

Understanding Pain

Community Resources
Hunter Integrated Pain Service
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Key messages

It is time to think differently about chronic pain:

1. Focus on the whole person.
2. Know that chronic pain *can* change.
3. Body structures (bones, muscles, discs, joints and ligaments) are less important in chronic pain than the brain and nervous system.

What does pain tell us?

Pain comes from the brain and is one of our mechanisms of protection. The brain weighs up incoming messages from the body and environment. These may include danger signals from body tissues that are under threat or damaged. The danger signals are simply chemical and electrical messages in the nervous system until the brain makes an interpretation of pain. This interpretation of pain becomes more likely when danger messages outweigh safety messages.

There are two main types of pain: acute and chronic. Acute pain lasts a short time while chronic or persistent pain is of longer duration (3 months or more).

The underlying meaning is different for the 2 types of pain. Acute pain typically warns of damage to bodily tissues such as occurs with a broken arm or a surgical procedure. This type of pain usually settles as the tissues heal.

In some cases acute pain does not settle and goes on to become chronic. Chronic pain is usually more about the nervous system and less about damage to tissues. Increased activity or sensitisation in the nervous system can be triggered by “bottom up” messages of tissue damage and also “top down” mind factors such as the perception of threat or fear. Acute pain is more likely to progress to chronic if the person has a sense of being in danger.

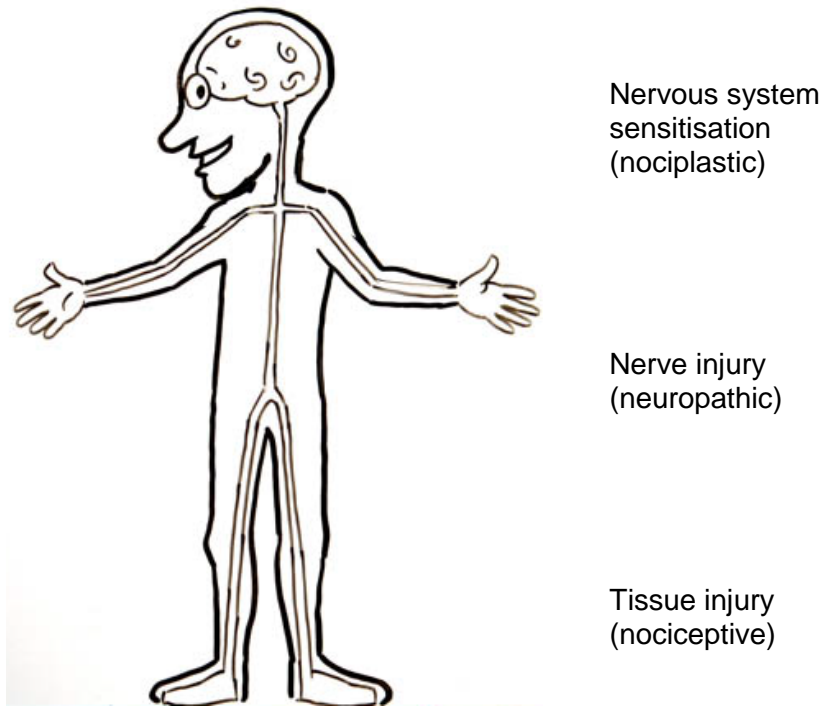
Acute low back pain may be triggered initially by “bottom up” tissue injury messages (eg. from a disc), but if pain persists it is usually more about “top down” mind factors and a brain interpretation of danger. This might involve thoughts and fear of serious damage or anger about the circumstances of the injury.

When pain becomes chronic the challenge is to move away from a focus on the initial tissue injury and switch to modifying the brain interpretation of danger and winding down the nervous system as the mainstay of treatment and recovery.

What are the different mechanisms contributing to pain?

Perception of pain takes place in the brain. However a number of different mechanisms contribute to the way that messages are initiated and transmitted within the nervous system (Figure 1).

Figure 1. Mechanisms contributing to pain



1. Tissue injury (nociceptive)

Pain is part of an early warning system to avoid or minimise tissue damage. Touching something that is too hot, for example, activates specialised nerve endings called nociceptors which relay messages through the nervous system to the brain. The brain makes an interpretation of pain and this in turn leads to protective withdrawal that hopefully prevents a serious burn.

If tissues are damaged an “inflammatory soup” of substances is released locally which leads to nociceptive nerves being activated more easily. For example the nociceptive nerves might be activated by a light touch that would not normally result in pain. In this setting “nociceptive pain” encourages an initial period of rest to aid the healing process. Mostly this type of pain settles as the tissues heal.

2. Nerve injury (neuropathic)

If nerves are damaged this may contribute to what is known as “neuropathic pain”. Increased electrical impulses from the site of nerve injury travel to the brain and are perceived as pain. Common examples include phantom pain after limb amputation (pain felt in a limb that is no longer there), painful diabetic neuropathy (where nerves are damaged by diabetes) and post herpetic neuralgia (pain following shingles infection).

3. Nervous system sensitisation (nociplastic)

Sometimes pain persists after a tissue injury has healed and in the absence of nerve injury. Commonly in this situation the main contributors are brain interpretation and ongoing sensitisation in the nervous system (plasticity or change in the nociceptive system). Sensitisation can occur at multiple levels including peripheral nerves, spinal cord and brain. The situation can be likened to sheep crossing a paddock to get to the

dam. The sheep follow the same route and an animal track forms. In the same way, messages in the nervous system can repeatedly follow well-worn pathways to pain perception areas in the brain. “Nociplastic pain” is thus more about the established track in the nervous system than the precipitating injury.

Although “bottom up” input from tissue injury can play a role in development of nervous system sensitisation, it is the “top down” or mind factors that usually play the more important role. Emotional stress around the time of an acute injury increases the risk of nervous system sensitisation and chronic pain. In addition emotional stress relating to earlier periods of life including childhood can play a role by setting the nervous system to long term alert mode.

The transition from acute to chronic pain

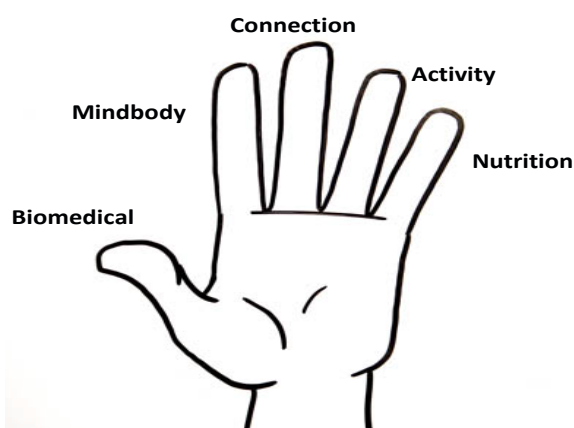
Acute pain is most commonly linked to tissue injury (“nociceptive pain”). Nerve injury (“neuropathic pain”) and nervous system sensitisation (“nociplastic pain”) can also be involved. Generally the acute pain that follows tissue or nerve injury settles as the body heals. However pain can progress to chronicity if a pattern of nervous system sensitisation becomes established. This is most likely, as mentioned above, in situations of threat or emotional stress.

What is a whole person approach to treatment of pain?

Whole person treatment addresses multiple aspects of pain and lifestyle. The standard approach involves steadily weaning passively received medical treatments including medication and transitioning to active self-management. Support from family, friends and health professionals is helpful. The aim in chronic pain is to “retrain the brain”. Pain reduction usually happens slowly over a 6-12 month period, although at times rapid improvement does occur.

Figure 2 shows five key areas that can be considered as an individualised approach is developed. A brief outline is given below. Further information is available at www.hnehealth.nsw.gov.au/pain/ Community Resources.

Figure 2. Whole person approach



1. Biomedical

“Biomedical” treatments such as medication, nerve blocks and surgery have established roles in the treatment of acute pain. In selected types of chronic pain, for example pain associated with osteoarthritis of the hip, joint replacement surgery can have a role. In most cases of chronic pain, medication, nerve blocks and surgery are phased out and replaced by active self-management strategies.

An important part of the medical role is to rule out “red flags” which are indicators of possible harmful underlying structural problems (eg. fractures, cancer, infection, and medical diseases). Checking people’s understanding of pain and where necessary providing a good explanation is another key part of the medical role in chronic pain. There is now good evidence that explaining pain reduces pain intensity. Other aspects of the medical role are support to wean medication, make lifestyle changes and monitor progress.

2. Mindbody

Our thoughts and emotions have an immediate impact on the body. Unhelpful thought patterns (beliefs and expectations) and associated emotions (anxiety and fear) contribute to physical health problems via the nervous, immune and endocrine (hormonal) systems. In the reverse direction it is also true that physical health problems can produce changes in thoughts and emotions. The exercise of charting a **timeline** is one way of looking for important links between stressful periods of life and the onset of health problems such as chronic pain. Learning to be more aware or mindful of mind and body and the links between the two is a key aspect of treating pain.

3. Connection

Many people with chronic pain have a sense of disconnection or isolation relating to people (social), place (environment) or purpose. Therefore one component of treating pain involves re-establishing lost connections. For some this is about spending more time in nature, for others volunteering or joining a group. In whatever form it takes, re-connecting can help to reduce nervous system sensitisation and pain.

4. Activity

Our actions, like our thoughts and emotions, can easily become stuck in unhelpful patterns. Learning to “reprogram” activity is an important part of the overall brain retraining strategy. “Pacing” means finding the right balance and avoiding doing too little or too much. Gradually building activity helps to overcome the fear that there may be something dangerous and structurally wrong with the body. A comfortable daily walk is a commonly used treatment strategy in this area.

5. Nutrition

Mind and body are nourished by clean air, clear water and quality food. Addressing these issues directly improves health. Avoiding smoking and minimising intake of caffeine and other recreational drugs is helpful. Eating more vegetables and less starchy carbohydrate (particularly high glycaemic index carbohydrate) reduces inflammation and nervous system sensitisation. Replacing sugary soft drinks with water is helpful. We have the capacity to adapt and renew as we improve our nutrition. We are not inevitably condemned to degeneration and disease.

A whole person approach aims to retrain the nervous system and restore tissue health. Key components include biomedical, mindbody, connection, activity and nutrition.

Developing your own approach

Questions to consider in developing your treatment approach include:

1. What factors might be contributing to my pain?
2. What might the pain mean in terms of my life story and timeline?
3. What positive changes can I make as part of a whole person treatment approach?

Brian's story

Brian is 44 years old and experiences pain in the low back. The pain began after a lifting injury at work. There had been family and workplace stress in the weeks before the injury. Despite early treatment from his GP and physiotherapist combining medication, gentle manipulation and exercises, the pain persisted. It was still present 6 months later. An MRI scan showed a bulging disc with a tear.

He was referred to a pain clinic. The pain clinic assessment showed that he tended to push past his tissue limits and flare up his pain. He had developed some changes in posture. He felt anxious about pain and his mood was low. There were difficulties in his marriage and he was holding on to anger in relation to the injury. His diet was high in processed carbohydrate and low in vegetables and fruit. He had only been able to return to part time work.

No "red flags" were present to suggest a harmful underlying structural problem. It was thought that the initial tissue injury component of his pain had settled. The usual lack of relationship between structural change on scans and the presence of pain (which relates more to nervous system function) was pointed out. The fact that his pain had become chronic suggested sensitisation in the nervous system.

Following discussions at the pain clinic and with his GP, Brian put a pain recovery plan in place. He began to slowly wean medication. He started eating more vegetables and fresh fruit. He began to pace rather than overdo activity. He recognised that he had been unnecessarily fearful of his pain. He became more aware of deeper emotions and began to let go of anxiety and anger. As he put these strategies in place his pain became less and his level of activity gradually increased.

Summary

1. Pain comes from the brain and signals danger.
2. At times pain continues even after the danger has passed and any injured tissues have healed. This is usually due to nervous system sensitisation.
3. Both mind and body factors can play a role in maintaining nervous system sensitisation.
4. Learning about pain is an important part of treatment to reduce pain.
5. When pain becomes chronic, medications and other medical treatments are usually phased out; active self-management becomes the main focus.

Further reading

[What is this thing called pain? CJ Woolf 2010](#)

Rewire your Pain. S Davies, N Cooke, J Sutton