

# UNDERSTANDING PAIN

## Information for you

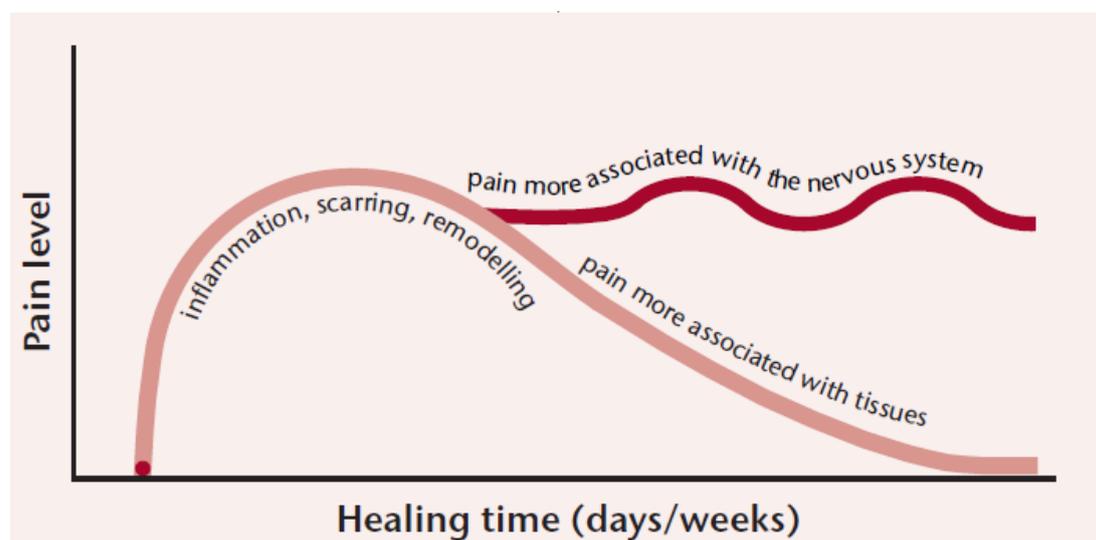
### Why do we feel pain?

Pain can start for a variety of reasons, it may be the result of tissue damage, for example after an injury or because of a medical condition. Sometimes though, there isn't always an obvious reason.

Pain is normal and helps us in situations of potential danger. For example, if you put your hand on a hot iron you would quickly remove it, due to pain.

Pain that lasts less than three months is usually called acute pain. This is shown as the lighter line on the diagram. In acute pain, it is useful for the brain to perceive a threat and give us the experience of pain so we take action to facilitate healing. For example, by walking less for a short while after twisting an ankle. Most often, acute pain settles with time, although it can be up and down and come and go.

However, sometimes pain doesn't settle even though any injury may have healed, leaving the person with chronic or chronic pain. This pain serves no useful purpose and affects the lives of many people, their family and friends. The remainder of this hand out concerns chronic pain.



(Diagram from Explain Pain, P.71.)

### Chronic Pain

Chronic pain is pain that has continued for more than 12 weeks. This is shown as the darker line on the diagram. It is different to acute pain as it is caused by the pain system 'not resetting itself back to normal' after an injury or persisting when there is no obvious injury or disease - for example, in 'non-specific' low back pain or fibromyalgia (pain in the muscles

and ligaments). In chronic pain, it is not useful for the pain system to produce pain, as there is usually no threat or no new threat.

### **How we used to think pain worked**

Years ago, it was thought that the amount of tissue damage (for example, from an injury or disease) determined the amount of pain you had.

But this doesn't explain why:

- Some people in pain are told that everything seems normal when they are examined and they have normal or near normal X-rays and scans. This may have happened to you. It can be confusing, and you may feel that your physiotherapist or doctor doesn't understand or believe you.
- Some people have lots of changes on X-rays and scans but don't feel much pain or have very little pain. These age-related changes are a part of life, just like getting wrinkles. Sometimes the changes are given worrying names like 'wear and tear' or 'degeneration'.
- Some people have changes on x-rays or scans but they don't seem to match with their symptoms or explain their pain

**It is possible to have pain without tissue damage or disease and it's possible to have tissue damage without pain. Even if there is tissue damage, this doesn't always seem to match with the amount of pain someone is feeling.**

**It seems that pain is much more complicated than we used to think and investigations are often not that helpful in telling us why someone hurts.**

### **What we now know about pain**

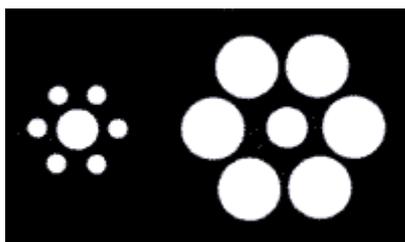
The problem isn't so much in the tissues, but in the pain system.

Research has taught us that the pain system gives us the experience of pain in response to a perceived threat.

It can be hard to believe that pain is not necessarily in the part that is 'hurting' and that pain is actually 'produced' by the pain system. An example that illustrates this is phantom limb pain. This is when a person who has had a leg amputated feels pain in the foot, even though they no longer have a foot.

Different parts of the pain system are involved in us experiencing pain, including the nerves, spinal cord and brain. The brain processes a huge amount of information, including sensations from the body, thoughts and feelings. It 'weighs up' all of this information and if it perceives it as threatening it gives us the experience of pain. This creates a very personal experience of pain, different for each person. As part of this, there might be some potential tissue damage messages coming the body, although there don't need to be in order for someone to feel pain.

Sometimes the brain gets it wrong, and there is no threat. Look carefully at the centre circles on both the left and right. Which circle is bigger?



Did you say the circle on the left? They are actually both the same size. This is an example of how the brain sometimes gets it wrong. Here, the brain is telling us that we are 'seeing' the left circle as bigger when in fact it isn't. Similarly, the pain system can tell us that there is a serious problem or tissue damage, when there isn't.

### So how does this happen?

There are three main things that contribute to this.

1. Chemical and electrical changes in the pain system (nerves, spinal cord and brain) mean the pain system becomes extra sensitive and responsive to certain messages in the body. This process is called sensitisation. A number of different changes take place as part of this process, including:

- Nerves that transmit potential tissue damage messages start to be very sensitive and carry a lot more of these messages to the spinal cord and brain, even though there may be no tissue damage. After receiving all these additional messages the brain produces more pain in return. It's a bit like turning the volume up on the radio. This is why someone lightly touching your skin or normal movement can be painful.
- Messages and nerves can fire off randomly with no stimulation at all. This is why you can sometimes experience sharp pain when you haven't even moved.
- Nerves that don't normally transmit potential tissue damage messages start to do so and the area covered by each nerve increases. This is why over time, it can feel like the pain is spreading. All these changes help explain why someone can feel pain in response to normal touch or movement and why treatments directed at the tissues (bones, muscles, nerves etc.) might have only provided limited or short-term benefit

2. Difficult life events, anxiety, stress, worry or low mood can be perceived by the brain as threatening thereby resulting in pain or can 'wind-up' the pain system, resulting in the pain system producing more pain.

- Research has shown that what we think, feel and do are very important in explaining how much pain we feel. This is because many of the same chemicals and electrical activity involved in pain are involved in emotions and thoughts, as are the same areas of the brain. However, this does **not** mean that pain is imaginary or psychological. It is very real. Of course, in turn, having chronic pain often results in low mood and worries.

3. The things that we do or don't do in response to pain can also make our pain experience, how much we suffer, and the impact that pain has on our lives greater or lesser. The good news is that there is a lot that we can do about this.

- As a result of these changes, the pain system and brain becomes 'wound up' or on 'high alert'. Even the slightest thing can be perceived as threatening, when it isn't. It could be compared to your house alarm system going off. The alarm thinks there is a burglar in the house, when in fact, it's the cat. In the same way, the brain can perceive a threat and respond by producing pain, when in fact there is no new or on going tissue damage.

### **What does this all mean for me?**

What we have tried to explain is that pain is much more complicated than we used to think. It has produced by the pain system. The brain 'weighs up' lots of different things including any potential tissue damage messages, your thoughts, feelings and previous experiences. If it perceives a threat, it gives you the experience of pain.

Although it is usually not possible to get rid of chronic or chronic pain, with help, there is much that you can do to lessen its impact on your quality of life.

The other information sheets in this series will give you reliable, evidence-based advice to support you along the way to improving your function and quality of life, with pain.

### **So pain does not necessarily mean there is any new damage in my body.**

That's right. The result of all of these changes is that the pain system itself generates and maintains pain even when there is no on going damage and even after any original injury, if there was one, has healed

Further information is available from:

- [www.chronicpainscotland.org](http://www.chronicpainscotland.org)
- [www.nhsinform.co.uk/msk](http://www.nhsinform.co.uk/msk)

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