

The Psychology of Pain

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The perception of pain involves far more than mere sensation. The affective and evaluative components of pain are often as important as the production and transmission of the pain signal. These emotional aspects are most prominent in chronic pain patients, but knowledge of the psychology of pain can greatly improve the treatment of acute pain as well.

Pain and its perception

The limbic system, where emotions are processed, modulates the amount of pain experienced for a given noxious stimulus. It has been shown in cancer patients [1] that the affective component of pain can be completely blocked by frontal lobectomy. Lobectomized patients still register severe pain, but it doesn't "bother" them. Pain can thus be viewed as merely a "signal" that something is wrong somewhere in the body, until it reaches the emotional brain, where this signal becomes what we feel as pain.

The emotional response to pain involves the anterior cingulate gyrus and the right ventral prefrontal cortex. These centers are also activated by social rejection. Serotonin and norepinephrine circuits are also involved in the modulation of sensory stimuli, which probably influence how depression and antidepressant medications affect the perception of pain [2].

Context

The perception of even acute pain is highly dependent on the context in which it occurs [3]. It has been found that the pain perceived in battle

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wounds bears little relationship to the extent of the wounds [4]. There are reports of soldiers in battle who suffer a compound fracture, and report only twinges of pain [5]. In laboratory studies of experimental pain in which context, fear, and anxiety are controlled, the placebo effect and opioids are much less effective. This occurs because the reduction of both the fear and anxiety is a large part of the placebo effect and of the function of opioids [6].

Attention

Focusing one's attention on pain makes the pain worse [1]. Patients who have somatic preoccupation or hypochondriasis are overvigilant about bodily sensations. It has been found that by attending to these sensations, they amplify them to the point of feeling painful [7].

Conversely, distracting patients is highly effective in reducing their pain. Burn patients undergoing treatments or physical therapy experience excruciating pain, even after they have been given opioids. It has been shown that these patients report only a fraction of this pain if they are distracted with a virtual-reality type of video game during the procedure [8].

Anxiety

Anxiety, fear, and a sense of loss of control contribute to patient suffering. Treating anxiety and providing psychological support has been shown to improve pain and reduce analgesic use. Improving patients' sense of control and allowing them to participate in their care is also helpful [9]. Physicians should try to create an environment that is nonthreatening. For procedures, prepare needles and other equipment out of sight from the patient. In addition to assuring that procedures are performed in the least painful way possible, use nonthreatening terms such as "mild discomfort" instead of "pain." It is also helpful to distract patients with conversation about subjects that interest them, such as their hobbies or family [10].

Memory

Patients who have low levels of pain remember it as being worse than they originally reported, which tends to worsen with time. Almost all patients report relief with treatment, even when true measured changes in pain scale are not significant, and sometimes when measured pain is worse [11].

Learned pain

Pain can be a learned response, rather than a purely physical problem. Just as cancer patients can develop nausea as a learned response to

treatment and experience it even before chemotherapy is administered, patients can learn to have pain even in the absence of a physical stimulus [12]. In some cases, pain can be entirely “in the mind,” as in the case of a butcher who slipped and caught his arm on a meat hook, and was reported to be suffering in great agony. When he learned that the hook had merely caught on his sleeve and his arm was uninjured, his pain resolved [13].

Patients can learn to feel different amounts of pain just by viewing other people. When laboratory subjects were shown models demonstrating high pain tolerance, they required 3.48 times greater stimulus before they rated it as painful, compared with those subjects who observed models who showed poor tolerance. Nonaversive shock, usually described as “tingling,” was rated as painful by only 3% of those who had viewed a tolerant model, compared with 77% of the subjects who viewed models who showed poor tolerance [14].

Expectations

Patients' expectations of how much pain they should have also influence how much pain they feel, their response to treatment [15], and whether or not the condition becomes chronic and disabling. The results of minor whiplash injuries have been shown to be highly variable in different regions. This has been attributed to the local cultures and expectations. Any messages that communicate to patients that they have a serious or debilitating injury may contribute to deconditioning and maladaptive postures that worsen their pain. Prescribing medications can contribute to the problem. Patients who are not given sick leave and are told to “act as usual” have much better outcomes [7].

The placebo effect is also influenced by patients' and physicians' expectations [15]. It can be assumed that the “nocebo” effect (ie, the perception of harm resulting from a patient's beliefs) can also result from messages that inadvertently increase the patient's anxiety and expectations of pain.

Beliefs and coping

Other psychosocial issues, such as what patients believe about their pain [16,17], their coping skills [18–21], their tendency to “catastrophize” [17,18,20], self-efficacy [17], locus of control [22], and their involvement in the “sick role” [13], all have an impact on how much pain patients feel, and how it affects them.

In successfully getting low back pain patients back to work, the most important factor identified has been a reduction in subjective feelings of disability [23]. Patients diagnosed with fibromyalgia have to stop catastrophizing to improve, and they must be persuaded that they have

the capacity to be more functional [24]. Consequently, physicians should focus on improved function and long-term management. Patients should be led to understand that they themselves have an important role in distracting themselves, and that they can minimize the interference that pain has in their lives.

Chronic pain

Chronic pain patients commonly have problems with the psychological and emotional aspects of pain [25]. Preexisting psychological factors have been shown to be very important in the development of chronic pain after surgery [26,27] and in complex regional pain syndrome (CRPS) [28,29], tension-type headaches [30], and fibromyalgia [24]. The National Institutes of Health Technology Assessment Conference Statement [31] identified six factors that correlated with treatment failures of low back pain—all were psychosocial. Even chronic, episodic, low back pain may have a vital component of socioeconomic and psychological influences [32].

There is a vicious cycle in which pain causes disability and stress, which in turn worsens the perception of pain [21]. An unhealthy lifestyle, lack of social support, depressive illness, and substance abuse are predisposing factors to chronic pain [33]. Chronic pain has been referred to as “complex” when there are interactions of legal, psychological, medication, and family issues [34].

Behavior

Immobility may be a factor in adult “reflex sympathetic dystrophy,” which some feel is overdiagnosed [35]. A study of reflex neurovascular dystrophy in children revealed that prominent swelling, skin changes, and decreased skin temperature were caused by maintaining the extremity in an immobile, dependent position. The prolonged immobility also caused chronic fibrosis of subcutaneous tissues and contractures of tendons and ligaments. This was effectively relieved with physical treatments, which included vigorous sensory stimulation and use of the affected extremity [36].

Inactivity is a serious impediment to improvement in chronic pain, and can produce concurrent myofascial pain [37]. Many fibromyalgia patients have been found to have a vicious cycle of maladaptive pain behavior, resulting in further deconditioning, social dysfunction, and subsequent worsening pain [24].

Obesity is also a problem in chronic pain. A review of patients at a rehabilitation clinic found that among those who could not be returned to gainful employment or function, 78% were grossly overweight [38]. Many low back pain patients have been found to be in the lowest quartile for aerobic capacity [39].

Pain behavior, such as guarding, bracing, rubbing, grimacing, and sighing, has been shown to be strongly influenced by psychological factors [40]. Some chronic pain patients demonstrate pain behavior only around staff [41], or decrease this behavior when they think no one is watching [42]. Reinforcing this behavior can cause some patients to perceive that they have more pain. Eliminating the behavior leads to improved pain [40]. It has been noted that if neuropathic pain patients are allowed to develop guarding and behavioral dysfunction, then drugs are not effective, and the patients require multidisciplinary pain treatment [37].

Pain can be a conditioned response similar to conditioned nausea associated with chemotherapy. The behavior begins purely in response to the presence of injury. It is then reinforced and becomes a conditioned response, an iatrogenic complication of treatment [12], particularly when rewards are made contingent on the expression of pain behavior [21]. The effect of reinforcement is illustrated by the case of a 10-year-old girl who had chronic daily abdominal pain for which no medical condition could be found. During episodes, her mother allowed her to rest in bed with her toys and watch television, and brought her food and drinks. After an hour or so, she would go back to play. After the mother stopped reinforcing the patient's pain behavior, the episodes rapidly diminished, as well as her use of belladonna and phenobarbital elixir [43].

Pain can result from conditioned fear reactions that persist even after the resolution of pain [42], phobic reactions to pain and to nonpainful activities [44], and posttraumatic stress disorder [45]. Some patients have had good improvement of their pain or function with desensitization therapy [46].

Psychiatric disease

Overall, some psychiatric morbidity is present in up to 67% of chronic pain patients [47]. Personality disorders have been found in 31% to 59% of chronic pain patients [48]. Among low back pain patients admitted to an inpatient multidisciplinary pain center, 70% were found to have a hysterical conversion disorder, and 8% had a sociopathic personality disorder [49].

Somatoform pain disorders

Somatoform disorders are conditions in which the presence of physical symptoms suggests a general medical condition, but cannot be explained by any such condition. Among the somatoform disorders, "pain disorder associated with psychological factors" is specified in the Diagnostic and Statistical Manual of Mental disorders, fourth edition (DSMIV) [50] as a clinical condition in which pain is the focus and in which psychological factors have the major role in the onset, severity, maintenance, or exacerbation. The epidemiology of this condition is not known, but

unexplained chronic pain that causes disability is common in general practice and is frequently seen in emergency rooms. Pain disorder associated with psychological factors was found in 88% of referrals to a pain clinic serving an indigent population [51]. Most somatoform patients had pain that spread to new areas from the site of injury, whereas this did not occur in the patients who had objective signs of injury. Compared with patients who had serious injuries involving long-term pain, mildly injured somatoform pain patients are more than five times as likely to use daily opioids [52]. Moreover, one program found a 30% incidence of abuse of opioids among those patients who had somatoform pain disorder, many times higher than that of the other patients [53].

Hypochondriasis, another kind of somatoform disorder that involves fear of having a disease when there is none, has also been identified in chronic pain patients [54]. It has been found to be worsened by the chronic medical use of morphine [55], and by its abuse [56].

Mood disorders

In a study of chronic pain patients on opioids, 61% were found to have major depression [57]. It appears that the pain causes depression at least as often as depression causes pain [58,59]. Nonetheless, depression is known to make the patient's pain feel worse [48]. In postsurgical pain after cholecystectomy, patients who had even subclinical depressive symptoms reported higher pain [60]. Treating depression can improve, and in some cases eliminate, chronic pain [6]. Whether depression is considered to be a cause or an effect of chronic pain, it should be considered at least a comorbid condition that requires concurrent treatment [61].

An anxiety disorder was found in 10.6% of chronic work-related musculoskeletal pain patients [62]. The lifetime risk of a major anxiety disorder in men who have chronic low back pain is 30.9%, compared with 14.3% in men who do not have low back pain [59]. It is likely that some "chronic pain" patients are actually using opioid medications to self-treat anxiety or depression, instead of relying on more effective anxiolytic or antidepressant agents [57]. These patients are not only using the wrong drug for their condition, but what little subjective benefit they initially feel is rapidly lost with tolerance, and replaced with dependence.

Evaluation

Because of the influence of psychological factors on chronic pain, at least brief screening should be done on initial evaluation. It is very useful to examine for Waddell signs or nonphysiological findings, which can be done quickly during the physical [63]. A particularly good test is the application of pressure on the top of the head when the patient is standing, to put stress

on the spine. The low back pain patient who has a somatoform pain disorder will often complain of increased pain. If the pain were purely of spinal origin, this maneuver would not increase it.

Whenever psychiatric comorbidity is present or suspected, more comprehensive screening should include tests such as the Multidimensional Pain Inventory (MPI) and the Minnesota Multiphasic Personality Inventory 2 (MMPI-2) [21]. Such comprehensive testing is usually impractical in the emergency setting, and ideally should be done by a psychiatric consultant familiar with chronic pain [48]. Although acute care physicians are not likely to be doing this evaluation themselves, they should insure that it has already been completed, or that it will be done as soon as possible. Failing to address psychological issues in chronic pain patients may result in prolonged disability in a substantial number of patients [25].

The psychology of opioid dependence

The subject of opioid dependence in patients complaining of pain is controversial, and is discussed in further detail in the article by Hansen elsewhere in this issue on the drug-seeking patient. It should be noted that chronic opioid use, particularly in high doses, can produce a condition of enhanced pain sensitivity [64]. Patients dependent on daily doses feel worse when the medication wears off, and closer to baseline levels of pain temporarily when they take it, even though the overall pain condition fails to improve [65]. These patients may see opioids as necessary for survival. It may become difficult to control the use of opioids, and they visit the emergency room when they run out. They complain of increased pain from conditions that would not typically call for opioids. The patient who escalates demands for opioids when these are not forthcoming is typically opioid-dependent, and may have issues of problematic use.

The psychology of the physician also influences the use of opioids for chronic pain, and the interpretation of their effectiveness. Some patients are insistent that certain medications must be prescribed. They will exaggerate the benefits and deny adverse effects. Some physicians have difficulty setting limits. It is faster and easier to give in to the patient's demands than to institute an alternate course. The physician may realize that the prescription is in excess of normal practice, but rationalizes that for this particular patient, nothing else works. The emergency physician can anticipate these issues, and plan, with consultation if desired, how to deal with them.

Summary

Emotional and evaluative issues are very important in the evaluation and treatment of pain. Treating the physical pain alone can leave these issues unresolved, and possibly exacerbate them through reinforcement.

Understanding the impact of fear, expectations, and attention can help physicians deal more effectively with acute pain. Psychological issues are particularly prominent in chronic pain. Though acute care physicians are not treating these psychological conditions, they can help by referring patients to the appropriate psychological or multidisciplinary setting.

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