

Module 1: A contemporary understanding of pain

Introduction

This module introduces the concepts and principles that underlie this entire course and provides the evidence base for its effectiveness. Because understanding how and why you hurt is shown by research to assist in your healing process, we start with education.

Experience Yoga has completed face-face courses with these researchers. All principles and practices have been personally applied and used successfully with yoga therapy clients.

1. Incidence of chronic pain

It is estimated that 20% of adult Australians suffer chronic pain and stress. Chronic pain is estimated to cost the Australian economy \$34.3 billion each year, which equates to \$10,847 for each person with the condition (ABS 2011). This cost is huge and does not reflect the impact on families and relationships, creativity and productivity, and society in general.

Injury is the most common cause of chronic pain (38 percent), though a further third of all people who experience chronic pain are unable to identify the original cause. Other identified causes include arthritis, musculoskeletal conditions, headache, cancer-related pain, post-surgical persistent pain and non-specific lower back pain.

2. Who is the Neuro Orthopaedic Institute (NOI)?

Many clinicians and the public are unaware that here in Australia is an active research and educational Institute, NOI, who for the past 20 years has been educating multidisciplinary audiences on all continents at conferences, universities and postgraduate programmes. Their programs address acute and chronic musculoskeletal, peripheral, and neuropathic pain states. NOI reinvests in education and clinically based research and the demand for their resources has grown exponentially.

There are five critical and essential features of NOI, and these are that:

- Injury or disease does not mean that you feel pain.
- The nervous system moves and stretches as we move.
- Pain, stress and performance are outputs of the brain.
- Knowledge and movement are the greatest pain and stress liberators.
- Nervous system plasticity gives new hope and techniques in recovery.

We all seek answers for many health problems and active answers are not often provided in the health domain. Many problems such as chronic pain and stress are still 'off the radar' in terms of health professional, business and government understanding.

The usefulness and effectiveness in healing through therapeutic education is underestimated and education is the vital link to healing altered sensations in your body.

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3. The biopsychosocial approach

Bio = Biological factors = your anatomy, physiology, genes

Psycho = Psychological factors = your mood, personality, behaviour

Social = Social factors = your cultural heritage, socioeconomics, familial situation,

A traditional medical approach to injury involves a search for a cause, is a disease focus and the patient/person is largely passive in the process. Many of you will have engaged in this approach with varying degrees of success and effectiveness.

However, a biopsychosocial approach seeks to create change through education and active involvement of you, self-management of home practices, and addressing your psychosocial contributing factors. It takes the approach that 'knowledge is power' and invites you to reclaim the driver's seat. It focuses on the neuroplasticity of the nervous system and brain, that pain is an output from the brain and that physical activity does not have to be harmful and is in fact beneficial.

4. Understanding why and how you hurt

Understanding why and how you hurt is therapy – in other words understanding the mechanisms of pain is shown by research to assist in your healing process.

It is known that the amount of pain experienced in your body does not always relate to the amount of tissue damage. You will have experienced this, as most likely your sensations/discomfort have continued despite the injury/surgery/treatment being some time ago.

Essentially the brain continues to respond based on how much danger it 'perceives' you are in, not on how much you are actually in. If your brain thinks a part of your body is in danger and needs protecting it will make it hurt. There are neurons in your tissues that respond to all manner of stimuli; if sufficient to be dangerous to the tissue, a signal is sent with neurotransmitters (hormones) to your brain. And these messages keep getting sent to your brain saying that your body is in danger even after your tissues are better. This is called nociception or danger reception, but this (nociception) is neither sufficient nor necessary for pain.

Despite how it might seem there is no such thing as a pain receptor, a pain centre, pain pathways. This is really important to understand and accept. Pain occurs as a distributed phenomenon in the body and brain, that is why it is so 'tricky' to treat.

5. How it shows up in the brain

As I've said there is no one pain centre in the brain, many areas become involved. Although the pain experience is distributed in the brain, common areas are activated. These areas become over sensitive and get 'hijacked' into responding. This is called a pain neurotag. This can create other hypersensitivities for you, like to noise, light, temperature etc

Imaging techniques of the brain show representations of these 'pain' experiences. For example, emotional pain 'lights up' and looks similar to physical pain. Cognitive factors e.g. anticipation of pain can cause the same brain responses.

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It is fascinating to know that there is 200,000 km of cabling in your brain and that much of this cabling is replaced every few months and fully replaced every 6 months. This means that these pathways can be changed.

Another way of imagining this activity in your brain is that there is an orchestra in the brain. A good orchestra can play many tunes however when the brain gets stuck and plays the same tune over and over, it becomes automatic. It is not a happy tune and curiosity, creativity, adaptability are lost!

6. What can we offer the physical body?

The initial anti-inflammatory response in the early acute stage is beneficial however it is vital to turn this down with healthy movement as soon as is practicable. Practices like yoga, tai chi are ideal as the nerves in your body move, slide and glide as you do – yoga gets that healthy sliding back!

Your body parts are virtually represented in an area of your brain called the homunculus. This is where the receptive fields (or neurons) for particular body parts are represented. This virtual representation refines and changes over time. It also codes for space so the more sensitivity required, the greater the representation. In other words, the more your experience of back pain, the larger this area for your back in your homunculus becomes. So, the more sensitised your responses, the more sensations increase. The good news is though that this can be modified.

We can treat the representation of the injury/body area. We aim to activate (or exercise) the body/body parts without turning on the pain response. We aim for normal movement as early as possible, even visualisation. Cognitive factors, like your thinking processes, can also turn this area up or down!

We call this homuncular refreshment so yoga movement reverses/changes brain representation and is ideal to promote more usual movement and function.

7. What are these systems – and why do I need to know about them?

- the autonomic nervous system
- the neuroendocrine system

The autonomic nervous system is a control system that acts largely unconsciously and regulates your heart rate, digestion, breathing rate, and other important functions for your survival. It comprises the two parts of your nervous system - the sympathetic (active state) and the parasympathetic (calm state).

Chronic pain and stress are associated with the sympathetic nervous system (SNS) which increases your levels of adrenaline, changing your tissues, nerves and sensors. This magnifies the 'pain' message and your brain responds by increasing the uncomfortable sensations in your body.

The parasympathetic nervous system (PNS) is the calm state of your nervous system and is more engaged at night, when asleep, at rest, and during meditation. So, for example, if your sleep is disturbed and restless, there is less activation of the calm state of your nervous system and so again your sensitivity is increased.

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The neuroendocrine system controls your reactions to stress and regulate many body processes, including the immune system, mood and emotions. This system is great for short periods however get edgy when ON for too long. Cortisol levels can be chronically altered, affecting memory, mood, immunity.

8. Meet your DIM/SIMs!

OK so now it's time for a practical tool for you to use each day!

As described previously, pain exists when your credible evidence of 'danger' is greater than your credible evidence of 'safety'. Pain does NOT exist when your credible evidence of **safety** is greater than your credible evidence of danger.

DIM = Danger In Me
SIM = Safety In Me
(refer handout)

It is important to understand that a person's normal setting of their DIM/SIMs (danger and safety) may be higher than others. For example, just thinking about pain for some people may push the indicator up.

The Protectometer, as its name suggests, is a guide to **protect you**. It was developed by NOI and is available as a complete workbook to purchase from NOI, which may be a consideration once you've completed this course.

The Protectometer invites you to identify and label what creates a sense of danger in you and what creates **a credible sense** of safety in you. It includes the things you see, hear, smell, and taste; the things you say; the places you go; the things you do; the things you think and believe; the people in your life.

Once you have finished listening to this audio, there is a handout to download and complete. I invite you to spend some time with this to identify your DIMS/SIMS. This is an aid or tool to expand your awareness and may be one aspect of a personal Skype call with me during this course.

DIM/SIMs are said to hide in hard to find places - so start with a DIM that is easy to change! For me, a SIM is to go to my happy place (my yoga studio) and rest..

The Protectometer was developed to identify your protective feelings around pain. However, the researchers discovered that it also assists people to work with other protective feelings like stress, fatigue, phobia, depression and anxiety. These latter feelings often accompany and are apparent in those with persistent pain.

9. What can we offer the mind?

Hopefully you are now aware that the brain ultimately makes the final decision about whether something is 'dangerous' to you and what action is required. The pain 'neurotag' (we talked about this in section 5) can light up across your brain even when you imagine or see someone else doing the movement (or being in the place) that hurt you.

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There are over 500 places in the brain that are in action during pain sensations - we can't just fix/replace one bit, it's all related.

Your thoughts also affect the brain as they are nerve impulses that release chemicals (known as neurotransmitters). Scientific research has shown that thoughts are enough to increase your 'pain'.

But remember, pain is the defender not the offender.

A person's concept of their problem or issues and how they talk about them, the words they use, is usually metaphorical. For example, you may hear people say:

- My shoulder is stuffed;
- That pain cuts like a knife;
- My bones are crumbling;
- Even their whizz band machines can't find the problem – it must be bad.

More helpful thoughts are:

- It's a stiff shoulder
- I feel strong sensations
- I can strengthen my bones with exercise – what a great way to keep fit!
- Zings and zaps occur in the body, but this doesn't necessarily mean permanent damage

As we now know that the brain is affected by the quality of your thinking, it is vital that we use words/language conducive to healing. From now on in this course, the word 'pain' will be replaced with phrases like: altered sensations, increased discomfort,