



12. Pain



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There are two main types of pain.

Acute Pain is basically a warning of harm to the body, either as a result of internal disease processes within the body or damage caused by accident. It is part of the fight and flight reaction to ensure further harm is minimised.

Chronic Pain is a much more complex problem. Unlike acute pain it serves no immediate biological purpose even though it can affect the whole of the patients' life. Often it will become part of the 'opt out' clause associated with clinical depression and clinical anxiety.

Pain is a sensation which is felt when nociceptors are stimulated.

Nociceptors send the pain sensation to the spinal cord through nerve fibres.

Subsequent transmission to the brain is via A-Fibres, short, sharp and well localised. (This fast pain is often referred to as 'acute') or C-Fibres, burning, aching, poorly localised. (This slow pain is often referred to as 'chronic').

A-fibres are fast transmitters and take precedence over C-Fibres. This is why, if there is chronic pain and a new injury is sustained, the new injury will take priority and block the old C-Fibre message.

The fastest A-Fibre of all is a specialised fibre that transmits sensations of pressure, touch and vibration. This is why rubbing or massaging the area of pain can close the pain gate. In effect it provides competing counter stimulations, or distraction, that can block the pain from registering or even reaching, the brain.

These A-Fibres and C-Fibres carry the pain 'message' to the thalamus. Fibres from the thalamus project to the primitive brain, particularly the amygdala, which explains the emotional aspect of pain manifestation. Other fibres 'informing' the hypothalamus explain autonomic changes associated with pain such as increased heart rate, sweating, fainting etc. Finally, some fibres move to 'inform' the frontal lobes which explains behavioural affectation which can be a 'proper assessment' or otherwise.

There are still other fibres, mostly in the C-fibre category, that instead of being responsible for sending nerve impulses to the brain send nerve messages from the brain down to the spinal cord. This can become a constant,beit redundant, circuitry.

According to Melzack and Wall, the Pain Gate Control Theory, when this circuitry is controlled, nerve messages that carry pain signals are blocked. This control can be initiated in the spinal cord when the nerve fibres carrying pain synapse with neurons called Transmission or 'T' neurons. When T neurons are activated to release excitory neurotransmitters it opens the gate. When, 'T' neurons synapse with other neurotransmitters it can have an inhibitory effect thus closing the gate. Inhibitory neurons can be excited by the production of serotonin and noradrenaline. Inhibitory neurons secrete endorphins and enkephalins.

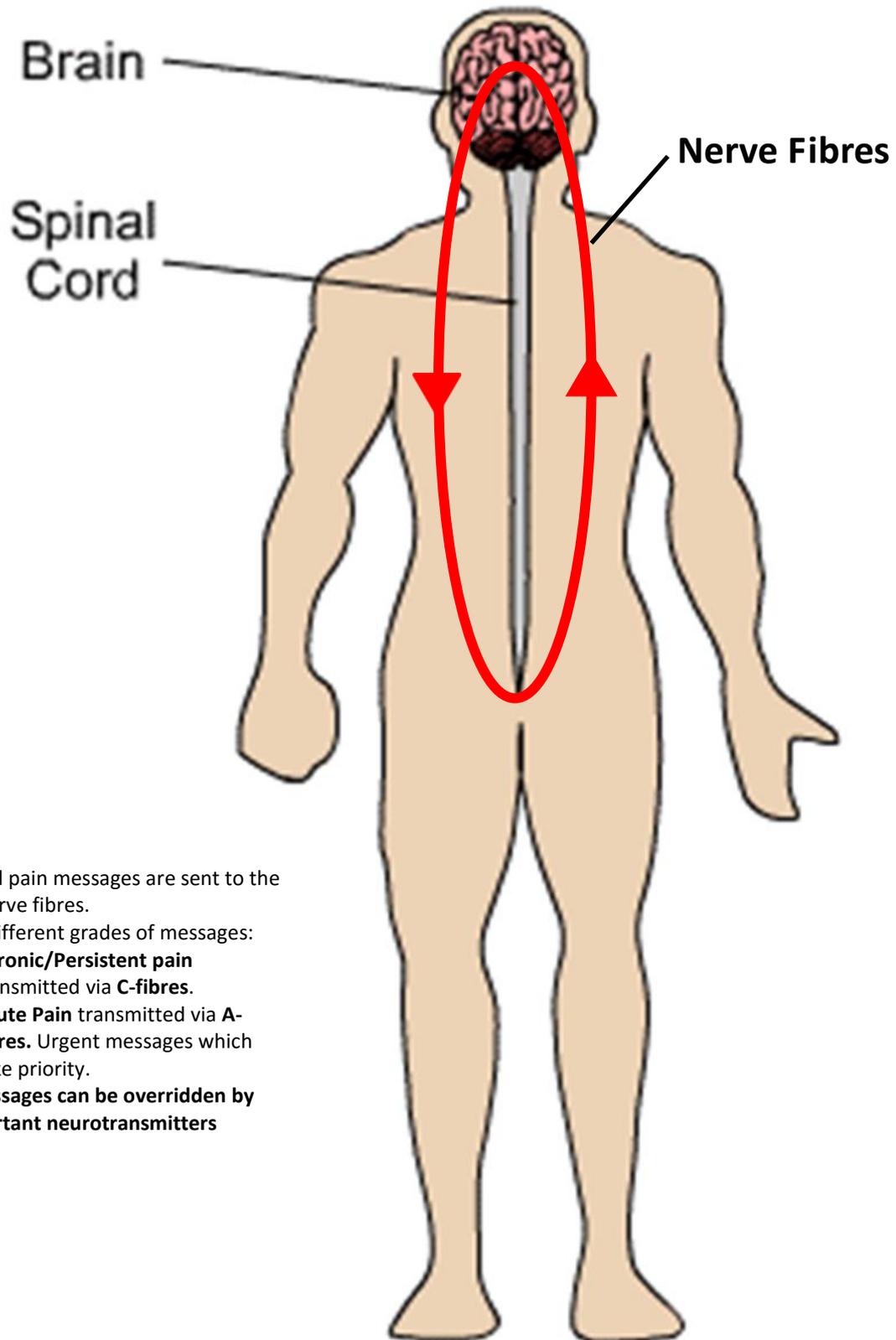
It is because of this latter fact that certain antidepressants (SRI's, TCA's) can help in controlling pain as well as depression.

If pain sensations are not blocked or inhibited before they travel back up the spinal column other mechanisms can still influence the final outcome. One such mechanism that increases the intensity of pain is the sympathetic nervous system. It causes the release of neurotransmitters associated with stress hormones. Things that can modulate pain are associated with the parasympathetic nervous system. Simple relaxation can initiate this response.

Clearly the production of serotonin and noradrenaline, and subsequently the production of endorphins and enkephalins, are important factors in helping with chronic pain. Subsequently the brain will decide that the chronic pain message is unnecessary. This could take some time.

About twenty-five years ago a Dr Steve Allen, Senior consultant at the Reading Pain Clinic, recognised that to properly address chronic pain all aspects must be addressed. "There could be a nociceptive element to the pain but other factors may be equally or more important. Physiological, behavioural, cognitive, social and emotional factors will play significant roles".

Simple Pain Message Diagram – Pain Gate Theory



Sensory and pain messages are sent to the brain via nerve fibres.

There are different grades of messages:

- **Chronic/Persistent pain** transmitted via **C-fibres**.
- **Acute Pain** transmitted via **A-fibres**. Urgent messages which take priority.

C-Fibre messages can be overridden by more important neurotransmitters