

Complexities of pain perceptions



Pain perception is a complex experience that is not simply dependent on physical injury

Pain is a complex unpleasant sensation and emotional experience that affects everyone at some point in his or her lives, as defined by the International Association for the Study of Pain as ' an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.' (IASP, 2007). Pain has the important function to serve as a warning of potential harm to the body, however it can be experienced in the absence of physical injury, here several examples will demonstrate that pain perception is not solely dependent on physical injury.

Pain can be classified into two types; chronic pain that can be experienced when an individual continues to feel pain after the initial injury has healed, the intensity of the pain may not be proportionate to the severity of the original injury. In the case of chronic pain syndrome, it is clear that the pain experience has two components, a sensory component, when the body detects the physical pain and an emotional component associated with the pain such as depression, anxiety and fear. Acute pain typically lasts a short amount of time, the degree of pain is most relative to the injury, and is caused by damage to tissues for example stubbing your toe. The body uses the spinal reflex pathway as a fast and involuntary response to a sensory stimulus that acts to protect the body from noxious stimuli, but does not reach the brain; it forms a process called a reflex arc. The muscle contracts and moves the body part away from the damage.

In addition to this pathway, the pain system involves another pathway which pain information can travel, a study carried out by Susanna Bantick, (Bantick et al., 2002) hypothesised that attention distraction would have an effect on pain processing in the brain. In the study, participants were given tasks, which required cognitive processing, thus reducing the amount of attention on the painful heat stimulus. Bantick's results showed there was a decrease in the activity in the spinothalamic pathway, which carries the information about the painful stimuli from the thalamus onto the somatosensory cortex. When participants were distracted, there was an increase in ACC activity, implying a greater signal is sent to the spinal interneurons that act as the gate in the spinal cord, which suppresses the pain information from the body to the brain via the spinothalamic pathway and pain is reduced, leading onto the gate control theory.

Dr Ronald Melzack's gate control theory (Melzack and Wall, 1965) is the most influential to date; it suggested that there were little cells in the spinal cord that can 'close off' the pain pathway to the brain. Information is then unable to reach the brain and pain is not consciously perceived. Information can be carried away from the brain to the spinal cord and begins in the periaqueductal grey (PAG), activated by touch neurons and cognition, it excites interneurons in the spinal cord, the interneurons form synapses with transmission cells in the spinothalamic pathway. These interneurons can release two neurotransmitters, GABA and enkephalin, which have an inhibitory effect on the transmission cell, reducing the creation of action potentials and decreasing the activity in the spinothalamic pathway, overall reducing pain perception. Melzack's theory is supported by phantom limb

pain, pain is experienced as arising from a limb that is not there, and therefore the noxious stimulation cannot be arising from that location.

Leading onto the fact that pain is not only a sensory and cognitive experience, but also involves non-physical events, which trigger pain unpleasantness called psychogenic pain, for example social rejection and grief. In a study by Gündel et al. (2003) an fMRI was used to measure the activity in women's brains who had experienced a recent death of a loved one, images and verbal descriptions of strangers and the deceased were presented, the region of the brain responsible for pain showed some activity when a loved one was shown. However, there are situations where there is no relationship between noxious stimuli and pain perception, Henry Beecher observed that soldiers during the Second World War initially perceived significantly less pain than the injury causing them considerable noxious stimuli should have produced. Beecher stated that 'the intensity of suffering is largely determined by what the pain means to the individual' (Beecher H, 1956) concluding that the perception of pain depends on its context.

Ultimately, many factors play a part in dictating a person's pain perception, from chronic pain, to attention as demonstrated by Bantick's study (Bantick et al., 2002), and emotion. Pain is a complex and subjective experience that varies in location, duration, and unpleasantness and can range from the inability to perceive pain, to the perception of pain in an amputated limb, illustrating that pain is not solely dependent on physical injury

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