The role of cognitive behavioral therapy in pain management

CBT can help patients learn to identify irrational or dysfunctional thoughts around pain and learn to develop strategies for replacing these thoughts with healthier alternative thoughts, leading to less stress and eventually less pain.

by Kimeron Hardin, PhD, ABPP

As a clinical psychologist, I have spent the better part of 25 years working exclusively in the field of pain management, across many settings and treating patients with pain along the acute to chronic spectrum. Due to the dearth of pain management training at the time, my early experiences were fraught with mistakes, as I stumbled through our limited understanding of pain perception. I struggled to understand the complex interaction between mind and body, even while the steady stream of referrals from my medical colleagues grew larger. In the beginning, most referrals stepped into my office only after all reasonable attempts at "cure" had failed and the patients were past the point of frustration, often desperate, and frequently suicidal.

Those early experiences forced me to step outside the box of my traditional psychology training and to learn from the rapidly unfolding scientific and technological advances.

My role is two-fold. First, to reduce suffering in my patients in whatever form and second, to work collaboratively with my medical colleagues to help them provide quality care and to achieve the best outcomes possible.

With the development of the gate control theory by Melzack and Wall, and the later iteration in 1990 by Melzack called the neuromatrix theory, I began to understand the critical role of the perception in the experience and mediation of pain. The neuromatrix theory of pain states that “the perception of pain stimuli does not result from the brain's passive registration of tissue trauma, but from its active generation of subjective experiences through a network of neurons known as the neuromatrix.”

Before functional MRIs came along, allowing us to literally “see” and therefore begin to map these proposed neural networks, psychologists were already helping pain patients to change their perception of pain, largely through helping them to recognize dysfunctional thoughts, beliefs and attitudes about the pain. Mounting evidence suggests that by changing perception, we are indeed changing neural pathways.

Cognitive behavioral therapy (CBT) is an evidence-based approach to addressing many forms of mental health issues and has been the subject of many clinical trials. In many studies, CBT has been found to be as effective, if not more effective, than medications in the treatment of many forms of depression and anxiety.

How does CBT change the brain in people with pain?

We are born with an automatic stress response to the sensation of pain. It is entirely appropriate that our brains kick into higher gear when we detect something is wrong via uncomfortable sensations. The stress response is a complex chain of events, beginning with a perception of potential danger and including the release of hormones such as adrenaline and cortisol, which ultimately can intensify the sensation of pain in an attempt to help the body deal with the potential danger. Prolonged and unmitigated pain leads to prolonged stress, which in turn affects neurotransmitters such as serotonin and norepinephrine, which also play a strong role in mood. Effective CBT, which identifies and replaces stress-inducing or otherwise dysfunctional thinking with healthier coping thoughts, reduces the arousal and the release of pain-intensifying chemicals in the body.

A second possibility for how CBT changes the brain involves the specific functions of two key regions of the brain. The region that handles emotions such as stress and fear is commonly referred to as the “emotional brain,” while the structures that deal with planning, logic and reason are referred to as the “logical brain.” The logical brain is able to override the emotional brain—for example, when a person experiencing the pain of getting a tattoo is able to understand that the pain, while uncomfortable, is a natural and expected part of the tattoo process, and not typically a sign of danger, and they are typically able to withstand the discomfort.

Every time the logical brain overrides the emotional brain by using abdominal breathing or thinking positive calming thoughts, especially while experiencing chronic pain, new neural pathways become reinforced, making it easier to deal with future episodes of pain and stress.

What are the essential components of CBT in pain management? How does it actually work?

CBT is typically focused on the present, is time-limited, interactive and goal-directed and typically begins with a thorough pain and family history. During this process, the therapist identifies specific goals with the patient, most commonly around successful pain management. Examples of goals include better coping with acute flare-ups of pain, identifying...
fatigue, decreased joint and muscle pain, decreased blood pressure, decreased resting heart rate, decreased risk for other chronic diseases, decreased anxiety and depression, improved sleep, increased ability to burn fat, improved regulation of endorphin release, improved aerobic capacity, increased functional capacity, increased muscle strength, increased energy, improved cholesterol profile, improved self esteem, improved ability to perform recreational and simple daily activities, and an ability to return to work.

It is strongly believed that the best way to effect a multi-disciplinary approach to maximize the functional capacity of the chronic pain patient, regardless of the underlying pathology, is through a functional restoration program. The patient attends the program on a daily basis, regardless of any flare-ups; the patient is seen daily by the pain psychologist, physical therapist, and physical trainer. The patient sees the pain physician and nutritionist once per week, and the vocational rehab counselor as needed. This program cannot be supported in a traditional out-patient physical therapy setting.

There are additional things to consider in the attempt to maximize the effectiveness of a functional restoration program. In order to establish a setting that promotes “health” versus “sickness,” the treatment area should be as non-clinical in design as possible. An area including bright colors, mirrors, and equipment designed in a fashion to more resemble a “gym” setting is optimal. Clear and realistic long-term functional goals should be established at the beginning of the program. Achievable short-term goals should be established on a weekly basis. Patient progress should be processed in a form (chart or graph) that is easy for the patients to be able to realize their objective functional gains. A subjective measure of the patient’s perceived level of disability, such as the Oswestry Disability Index, should be additionally utilized to realize improvement of how disabled the patients perceive themselves to be.

Ultimately, exercise as part of a multidisciplinary approach to the treatment of chronic pain is invaluable in allowing the patient to effectively regain their maximum functional capacity level, improve their level of optimism, decrease their level of depression, and take control of regaining their life!

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behavioral pain coping strategies in order to reduce dependence upon habit-forming pain medications, avoiding invasive procedures, reducing symptoms of depression around pain and disability, and improving function despite the pain.

These general goals are then made more behaviorally specific, and problematic thoughts or feelings are tracked for frequency and intensity of emotional arousal.

CBT assumes that triggering events lead to automatic thoughts, which in turn, lead to feelings followed by actions or behaviors. Automatic thoughts are part of a deeper system of core beliefs and values that we accumulate from life experiences about who we are, our self-worth, and the trustworthiness of others around us.

Those early experiences shape our reactions to, and interpretations of, the events in our lives. Sometimes, our interpretations are accurate and our responses are appropriate. Often however, our thoughts are based on superficial information and in our current world, are irrational or dysfunctional, leading to excessive anxiety or depression.

Many studies of the thinking patterns in people with pain have found that catastrophic thinking, or worrying about the future worst-case scenario about their pain and health, is common. CBT in pain management therefore is often focuses on helping the patient learn to identify thoughts around pain that increase stress, muscle tension and thereby exacerbate the pain even more.

Over time with practice, patients learn to not only identify irrational or dysfunctional thoughts around pain and learn strategies for stopping and replacing these thoughts with healthier alternative thoughts, leading to less stress and eventually even less pain.

Although often initially CBT is focused on managing the immediate experience of pain, it is a natural transition to reducing the negative thinking characteristic of depression and feelings of helplessness that is often a consequence of living with chronic pain.

Unmanaged or poorly managed chronic pain inevitably leads to feelings of hopelessness, helplessness and depression but we also observe that depression, without injury or obvious structural pathology, leads to the experience of physical pain. Current thinking about this relationship revolves around the shared neurotransmitters and neural pathways between pain and depression. In many cases reducing depression with CBT often leads to both reduced pain and improved pain coping. Effective management includes both wise medical intervention and improving the patient’s sense of control by increasing awareness of effective behavioral and cognitive tools.

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