

OVERCOME PAIN AN OPTIMISTIC SCIENTIFIC MODEL

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This model provides a treatment framework:

- : for clinicians working with people with persistent pain,
- : from which people with persistent pain can understand their physical rehabilitation process.

This model and explanation is not intended to take the place of one-on-one health care. Before using this model with clients, health care professionals should gain knowledge and expertise in pain management. This model is not intended as a self care approach; people in pain must first seek advice from a regulated health professional.

This is a best-evidence model, based on current scientific findings and clinical experiences from multidisciplinary and private practice pain management settings. As the title suggests, research findings promote an optimistic view of recovery outcomes for people with persistent pain.

The model offers guidance in treatment planning. It is meant to be fluid and adaptable more than rigid, and it is recognized that we have much to learn about the most effective order of interventions and which specific intervention strategies will be most effective for which person.

Less Pain, Move Well, Enjoy Life. These should be the goals of all interventions for people with persistent pain. Whether one is managing medications, performing surgery, providing cognitive behavioural therapy, psychology or counselling or guiding a client through functional restoration these should be our goals. We can do more for people than cover up their pain, train them how to tolerate it better, or improve their function despite the pain. Recent scientific evidence supports a more optimistic outlook: less pain, improved function and better quality of life are possible for many people with persistent pain.

For the person with pain:

- this model offers a way to make some sense of how all the different treatment interventions provided to you will help you attain your goals.
- the goals of this model and the optimistic outlook may be new to you. Skepticism is good, and just like pain it is a useful protective mechanism. If you find yourself so skeptical that you can not fully engage in the techniques recommended for you, then you should spend more time with your clinician on one of two things. Either gain more knowledge about pain science, or focus on trying a few simple techniques which you know will be safe for you. When you can fully and openly engage in them you will truly be able to assess whether this model is going to bring you benefit.
- the model draws your attention to the key areas on which you will need to focus and practice during your rehabilitation. These are based on research findings.
- The model provides a typical pattern for treatment. However, your clinicians may decide, based on your individual circumstances, that you need to begin or progress through treatment in a different manner. We do not know the best plan for every individual. As such you will need to adapt to your own situations, and through guidance from your clinicians find the best way for you to reach your goals.

For health care workers:

This model differs from traditional treatment pain management models. It focuses on pain science and neuroplasticity. It does not discuss traditional medical management, and in no way suggests that medical interventions or medications should be overlooked. The model assumes that medical interventions have been provided and the client requires further assistance with their pain. You will also notice that the model does not identify which health care professional should be providing which treatment. Due to the multifaceted nature of pain, blurring of roles across professions is important and especially necessary when treatment is being offered outside interdisciplinary settings. The model describes a treatment framework instead of allocating who should provide which intervention.

Details are provided below, and the model is on page 13.

THE THEORY AND SCIENCE BEHIND THE MODEL

KNOWLEDGE OF PAIN NEUROPHYSIOLOGY

Pain neurophysiology education provides the cognitive foundation for treatment. This knowledge provides the client and clinician a common language to discuss problems and the potential solutions.

Research has shown that pain education leads to changes in pain attitudes and beliefs, improved perception of ability, improved function, and decreases in activity of brain areas related to threat and danger during exercise. Moseley, in four separate clinical trials, three of which are RCTs, demonstrated these effects in groups with chronic low back pain. Improvements post-education continued to outpace improvements in a control group months after the education.

There is growing support for the benefits of pain neurophysiology education in populations beyond those with chronic low back pain. Clinical experience suggests that when patients with any type of pain understand pain neurophysiology, the threat value of the pain decreases. When fear of pain and of movement decreases, our pain threshold during movement increases, we catastrophize less about the pain, and gain greater self-efficacy. When we “understand pain”, we know how to exercise to recover from it.

Clinical findings from educating groups with chronic pain supports that pain neurophysiology education can be beneficial for people with pain from many different sources and causes. Research is required to ascertain whether there are differences between groups with different medical diagnoses, and the extent to which these benefits impact functional outcomes, yet this is very promising.

AWARENESS AND SELF-REGULATION

Awareness and self-regulation refers to drawing attention to the body (muscle tension; physical sensations other than pain), breath, thoughts, and emotions. People with persistent pain often lose awareness of subtle non-pain tissue and body sensations. It is as if the nervous system is focusing on the danger signals, while disconnecting from normal tissue sensations. People may not realize how tight their muscles might be, or lose the ability to influence how muscles contract or relax. Our breath is another normal physiological pattern that typically changes when pain persists. Yet we are often not aware of this. Given the positive feedback loops believed to be present between pain and altered muscle tension and pain and maladaptive breathing patterns, awareness and self-regulation become extremely important.

Similar feedback loops occur between negative thoughts or negative emotions and pain. In order to regulate these, we must first become aware that they are present. Once aware, we can be instructed and then begin to practice how to alter our thoughts and emotions. This might even require assistance from the skills of a psychologist or counselor.

Awareness by itself can change our experiences, including pain. This seems unlikely to some, but growing evidence shows the brain changes, and pain changes, associated with insight and mindfulness practices. Spending time every day paying attention to your breath, your body, your mind and your spirit is an important pain care technique. If you struggle with this as a concept, please consider this – if you have difficulty paying attention to your breath, body and thoughts, how are you going to know if these are staying calm when you are trying to recover movement? Tensing your body, and holding your breath will make movement more painful - you need to practice awareness so you can practice moving in a way that will increase your success.

Self-regulation is different than awareness. Here you start with awareness, and then work on change. Like awareness, this requires practice, and is not an all or nothing skill. Mastery takes considerable practice, so there is no need to wait for this before moving on within the recovery model. Gain some expertise in awareness and in self-regulation first while positioned in a comfortable position. Then on your first attempts of movements or confronting a stressful situation don't be discouraged if you completely lose awareness of one or all of the breath, body, thoughts or emotions. Continued practice will improve both your awareness and self-regulation of body, breath, thoughts and emotions during (progressively) more stressful/threatening situations.

One aim of self-regulation is to calm the nervous systems – central, peripheral and autonomic. It is believed to decrease activity in the fight and flight aspects of the hormone, immune and autonomic nervous systems, and increase activity in pain inhibitory systems of the central nervous system. These in turn are expected to decrease the responsiveness or hypervigilance of the body's protective systems including the 'pain alarm system'. Thus a person is able to move with less pain. Moving with less pain creates new patterns of neural activity for that movement – ones that do not fire up the threat areas of the brain when you move.

One specific technique to use for self-regulation is the question "Is this safe?" (or as David Butler and Lorimer Moseley suggest, "Is this really dangerous?"). Given that the protective mechanisms of the nervous system are typically on high alert when pain persists, you may feel pain long before there is sufficient force on the tissues to produce damage. As such, the nervous system is interpreting the movement as more dangerous than it really is, or possibly even dangerous, when it is not.

By asking the question, “Is this safe?”, you have the opportunity to decide whether this movement is truly dangerous. If you believe it is not, you can then ask a second question “Will I be okay later?”, or practice the movement with the belief of, “I hurt and I’m okay”. This will train the nervous system that the movement is not so dangerous. (see Butler and Moseley’s excellent Explain Pain book for further information, and). We know from science that thoughts can change body physiology, so give this a try. An even more powerful technique would be to send multiple signals into the nervous system with the same message – “this is not so dangerous”. We can do this by keeping four other ‘alarm systems’ calmer and quieter when we approach a painful movement or activity. Imagine the power of sending messages to your nervous system that this is safe, by keeping your breath, your body, your thoughts and your emotions all calm while you perform your recovery exercises. For example, imagine every time you have lifted a carton of milk from the refrigerator it has worsened your chronic neck pain. If you know that this activity is not dangerous to your body, then the increase in pain is occurring because the automatic processes of your nervous systems are telling you that this activity is threatening. To change how your nervous system responds to the activity, practice it while telling yourself “I hurt and I am okay”, AND while breathing more calmly, while keeping your body tension (including facial expression) calmer, while quieting catastrophic thoughts, and while calming the emotions of frustration that this simple activity is painful. When your nervous systems receive information from all these areas that it is coming to the wrong conclusion about this activity being so dangerous, AND when you can send the same message through many many repetitions, neuroplastic changes will occur - decreasing the sensitivity of the pain alarm systems will be possible.

This example will hopefully also lead you to understand the importance of psychological interventions in assisting recovery for some of us. Most people need to learn coping strategies to calm their thoughts and emotions. Suppression, ignoring the pain, and hypervigilance are three of the most common coping strategies that we learn on our own. Science does not support that these promote the positive lasting changes we desire. Professionals trained in integrating movement and psychology are best-suited to teach advanced coping strategies in these areas.

Key Point

The technique of telling yourself “that an activity is not dangerous’ is of no value if you believe the movement is truly dangerous to your body, or if you believe you will regret this later. Using your ‘strength of will’ to persevere might be a strategy you excel in already, but it often doesn’t lead to lasting positive changes.

GOAL SETTING

People with persistent pain benefit from goal setting. The SMART acronym for goal setting is a great place to start, as it is for most people attempting to make significant changes in their life. Also recommended is to study the video titled From Escape, Calm and Challenge to Daily, Weekly and Monthly Planning, on the Life Is Now Pain Care Pro membership area.

For people with persistent pain there are four specific aspects of goal-setting which are particularly important.

Important aspects of Goal Setting

- i. Clinicians need to teach their clients how to set their own goals and how to move towards them. It is much easier to set the goals for the person, however this will not effectively improve coping skills, and it will not promote self-efficacy.
- ii. Clinicians need to review the goals each week with the client and ensure there is progress. With the end-goal in mind, successive goal setting will progressively expose the person's body and nervous system to the desired task.
- iii. Clinicians need to support and encourage their clients to put their new knowledge of goal setting into practice. As weeks progress, the person should be able to make their own weekly goals and present these to the clinician.
- iv. Clinicians should teach their client the power of imagery. One goal for the client should be to spend time each day seeing themselves attaining their goals. This is asking a person to imagine their desired life until the body and nervous system catch up. From a goal-attainment model, a strong predictor of no improvement is envisioning oneself not getting better.

CHALLENGE THE BODY (Treatment Strategies)

These techniques are typically believed to change the body. They include exercises to:

- : increase flexibility,
- : reactivate inhibited muscles,
- : release tight muscles,
- : improve strength,
- : improve motor control, coordination and stability,
- : improve the cardio-pulmonary system and endurance,
- : increase abilities to perform daily functions.

Differentiating these from 'physical' exercises and activities that are primarily intended to change the nervous system could be seen as unnecessary dualism. However, the distinction is made in this model to assist in the understanding that recovery from persistent pain requires changing more than the body. People do not typically recover from complex persistent pain problems just because they become more flexible, stronger or gain more joint stability – the nervous systems need to change as well. Research has shown that there are specific characteristics of the exercises that promote recovery from persistent pain the best.

You must be focused on what are doing. Without attention, exercise becomes little more than distraction, and provides only temporary improvements.

You must find our activity-specific baseline – An amount of exercise that does not make the alarm scream. Linking exercise with pain flare-ups produces conditioned responses and will not decrease sensitivity of the pain alarm system.

Find activities and tasks that are novel, unique and enjoyable. This will promote neuroplasticity. Even finding new ways to stretch, such as coordinating stretching with breathing patterns could be novel enough to change how the body and nervous system respond during stretching. This could therefore improve the effectiveness of stretching.

Setting progressive goals has been shown to improve functional outcomes in people with persistent pain.

Research has not shown specific exercise techniques that are better for people with persistent pain. Gentle movement patterns that require attention, and are novel are likely to produce positive outcomes. As such, gentle yoga, Tai Chi, Chi Gong, and exercise techniques such as focusing on core stability and motor control, learning to juggle, or Pilates may be particularly beneficially.

Key Points

The techniques described above in the Awareness and Self-Regulation section are potentially what will make the biggest difference in the success or failure when you attempt to recover movement and function. Pushing through the pain, or at the other extreme, avoiding any increase in the pain will not work.

We need an individualized manner for instructing people how much exercise to perform. Starting an exercise program at 50% of a person's tolerance or suggesting they only exercise until the pain level increases 2 points on a ten point pain scale are the common approaches to physical recovery. Pain neuroscience offers what may turn out to be a more effective and individualized approach. Consider teaching people to do as much movement as they can while at the same time staying present and regulating their breathing pattern, their body tension, their thoughts and emotions. The Pain Care Pro membership areas all provide more details to refine these ideas based on individual differences.

If it is not possible to stay aware and to regulate breath, body, thoughts and emotions all at once, then practice and train yourself in each aspect on its own first. Learn calm breathing at rest. Then add in calm breath with calm body. Then add in calming thoughts and emotions. At some point start to challenge yourself by adding simple, gentle movement. With continued practice, make the movements more challenging, while at the same time ensuring that you feel safe during the movement.

RESET THE NERVOUS SYSTEM (Treatment Strategies)

Competitive Neuroplasticity

These techniques are typically considered to change the nervous system, thoughts and emotions. They take advantage of our ability to use the activities of the nervous system to make changes in the body.

Interventions to 'reset the nervous system' include:

- : breathing exercises,
- : relaxation,
- : body awareness techniques,
- : mindfulness,
- : imagery,
- : mirrors
- : visualization.

There is some evidence that incorporating these techniques in the treatment plan will support recovery from persistent pain. Use of imagery, mirrors, and relaxation with visualization have all been shown to have positive outcomes for some people with

persistent pain. Basic science supports the use of breathing, EMG and heart-rate variability biofeedback to counteract objective findings in people with persistent pain. Mindfulness is gaining more and more research evidence of its positive effects. There are no RCTs yet measuring effects of these techniques in heterogeneous groups with persistent pain.

Clinically, interventions in this category should be practiced on their own before incorporating them as adjuncts to the techniques in the 'challenge the body' category. People succeed the most with exercises when they are able to maintain calm breathing, when they can keep their muscles relaxed, including their face and tongue, and when they become aware of and regulate negative thoughts and emotions. Using imagery or mirror exercises before physically moving the body has considerable benefits. For some, it is as important as calm breath, body and mind before the exercise - in order to limit nervous system wind-up. For others, especially when there has been considerable negative conditioning with exercises, these same techniques become important even after the exercise is completed.

Just as attention is necessary during exercise, distraction in the form of suppressing or ignoring one's pain, body or breath should be avoided during exercise. Clinicians need to understand that people are often taught distraction techniques as a powerful way to manage pain.

Due to education we often receive regarding the benefits of distraction as a pain coping skill, and since we all seem capable of readily learning this technique without any formal teaching, people often distract themselves from the pain in order to complete their physical exercises. Some clients are masters at this technique, and some even use or learn to use dissociation as a coping technique during exercise. Clinicians need to teach clients the difference between ignoring the pain, and engaging the nervous system in a positive healthy activity.

As much as winding down the hypersensitive nervous system is important, so is turning on the nervous system's anti-pain mechanisms. The body has systems and powerful chemistry to elevate mood and decrease pain. If you are happy you smile. If you smile you will be happier. This is chemistry and neurophysiology at work. Persistent pain is difficult to overcome, so we should use all the tools now, and not wait for the person to have less pain before they start to smile and laugh.

Anti-Pain Mechanisms

- Rhythmic breathing, and rhythmic movement
- Avoiding the 'posture of being in pain'
- Smiling and laughing
- Doing things that bring you joy, a sense of peace and meaning
- Music
- Gentle movement, activities and exercise

Competitive Neuroplasticity refers to the tendency of the nervous system to 'self-maintain' patterns of activity. When the nervous system has engaged certain neurotags over and over, these become well-learned. Nerves that fire together, wire together. New competitive non-pain provoking neurotags will then be more difficult for the nervous system to retain. A neurotag associated with painfree movement of the body needs to fire off many many times to become strong enough to become the dominate neurotag associated with movement of that part of the body. Given that the nervous system has learned the pain neurotags as protective mechanisms, it is likely that there will be even greater competitive neuroplasticity. Protective mechanisms will be reinforced extensively in the CNS. As such, it may take even more practice for the nervous system to learn new neurotags that are more powerful than the old pain tunes. Whatever a person practices as recovery techniques, they must not reinforce the protective mechanisms. It is as if we need to divert attention away from the protective mechanisms without ignoring them completely, and we need to attend to the pain while slowly learning to engage less and less of the pain neuromatrix.

PRACTICE

Everyone knows that practice is necessary to change the body and to change the mind. As well, everyone will likely agree that it is possible to change the body and the mind – within limits. Let's start with the concept that we have the ability to teach the nervous system, and the nervous system has the capacity to learn anything that we can practice.

There are specific ways to make practice more effective in changing the body and nervous system for people with persistent pain:

- Make the task relevant and engaging.
- Increase attention to and focus on the task.

- Don't practice with any of the following approaches: 'more pain more gain', or 'keep going despite the pain' or 'avoiding any increase in the pain while you exercise'.
- Do a little more each day, or two, or three.
- Find ways to make it fun.
- Measure success and provide rewards. The rewards do not need to be contingent on success, they should also be given just because the person is continuing with the potentially tedious practice.
- Make the exercise novel, and provide unique input. This will produce greater neuroplastic changes. Mix up the exercises, do them in a new place, ask the client to practice while also performing another task (such as while breathing in a new way, or holding the stability muscles in a new way, or counting to a higher number).
- Consider turning on the learning chemistry of the nervous system. Engage the brain in a novel learning technique like learning words of a new language, or learning a new game like Sudoku, or learning a new skill like juggling. Performing these activities daily may promote the learning abilities of the brain.

People in pain need to be focused when they practice recovery techniques/exercises. Attention to the exercise is necessary for changes to be sustained in nervous system activity patterns (Changes in nervous system activity patterns are called neuroplastic change). Find activities that bring some enjoyment, as this too supports neuroplasticity. Find a way to persist, practicing the same things over and over. At the same time, find a way to be compassionate to yourself, so that when change comes slowly you do not 'beat yourself up' or repeat negative self-talk.

Key Points

Practice every day for at least three to four weeks before significant change is expected. Some research has shown no observable changes for 2-3 weeks, and then powerfully positive changes in pain and function.

Practice the new patterns more frequently than the old patterns. Consider this question - Will one hour each day be enough to compete with the powerful pain protective neuromatrix?

Less Pain, Move Well, Enjoy Life

What to do after formal treatment ends...

Don't stop. We do not know the limits of neuroplasticity. Continued daily work on the techniques you have found beneficial is likely to bring you further improvements.

In addition...

Research suggests that in order to maintain neuroplastic changes, an enriched supportive environment, and keeping the body and mind active are helpful. People need to be encouraged and supported to find a way to re-engage in their life or develop new engaging life activities. This will sustain their improvements and potentially lead to even further improvements.

Pain Care Self Management

PATHS TO RECOVERY

