

Pain Psychology for Surgeons and Otolaryngologists



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KEYWORDS

- Pain management • Pain beliefs • Resilience • Catastrophization
- Preprocedure psychological screening • Psychological therapy

KEY POINTS

- Pain experience is the result of an interplay between psychological, social, environmental, and biological factors.
- Pain beliefs and pain expression influence and are influenced by learning history, perception of pain, and threat appraisal.
- Catastrophization, which consists of rumination, magnification of symptoms, and feelings of helplessness, is a predictor of poor prognosis.
- Readiness for change and patient expectations influence response to treatment.
- Psychological techniques can be incorporated by surgeons and otolaryngologists to manage procedure-related anxiety.

INTRODUCTION

More than 115 million emergency room visits each year are for management of acute pain, a condition characterized by an inciting event, occurring suddenly, and with a duration of less than 3 months to 6 months. In the years 2006 to 2010, an estimated 28 million inpatient surgical procedures and 48 million ambulatory surgeries, respectively, were reported in the United States^{1,2}; 50% of patients undergoing surgery on the oral, pharyngeal, and laryngeal region as well as on the neck and salivary glands had a visual analog scale score higher than 40 mm on day 1 on a scale of 0 mm to 100 mm. A multivariate analysis of these data revealed that preoperative pain, pain catastrophizing, and the anatomic site of operation were independent predictors of postoperative pain.³ Despite this knowledge and recent medical advances, acute pain often is undertreated and contributes to increases in health care costs and lengths of stay in the hospitals. Moreover, poorly controlled postoperative pain leads

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to increased anxiety and is seen as a contributor to the development of chronic pain. In a comprehensive report, the Institute of Medicine⁴ noted that approximately 100 million Americans suffer from chronic pain. Furthermore, the US Department of Health and Human Services⁵ identified educational gaps in pain management for medical practitioners and highlighted the pivotal role of psychological aspects of pain and its management in medical training. Finally, aside from the physiologic benefit of better pain control, “there is a moral imperative to do our best to avert patients’ needless suffering from pain.”⁶

It is now understood that pain is more nociception. Historically, however, physiologic pain was considered a distinct entity separate from any psychological contributions. Furthermore, if assessed as psychological it was assumed that the pain was “all in the patient’s head.” This often carried with it a stigma and a disparaging interpretation that the pain was not real, a figment of the patient’s imagination, and was being perpetuated for secondary gain. This provider attribution resulted in a conflictual relationship between patient and provider, minimized the patient’s pain complaints, and often led to undertreatment of pain. As early as 1954, John Bonica⁷ commented in his book, *The Management of Pain*, that “...there has emerged a sketch plan of the pain apparatus with its receptors, conducting fibers.... (but) medicine has overlooked the fact that the activity of this apparatus is subject to a constantly changing influence of the mind.” Pain was now being recognized as complex because patients had (1) pain in the absence of pathology, (2) pathology in the absence of pain, (3) individual differences in responses to identical treatments, and (4) a poor response to surgical procedures and medications that were known to consistently eliminate pain.⁸

The understanding that pain is a multifaceted construct resulted in the conceptualization of the biopsychosocial model, one that recognizes that the experience of pain is the result of complex interactions among biological, psychological, and social factors.⁹ The current definition of chronic pain is that it is an “unpleasant sensory and emotional experience with actual or potential tissue damage or described in terms of such damage.”¹⁰ Therefore, pain is subjective and it reflects a perception of the sensation, appraisal of threat, and interpretation of sensory input and has social ramifications. In short, the recognition that the experience of pain was more than nociception created a platform upon which to examine “the constantly changing influences of the mind.”⁷

This article is based on a summary of selected literature and clinical experience in pain psychology. It highlights relevant psychological factors that influence acute and chronic pain with the aim of preparing the practitioner to understand patient presentations and broaden interpretation of behaviors, which otherwise might be seen as challenging. Also included are factors that can influence an optimal surgical outcome and psychological approaches to pain management.

PSYCHOLOGICAL FACTORS THAT INFLUENCE PAIN RESPONSE AND TREATMENT OUTCOME

Learning

One of the first few psychological factors to be explored was the role of learning in maintaining pain.¹¹ The importance of reward or punishment, otherwise known as operant conditioning, was identified as being an important process in reinforcing pain and its associated behaviors. It also became evident that there was a difference between the experience of pain and exhibiting pain behaviors. Recognizing the role of pain behaviors in communicating pain experience led to a body of research attempting to objectively examine these behaviors. It also became evident that pain behaviors

that may have started due to operant processes were not as dependent on the original circumstances as much as they were on the communicative function of these behaviors.⁸ Over the years, numerous taxonomies to measure quantitative and qualitative dimensions of pain behaviors were developed. Follick and colleagues¹² confirmed that 4 behaviors—partial movement, limitation statements, sounds, and position shifts—identified 88.9% of their pain subjects. Keefe and Hill,¹³ in an experimental study, found significant differences between pain patients and controls on 5 specific pain behaviors: guarding, bracing, rubbing the painful area, grimacing, and sighing. Pain behaviors often occur in an interpersonal domain and can be strengthened by the response of others in the environment when they react to these behaviors in a rewarding manner.¹⁴

A second form of learning is through classical conditioning, which refers to the repeated pairing of 2 stimuli, 1 of which is a neutral stimulus and results in a response being elicited by both stimuli. Classical conditioning, also known as respondent conditioning, may maintain and generalize pain behaviors through avoidance, behaviors that may have been initially learned through operant conditioning.¹⁵ Therefore, avoidance of a painful stimuli perpetuates the cycle pain-avoidance-pain because the fearful stimuli never is confronted. Finally, learning and reinforcement occur not only through personal experience but also through observation and modeling influences that come from family and culture.

Affect

Affective distress in the form of depression, anger, and anxiety is a common comorbid condition associated with acute and chronic pain. There is a plethora of research documenting the relationship between depression, anxiety, and pain.¹⁶ Research on affective factors has examined the interactive effects of preexisting mood disorders on pain, mood disorders that emerged after onset of pain, and those aggravated by the chronicity of pain. Anxiety disorders and chronic pain share common underlying cognitive and behavioral processes. Therefore, “selective attention directed toward threatening information, such as bodily sensation leads to greater arousal. Because of this attentional process, those with high anxiety sensitivity may be primed, such that even minor painful stimuli are amplified.”¹⁷ Surprisingly, there is limited information on chronic pain or acute pain after ear, nose, and throat surgery. The few studies available have identified that the type and location of surgery, delay in returning to work after 2 weeks following a routine otolaryngologic surgery, amount of preoperative pain, amount of preoperative anxiety, and catastrophization are predictors of poor outcome. Additionally, expectations of high levels of postoperative pain were mediated by catastrophization and also predictive of poor recovery.^{18,19} For more detailed information on this topic, readers are referred to Salas and colleagues.²⁰

Personality and Early Life Adversities

Over the years, there have been many attempts to find a specific personality type associated with pain but with little success. Engel²¹ broadened the scope and presented a model showing the interaction between personality traits, dispositions, and biological factors in determining an individual's experience and response to pain. More recently, descriptive research using Cloninger's Temperament and Character Inventory has shown that individuals who are fearful, are pessimistic, are sensitive to criticism, have a high need for reassurance (high harm avoidant), and have difficulty with defining and setting realistic goals (lower self-directedness) reflect the personality features of chronic pain sufferers. These characteristics also were found in those

suffering from anxiety and depressive disorders,²² highlighting the closely interwoven relationships between personality, mood disorders, and pain. Early life adversities, including neglect, physical and sexual abuse, and rejection, were found to create opportunities for developing a conditioned response to certain stimuli, which, in turn, influenced reaction to pain in adulthood. These reactions were mediated by distress and poor sleep but also buffered by resilience, optimism, and control.²³ Research on resilient personality has shown that positive characteristics, such as optimism, acceptance, and purpose in life, decrease maladaptive coping.²⁴

Social Support

The beneficial effects of social support on physiologic and psychological health are well documented²⁵ so also are the detrimental effects of isolation and unsatisfactory relationships. In a systematic review, Krahe and colleagues²⁶ concluded that modulation of pain based on interpersonal factors depended on (1) the degree to which social partners were active or perceived by the partners to possess a possibility of action, (2) the degree to which partners could perceive the intentions of their social partners, (3) preexisting relationship prior to pain onset, and (4) individual differences in relating to others.

Sociocultural Factors and Pain Disparities

Ethnicity influences pain by its cultural context. Mistrust of the health care system, fear of addiction, and limited access to resources, including health information, are factors that influence pain outcome. Culturally normative explanations and expectations determine whether pain is seen as a normal part of life or as a pathologic state.²⁷ Health inequities are an inherent part of socioeconomic disadvantage and ethnic minority status. Both these factors can result in high-impact chronic pain and poor access to and quality of pain care.²⁸

Cognitions and Pain Beliefs

It is well documented that patients' beliefs about their pain, its controllability, and self-efficacy influence chronicity and treatment outcome. Negative outcomes in neuromodulation surgical procedures are associated with beliefs that the pain is purely physical, means loss of a productive life, and responds only to medical or surgical methods.²⁹

More recently, there has been an emphasis on positive characteristics, such as social support, appropriate expectations, and effective coping skills, in buffering the adverse effects of chronic pain. When confronted with adversity, such as chronic pain, the individual initially resorts to a customary style of coping. When this style is not successful in the context of unexpected acute pain or unrelenting chronic pain, the person is forced to acquire more adaptive methods of coping. Active or passive coping is considered an individual's effort to manage real or perceived stress. Active coping strategies include engagement in activity in spite of pain whereas passive strategies result in withdrawal from activity.³⁰ Extant research reveals that passive or avoidant coping strategies are strongly associated with higher pain-related disability.

Chronic pain can contribute to rekindling preexisting maladaptive ways of thinking or creating new ones. These distorted beliefs about self or situation, otherwise known as cognitive errors, add to the complexity of the pain response by decreasing function and increasing distress. Burns³¹ lists 10 cognitive errors often seen in maladaptive coping. Here are a few of those most commonly seen in patients with pain:

1. All-or-nothing thinking or categorical/black and white thinking: "As long as I have pain I will not be happy."

2. Over-generalization—coming to a general conclusion based on a single event: “All medicines aggravate my tinnitus.... I know because when I applied capsaicin cream for my neck pain my ears started to worsen.”
3. Discounting the positive: “Yes today is a good day but it doesn’t matter because I still have pain.”
4. Magnification: “If I walk around the block today, I will not be able to walk again for a week.”

Catastrophization is the misinterpretation of an event as a catastrophe. It is personalized and is selectively attended to by the person in pain.³² Through a cycle of rumination, magnification, and helplessness, catastrophic thinking is maintained. Fear avoidance has been found to play a key role in catastrophization.³³ In addition, functional magnetic resonance imaging research supports these findings and demonstrates that catastrophization is significantly associated with the anticipation of pain (medial frontal cortex and cerebellum), attention to pain (dorsal contralateral anterior, dorsolateral prefrontal cortex, and claustrum), and emotional aspects of pain.³⁴

Resilience

In the past few years, the concept of resilience has been getting a fair amount of attention because it is seen as a buffer between pain and disability. The 3 forms of resilience outcomes seen in a successful adaptation to chronic pain are (1) recovery or the extent to which the person regains equilibrium after adversity; (2) sustainability or the perseverance of desirable actions, goal pursuits, and social engagements that are sources of positive emotion and self-esteem; and (3) growth or the realization that one can grow from adverse experiences by becoming aware of one’s capabilities.³⁵

Readiness for Change

The concept, readiness for change, was developed for improving treatment adherence in smoking cessation and substance abuse and later applied by Jensen³⁶ to pain management. This model assumes that people pass through different stages of readiness, ranging from precontemplation to contemplation to preparation to action and to maintenance as they transition from maladaptive to adaptive behaviors. It also assumes that behavior change is a process and that people can be helped to move from 1 stage to the next. Motivational interviewing has been used successfully to enhance progression through these stages and adherence to treatment in different pain conditions.³⁷ Therefore, for a successful outcome, it is important to match a patient’s stage of readiness to the intervention. When there is a mismatch between a patient’s readiness and the treatment option offered, there likely is poorer treatment adherence and a poorer outcome.

ASSESSING BEHAVIORAL APPROPRIATENESS FOR SURGERY

Often, a thorough presurgical evaluation inclusive of psychological components is helpful in ensuring that a patient is psychiatrically stable, understands the procedure and process, has appropriate outcome expectations, and is treatment adherent. In addition to a clinical assessment, providers can use questionnaires or self-report measures to obtain systematic information regarding pain levels, psychiatric symptomatology, suicidality, and function. Risk factors for a poor outcome in patients undergoing neuromodulation procedures (ie procedures using neuromodulation to improve chronic pain) were identified as the following: (1) longer pain chronicity, (2) ongoing psychological distress, (3) current pain-related catastrophizing, (4) a history

of untreated abuse or trauma, (5) current nicotine or substance abuse, (6) poor social support, and (7) significant cognitive deficits.³⁸

A brief screening to assess risk prior to a procedure includes the following factors:

1. Pain: pain intensity frequently is assessed using a numeric rating scale of 0 to 10, where 0 = no pain and 10 = worst pain. Additionally, obtaining information on pain descriptors, pain duration, pain frequency and functional ability is helpful in understanding the pain in a more nuanced manner.
2. Psychiatric illness: patients with untreated psychiatric illnesses are seen as poor responders from a pain perspective for elective surgery, especially for the type of procedure that requires reliable feedback from a patient. If a patient is seeing a mental health provider, it often is helpful to obtain corollary information from the provider regarding a patient's psychiatric stability.
3. Substance abuse: Patients should be assessed for active or untreated substance abuse.
4. Capacity to make decisions: assess the patient's capacity to understand the technology, the procedure, and the risks versus benefits.
5. Treatment adherence: procedures requiring lifestyle changes, regular medication use, or compliance with any postoperative recommendations need patients to adhere to them for the best possible outcome. It is helpful to obtain historical information on the patient's response to previous treatments and adherence habits.
6. Expectations: for an optimal outcome, clarity regarding a patient's expectations is necessary. It gives the provider an opportunity to educate the patient if expectations are unrealistic. A mismatch between patient and provider expectation can affect a patient's overall response to treatment.
7. Functional goals: it is helpful to identify what type of improvement in function a patient hopes to regain after the procedure.
8. Response to unsatisfactory surgical outcome: determine how catastrophic a failed procedure or intervention will be for the patient.
9. Summarize and provide preparatory information for upcoming surgery: it is helpful to provide a patient with information regarding the upcoming procedure, not only from a consent perspective but also to enhance cognitive and emotional readiness for the procedure. The information can be of 2 forms: procedural information, which includes the mechanics of the procedure, and sensory information, which includes the pain and other sensations a patient might experience after the procedure. With respect to sensory information, it is helpful to inform the patient how long these acute sensory symptoms may last.³² It is important to ask patients what they would like to know and recognize their personality type to determine how much information should be provided. For example, in order to manage their health-related anxiety, an obsessive personality-style patient may need detailed information, take notes during the appointment, and ask many questions. Other patients can become more anxious when detailed medical information is provided.

Upon completion of the screening, the practitioner may make the following recommendations for an elective procedure:

1. No psychological risks or vulnerabilities identified. Proceed with procedure.
2. Some risks in the form of unrealistic expectations identified. Provide psychoeducation and then proceed with procedure.
3. Moderate risk identified, such as untreated depression, anxiety, or substance abuse: refer to mental health provider for treatment. Re-evaluate in 3 months to 6 months.

PSYCHOTHERAPEUTIC APPROACHES TO PAIN MANAGEMENT

There is a long history of psychological therapies used as an integral part of comprehensive pain management. Although these strategies are used by mental health practitioners, a few of these approaches may be simplified and incorporated into medical and surgical practices.

Therapies based on operant behavioral approaches use principles of learning and reinforcement in order to change behavior. In vivo exposure to painful or anxiety-provoking stimuli is one such technique. In this technique, patients are progressively exposed to a stimulus that they have been avoiding for fear that it will cause pain. This gradual engagement with the stimuli, which may at this time result in minimal to no pain, helps patients learn that their expectations about pain associated with this stimulus is unrealistic. For this technique to succeed, a graded hierarchy of pain-related anxiety-provoking activities may need to be created and patient taught a relaxation exercise. In addition, educating patients about their pain and the associated stimulus is helpful.

Tip: educate patients regarding the procedure and refer them to resources they may use for more information, including videos.

Cognitive behavior therapy (CBT) is considered the gold standard for psychological intervention of pain³⁹ and focuses on changing maladaptive beliefs, emotional responses, and behavior. CBT for chronic pain is based on 2 broad principles. The first is “feelings of pain and aspects of emotional, physical, and social functioning impacted by pain are both related *and* separable...problems with functioning related to pain can be addressed even if the pain is not targeted directly and remains unchanged. The second principle is that psychological factors can influence the experience of pain itself.”⁴⁰ CBT is a short term-structured form of therapy and includes techniques, such as monitoring of thoughts, feelings, and behaviors related to pain and distress; cognitive restructuring; relaxation exercises; behavioral activation; assertiveness skills; and personalized daily activity and pain management schedules. Workbooks, such as *Managing Pain Before It Manages You* by Margaret Caudill,⁴¹ can be helpful in providing psychoeducation for the chronic pain patient. Calm and Headspace are 2 apps that are popular among patients with pain, anxiety, and sleep issues. Health Journeys has produced several CDs, MP3s and a streaming app by Belleruth Naparstek to promote successful surgery, to help with anxiety and panic, and to ease pain.

Tip: understand a patient's thoughts and feeling regarding the procedure and reassure by educating and managing anxiety.

Mindfulness-based stress reduction often is an 8-week training program, developed by Jon Kabat-Zinn,⁴² that emphasizes intensive mindfulness training through mindful daily meditation. Mindfulness is considered a nonjudgmental acceptance and awareness of the present, including physical sensations, emotions, thoughts, and impulses in order to reduce pain and suffering. This form of therapy helps individuals see pain as discrete events and not as a continuous pattern through their life. Meditation has been shown to decrease preprocedure anxiety and postprocedure recovery. There are many mindfulness meditation apps that can be used as adjuncts in treatment. Mindfulness Coach is a helpful app to promote this skill.

Tip: encourage patients to learn breathing and relaxation techniques to decrease preprocedure anxiety.

The acceptance commitment therapy (ACT) therapeutic approach falls broadly under CBT and includes methods of acceptance, mindfulness, activation, and behavior

change.⁴¹ A central aspect of ACT is psychological flexibility, which is the capacity of an individual to change behavior based on values. ACT supports active behavioral engagement in spite of pain and the willingness to tolerate pain in order to engage in a purposeful activity without emphasizing reduction of pain.³⁹

Tip: encourage patients to continue to be actively engaged in valued activities in spite of the pain.

There are several models of group therapy that are offered for patients suffering with chronic pain and their goals can be 1 or all of the following: (1) psychoeducation, (2) providing social support, and (3) building a repertoire of coping skills, including relaxation exercises and mindfulness practice. In practices that do have a multidisciplinary team, it is not unusual to have a support group organized by a nurse or a nurse practitioner. At ColumbiaDoctors Pain Medicine, time-limited pain and spirituality groups were offered, co-led by a pain psychologist and a hospital chaplain to address pain, grief, and existential issues. In some cities, peer groups are available. Internet-based peer groups also are being offered.

Tip: encourage patients to participate in disease-specific or procedure-specific groups to find support and information from their peers.

Biofeedback often is used as an adjunct to other psychotherapies. It enables an individual to change physiologic activity by learning from the feedback provided from their bodily responses (muscle tension, surface skin temperature, heart rate, electroencephalogram, and galvanic skin response) on a monitor. With repeated practice, patients learn the association between their physiologic response and their thoughts and feelings and how to modify them. Biofeedback has been found effective in the management of headache disorders, in particular tension headaches.

Hypnosis is an adjunctive treatment in the management of chronic and acute pain and has been found efficacious in decreasing pain and distress compared with standard care.⁴³ Although medical procedures often are a source of acute pain and anxiety, patients can be taught to manage the anxiety with images that promote a deeply relaxed state. When in this state, they are provided the anxiety-provoking cues but are asked to continue to stay in the relaxed state. Posthypnotic cues are provided and suggestions for going through surgery in a relaxed manner are given. Readers are referred to a comprehensive article on clinical hypnosis in the treatment of pain by McKernan and colleagues⁴⁴ for a more detailed review.

TECHNOLOGY TO IMPROVE PSYCHOLOGICAL INTERVENTIONS

Technology to improve psychological interventions is a relatively new approach to providing psychological services and has the potential for significant growth. In a detailed discussion on the use of technology in pain management, Eccleston and colleagues⁴⁵ acknowledge the complexity of this approach and suggest that technologies can achieve 3 main therapeutic functions: improve access to psychological interventions, improve psychological interventions themselves, and directly alter pain experience. Smartphones, interactive apps, and virtual reality systems are a few examples of extending psychological interventions outside the clinical setting. Apps, such as Calm and Headspace, have become popular. The shift from traditional to technology-based therapeutics is an interdisciplinary challenge and Eccleston and colleagues⁴⁵ emphasize that the focus should not be on achieving similar results to face-to-face therapy but on using technology to improve treatment via innovation.

REFERRAL TO MENTAL HEALTH PRACTITIONERS

When patients present with active psychiatric symptoms, substance abuse, drug-seeking behavior, and nonadherence to treatment, they may benefit from a referral to a pain-trained mental health professional. Referral to a psychiatrist may be necessary for pharmacotherapy related to pain and psychiatric symptoms. Licensed, pain-trained clinical psychologists are skilled in various forms of individual, family, and group therapies. Some psychologists have additional training in CBT for insomnia for managing pain-associated sleep disorders.

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