Referred Pain Encyclopedia Article

Referred Pain

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Referred **pain** is the perception of pain in a region of the body that is not the actual source of that pain. One of the most common examples of this would be the radiating pain down the left arm experienced during a **heart** attack. What is the anatomical basis for this phenomenon? One explanation may lie in the number of pain receptors found on the skins surface and those of the internal **organs**, and the mechanism and hierarchy for how the **brain** is able to process the signals from these receptors. The number of cutaneous receptors is much greater then those of internal structures.

Pain sensation is caused by rapidly conducted action potentials (the electrochemical propagation of a nerve signal) from large-diameter myelinated axons, and more slowly propagated action potentials carried on smaller less myelinated axons. The former results in a sharper, more localized pain where as the latter causes a diffuse, or burning pain. Pain on the skin surface is highly localized due to the number of pain receptors and the presence of **mechanoreceptors**. Deep or visceral pain is much more diffuse. Referred pain may simply result from convergence of the two types of pain action potentials on the same afferent **neurons**. It is likely that the brain cannot distinguish the source of these two stimuli so the more rapidly propagated signal is given a preferential priority.

Other examples of referred pain often include the gall bladder referring pain to the top of the right shoulder, a **diaphragm** problem felt in the neck, and intestinal dysfunction felt in the middle or the low back. Referred pain can be a valuable diagnostic tool. Often the clinician is able to diagnose a condition or disease based on the typical location where the pain is referred.