



A1: Understand the pain system

What is Pain?

Generally, pain is useful because it tells us something is wrong and that we need to do something about it. Acute (short-lived) pain occurs as part of the normal healing process, it is time limited. It is a warning, a danger signal. It protects us. Without it we would not notice danger or injury.

Chronic pain

Chronic pain is rather more complex. We describe pain as “chronic” or “persistent” if it lasts for longer than it takes for something to heal. It continues to fire “danger” signals when we no longer need the warning. When pain persists for months or years, the nervous system itself changes.

To put this another way, the relationship between “damage” and pain seems to break down altogether. The brain becomes better at producing pain. And the tissues and signalling nerves become more sensitive.

The longer you are in pain, the better you become at producing pain.

That sounds like very bad news. BUT – the body and the brain are very good at changing and adapting. Pain management is about reducing the sensitivity and turning down the pain “volume”.

Examples of how complex pain is:

The amount of pain we feel does not equate to the amount of damage in our bodies. Sometimes we have a lot of pain and very little damage.

For example:

Injuring your fingernail, having toothache, stubbing your toe... it is said that passing a small kidney stone is agonising.

You can probably think of many more examples.

Sometimes people have severe injuries and feel very little or no pain.

For example:

Deep burns, severed spinal cord, injuries on the battlefield, sports injuries during a game. You can also have pain in a part of the body that has been removed - phantom limb pain.



Why is persistent pain so different to acute pain?

Persistent pain is a result of changes in the nerves, tissues and brain. This is called **plasticity or bioplasticity**.

Bioplasticity is a term that means the body can adapt and change. This can be a good thing.

Helpful plasticity:

- You can become stronger if you regularly lift weights
- You can become smarter if you study and learn
- You can become fitter if you exercise regularly
- You can recover function and speech after a stroke
- You can use relaxation or meditation to reduce stress symptoms

Unhelpful plasticity: Changes in the brain can make pain output worse over time. The longer your nervous system has been “protecting” you, the better it becomes at doing so. The brain and the nervous system become more sensitive.



When our nervous system “**over-protects**” us, other changes begin to happen too:

Have you noticed any of the following since you have had pain?

- Changes in Movement?
- Changes in emotion?
- Changes in sleep?
- Feeling tired?
- Worrying all the time?
- Short fuse?
- Change in the pain itself?



Why is the sensor lit up?

An interesting article by Atul Gawande in 2008 describes what is now accepted as the reason we have persistent symptoms such as pain. He says it is the “brain’s best guess” at what is going on

“ perhaps many patients whom doctors treat as having a nerve injury or a disease have, instead, what might be called sensor syndromes. When your car’s dashboard warning light keeps telling you that there is an engine failure, but the mechanics can’t find anything wrong, the sensor itself may be the problem. This is no less true for human beings. Our sensations of pain, itch, nausea, and fatigue are normally protective. Unmoored from physical reality, however, they can become a nightmare..... hundreds of thousands of people in the United States alone who suffer from conditions like chronic back pain, fibromyalgia, chronic pelvic pain, tinnitus, temporomandibular joint disorder, or repetitive strain injury, where, typically, no amount of imaging, nerve testing, or surgery manages to uncover an anatomical explanation. Doctors have persisted in treating these conditions as nerve or tissue problems—engine failures, as it were. We get under the hood and remove this, replace that, snip some wires. Yet still the sensor keeps going off.”

(From: Scratching an itch through the scalp to the brain by Atul Gawande)

We can’t “control our brains” as such. If the brain believes there is a threat, you are going to hurt. However... if we understand the threats better, we can “hack” pain neurology and very often turn the sensor down or even eliminate it.

The brain’s job is to decide: is this dangerous? Is it worth producing pain?

Our tissues are constantly sending messages, via our peripheral nervous system and spinal cord, to the brain. Those messages are the communication with our brain about what is happening in our body. The brain has to make sense of those messages, and does this by combining them with other sensory messages we are receiving, for example: what we see or hear, memory of what we have experienced before, how we are feeling, and what we are expecting. If those messages represent a threat, that is when the pain alarm is triggered; so the pain alarm is a threat alarm, triggered when the brain perceives danger, and is an output of the Central Nervous System designed to keep us safe/protect us.

You will experience pain when your brain concludes that there is more credible evidence of danger related to your body than there is credible evidence of safety related to your body.

What's emotion got to do with it?

Pain is regulated by your central nervous system (your brain and your spinal cord) but it is never "all in your head". So why do we need to manage mood when we are managing pain?

Fear and anxiety have probably more power to aggravate pain than any other emotional state. When we are frightened or stressed, we release stress chemicals. Our bodies get more tense and our pain increases. Pain causes stress and, physically, stress causes pain. Pain also causes low mood and depression causes more pain, insomnia, changes in thinking and more bodily symptoms. All the time, our brains and our bodies are working together. It is vital that we manage our mood and stress levels as well as we can. Pain Management programmes can help you learn the skills and tricks to do this. This is why we have a pain psychologist and we teach relaxation and stress management.

Take a break and watch a video on You Tube:

Type 'Lorimer Moseley why things hurt' into your search engine or click the link below. It explains nicely how complex our brains are when assessing danger and producing pain.

TEDxAdelaide - Lorimer Moseley - Why Things Hurt

When your pain is manageable, you will have more SAFETY IN ME messages. When your pain is worse and when it is distressing, you will have more DANGER IN ME messages.

Examples of danger messages:

- Belief that pain is a sign of damage
- Hearing that your discs are "gone"
- Worrying about what is on your MRI scan
- Staying at home all day
- Fear of movement and exercise
- Anxiety and worry

Examples of safety messages:

- Understanding that hurt does not always mean harm
- Having fun with friends
- Gentle exercise
- Feeling relaxed
- A nice warm bath
- Feeling listened to and understood

Have a look at the "**protectometer**" and think about the things that make your pain experience worse (danger in me) and better (safety in me). You can make a list of these later.



The good news

Scientific studies over many years have shown that pain management can address many of these changes. Pain management helps you to adapt back to “normal” and will slowly help you reduce pain, distress and disability.

Pain management will help you to:

- Move differently
- Become fitter and more flexible
- Breathe differently
- Think differently (understand your pain system and not fear pain)
- Behave differently (respond differently)

How will I be able to do that?

We can reduce danger messages and increase safety messages. We can slowly change movements, habits, thoughts, beliefs and worries. Over time, these changes will reduce the sensitivity of our nervous system.

DIMs and SIMs

“Danger in me” DIMs

“Safety in me” SIMs

Think of all the things / thoughts that seem to make your pain worse and more distressing (DIMs)

1

2

3

4

5

6

Think of all the things / thoughts that seem to make your pain easier and less distressing. (SIMs)

1

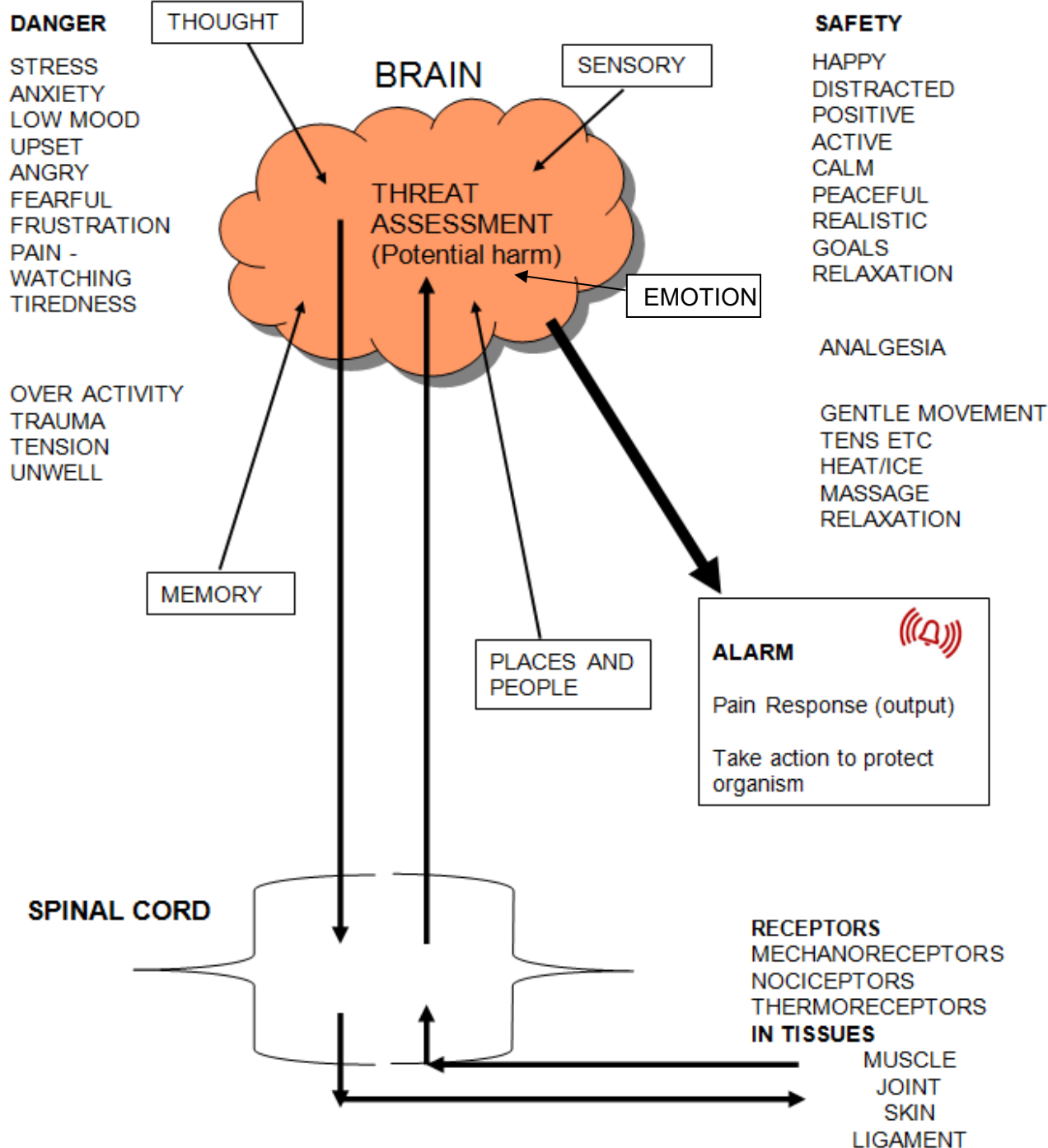
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REMEMBER
 Pain experience doesn't necessarily equate to tissue damage
 It is a complex system with subtle influences
 It is a powerful system which you can influence in positive or negative ways

These can be 'grumpy structures'