

A Biopsychosocial Approach for Addressing Chronic Pain in Everyday Occupational Therapy Practice

Kimberly Breeden, MS, OTR/L
Pain Consultants of East Tennessee
Knoxville, Tennessee

Nicole Rowe, BA, COTA/L
Pain Consultants of East Tennessee
Knoxville, Tennessee

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ABSTRACT

Occupational therapy practitioners in every setting encounter clients with chronic pain. Even with this prevalence, how often are we as practitioners considering the impact that this condition will have on their occupational performance? How often do our treatment plans and interventions address the functional impact of chronic pain? This article seeks to provide occupational therapy practitioners with a foundation of knowledge and theory that can guide clinical reasoning for improving occupational engagement for individuals with chronic pain. The current evidence indicates that a biopsychosocial approach can be used to most effectively identify and treat the functional implications of chronic pain. Occupational therapy is distinctly prepared to provide services in a biopsychosocial model.

LEARNING OBJECTIVES

After reading this article, you should be able to:

1. Identify the biopsychosocial factors that contribute to chronic pain
2. Describe the impact chronic pain can have on occupational performance
3. Identify the occupational therapy interventions that could be used in a biopsychosocial approach to treat individuals with chronic pain
4. Describe an appropriate approach that can be used to develop a plan of care for a client with chronic pain

INTRODUCTION

Conversations surrounding the treatment of chronic pain have increased over the past decade, not only in health care, but also within communities, the media, and law enforcement. During this time, concern has grown over the impact of chronic pain on our society. It can often result in loss of work

and increased health care costs, taking a physical, mental, and emotional toll on all involved. Those with chronic pain in the United States make up more than the total number of individuals with diabetes, heart disease, and cancer combined, costing the United States more than \$500 billion a year (IOM, 2011). Given the high incidence of chronic pain, it is reasonable to assume that occupational therapy practitioners are frequently treating clients who have chronic pain, regardless of population or practice setting. The intent of this article is to prepare practitioners with foundational knowledge for treating clients either with a primary or secondary diagnosis of chronic pain.

Due to the ever-growing concerns regarding the prescription of opioid medications, many regions of the country have seen changes in regulations and practice guidelines to limit the prescribing of opioids, and in March 2016, the CDC released *Guidelines for Prescribing Opioids for Chronic Pain* (Dowell, Haegerich, & Chou, 2016). In response to these regulatory changes and practice recommendations, medical providers are looking for effective non-pharmacological treatment options for managing chronic non-malignant pain.

Based on the growing body of research supporting the complexity of pain, a model for treatment must be considered that addresses the multifactorial impact of chronic pain. The biopsychosocial model is the most widely accepted, evidence-based approach that can provide the transformational guidance to treating chronic pain that is recommended. The Biopsychosocial Model for Pain and Disability “views pain and disability as a complex and dynamic interaction among physiologic, psychologic, and social factors that perpetuates—and may even worsen—the clinical presentation” (Gatchel & Okifuji, 2006, p. 781).

Given the significance of these findings and the prevalence of chronic pain, it is of growing importance for all occupational therapy practitioners to consider a biopsychosocial approach to understand chronic pain, recognize its impact on an individual's occupational performance, and implement appropriate interventions to help clients manage their pain. Not only should we, as practitioners, strive to ensure that the holistic needs of the client are met, but we must also be effective at promoting the distinct value of occupational therapy as a provider of non-pharmacological treatment of chronic pain.

BIOPSYCHOSOCIAL FACTORS ASSOCIATED WITH CHRONIC PAIN

The International Association for the Study of Pain (1994) defined pain as:

An unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage Pain is always subjective (p. 210)

For most health care providers, this is a shift in our understanding from pain as only a sensory modality and a general symptom to a more complex experience that includes emotions. Typically, pain is classified as malignant, acute, or chronic. Malignant pain is associated with neoplasm or effects of treatment for malignancy (Portenoy, 1996). Acute pain is commonly defined as sudden onset with expected short duration, usually associated with an injury or illness (Interagency Pain Research Coordinating Committee [IPRCC], 2016). In contrast, chronic pain is pain that persists “beyond the expected time frame for healing or that occurs in disease processes in which healing may never occur” (Clinical Standards Advisory Group, as cited in Jordan, Holden, Mason, & Foster, 2010, p. 2). Chronic pain is sometimes defined by a duration of time, such as greater than 3 to 6 months. For the purposes of this article, we will be discussing chronic, non-malignant pain.

The biology of pain is complex and still not fully understood. Like all senses, pain has an intended purpose. Most senses are primarily informative; however, pain’s purpose is different, as it is a protective modality. It is designed to act as an alarm that alerts one to actual or potential tissue damage. This process is called *nocioception* and includes transduction, transmission, perception, and modulation. *Transduction* occurs when nociceptors in the tissue, joints, or organs are activated by noxious stimuli, resulting in nociceptive, neuropathic, or inflammatory pain. *Transmission* occurs when the nerve impulse is then transmitted to the brain via the ascending sensory pathways. *Perception* of pain occurs when the brain receives the signals and interprets them as painful. Magnetic resonance imaging (MRI) has demonstrated that pain activates a large brain network, including the sensory cortices, insula, anterior cingulate cortex, prefrontal cortex, and the limbic system. The areas comprising this network are also associated with cognition, mood, emotion, personality, and motor function. Pain *modulation* is the process through which the body alters a pain signal during transmission. This process explains why individuals respond differently to the same painful stimulus, also known as *pain tolerance* (Kirkpatrick et al., 2015). Modulation can be both facilitatory and inhibitory, leading to both analgesia and hyperalgesia.

If pain remains after its purpose for warning is over, it becomes maladaptive. Continued pain results in changes to the central and peripheral nervous systems, aiding in its persistence (IOM, 2011). Two of those changes, peripheral and central sensitization, result in a state of high reactivity, leading to the amplification of pain (hyperalgesia) or the feeling of pain with stimulation that is not typically painful (allodynia). According to

Clauw (2014), “Fibromyalgia can be thought of as a centralized pain state [in which one may] feel more pain than would normally be expected based on the degree of nociceptive input” (p. 1548).

Unlike the other senses, the perception of pain involves more than just reacting to stimuli and then processing a neural signal. It is a cognitive and emotional experience. There are multiple factors beyond biology, including psychological and social, that impact the individual’s perception of pain. In other words, the degree of pain one experiences is influenced by one’s psychology and surroundings. Because pain is modulated in the limbic system, it results in pain becoming a feeling. One’s perception of pain is shaped by the context of the pain, attention on the pain, presence of anxiety, fear, and sense of loss of control (Hansen & Streltzer, 2005). An individual’s learned experiences with pain, expectation of how much pain should be present, personal beliefs regarding pain, current coping skills, self-efficacy, locus of control, fear of pain, involvement in the “sick role,” and tendency for catastrophizing may all influence pain perception (Hansen & Streltzer, 2005). Studies indicate that pre-existing psychological conditions, such as major depression, anxiety disorder, somatoform disorders, and personality disorders, may increase the likelihood of developing chronic pain after surgery (Hansen & Streltzer, 2005; Perkins & Kehlet, 2000).

Social factors also impact the perception and experience of pain, but they are often less recognized. Socioeconomic status, lack of social supports, unhealthy lifestyles, substance abuse, legal interactions, and family issues affect the pain experience (Hansen & Streltzer, 2005). Growing literature indicates that cultural factors may influence pain as well (IOM, 2011). Pain behaviors and conditioned pain responses can also perpetuate the persistence of pain (Hansen & Streltzer, 2005). An example of this could be the individual receiving increased attention from a spouse or family member because of pain. These conditioned pain responses, also referred to as reinforced behaviors, are unintentional consequences of social interactions.

Although not fully understood, the development and persistence of chronic pain is a multidimensional process that integrates the relationships among physical, psychological, and social factors. Variables predisposing an individual to developing chronic pain could include genetics, medical conditions, history, emotional factors, family dynamics, environment, and socioeconomic status.

IMPACT OF CHRONIC PAIN ON OCCUPATIONAL PERFORMANCE

A better understanding of chronic pain physiology is important, but we must also, as occupational therapy practitioners, consider the impact that pain has on the many occupations of living. The debilitating effects of chronic pain can result in decreased participation in self-care, work, sleep, sexual activity, and mobility (Covinsky, Lindquist, Dunlop, & Yelin, 2009; Eggermont et al., 2014; McCracken & Iverson, 2002; Nikoobakht, Fraidouni, Yaghoubidoust, Burri, & Pakpour, 2014).

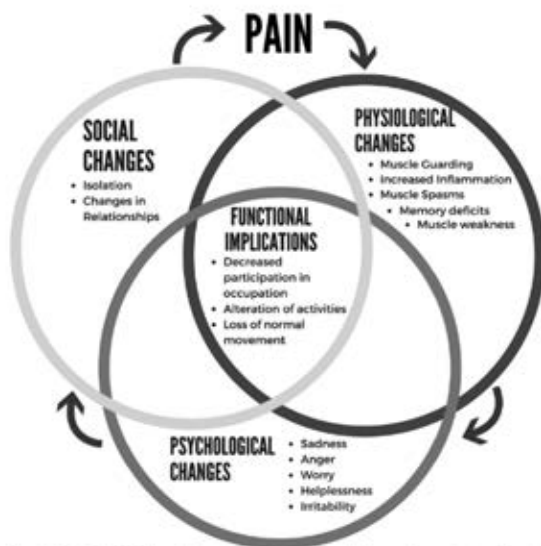
Chronic pain also impacts one's roles, making it difficult to carry out activities for fulfilling them, such as child rearing, socializing, and playing.

These effects are not limited to an age group or specific condition. For example, a father with chronic low back pain may have concerns about being able to attend his daughter's sporting event after a full day of work. For most individuals with chronic pain, many complex factors can affect their engagement in activities. The father's ability to watch his daughter play basketball could be impacted by his exacerbated pain from work activities, anticipation of how driving and prolonged sitting will be tolerated, and his fatigue resulting from poor sleep the previous night.

In response to these complex factors, individuals will often alter the occupation in an attempt to maintain engagement. These alterations can include task modification, decreased frequency, decreased quality, delegation, and/or cessation. One study determined that two thirds of participants with chronic pain reported modifying at least one activity due to pain (Duong, Kerns, Towle, & Reid, 2005). Although participation continues, the person is frequently not satisfied with the experience. In the example of the father, having to periodically leave his seat to stand outside the arena may result in missing seeing his daughter make the winning shot. An exceptionally rigorous day at work may result in him being unable to attend the game at all.

The chronic pain cycle can illustrate the complex biopsychosocial factors that influence occupation and engagement (see Figure 1). Although the pain cycle is frequently used by pain practitioners in client education, there is no universally accepted diagram. For the purposes of this article, the biopsychosocial approach was used as the basis for developing this chronic pain cycle with an occupational perspective.

Figure 1. Chronic Pain Cycle



Chronic Pain Cycle. 2017 Nicole Rows. May not be reproduced without written permission of authors.

Physiologic Changes

Changes in strength, range of motion, and stability may be expected in the specific joint or limb affected by pain. Unexpected changes can also occur throughout the body due to pain-related alteration in movement. Among those with chronic pain, studies have found changes in motor control, proprioception, muscle recruitment, and coordination as well as decreased endurance, strength, and velocity of movement (Arendt-Nielsen, Madeleine, & Graven-Nielsen, 2004; Hodges & Moseley, 2003; Popa, Bonifazi, Della Volpe, Rossi, & Mazzocchio, 2007). Protective behaviors, such as guarding, can also lead to changes in body structures and altered psychological functioning. Guarding is defined as any of a set of protective behaviors, such as limping, bracing, or otherwise protecting a part of the body. Guarding, similar to other pain behaviors, continues after healing has occurred and reinforces self-perceptions of disability (Prkachin, Schultz, & Hughes, 2007). An example would be someone who has ankle pain later developing shoulder pain as a result of prolonged guarding and disruption of normal movement patterns.

As impactful as movement changes may be for someone with chronic pain, dealing with the cognitive effects may be just as challenging. Chronic pain has been linked to changes in the brain, including decreased grey matter volume, cortical thickness changes, and hippocampal changes (Vachon-Preseu et al., 2013). Those who have chronic pain often demonstrate cognitive changes, with memory, attention, and executive function being impacted (Moriarty, McGuire, & Finn, 2011). As pain commands one's attention, greater difficulty may be experienced with the cognitive processes required for getting through the day.

Psychologic Effects

Everyday challenges that those with chronic pain face can lead to a cycle that leaves the person feeling helpless, worthless, and hopeless. The same psychological factors that can influence the development of chronic pain may be exacerbated as pain persists, further continuing the cycle. Individuals who catastrophize not only are more likely to develop chronic pain, but they have also been shown to report greater negative outcomes, such as disability, increased health care usage, greater use of pain medication, and increased depression (Keefe, Rumble, Scipio, Giordano, & Perri, 2004). Often, those who have chronic pain develop anxiety and fear related to the pain. This may include kinesiophobia and fear avoidance, which is a reduction in movement due to fear of pain and/or re-injury. Reducing movement can lead to a decrease in overall activity. Ambrose and Golightly (2015) found that 24% to 58% of adults with arthritis are physically inactive. Physical inactivity or sedentary behaviors were found to have adverse effects on health and physical function (Ambrose & Golightly, 2015). The incidence of depression is higher among those who have chronic pain when compared with the public (Turk, Fillingim, Ohrbach, & Patel, 2016). An example of this could be a 60-year-old woman, faced

with cancelling life-long retirement plans due to her pain, experiencing feelings of depression as she deals with disappointment and loss. Depression could make it more difficult for her to fully engage in actively managing her chronic pain.

Social Impact

The social impact of chronic pain extends beyond individuals, affecting relationships and those around them. Relatives have reported emotional changes, limited socializing, and financial changes related to their loved one's pain, contributing to a reported deterioration in physical, mental, and emotional health (Ojeda et al., 2014). For the individual, social interactions become more difficult, leading to avoidance and social isolation. In the case of children, those with chronic pain were found to experience disability, missed school days, and difficulty with academic performance, limiting their ability to socialize (Miller, Scott, Trost, & Hirsch, 2016).

OCCUPATIONAL THERAPY'S ROLE IN CHRONIC PAIN MANAGEMENT

To comprehensively address the biopsychosocial implications of chronic pain, an integrated, multimodal, and interdisciplinary treatment approach is indicated (IPRCC, 2016). As occupational therapy professionals, we need to promote the distinct value our services offer to this treatment model.

Viewing chronic pain as a chronic condition rather than as a symptom is a transition for most health care professionals. The evidence suggests that *self-management* strategies are effective for improving pain, mental health, and health-related quality of life outcomes for individuals with chronic pain (Mann, LeFort, & VanDenKerkhof, 2013). The treatment goals are no longer focused on reducing pain, but rather on managing a chronic condition to increase occupational participation. Although many health care disciplines provide services using a self-management approach, our profession distinctly uses occupation-based interventions to improve self-management.

Evaluation

The occupational therapy evaluation for the individual with chronic pain should be a comprehensive, client-centered assessment of current engagement in the occupations of activities of daily living (ADLs), instrumental ADLs (IADLs), rest and sleep, education, work, play, leisure, and social participation (American Occupational Therapy Association [AOTA], 2014). It is important to evaluate the biological, psychological, and social implications affecting occupational performance, including current coping strategies, beliefs regarding pain, postural and movement patterns, musculoskeletal factors, cognition, and the client's expectations and goals. The evaluating therapist must consider that the client with chronic pain may have seen multiple providers and may be frustrated by a lack of identification of a pain source, unresolved pain, or the perceived stigma associated with receiving pain treatment. Therapeutic use of self and active listening should be used to affirm the client's values

and to establish a collaborative relationship that results in a plan of care that reflects the individual's occupational goals.

There are a significant number of assessment tools and outcomes measures that can be used for individuals with chronic pain, and that will be determined by population, setting, or location of pain. These include the Canadian Occupational Performance Measure, Patient Specific Functional Scale, 36-Item Short Form Survey, Varni/Thompson Pediatric Pain Questionnaire, Timed Up and Go (TUG), and Functional Reach Test, as well as condition-specific scales, such as the Oswestry Low Back Pain Disability Questionnaire, Disabilities of the Arm, Shoulder and Hand Questionnaire, and Neck Disability Index (Rehabilitation Institute of Chicago, 2010).

Treatment Interventions for Managing Chronic Pain

Multimodal pain treatment consists of a combination of therapies using approaches that may include medical, surgical, psychological, behavioral, and integrative (IPRCC, 2016). The ultimate aim in treatment is to re-engage the client in their occupations of living. Strategies should be applied to improve participation in all occupations. Multimodal interventions should focus on the client's active participation in all possible aspects of managing their chronic pain condition, such as teaching a client how to operate a home transcutaneous electrical nerve stimulation (TENS) unit and working with them on an individualized plan for using it. Passive pain relief treatments, such as receiving electrical stimulation only in the clinic, may not be as beneficial in improving self-efficacy.

Psychological Interventions and Approaches

Cognitive Behavioral Therapy (CBT). The most widely recommended psychological approach for treating chronic pain, CBT seeks to decrease maladaptive behaviors, beliefs, and thought patterns regarding one's pain (Eccleston, 2001). Techniques include training in relaxation, activity pacing, and problem solving as well as personal goal development and facilitation for achievement, behavioral activation, and cognitive restructuring (Ehde, Dillworth, & Turner, 2014). CBT strategies have been shown to "effectively reduce pain and fatigue [and] improve sleep, overall physical function, and coping" (Ambrose & Golihtly, 2015, p. 122).

Pain Education. For most individuals, pain is a result of injury or illness, resulting in feelings of distress. Based on past experiences, someone with persistent pain may believe that pain cannot be influenced. Providing education on the physiology and modulation of pain is the foundation for learning self-management strategies. Providing neuroscience education has been shown to reduce pain ratings, improve function, and help individuals develop strategies to cope with pain (Louw, Diener, Butler, & Puentedura, 2011).

Coaching. Health coaching is an adaptable, self-management-based approach that may use CBT, self-efficacy principles, and motivational interviewing in a collaborative process for

joint goal setting, problem solving, and follow up (Wong-Reiger, 2011). When working with individuals with chronic pain, interventions may include collaborating to develop personal, reasonable goals for increasing physical activity and plans for managing pain flares.

Relaxation Training/Biofeedback and Mindfulness. The literature often interchangeably uses the terms *relaxation*, *mindfulness*, and *biofeedback*. Some studies define all three interventions collectively as either relaxation or mindfulness. Other studies and authors consider relaxation training and biofeedback to be CBT approaches and mindfulness a distinct approach. For the purposes of this article, we will define them as distinct from one another.

Relaxation training focuses on identifying and then purposefully working to decrease tension in the body. Relaxation interventions may include teaching diaphragmatic breathing, progressive muscle relaxation, guided meditation, visualization, and stretch-based relaxation. According to Persson, Veenhuizen, Zachrisson, and Gard (2008), relaxation training resulted in decreased pain intensity, anxiety, depression, and fatigue for individuals with fibromyalgia. Incorporating relaxation strategies that are consistent with the client's values, spiritual beliefs, and current practices may improve the client's engagement in the activity.

Biofeedback involves a client learning to regulate certain physiological processes through use of feedback that can be visual, auditory, or tactile (Sielski, Rief, & Glombiewski, 2016). Relaxation, improved postural control, coping, increased self-efficacy, and reduced muscle tension can all be objectives for biofeedback treatment, which has been shown to have a positive impact on pain intensity, muscle tension, depression, and coping for those with chronic back pain (Sielski et al., 2016).

Mindfulness can be defined as "the development of a particular kind of attention characterized by a nonjudgmental awareness, openness, curiosity, and acceptance of internal and external present experiences," allowing one "to act more reflectively rather than impulsively" (Chiesa & Serretti, 2011, p. 83). Guided meditation, walking meditation, and quiet meditation could be used in mindfulness training. Several literature reviews have demonstrated the benefits of mindfulness-based interventions for chronic pain, including improvement in the areas of functional status, sleep, stress, pain acceptance, pain intensity, and the psychological components of pain (Chiesa & Serretti, 2011; Khusid & Vythilingam, 2016). Through the use of functional MRI, several alterations in pain physiology mechanisms, including sensitization, were noted after mindful meditation (Zeidan et al., 2011).

A case example for treatment might be an occupational therapy assistant (OTA) training a mother with fibromyalgia to incorporate mindfulness into a daily activity, such as washing dishes. The OTA may encourage the mother to increase her sensory awareness of conditions such as the smell of the dish detergent, the temperature of the water, and the iridescence of the bubbles.

Activity Pacing. Pacing "is an active self-management strategy whereby individuals learn to balance time spent on activity and rest for the purpose of achieving increased function and participation in meaningful activities" (Jamieson-Lega, Berry, & Brown, 2013, p. 212). Pacing addresses maladaptive behaviors in which those with chronic pain avoid activity or have periods of overactivity, leading to extended sedentary behaviors due to exacerbated pain (Songer, 2005). For example, a 24-year-old male veteran with central pain syndrome reports that he is still able to mow his lawn on Saturdays, but typically is not able to get out of bed for the next several days. The occupational therapist works with him to develop a strategy for mowing in 30-minute increments over several days.

Social Interventions and Approaches

Pain behaviors are ways of communicating pain to others; this can be done through verbalizations, postures, gait, facial expressions, clenching, guarding, wincing, and the use of medical aides (Eccleston, 2001). Family members and others close to the client may inadvertently reinforce these negative pain behaviors by increasing attention when the behaviors are presented, or providing opportunities for the client to avoid undesirable activities when demonstrating pain behaviors. Turk et al. (2016) suggested that reinforcing pain behaviors is associated with "increased pain, increased pain behaviors, and maintenance of disability" (p. T37). Occupational therapy practitioners can teach families to ignore pain behaviors while strongly reinforcing efforts to increase function (Songer, 2005).

Socialization. Interventions for improving socialization should consider not only the support systems in place for the person, but also satisfaction with social activities, relationships, and the effects of isolation. Facilitating online interactions, including blogging, may be considered, depending on the client's virtual context, because a portion of those who blogged about their pain reported decreased feelings of isolation (Ressler, Bradshaw, Gualtieri, & Chui, 2012). It may not be enough to just assist in facilitating increased opportunities for socialization, as those with chronic pain may not be satisfied while participating. The occupational therapy practitioner provides guidance during problem solving to identify specific factors contributing to the pain and how to use pre-planning to reduce those factors. For example, a client may report choosing a better seating option and earlier time of day for his main meal, which leads to decreased pain and greater satisfaction during dinner with his family.

Physical Interventions and Approaches

Positioning/Body Mechanics. Protective behaviors, often demonstrated by those with chronic pain, may lead to alterations of posture that make it difficult to tolerate static positions. Further, this impaired tolerance to positions such as sitting, standing, or lying may negatively impact successful and fulfilling participation in occupations such as school or work.

Occupational therapy interventions directed at helping a client achieve more comfortable postures may reduce overall pain with activity. Desouzart, Matos, Melo, and Filgueiras (2016) found that reported pain decreased 4 weeks after subjects were trained in sleeping postures that provided stability and neutral spine posture.

One study found that training in neutral spine principles and applying them to daily activities (body mechanics) for those with nonspecific low back pain reduced the intensity of the pain as well as improved self-report of work ability (Sun et al., 2006). Lieber, Rudy, and Boston (2000) found that “intensive instruction in body mechanics” as part of a work hardening program impacted static strength, dynamic endurance, and work for participants (p. 166).

Physical Activity Training. The evidence is consistent that when physical activity is applied appropriately for those with chronic pain conditions, it relieves pain and improves physical function, sleep, fatigue, and mood. The effects of activity have been comparable to the effects of simple analgesics and nonsteroidal anti-inflammatory drugs (Ambrose & Golightly, 2015). For individuals with chronic pain who have sedentary behaviors, reversing those behavior patterns is crucial to breaking the chronic pain cycle. Different from pacing training, which works to balance activity and rest, improving participation in exercise and physical activity is done systematically to gradually expose the client to increased challenges to minimize the hyperalgesia effects of overactivity (Ambrose & Golightly, 2015). For example, an adolescent female with chronic pain may struggle with the fear of her pain increasing if she exercises. The OTA may identify that this client used to enjoy playing virtual dance games prior to her pain. The OTA may have the client begin with seated participation in a dance game for one song. Treatment would progress gradually to extended durations, difficulty, and intensity.

Relapse Prevention Training. Preparing the client for inevitable pain flares through CBT approaches is called *relapse prevention training* (Songer, 2005). The occupational therapy practitioner and client collaborate to identify learned skills that can be used to manage pain flares and prepare the client for implementing those skills. Historically, thermal, electrical, and manual modalities have been used to reduce pain. If these are safe and effective for the individual, they can be used independently in order to self-manage pain as well as prevent relapse. The occupational therapy practitioner can educate the client to the benefits, safe use, and integration into daily routines for these modalities.

CONCLUSION

Given the current climate in health care regarding chronic pain, occupational therapy practitioners must be prepared to demonstrate their distinct value and address the occupational needs of this population. The existing biopsychosocial evidence can be applied in providing a basis for occupation-based services,

although further research is required to demonstrate the value of occupational therapy's contribution in serving clients with chronic pain. ☯

REFERENCES

- Ambrose, K. R., & Golightly, Y. M. (2015). Physical exercise as non-pharmacological treatment of chronic pain: Why and when. *Best Practice and Research Clinical Rheumatology*, 29, 120–130. <http://dx.doi.org/10.1016/j.berh.2015.04.022>
- American Occupational Therapy Association. (2014). Occupational therapy practice framework: Domain and process (3rd ed.). *American Journal of Occupational Therapy*, 68, S1–S48. <http://dx.doi.org/10.5014/ajot.2014.682006>
- Arendt-Nielsen, L., Madeleine, P., & Graven-Nielsen, T. (2004). Interaction between muscle pain and motor control. *Pain and Movement: Newsletter of the IASP Special Interest Group on Pain and Movement*, 5, 2–4. Retrieved from [http://vbn.aau.dk/en/journals/pain-and-movement-newsletter-of-the-iasp-special-interest-group-on-pain-and-movement\(33f8121d-d4ce-4b6a-98adc9ec363546ac\)/publications.html?filter=research&subfilter=contribution-tojournal](http://vbn.aau.dk/en/journals/pain-and-movement-newsletter-of-the-iasp-special-interest-group-on-pain-and-movement(33f8121d-d4ce-4b6a-98adc9ec363546ac)/publications.html?filter=research&subfilter=contribution-tojournal)
- Chiesa, A., & Serretti, A. (2011). Mindfulness-based interventions for chronic pain: A systematic review of the evidence. *Journal of Alternative & Complementary Medicine*, 17(1), 83–93. <https://dx.doi.org/10.1089/acm.2009.0546>
- Clauw, D. J. (2014). Fibromyalgia: A clinical review. *Journal of the American Medical Association*, 311, 1547–1555. <https://doi.org/10.1001/jama.2014.3266>
- Covinsky, K. E., Lindquist, K., Dunlop, D. D., & Yelin, E. (2009). Pain, functional limitations, and aging. *Journal of the American Geriatrics Society*, 57, 1556–1561. <http://dx.doi.org/10.1111/j.1532-5415.2009.02388.x>
- Desouzart, G., Matos, R., Melo, F., & Filgueiras, E. (2016). Effects of sleeping position on back pain in physically active seniors: A controlled pilot study. *Work*, 53, 235–240. <https://dx.doi.org/10.3233/WOR-152243>
- Dowell, D., Haegerich T. M., & Chou R. (2016). CDC guideline for prescribing opioids for chronic pain. *Morbidity and Mortality Weekly Report*, 65(1), 1–49. <http://dx.doi.org/10.15585/mmwr.r6501e1>
- Duong, B., Kerns, R., Towle, V., & Reid, M. (2005). Identifying the activities affected by chronic nonmalignant pain in older veterans receiving primary care. *Journal of the American Geriatrics Society*, 53, 687–694. <https://dx.doi.org/10.1111/j.1532-5415.2005.53220.x>
- Eccleston, C. (2001). Role of psychology in pain management. *British Journal of Anaesthesia*, 87, 144–152. <https://dx.doi.org/10.1093/bja/87.1.144>
- Eggermont, L. P., Leveille, S. G., Shi, L., Kiely, D. K., Shmerling, R. H., Jones, R. N., ... Bean, J. F. (2014). Pain characteristics associated with the onset of disability in older adults: The maintenance of balance, independent living, intellect, and zest in the elderly Boston study. *Journal of the American Geriatrics Society*, 62, 1007–1016. <https://dx.doi.org/10.1111/jgs.12848>
- Ehde, D. M., Dillworth, T. M., & Turner, J. A. (2014). Cognitive-behavioral therapy for individuals with chronic pain. *American Psychologist*, 69, 153–166. <https://dx.doi.org/10.1037/a0035747>
- Gatchel, R. J., & Okifuji, A. (2006). Evidence-based scientific data documenting the treatment and cost-effectiveness of comprehensive pain programs for chronic nonmalignant pain. *Journal of Pain*, 7, 779–793. <https://doi.org/10.1016/j.jpain.2006.08.005>
- Hansen, G. R., & Streltzer, J. (2005). The psychology of pain. *Emergency Medicine Clinics of North America*, 23, 339–348. <https://doi.org/10.1016/j.emc.2004.12.005>
- Hodges, P. W., & Moseley, G. L. (2003). Pain and motor control of the lumbopelvic region: Effect and possible mechanisms. *Journal of Electromyography and Kinesiology*, 13, 361–370. [https://dx.doi.org/10.1016/s1050-6411\(03\)00042-7](https://dx.doi.org/10.1016/s1050-6411(03)00042-7)
- Institute of Medicine. (2011). *Relieving pain in America: A blueprint for transforming prevention, care, education, and research*. Retrieved from <http://dx.doi.org/crossref.org/10.17226/13172>

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- Interagency Pain Research Coordinating Committee. (2016). *National pain strategy*. Retrieved from https://iprcc.nih.gov/docs/HHSNational_Pain_Strategy.pdf
- International Association for the Study of Pain. (1994). Part III: Pain terms, a current list with definitions and notes on usage. In H. Merskey & N. Bogduk (Eds.), *Classification of chronic pain* (2nd ed., pp. 209–214). Seattle, WA: IASP Press.
- Jamieson-Lega, K., Berry, R., & Brown, C. A. (2013). Pacing: A concept analysis of a chronic pain intervention. *Pain Research and Management, 18*, 207–213. <https://dx.doi.org/10.1155/2013/686179>
- Jordan, J. L., Holden, M. A., Mason, E. E., & Foster, N. E. (2010). Interventions to improve adherence to exercise for chronic musculoskeletal pain in adults. *Cochrane Database Systematic Review*. <http://dx.doi.org/10.1002/14651858.CD005956.pub2>
- Keefe, F. J., Rumble M. E., Scipio, C. D., Giordano, L. A., & Perri, L. M. (2004). Psychological aspects of persistent pain: Current state of the science. *Journal of Pain, 5*, 195–211. [https://dx.doi.org/10.1016/s1526-5900\(04\)00665-0](https://dx.doi.org/10.1016/s1526-5900(04)00665-0)
- Khusid, M. A., & Vythilingam, M. (2016). The emerging role of mindfulness meditation as effective self-management strategy, part 2: Clinical implications for chronic pain, substance misuse, and insomnia. *Military Medicine, 181*, 969–975. <https://dx.doi.org/10.7205/milmed-d-14-00678>
- Kirkpatrick, D. R., McEntire, D. M., Hamsch, Z. J., Kerfeld, M. J., Smith, T. A., Reisbig, M. D., ... Agrawal, D. K. (2015). Therapeutic basis of clinical pain modulation. *Clinical and Translational Science, 8*, 848–856. <https://dx.doi.org/10.1111/cts.12282>
- Lieber, S. J., Rudy, T. E., & Boston, J. R. (2000). Effects of body mechanics training on performance of repetitive lifting. *American Journal of Occupational Therapy, 54*, 166–175. <https://dx.doi.org/10.5014/ajot.54.2.166>
- Louw, A., Diener, I., Butler, D. S., & Puentedura, E. J. (2011). The effect of neuroscience education on pain, disability, anxiety, and stress in chronic musculoskeletal pain. *Archives of Physical Medicine and Rehabilitation, 92*, 2041–2056. <http://dx.doi.org/10.1016/j.apmr.2011.07.198>
- McCracken, L. M., & Iverson, G. L. (2002). Disrupted sleep patterns and daily functioning in patients with chronic pain. *Pain Research & Management, 7*(2), 75–79. <https://dx.doi.org/10.1155/2002/579425>
- Mann, E. G., LeFort, S., & VanDenKerkhof, E. G. (2013). Self-management interventions for chronic pain. *Pain Management, 3*, 211–222. <https://dx.doi.org/10.2217/pmt.13.9>
- Miller, M. M., Scott, E. L., Trost, Z., & Hirsh, A. T. (2016). Perceived injustice is associated with pain and functional outcomes in children adolescents with chronic pain: A preliminary examination. *Journal of Pain, 17*, 1217–1226. <https://dx.doi.org/10.1016/j.jpain.2016.08.002>
- Moriarty, O., McGuire, B. E., & Finn, D. P. (2011). The effect of pain on cognitive function: A review of clinical and preclinical research. *Progress in Neurobiology, 93*, 385–404. <https://dx.doi.org/10.1016/j.pneurobio.2011.01.002>
- Nikoobakht, M., Fraidouni, N., Yaghoobidoust, M., Burri, A., & Pakpour, A. H. (2014). Sexual function and associated factors in Iranian patients with chronic low back pain. *Spinal Cord, 52*, 307–312. <https://dx.doi.org/10.1038/sc.2013.151>
- Ojeda, B., Salazar, A., Dueñas, M., Torres, L. M., Micó, J. A., & Failde, I. (2014). The impact of chronic pain: The perspective of patients, relatives, and caregivers. *Families, Systems & Health: Journal Of Collaborative Family Healthcare, 32*, 399–407. <https://dx.doi.org/10.1037/fsh0000069>
- Perkins, F. M., & Kehlet, H. (2000). Chronic pain as an outcome of surgery: A review of predictive factors. *Anesthesiology, 93*, 1123–1133. <https://dx.doi.org/10.1097/0000542-200010000-00038>
- Persson, A. L., Veenhuizen, H., Zachrisson, L., & Gard, G. (2008). Relaxation as treatment for chronic musculoskeletal pain: A systematic review of randomized controlled studies. *Physical Therapy Reviews, 13*, 355–365. <https://dx.doi.org/10.1179/174328808x356366>
- Popa, T., Bonifazi, M., Della Volpe, R., Rossi, A., & Mazzocchio, R. (2007). Adaptive changes in postural strategy selection in chronic low back pain. *Experimental Brain Research, 177*, 411–418. <https://dx.doi.org/10.1007/s00221-006-0683-4>

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- Portenoy, R. K. (1996). Opioid therapy for chronic nonmalignant pain: A review of the critical issues. *Journal of Pain and Symptom Management, 11*, 203–217. [http://dx.doi.org/10.1016/0885-3924\(95\)00187-5](http://dx.doi.org/10.1016/0885-3924(95)00187-5)
- Prkachin, K. M., Schultz, I. Z., & Hughes, E. (2007). Pain behavior and the development of pain-related disability: The importance of guarding. *Clinical Journal of Pain, 23*, 270–277. <https://dx.doi.org/10.1097/AJP.0b013e3180308d28>
- Rehabilitation Institute of Chicago. (2010). *Rehabilitation measures database*. Retrieved from <http://www.rehabmeasures.org/rehabweb/rhaboutus.aspx>
- Ressler, P. K., Bradshaw, Y. S., Gualtieri, L., & Chui, K. K. H. (2012). Communicating the experience of chronic pain and illness through blogging. *Journal of Medical Internet Research, 14*(5), e143. <http://dx.doi.org/10.2196/jmir.2002>
- Sielski, R., Rief, W., & Glombiewski, J. A. (2016). Efficacy of biofeedback in chronic back pain: A meta-analysis. *International Journal of Behavioral Medicine, 24*(1), 25–41. <https://dx.doi.org/10.1007/s12529-016-9572-9>
- Songer, D. (2005). Psychotherapeutic approaches in the treatment of pain. *Psychiatry, 2*(5), 19–24.
- Suni, J., Rinn, M., Natri, A., Statistisian, M. P., Parkkari, J., & Alaranta, H. (2006). Control of the lumbar neutral zone decreases low back pain and improves self-evaluated work ability: A 12-month randomized controlled study. *Spine, 31*, E511–E520. <https://dx.doi.org/10.1097/01.brs.0000231701.76452.05>
- Turk, D. C., Fillingim, R. B., Ohrbach, R., & Patel, K. V. (2016). Assessment of psychosocial and functional impact of chronic pain. *Journal of Pain, 17*, T21–T49. <https://dx.doi.org/10.1016/j.jpain.2016.02.006>
- Vachon-Preseau, E., Roy, M., Martel, M., Caron, E., Marin, M., Chen, J., ... Rainville, P. (2013). The stress model of chronic pain: Evidence from basal cortisol and hippocampal structure and function in humans. *Brain, 136*, 815–827. <https://dx.doi.org/10.1093/brain/aws371>
- Wong-Rieger, D. (2011). *Health coaching for chronic conditions: Engaging and supporting patients to self-manage*. Retrieved from <http://www.wellcoach.com/images/health-Coaching-Chronic-Conditions-2011.pdf>
- Zeidan, F., Martucci, K. T., Kraft, R. A., Gordon, N. S., McHaffie, J. G., & Coghill, R. C. (2011). Brain mechanisms supporting modulation of pain by mindfulness meditation. *Journal of Neuroscience, 31*, 5540–5548. <http://dx.doi.org/10.1523/JNEUROSCI.5791-10.2011>

Final Exam

Article Code CEA0717

A Biopsychosocial Approach for Addressing Chronic Pain in Everyday Occupational Therapy Practice

To receive CE credit, exam must be completed by July 31, 2019.

Learning Level: Intermediate

Target Audience: Occupational Therapists and Occupational Therapy Assistants

Content Focus: OT Domain: Client Factors, Context and Environment; OT Process: Interventions

1. The biopsychosocial model considers pain and disability to be interactions between:
 - A. The peripheral nervous system and the central nervous system
 - B. The individual and broader populations
 - C. Complex and dynamic factors
 - D. The body and the environment
2. Chronic pain differs from acute pain in that it:
 - A. Lasts more than 3 to 6 months
 - B. Is always caused by inflammation
 - C. Is never caused by inflammation
 - D. Is always associated with mood disorders
3. Included in the brain pain matrix are areas that process not only pain, but also:
 - A. Vision and speech
 - B. Respiration and heart rate
 - C. Auditory perception and circadian rhythms
 - D. Cognition, mood, and emotion
4. Due to potential changes in cognition typically associated with chronic pain, occupational therapy practitioners must consider:
 - A. Visual-perceptual abilities
 - B. The client's ability to problem-solve solutions
 - C. Kinesiophobia
 - D. Avoidance
5. What psychological factors has research demonstrated may influence pain perception?
 - A. Fear avoidance
 - B. Pain behaviors
 - C. Catastrophizing and personal beliefs regarding pain
 - D. Social isolation
6. What social factors has research demonstrated may influence pain perception?
 - A. Socioeconomic factors
 - B. Job skills
 - C. Social isolation
 - D. Poor social skills
7. Goals of treatment for a client with chronic pain should facilitate:
 - A. Training the client to push through the pain to increase function
 - B. Decreasing pain
 - C. Using passive modalities to decrease pain during treatment
 - D. A self-management approach that increases function
8. Cognitive behavioral therapy techniques to address chronic pain can include all of the following *except*?
 - A. Activity pacing
 - B. Relaxation
 - C. Mindfulness
 - D. Developing personal goals
9. Behaviors such as grimacing, wincing, and clenching should be:
 - A. Ignored
 - B. Reinforced
 - C. Assessed
 - D. Acknowledged
10. Strategies that can be used by a client to address social isolation include:
 - A. Always discuss their pain
 - B. Never discuss their pain
 - C. Consider pre-planning variables, such as time or location, for greater chance of success
 - D. None of these
11. To improve sleep, occupational therapy practitioners should consider training the client in:
 - A. De-emphasizing pain behaviors
 - B. Activity pacing
 - C. Transcutaneous electrical nerve stimulation
 - D. Neutral spine positions
12. The process in which the central nervous system goes into a state of hyper-reactivity is called:
 - A. Peripheral sensitization
 - B. Central sensitization
 - C. Modulation
 - D. Amplification