

GENERAL ACUPUNCTURE



PAIN RELIEF / PREVENTION

The Psychobiology of Pain

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At its worst, acute pain can be unimaginably intense and stressful, and chronic pain can wreck havoc on a person's quality of life. Because pain is such a universal problem Traditional Chinese medical practitioners devote a considerable amount of time treating it. Understanding the powerful psychology involved in the experience of pain, as well as its neurological and biochemical causes is therefore important.

It's sad but true that we need to have pain. Those who have worked in convalescent hospitals know about the bedsores that paraplegic patients who feel no pain often get on their hips or sacral region, or on their ankles. Some of these ulcers can go right down to the bone and can then infect the bone itself.

Patients with many neurological diseases who have diminished or absent pain sensation develop "Charcot joints" in their elbows, knees or ankles. Named after a French physician in the 1800s, these joints have been exposed to repetitive chronic trauma, with dislocations, infection, swelling and severe deformity. There is neurological abnormality known as "congenital absence of pain sensation." Those born with this condition do not feel pain at all. They grow up suffering from dental abscesses, infected joints and bedsores. They often die in their twenties. Some die from a ruptured appendix or a perforated duodenal ulcer they didn't know about until it was too late to save them.

The Elusive Nature of Pain

Observations of Howard Beecher, military surgeon in WWII, contrasted with his civilian surgical practice after the war was over. He noted that on the battlefield soldiers would continue fighting after they had suffered significant wounds. Many would report they had felt almost no pain while they were on the battlefield. Years later as a trauma surgeon in civilian life, Dr. Beecher noted a stunning contrast: he described the severe pain that accident victims complained of, beginning at the time of injury. Athletes in sporting events often continue on after spraining their ankle or falling on the race course and experiencing injuries, reporting later they hardly noticed any pain.

The other side of this coin is overreaction to pain. Physicians and nurses often report pain magnification in shut-in people such as those in nursing homes or other extended care facilities. These individuals focus on their pain and it seems to make it worse. We all know about how hypochondriacs react to pain, and it seems we are all on a spectrum in terms of how much pain we experience and how much or how little it affects us.

Some of this can be cultural. If we come from a society of over reactors we are likely to overreact. I worked as a surgeon in Saudi Arabia for several years, where the culture encourages those who are ill or injured to moan and complain about their physical discomfort. If they are in the hospital the entire village often comes there to sympathize with them, and they all moan and cry together. My experiences in this culture were in stunning contrast to those later on in Michigan, working with many Scandinavian patients. As a rule these patients seemed almost impervious to pain, and they rarely complained about their discomfort.

Amputee patients often develop phantom limb pain - severe discomfort in the hand or foot that is no longer actually there. They cannot rub it to provide comfort because it no longer exists. We must come to the conclusion that pain has a powerful psychological basis as well as a physical one.

The Psychophysiology of Pain Perception

The perception of pain has three aspects: physiological, affective and evaluative. The physiological aspects are based upon the stimulation of nociceptive pain fibers distributed throughout the body. The actual amount of pain sensation depends on the extent of the injury or illness, and the particular body tissue that is involved. There are far more pain fibers per square centimeter on the cornea of the eye than on the skin of the chest or back, so a small ulcer on the cornea or a tiny grain of sand in the eye can be extremely painful. Partial ablation of pain sensation can often be achieved by ice packs, the application of local anesthetic agents such as oil of wintergreen or by acupuncture. The injection of xylocaine blocks all pain sensation because it blocks the firing of the nociceptive pain fibers.

The affective aspects of pain perception are highly individualized, as the experience of pain varies widely in different individuals, whereas other sensory thresholds are more similar from one person to the next, such as position sense or touch. We are all on spectrum of how much pain we experience with a given injury or illness.

The evaluative aspects of pain perception refer to our learned, interpretive responses to pain. Some of these are broadly cultural, as I described above in my reference to Arab versus Scandinavian patients (I was speaking in general terms, of course). Beyond this we may have familial influences on how we perceive and interpret pain that go back to our early upbringing. These can be very powerful. Lastly, we carry with us our own Gestalt: the sum total of our personality, temperament, the amount of stress currently in our lives and the self-discipline we have developed over the years (or the lack of it).

Chemical aspects of pain

There are pain diminishing endogenous opioids that we all manufacture in our brain tissue. These are secreted by neurons in the central nervous system, and include beta endorphins, enkephalins and dynorphins. These opioids are 80 times more potent than morphine, molecule for molecule. Many of you are familiar with the studies that have been done in China and in this country indicating that acupuncture increases these pain-diminishing opioids in brain tissue. Some of us secrete more of these beneficial substances than others do, and there are many ways to enhance them, as we'll discuss in this article.

Conversely, there are pain enhancing endogenous substances in our nervous systems, including serotonin, substance P, bradykinins, prostaglandins and histamine. In addition, cytokines secreted by white blood cells when we are sick or injured can make our bodies more sensitive to pain. Our immune system seems to be signaling us to pay attention to what is wrong.

Neurological Aspects of Pain

The body has built-in mechanisms to control how much pain we experience, either reducing or increasing it, depending on what is going on in our lives at the moment. There is a gate-like mechanism in the dorsal horns of the spinal column, known as the substantia gelatinosa. This "gate" controls the flow of pain sensations that pass through on their way up to the thalamus and limbic system and then to the cerebral cortex where we actually experience pain.

When we are sick or injured, the initial pain sensations get through this gate in the spinal column and go through the thalamus, and on into the limbic system, the pre-conscious area deep in our brain where we process our feelings and the meaning of sensations we are experiencing. The limbic system communicates with the cortex. This system can stimulate a descending inhibitory signal. The descending signal goes from the limbic system and down the periaqueductal grey tissue to the dorsal horns of the spinal column, and into the substantia gelatinosa (gelatinous substance). These signals can then moderate pain, by closing the gate. Nerve cells in this area secrete endorphins that close the gate. With a closed gate: pain sensation is blocked. With an open gate, pain gets through to the thalamus and on to the sensory cortex.

Anxiety, worry, depression or focusing on an injury or illness open the gate and increase pain. Meditation, relaxation, or positive emotions close the gate and decrease or even block pain. We know acupuncture increases endorphin secretion in the cerebral cortex. Further research needs to be done to see if acupuncture also increases the secretion of endorphins in the substantia gelatinosa. This has been proposed as a mechanism of how acupuncture reduces pain, but it needs further study in the research laboratory. This research should also include an analysis of how the myelinated A delta pain fibers and the slower unmyelinated C fibers take part in this closure of the gate.

The actual experience of pain is influenced by many things: the person's activity at the time (running an Olympic marathon; fighting in battle), the level of attention versus distraction at the time, and circulating endorphins versus pain-inducing substances perfusing the brain at the time of the pain event. All of this is also influenced by our advance expectancy that we will experience pain. For example, what are our previous memories of going to the dentist? Was it a highly stressful, painful experience? If so, this primes us for a repeat performance the next time we drive to the dentist.

The meaning of the present event to the person is a strong contributor to how much pain he or she experiences. Our feelings of self-control or self-mastery, and our ability to minimize the pain experience are important contributors to how much pain we experience, and how it affects us.

Psychological treatment and support of patients with chronic pain

Techniques of psychological treatment include hypnosis, progressive muscle relaxation, meditation, guided imagery and biofeedback. Behavior modification with operant conditioning is often surprisingly effective. This psychotherapy reverses the usual rewards of being in pain: sympathy, attention, and relief from work/school responsibilities. The technique is for the therapist to increase the patient's activity level, ignore pain behaviors, and reinforce well behaviors. Cognitive therapy changes the interpretation of the pain, encouraging the patient to go towards the pain! The

idea is that we do better if we control the pain, rather than letting the pain control us. This therapy attempts to increase self efficacy beliefs.

Mindfulness based stress reduction, created by Jon Kabat Zinn at the University of Massachusetts, is based on this approach. It includes deep inner self-focusing, muscle relaxation and an awareness of all body sensations. The patient is invited to go toward the pain, and to own it. Each person is bigger and more powerful than his or her pain. With this prevailing attitude, the person can gain control over the pain and place it in proper perspective. Curiously, the pain may then go away!

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