCTIONAL TRAINING

Treatment Details – see more details above in session 7

Goals of treatment:

- Improve the patient's ability to function in daily life
- Decrease the sensitivity of the nervous system
- Decrease fear and avoidance of movement and functional activities
- Increase the strength and mobility required to do a specific functional activity
- Provide the patient with the opportunity to experience a variety of postures and movements and give them the ability to identify what is best for themselves at any given moment

Key points:

- Use the functional training handout that you completed with the patient during last session.
- Don't focus on pain. Focus on function.
- Explore different variations of postures and movement patterns when doing the functional activity and guide the patient to find what is most comfortable.
- Make sure to have the patient choose which step of the activity they can commit to doing nearly every day. You should not make the decision for them.
- Help the patient understand how short breaks with belly breathing can help calm the nervous system so that they can continue to do the functional activity

Here are the steps for the functional training treatment in this session. This is a progression from the functional training treatment completed in the previous session. See more details on how to complete these steps above in session 7.

1. Discuss with the patient what they experienced when doing the step of the functional activity at home
2. Have the patient decide the step of the activity that they will now do at home
3. Do the step of the activity that the patient selected
4. Have the patient set the home activity plan for this step

INTERVALS OF MEDIUM INTENSITY PHYSICAL ACTIVITY

Treatment Details:

Goals of treatment:

- Understand physical activity, its benefits, and the physical activity recommendations
- Learn how to use belly breathing while being active
- Experience participating in medium intensity physical activity without significant pain or other problems
- Experience noticing the positive physical changes that happens during medium intensity physical activity like increased heart rate, heavy breathing, and sweating
- Understand the talk test and practice using it
- Develop a realistic plan for including regular medium intensity physical activity into their daily life

Key points:

- Discussing the patient's experience with medium intensity physical activity at home is important to helping them move more and be more physically active.
- Make sure to discuss the plan for physical activity at home with the patient. They should set a realistic goal. Starting with a small amount of physical activity is ok. The goal is to get the patient moving more and starting to be more physically active.
- You want to help the patient be able to independently move at a medium intensity. This means that you should help them understand how they can use the talk test and how they can modify an activity.
- Make sure to select an activity that the person can achieve medium intensity physical activity without significant pain or other problems

Discuss physical activity with the patient. You can use the following questions:

- Have you been able to do medium intensity physical activity in your daily life?
- Have you been able to move more? What are simple things that you are doing in your daily life to move more?
- What is going well?
- What challenges do you have?

Healthcare professional: We are going to continue to do medium intensity physical activity in our treatment sessions. We are progressively increasing the amount of time that you do so that it will be easier for you to do physical activity in your daily life.

Perform 7 to 10 minutes of medium intensity physical activity. You can change the method of physical activity that you have done so the patient can experience something new. Guide the patient to use the talk test to determine if they are moving at a medium intensity. Guide the patient to think about how to increase or decrease the challenge as needed to keep the level at medium intensity.

After the physical activity, ask the patient to perform belly breathing in sitting or standing until their breathing returns to normal.

Repeat this cycle at least 2 times. Guide the patient become independent in using the talk test and changing the physical activity to maintain a medium intensity.

Healthcare professional: You just did a total of ____ minutes of physical activity. Do you think you could do this same physical activity at home? Discuss with the patient. Have the patient set the plan for the home activity plan.

STRENGTHENING AND STRETCHING EXERCISES

Treatment Details – See more details in session 7 and 8

Goals of treatment:

- Improve the patient's strength and mobility to better perform functional activities in daily life
- Teach the patient exercises that can be used to prevent and manage pain at home
- Improve body awareness and the patient's ability to differentiate normal physical sensations from pain
- Decrease the sensitivity of the nervous system
- Decrease fear and avoidance of movement, activity, and exercise
- Introduce exercises into the home activity plan

Key points:

- Progress the exercises if the patient had a good response from the previous session
- Make sure to educate the patient about normal muscle soreness
- Select exercises based on the patient's physiotherapy problems
- Select some exercises for doing in the clinic and select some exercises for doing at home
- Make sure that the patient breathes during the exercises
- To increase body awareness, ask the patient questions about what they are feeling in their body as they are doing the exercises

HOME ACTIVITY PLAN

Treatment Details - See details above in the description for session one

- The home activity plan involves developing a plan that is meaningful to the patient and that will provide them with ways to manage pain and improve function in their daily life. Make sure to write down the plan in your documentation so you can follow up during the next session.

SESSION 10

Session 10 should include the following treatments:

- Check-in
- Intervals of medium intensity physical activity
- Strengthening and stretching exercises
- Reassess goals
- TNE: Health Plan
- End treatment if appropriate

CHECK-IN

Treatment Details - See details above in the description for session one
The check-in involves discussing the following two questions with the patient.

1. What has gone well since the last time we met?
2. How did the home activity plan go?

INTERVALS OF MEDIUM INTENSITY PHYSICAL ACTIVITY

Treatment Details:

Goals of treatment:

- Understand physical activity, its benefits, and the physical activity recommendations
- Learn how to use belly breathing while being active
- Experience participating in medium intensity physical activity without significant pain or other problems
- Experience noticing the positive physical changes that happens during medium intensity physical activity like increased heart rate, heavy breathing, and sweating
- Understand the talk test and practice using it
- Develop a realistic plan for including regular medium intensity physical activity into their daily life

Key points:

- Discussing the patient's experience with medium intensity physical activity at home is important to helping them move more and be more physically active.
- Make sure to discuss the plan for physical activity at home with the patient. They should set a realistic goal. Starting with a small amount of physical activity is ok. The goal is to get the patient moving more and starting to be more physically active.
- You want to help the patient be able to independently move at a medium intensity. This means that you should help them understand how they can use the talk test and how they can modify an activity.
- Make sure to select an activity that the person can achieve medium intensity physical activity without significant pain or other problems

Discuss physical activity with the patient. You can use the following questions:

- Have you been able to do medium intensity physical activity at home?
- Have you been able to move more? What are simple things that you are doing in your daily life to move more?
- What is going well?
- What challenges do you have?

Healthcare professional: We are going to continue to do medium intensity physical activity in our treatment sessions. We are progressively increasing the amount of time that you do so that it will be easier for you to do physical activity in your daily life.

Perform 8 - 12 minutes of medium intensity physical activity. You can change the method of physical activity that you have done so the patient can experience something new. Help the patient use the talk test to determine if they are moving at a medium intensity. Help the patient think about how to increase or decrease the challenge as needed to keep the level at medium intensity.

After the physical activity, ask the patient to perform belly breathing in sitting or standing until their breathing returns to normal.

Healthcare professional: You just did a total of ____ minutes of physical activity. Do you think you could do this same physical activity at home? Discuss with the patient. Have the patient set the plan for the home activity plan.

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STRENGTHENING AND STRETCHING EXERCISES

Treatment Details – See more details in session 7 and 8

Goals of treatment:

- Improve the patient's strength and mobility to better perform functional activities in daily life
- Teach the patient exercises that can be used to prevent and manage pain at home
- Improve body awareness and the patient's ability to differentiate normal physical sensations from pain
- Decrease the sensitivity of the nervous system
- Decrease fear and avoidance of movement, activity, and exercise
- Introduce exercises into the home activity plan

Key points:

- Have the patient select strengthening and stretching exercises that they will continue to do at home
- Make sure to educate the patient about normal muscle soreness
- Select exercises based on the patient's physiotherapy problems
- Select some exercises for doing in the clinic and select some exercises for doing at home
- Make sure that the patient breathes during the exercises
- To increase body awareness, ask the patient questions about what they are feeling in their body as they are doing the exercises

Have the patient select which stretching and strengthening exercises they will continue to do at home, after the treatment is complete. Do the following steps to achieve this:

1. List all of the exercises that the patient has done at home during all of the treatment sessions. Use the exercise handouts as references.
2. Ask the patient to select which ones they think will be most beneficial for them to continue to do regularly. Guide them to pick ones that will be realistic for them to do regularly.
3. Have the patient demonstrate how to do the exercises they selected. Make sure the patient does the exercise just as they would at home including the same number of repetitions, weight, etc.
4. Provide the patient with a handout with the selected exercises.

REASSESS GOALS

Treatment Details – See details above in the description for session four

Goals of the treatment – Reassess Goals

- Assess progress - what is improving and what is not improving
- Help the patient recognize their improvements and what they need to continue to work on
- Gather information to make the treatment plan specific to the needs of the patient – The results of the goal reassessment will help you determine if this is the last treatment session.

Key points – Reassess Goals

Use the patient's assessment form. Go to the section of the treatment plan called "Goals – Based on Outcome Measures." You completed this section after the assessment and during treatment session 4. Now, you will re-test for all of the goals that were included in this patient's treatment plan. All patients will have the following goals for you to re-test:

- Sit to Stand Test – Total Time
- Pain Self-efficacy Questionnaire – Total Score
- During the past month, how would you rate your sleep quality overall?
- At least once a week, do you do any regular activity long enough to work up a sweat? – Number of hours
- Activity 1
- Activity 2
- Activity 3

If you are treating nociplastic pain and changes, then you also have the Central Sensitization Inventory to re-test.

For the re-assessment, you will complete it just as you did during the initial assessment. Refer back to part 3 to recall how to administer each of these outcome measures.

After you have completed the reassessment of goals, discuss the following information with the patient:

- Improvements on goals
- What goals have been achieved and what that means
- What goals still need to be worked on
- If ending treatment is appropriate
- Do they feel comfortable continuing to work on the remaining goals on their own at home

TNE: HEALTH PLAN

Background Information:

Health plans are often called coping plans. Health plans are used in many fields of healthcare including for managing chronic disease, pain, cancer symptoms, and mental health problems. A health plan is a plan that the patient creates so that they can control the symptoms of their health condition. For people with pain, a health plan serves the following purposes:

- Guides the patient to continue to do activities that decrease the sensitivity of the nervous system – As reversing nociplastic changes takes time, it is important that the patient continues to do activities that work to decrease the sensitivity of the nervous system. During the last treatment session, the patient may not be pain-free, but they should be able to function in their daily and have the skills to control pain. The health plan is a way to help the patient make a plan to continue the healing process so they will become pain-free.
- Helps the patient know that they have ways to manage pain if pain increases at any point – A patient must know that they can manage pain on their own and that an increase in pain does not indicate tissue damage. The health plan helps the patient know what to do if pain increases so that they will not develop fear and avoidance behaviors which would make the pain worse.
- Maintain behavior change – Recall that in session 1 of this treatment manual, we discussed the stages of change that all humans go through when trying to change a behavior. Maintaining changes in behavior, like increased levels of physical activity, is difficult. Research has shown that if a person has a plan on how to maintain behaviors, then they are more likely to continue to do healthy behaviors over time.

The health plan includes pictures for the following areas: be physically active, eat healthy, sleep well, be social, and be calm. Research has shown that if a person is able to do regular activities in each of these areas, then the sensitivity of the nervous system is reduced, and in this way, pain can be reduced and controlled. Here are some examples of healthy activities that can prevent and reduce pain in these five healthy behavior areas:

- Be physically active: As we have discussed, regular physical activity reduces pain. You have discussed this a lot with the patient. The patient should already have plans on how to move more, what exercises to do, and how to do medium intensity physical activity. Include these on the health plan.
- Eat healthy: Research has shown that a healthy diet contributes to decreased pain. Specifically, here are some recommendations related to pain: drink 2 liters of water per day, eat fruits and vegetables, and avoid pre-packaged foods and drinks with sugar as they have ingredients that cause inflammation in the nervous system.
- Sleep well: As we have discussed, sleep has a significant impact on pain. You have already discussed healthy sleep habits with the patient. For the health plan, have the patient identify what sleep habits they will start, stop, and continue.
- Be social: Research has shown that people with strong social support have decreased rates of persistent pain. Often pain can disrupt a person's normal social activities and make it difficult for them to continue social activities like picnics and visits to the houses of family and friends. But it is important for people to maintain healthy social relationships as this decreases the sensitivity of the nervous system. For the health plan, have the patient identify what they will do to have positive social relationships.
- Be calm: This is related to managing stress levels. You have discussed this with patient using the lion TNE and the speedometer TNE. Research shows that people that are able to control their response to stress and challenges, have less persistent pain. For the health plan, have the patient identify the things they can do to remain calm and healthy even when they face challenges in their daily life.

Treatment Details:

Goals of the treatment – Health Plan

The “Healthy Plan” TNE aims to help the patient understand the following point:

- They can do things in their daily life to prevent pain and control pain
- Biological, social, and psychological factors contribute to how and when a person experiences pain
- Pain is not permanent - Our biology can change

Key points –Health Plan

- Support the patient to make decisions on what is best for them – The patient will be more likely to implement this plan successfully if they created it, rather than you creating it for them.
- Do not recommend activities for the plan that are not realistic for the patient.

Healthcare professional: We will create a plan so that you can continue to take control of your pain. This plan will include things that you can do to continue to decrease the sensitivity of the nervous system, so that over time the pain will decrease even more. Also, this plan will help you be able to continue to do the functional activities in your daily life. Throughout these treatment sessions, you have learned a lot of techniques and ways to manage and prevent pain. But it can often be difficult to start doing healthy behaviors even if you know that they are good for you. One thing that can help people start and maintain healthy behaviors is the making of a plan. So, I am going to guide you to make a health plan.

Give the patient the handout. You can see the pictures on the top of the paper. The pictures represent five healthy behaviors that help control pain and help you maintain your ability to do the activities in your daily life. What do you think each picture represents? Discuss with the patient. The pictures from left to right represent the following: be physically active, eat healthy, sleep well, be social, and be calm. Share example of healthy behaviors from each area so that they can understand the five areas.

Healthcare professional: You want to think of what changes you can make in your daily life so that you can control and prevent pain. You want to think of what changes you can make so that you are following the five healthy behaviors. You are going to think of what to keep doing, what to stop doing, and what to start doing. What to keep doing are things that you are already do that help you control pain and remain active and functional in your daily life. For example, maybe you go on a walk most evenings or you do relaxation exercises almost every night. What to stop doing are things that you could stop or decrease to better control pain. For example, you can stop being inactive at night. Or you could stop using your phone in bed because it is making it difficult for you to fall asleep. What to start doing are new things that you can add to your daily life. For example, you could start walking at a medium intensity every day for 10 minutes or start doing a few of the strengthening and stretching exercises most days of the week.

Write down at least 5 things in each of the three areas. Think back to all of the different things you have learned in the treatment. Also consider things from each of the five healthy behaviors as they are proven to help control pain. Support the patient to complete this activity. You can discuss ideas with the patient but make sure they select what is best for them. The patient should select things that are realistic for them to do. If the patient doesn't know how to write, you can write for them. Or you can have them draw a picture or something else that will remind them of each item. Have the patient take the completed handout home with them. Keep a copy for yourself in the patient's file.

Demonstrate this in a role play for the big group. Have the participants complete the health plan for themselves as you demonstrate the TNE.

Do small group role play. The participants should read the script to themselves and then use it as they are doing the role play.

Have everyone return to their seats. As a large group, have some participants share what they observed during the role play. Use this as an opportunity to emphasize the key points and to correct any misunderstandings.

END TREATMENT IF APPROPRIATE

Background Information:

The overall goal of last phase of a treatment is as important as the assessment and the actual treatment. The patient will very soon be on their own and it is therefore essential that we make sure that they feel empowered to be so.

Treatment Details:

Goals of treatment – End Treatment if Appropriate

- The goal of this is to discuss with the patient about if it is appropriate to end treatment

Key points – End Treatment if Appropriate

- To determine if it is appropriate to end treatment, consider the following:
 - Did the patient achieve the goals per the treatment plan?
 - Is the patient confident that they can do the health plan to maintain their ability to function in daily life?
 - Does the patient feel comfortable ending treatment, or would they prefer to continue treatment?
 - Is it possible to continue treatment?
 - Does the patient have any unhealthy beliefs or thoughts that will contribute to the pain experience?

Discuss this decision with the patient. It should be a decision that you come to together. It would be appropriate to continue treatment if: 1) the goals are not yet met, 2) the patient continues to require support to do activities in the health plan like regular physical activity and exercise, 3) the patient would like to continue, and/or 4) the patient still has unhealthy beliefs and thoughts that may lead to avoiding activities and not implementing the health plan.

It is not appropriate to continue treatment just because the patient has pain. As we know, it can take months to years to completely reverse nociceptive changes that contribute to nociceptive pain.

If the decision is to continue treatment, then develop a treatment plan for the patient. The focus for the new treatment plan should be on the patient gaining independence in their health plan, progressing medium intensity physical activity, and progressing strengthening and stretching exercises. If the patient continues to have difficulties with functional activities, then additional functional training is appropriate. If the patient continues to have unhealthy beliefs and thoughts that are contributing to the pain experience, then it is appropriate to integrate TNE into the treatment plan.

Often patients may find it helpful to continue to come to treatment sessions in order to maintain a physical activity and exercise routine. If possible, you can provide this, or work with the patient to find a way to access this type of service. For example, the patient could use a fitness trainer in a gym.

If the treatment is ending, make sure to discuss with the patient when and if they should return to see you. For example, if the patient has a sudden increase in pain and they are having difficulty controlling it, it could be beneficial to come see you for a few treatment sessions. Or if the patient is unable to follow their health plan, including maintaining physical activity and function in their daily life, they should come see you for support.

ADDITIONAL LEARNING RESOURCES

- Video – Coping with Chronic pain: <https://www.youtube.com/watch?v=KwGMWTUFu0c>
- Video – Making coping plans: https://www.youtube.com/watch?v=gbGl6RsnV_k&t=58s

TREATMENT MANUAL – NEUROPATHIC PAIN AND CHANGES

This treatment manual is designed to treat neuropathic pain and changes. You may have to modify it for the context that you work in. Here are some general recommendations for applying this treatment manual:

- Use the form called “Treatment documentation for nociplastic and/or neuropathic pain and changes.” This document provides an outline of what treatments should be included in each treatment session. It also guides you to record important information about the patient during every treatment session.
- The physiotherapy treatments for nociplastic pain and neuropathic pain are very similar. So, this manual only provides some additional background about neuropathic pain and a neuropathic pain TNE. You can use the nociplastic pain treatment manual to provide the other treatments for neuropathic pain and changes.
- The treatments as described on the “Treatment documentation for nociplastic and/or neuropathic pain and changes” are in a very specific order. The order of the treatments is based on research. So, it is best to keep the order of these treatments as described in the form.
- If you don’t have time to do all of the treatments recommended for a specific session, then do the treatments in the following session. You don’t want to skip treatments. So, it will be more effective to spread the content of the treatments over more than the 10 sessions.
- Make sure you are prepared before each treatment session. This means that you are comfortable providing each treatment, you have the resources you need to do each treatment, and you have the information you need to focus the treatment on the patient’s specific needs.
- Neuropathic pain and changes take time to reverse. Therefore, it may be best to do one session per week over a span of 10 weeks. However, you will have to decide what is best in your context and for each patient.

Background Information About Neuropathic Pain:

Remember that neuropathic pain is pain associated with damage or disease to the central or peripheral nervous system. Because of this, there are some important considerations when treating neuropathic pain and changes that we will summarize here.

1. Nerves do heal following damage. The nerve will heal by creating new axons which can restore the motor and sensory functions of the nerve. But this is a slow process. Nerves grow at the rate of about 2.5cm per month. Also, the new growth does not always make the correct corrections with other nerves so sometimes the sensory and motor functions of the nerve are not restored fully. If there is an ongoing disease process, like diabetes or multiple sclerosis, then it will be difficult for the nerves to heal fully as they continue to be damaged from the disease. But this does not mean that a person with damage or disease of the nerves will have continued pain. With treatment, the person can be pain-free, but they may have continued symptoms like decreased sensation, discomfort, and mild muscle weakness.

2. The goal of treatment for neuropathic pain and changes is to decrease neuropathic pain and to improve the person’s ability to function in daily life. Some changes to the nervous system may remain and this can cause symptoms like decreased sensation and discomfort. But with treatment and time, people with neuropathic pain and changes can be pain-free. Also, treatment should help the patient learn ways to manage when they have an episode of pain so that they can continue to do the activities in their daily life.

3. Increased sensitivity of the nervous system contributes to neuropathic pain. Remember from part 2, that the following are neuropathic changes that increase the sensitivity of the nervous system:

- Activation of action potentials with little or no stimulus
- Abnormal activity in axons that are not directly involved in the nervous system damage or disease
- Activation of immune cells in the area around the damage
- Increased effectiveness of danger neural pathways

In addition to these changes, changes in the myelin of the nerves can contribute to increased sensitivity of the nervous system. Myelin is the covering on the nerve that helps the electrical signals move quickly across the nerve. Disease of the nervous system and injuries to the nerves often result in the myelin becoming damaged or absent in areas of the nerve. When myelin is damaged, the body automatically builds sensors in the areas where there is no myelin. More sensors result in more action potentials. So, in this way, when myelin is damaged, there are more sensors that the brain can use to produce more danger messages that can be sent to the brain. All of these changes in the nervous system result in allodynia and hyperalgesia in and around the area that the nerve supplies.

As we know, many other things can also contribute to increased sensitivity of the nervous system, including thoughts, beliefs, emotions, and body information. So, just like in nociplastic pain, it is important to treat the many factors contributing to pain through the use of TNE, physical activity, exercises, active movement of an area of pain, and relaxation exercises.

4. Medium intensity physical activity has a positive effect on neuropathic pain and changes and on a persons' ability to function in daily life. Medium intensity physical activity has been shown to improve sensory and motor functions of damaged nerves and to improve the healing of damaged nerves. These improvements result in decreased symptoms of pain, numbness, and tingling. Also, in conditions where nerves can continue to degenerate, like with diabetic neuropathy and multiple sclerosis, medium intensity physical activity has been shown to reduce the speed of nerve degeneration. Lastly, regular medium intensity physical activity also improves other factors that may be contributing to neuropathic pain and changes like emotions and avoidance behaviors.

5. Strengthening exercises that get progressively more difficult have a positive effect on neuropathic pain and changes and a person's ability to function. Research has shown that progressive strengthening programs result in decreased symptoms of neuropathic pain. Also, they result in an improved ability to function in daily life. Strengthening exercises also contribute to increased health and function of nerves that are damaged or have disease.

6. If neuropathic pain and changes are in the feet and legs, then it is important to include balance exercises in the treatment plan. Neuropathic pain and changes, as well as decreased motor and sensory function of nerves, contributes to poor balance and increases the risk of falls. Poor balance and a high fall risk are associated with high rates of disability. So, improving balance is essential to helping a person have the ability to function in daily life.

7. For people with neuropathic pain and changes, you can use the same process and guidelines as nociplastic pain for selecting and progressing exercises, doing active movement of an area, and doing physical activities. See the nociplastic pain and changes treatment manual for more details.

8. Therapeutic neuroscience education is an effective treatment for neuropathic pain. You can use the same TNE that are included in the nociplastic pain and changes treatment manual. But you may need to modify some of the TNE to be specific to neuropathic pain and changes. If you have a good understanding of the content that was described about neuropathic pain in part 2 and here in this manual, then you will be able to easily modify the TNE.

9. Improving sleep decreases neuropathic pain and changes. Neuropathic pain often contributes to poor sleep. And in turn, poor sleep makes neuropathic pain worse and contributes to increased disability associated with neuropathic pain. So, it is important that treatment works to help a patient to return to healthy sleep.

10. As neuropathic pain is complex, it requires a multidisciplinary approach. This means that healthcare professionals from different fields should work together to treat a person with neuropathic pain and changes. Here are some key points for the multidisciplinary treatment of neuropathic pain:

- a. If possible, treat the disease that is contributing to neuropathic pain and changes. For example, uncontrolled diabetes contributes to diabetic peripheral neuropathy. So, a healthcare professional should work with the patient to control blood glucose levels through medications, diet, and physical activity. If blood glucose levels are controlled and remain in a normal range, then the nerve will stop being damaged. Many of the nerves may even heal which will reduce symptoms.
- b. If a nerve is cut completely into two parts, like what can happen in a car accident or gunshot injury, surgery to repair the nerve is appropriate so that motor and sensory function can be restored. Neuropathic pain is common after this surgery but may resolve as the nerve heals and as the person participates in active treatments.
- c. Medications can be important for decreasing neuropathic pain. But research shows that medications alone are not as effective for treating neuropathic pain as when combined with active treatments. It is outside the scope of this manual to provide details on the medications. But it is important to recognize the role of medications in treating neuropathic pain. If you have a patient with neuropathic pain, it is best to work with a physician that can prescribe appropriate medications. For your reference, treatment guidelines provide the following recommendations for medications for treating neuropathic pain:

Recommendation	Medications
First option	<ul style="list-style-type: none"> • SNRI - duloxetine, venlafaxine • Tricyclic antidepressants • Gabapentin, pregabalin
Second option	<ul style="list-style-type: none"> • Capsaicin 8% patches • Lidocaine (lignocaine) patches

If the patient is interested in medications, they should work with a physician that is familiar with research-based guidelines for neuropathic pain. Patients should try the first options of medication, in combination with active treatments. If the patient continues to struggle with pain after completing the treatment described in this manual, the second option of medications can be explored, in combination with ongoing active treatment.

Opioids, including tramadol, should be avoided. Opioids are highly addictive, so they have many risks to the patients including unhealthy addiction, disability, and death from overdose. Additionally, opioids have been shown to increase neuropathic changes and to increase the sensitivity of the nervous system.

11. It is normal for people to have episodes of pain. So, it is important for the patient to develop ways to cope with episodes of pain and to remain functional in their daily life. Activities that can be helpful in decreasing pain and its effects on daily life include massage, yoga, breathing exercises, exercise classes, and acupuncture. But each person has to explore the options and find what works best for them.

12. Some passive treatments may help patients with neuropathic pain and changes.

- Any passive treatment that does deep heat is not recommended. So, ultrasound, laser, and short-wave diathermy are not recommended as they have a negative effect on the nerve.
- Research has explored if massage is helpful for people with neuropathic pain. But the research is not yet able to make a clear conclusion. So, the recommendation is that people with neuropathic pain can try massage. If they get benefit from massage, they can choose to continue to use this treatment.
- Research has explored if transcutaneous electric nerve stimulation, also known as TENS, is effective for treating neuropathic pain. But the research is not yet able to make a clear conclusion. So, the recommendation is that people with neuropathic pain can try TENS. If they get benefit from TENS, they can choose to use a TENS unit designed for use at home.
- Neurodynamic exercises are specific exercises that aim to move and stretch the nerves in specific patterns. Research has shown these to be effective for reversing neuropathic changes and for decreasing the sensitivity of the nervous system. If you have the skills to provide this treatment, you can integrate these exercises into a treatment plan for someone with neuropathic pain and changes.

TNE: NEUROPATHIC PAIN – SESSION ONE

Treatment Details:

Goals of the treatment - TNE: Neuropathic Pain

The “Neuropathic Pain” TNE aims to help the patient understand the following points:

- Biological, social, and psychological factors contribute to how and when a person experiences pain
- Pain is not permanent - Our biology can change

Key points – TNE: Neuropathic pain

- Make the information specific to the patient’s situation. Be prepared to describe the following for each patient:
 - What results on the assessment indicate neuropathic pain
 - How the nerves were changed for this patient
 - The symptoms that the patient experiences that are caused by neuropathic pain and changes

Healthcare professional: Based on the results of the assessment, you have a type of pain called neuropathic pain. This type of pain is caused by changes to nerves. We have over 400 nerves in the body. They are like electrical wires that carry messages to and from our body and brain. Use picture of the nervous system. Nerves carry information from our body about how we move, the temperature of the room and in that area of our body, the chemicals and hormone levels in the body, and many other things. This information gets sent to the brain and the brain decides how to use it. The brain also controls our body through the nerves. Messages from the brain are sent through nerves and this is how we move our body, how the immune system fights infections, and how hormone levels are controlled.

With neuropathic pain, some nerves are changed and are not working normally. In your case, the nerves are not working normally because _____. Provide details specific to the patient’s situation. There is no surgery or medications that reverse these changes in the nerves. But nerves do heal on their own. It takes time for nerves to heal as nerves grow back at a rate of 2.5 cm per month. Through active movement and other techniques, we can help the nerves grow back and we can help reverse many of the changes in the nerves that are contributing to your pain.

Even if the nerves do not grow back fully or heal completely, this does not mean that you have to have pain. Sometimes people will have some numbness, weakness, or discomfort from a nerve that continues to be damaged. But with treatment, we can reduce the pain that you are experiencing. As we will discuss more today and in future treatment sessions, other things also contribute to the pain you are experiencing. For example, decreased movement of the painful area will make the nerves less likely to heal and will also contribute to increased pain and symptoms. So, the treatment we do together will work on helping the nerves heal and will also address all of the other things that are contributing to your pain.

The goal of the treatment is to improve your ability to function in daily life. And with time and if you follow the recommendations for home activities, the changes in the nerve will improve. You have the power to heal your nerves and to treat your pain.

All other treatments for neuropathic pain are described in the nociplastic pain treatment manual.

Developed by Dr. April Gamble DPT, PT

Director of ACR - The American Center for Rehabilitation



TREATMENT DOCUMENTATION – NOCIPLASTIC AND/OR NEUROPATHIC PAIN AND CHANGES

Every time you see the patient, you should document on the table below.

Patient Name: _____

Date of assessment: _____

Lead physiotherapist for this patient: _____

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
1			<input type="checkbox"/> Check-in <input type="checkbox"/> TNE: <i>Neuropathic Pain (if it applies)</i> <input type="checkbox"/> TNE: Stepping on a Nail <input type="checkbox"/> Sensory discrimination <input type="checkbox"/> Belly breathing <input type="checkbox"/> Finding comfort in sitting <input type="checkbox"/> Home activity plan <input type="checkbox"/> Passive treatments (only if requested)		
	Home Activity Plan:				
2			<input type="checkbox"/> Check-in <input type="checkbox"/> TNE: Temperature warning light <input type="checkbox"/> Sensory discrimination <input type="checkbox"/> TNE: Stuck window <input type="checkbox"/> Active movement of an area with pain <input type="checkbox"/> Square breathing <input type="checkbox"/> Home activity plan <input type="checkbox"/> Passive treatments (only if requested)		
	Home Activity Plan:				

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
3			<input type="checkbox"/> Check-in <input type="checkbox"/> TNE: Cross chart <input type="checkbox"/> TNE: Lion <input type="checkbox"/> Active movement of an area with pain – progress <input type="checkbox"/> Finding comfort in laying down <input type="checkbox"/> Muscle relaxation <input type="checkbox"/> Home activity plan <input type="checkbox"/> Passive treatments (only if requested)		
Home Activity Plan:					
4			<input type="checkbox"/> Check-in <input type="checkbox"/> Reassess goals <input type="checkbox"/> TNE: Cup of water <input type="checkbox"/> TNE: Factors contributing to sensitivity <input type="checkbox"/> Muscle relaxation <input type="checkbox"/> Active movement of an area with pain – progress <input type="checkbox"/> Home activity plan	*Summarize results of reassessment of goals*	*Summarize results of reassessment of goals*
Home Activity Plan:					

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
5			<input type="checkbox"/> Check-in <input type="checkbox"/> TNE: Wrinkles <input type="checkbox"/> TNE: The electrical system <input type="checkbox"/> Active movement of an area with pain – progress <input type="checkbox"/> Intervals of medium intensity physical activity <input type="checkbox"/> TNE: Sleep and Pain <input type="checkbox"/> Body scan <input type="checkbox"/> Home activity plan		
Home Activity Plan:					
6			<input type="checkbox"/> Check-in <input type="checkbox"/> TNE: Posture <input type="checkbox"/> Finding comfort in standing <input type="checkbox"/> Functional training <input type="checkbox"/> TNE: Sounds in the Joint <input type="checkbox"/> Intervals of medium intensity physical activity <input type="checkbox"/> Body scan <input type="checkbox"/> Home activity plan		
Home Activity Plan:					

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
7			<input type="checkbox"/> Check-in <input type="checkbox"/> Functional training <input type="checkbox"/> Intervals of medium intensity physical activity <input type="checkbox"/> TNE: Sleep Habits <input type="checkbox"/> Strengthening and stretching exercises <input type="checkbox"/> Home activity plan		
Home Activity Plan:					
8			<input type="checkbox"/> Check-in <input type="checkbox"/> Reassess goals <input type="checkbox"/> TNE: Speedometer <input type="checkbox"/> Functional training <input type="checkbox"/> Intervals of medium intensity physical activity <input type="checkbox"/> Strengthening and stretching exercises <input type="checkbox"/> Home activity plan		
Home Activity Plan:					

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
9			<input type="checkbox"/> Check-in <input type="checkbox"/> TNE: The common cold <input type="checkbox"/> Functional training <input type="checkbox"/> Intervals of medium intensity physical activity <input type="checkbox"/> Strengthening and stretching exercises <input type="checkbox"/> Home activity plan		
Home Activity Plan:					
10			<input type="checkbox"/> Check-in <input type="checkbox"/> Intervals of medium intensity physical activity <input type="checkbox"/> Strengthening and stretching exercises <input type="checkbox"/> Reassess goals <input type="checkbox"/> TNE: Health Plan <input type="checkbox"/> End treatment if appropriate		
Health Plan:					

TREATMENT DOCUMENTATION – NOCIPLASTIC AND/OR NEUROPATHIC PAIN AND CHANGES

Every time you see the patient, you should document on the table below.

Patient Name: Avan

Date of assessment: October 22, 2019

Lead physiotherapist for this patient: Mohammed

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
1	October 25, 2019	Mohammed	<input checked="" type="checkbox"/> Check-in <input type="checkbox"/> TNE: Neuropathic Pain (if it applies) <input checked="" type="checkbox"/> TNE: Stepping on a Nail <input checked="" type="checkbox"/> Sensory discrimination <input checked="" type="checkbox"/> Belly breathing <input checked="" type="checkbox"/> Finding comfort in sitting <input checked="" type="checkbox"/> Home activity plan <input type="checkbox"/> Passive treatments (only if requested)	<p>Patient reported feeling hopeful that the treatment will help.</p> <p>Patient reported that she went to the appointment with the counselor. They gave her some anti-depression medications and also talked with her. She thought it was helpful and she will continue to go once every 2 weeks.</p>	<p>Problems remain the same since the assessment.</p> <p>Patient reported no new problems.</p>
<p>Home Activity Plan:</p> <ul style="list-style-type: none"> o Sensory discrimination by herself, 2 times in the evenings o Belly Breathing: in the morning, every time she sits down to watch television, when she has a headache, in bed when going to sleep, if she wakes up in the middle of the night o Finding comfort in sitting: every evening when she sits down to watch television, when she has a headache 					
2	October 28, 2019 October 30, 2019	Mohammed	<input checked="" type="checkbox"/> Check-in <input checked="" type="checkbox"/> TNE: Temperature warning light <input checked="" type="checkbox"/> Sensory discrimination <input checked="" type="checkbox"/> TNE: Stuck window <input checked="" type="checkbox"/> Active movement of an area with pain <input checked="" type="checkbox"/> Square breathing <input type="checkbox"/> Home activity plan <input type="checkbox"/> Passive treatments (only if requested) Active movement= level 1	<p>She has been doing the belly breathing when the pain wakes her up at night and it helps her fall asleep more quickly.</p> <p>She saw improvements in her ability to do sensory discrimination. But she doesn't know if it helps the pain.</p> <p>During the square breathing, she has an improved ability to maintain a belly breathing pattern.</p> <p>She reported that her breathing feels a lot better because of the breathing exercises.</p>	<p>Patient continues to show fear of moving the right shoulder.</p> <p>Patient continues to hold her right arm close to her body when walking and sitting.</p> <p>She did not do sensory discrimination after session 1, so repeated the sensory discrimination from session 1 on the 28th and then did the treatment from session 2 on the 30th.</p>
<p>Home Activity Plan:</p> <ul style="list-style-type: none"> o Square breathing: when laying down to sleep, if she wakes up in the middle of the night, when she has a headache. Sensory discrimination from session 1: by herself, 2 times in the evening o Active movement of an area with pain: level 1, 2 times per day o Finding comfort in sitting: every evening when she sits down to watch television, when she has a headache 					

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
3	October 30, 2019		<input checked="" type="checkbox"/> Check-in <input checked="" type="checkbox"/> TNE: Cross chart <input checked="" type="checkbox"/> TNE: Lion <input checked="" type="checkbox"/> Active movement of an area with pain – progress <input checked="" type="checkbox"/> Finding comfort in laying down <input checked="" type="checkbox"/> Muscle relaxation <input checked="" type="checkbox"/> Home activity plan <input type="checkbox"/> Passive treatments (only if requested) Active movement = Level 3	<p>Patient reported she still wakes up often from pain, but she can now fall back asleep quickly with the square breathing.</p> <p>Patient reported that the shoulder swing doesn't cause any problems.</p> <p>Patient reported that she had less headaches this week.</p> <p>Patient was able to do level 3 of the active movement without significant pain or fear</p>	Patient only did sensory discrimination one time at home. So provided sensory discrimination from session 2 during both treatment sessions.
	November 3, 2019				
<p>Home Activity Plan: Muscle relaxation: when laying down to sleep, when she has a headache, when she feels very tired Finding comfort in laying down: during her normal rest time in the afternoon Square breathing: when laying down to sleep, if she wakes up in the middle of the night, when she has a headache. Active movement of an area with pain: level 3, 2 times per day Sensory discrimination by herself, 2 times in the evenings</p>					
4	November 6, 2019	Mohammed	<input checked="" type="checkbox"/> Check-in <input checked="" type="checkbox"/> Reassess goals <input checked="" type="checkbox"/> TNE: Cup of water <input checked="" type="checkbox"/> TNE: Factors contributing to sensitivity <input checked="" type="checkbox"/> Muscle relaxation <input checked="" type="checkbox"/> Active movement of an area with pain – progress <input checked="" type="checkbox"/> Home activity plan Active movement: Level 4	<p>*Summarize results of reassessment of goals*</p> <p>Patient demonstrates small improvements in all areas.</p> <p>Patient reported that she can now fall asleep more easily.</p> <p>Patient reported that she can cook easier now, but she can't do any meal that takes longer than 20 minutes to prepare.</p> <p>Patient continues to see the counselor for depression.</p>	<p>*Summarize results of reassessment of goals*</p> <p>Patient has not increased her level of physical activity yet which is to be expected.</p> <p>Patient continues to avoid carrying and holding her grandson.</p> <p>Patient continue to avoid walking outside the home.</p>
<p>Home Activity Plan: Muscle relaxation: when laying down to sleep, when she has a headache, when she feels very tired Finding comfort in laying down: during her normal rest time in the afternoon Square breathing: when laying down to sleep, if she wakes up in the middle of the night, when she has a headache. Active movement of an area with pain: level 4, 2 times per day Sensory discrimination by herself, 2 times in the evenings</p>					

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
5	November 10, 2019	Mohammed	<ul style="list-style-type: none"> ✗ Check-in ✗ TNE: Wrinkles ✗ TNE: The electrical system ✗ Active movement of an area with pain – progress ✗ Intervals of medium intensity physical activity ✗ TNE: Sleep and pain <input type="checkbox"/> Body scan ✗ Home activity plan <p>Active movement: Level 6 Physical activity: sit to stands, 6 minutes</p>	<p>Patient reported that she now only has pain in her back and neck when she gets very tired, about 1 time per week.</p> <p>Patient reported that she can now hold her grandson when she is sitting without much pain.</p> <p>Patient participated in the physical activity well and said that she felt tired but good after.</p>	<p>Patient reported that she still avoids lifting her grandson and carrying him while walking.</p> <p>Patient found benefit from the body scan but said she wouldn't be able to remember how to do it at home. Plan to repeat in next session.</p> <p>Patient had difficult time understanding and believing about imaging and her situation. Repeat next session.</p>
	November 13, 2019				
6	November 20, 2019	Mohammed	<ul style="list-style-type: none"> ✗ Check-in ✗ TNE: Posture ✗ Finding comfort in standing ✗ Functional training ✗ TNE: Sounds in the Joint ✗ Intervals of medium intensity physical activity <input type="checkbox"/> Body scan ✗ Home activity plan <p>Physical activity: sit to stands, 9 minutes. Functional training: carrying and holding her grandson. Step 3. See handout.</p>	<p>Patient reported that the physical activity did not increase her pain or make her too tired.</p> <p>Patient had improved breathing and increased speed and ROM during physical activity.</p> <p>Repeated Wrinkles TNE and patient seemed to believe and understand this time.</p> <p>Repeated body scan. Patient said she prefers muscle relaxation for home activity plan.</p>	<p>Patient demonstrated anxiety during step 3 of functional training.</p> <p>Patient understood and believed the key points from TNE: Sounds in the joint</p>
	<p>Home Activity Plan:</p> <p>Muscle relaxation: when laying down to sleep, when she has a headache, when she feels very tired</p> <p>Finding comfort in laying down or sitting: during her normal rest time, when sitting to watch television at night</p> <p>Finding comfort in standing: before starting to cook a meal</p> <p>Square breathing: when laying down to sleep, if she wakes up in the middle of the night, when she has a headache.</p> <p>Functional training: step 3, every day during the morning before her grandson arrives</p> <p>Physical activity: 2 minutes in the morning and afternoon, during all commercials of her television show in the evening</p>				

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
7	November 27, 2019	Mohammed	<ul style="list-style-type: none"> ✗ Check-in ✗ Functional training ✗ Intervals of medium intensity physical activity ✗ TNE: Sleep Habits ✗ Strengthening and stretching exercises ✗ Home activity plan Physical activity: Walking 10 minutes outside. Functional training: carrying and holding her grandson. Step 5. See handout. 	<p>Patient reported that she wanted to start walking to the bazaar.</p> <p>Walked on treadmill for 10 minutes. Patient has improved right arm swing.</p> <p>Patient reports pain no longer wakes her up in the middle of the night.</p>	<p>Patient continues to be afraid that if she carries her grandson too much, the shoulder will start being really painful again.</p> <p>Did passive and active mobilizations of thoracic spine. She responded well but spine continues to be stiff and contribute to shoulder mobility. Continue this treatment next session.</p>
<p>Home Activity Plan: Muscle relaxation: when laying down to sleep, when she has a headache, when she feels very tired Finding comfort in laying down or sitting: during her normal rest time in the afternoon, when sitting to watch television at night Finding comfort in standing: before starting to cook a meal Square breathing: when laying down to sleep, if she wakes up in the middle of the night, when she has a headache. Functional training: step 5, every day during the morning before her grandson arrives Physical activity: Sit to stands during the commercials of her television show in the evening. 10-minute walk every day.</p>					
8	December 2, 2019	Mohammed	<ul style="list-style-type: none"> ✗ Check-in ✗ Reassess goals ✗ TNE: Speedometer ✗ Functional training ✗ Intervals of medium intensity physical activity ✗ Strengthening and stretching exercises ✗ Home activity plan Physical activity: Walking 15 minutes on treadmill. Functional training: carrying and holding her grandson. Step 7. See handout. See handout with strengthening and stretching. 	<p>Patient reported that she was able to walk for 15 most days. She wants to try going shopping soon.</p> <p>Focused strengthening exercises on being able to carry grocery bags and her grandson. She did not show any avoidance behavior.</p> <p>Patient understood key points of TNE: Speedometer.</p> <p>Neck and shoulder have full ROM.</p>	<p>She is at the full functional activity now. She reported being nervous that lifting her grandson will cause pain, but she will try to do it once a day.</p> <p>Did passive and active mobilizations of thoracic spine. Mobility is improving. Included active mobilization of spine in home activity plan.</p>
<p>Home Activity Plan: Muscle relaxation: when laying down to sleep, when she has a headache, when she feels very tired Finding comfort in laying down or sitting: during her normal rest time in the afternoon, when sitting to watch television at night Finding comfort in standing: before starting to cook a meal Square breathing: when laying down to sleep, if she wakes up in the middle of the night, when she has a headache. Functional training: step 7, final step, once a day Physical activity: Sit to stands during the commercials of her television show in the evening. 15-minute walk everyday Strengthening and stretching exercises: see handout</p>					

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
9	December 8, 2019	Mohammed	<ul style="list-style-type: none"> ✗ Check-in ✗ TNE: The common cold ✗ Functional training ✗ Intervals of medium intensity physical activity ✗ Strengthening and stretching exercises ✗ Home activity plan <p>Physical activity: Walking on treadmill for 15 minutes with 3 kilo bag across her chest.</p> <p>Functional training: Practiced carrying a 10-kilo weight in her arms while walking and picking up a 10 kilo weight from the floor. Repeated same exercises for home. See handout</p>	<p>Patient reported that she felt pain when lifting her grandson, but it was only temporary, and she did some breathing and stretching to make it feel better.</p> <p>Patient reported she walked to the bazaar with her son's wife but she carried the items home. She said she was tired and had a small headache, but she did muscle relaxation at home and felt better.</p>	<p>She was not able to do the strengthening exercises at home because she forgot how to do them. She was worried that if she did it wrong, she may cause pain.</p>
<p>Home Activity Plan: Muscle relaxation: when laying down to sleep, when she has a headache, when she feels very tired Finding comfort in laying down or sitting: during her normal rest time in the afternoon, when sitting to watch television at night Finding comfort in standing: before starting to cook a meal Square breathing: when laying down to sleep, if she wakes up in the middle of the night, when she has a headache. Functional training: step 7, final step, at least 2 times per day Physical activity: Sit to stands during the commercials of her television show in the evening. 15-minute walk everyday while carrying a light bag across her body. Strengthening and stretching exercises: see handout</p>					
10	December 13, 2019		<ul style="list-style-type: none"> ✗ Check-in ✗ Intervals of medium intensity physical activity ✗ Strengthening and stretching exercises ✗ Reassess goals ✗ TNE: Health Plan <input type="checkbox"/> End treatment if appropriate 	<p>Patient has improved meaningfully in all areas. She would benefit from continued treatment to continue progressing exercises, functional training and physical activity.</p> <p>Patient reports that her hand still feels numb sometimes, but it doesn't affect her.</p>	<p>Patient is worried that she will stop improving if she stops treatment sessions. So, she will come one time a week for 6 more weeks for continued strengthening and stretching exercises, physical activity, and functional training. See treatment plan for details.</p>
<p>Health Plan: See her health plan for details. It includes the following: walking outside every day for 15 minutes, shopping once a week, using breathing and muscle relaxation to improve sleep and manage any headaches, start going on picnics with her family again, stop doing all of the cleaning and cooking tasks in one day but rather spreading them out throughout the week, continuing to care for her grandson.</p>					

TREATMENT MANUAL – NOCICEPTIVE PAIN AND CHANGES

This treatment manual is designed to treat nociceptive pain and changes. You may have to modify it for the context that you work in. Here are some general recommendations for applying this treatment manual:

- Use the form called “Treatment documentation for nociceptive pain and changes.” This document provides an outline of what treatments should be included in each treatment session. It also guides you to record important information about the patient during every treatment session.
- The treatments for nociceptive pain include many of the same treatments as nociplastic pain. But not all of the treatments for nociplastic pain is included in the treatment plan for nociceptive pain. Also, the order of treatments is different between the treatment plan for nociceptive pain and for nociplastic pain. You should use the “Treatment documentation for nociceptive pain and changes” to know what treatments should be provided and in what order.
- This manual gives you details for providing session one of the “Treatment documentation for nociceptive pain and changes.” But then you can use the nociplastic treatment manual to understand how to do the treatments included in the remaining treatment sessions.
- The treatments as described on the “Treatment documentation for nociceptive pain and changes” are in a very specific order. The order of the treatments is based on research. So, it is best to keep the order of these treatments as described in the form.
- If you don’t have time to do all of the treatments recommended for a specific session, then do the treatments in the following session. You don’t want to skip treatments. So, it will be more effective to spread the content of the treatments over more than the 8 sessions.
- Make sure you are prepared before each treatment session. This means that you are comfortable providing each treatment, you have the resources you need to do each treatment, and you have the information you need to focus the treatment on the patient’s specific needs.
- Completing the full treatment program for nociceptive pain and changes is important as it helps to prevent future injury and the development of persistent pain and nociplastic pain and changes. So, aim to complete all of the recommended treatments with a person with nociceptive pain and changes even if they no longer are having any pain or difficulties after a few treatment sessions. You can help the patient understand why you are recommending that they continue treatment after the pain stops by explaining that the treatments are helping their body become stronger and more mobile to prevent future injuries and pain. Also, you can explain that you are helping them learn ways they can treat any episodes of pain by themselves in the future.
- You may have to modify the treatment if you are working with a patient that has nociceptive pain and changes, as well as, another type of pain, like nociplastic or neuropathic pain. The symptoms from nociceptive pain and neuropathic pain will improve with the treatments included in the nociplastic treatment manual. So, if a patient has more than one type of pain, first provide the treatment approach for an irritated tissue if appropriate and then provide the treatment sessions as described for nociplastic and neuropathic pain and change. After completing this treatment plan, you can do a reassessment and determine if additional treatments would be helpful.

Background Information for Nociceptive Pain and Changes:

Remember that nociceptive pain is pain associated with damage to the tissues. All of the same principles of pain apply to nociceptive pain including the following:

1. Pain is always a decision by the brain
2. Pain is not a reliable way to judge the amount of tissue damage or injury
3. Biological, social, and psychological factors contribute to how and when a person experiences pain
4. Pain is not permanent - Our biology can change

In the big group, ask the participants to share what they remember about why nociceptive pain can often develop into nociplastic pain and changes and persistent pain.

It is important to understand that one of the primary goals of treating nociceptive pain and changes is to prevent the development of nociplastic pain and changes. Most people that have persistent pain and disability caused by pain, originally had nociceptive pain and changes. The nociceptive pain can become nociplastic pain and changes if a person is afraid of pain and movement, avoids movement and physical activity, and has unhealthy thoughts and beliefs. That is why the treatment of nociceptive pain and changes includes TNE, physical activity, and gradually progressing movements and exercises.

Based on the biopsychosocial assessment, you determine if the patient requires a treatment approach for an irritated tissue. This treatment approach is required if the area of pain has redness, swelling, and warmth. In this case, you should start with session 1 as described on “Treatment documentation for nociceptive pain and changes.” You continue with the treatment approach for session 1 until the redness, warmth, and swelling goes away. Then you provide the remaining sessions as outline on the “Treatment documentation for nociceptive pain and changes.”

Developed by Dr. April Gamble DPT, PT

Director of ACR - The American Center for Rehabilitation



If the patient does not require a treatment approach for an irritated tissue, then start with session 2 as outlined on the “Treatment documentation for nociceptive pain and changes.”

All of the details for session 1 are described below. The remaining sessions are not described in detail as the treatments are described in the nociplastic treatment manual. You can use the same TNE that are included in the nociplastic pain and changes treatment manual. But you may need to modify some of the TNE to be specific to nociceptive pain and changes. If you have a good understanding of the content that was described about nociceptive pain in part 2 and how this can become nociplastic pain, then you will be able to modify the TNE effectively.

Redness, swelling, and warmth are signs of acute inflammation. Acute inflammation is when the body’s immune system has recognized that a tissue is injured and is sending immune cells to heal the area. This is healthy and positive because this inflammation response helps the tissue heal. Redness and warmth both occur because the body increases blood flow to the area so that it can send more immune cells. Swelling occurs because the body sends more fluid with immune cells to the area but then this fluid accumulates and doesn’t get sent back out of the area. Swelling can contribute to pain because the extra fluid puts pressure on nerves and tissues. Also, swelling can contribute to joint stiffness and difficulty moving and using the area because the fluid becomes an obstruction in the joint or tissue. Treating swelling with movement, ice, compression, and elevation is important because it contributes to decreased pain and improved movement. Treating swelling does not prevent the body’s immune response from healing the tissue. Rather, it just helps the body’s immune response remain at the appropriate level so that the tissue can heal more quickly, and the person can experience less pain and more movement.

In pairs, have the participants practice explaining the following to each other as if the other person is a patient.

- What is acute inflammation
- Why do we sometimes see redness, swelling, and warmth when a tissue is irritated
- Why is it important to treat swelling

SESSION 1

Session 1 is designed for patients that will benefit from a treatment approach for an irritated tissue. If the person does not require this treatment approach, then skip session 1 and start with session 2 as outlined on the “Treatment documentation for nociceptive pain and changes.”

Session 1 includes the following:

- Check-in
- TNE: Irritated tissue
- TNE: Wrinkles
- Elevate and ice
- Belly breathing
- TNE: Protect and move
- Home activity plan

- Passive treatments (only if requested)

CHECK - IN

Treatment Details:

Goals of Treatment – Check-in:

- Strengthen neural pathways responsible for functional ability and comfort
- Recognize the patient’s improvements and efforts
- Provide support to increase the patient’s ability to do the home activity plan
- Understand the patient’s ongoing physiotherapy problems

Key Points – Check-in:

- Make sure to document what the patient shares with you on the treatment session documentation form
- Do not focus on discussing pain but rather focus on functional ability
- Provide support and education to the patient so that they can do the home activity plan
- Listen to the patient and notice any thoughts, beliefs, and emotions that may be contributing to the pain experience and that you should address during the treatment

The check-in involves discussing the following two questions with the patient.

1. What has gone well since the last time we met?
2. How did the home activity plan go? (if this applies – if you discussed a home activity plan during the initial assessment)

TNE: IRRITATED TISSUE

Background Information:

For nociceptive pain with swelling, redness and warmth, the standard recommendation in the past was to do rest, ice, compression, and elevation. You may have heard this described before as the acronym RICE. But research has shown that rest is not effective for this situation. Resting the area too much can actually be harmful. As we have learned, if a person stops moving an area with pain, the nervous system will become over sensitive. So, in this way, resting an area with pain can make the nociceptive pain and changes remain for longer and can often lead to the development of nociplastic pain.

Based on this, the recommendation now for nociceptive pain with swelling, redness, and warmth has the following 5 components: protection, optimal loading, ice, compression, elevation. The acronym POLICE is used to describe this treatment approach. To make the words easier for patients, we will call this the “treatment approach for an irritated tissue.” To make the words easier for patients we use the following words which have the same meaning as the POLICE acronym: Protect, Move, Ice, Compress, Elevate.

Treatment Details:

Goals of the treatment- TNE: Irritated tissue

The “Irritated tissue” TNE aims to help the patient understand the following points:

- Pain is not permanent - Our biology can change

Key points – Irritated tissue

- Make the information specific to the patient's situation. Be prepared to describe the following for each patient:
 - What results of the assessment indicate that the tissue is irritated but that there is no permanent damage
 - What tissues are irritated
 - How do you know that there are no signs of a serious medical condition that requires imaging, a physician, or surgery

Healthcare professional: Based on the assessment, the _____ is irritated. Provide the patient with education about what tissues are irritated. Do not use the word damage or injury. Reassure the patient that there are no signs of serious damage or injury that require imaging or surgery.

There is no reason that this irritation will not heal fully. You should be pain free with time. To help the tissues heal and to prevent future pain and problems, there are some things that we can do. I will teach you these today so that you can also do them at home. I will work with you to make sure that these tissues return to normal. And I will work with to return to being pain free and to return to being able to do all of the normal activities in your daily life.

The treatment approach that we will use to help the irritated tissue has 5 components: Protect, move, elevate, ice, and compress. We will do each one today and also teach you how to do it at home.

The goal of the protect, move, elevate, ice and compress is to help the tissues heal. As you do these treatments over the next few days, we should see the redness, swelling, and warmth decrease. Once these signs go away, then we can then do more treatments to help the tissues heal, to restore strength and movement in the area, and to do exercises to prevent the area from being irritated again in the future.

Do big group role play for this treatment.

Have one trainer be the physiotherapist and one trainer be the patient, based on the case example from part 3. Use the script and guide in this manual for the role play. As you demonstrate, the participants can follow along with the script.

After demonstrating, ask if the participants if they have any questions. Use this an opportunity to emphasize the key points, answer any questions, and to correct any misunderstandings.

If time allows, do small group role play to allow the participants to practice this TNE.

TNE: WRINKLES

Provide the TNE: Wrinkles in the following situations:

- The patient had imaging for the painful area and is worried that the results indicate tissue damage
- The patient is asking if they should have imaging of the painful area

See the full description of this TNE in the nociplastic treatment manual.

ELEVATE AND ICE

Treatment Details:

Goals of the treatment – Elevate and ice

The elevate and ice treatment aims to help the patient:

- Understand how elevation and ice are helpful for healing tissues
- Know how to elevate and ice on their own or with the support of their family

Key points – Elevate and ice

- After demonstrating and describing how to elevate, have the patient do this by themselves. This will allow you to make sure they can do it correctly when they are at home. It will also help the patient be confident in doing it which increases the likelihood that they will do this treatment at home.
- If the patient likes, you can also teach a family member so that they can help the person do this treatment at home.
- Provide recommendations on how to elevate and ice that are realistic to the patient's situation. For example, consider what they have available in their home to do this treatment.

Healthcare professional: The first treatments that are helpful for an irritated tissue are ice and elevate. The goal of these treatments is to decrease swelling. When a tissue is irritated, the body increases blood flow to that area and sends fluid with immune cells in it to help the tissue heal. This is a healthy and normal response. But swelling happens when this blood and fluid builds up in the area. If the fluid and blood remain in the area, it can take longer for the tissues to heal. Also, you will feel more pain because the extra fluid puts pressure on the nerves and tissues. Also, the extra fluid takes up space which makes it more difficult for you to move the area. Have you experienced any of this? Have the patient share. So, decreasing swelling helps create an environment where the tissues can better heal. Also, decreasing swelling will help decrease the pain and improve your movement. Do you have any questions about that? Have the patient share.

To decrease swelling, we want to ice and elevate. We will first learn how to elevate. When you elevate an area, there are three important things to think about. 1. When elevating, the body part should be above the level of your heart. This way gravity will help move the swelling out of the area. 2. Make sure the body part is fully supported so you can relax your muscles completely. 3. After you have found a comfortable and supported position, take a deep breath and let all of the air out. This helps your muscles relax completely which makes the elevation more effective.

When you elevate the area, you should also apply ice. Ice helps to decrease swelling and pain. You want to only use ice for about 10 to 15 minutes at a time. It is normal to feel numbness or a stinging pain when using ice. You can ice as much as one time every hour. But this may not be realistic for you so a good goal would be to elevate and ice at least 4 times per day.

Teach the patient how to elevate the specific area of the body. Make sure that they are able to set up the position without your help so that they can do this at home.

Gently moving the joint while you are elevating the area can also help decrease the swelling. The movement helps to push the swelling out of the area. Demonstrate and help the patient learn what movement is helpful for them.

After teaching the patient how to find the position for elevation, elevate the body part and apply ice to the patient during your treatment session. This will help them be more confident in doing this at home.

As the patient is elevating and icing the area, discuss with the patient how they will elevate and ice the area at home. Discuss with the patient what furniture and supplies they have at home that will make it possible for them to elevate the area. Discuss with the patient what they will use at home to ice the area. Options for ice include purchasing an ice pack, using bags of frozen items from the freezer, ice cubes, or making an ice pack. An ice pack can be made by combining water and a couple spoons of salt in a plastic bag and then freezing it. The salt makes it so that the ice will not become a solid but rather will remain flexible.

Demonstrate how to elevate different parts of the body. Make sure to demonstrate how to follow the 3 principles.

Then have the participants break up into small groups and do a small group role play. They can select which part of the body has irritated tissue. They should use the script to make sure that they practice all of the components of the treatment.

BELLY BREATHING

Keep the patient in the same position, with the body part elevated. Explain that belly breathing is very helpful to do when they are elevating the area.

Do belly breathing as described in the nociplastic treatment manual. This is important as it decreases the sensitivity of the nervous system which decreases pain, decreases anxiety, improves movement, and helps prevent the development of nociplastic pain.

COMPRESS

Treatment Details:

Goals of the treatment – Compress

The compress treatment aims to help the patient:

- Understand how compression is helpful for healing tissues
- If possible, know how to do compression on their own at home or with the support of their family

Key points – Compress

- If you are not comfortable doing the compression correctly, then don't do this treatment. Doing it wrong can cause more damage than not using it.
- If the patient is not able to do it correctly, then recommend that they do not do this at home. But you can do the compression bandaging for them in the treatment sessions. It is better that the patient doesn't do compression rather than doing it incorrectly.
- After demonstrating and describing how to compress, have the patient do this by themselves. This will allow you to make sure they can do it correctly when they are at home. It will also help the patient be confident in doing it which increases the likelihood that they will do this treatment at home.
- If the patient likes, you can also teach a family member so that they can help the person do this treatment at home.
- Provide recommendations on how to compress that are realistic to the patient's situation.

Healthcare professional: Compression is using bandages to wrap the area in a way to decrease swelling. The goal of compression is to help control the swelling. Compression is not used for decreasing movement or protecting the area. When doing compression, it is important to follow a few key points. If you don't follow these, then the compression can actually make things worse because it cuts off the blood flow in the area. If the blood flow in the area is cut off, then the swelling will increase, and the body will have a more difficult time healing the area. The key points to follow when doing compression are: 1. The bandage should be tight at the area furthest from your body and then gradually get looser as it moves closer to the body, 2. Each layer of the bandage should overlap, and 3. It should be comfortable and not too tight.

The following are signs that the compression is too tight and should be removed: 1. Area feels numb, 2. Area feels cold, 3. Area changes color, 4. There is swelling above or below the bandage. If you notice any of these signs, then remove the bandage immediately and elevate the area of the body.

Demonstrate how to do compression bandaging on the area. Discuss and demonstrate the key points with the patient. Then have the patient or their family member do the compression on their own. Make sure that they are able to do it correctly. If the patient is not able to do it correctly, then recommend that they do not do this at home. But you can do the compression bandaging for them in the treatment sessions. Then when the compression bandages become too loose, then they can just remove them until you can reapply them in the next treatment session. It is better that the patient doesn't do compression rather than doing it incorrectly.

If you are recommending that the patient does compression at home, discuss with the patient when they will do this. Compression can be done just when they are elevating the area of the body. Or they keep compression on throughout the day as they do the activities in their daily life.

You probably won't have time to teach how to do compression. You can describe the key principles to follow. Emphasize that if the participant does not know how to do this treatment, then they should not do it with patients.

TNE: PROTECT AND MOVE

Treatment Details:

Goals of the treatment - TNE: Protect and Move

The "Protect and Move" TNE aims to help the patient understand the following points:

- Pain is not permanent - Our biology can change
- How to move the area of the body the right amount so that it can heal

Key points – Protect and Move

- Do not lecture at the patient. Discuss the topics and have them apply it to their own situation.
- Work with the patient to develop the exact plan for how to protect and move the area of their body.
- Have the patient practice the activities and movements that you are recommending. The patient may be afraid of moving and using the area of the body. This fear may contribute to them avoiding movement of that area. So, it is important that you practice the activities and movements with the patient so that you can help them to know that what they are doing is appropriate and helpful for healing.

Healthcare professional: The next two treatments for the irritated tissue are protect and move. We want to protect the area so that it can heal but also move it the right amount. Protecting the area does not mean that we do not move or use the area. Medical research shows that if you don't move and use the area that is irritated, then the tissues will have a more difficult time healing. Moving the area helps to decrease swelling because the movement pumps the swelling out of the area. Also, moving helps give the tissues the oxygen and other nutrients it needs to heal. Moving the area also helps the tissues stretch and move so that that they don't get stiff.

You can think of it like this: Think of someone with long hair. If they don't brush their hair regularly, what happens to it? Have the patient share. If they don't brush their hair regularly, then the hair gets tangled up. This is the same for tissues like muscles and ligaments. If you don't move and use the tissue, they can get stiff, and tangled. And what happens if a person brushes their hair after not brushing it for a few days? Have the patient share. It is more difficult to brush the hair and it is painful because you have to pull through the tangles. This is the same for the tissues. If you don't move the area that is irritated, then the tissues will become stiff and tangled and moving it will feel more difficult and more painful. So, you need to move the area the right amount. We are going to discuss exactly how you can do this.

Sometimes doctors are not aware of the most current research and recommendations in this area. Did any doctor tell you to rest this area or give you any other specific recommendations? Have the patient share. Discuss this with the patient so that they understand why protect and move is the best approach.

The goal is to protect the area while also using and moving it. So, we are now going to decide how you can do that for your specific situation. Provide the following recommendations and make them specific to the patient and to what tissues are irritated. The overall goal is that the patient understands how to move and use the area the right amount. The right amount involves moving and using the area but also protecting it from too much use.

1. Have the patient describe what activities they do in their daily life that involve the specific area of the body that is irritated. For example, if the knee is irritated, you can ask the patient how often they walk, climb stairs, lift and carry heavy objects, stand in one place, drive, and other activities that involve the leg. For example, if the shoulder is irritated, you can ask how often the patient writes, carries objects, uses hands and arms in daily tasks like cooking, cleaning, and at work, and any other activities that involve the arm.
2. Based on what the patient shared, discuss with the patient the activities that they can continue to do without changing how they do it. You want to make it clear to the patient what activities are safe and beneficial to continue doing in their daily life.
3. Practice these activities. Only telling the patient to continue to do these activities is not enough because the patient may be afraid which will make them avoid the activity. So, practice a few of the activities with the patient so that they can gain the confidence that it is safe and helpful to do these activities.
4. Based on what the patient shared, discuss with the patient the activities that they can continue to do by making some changes to how they do it. You do not want to tell the patient to avoid any activities. Rather just help them know how to do an activity in a way that protects the irritated tissue. Discuss this with them so that they can help determine what is realistic in their daily life. The following are some things to consider for this:
 - Not putting weight through the area may be helpful for 1 to 4 days. But it should not be longer than this amount of time because then the person will experience the negative effects of resting too much. Equipment, like crutches, may be needed to allow the patient to avoid putting weight through the area.
 - Other changes that can be made to activities to decrease the challenge include changing the following: speed, distance, length of time, weight, repetitions, frequency, etc.
5. Practice these activities. Only telling the patient how to do these activities differently is not enough because the patient may be afraid which will make them avoid the activity. So, practice a few of the activities with the patient so that they can gain the confidence that it is safe and helpful to do these activities with some small changes.
6. Do active movements. Select 1 to 2 gentle active movements that the patient should do every day. The active movement should make the patient move through the full ROM of the area.
7. Practice these movements. Only telling the patient how to do these movements is not enough because the patient may be afraid that the movements will increase the pain or cause problems. This fear may make them avoid doing the movements. So, practice the movements just like you want them to do it at home. This way the patient can gain the confidence that the movements are safe and helpful. Also, this allows you to make sure that the patient understands how to do the movement correctly.

Do big group role play for this treatment.

Have one trainer be the physiotherapist and one trainer be the patient, based on the case example from part 3. Use the script and guide in this manual for the role play. As you demonstrate, the participants can follow along with the script.

After demonstrating, ask if the participants if they have any questions. Use this an opportunity to emphasize the key points, answer any questions, and to correct any misunderstandings.

If time allows, do small group role play to allow the participants to practice this treatment.

HOME ACTIVITY PLAN

Treatment Details:

Goals of treatment – Home Activity Plan:

- Develop a plan that is meaningful to the patient and that will provide them with ways to manage pain and improve function in their daily life

Key points – Home Activity plan:

- This should be a discussion. Your goal is to have the patient determine the most realistic and effective home activity plan.
- Make sure that the patient understands why the activities will help their specific problems and concerns
- Allow the patient to set the details of the plan so that it is realistic for them
- Provide handouts for the patient to take home so that it can be a reminder of the home activity plan

Healthcare professional: Today you learned how to elevate, ice, and compress. When will you do this at home? What specific times of the day will work best for you to do this at home? Have the patient set the plan so that they can include this into their daily schedule.

Healthcare professional: You also learned belly breathing which will help decrease pain and help your body heal. When do you think you will do belly breathing at home? Have the patient set the plan so that they can include this into their daily schedule.

Healthcare professional: Today you also learned how to protect and move the area. Can you summarize the plan that we developed together? Do you have any concerns about doing this? Have the patient share to confirm that they feel comfortable with the plan.

Provide them with any handouts related to the home activity plan. Write down the plan in your documentation so you can follow up during the next session.

End the session by telling the patient the plan for the next session.

ADDITIONAL LEARNING RESOURCES

- Video about POLICE treatment approach: https://www.youtube.com/watch?v=-5cT6_PFV8Q
- Article about POLICE treatment approach: https://www.physio-pedia.com/POLICE_Principle
- Video – compression bandage to the ankle: <https://www.youtube.com/watch?v=FBV6g8q-pjE>
- Video – compression bandage to the wrist: <https://www.youtube.com/watch?v=iZOwys-DyAQ>

TREATMENT DOCUMENTATION – NOCICEPTIVE PAIN AND CHANGES

Every time you see the patient, you should document on the table below.

Patient Name: _____

Date of assessment: _____

Lead physiotherapist for this patient: _____

If the patient will benefit from a treatment approach for an irritated tissue, start with session 1 and continue until this treatment approach is no longer required. Then start with session 2 and complete all sessions.

If the patient does not require a treatment approach for an irritated tissue, start with session 2 and complete all sessions.

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
1			<input type="checkbox"/> Check-in <input type="checkbox"/> TNE: Irritated tissue <input type="checkbox"/> TNE: Wrinkles <input type="checkbox"/> Elevate and ice <input type="checkbox"/> Belly breathing <input type="checkbox"/> TNE: Protect and move <input type="checkbox"/> Home activity plan <input type="checkbox"/> Passive treatments (only if requested)		
	Home Activity Plan:				
2			<input type="checkbox"/> Check-in <input type="checkbox"/> TNE: Stepping on a Nail <input type="checkbox"/> Belly breathing <input type="checkbox"/> TNE: Stuck window <input type="checkbox"/> Active movement of an area with pain <input type="checkbox"/> Home activity plan <input type="checkbox"/> Passive treatments (only if requested)		
	Home Activity Plan:				

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
3			<input type="checkbox"/> Check-in <input type="checkbox"/> TNE: Temperature warning light <input type="checkbox"/> Active movement of an area with pain – progress <input type="checkbox"/> Intervals of medium intensity physical activity <input type="checkbox"/> Square breathing <input type="checkbox"/> Home activity plan <input type="checkbox"/> Passive treatments (only if requested)		
	Home Activity Plan:				
4			<input type="checkbox"/> Check-in <input type="checkbox"/> TNE: Wrinkles <input type="checkbox"/> TNE: Sounds in the Joint <input type="checkbox"/> Active movement of an area with pain – progress <input type="checkbox"/> Intervals of medium intensity physical activity <input type="checkbox"/> Muscle relaxation <input type="checkbox"/> Home activity plan	*Summarize results of reassessment of goals*	*Summarize results of reassessment of goals*

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
5			<input type="checkbox"/> Check-in <input type="checkbox"/> Reassess goals <input type="checkbox"/> TNE: Cup of water <input type="checkbox"/> TNE: Factors contributing to sensitivity <input type="checkbox"/> Intervals of medium intensity physical activity <input type="checkbox"/> Strengthening and stretching exercises <input type="checkbox"/> Muscle relaxation <input type="checkbox"/> Home activity plan		
Home Activity Plan:					
6			<input type="checkbox"/> Check-in <input type="checkbox"/> TNE: Sleep and pain <input type="checkbox"/> Intervals of medium intensity physical activity <input type="checkbox"/> Strengthening and stretching exercises <input type="checkbox"/> TNE: Posture <input type="checkbox"/> Functional training <input type="checkbox"/> Home activity plan		
Home Activity Plan:					

<u>Session Number</u>	<u>Date/s of session</u>	Name of physiotherapist doing treatment session	<u>Treatment</u> Check the ones that you did	<u>Improvements</u> Write improvements the patient tells you about and that you observe	<u>Problems</u> Write continued or new problems that the patient tells you about and that you observe
7			<input type="checkbox"/> Check-in <input type="checkbox"/> TNE: The common cold <input type="checkbox"/> Intervals of medium intensity physical activity <input type="checkbox"/> Strengthening and stretching exercises <input type="checkbox"/> Functional training <input type="checkbox"/> Home activity plan		
Home Activity Plan:					
8			<input type="checkbox"/> Check-in <input type="checkbox"/> Intervals of medium intensity physical activity <input type="checkbox"/> Strengthening and stretching exercises <input type="checkbox"/> Functional training <input type="checkbox"/> Reassess goals <input type="checkbox"/> TNE: Health Plan <input type="checkbox"/> End treatment if appropriate		
Home Activity Plan:					

The Biopsychosocial Assessment and Treatment of Pain

Treatment Resources



Funded by the IASP Developing Countries Project 2019

Organized by Wchan Organization

Developed by Dr. April Gamble PT, DPT

Director of ACR - The American Center for Rehabilitation

Supported by



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Version October, 2019

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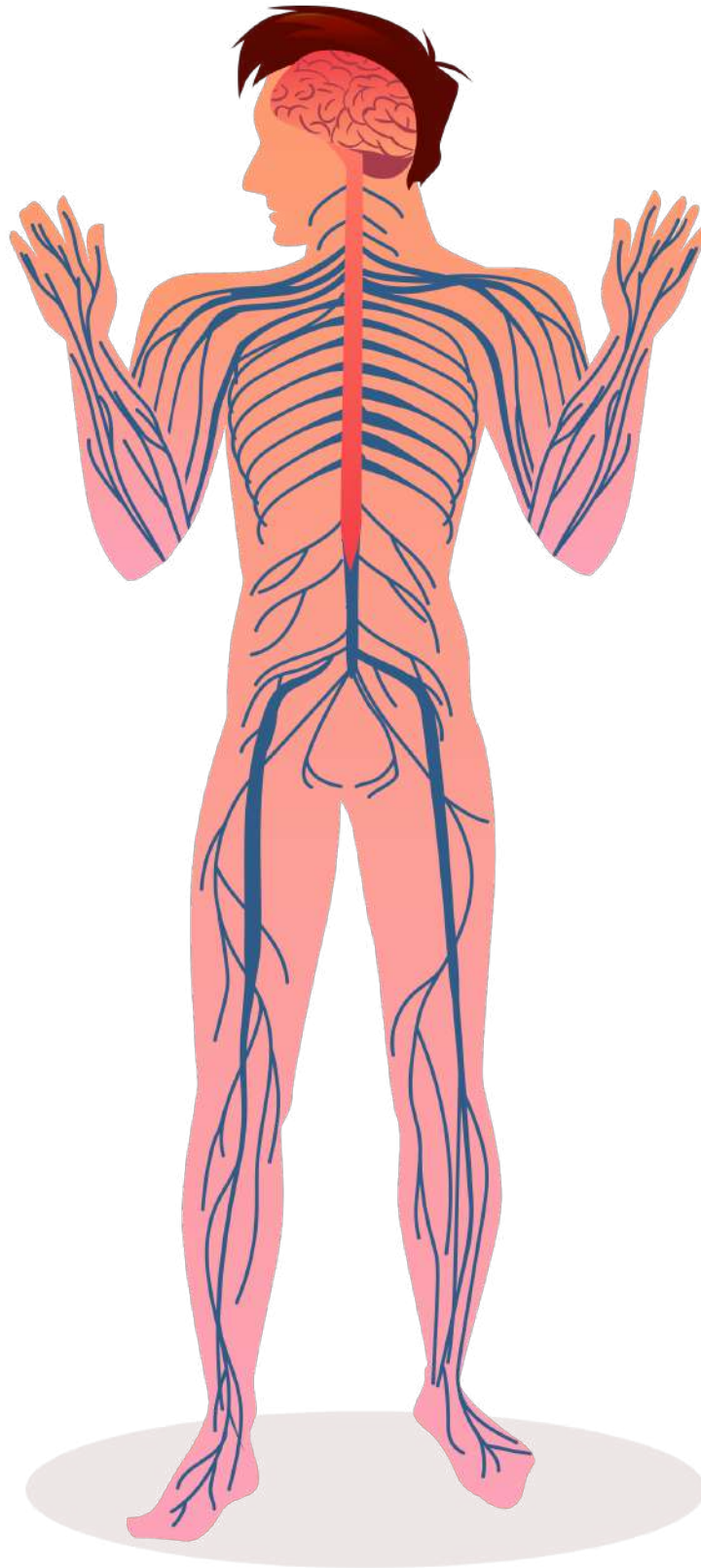
TNE: Stepping on a Nail



Developed by Dr. April Gamble DPT, PT

Director of ACR - The American Center for Rehabilitation

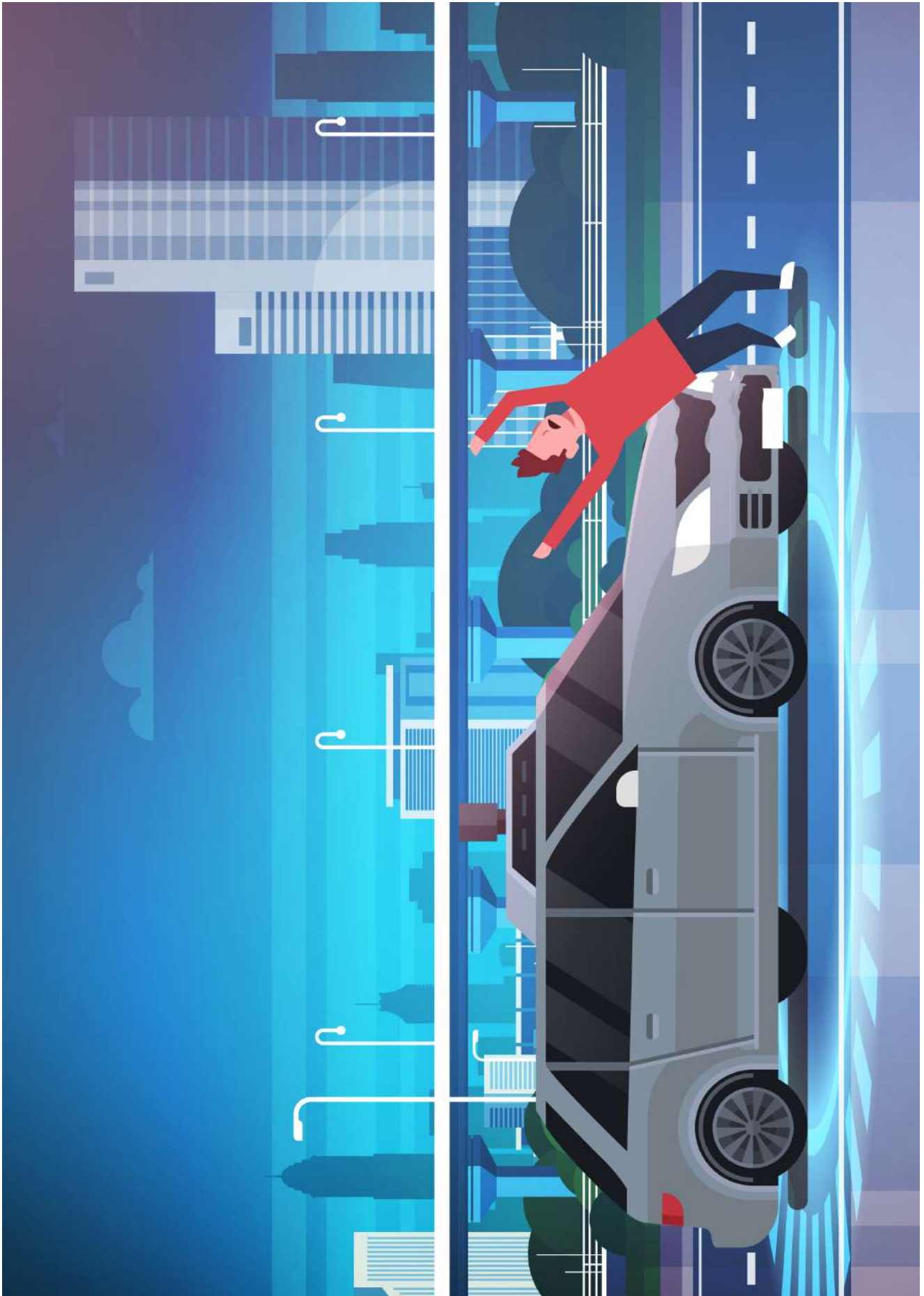
TNE: Stepping on a Nail



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TNE: Stepping on a Nail



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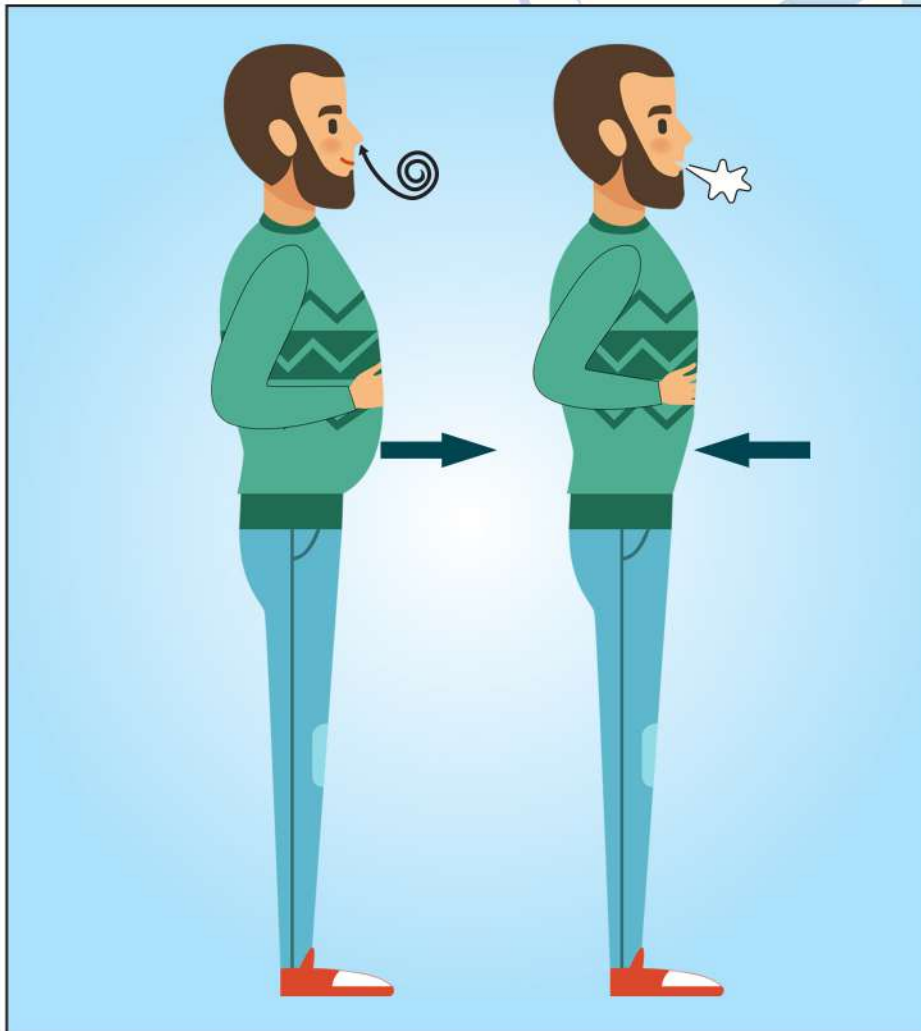
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Belly Breathing

Belly breathing is a simple way that you can calm down your mind and body. Belly breathing can help decrease pain, decrease effects of psychological stress, improve sleep and improve thinking and concentration.

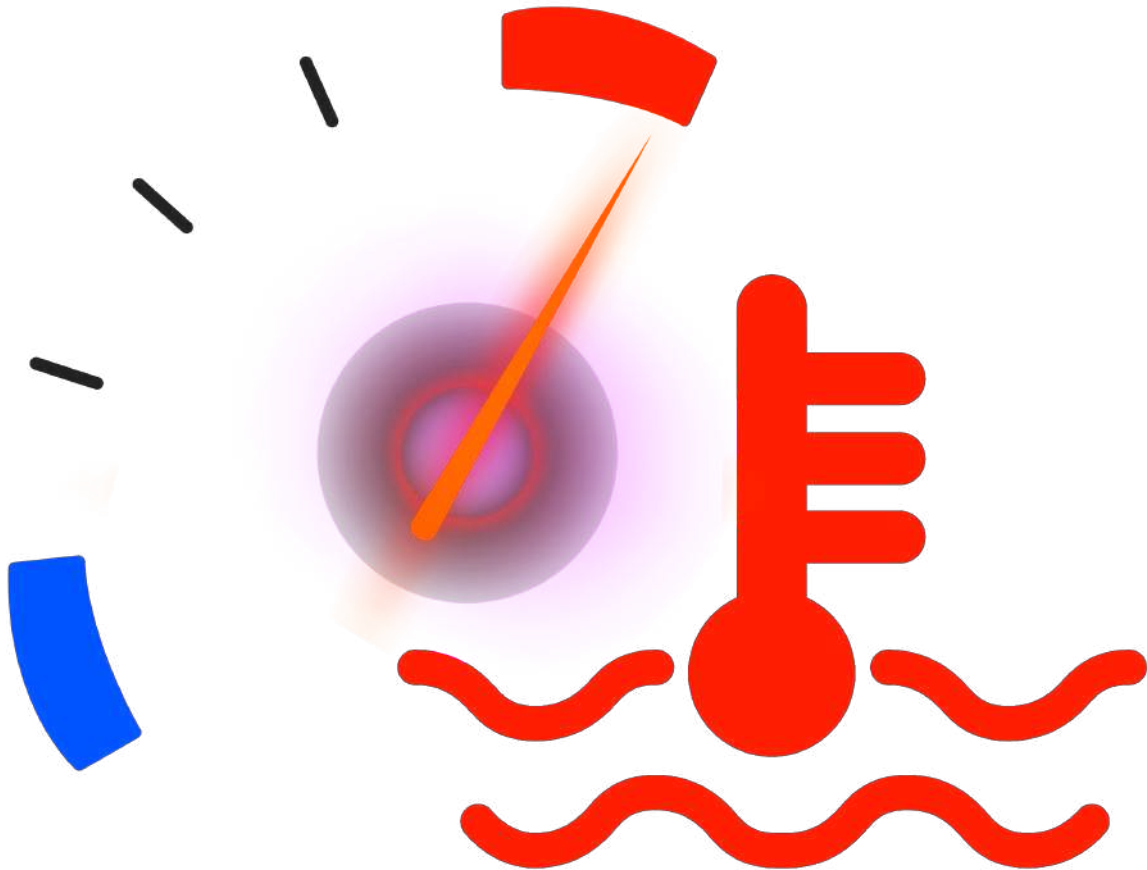
Try to do belly breathing frequently throughout your daily life.



**Breathe in through your nose and out through your nose or mouth.
Keep your upper chest and shoulders relaxed.**

**When you breathe in, your stomach should move out.
When you breathe out, your stomach should move in.**

TNE: Temperature Warning Light

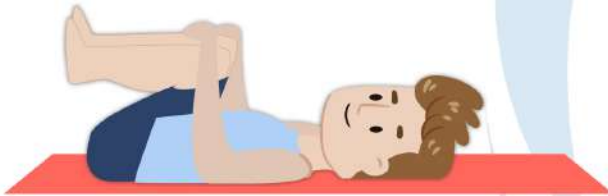


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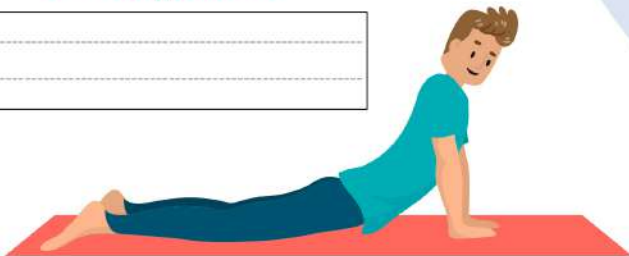
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Active Movement Back

- Level 1.** Lay on your back. Bring one knee to your chest, one at a time. Then bring both knees to your chest.



- Level 2.** Lay on your stomach. Place your hands on the floor by your shoulders. Straighten your arms so you bring your chest off the ground. Let your back and buttocks muscles relax. Then return your body to rest on the ground.



- Level 3.** Lay on your back. Bend your knees and place both feet on the ground with your toes facing forward. Now, move both knees to the side, towards the floor. Keeping both feet on the ground. Do this rhythmically from left to right. You should feel rotation in your lower back.



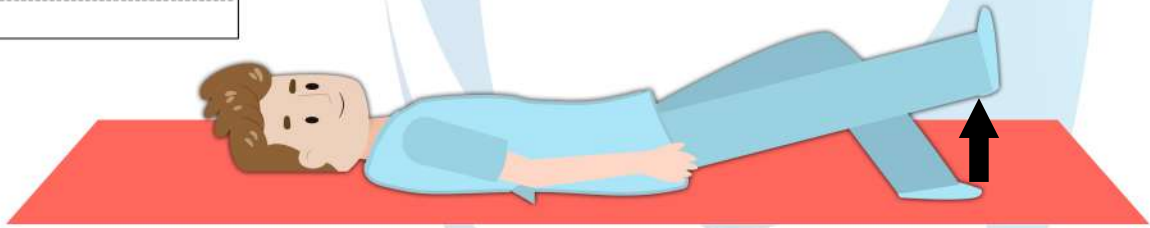
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Active Movement Back

- Level 4:** Lay on your back. Have your legs straight. Lift one leg up towards the ceiling while keeping the knee straight and the toes pulled towards your face. Slowly lower it back to the ground. Do the same on the other side.

Blank writing area for notes.



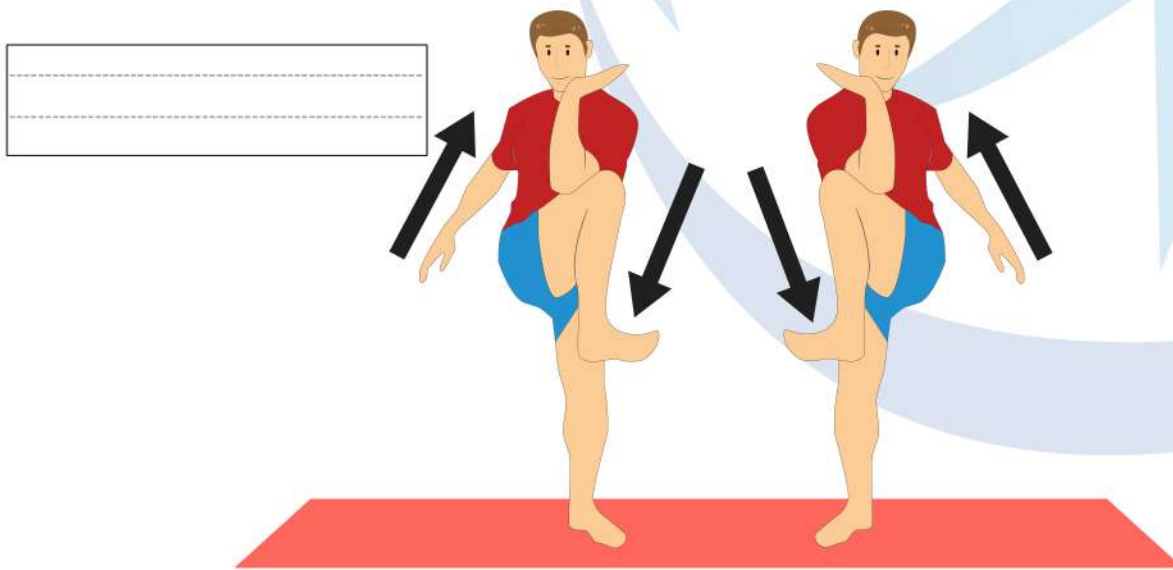
- Level 5:** Sit on a chair with both feet firmly on the ground and with an upright relaxed posture. Place both hands on your thighs. Now, slide the right hand towards the right knee and then return it to the starting position. Then slide your left hand towards the left knee. As you do this, you should feel your lower back

Blank writing area for notes.

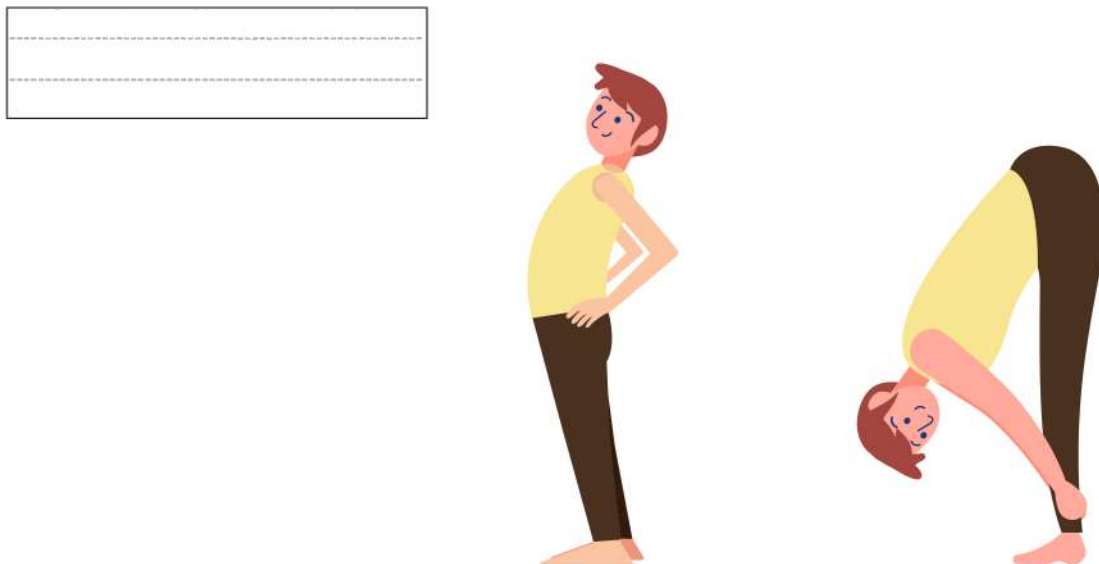


Active Movement Back

- Level 6:** Stand firmly on the ground with feet a bit apart, toes facing forward. Lift your right knee up so that you form a 90-degree angle in your hip. Have your left hand or elbow meet the right knee as it reaches the full movement. Return to the starting position. Do the same movement but with the left knee meeting the right elbow or hand. Make sure that you rotate in your lower back and not just your upper back and shoulders.



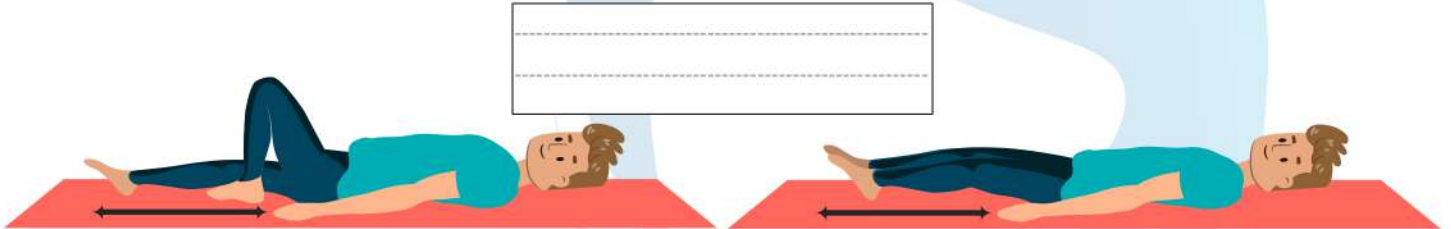
- Level 7:** Stand in a comfortable position. Bend forward and reach for your toes. Slowly come up to a standing position. Place your hands on your low back and arch your back backwards so that you are looking up at the ceiling. Return to



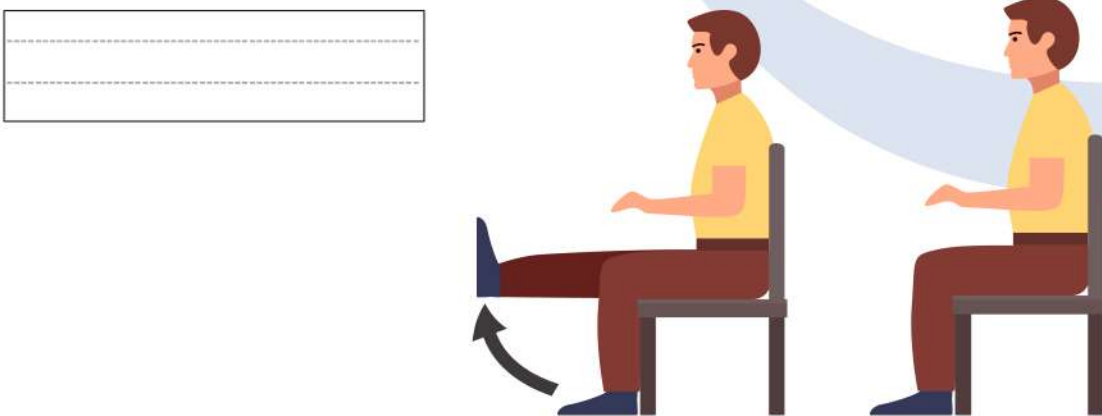
Active Movement

Knee

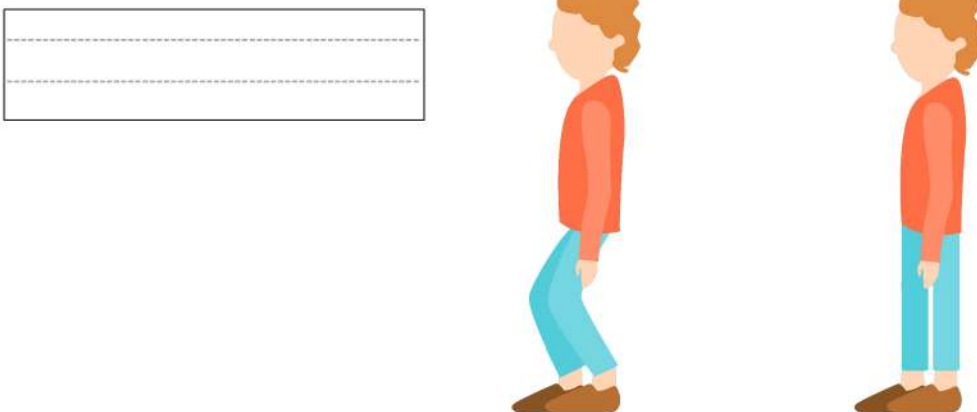
- Level 1:** Lay on your back with your legs straight. Bring the heels of your legs up towards your bottom. Then straighten your legs fully.



- Level 2:** Sit in a comfortable position in a chair. Straighten the knee and then return the foot to the floor.



- Level 3:** Stand in a comfortable position. Bend and straighten your knees a small amount.



Active Movement Knee

- Level 4:** Stand in a comfortable position. Bring one knee up towards your chest. Then return to the starting position. Make sure to not lock the knee straight when it is standing on the ground. Repeat the same for the other leg.



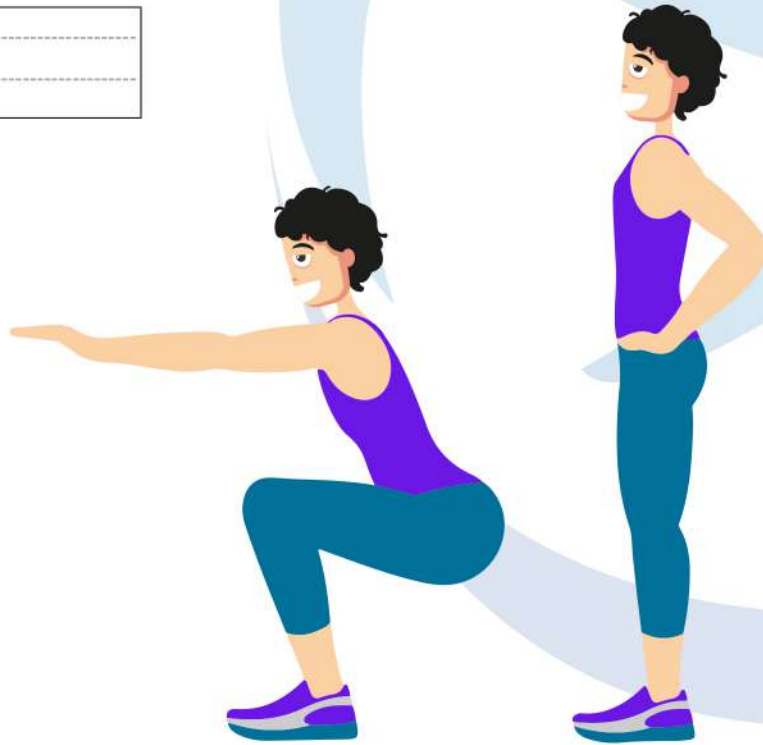
- Level 5:** Stand in a comfortable position. Hold on lightly to the back of a chair for support. Squat down halfway and then return to standing.



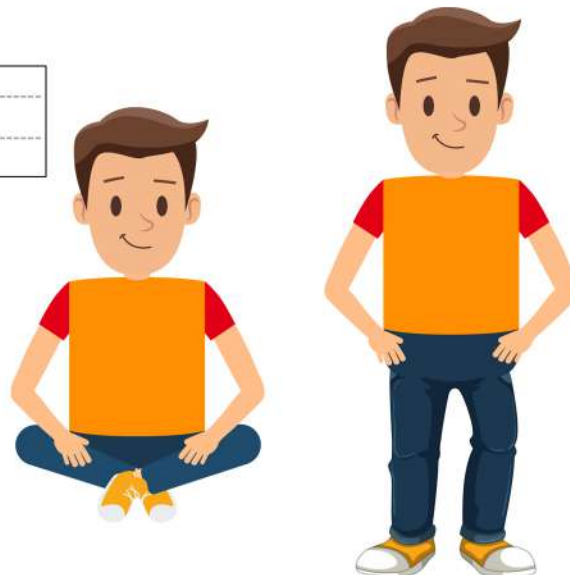
Active Movement

Knee

Level 6: Stand in a comfortable position. Squat fully down and return to standing.



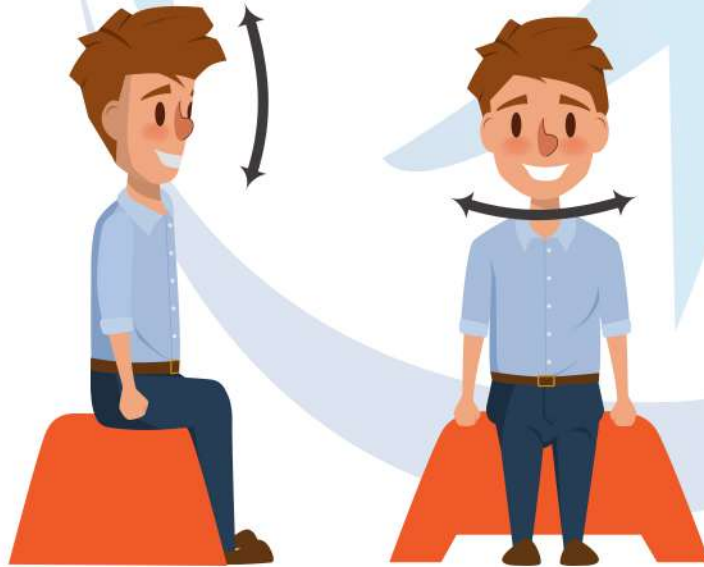
Level 7: Stand in a comfortable position. Move to sitting on the floor. Return to standing. You can move in whatever way feels comfortable. Try not to use anything but the ground for support.



Active Movement Neck

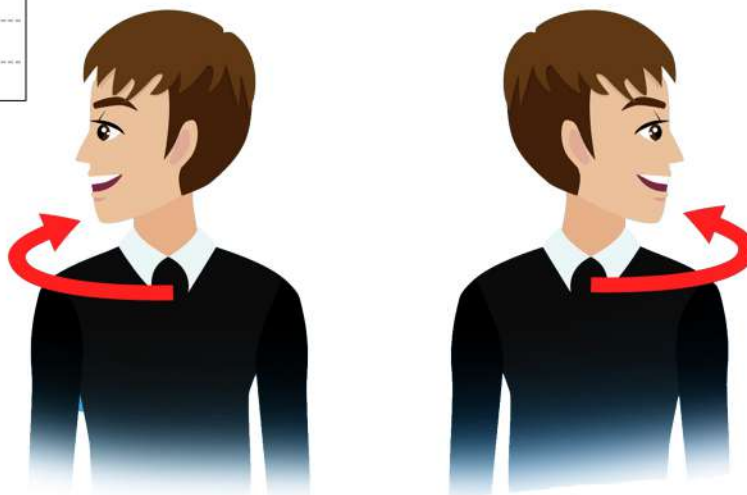
- Level 1:** Sit upright in a comfortable chair. Try to have your back and arms supported by the chair. Move your head up and down rhythmically as if saying yes. Move your head left to right rhythmically as if saying no.

Blank writing area for notes.



- Level 2:** Sit upright in a comfortable chair. Try to have your back and arms supported by the chair. Turn your head to the left so that you are looking over your left shoulder. Then turn your head to the right so you are looking over your right shoulder.

Blank writing area for notes.

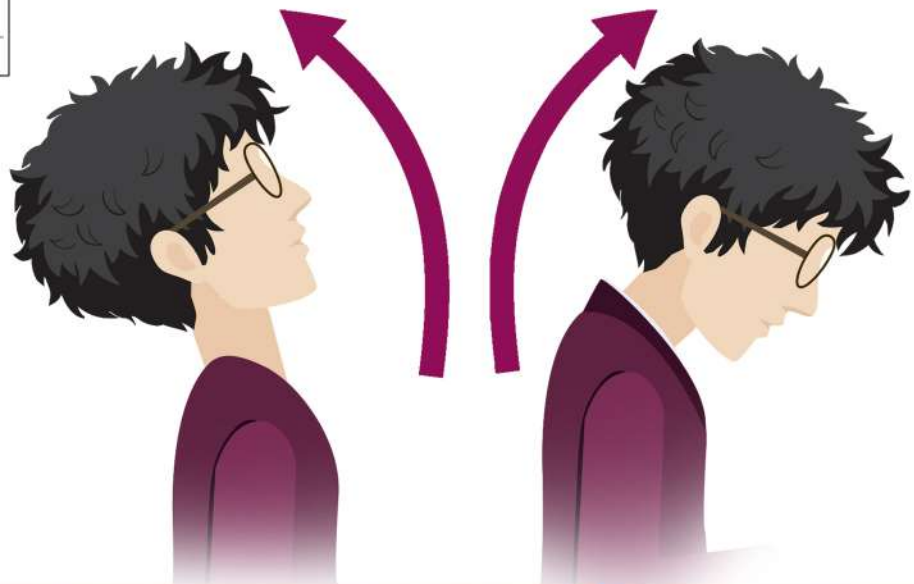


Active Movement Neck

- Level 3:** Sit upright in a comfortable chair. Try to have your back and arms supported by the chair. Bring your right ear towards your right shoulder. Then bring your left ear towards your left shoulder.



- Level 4:** Sit upright in a comfortable chair. Try to have your back and arms supported by the chair. Bring your head back so that you are looking at the ceiling. Then bring your head forward so that your chin touches your chest.



Active Movement Neck

- Level 5:** Sit upright in a comfortable chair. Try to have your back and arms supported by the chair. Move your head in a circle so that it moves in all directions.



- Level 6:** Stand in a comfortable position. Hold your arms out to the side. Turn your body and head to the right. Try to look behind you and reach your right arm behind you. Return to the starting position. Then turn your body and head to the left. Try to look behind you and reach your left arm behind you.



Active Movement Neck

Level 7: Stand in a comfortable position. Bring your head back so that you are looking at the ceiling while also raising your arms up and reaching back. You should be able to look at your hands while you do this. Then bring your head forward so that your chin touches your chest while also bringing your arms down and behind you.

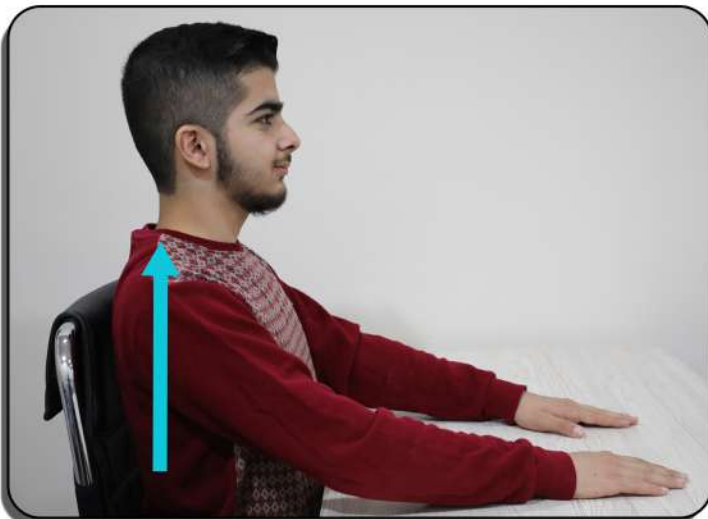


Active Movement Shoulder

- Level 1:** Stand in a comfortable position. Have your arms relaxed by your side. Move your weight from your heels to your toes. As you rhythmically move on your feet, let your arms gently swing by your side. The goal is to let your arms gently move forwards and backwards.



- Level 2:** Sit in a comfortable position and with your arm supported by a table. Sit close to the table so that the arms are fully supported. Move the shoulders up and down like in a shoulder shrug. Move the shoulders in a circle.



Active Movement Shoulder

- Level 3:** sit in a comfortable position. Hold your arms by your side so that the elbows are bent, and the palms of the hands are turned up. Keep the hands open and relaxed. Move your hands out, away from your body. Return to the starting position. Move your hands in, towards your body.



- Level 4:** sit or stand in a comfortable position. Clasp your hands together. Keep your thumbs pointing up. Bring your arms up over your head and then back down.



Active Movement Shoulder

- Level 5:** Stand in a comfortable position with your arms by your side and your palms facing your body. Bring your arms forward and over your head. Return to the starting position.

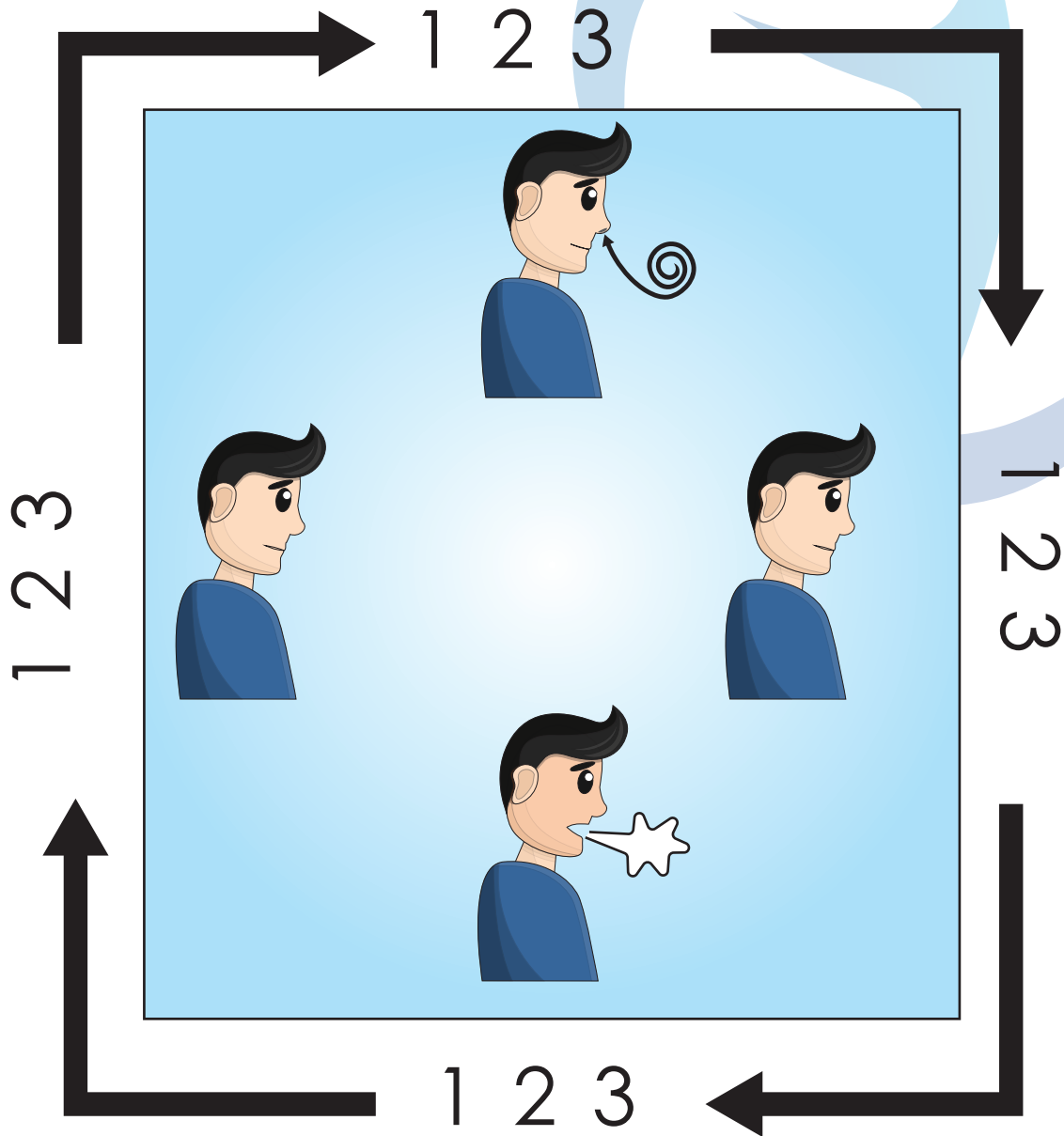


- Level 6:** Stand in a comfortable position. Reach your hands behind your back. Then reach your hands behind your neck.



Square Breathing

This is a type of belly breathing exercise. This exercise will help you learn how to control your breath more which helps to calm down the mind and body. Square breathing can help decrease pain, decrease shortness of breath, decrease effects of psychological stress and anxiety, improve sleep, and improve thinking and concentration.



Draw a box in front of you with your finger or in your mind. As you move across, breathe in. As you move down, hold the breath. As you move across, breathe out. As you move up, to complete the square, hold the breath.

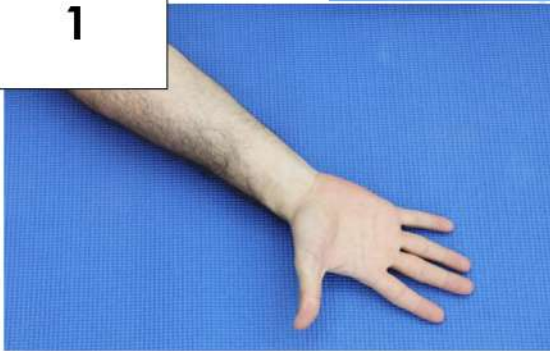
Continue to repeat this.

Each side of the box is even which means each phase of the breath is done for the same amount of time. Try starting at a count of 3 for each side of the box. As you practice and get more comfortable, you can increase the time.

Muscle Relaxation



1



2



3



4



5



TNE: Lion



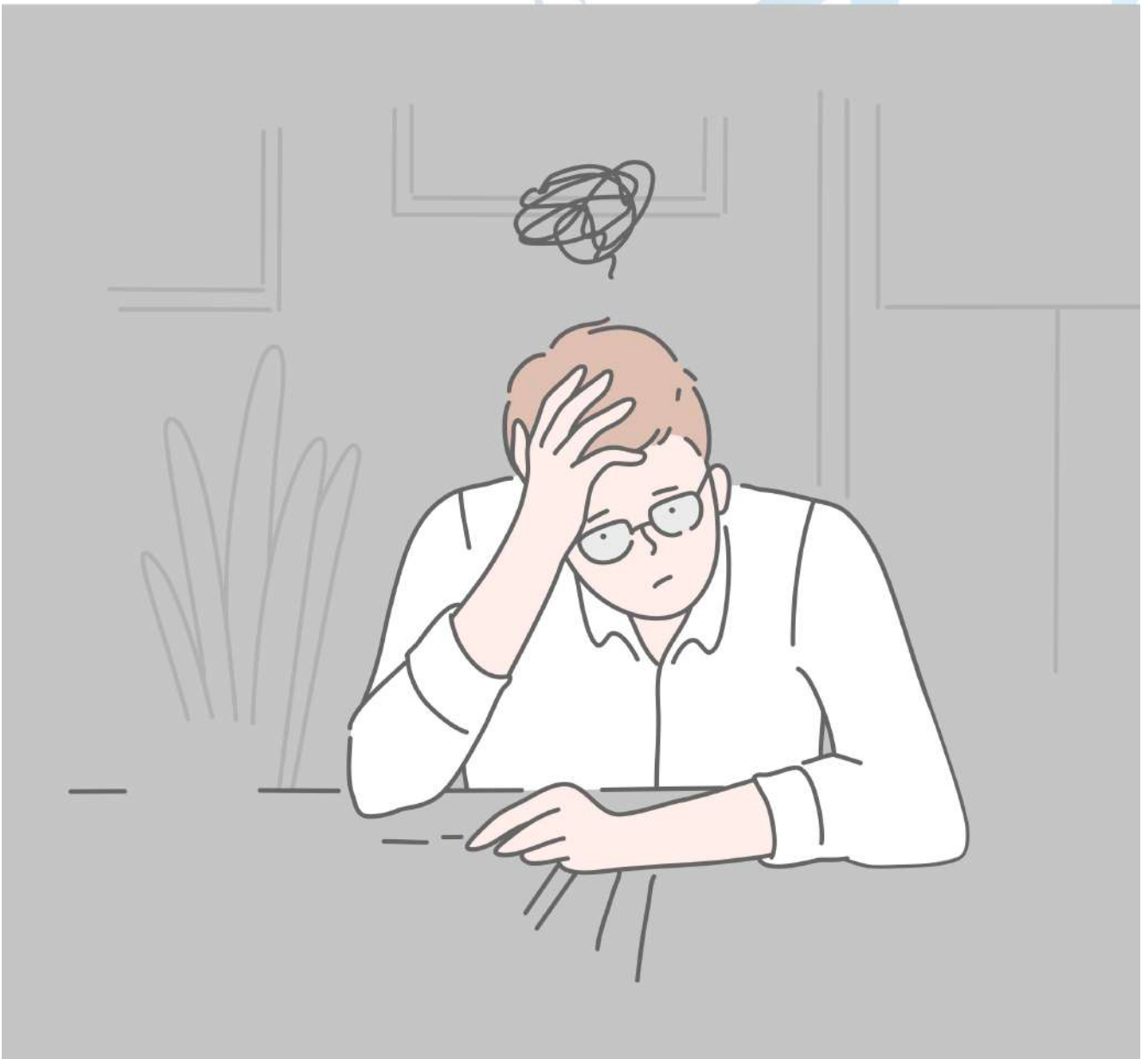
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Director of ACR - The American Center for Rehabilitation

TNE: Factors Contributing to Sensitivity

Beliefs and thoughts that make you less willing to move

ئەو بىر و باوەرانەى وات لىدەكەن كەمتر بجولئىت



TNE: Factors Contributing to Sensitivity

Participating in activities that you find meaningful and enjoyable

به شدار یکردن له و چالاکیا نه ی که به سودو چیر به خشن



TNE: Factors Contributing to Sensitivity

Muscle weakness, poor flexibility, and poor fitness

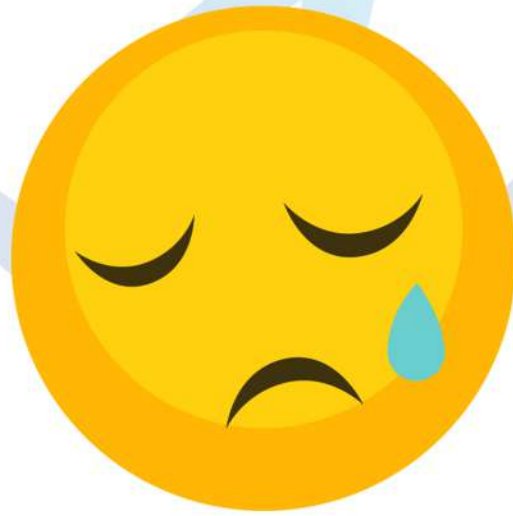
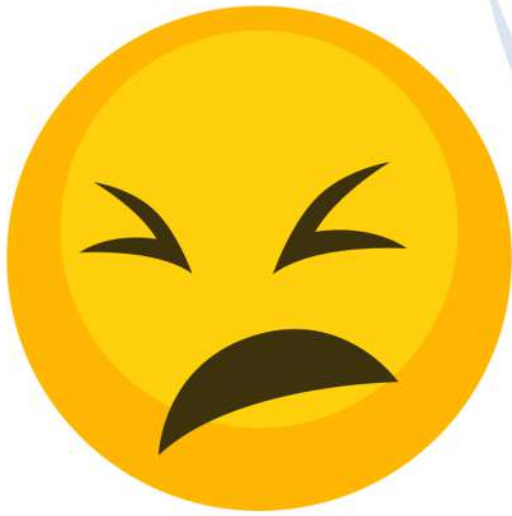
If you don't participate in regular physical activity, your body may become weak and stiff. Your overall fitness and physical health can become poor. This may contribute to increased sensitivity to pain

لاوازي ماسولكهكان و خوگونجاندنيان
ئهگهر به بهردهوامي چالاكي جهستهيي ئه نجام نه دهيت، ئهوا جهسته
لاوازو كرژ دهبيت. بهم شيويهيه، تواناي خوگونجاني جهسته لاوازتر
دهبيت و بهمهش ههستياريت به ئازار زياد دهكات.



Emotions of anger, sadness, anger, fear, loneliness

ههستی توپره بون، دل تهنگی، ترس وه ته نهایی



Using the coping strategies in your toolbox

به کارهينانی ريگاکانی خوگونجاندن که له سندوقی چاره سهریدا ههلتگرتووہ



TNE: Factors Contributing to Sensitivity

Social isolation

گۆشەگىرى كۆمەلەيەتى



Developed by Dr. April Gamble DPT, PT

Director of ACR - The American Center for Rehabilitation



Thoughts about negative experiences in our past

بیرکردنه وه له ئەزمونی نەرێی رابردومان



Physical exercise and physical activity

پراھینان و چالاکی جھستھیی



TNE: Factors Contributing to Sensitivity

Worrying (about the future, the present, what others think of you)

نیگہران بون سہبارت بہ داہاتو، ٹیستا، کہسکان چوں بیرت لٹ دہکەنەوہ



TNE: Factors Contributing to Sensitivity

Sad and weak postures

باري جهستهي لاواز



Developed by Dr. April Gamble DPT, PT

Director of ACR - The American Center for Rehabilitation



TNE: Factors Contributing to Sensitivity

Good quality sleep

کوالیٹیہ کی باشی خہ وتن



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Director of ACR - The American Center for Rehabilitation



Physical inactivity

نه نجام نه دانى چالاكى



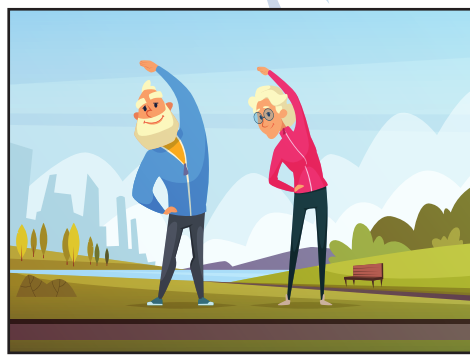
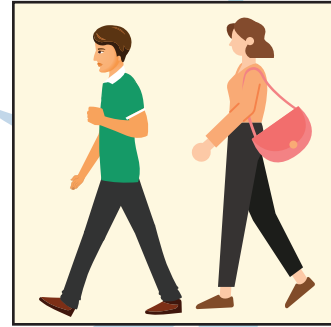
Eating healthy

خواردنی ته ندروست



Physical activity

Physical activity is anything that we do where we are moving our body and using energy.



Physical activity has many benefits

- Decrease pain
- Improve sleep
- Decrease effects of psychological stress
- Decrease feelings of anxiety and depression
- Improve a person's ability to do daily activities
- Decrease risk of heart disease, diabetes, cancer and CVA

Adults should do 150 minutes per week of medium intensity physical activity

When you are moving at a medium intensity, you can still talk full sentences, but you cannot talk smoothly or comfortably. Your breathing is heavy and prevents you from talking normally.

Everyone should be physically active at a medium intensity for at least 150 minutes per week which is about 25 minutes per day.

Move more and sit less!

Handwriting practice area with multiple horizontal dashed lines for writing.

Functional Training

This will help you improve your ability to do functional activities in daily life.

Functional Activity: _____

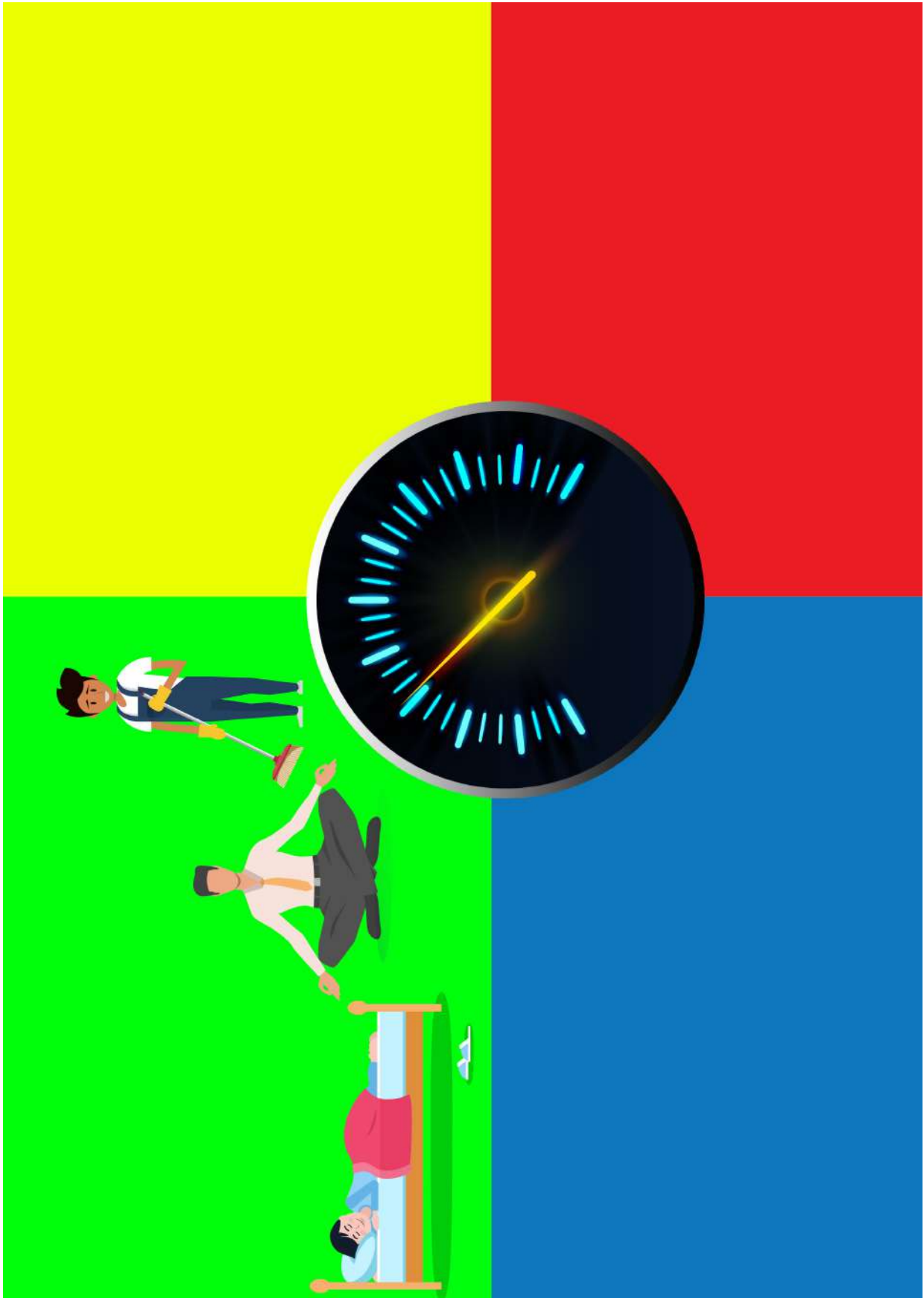
Steps to the functional activity:

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

I will do step ____ every day. I will do this step of the functional activity even if I have pain or don't feel well because this is how I will restore my ability to do the full functional activity.

If possible, I will write down every time that I do this step of the functional activity.

TNE: Speedometer



Developed by Dr. April Gamble DPT, PT

Director of ACR - The American Center for Rehabilitation



Health Plan



Keep Doing

Stop Doing

Start Doing

Beyond Pain ©

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april.dpt@gmail.com

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Beyond Pain © (Eng): ISBN (print) 978-87-93675-41-4

Beyond Pain © (Arabic): ISBN (print) 978-87-93675-42-1

Beyond Pain © (Kurdish): ISBN (print) 978-87-93675-43-8

