Understanding Acute & Chronic Pain

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The purpose of this article is to provide the non-health care practitioner with a useful understanding of current concepts of pain. Pain is a universal human phenomena, yet one that is difficult to define or quantify. The primary goal will be to explain how acute and chronic pain differ and how that difference is critical to your treatment plan. A situation often overlooked by the health care practitioner is when a patient makes the transition from acute to chronic pain. The implications of overlooking this sometimes easy-to-miss changeover can mean the difference between success and failure. The medical profession utilizes a specific time frame (six weeks or three months are most common) to determine when a patient's pain becomes "chronic". It is the individual's nervous system that creates changes in how the "pain message" travels through your body that is the most important factor, as it requires that the treatment interventions be altered. "Chronic pain" is not simply "acute pain that last a long time". This understanding often leads toward initial interventions that are comparable for both acute and chronic conditions in the form of pharmaceutical agents (anti-inflammatories and analgesics) and rest. The focus of this material will include the biological changes that occur in both anatomy and physiology and how this information can help people develop appropriate self-treatment strategies.

The first issue to be addressed is "what is pain"? The International Association and Society of Pain (IASP) definition includes " Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage". The key words in this passage may be actual or potential. The brain is the mediator between sensory input and physiological output and as such constructs the reality we perceive. The sensory information received by the peripheral bodily systems comes in the form of mechanical, thermal and chemical stimuli. How the brain interprets these incoming stimuli depends on "complex reasoning mechanisms that are based on experience, context and environment that provides meaning to the question, "How dangerous is this situation really?" (Moseley, 2003) Thus each individual will construct their own unique representation in the nervous system of what the stimuli mean in terms of their survival. A given stimuli in the form of mechanical stretching of a knee joint may elicit different perceptions based upon a myriad of factors that include environment and past experience of sensations to the anatomical region.

An additional and more precise definition of pain includes "Pain is a multiple system output activated by an individual specific pain neuromatrix. This neuromatrix is activated whenever the brain concludes that body tissues are in danger and action is required and pain is allocated an anatomical reference in the virtual body". (MOSELY 2003) Although this definition includes phrases that may seem metaphysical in meaning it is merely stating many different regions of the nervous system are involved in the construction of pain experiences, and that pain experiences can be turned on more by threat than actual injury. This appears to be particularly true in the domain of chronic pain phenomena. Several important shifts in paradigms are required in consideration of the preceding concept and those include the understanding that there does not exist within the brain a specific region generating pain, the whole nervous system through a vast

interconnecting network of elements is constructing the conscious perception of pain. As an example, the medical literature provides plenty of evidence to support that surgical removal of regions of the brain felt to be involved in painful experience generally fail. For that matter the body does not possess any nerve fibers or receptors specifically for the generation of pain as much research an attest to the accuracy of this statement.

Now that an understanding of pain has been defined the differences between acute and chronic conditions needs to be explored. In general acute pain can be defined as tissue injury that last less than 6 weeks in duration. The primary generator of pain includes a change in the biochemistry of the injured tissue in the form of inflammation. Inflammation is the bodies self repair mechanism that is characterized by redness (increased blood to the region), pain (stimulation of specific nerve fibers), swelling (increased fluid in region), increased temperature (increased metabolic activity) and limited mobility(protective). The acute phase if properly managed will allow the body to recover in a predictable and timely manner. It is at this stage however that individuals make decisions that can lead to chronic pain states.

Chronic pain as stated earlier is usually considered acute pain that has endured for greater than 6 weeks to six months. It should be obvious from this statement that no clear and objective criteria is ascertained in regards to this condition. Several factors need to be considered in relation to events leading up to chronic pain experience. The most important factor appears to be a persistence of painful stimuli, or what the brain represents as painful stimuli, into the nervous system. This leads to a condition termed "central sensitization" in which the central nervous system has changed through a process or plasticity. Plasticity refers to an adaptation of the nervous system in the response to changes in the associated internal or external environment. In summary this means that if an individual continues to experience a condition such as inflammation over a extended period of time the nervous system will adapt because it is plastic/giving in nature, and the adaptations will usually be in the form of making the nervous system more sensitive, ie. hypersensitive, to incoming stimuli. What needs to be taken into account at this point is that the brain may start to associate certain emotions with incoming physical signals that may initiate changes within the body's internal chemical environment. These changes may be in the form of increased inflammation through sensory nerves themselves through a mechanism termed neurogenic inflammation. This process results in changes in the production of certain proteins and neurotransmitters known to be an irritant to the nervous system and the tissue that is innervated.

Now that acute and chronic pain conditions have been discussed in terms of their differences it should apparent that they are not the same phenomena distinctive only in their temporal characteristics. Acute pain is a protective biological reaction that serves the purpose of alerting us to an immediate threat to our survival. The process allows us to withdraw from harm and start the immediate job of self-repair through well designed inflammatory responses. Chronic pain on the other hand is a distinct process in which injured tissue has never undergone appropriate healing. The injury is represented in the nervous system elements which include both the central and peripheral components. That is to say that a long-standing injury causes changes to occur in both the nerves and

the sensory aspects of the brain and in the form of memories. When chronic tissue is irritated the brain may consciously assign it greater danger status to our survival resulting in an exaggerated response, both emotionally and physically.

Acute and chronic pain need to be managed with distinctly different approaches since they are not the same condition. An acute injury is best managed through the principles of rest, ice, compression and elevation, otherwise known as the RICE principles. The key to successful resolution is dependent upon controlling the quantity of swelling and early initiation of mobility. Both of these aspects of care are seldom practiced optimally outside a sports medicine setting. Health care practitioners generally consult patients to use heat in place of cold after 1-2 days of an injury under the erroneous belief that ice is not effective at this stage. This philosophy lacks credible evidence and is incorrect as cold therapy is an excellent intervention to minimize inflammation and control pain at all stages of acute healing. The limitation of inflammation will also allow for a speedier return to normal mobility, thus reducing any abnormal or compensatory movement strategies.

The recent literature on chronic pain suggests that creating a rehabilitation strategy aimed at changing the brains representation of the initial injury is imperative. This would include creating an environment that encourages a return to normal movement patterns with the recognition that many chronic pain sufferers have developed fear avoidance patterns. The avoidance of movement for fear of creating greater pain is also accompanied by the incorrect assumption on the part of these individuals, and sometimes their health care practitioners, that the pain is serving a protective function. Chronic pain serves no protective function. It is a process that has literally taken on a life of its own, and impairs the ability of the sufferer to return to normal everyday activities or recreational activities. In terms of therapeutic interventions utilized to decrease chronic pain, the literature indicates minimal to no evidence to support the use of many commonly used tools. This would include therapeutic ultrasound, electrical stimulation, tens units, various heat agents, general exercise and spinal traction. This is not to imply that these modalities may not be used by some individuals with success, only that no evidence has been presented for general long term success in this group of subjects.

In summary, appropriate management of painful experiences includes recognition and understanding of the differences between acute and chronic conditions. Acute pain is an appropriate physiological response to a tissue injury. Proper management will often lead to a quick resolution of symptoms and return to normal activities. Chronic pain on the other hand is a pathological response initiated by tissue injury and usually the result of less than adequate management of an acute situation. Whereas acute pain is fairly well understood in terms of biological mechanisms, chronic pain is a very complex phenomenon involving dramatic changes in both nervous tissue and behavioral responses. The logical take home message of this article should be the prevention of an acute injury evolving into a chronic condition through judicious use of the RICE principles.

References:

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