AN INTRODUCTION TO CHRONIC PAIN AND CHRONIC PAIN EDUCATION

INSTRUCTOR

Anna Redmond, Psy.D., BCB, earned her doctorate in Psychology from Roosevelt University in Chicago. Dr. Redmond is a clinical psychologist specializing in chronic pain management and is board certified in biofeedback through the Biofeedback Certification International Alliance. Dr. Redmond's clinical work has spanned many settings, including private practice, hospital, VA medical centers, online education, and in primary, secondary, and tertiary care settings. She served as a clinical associate in the department of psychiatry at the Perelman School of Medicine at the University of Pennsylvania Health System and worked at the Philadelphia VA Medical Center in multiple roles, which included clinical director of the Interdisciplinary Pain Rehabilitation Program, coordinator of pain psychology services, and primary care psychologist. Dr. Redmond currently owns a private practice specialized in educating and helping women live with chronic pain.

SYLLABUS

LEARNING OBJECTIVES

Upon completion of this course, the learner will be able to:

1. Identify health disparities that exist in the management and treatment of chronic pain.
2. Define chronic pain terminology.
3. Explain the role of the brain and central nervous system in chronic pain.
4. Differentiate the biomedical and biopsychosocial models of pain.
5. Describe methods of teaching patients and clients about chronic pain using the biopsychosocial model of pain and pain neuroscience education.

INTRODUCTION

Chronic pain is a major global health issue, with approximately 20% of adults in the United States reporting chronic pain (Macchia, 2022; Pitcher et al., 2019). Similarly, the number of Americans experiencing chronic pain is growing (Zajacova et al., 2021). While it is one of the most frequently cited reasons for seeking medical care, chronic pain can be challenging for healthcare professionals to manage and treat effectively (Zelaya, 2020). A systematic review of 26 studies and almost 195,000 clients, for example, found that less than 20% of those seeking treatment for low back chronic pain received evidence-based information and advice (Kamper et al., 2020).

Due to the growing epidemic of chronic pain, there are two important questions to ask. Why is chronic pain increasing? Why are some of the most amazing medical treatments not working? One proposed barrier to resolving this epidemic is access to education for both clients with chronic pain and the professionals providing their care. A systematic review of the literature on pain medicine education at medical schools internationally found that 90% of the medical schools in the United States have no compulsory education dedicated to pain management or pain education (Shipton, et al., 2018).

Social workers, marriage and family therapists, psychologists, and counselors frequently encounter clients suffering from chronic pain, but they may feel uneducated and unempowered to discuss chronic pain with their clients. Clinicians' avoidance of this clinical issue, however, can worsen client experiences overall. When mental health professionals understand and can confidently interact with clients about their chronic pain, they can counteract stigma, reduce client experiences of marginalization, and empower clients around this crucial component of their health. Dissemination of chronic pain education to both providers and clients is critical to continuing to change the culture, stigma, and understanding of chronic pain (Committee on Advancing Pain Research, Care, and Education, 2011; Thompson et al., 2018).

Given the significant prevalence of chronic pain and its negative consequences, including social and economic burden, it is imperative to reduce the contribution of suboptimal care. Mental health clinicians are in unique positions to help their clients understand and self-manage their chronic pain and the purpose of this introductory learning material is to increase clinician confidence in working effectively with this population. This learning material provides clinicians with critical information regarding the global effect and health disparities of pain, evolving theories and current research on pain and pain management, and important approaches that clinicians can use to build rapport and educate clients about their chronic pain in the initial sessions.

This learning material begins with a discussion of a long-standing and primarily biomedical approach to chronic pain and presents a structure for how to better understand the experiences of a client who has navigated the healthcare system over many years. Clinicians participating in this course are offered ways to empathize and form an alliance with their clients, illustrations for delivering specific neuroscience education to clients, and a framework for introducing clients to a biopsychosocial self-management approach to chronic pain. Upon completion of this course, clinicians will be able to apply evidence-based psychoeducation when first interacting with a client who is experiencing a diminished quality of life and impaired mental health due to chronic pain.

SCOPE OF THE PROBLEM

Since 1990, the high prominence of pain and pain-related diseases are leading causes of disability and disease burden globally, with low back and neck pain consistently being the leading causes of disability internationally (GBD 2021 SDG Collaborators, 2023). The number of people with low back pain and years lived with disability increased substantially between 1990 and 2017. According to Wu and colleagues (2020), the prevalence of low back pain is higher in females than males, but the prevalence of low back pain is high in all groups aged 18 and older and peak prevalence occurs between 80 and 89 years old. Years lived with disability, however, peaks in the middle-aged, working-age population (45–49 years old), indicating a significant burden of low back pain for that group in particular.

Not all individuals with chronic pain are affected alike. An estimated 10.6 million people (4.6%) of U.S. adults experience **high impact chronic pain**, a term that describes more severe pain in the chronic pain population that lasts 3 months or longer and involves an activity restriction or disability (e.g., unable to go to school or do chores) and increased mental health problems (Pitcher et al., 2019; National Center for Complementary and Integrative Health, 2023). The population of adults with high impact chronic pain report more severe pain and mental health problems (e.g., depression, anxiety, sleep disturbance), cognitive impairments, worsening health, more difficulty with self-care, and greater health care use than individuals with chronic pain without disability (Pitcher et al., 2019).

Health Disparities

There is a lack of parity in the management and treatment of chronic pain among varied demographics. For example, a well-established treatment gap exists for communities of color across many practice settings (e.g., emergency, primary care, surgical, and tertiary care centers) for both acute and chronic pain (Meints et al., 2019). Bias and discrimination contribute to the inequities in pain experiences and treatment for Black, Indigenous, and People of Color (BIPOC) compared to White individuals. Barriers to optimal pain treatment for racial and ethnic minority clients include factors related to clients, healthcare providers, and the healthcare system (Meints et al., 2019).

Research shows that non-Hispanic White clients report a similar or higher prevalence of chronic pain compared to other groups overall; however, Black and Hispanic clients report higher levels of pain severity and Black clients tend to report greater pain-related disability (Grol-Prokopczyk, 2017; Cosio & Demyan, 2021). While Black and Hispanic Americans report greater severity of pain, they report lower quality of care. For example, Black women with

endometriosis are historically underdiagnosed and undertreated due to stereotypes and perceptions that the condition is more common in White women (Bougie et al., 2019). In addition, Black clients receive less analgesics (a class of medications designed specifically to relieve pain) and "significantly less opioids across pain types and treatment settings" than other racial and ethnic groups that experience marginalization (Cosio & Demvan, 2021), while Hispanic Americans receive lower quality of care than the non-Hispanic White population (Kim et al., 2019). Indigenous Persons also experience subpar care and their pain is often undertreated (Cosio & Demvan, 2021). The bias, stigma, and discrimination they face leaves them feeling underserved and ignored by the healthcare system, frustrated and betrayed by their providers, and limited in healthcare access (Haozous et al., 2016).

Pain is inherently personal and subjective, which has historically made diagnosis, assessment, and treatment a difficult task at baseline. Additional factors unique to individual clients further complicate the larger clinical picture of chronic pain. These factors include:

- differences in pain thresholds and tolerances
- genetic factors
- cultural norms related to coping
- social norms
- stigma
- access to healthcare
- pain-related attitudes and beliefs
- expectations of pain management
- causal attribution

Minority stress theory (Meyer, 2003) posits that members of non-dominant identities accrue additional social and psychological burdens as a result of their minority status. Minority stress theory is also relevant to the study of chronic pain and racial discrimination adds to these complexities. Expanding upon minority stress theory, findings from Brown and colleagues (2018) reveal that the chronic psychological distress caused by racial discrimination can then cause chronic pain by increasing immune-mediated inflammatory responses and heighten the risk for developing other chronic conditions (e.g., depression, heart disease, obesity, behavioral health disorders), and lead to poor health outcomes. Black individuals report perceived discrimination due to race at a level higher than other racial and ethnic client groups; however, perceptions of discrimination, pain sensitivity, beliefs, and coping all influence a negative chronic pain experience among racial groups in different ways (Brown et al., 2018).

Health disparities also exist among individuals experiencing high impact chronic pain. High impact chronic pain is most common in women, Black adults, individuals with lower levels of education (i.e., high school or less), and adults over age 65(Janevic et al., 2017). Regardless of the type or length of chronic pain, average reports of pain intensity and pain-related disability is higher among Blacks than Whites and pain intensity decreases as wealth increases. Black adults and people of low socioeconomic status disproportionately experience high impact chronic pain for reasons linked to greater vulnerability to chronic conditions, exposure to occupational hazards, and reduced access to care. Similar to other health-related outcomes, social determinants like lower educational level and reduced economic resources are also linked with chronic pain and pain severity (Riskowski, 2014; Barr, 2019).

The characteristics of the chronic pain does not always determine the level of treatment for patients seeking care. Instead, the interplay between client and clinician during health visits often influences health outcomes. There are several barriers that may affect the level of care a patient receives. Provider-related barriers often include lack of knowledge and training related to chronic pain, inadequate assessment and treatment of pain, and beliefs and expectations connected to BIPOC client groups. A review study by Meints and colleagues (2019) highlights these disparities in pain treatment and experiences among clients of racially diverse backgrounds compared to their White counterparts in many different types of settings. The review found that healthcare providers underestimate pain levels, provide less comprehensive diagnoses, and reduce access to analgesic medication for pain more often with racially diverse clients than White clients. Further, implicit bias and racial stereotypes can influence provider decisions, which may result in adverse health effects. Providers may express implicit bias and racial stereotyping overtly and/or subtly during client interactions. There may be shifts in behavior, such as a condescending tone, assumptions made about an individual's treatment adherence or social context, long wait times, and a failure to use interpreters (Mende-Siedlecki et al., 2019).

In addition to client and provider barriers, BIPOC client groups face barriers in the healthcare system that significantly affect their ability to receive optimal pain treatment. According to the Centers for Disease Control and Prevention (2020), general systemic inequities in social health determinants (e.g., healthcare access, racial discrimination, and economic security) contribute to barriers and lead to poor health outcomes and quality of life for these underrepresented groups. Some gaps in care also stem from a historical scarcity of research devoted to pain experiences and treatment of various racial and ethnic groups. For those with poor access to pain management, other socioeconomic consequences continue to grow, which creates greater demand on an individual's resources, including the following:

- increased time off of work
- increased need for childcare and transportation
- greater care needs with perhaps inadequate health insurance
- greater import of geographic location and proximity to care
- greater relevance of economic status because of associated costs and work restrictions

Multiple points make it clear that BIPOC client groups are at risk of receiving suboptimal pain management at many points throughout their pain experience. When clinicians focus on the client experience and build a therapeutic alliance, they can empower clients from various ethnic, racial, and cultural backgrounds to accurately report their story and the meaning of their pain in their own lives. Alongside them, providers and health systems must do the work to acknowledge their own beliefs around these groups regarding pain and devote effort toward developing strategies to overcome unconscious and often harmful negative stereotyping. By employing a biopsychosocial approach to pain, clinicians can more successfully apply individualized approaches to chronic pain because it inherently accounts for biological, psychological, social factors, and an understanding of cultural differences in pain coping and expression among racial and ethnic groups. This is one step toward reducing disparities in chronic pain management.

Biomedical Prioritization

The problem of chronic pain is increasing as pain prevalence rises among Americans across the lifespan (Zajacova, 2021); however, there continues to be a high level of biomedical prioritization over including psychosocial factors for targeted intervention (i.e., psychosocial inclusion).

In their recent study on equity, social marginalization, and chronic pain, Wallace and colleagues (2021) concluded

> This study underscores the complexity of the experiences and meanings of pain for people living with pain and facing social disadvantages, stigma, discrimination and structural barriers to support such as poverty, systemic racism, sexism, cisnormativity and heteronormativity that are embedded in and supported by policies and social arrangements. This analysis emphasizes the inadequacies of an exclusive biomedical orientation to the understanding and treatment of pain, in particular the over-reliance on pharmaceutical management, and points to the need for efforts toward equity in the response to pain. Equity requires treating people according to needs, not treating everyone the same. The specific experiences of these participants highlight the connections among pain, mental health and substance use and shows how stigma, discrimination and dismissal of the meanings and experiences of people living with pain must be tackled through change, not just by care providers, but by innovations in systemic structures. (Conclusions section)

Biomedical prioritization can be additionally problematic in that it uses diagnostic investigations and screenings and medical treatments approaches that inadvertently contribute to the negative experiences of individuals with chronic pain and contributes to the on-going burden to society. Preliminary research done by Foster and colleagues (2018) found that the high use of biomedical approaches such as imaging, medications, procedures, surgeries, and restrictions for movement and exercise do not reduce the consequences of chronic pain (Foster et al., 2018). Instead, they found that more effective and emerging solutions to chronic low back pain may come with prudent use of these biomedical approaches along with psychosocial inclusion.

Essentially, a gap exists between the updated evidence available for effective chronic pain management and what exists in current practice and policy, which requires both attention and education from government, policymakers, clinicians, educators, and the broader society (Buchbinder et al., 2018). A biopsychosocial framework can bridge this gap by allowing for a self-management approach that includes education, gradual exposure to resume usual activities and exercise, psychological approaches, lifestyle medicine, and energy management. Mental health providers are often uniquely placed to support a biopsychosocial and educational approach to the self-management of chronic pain and round out the experience of a client who has mainly received a biomedical approach. Further, implementing these approaches may help interrupt the current trajectory and growth towards a chronic pain epidemic in the United States.

DEFINITIONS OF PAIN

Pain was once thought of as simply a measure of tissue damage; however, clinicians should think of pain as a complex and sophisticated protective mechanism and as a threat detection system based on a human's evolutionary need to survive. When pain persists chronically, it becomes more complex and is described best in terms of variable, unique, and intricate interaction between biological, psychological, and social factors.

A Revised Definition for Pain

In July 2020, the International Association for the Study of Pain (IASP), a multi-national, multidisciplinary task force, developed a revised definition of chronic pain to improve assessment and management and to better align with a biopsychosocial interpretation. Their definition states that **pain** is "An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage" (Raja et al., 2020; IASP, 2021a, para 3, p. 481). In this definition, chronic pain is pain persisting beyond conventional healing time, generally considered to be 3–6 months. Beyond a new definition, the IASP also provides six key notes to provide further context and better convey the complexity of the pain experience. These key notes include the following:

- Pain is always a personal experience that is influenced to varying degrees by biological, psychological, and social factors.
- Pain and nociception are different phenomena. Pain cannot be inferred solely from activity in sensory neurons.
- Through their life experiences, individuals learn the concept of pain.
- A person's report of an experience as pain should be respected.
- Although pain usually serves an adaptive role, it may have adverse effects on function and social and psychological well-being.
- Verbal description is only one of several behaviors to express pain; inability to communicate does not negate the possibility that a human or a nonhuman animal experiences pain. (Raja, 2020; IASP, 2021, para 3, p. 481)

NOCICEPTION & NOXIOUS STIMULUS

According to IASP (2021b), nociception is "the neural process of encoding noxious stimuli" and noxious stimulus is "an actually or potentially tissue-damaging event" encoded by nociceptors in the nervous system.

The IASP's definition, stemming from more updated research, acknowledges that pain continuing beyond 6 months may not be related to tissue damage or nociception at all. Pain is the subjective experience of actual or impending harm (Smith, 2018). This is an important acknowledgment that provokes healthcare providers to think about pain from a more comprehensive biopsychosocial perspective and to consider that pain can result from factors

outside of injury or tissue damage. The IASP's definition improves earlier definitions in that it acknowledges that pain without injury, tissue damage, or an objective "cause" with "proof" visible on imaging is indeed just as "real" as pain emanating from these sources. Inherently, this makes discussing pain issues easier for clients—especially for those with long-standing pain. It allows for a more comprehensive picture of the chronic pain experience, which includes how pain interferes with emotions, thoughts, relationships, daily activities, and quality of life. This updated way of looking at chronic pain involves biological, psychological, and social factors that providers should address with their patients in order to comprehensively educate and treat them through their pain experience.

Acute Versus Chronic Pain

Pain is an important life preserving mechanism based on an evolutionary need to survive. The nervous system's job is to help humans detect and avoid threats in order to stay alive. Pain is a signal that guides behavior and provides critical functions necessary for the nervous system to maintain survival. Pain can show up acutely, and in some cases, remain chronic for years.

Acute pain is a protective internal alarm system that focuses attention on a situation that is threatening. Pain alerts people to danger, which motivates them to take action to keep safe. For example, acute pain keeps a child from using their arm when it's broken or causes an adult to reflexively remove their hand from the hot pan burning it. More clearly defined in the medical field, **acute pain** has a known cause and is time-limited—usually lasting no longer than 6 months—and diminishes with healing (Cleveland Clinic, 2023a). Most soft tissues in the body heal within three to six months and the typical recommendations for successfully resolving acute pain involve rest, repair, and conventional medical approaches. For some, their pain experience does not resolve within the expected healing time and, instead, remains present and chronic.

Chronic pain is different than acute pain. **Chronic pain** is ongoing, lasting longer than 6 months or beyond the expected or indicated point of healing (Cleveland Clinic, 2023a). Chronic pain can be present in multiple contexts and have an unknown or known cause. It can continue even after the injury or illness that caused it heals or goes away, and then last for years. Chronic pain can also develop even when there is no past injury or apparent body damage. Thus, again, an injury is not required to have the experience of chronic pain. Chronic pain can feel similar to acute pain for the individual experiencing it; however, after a 6-month period of time most of the physical healing has been accomplished and the signal of pain is less reliable from a life-preserving standpoint which results in the pain having a different meaning than the acute pain experience. Chronic pain is often nonspecific and includes non-cancer pain and post-cancer pain. The term chronic primary pain (also referred to as **nonspecific pain**) suggests a lack of identifiable pathology or tissue damage or that the limited amount of identifiable pathology or tissue damage lacks in severity to explain a person's pain (Nijs et al., 2021).

CHRONIC PAIN AND THE CENTRAL NERVOUS SYSTEM

Whether pain starts with an injury or an unidentifiable cause, when pain lasts for months or years, the brain begins to learn the pain. This involvement of the brain and nervous system is what can keep the pain going once physical causes of pain have been resolved to whatever extent possible. It is important for practitioners to understand these implications because it is most likely

under these circumstances that psychosocial treatments will be called upon to assist in the management of suffering caused by chronic pain.

Chronic pain is more complex than acute pain, is processed across multiple brain regions, and is associated with many changes across the nervous system. These changes in the nervous system can cause pain to persist long after injuries have healed because the threat detection system has become more overprotective or sensitive over time.

Chronic Primary Pain

The World Health Organization's (WHO; 2019) *International Statistical Classification of Diseases and Related Health Problems* (11th ed.; *ICD-11*) distinguishes between chronic primary pain and chronic secondary pain. **Chronic secondary pain** is chronic pain that is caused by (i.e., secondary to) an injury or condition (e.g., endometriosis, rheumatoid arthritis). **Chronic primary pain** is chronic, persistent, and unremitting pain coming from the nervous system, "with no underlying cause...or out of proportion to any observable injury or disease" (National Institute for Health and Care Excellence, 2021, Overview section, para. 1). Chronic primary pain is multifactorial—biological, psychological, and social factors contribute to it. Chronic pain can be considered a syndrome, occur in one or more anatomical regions, and involves significant emotional distress or functional disability. Chronic primary pain has several names each of which are described in greater detail below, including central sensitization, nociplastic pain (see Figure 1), and nonspecific pain.

General signs for clinicians that the nervous system is playing a significant role in chronic pain include:

- The pain is more widespread or intense than would be expected given any identifiable tissue or nerve damage.
- The pain is inconsistent, and unpredictable, with its location changing.
- The individual experiences sensitivity to the environment such as to light or sounds.
- The individual has a history of exposure to adverse childhood events.
- Co-occurring symptoms exist such as depression, fatigue, anxiety, cognitive disturbances, disturbed sleep.
- A high pain-related fear and avoidance is present.
- The individual has a poor response to conventional pain treatments.

The ICD-11 describes primary chronic pain as the following:

- Pain that is chronic—persisting or recurring for longer than 3 months.
- Pain that is in one or more regions of the body.
- Pain that is associated with significant emotional distress (e.g., anxiety or depressed mood) or functional disability .
- Pain that is independent of another chronic biological or psychological condition (WHO, 2019).

All these signs are not required for a diagnosis of primary pain, however, the more of these signs observed, the more it can be assumed that the nervous system is playing a role in maintaining pain. When learning about the nervous system's involvement, many individuals with chronic

primary pain resist the ICD-11 definition, stating that their pain is "organic," "structural," or "real" because it started with an injury. Although symptoms can develop true to the individual's experienced original, organic, or structural cause or injury, it is also common for them to experience an amplification of symptoms or development of new sensations due to suffering, fear, avoidance, or conditioned responses that come with an overprotective pain alarm system and nervous system involvement.

Central Sensitization

Central sensitization is pain hypersensitivity (i.e., experiencing pain from things that are not typically painful) due to the amplification of neural signaling and sensory input throughout the central nervous system (Nijs et al, 2021). For many with chronic primary pain (i.e., chronic nonspecific pain) the classification of central sensitization provides an explanation for why they experience pain in the absence of identifiable nociceptive input (i.e., pain caused by inflammation or tissue damage). Unfortunately, sensitivity of the nervous system cannot be picked up on conventional imaging which again places a burden on sufferers because they do not have "proof" of their pain.

Central sensitization can be present in a variety of chronic musculoskeletal pain conditions, including the following:

- chronic traumatic neck pain (e.g., whiplash, neck sprain)
- fibromyalgia
- osteoarthritis
- migraines
- irritable bowel syndrome
- chronic fatigue syndrome
- pediatric pain
- low back pain
- non-traumatic neck pain
- rheumatoid arthritis
- post-cancer pain

Clients with central sensitization will often respond poorly to conventional biomedical treatment approaches, conventional conservative interventions, and surgical interventions that target nociception or injury. These clients are often more disabled and suffer more pain than those without central sensitization (Nijs et al., 2021).

Some signs of central sensitization may include the following:

- Pain persists beyond expected tissue healing/pathological recovery time.
- Pain is disproportionate to the nature and extent of injury or pathology.
- Pain is no longer localized and is constant, unremitting, generalized, more widespread, or nonanatomical in its distribution throughout the body.
- Pain is easily provoked or takes a long time to subside.
- Individual exhibits negative emotions, poor self-efficacy, maladaptive beliefs, pain behaviors, an altered family/work/social life, and/or medical conflict.

- Pain is unresponsive to nonsteroidal anti-inflammatory drugs ([NSAIDs] e.g., ibuprofen, naproxen, celecoxib) and/or more responsive to antiepileptic (e.g., Lyrica) and/or antidepressants (e.g., Amitriptyline) medications.
- There is a history of failed medical, surgical, and/or therapeutic interventions.
- Individual experiences increased levels of emotional distress (particularly anxiety and depression), has a tendency toward pain catastrophizing, and engages in fear-avoidance behaviors (McAllister, 2017; Louw et al., 2017; Bellinato et al., 2023; Harte, 2018)

Nociplastic Pain

Contributors to pain can come from the periphery (i.e., outside of the brain and spinal cord) or be secondary to an injury in the body, or it can come from the central nervous system. Semantic terms now applied to different types of pain include (a) **nociceptive pain**, caused by inflammation and damaged tissues; (b) **neuropathic pain**, caused by nerve damage; and (c) **nociplastic pain**, a term suggested by researchers that resolves some of the unknown that exists between nociceptive and neuropathic pain (Fitzcharles et al., 2021). Nociplastic pain mechanisms are continuing to be studied. However, research suggests that **nociplastic pain,** which is also considered primary pain, is caused by amplified pain and altered sensory pathways in the central nervous system. The mechanisms of nociplastic pain continue to be the subject of on-going research, however current theories focus on the idea that nociplastic pain is driven by amplified or "wound up" central nervous system pain in combination with altered pain modulation (i.e., how the body processes or alters pain signals as they are transmitted along pathways in the spinal cord and brain; Volcheck et al., 2023). Central sensitization is the major underlying mechanism of nociplastic pain and those with a dominant presentation of central sensitization are classified as having nociplastic pain (Kosek et al., 2021).

These three categories of pain can occur alone or as part of a mixed pain state in combination with one or more of the other two types of pain. The benefit of identifying types of pain is that doing so helps select proper treatments, facilitates better communication among providers, and validates all forms of pain experiences.

The IASP offers clinical criteria for nociplastic pain of the musculoskeletal system.

Figure 1. Clinical Criteria and Grading for Nociplastic Pain Affecting the Musculoskeletal System

1. The pain is

1a. Chronic (>3 mo);

1b. Regional (rather than discrete) in distribution*;

1c. There is no evidence that nociceptive pain (a) is present or (b) if present, is entirely responsible for the pain; and

1d. There is no evidence that neuropathic pain (a) is present or (b) if present, is entirely responsible for the pain.†

2. There is a history of pain hypersensitivity in the region of pain.

Any one of the following:

Sensitivity to touch

Sensitivity to pressure

Sensitivity to movement

Sensitivity to heat or cold

3. Presence of comorbidities:

Any one of the following:

Increased sensitivity to sound and/or light and/or odors

Sleep disturbance with frequent nocturnal awakenings

Fatigue

Cognitive problems such as difficulty to focus attention, memory disturbances, etc.

4. Evoked pain hypersensitivity phenomena can be elicited clinically in the region of pain.

Any one of the following:

Static mechanical allodynia

Dynamic mechanical allodynia

Heat or cold allodynia

Painful after-sensations reported following the assessment of any of the above alternatives.

Possible nociplastic pain: 1 and 4.

Probable nociplastic pain: all the above (1, 2, 3, and 4)‡

*Musculoskeletal pain is deep, rather than cutaneous and regional, multifocal, or widespread in distribution (rather than discrete). In case of multifocal pain states that can be caused by different chronic pain conditions (eg, shoulder myalgia and knee osteoarthritis), each chronic pain condition or pain region must be assessed separately.

†The presence of a source of nociceptive pain, such as osteoarthritis, or of neuropathic pain, such as a peripheral nerve lesion, does not exclude the concurrence of nociplastic pain, but the region of pain must be more widespread than that which can be explained by the identifiable pathology.

‡The purpose of the grading system is to indicate the level of certainty that a patient has nociplastic pain and, as mentioned above, was inspired by the current grading system for neuropathic pain.7 However, because of the lack of clinically useful, reliable diagnostic tests to confirm the presence of altered nociception, currently nociplastic pain is graded as possible or probable but not definite. If future diagnostic tests are developed and validated, the introduction of the term "definite nociplastic pain" should be considered.

Note. From Kosek, E., Clauw, D., Nijs, J., Baron, R., Gilron, I., Harris, R. E., Mico, J. A., Rice, A. S., & Sterling, M. (2021). Chronic nociplastic pain affecting the musculoskeletal system: Clinical criteria and grading system. *Pain, 161*(11), 2629–2634. https://doi.org/10.1097/j.pain.0000000000002324

These criteria can have clinical utility in differentiating among pain types. However, due to the complexity of pain, clinicians should employ and emphasize a holistic and biopsychosocial approach to assessment and treatment, as first discussed in The Biopsychosocial and Biomedical Models section, in part to avoid the development of "a tunnel view" that may be generated by strict adherence to these criteria (Nijs et al., 2021, 4. The Future section, para. 2).

ALLODYNIA

According to the Cleveland Clinic (2023b), Allodynia is a type of neuropathic pain (nerve pain). People with allodynia are extremely sensitive to touch. Things that don't usually cause pain can be very painful. These may include cold temperatures, brushing hair, or wearing a cotton t-shirt. There are three types of allodynia, which occur when an object moves across the skin (dynamic or mechanical), from gentle touch or pressure (static or tactile), or due to mild changes in temperature (thermal).

Treatment Implications for Nervous System Involved Pain

Central sensitization, nociplastic pain, and chronic primary pain facilitate embracing a biopsychosocial model for assessment and treatment. By identifying signs of nervous system involvement, or more specifically the potential presence of central sensitization or nociplastic pain, providers can better match pain treatment to an individual's pain phenotype. For example, injury or pathology-related pain may be best suited for classical biomedical treatments such as surgery, joint treatment, and anti-inflammatory drugs. On the other hand, nociplastic pain inherently requires a broad multimodal approach that includes:

- client education
- graded exposure to movement
- stress management
- graded exercise
- cognitive interventions
- sleep management

Rather than centering treatment on underlying pain mechanisms, a biopsychosocial approach focuses on reconnecting clients with their values and improving their ability to engage in self-chosen functional activities with the goal of enhancing their quality of life.

Regardless of the specific classification, individuals with nervous system involvement and a widespread effect of pain are particularly suited to the biopsychosocial approaches provided by those in behavioral health fields, such as mental health clinicians. To meet the clients where they are with their chronic pain experience, a therapist must employ a comprehensive biopsychosocial assessment and holistic biopsychosocial approach (Nijs et al., 2021). A positive attribute of nervous system involvement is that neuroplasticity (i.e., growth and reorganization of neural networks in response to injury or other new experiences) and adaptability of the brain are what bring clients to the point of such hypersensitivity and these plastic changes are reversible with education and treatment.

The concept of **bioplasticity** expands neuroplasticity to include learning and adaptation within all body systems, including those outside of the brain and neurons. There are positive and negative aspects of bioplasticity. While body systems improve at protecting the body over time, they can also overprotect it. When nerves chronically relay danger messages to the body, they can become more practiced at sensing and responding to pain. However, bioplasticity asserts that the body's protective systems are adaptable and can change with education and new experiences, such

as new ways of thinking, moving, and turning down or turning off protective mechanisms. This plasticity provides hope for those experiencing persisting pain, no matter the complexity, diagnosis, or duration (Butler, 2015).

PAIN THEORIES AND MODELS THROUGHOUT HISTORY

Humans have expressed curiosity about pain throughout history. Across different eras various researchers have theorized the root cause of pain and how pain interacts with the body. These theories have led to more well-known pain models—the biomedical and biopsychosocial models of pain.

Specificity Theory

In the 16th century, mathematician and scientist René Descartes proposed a pain model that suggested the brain was the center of the senses. This theory, later called **specificity theory**, suggested that pain and injury were the same issue, with the intensity of pain having a direct relation to the amount of physical tissue damage (e.g., the bigger the burn, the more pain experienced). The specificity theory regarded pain as a phenomenon of strict nociception and ignored the roles of perception, the mind-body connection, and psychosocial factors.

Specificity theory endorsed **mind-body dualism**—the idea that there was no relationship between physical and psychological experiences and that these two experiences were always separate. This became the primary theory of Western thought around pain for centuries and the basis of the biomedical model and medical school training. It continues to be used by medical health professionals. Addressing pain from a mind-body dualism perspective endorses the idea that if treatment can eliminate the physical cause of the pain, then the pain will go away (Moayedi & Davis, 2013). Over time, limitations to this approach became evident.

Critics of specificity theory argued that it failed to consider the psychological and social factors that can influence pain. One famous critic, Dr. Henry Beecher, worked with severely wounded soldiers in World War II. He observed that only one in five injured soldiers—identified as not experiencing shock—complained of enough pain to require morphine. After the war, Dr. Beecher observed that trauma patients with wounds similar to war injuries complained of pain requiring morphine at a higher rate than the World War II soldiers. He concluded that there was no direct relationship between the severity of a wound and the intensity of pain and, rather, that what the pain meant to the patients and the context of their pain determined the intensity of suffering. A soldier's wound meant surviving the battlefield and possibly returning home while a wound for an injured civilian often meant unanticipated tragedy, major surgery, loss of income, diminished activities, and other negative consequences (Beecher, 1956). In this perspective shift that incorporated interpersonal meaning and context, pain phenomena continued to be more complex than originally thought. Another shortcoming of the specificity model was that it did not allow for the idea that pain was not dependent on tissue damage. Research reveals that the correlation between objective physical findings on an MRI or X-ray and complaints of pain, for example, is often fairly low. People with identical injuries will often report different levels of pain and, conversely, pain can often present without tissue damage or long past an injury's healing. Pain can be disproportionate to tissue damage, and tissue damage, nociception, or objective findings do not necessarily result in the feeling of pain. An example of this is **phantom pain**—

pain or pain sensations that occur in place of a missing body part—which was studied as far back at the 16th century and continues to be studied today (Erlenwein et al., 2021). The phenomenon of phantom pain further contradicts specificity theory, for example if someone loses a limb and continues to have terrible pain in that missing part of their body, it becomes clear that pain is dependent on factors other than tissue damage. If pain only lived in the body, then no limb would equate to no pain.

Gate Control Theory

In the years that followed Dr. Beecher's observations, there was a dramatic increase in research surrounding the role of psychosocial moderators and mediators of pain. The development of Melzack and Wall's (1965) gate control theory of pain provided an alternative to the traditional biomedical approach to chronic pain. The **gate control theory** outlined the role of special neurons (i.e., "gates") in the spinal cord, brain stem, and cerebral cortex that had the ability to block or intensify the transmission route of a pain signal, resulting in an altered perception of pain. Further, it suggested that biological, social, and psychological factors could open or close the "gates" along the route of the pain signal. For example, stress, depression, or anxiety might "open the gates," while distraction, heat or ice, or relaxation might "close the gates." This theory led to a monumental change in the conceptualization and discussion of chronic pain, which allowed for a smoother transition into the biopsychosocial model of pain (Engel, 1977).

The Biopsychosocial and Biomedical Models

In 1977, Engel proposed the biopsychosocial model with the goal of applying a more humanistic approach to healthcare and considering the whole biological, psychological, and social person. The **biopsychosocial model,** generally accepted as the current best way to conceptualize and understand chronic pain, is a model that considers the interplay of multiple biomedical/physical, psychological, social, and other factors that can influence pain (Declercq, 2023). This model rejects a primary or sole focus on the physical or biomedical perspective. Rather, this model compares biological, psychological, and social factors in a Venn diagram to show their relationship and how they overlap to create the chronic pain experience. Biological factors may include genetics, anatomy, sleep, nutrition, and injuries. Psychological factors may include emotions, thought patterns, coping behaviors, and mental health diagnoses. Social factors may include culture, health and/or social system, social interactions, occupation, context, and environment (Turk, 2002).

The biopsychosocial model was developed to expand on the biomedical model to acknowledge the multidimensional nature of chronic pain of chronic pain beyond a dominant structural conceptualization of it in Western healthcare. Given the strong evidence in research and science that pain is complex and multifactorial, the biopsychosocial model's new approach was needed to meet the demands of chronic pain in society.

Chronic pain had started to be viewed as a condition, similar to that of other chronic illnesses like diabetes, to be self-managed rather than a symptom to be fixed. Rather than identifying the cause and the cure, the biopsychosocial model aims to identify the effects and restore function. Within a biopsychosocial approach, the provider's role is that of a teacher, coach, or guide, and the client's role is that of being an active and responsible participant in treatment.

The application of a biopsychosocial model to chronic pain may often feel like an uphill battle to therapy providers who find it comes naturally to them as therapists, but who are applying it in a culture where the biomedical model continues to dominate. The biomedical model has received considerable amounts of criticism due to its reductionist assumptions, inability to explain the complexity of chronic pain, and the nuances encased within someone's unique experiences of it. Despite the biomedical model being contested in medicine and physiotherapy in the last several decades, it remains the main focus of literature and research. It is important, however, to consider the biopsychosocial model with its inclusion of biology and biomedical concepts. Thus, the biomedical and biopsychosocial models are not opposing one another, rather, the biomedical portion is one-third of a biopsychosocial chronic pain perspective that is continuously expanding. Some research has even emerged on the expansion and reconceptualization of the biopsychosocial model with the continued goal of a broader and more flexible approach to researching and enacting chronic pain treatment (Nicholls et al., 2016; Stilwell & Harman, 2019; Declercq, 2023).

When comparing the two current pain model approaches—biomedical and biopsychosocial—we can see how effective the biomedical model is when applied to acute pain. The **biomedical model** seeks out the source of pain and then targets the source with medical treatment. This works great if someone has abdominal pain and needs their appendix taken out, for example. The separation of the mind and body is not seen as harmful—irrespective of any depression a patient may experience, for example, they still need their appendix removed. The goal of the biomedical approach in this case is freedom from disease, a cure, or a fix. The appendix is removed, the patient heals, and eventually the patient feels better. The patient plays the role of the helpless and passive receiver of treatment while the provider plays the role of expert.

However, it is important to consider how the use of a primarily biomedical approach, which is often accepted in Western medicine, may not only be ineffective with chronic pain but negatively affect a client's experience. This model influences the perception that all pain is a result of injury or tissue damage and that the presence of pain means that something is wrong. Within this model, treatment often focuses on addressing abnormal movement patterns, faulty tissue, surgery, medication, and resolving pain. As a result, many patients embrace the idea of a biomedical model of pain and pursue treatment for a cure. A significant amount of time and money is spent on tests, treatments, surgeries, and medications that do not reliability cure or reduce pain for many clients. Providers also lean heavily on this model, questioning clients' reports of pain when they cannot see evidence of damage and unintentionally implying that a client's pain is not real or instead is attributed to disordered psychology. This experience is both marginalizing and invalidating for clients.

When providers rely on the biomedical approach only, they neglect other psychosocial factors that can keep pain chronic and leave the patient feeling hopeless. Often, clients will report feeling like a burden to their families, society, or their providers when there is no evidence of damage on a scan or when a client tries all of the conventional medical treatments for pain and they do not work. They may also experience skepticism from others who do not believe their pain is real or think the pain is made up or "just in my head". Providers may directly or indirectly communicate to their clients that their pain is "psychological," psychosomatic, or that there is nothing to be done. A pain model focused only on the biomedical approach not only misses the other two-thirds of the pain experience (i.e., psychological and social factors), it leaves clients to feel like their pain is a mystery or a burden, which amplifies their distress and pain.

When the biomedical model is so heavily relied upon, self-management strategies or psychological approaches are often regarded with disbelief or skepticism. Providers may even

think that a client's pain is "all in their head". As a result, many providers have a difficult time presenting treatment options alternative to the biomedical model due to their limited training with a biopsychosocial approach to pain and because their clients are expecting a biomedical model from them. This is the long-standing culture of chronic pain treatment.

INCOMPLETE AND OUTDATED INFORMATION ABOUT CHRONIC PAIN

In many instances throughout history, chronic pain has been approached as a dichotomy: either by approaching it biomedically or psychologically. Conventional biomedical approaches for pain-related musculoskeletal conditions provide education that focuses on structural pathology to explain an individual's pain experience. Science and research show that this type of traditional education has limited efficacy in helping those suffering from longstanding pain because it cannot explain persistent and/or spreading pain, extreme pain caused by a gentle touch (i.e., allodynia), pain without identifiable objective injury or disease, immune responses, or stress biology (Louw & Butler, 2018; Louw et al., 2018). Further, traditional biomedical education is associated with inducing fear, anxiety, and faulty beliefs, which amplify the pain experience (Louw, 2014). Some researchers propose that teaching individuals suffering from chronic pain about anatomy, rather than explaining the biopsychosocial aspects of the experience of pain, may contribute to why biomedical education often fails (Butler & Moseley, 2013).

Teaching About Pain

The biomedical model is most commonly used to teach patients why they hurt. A common scenario is that an individual presents at their primary care office with a pain symptom such as low back pain. Their provider is likely to order diagnostic scans, use a spine model to educate the individual, and explain that the pain is coming from a bad disc, abnormal or faulty movements, or other structural issue. The biomedical model is quickly set in place with a focus on addressing the abnormal tissue problem and the person hopes that once treated the pain will go away. The concept of a "cure" is implied and this visit instills the idea that something is very wrong with their body and that the presence of pain is due to a physical issue—whether an old injury or ongoing tissue damage. Unfortunately, the information that an individual receives via the biomedical model is outdated and incomplete. Studies show, for example, that most degenerative changes are normal age-related processes and not a disease or pathological process. Other studies show that people with structural issues found on imaging can be symptomatic or asymptomatic (Brinjikji, et al., 2015; Guermazi et al., 2012) . Essentially, providers that rely heavily on the biomedical model may be providing ineffective information to their patients about their pain.

Brinjikji and colleagues (2015) conducted an important systematic review to study the age-specific prevalence of different imaging findings across 7 decades of life for asymptomatic clients. The review found that signs of degeneration are present in high percentages of people who are healthy and who have no symptoms, concluding that many degenerative features found on diagnostic imaging are likely part of normal aging and not necessarily associated with pain. These imaging findings are highly prevalent in asymptomatic individuals, especially as age increases, but may be an incidental finding when it comes to trying to diagnose reasons for chronic pain.

In another study that looked at MRI knee abnormalities, (Guermazi et al., 2012) found that nearly all asymptomatic adults will show abnormalities in at least one knee structure on an MRI. Similar to the Brinkjiki and colleagues' review (2015), this study indicates that knee joint pathology increases with age and is often already existing on MRI imaging before middle age for people without symptoms. Further, the study outlines that both well and poorly-functioning knees can show similar damage, making it difficult to correlate findings from an MRI with reported knee pain. The results of this study bring into question clinical decision-making regarding surgical assessments (i.e., arthroscopy) and surgical interventions, and their efficacy in reducing symptoms. It shines a light on why such interventions do not have better efficacy than sham surgery (i.e., surgeries performed without making alterations, comparable to placebo effects), and confronts the increased risks surgical interventions present by possibly leading to further complications, deterioration, and risk of osteoarthritis when attributing pain to this potentially incidental finding (Horga et al., 2020).

As a result of these types of studies, radiologists are changing how they report MRI and other diagnostic scans. Many reports now comment on whether the findings are age-related or pathological and how likely they are to correlate with the pain symptom or reason for referral. This change in teaching about chronic pain is one step toward providing patients with the most complete and up-to-date (and least fear-inducing) education regarding pain at their office visits.

Once red flag symptoms or acute issues have been ruled out, chronic pain is a relatively stable condition with flare-ups that can occur. It is important for providers to think about how the conceptualization of a pain diagnosis or the way they share it can influence the perception of pain and the pain experience.

Language Considerations

The language encased within a biomedically-focused approach can further cement a client's perception that their pain (or flare-up) is a result of injury or tissue damage, adding fear and a heightened sense of danger or threat to their chronic pain experience. Words such as "bulging," "herniated," "ruptured," and "tear," for example, may increase fear, anxiety, guarded movement, and lack of exercise compliance. The way that a diagnosis or problem is shared by a provider can influence the perception of pain and a client's pain experience. Language can affect level of fear around work, compensation, family, self-identity and future, movement, and disability. Language can invoke worst-case scenario or catastrophic thinking in the client as well as negative emotions such as depression, hopelessness, anger or irritability, anxiety, and grief. These conceptualizations and experiences lead to more pain and cement a negative pain cycle into place (Louw et al., 2018).

It is important for providers to use appropriate and accurate language regarding pain whether it is acute or chronic. Doing so serves to reduce the threat(s) patients may perceive. Examples of appropriate and accurate language that providers may use includes:

- "Tissues heal, with most healing within the first 2–4 months after an injury.
- "Chronic pain involves our entire nervous system and is not directly related to damaged tissues or structural problems."
- "Hurt does not always equal harm.

Language like this reinforces that the presence of pain does not directly or primarily correlate to tissue damage and also that emotions, thoughts and beliefs, and other psychosocial

factors contribute significantly to the chronic pain experience. With approximately one in four people in the United States reporting some kind of chronic pain, a standardized approach to education has become necessary (Dahlhamer et al, 2018). It is critical that a general pain curriculum applicable to the masses be accessible, affordable, easy-to-understand, and easily employed by a variety of healthcare professionals (Moseley & Butler, 2015).

A Biopsychosocial Conceptualization

Using the biopsychosocial model for conceptualizing pain and providing complete information about pain can be of great benefit to clients, especially those experiencing chronic pain. It goes without saying that the experience of pain is unique to the person and an individualized plan of care is ideal. Clinicians do not need knowledge about specific diagnoses or disorders to educate a client about chronic pain. Introducing education around biopsychosocial factors, the processing of information by the central nervous system, personalization of the pain experience, and neuroplasticity provides a client with basic knowledge from which they can move forward and, if indicated, possibly change behaviors.

Case Example: A Common Cycle of Chronic Pain—Incomplete and Outdated Information and Help Seeking

L.C. is a 45-year-old unmarried, Latina, cisgender woman. She grew up in several states on the east coast, moving often with her family due to her father's work, eventually settling in a suburb outside of Chicago. She had an average childhood up until the age of 15 when her father passed away suddenly. Due to the drop in income, her family dynamics changed as her mother had to work a second job to ensure they had what they needed. L. C. also took on a job, working in restaurants after school and on the weekends. After graduating high school and then college, she worked for several small businesses until finally going off on her own to pursue a career in wedding photography.

When L.C. was 29, she began to experience neck pain, which she thought may be attributable to past falls while learning how to ski or a hard fall that she took one winter on the ice a few years back. The neck pain persisted for months and began to interfere with L.C.'s photography work. Finally, she went to talk to her primary care doctor, who ordered X-rays and an MRI. Her doctor shared the diagnosis of a bulging disc in her cervical spine, while pointing to the imaging and using a spine model to illustrate. After that appointment, L.C. could not get the image of her bulging disc or the idea of possibly having to have surgery at age 29 out of her mind. In addition to the bulging disc, the doctor noted that there was some degeneration in her spine. L.C. feared that diagnosis as well, worried it would worsen with age.

After her diagnoses, L.C. engaged in physical therapy for 6 months with limited relief but was able to push through a workday better than she could previously. However, to prevent flare ups, she avoided any activities outside of her work tasks. She stopped exercising, rarely spent time with her friends, and most often crashed on the couch as soon as she finished her workday. Her fatigue was significant and she experienced frequent headaches. At night, when her pain was at its worst, she had difficulty getting comfortable, falling asleep, and even staying asleep as muscle spasms often woke her.

Currently, L.C.'s pain persists despite years of biomedical pain intervention and her overall health has worsened. She eats only what she craves, which is often high-calorie comfort foods. She severely restricts her physical activities and no longer has a social life, which leaves L.C. feeling sad, helpless, fearful, and stuck in her ruminations about pain. She notices that even the smallest of activities, such as washing dishes, is difficult and she fears many of the things she used to enjoy, such as playing the guitar, because they hurt too much.

For more than a decade, L.C. has consulted several traditional and complementary providers about her pain. These providers have offered her several diagnoses, including fibromyalgia, but never have identified the cause of her chronic pain. L.C. is frustrated with the healthcare system and worries that her providers think her pain is "all in her head." Her body is becoming more and more sensitive, her level of emotional distress is increasing, and her pain is at an all-time high. She continues to push through her workdays until she crashes, but otherwise avoids any type of movement due to fear of pain. Her body is often tense, guarded, and she moves very carefully. She minimizes interactions with the outside world to reduce additional stress that adds to her pain. At one time, L.C. wanted a family and a husband, but she has no dating life to speak of and, lately, her involvement with weddings as a photographer has brought her a sense of grief and loss. Even her relationships with immediate family members is strained.

L.C. feels that there is something wrong in her body and her pain feels like a mystery because no one can explain why it continues to plague her. This causes her tremendous distress. She continues to seek answers from healthcare providers and has tried treatment after treatment, including noninvasive procedures, physical therapy, acupuncture, laser treatment, a TENS unit, dry needling, and many medication trials. She remains very focused on finding a physical fix to stop her pain so that she can get back to doing the things that she loves.

At her most recent visit, L.C.'s primary care doctor refers her to a nearby mental health clinic to address her symptoms of depression and withdrawal and to help her reengage in valued activities. L.C. is skeptical that a clinician will be able to help her. In her mind, participating in extracurricular activities is not possible due to her pain levels and sleep disturbance.

In this case example, L.C. is stuck in a very common cycle of chronic pain, which starts with avoiding activities because it hurts to move. This avoidance leads to physiological deconditioning (i.e., loss of strength, endurance, or general movement capacity due to lack of muscle use), guarding behaviors, muscle tension, negative thoughts about pain, and negative emotions because it hurts too much to move, which reduces engagement in social/leisure activities. As the cycle continues, the withdrawal from life deepens and the nervous system becomes more sensitive while the brain becomes overprotective and creates pain with even the smallest stimulus indicating a threat. When threat is high, the brain will produce pain. Given that there are very few factors that would send messages of safety to her brain, her brain continues to protect her by producing pain. More withdrawal and more distress leads to more pain and the vicious physical and psychological cycle continues.

From a biopsychosocial perspective, L.C. has several biological factors that can contribute to the development of chronic pain, including adverse events in childhood (i.e., the loss of her father), sleep disturbance, poor nutrition, and evidence of a hypersensitive nervous system (e.g., her experience of pain with little movement, her increased emotional distress, her high levels of pain, her minimizing interactions with the outside world to reduce stress and pain, and her fear/avoidance of movement). Several psychological factors are also maintaining her pain,

including a passive coping style (i.e., avoidance), which reinforces her fear of activities and movement. Her depressed mood, rumination, and negative thoughts about her pain serve to worsen her pain experience, increase her stress levels, and feed the fear that leads to avoidance. Finally, from a social perspective, her job as a photographer is physically demanding but remains the only meaningful activity in her life and she must keep this job to pay the bills as a single-income household. Finally, L.C. has let go of most of her relationships and her perceived level of support is low.

The biopsychosocial factors mentioned are serving to engage her pain response by increasing the level of threat being communicated to the brain. This is perhaps the most salient factor maintaining L.C.'s pain—the absence of messages about safety and the level of threat that is driving her brain to continue to create her pain.

CHRONIC PAIN TREATMENT USING PSYCHOEDUCATION AND PSYCHOTHERAPY

Pain science and a biopsychosocial approach to education can be beneficial for any individual with chronic pain. Therapists are in a unique position to not only directly target chronic pain through therapy, but also to provide pain education to their clients. However, prior to engaging in therapy visits, therapists should reach out to their client's treatment provider(s) to ensure that a review of systems, skilled interview, and thorough physical examination have ruled out acute issues. This coordination and communication with those involved in the patient's care (e.g., primary care provider, physical therapist, pain doctor, occupational therapist, or neurologist) enhances any chronic pain therapy or education the mental health clinician may provide. This communication, whether through letters, emails, or phone calls, is essential for developing a treatment plan and maintaining consistent messaging to the client. If beginning a treatment protocol that targets chronic pain, therapists should contact clients' primary pain providers to make them aware of the general nature of the intervention, including any movement that clients may engage in during treatment.

Aside from communicating with their clients' other healthcare providers, clinicians initiate therapy by establishing rapport with their clients, educating them on the biopsychosocial model of pain, and validating their pain experience. These therapeutic processes are discussed below and allow for the possibility of highlighting potential patterns of fear-avoidance and engaging in restorative interventions. What follows for the remainder of this section are models for educating clients about the long-standing nature of pain and sample scripts for incorporating these models while normalizing and validating client experiences. It is not necessary to use every single model provided in this course when educating clients. Education using one or more of these models should be tailored, client-centered, and chosen to match the client's story that was gathered during their intake.

Establishing Rapport

Establishing rapport is a transdiagnostic element in almost all therapeutic approaches, including application to work targeting chronic pain. When a client is referred to a therapist—whether for a treatment protocol targeting chronic pain or to establish care with a mental health provider with pain as a part of the clinical picture—the priority of the therapist is to establish a

strong rapport and solid therapeutic alliance with the client. Individuals with chronic pain often have a long history of feeling psychologized, invalidated, marginalized, or generally misunderstood by their healthcare providers and are likely to have a variety of reactions if referred to a mental health provider for their pain. These reactions can range from an appreciation of the time and opportunity to speak with a mental health professional to concern that a referral means their medical providers do not believe their pain is real. Finally, many individuals with chronic pain may focus on their pain as a physical problem and lack interest or understanding of why they would approach addressing pain with someone other than a medical provider (Declercq, 2023).

Prior to offering education about pain, therapists can establish rapport by empathizing and validating their clients' pain experiences. Many individuals with pain benefit from mental health providers who believe their pain exists exactly as they describe it. Similarly, clients appreciate it when providers acknowledge their past experiences as well as how pain has negatively affected their lives in many ways beyond physical ramifications. Finally, therapists may also help establish rapport by introducing clients to a foundation of the biopsychosocial model. When addressing pain as a complex problem via the biopsychosocial model, clients may initially present with hesitation. Eventually, many find hope in understanding the disadvantages of approaching pain from only one perspective, such as the biomedical approach with which they are likely already very familiar (Louw et al., 2018).

Framing Pain Within the Biopsychosocial Model

Chronic pain impairs many areas of life and functioning, is multifactorial in nature, and is unique to the person experiencing it. Variability between individuals who have chronic pain can be explained by the interactions between biological/physical, psychological, and social influences. Teaching clients about the biopsychosocial model is often a first step for gathering information, getting buy-in, and shifting the conceptualization of pain as a "physical only" problem to a multifactorial problem. The first step therapists can take toward addressing the complex problem of pain in a comprehensive way is gathering information that highlights how pain affects the client's life and teases out the factors contributing to their pain (Louw et al., 2018). While clients cannot change some factors, such as previous injuries or anatomy, they often can address other factors that influence pain directly in sessions with a mental health therapist. Using L.C.'s story from the case example, the following script is a model for how the therapist can introduce a biopsychosocial model of chronic pain to a client.

Therapist:	Chronic pain affects many parts of life and is unique to the individual experiencing it. You and I could both have X-rays that show mild arthritis, however, we could experience different levels of pain. What do you think explains this?
L.C.:	Maybe they have something going on in their bodies that X-rays are not able to identify.
Therapist:	Yes, exactly. Imaging is amazing technology, but it cannot show us everything happening inside our body, especially within our nervous system, or the factors happening outside that might dial up the pain. People vary in their responses to pain and this is due to the fact that pain is complex and multifactorial. One way we describe this is using a biopsychosocial model, stating that pain exists in the overlap between biological, psychological, and social factors. Each of these

	factors influences the others. Today we will talk through the biopsychosocial factors affecting your unique pain. By addressing all of these areas, we leave no stone unturned in learning about your experience in a comprehensive way. How does that sound?
L.C.:	Well, I know my pain is real. It was caused by a bulging disc and I have a ton of degeneration in my spine by now so I'm not sure this applies to me.
Therapist:	Yes, let's start there! We can talk about the biological or medical factors affecting your pain. This could be anything physical, such as your pain condition, other medical issues, your sleep, nutrition, or injuries. What comes up for you when you think about biological factors?
L.C.:	Well, like I said, I have a bulging disc, degeneration, but also no one is really sure why my pain is so bad and lasting so long. My doctors say it's pain like they've never seen! I've tried everything to treat my pain. Of course, I can't sleep and who has time to focus on nutrition when it's hard to even get off the couch to do anything.
Therapist:	Yes, these are all very important. Thank you for sharing. It sounds like this has been a difficult road for you but not an uncommon one for many individuals in pain. It sounds like you have taken a mostly medical approach for treating your pain. In addition to medical or biological factors influencing pain, there are also known psychological factors that can also cause pain to stick around for many years. Let's try to identify the psychological factors that might be contributing to your pain experience. Psychological factors include mood and mental health, confidence and self-esteem, the ways in which you cope with pain or try to get it to go away, or the way that you think about your pain. What comes to mind when you think about psychological factors?
L.C.:	I've never really been depressed or had issues with my mood until I had pain, but when you can't do the things you enjoy, of course someone would feel depressed. I worry a lot about my pain and my future and I am really sad that I can't do the things that I used to. I don't even have confidence to accomplish basic daily tasks. My goal every day is to avoid pain and flare-ups, so I try not to do anything that will make my pain worse and spend a lot of my time sitting on heat or ice on my couch. It's depressing.
Therapist:	Yes, that sounds like quite a change from your years prior to pain and it must be hard to maintain your very physical job as a photographer. Let's look at the social factors that could be affecting your pain, such as your relationships, work, cultural influences, and family environment. What else comes up for you when you think about these social factors?
L.C.:	Other than work, I pretty much avoid the outside world. I was tired of talking about my pain and explaining it to people. Everyone in my family cares about me, but they would always ask me about my pain or try to give me advice. I think they think I'm crazy and I'm making it up. I started to feel like a burden on them and they got sick of me always cancelling and not doing anything. I used to want a family, but I'm just too tired to date, let alone get coffee with some of my friends. I hang onto work because I need it to pay the bills. But honestly, it hurts so bad to complete a day of work. When I'm not working I'm just crashed on the couch.

Therapist:	Thank you for sharing these factors that make your chronic pain unique. First let's say that all pain is real. I believe your pain is real and that it exists exactly as you say it does. I believe that with some education we can begin to shift your perspective on pain. With your permission, I'd like to provide some education today that I believe can help tie this all together and support a new understanding of pain that will help you reconnect with your values.

Validating Pain Experiences with the Chronic Pain Cycle

Many clients can recognize some version of the **chronic pain cycle**, which involves the interaction between pain, thoughts, emotions, and behaviors within the experience of pain, in their lives. Therapists can help clients identify the chronic pain cycle stages that may have occurred in their chronic pain experience by tying-in the unique biopsychosocial factors that the client has shared and applying education around a common chronic pain cycle. The following script models how therapists can introduce the chronic pain cycle to clients and use it to build rapport and gain clients' buy-in for a biopsychosocial and self-management approach to chronic pain.

Therapist:	The condition of chronic pain affects many areas of life and daily functioning. Your experience is your experience and all pain is real. There are stages of chronic pain and a cycle that are common to many who experience it. When someone experiences pain, a natural decrease in activities often occurs. With this decrease in activity, physical deconditioning starts to hinder daily movement and activities. Dealing with decreasing abilities with daily tasks and constant pain often leads to negative thoughts and emotions. Common negative thoughts include "this pain will never go away" and "I can't do anything with this pain." Common negative emotions are frustration, grief, anxiety, and depression. The experiences of decreased activities, deconditioning, and negative emotions may lead to increased avoidance of family, friends, or meaningful activities, particularly activities that involve movement. This cycle leads to increased distress, disability, and eventually more pain, with the cycle continuing. Are you able to identify this cycle in your own experience with pain?
L.C.:	Yes! I remember when I first had pain and I was just avoiding little stuff or cancelling plans here and there. The more I avoided, the worse I hurt, and the more depressed I got. Years later, my pain and depression have gotten so bad. Still, I have no idea how to break out of this cycle that I'm so stuck in.
Therapist:	Thank you for sharing that. I want you to know that this cycle is both so common and so easy to fall into. Many people in pain find themselves in this cycle. That is the difficult news. The good news is that there are many places where this cycle can be broken and ways to intervene. The first step is educating yourself and you're already doing that!

Highlighting Patterns of Fear-Avoidance

What a person thinks about their pain shapes their pain experience and recovery. It is well established in research that **pain catastrophizing**—worst-case scenario thinking about pain in the form of rumination, helplessness, and magnification—and fear-avoidance beliefs are strongly

linked to a person's pain experience (Varallo et al., 2020; Kovacs et al., 2011). Many individuals with long-standing pain are prone to fear and preoccupation about damaged tissues or potential harm caused by movement. When these individuals experience pain or a flare-up, they may believe that they are causing damage to their tissues or harming their bodies and tend to avoid activity all together. Unfortunately, inactivity actually makes the pain worse over time.

A fear-avoidance cycle begins because the avoidance of physical activity produces an absence of pain in the short term. This temporary relief from pain serves as a reward for an individual with chronic pain and reinforces the avoidance behavior. With acute pain, avoiding movement is an appropriate approach because the chance of further damage is much higher. Over the long-term, however, avoidance of movement or activities because of pain can translate to deconditioning of the muscles to do even small everyday activities and an overestimation of how much pain those activities will cause. Inactivity causes future attempts to engage in activities to be more difficult and more painful and reinforces fear. **Kinesiophobia**, or fear of movement, can also develop in response to an individual's pain experience (Varallo et al., 2021). Individuals stuck in a fear-avoidance cycle are likely unaware that this process causes more pain and greater disability in the long-term. Many are likely to recognize, however, that their lives are becoming smaller due to the emotional consequences and distress that occurs as the fear avoidance way of relating to their pain becomes more reflexive and more dominant in their life. The following script offers therapists an example of how to highlight patterns of fear-avoidance in a session with a client.

Therapist:	Some people with pain problems, an injury, or decreased function will experience chronic pain. There are two pathways that clients suffering from chronic pain can find themselves in. One pathway includes fear, which is an expected emotional reaction to threats such as an injury. Fear protects us from danger and activates defenses such as our fight or flight responses. One model that explains this really well is the fear-avoidance model. Another path involves clients with chronic pain that continue on with valued activities to some degree and maintain independence. These clients approach pain with curiosity, empowered by education, rather than fear. They live with their pain, confront the challenges slowly, and find a faster recovery than those on the other path. The first path I mentioned, the fear-avoidance model, occurs when the individual suffering from pain has negative thoughts about their pain such as "I can't do anything with this pain," "this pain will never go away," or "I'll become disabled and unable to care for my family." Have you noticed any negative thoughts surrounding your pain? Anything that highlights how threatening the pain is to you?
L.C.:	I suppose so. I definitely have a hard time because I can't stop thinking about the pain and how much it hurts. I worry that before long I won't be able to do anything I love to do or even basic self-care. I worry about doing dishes or laundry because of how bad I think it will hurt.

Therapist:	Thank you for sharing that. These are really common thoughts that occur for someone suffering from chronic pain. What follows those negative thoughts for you?
L.C.:	Well, usually when I'm thinking that way my mood is also pretty low or I'm feeling anxious. Usually if I'm thinking that way, I won't do the activity that I want to do or need to do. I've seen it get worse over time. And my life has gotten smaller and smaller.
Therapist:	Yes, it makes sense that these types of thoughts and emotions show up with chronic pain. While they are an expected part of the suffering of persistent pain, they are unhelpful. Mostly, they are unhelpful because they feed threatening information about our pain to our brain and bodies. Our brain overprotects us because it is responding to our worst-case scenario thinking. These thoughts lead to pain-related fear, hypervigilance about our pain, and what we call safety-seeking behaviors. The main behavior that can keep this cycle going is avoidance. Avoidance reinforces our fear because we never confront what we are afraid of. We become more afraid over time, more avoidant, and we enter the chronic phase due to disuse and disability. At the same time, the threshold for which we experience pain is lowered and it seems like almost anything could set it off.
L.C.:	Wow, when you explain it like that it makes sense. I thought I was doing my body a favor by avoiding things I thought would hurt me, but I'm starting to see how that could make it worse in the long-term.

Pain Neuroscience Education

The well-established fact that beliefs heavily influence pain supports the notion that psychoeducation is vital as part of a chronic pain treatment plan (Jensen et al, 2021; Jongen et al., 2017; Vanhaudenhuyse et al., 2018). Psychoeducation also can be therapy within itself. In contrast to the long-standing biomedical model, the biopsychosocial approach to pain treatment assumes that people in pain are interested in or at least even slightly open to learning about their pain, how pain is processed in the brain and body (why they hurt), what keeps pain going, and what they can do about it. Providing information and expanding the client's knowledge base about their pain, body, and psychology is a cornerstone of treating pain and a key element necessary for behavior change, which also requires motivation and opportunity. These three factors (knowledge, motivation, and opportunity) were incorporated into the development of pain neuroscience education (PNE), an intentional form and application of psychoeducation that allows people in pain to understand the biological and physiological processes underpinning their pain experience. As science and research has moved away from outdated models and toward constructs such as neuroplasticity, more and more clinicians are becoming better equipped with knowledge about pain science, which results in positive outcomes.

Pain neuroscience education has a therapeutic effect (Song et al., 2023; Siddall et al., 2022; Louw et al., 2018). Evidence shows that, when clients better understand their pain and what pain actually is, they move better, exercise more, experience less pain, and recoup hope. The use of PNE, specifically, produces immediate and long-term changes including decreased pain, fear, healthcare costs, and diagnostic tests, and improved function, movement, and pain knowledge. It also produces an increase in positive thoughts related to pain experiences, which have a calming effect on the brain (Louw et al., 2016).

Pain neuroscience education consists of psychoeducation sessions for clients that describe the neurophysiology of pain and pain processing by the nervous system. The content of these sessions focus on how brain plasticity can maintain chronic pain, which leads to hyperexcitability of the central nervous system. Pain neuroscience education is based on the idea that regions in the brain involved in pain activate whenever the brain perceives that there is a threat (e.g., that body tissues are in danger) and action is required to protect against the threat. This information can help clients depart from a previous view of a particular tissue or diagnosis being the issue and allows clients to conceptualize their pain being maintained by a sensitive nervous system, which can lead to changes in their pain perception (Louw et al., 2018).

Clinicians can use PNE in combination with multimodal treatments, including graded activity or movement, exercise, and cognitive-behavioral therapy. The initial education sessions regarding pain neuroscience, which any clinician can provide, present information around several components, which include:

- pain is in the brain
- pain is an alarm system
- pain relies on context
- pain is maintained by an extra sensitive alarm system
- pain's alarm system can be recalibrated

One major component of pain education is that clinicians should present complex issues in a way that makes them easy to understand. The use of metaphors, examples, stories, or images, along with consideration of which language works best for each client, the presenting clinical concerns, and/or context, helps clients better absorb the information being offered (Louw et al., 2018). The following sections provide a basic example of PNE curriculum that clinicians can use in various initial encounters with clients suffering from chronic pain.

The Body's Alarm System and Protector

Most tissues in the body heal within 3–6 months; therefore, persistent pain is usually due to changes in the brain and central nervous system. When individuals experience an injury or emotional response, the nervous system activates. The likelihood and intensity of pain increases when the nervous system receives credible evidence that the body is in danger and that protective behavior is helpful. However, if the nervous system perceives that the body is safe, there is a decrease in the likelihood and intensity of pain.

For clients experiencing chronic pain, the brain becomes overprotective and the nervous system remains extra sensitive despite the healing of tissues. Sensitization of the peripheral and central nervous systems can significantly impair clients' movements and functioning as well as their beliefs about their pain (e.g., "my pain is a mystery" or "something must be really physically wrong with me"). Clinicians can describe pain to these clients in terms of an extra sensitive nervous system versus tissue injury, damage, or harm. This educational presentation is a powerful way to shift the paradigm in a manner that reduces fear, reduces pain, and makes way for engagement in activity, movement, and exercise (Louw et al., 2018).

Therapist:	We no longer think of pain as a measure of tissue damage. That view is outdated. We now think of pain as a complex and sophisticated protective system developed from an evolutionary need to survive. Think of your pain protection system as an alarm system made up primarily of the brain, spinal cord, nerves, and sensory receptors or "danger detectors." These "danger detectors," which are distributed across almost all of our body tissues, act as the eyes of our brain and exist to protect us. Once our sensory receptors detect danger, our nervous system carries these danger messages from affected areas in our body through the spinal cord to our brain. The brain decides what to do with these danger messages and whether it should create pain based on a variety of information, including past experiences and memories, mood or emotions, trust and feelings of safety, and input from the senses. Whether or not pain is produced is based on the degree of threat that the brain perceives with just this limited amount of information. The brain is always trying to make predictions so that we may be kept safe; and, pain response is only one example of this. When the brain produces pain, the pain is a "best guess scenario" based on the incoming data and stored information available to it at the time. Any pain that is produced is a guiding signal that motivates us to keep ourselves safe. Remember, it is pain that tells us what to do and what not to do, such as not to lift groceries with a broken arm or to rest or go to the doctor when experiencing pain. The main concept here is that our pain responses are in the brain and are produced by the brain when it perceives danger to the body and wants us to take action.
L.C.:	So, if I have pain, it's because my brain has decided that creating pain is GOOD for me?
Therapist:	Exactly. Our brain's job is to analyze all the information that it receives from our senses and determine whether or not it is in our best interest to be in pain. If your brain produces pain, it has concluded that creating pain will serve you in some way. Perhaps you believe that a certain tissue in your body is under threat and your brain takes that information and wants you to do something about it. The key is finding out why your brain has made that decision. And this is where context comes into play. We know that pain can be turned on by anything that provides the brain with credible evidence that the body needs protecting. The need for protection could be triggered by any number of biopsychosocial factors, such as a failed treatment, the belief that something is really wrong, or even the MRI that your doctor just went over with you. Things like our stress levels and emotions can affect our pain too.
L.C.:	What about things like my past experiences with certain activities? Can those affect my pain?
Therapist:	Absolutely. Memories provide strong context for our brains, as do our beliefs about our pain and our emotional functioning. The main principle here is that any

	credible evidence that the body is in danger and protective behavior would be helpful increases the likelihood and intensity of pain. Any credible evidence that the body is safe decreases the likelihood and intensity of pain.
L.C.:	Are you saying that pain isn't in my body and if so then why do I feel it in my back? If pain is in my brain, does that mean that it's emotional, psychological, or all in my head?
Therapist:	Great questions! Actually, the brain and body are always continuously connected. While pain comes from the brain's reaction to signs of danger, chronic pain responses depend on both physical and emotional components, meaning that there are both physical and emotional parts to pain. You see, when we feel pain, many parts of our brain are active, especially the parts that control our thoughts and emotions. Whether positive or negative, our thoughts and emotions affect our nervous system and play out physically in our bodies. So many factors influence your alarm system's perception of danger and increase sensitivity—fear, stress, endorphins, adrenalin, depression, anxiety, lack of sleep, poor nutrition, overactivity, and so many more. These factors lead to a greater protective response from your brain.
L.C.:	I could really use an example of how this works.
Therapist:	Yes, I want to make sure this information is easy to understand and accessible for you. Think of pain like a complicated alarm system that is set to protect you. One simple example of this happens when you accidentally touch something hot. The alarm in your brain goes off, creates pain to protect you, and this motivates you to take your hand off the hot object before too much damage is done. Initially, tissue damage can cause physical pain. If there has been sufficient healing time and someone is still in pain, however, there may have been a change in the sensitivity of the alarm system due to the central nervous system and your brain. Sensitivity means that it takes less and less to set the alarm off, sometimes to the point that things which didn't hurt before now do. For example, some people in pain will become so physically sensitive that even the wind on their skin causes them pain.
L.C.:	So, you're saying that once pain is chronic it isn't really about the injury anymore? Instead, the brain is creating pain because it believes there is more danger than there actually is?
Therapist:	You're on the right track. In chronic pain, the sensitivity of our biological structures increase so that the true need for the alarm to go off and for the brain to create pain as a form of protection becomes distorted. In essence, the brain becomes overprotective. Consider this example. We have alarm systems in most cars now. They are designed to go off when the car detects that someone is trying to break into the car. When someone attempts to break into the car, the alarm goes off and the intruder runs away. This alarm system worked as it should.

	But what if the alarm in the car was set at a level that was too sensitive. Let's say the alarm goes off when a dog barks across the street. At this point, the sensitivity of that alarm system would no longer be helpful and its level of protection is not necessary, and yet the alarm system will continue to go off just the same as if there is an actual intruder until it is recalibrated.
L.C.:	Why did my alarm system become too sensitive?
Therapist:	There are many unique biological, psychological, and social factors that have affected this process for you. We also know that for approximately one in four people, the alarm system will activate after an injury or stressful period of time and never calm down to the original resting level. Instead, it remains extra sensitive and too close to a "firing level." When this happens, it does not take a lot of movement, stress, or activity to activate the alarm system. Many individuals start to believe that something MUST be wrong with them.
L.C.:	Yes, I've often thought this.
Therapist:	Chronic pain is more likely due to an extra sensitive alarm system. I'm sure you've tried many traditional methods and approaches to fix your pain. Rather than fixing your tissues, we can work together to focus on a variety of strategies to calm down or recalibrate your alarm system so that you can steadily move more, experience less pain, and get closer to your previous level of functioning. In other words, we can reset or recalibrate your alarm system.

Recalibration of the Body's Alarm System

The body's natural danger-reduction pathways and mechanisms can be stimulated. Anything indicating safety can turn down the sensitivity of the body's pain alarm system and often mental health providers already know what tools or interventions may generate feelings of safety for their clients.

At the outset of treatment, alliance-building and good clinical skills are strong safety generators for clients. In early conversations and intake sessions, mental health providers should acknowledge the client's experience, listen and empathize, and normalize and validate clients' experiences of pain. These approaches can help reduce perceived threats and foster a sense of safety. Next, providers can help clients expand their perspectives and neutralize their experiences of pain by providing education on biopsychosocial factors that can affect pain and cycles that maintain pain chronically. Last, providers can teach clients specific skills that will communicate safety to their brain and nervous system. These skills can help stimulate the body's own danger-reduction pathways and reduce the sensitivity of the nervous system, overprotectiveness of the brain, and the need to create pain. These skills are often already part of the treatment approaches used by the provider. For example, CBT skills such as identifying, challenging, and changing negative thoughts about pain and activity scheduling (in a graded manner) can have a positive influence on mood and pain experiences (Richmond et al., 2015). In addition, values identification and mindfulness, often seen in acceptance-based approaches, have evidence to support their use with chronic pain (Lai et al., 2023). Finally, psychophysiological interventions such as diaphragmatic breathing, relaxation training, and guided imagery can help change the body's response to stress and reduce sensitivity of the nervous system. The dialogue below is an example of how the therapist ties this together for clients with the deliberate inclusion of recalibration as a way to reach their goal of experiencing reduced pain.

Therapist:	The best way to do recalibrate your alarm system is to learn skills that turn down the sensitivity of your nervous system, reduce danger messages reaching the brain, and reduce threat perceived by the brain. You have already started that process. The information that I have provided to you today often helps clients to neutralize pain. Learning how pain works helps reduce threat, a very important generator of danger messages. Next time we meet, we can start to identify the things that could communicate safety to your brain and identify new skills that could be helpful. We can work together to identify what works best for you and make tweaks along the way based on your unique pain experience.

CULTURAL CONSIDERATIONS

Culturally sensitive psychotherapy encourages a clinician to understand the background and belief system of a client as it relates to important elements of their culture or identity, which includes race, ethnicity, sexual orientation, and gender. Accommodating and respecting differences in the opinions, attitudes, and values of different cultures, people, and belief systems lies at the heart of culturally sensitive therapy and leads to the most effective treatment for a client.

Cultural sensitivity is applicable to any type of psychoeducation, therapy, or client concern. Clinicians can start to become culturally sensitive by building awareness of their own culture and how it influences their relationship with clients. Culturally sensitive clinicians also educate themselves on the guidelines for working with diverse groups and understand that beliefs and behaviors are influenced by racial, cultural, religious, gender, and sexual identity factors. Beyond this understanding, clinicians who are the most successful integrate cultural sensitivity practices by way of learning through inquiry about a client's unique beliefs, values, and preferences as part of or regardless of their culture. For clients that do not identify with a dominant culture group, cultural sensitivity on the part of a clinician can contribute to a stronger therapeutic alliance, which is of utmost importance when approaching a client with chronic pain.

Engaging with a client in pain is often a challenge for mental health therapists and health professionals in general. Pain is subjective in that it can only be perceived and reported by the clients. It is often challenging for them to describe and requires strong verbal skills and self-awareness. The cultural background of clients affects their pain, pain beliefs, pain descriptions, and pain perceptions. Therefore, clinicians should understand, respect, and integrate the client's culture into treatment in order to more effectively address their pain.

Consideration of the beliefs, experiences, and values of an individual with pain will improve the quality of their clinical care. Cultural differences in pain can range from an overestimation to an underestimation of pain severity—even a decreased pain expression—by a client. For example, Chinese culture may believe that pain results from an imbalance in Yin and Yang (Givler, 2023). Another example is military and other collectivist cultures which value sacrifice for others. Individuals from these cultures are likely to believe that pain should be endured bravely and not become a burden for others. Further enacting these values can maintain or improve an individual's standing as leadership is demonstrated when sublimating pain experiences in these ways. Arab cultures are very expressive about pain, while Cuban culture is more stoic. East Asian cultures are more stoic as well but will sometimes exhibit non-verbal signs of pain. Pain is also a sign of progress toward recovery for some. American Indian, Asian, Black, and Hispanic cultures

may be stoic about pain and maintain a neutral facial expression in even the most severe moments of pain. Finally, some people may have religious beliefs about pain being part of God's plan, penance, or a test of faith.

When clinicians provide culturally-sensitive care for musculoskeletal pain, they should consider the following:

- Both an individual and their culture are dynamic and evolving constantly.
- Cultural factors shape health beliefs and behaviors.
- There is limited research on the influence of cultural factors (the social portion of the biopsychosocial model) on pain and these factors often remain overlooked in their treatment appointments. Thus, there is a need to create and disseminate culturally adapted evidence-based materials and resources as often as possible.
- Culture shapes perception of pain, communication of pain, and pain behaviors.
- Cultural diversity should be considered regarding pain education, treatment, and exercises and the use of culturally appropriate examples, metaphors, images, or delivery methods may make pain education more accessible to clients.
- New skills, like those that help with recalibration, should be introduced using a culturally-sensitive approach so that clients can apply these skills in a way that is consistent with their values and culture (Reis et al., 2022).

The pain experience is multifactorial and a biopsychosocial approach lends itself well to cultural sensitivity. Individual clients can differ and it is important not to generalize cultural pain experiences or expressions. Clinical interviews around personal history, family background with pain, how pain has been modeled or described in their family of origin, or any spiritual or cultural considerations are important to identify any cultural issues impacting their pain experience. A culturally-sensitive clinician will approach each chronic pain client with an open mind and ask questions to formulate an approach that is client centered and considers intersectionality rather than using the same standard treatment or education with everyone (Cosio & Demyan, 2021; Wilson et al., 2019).

SUMMARY

Chronic pain is a major global concern. Effectively reducing the prevalence of chronic pain and the suffering connected with it requires clinicians to have a basic understanding of pain science and a biopsychosocial perspective of chronic pain. Pain neuroscience education is accessible, easy to understand, and effective and applicable to any clients with musculoskeletal pain with nervous system involvement (typically any person with pain lasting longer than 6 months and with a large impairment in their life and functioning). Clinicians new to chronic pain education and treatment may consider additional reading, resources, or seeking outside consultation or supervision.

Chronic pain, while often thought of as simply a physical sensation, is complex. It creates a large web that infiltrates many areas of a client's life. It is well-established that the medical model alone does not attend to the entire issue of chronic pain and the resulting functional impairments. Psychoeducation, therapy tools, and guidance that direct clients towards self-management can have a powerful influence on reducing the negative effects of pain. Just as the

brain has learned to be overprotective, it can unlearn this with repeated messages of safety over time. Clinicians can remind clients that humans are bioplastic and instill hope that their pain experience can change.

RESOURCES

Books

Explain Pain Supercharged
Painful Yarns: Metaphors & Stories to Help Understand the Biology of Pain
Pain Neuroscience Education: Teaching People About Pain
The Pain Management Workbook
The Brain that Changes Itself

Websites

National Institutes of Health Pain Consortium
University of Florida Health: Pain Assessment and Management Initiative

Veterans Health Administration Pain Management Information for Providers
International Association for the Study of Pain: Pain Resource Center

Videos

Why Things Hurt
The Psychology of Pain

REFERENCES

Anderson, K.O., Green, C. R., & Payne, R. (2009). Racial and ethnic disparities in pain: Causes and consequences of unequal care. *The Journal of Pain, 10*(12), 1187–1204. https://doi.org/10.1016/j.jpain.2009.10.002

Barr, D. A. (2019). Health disparities in the United States: Social class, race, ethnicity and the social determinants of health. Johns Hopkins University Press.

Beecher, H. K. (1956). Relationship of significance of wound to pain experienced. *JAMA,161*(17), 1609–1613. https://doi.org/10.1001/jama.1956.02970170005002

Bougie O., Yap, M. I., Sikora, L., Flaxman, T., & Singh, S. (2019) Influence of race/ethnicity on prevalence and presentation of endometriosis: A systematic review and meta-analysis. *BJOG, 126*(9), 1104–1115. https://doi.org/10.1111/1471-0528.15692

Brinjikji, W., Luetmer, P. H., Comstock, B., Bresnahan, B. W., Chen, L. E., Deyo, R. A., Halabi, S., Turner, J. A., Avins, A. L., James, K., Wald, J. T., Kallmes, D. F., & Jarvik, J. G. (2015). Systematic literature review of imaging features of spinal degeneration in asymptomatic populations. *American Journal of Neuroradiology, 36*(4), 811–816. https://doi.org/10.3174/ajnr.A4173

Brown, T. T., Partanen, J., Chuong, L., Villaverde, V., Griffin, A. C., & Mendelson, A. (2018). Discrimination hurts: The effect of discrimination on the development of chronic pain. *Social Science & Medicine, 204*, 1–8. https://doi.org/10.1016/j.socscimed.2018.03.015

Buchbinder, R., van Tulder, M., Öberg, B., Costa, L. M., Woolf, A., Schoene, M., Croft, P., & Lancet Low Back Pain Series Working Group. (2018). Low back pain: A call for action. *Lancet, 391*(10137), 2384–2388. https://doi.org/10.1016/S0140-6736(18)30488-4

Butler, D. (2015). Bioplasticity. *Noigroup.* https://www.noigroup.com/noijam/bioplasticity/

Butler, D. S. & Moseley, L. S. (2013). *Explain pain.* Noigroup Publications.

Centers for Disease Control and Prevention. (2022). *What is health equity?* https://www.cdc.gov/healthequity/whatis/?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fcoronavirus%2F2019-ncov%2Fcommunity%2Fhealth-equity%2Frace-ethnicity.html

Cleveland Clinic. (2023a). *Acute vs. Chronic Pain.* https://my.clevelandclinic.org/health/articles/12051-acute-vs-chronic-pain#:~:text=Acute% 20pain%20usually%20comes%20on,underlying%20cause%20for%20the%20pain.

Cleveland Clinic. (2023b). *Allodynia.* https://my.clevelandclinic.org/health/symptoms/21570-allodynia

Committee on Advancing Pain Research, Care, and Education. (2011). *Relieving pain in America: A blueprint for transforming prevention, care, education, and research.* Institute of Medicine of the National Academies, Board on Health Sciences Policy. https://doi.org/10.17226/13172

Cosio, D. & Demyan, A. (2021). Chronic pain management in marginalized populations: How to rebalance the provider-patient relationship. *Practical Pain Management, 12*(5).

Dahlhamer, J., Lucas, J., Zelaya, C., Nahin, R., Mackey, S., DeBar, L., Kerns, R., Von Korff, M., Porter, L., & Helmick, C. (2018). Prevalence of chronic pain and high-impact chronic pain among adults — United States, 2016. *Morbidity and Mortality Weekly Report, 67(36)*:1001–1006. http://dx.doi.org/10.15585/mmwr.mm6736a2

Declercq, J. (2023). Talking about chronic pain: Misalignment in discussions of the body, mind and social aspects in pain clinic consultations. *Health, 27*(3), 378–397. https://doi.org/10.1177/13634593211032875

Engel, G. L. (1977). The need for a new medical model: A challenge for biomedicine. *Science, 196*(4286), 129–136. https://doi.org/10.1126/science.847460

Erlenwein, J., Diers, M., Ernst, J., Schulz, F., & Petzke, F. (2021). Clinical updates on phantom limb pain. *Pain Reports, 6*(1), e888. https://doi.org/10.1097/PR9.0000000000000888

Fitzcharles, M., Cohen, S. P., Clauw, D. J., Littlejohn, G., Usui, C., & Hauser, W. (2021). Nociplastic pain: Towards an understanding of prevalent pain conditions. *The Lancet, 397*, 2098–2110. https://doi.org/10.1016/S0140-6736(21)00392-5

Foster, N. E., Anema, J. R., Cherkin, D., Chou, R., Cohen, S. P., Gross, D. P., Ferreira, P. H., Fritz, J. M., Koes, B. W., Peul, W., Turner, J. A., Maher, C. G. & Lancet Low Back Pain Series Working Group. (2018). Prevention and treatment of low back pain: Evidence, challenges, and promising directions. *Lancet, 391*(10137), 2368–2383. https://doi.org/10.1016/S0140-6736(18)30489-6

GBD 2021 SDG Collaborators (2023). Global, regional, and national burden of low back pain, 1990–2020, its attributable risk factors, and projections to 2050: A systematic analysis of the Global Burden of Disease Study 2021. *Lancet Rheumatology, 5*(6), 316–329. https://doi.org/10.1016/S2665-9913(23)00098-X

Givler, A., Bhatt, H., Maani-Fogelman, P. A. 2023. The importance of cultural competence in pain and palliative Care. In *StatPearls*. StatPearls Publishing. https://www.ncbi.nlm.nih.gov/books/NBK493154/

Grol-Prokopczyk H. (2017). Sociodemographic disparities in chronic pain, based on 12-year longitudinal data. *Pain, 158*(2), 313–322. https://doi.org/10.1097/j.pain.0000000000000762

Guermazi, A., Niu, J., Hayashi, D., Roemer, F. W., Englund, M., Neogi, T., Aliabadi, P., McLennan, C. E., & Felson, D. T. (2012). Prevalence of abnormalities in knees detected by MRI in adults without knee osteoarthritis: Population based observational study (Framingham osteoarthritis study). *BMJ*, *345*, e5339. https://doi.org/10.1136/bmj.e5339

Haozous, E. A., Doorenbos, A. E., Stoner, S. (2016). Pain management experiences and the acceptability of cognitive behavioral strategies Among American Indians and Alaska Natives. Journal of Transcultural Nursing, 27(3), 233-240. https://doi.org/10.1177/1043659614558454

Hayes, B. J., Craig, K. D., Wing, P. C. (2002). Diagnostic judgment: Chronic pain syndrome, pain disorder, and malingering. *BCMJ*, *44*(6), 312–316.

Horga, L. M., Hirschmann, A. C., Henckel, J., Fotiadou, A., Di Lau'a, A., Torlasco, C., D'Silva, A., Sharma, S., Moon, J. C., & Hart, A. J. (2020). Prevalence of abnormal findings in 230 knees of asymptomatic adults using 3.0 T MRI. *Skeletal Radiology, 49*(7), 1099–1107. https://doi.org/10.1007/s00256-020-03394-z

International Association for the Study of Pain. (2021a). *IASP announces revised definition of pain.* https://www.iasp-pain.org/publications/iasp-news/iasp-announces-revised-definition-of-pain/

International Association for the Study of Pain. (2021b). *Terminology.* https://www.iasp-pain.org/resources/terminology/

Janevic, M. R., McLaughlin, S. J., Heapy, A. A., Thacker, C., & Piette, J. D. (2017). Racial and socioeconomic disparities in disabling chronic pain: Findings From the Health and

Retirement Study. *The Journal of Pain*, *18*(12), 1459–1467. https://doi.org/10.1016/j.jpain.2017.07.005

Jensen, M. P., Hakimian, S., Ehde, D. M., Day, M. A., Pettet, M. W., Yoshino, A., & Ciol, M. A. (2021). Pain-related beliefs, cognitive processes, and electroencephalography band power as predictors and mediators of the effects of psychological chronic pain interventions. *Pain, 162*(7), 2036–2050. https://doi.org/10.1097/j.pain.0000000000002201

Jongen, P. J., Ruimschotel, R. P., Museler-Kreijns, Y. M., Dragstra, T., Duyverman, L., Valkenburg-Vissers, J., Cornelissen, J., Lagrand, R., Donders, R., & Hartog, A. (2017). Improved health-related quality of life, participation, and autonomy in patients with treatment-resistant chronic pain after an intensive social cognitive intervention with the participation of support partners. *Journal of Pain Research, 10*, 2725–2738. https://doi.org/10.2147/JPR.S137609

Kamper, S. J., Logan, G., Copsey, B., Thompson, J., Machado, G. C., Abdel-Shaheed, C., Williams, C. M., Maher, C. G., & Hall, A. M. (2020). What is usual care for low back pain? A systematic review of health care provided to clients with low back pain in family practice and emergency departments. *Pain*, *161*(4), 694–702. https://doi.org/10.1097/j.pain.0000000000001751

Kim, H. J., Greenspan, J. D., Ohrbach, R., Fillingim, R. B., Maixner, W., Renn, C. L., Johantgen, M., Zhu, S., & Dorsey, S. G. (2019). Racial/ethnic differences in experimental pain sensitivity and associated factors – Cardiovascular responsiveness and psychological status. *PloS One*, *14*(4), e0215534. https://doi.org/10.1371/journal.pone.0215534

Kosek, E., Clauw, D., Nijs, J., Baron, R., Gilron, I., Harris, R. E., Mico, J. A., Rice, A. S., & Sterling, M. (2021). Chronic nociplastic pain affecting the musculoskeletal system: Clinical criteria and grading system. *Pain, 161*(11), 2629–2634. https://doi.org/10.1097/j.pain.0000000000002324

Kovacs F. M., Seco, J., Royuela, A., Pena A., Muriel A., & Spanish Back Pain Research Network. (2011). The correlation between pain, catastrophizing, and disability in subacute and chronic low back pain: A study in the routine clinical practice of the Spanish National Health Service. *Spine*, *36*(4), 339–345. https://doi.org/0.1097/BRS.0b013e3181cfba29

Lai, L., Liu, Y., McCracken, L. M., Li, Y., & Ren, Z. (2023). The efficacy of acceptance and commitment therapy for chronic pain: A three-level meta-analysis and a trial sequential analysis of randomized controlled trials. *Behaviour research and therapy, 165*, 104308. https://doi.org/10.1016/j.brat.2023.104308

Louw, A. (2014). Therapeutic neuroscience education via e-mail: A case report. *Physiotherapy Theory and Practice, 30*(8), 588–596. https://doi.org/10.3109/09593985.2014.912255

Louw, A. & Butler, D. S. (2018). Chronic back pain and pain science. In S. B. Brotzman & R. C. Manske (Eds.), Clinical *Orthopaedic Rehabilitation, 4th edition* (pp. 532–540). Elsevier.

Louw, A., Nijs, J., & Puentedura, E. J. (2017). A clinical perspective on a pain neuroscience education approach to manual therapy. *Journal of Manual & Manipulative Therapy, 25*(3), 160–168. https://doi.org/10.1080/10669817.2017.1323699

Louw, A., Puentedura, E., Schmidt, S., & Zimney, K. (2018). *Pain Neuroscience Education: Teaching People About Pain* (2nd ed.). Orthopedic Physical Therapy Products.

Louw, A., Zimney, K., Puentedura E. J., & Diener, I. (2016). The efficacy of therapeutic neuroscience education on musculoskeletal pain: A systematic review of the literature. *Physiotherapy Theory and Practice*, *32*(5), 332–355. https://doi.org/10.1080/09593985.2016.1194646

Macchia, L. (2022). Pain trends and pain growth disparities, 2009–2021. *Economics & Human Biology, 47.* https://doi.org/10.1016/j.ehb.2022.101200

Meints S. M., Cortes, A., Morais, C. A., & Edwards, R. R. (2019). Racial and ethnic differences in the experience and treatment of noncancer pain. *Pain Management, 9*(3), 317–334. https://doi.org/10.2217/pmt-2018-0030 Melzack, R., & Wall, P. D. (1965). Pain mechanisms: A new theory. (1965). *Science, 150*(3699), 971–979. https://doi.org/10.1126/science.150.3699.971

Mende-Siedlecki, P, Qu-Lee, J., Backer, R., & Van Bavel, J.J. (2019). Perceptual contributions to racial bias in pain recognition. *Journal of Experimental Psychology: General, 148*(5), 863–889. https://doi.org/10.1037/xge0000600

McAllister, M. J. (2017). *What is central sensitization?* Institute for Chronic Pain. https://instituteforchronicpain.org/understanding-chronic-pain/what-is-chronic-pain/central-sensitization#

Meyer, I. H. (2003). Prejudice, social stress, and mental health in lesbian, gay, and bisexual populations: Conceptual issues and research evidence. *Psychological Bulletin, 129*(5), 674–697. https://doi.org/10.1037/0033-2909.129.5.674

Moayedi, M., & Davis, K. D. (2013). Theories of pain: From specificity to gate control. *Journal of Neurophysiology, 109*(1), 5–12. https://doi.org/10.1152/jn.00457.2012

Moseley G. L. & Butler, D. S. (2015). Fifteen years of explaining pain: The past, present, and future. *The Journal of Pain, 16*(9), 807–813. https://doi.org/10.1016/j.jpain.2015.05.005

Mossey J. M. (2011). Defining racial and ethnic disparities in pain management. *Clinical Orthopaedics and Related Research, 469*(7), 1859–1870. https://doi.org/10.1007/s11999-011-1770-9

National Center for Complementary and Integrative Health. (2023). *Prevalence and profile of high impact chronic pain*. U.S. Department of Health and Human Services, National Institutes of Health. https://www.nccih.nih.gov/research/research-results/prevalence-and-profile-of-high-impact-chronic-pain

National Institute for Health and Care Excellence. (2021). Chronic pain (primary and secondary) in over 16s: assessment of all chronic pain and management of chronic primary pain (NICE Guideline, No. 193). https://www.ncbi.nlm.nih.gov/books/NBK569960/#:~:text=Chronic%20primary%20pain%20is%20pain,any%20observable%20injury%20or%20disease

Nicholls, D. A., Atkinson, K., Bjorbækmo, W. S., Gibson, B. E., Latchem, J., Olesen, J., Ralls, J., & Setchell, J. (2016). Connectivity: An emerging concept for physiotherapy practice. *Physiotherapy Theory and Practice, 32*(3). 159–70. https://doi.org/10.3109/09593985.2015.1137665

Nijs, J., Lahousse, A., Kapreli, E., Bilika, P., Saraçoğlu, İ., Malfliet, A., Coppieters, I., De Baets, L., Leysen, L., Roose, E., Clark, J., Voogt, L., & Huysmans, E. (2021). Nociplastic pain criteria or recognition of central sensitization? Pain phenotyping in the past, present and future. *Journal of Clinical Medicine, 10*(15), 3202. https://doi.org/10.3390/jcm10153203

Pitcher, M. H., Von Korff, M., Bushnell, M. C., & Porter, L. (2019). Prevalence and profile of high-impact chronic pain in the United States. *The Journal of Pain, 20*(2), 146–160. https://doi.org/10.1016/j.jpain.2018.07.006

Raja, S. N., Carr, D. B., Cohen, M., Finnerup, N. B., Flor, H., Gibson, S., Keefe, F. J., Mogil, J. S., Ringkamp, M., Sluka, K. A., Song, X. J., Stevens, B., Sullivan, M. D., Tutelman, P. R., Ushida, T., & Vader, K. (2020). The revised International Association for the Study of Pain

definition of pain: Concepts, challenges, and compromises. *Pain*, *161*(9), 1976–1982. https://doi.org/10.1097/j.pain.0000000000001939

Reis, F. J. J., Nijs, J., Parker, R., Sharma, S., & Wideman, T. H. (2022). Culture and musculoskeletal pain: Strategies, challenges, and future directions to develop culturally sensitive physical therapy care. *Brazilian Journal of Physical Therapy*, *26*(5), 200442. https://doi.org/10.1016/j.bjpt.2022.100442

Richmond, H., Hall, A. M., Copsey, B., Hansen, Z., Williamson, E., Hoxey-Thomas, N., Cooper, Z., & Lamb, S. E. (2015). The effectiveness of cognitive behavioural treatment for non-specific low back pain: A systematic review and meta-analysis. *PloS One*, *10*(8), e0134192. https://doi.org/10.1371/journal.pone.0134192

Riskowski, J.L. (2014). Associations of socioeconomic position and pain prevalence in the United States: Findings from the National Health and Nutrition Examination Survey. *Pain Medicine*, *15*(9),1508–1521. https://doi.org/10.1111/pme.12528

Shipton, E. S., Bate, F., Garrick, R., Steketee, C., Shipton, E. A., & Visser, E. J. (2018). Systematic review of pain medicine content, teaching, and assessment in medical school curricula internationally. *Pain and Therapy*, *7*(2), 139–161. https://doi.org/10.1007/s40122-018-0103-z

Siddall, B., Ram, A., Jones, M. D., Booth, J., Perriman, D., & Summers, S. 2022. Short-term impact of combining pain neuroscience education with exercise for chronic musculoskeletal pain: A systematic review and meta-analysis. *PAIN*, *163*(1), e20–e30. https://doi.org/10.1097/j.pain.0000000000002308

Smith E. (2018). Advances in understanding nociception and neuropathic pain. *Journal of neurology*, *265*(2), 231–238. https://doi.org/10.1007/s00415-017-8641-6

Song, J., Kim, H., Jung, J., & Lee, S. (2023). Soft-tissue mobilization and pain neuroscience education for chronic nonspecific low back pain with central sensitization: A prospective randomized single-blind controlled trial. *Biomedicines*, *11*(5), 1249. http://dx.doi.org/10.3390/biomedicines11051249

Stilwell, P. & Harman, K. (2019). An enactive approach to pain: Beyond the biopsychosocial model. *Phenomenology and the Cognitive Sciences*, *18*, 637–665. https://doi.org/10.1007/s11097-019-09624-7

Sue, S., Zane, N., Hall, G. C., & Berger, L. K. 2009.The case for cultural competency in psychotherapeutic interventions. *Annual Review of Psychology*, *60*,525–548. https://doi.org/10.1146/annurev.psych.60.110707.163651

Thompson K., Johnson M. I., Milligan J., Briggs, M. (2018). Twenty-five years of pain education research—what have we learned? Findings from a comprehensive scoping review of research into pre-registration pain education for health professionals. *Pain*, *159*(11), 2146–2158. https://doi.org/10.1097/j.pain.0000000000001352

Turk, D. C. & Monarch, E. S. (2002). Biopsychosocial perspective on chronic pain. In D. C. Turk & R. J. Gatchel (Eds.), *Psychological approaches to pain management: A practitioner's handbook* (2nd ed., pp. 3–30). Guilford Press.

Vanhaudenhuyse, A., Gillet, A., Malaise, N., Salamun, I., Grosdent, S., Maquet, D., Nyssen, A. S., & Faymonville, M. E. (2017). Psychological interventions influence patients' attitudes and beliefs about their chronic pain. *Journal of Traditional and Complementary Medicine*, *8*(2), 296–302. https://doi.org/10.1016/j.jtcme.2016.09.001

Varallo, G., Giusti, E. M., Scarpina, F., Cattivelli, R., Capodaglio, P., & Castelnuovo, G. (2021). The association of kinesiophobia and pain catastrophizing with pain-related disability and

pain intensity in obesity and chronic lower-back pain. *Brain Science, 11*(1), 11. https://doi.org/10.3390/brainsci11010011

Wallace, B., Varcoe, C., Holmes, C., Moosa-Mitha, M., Moor, G., Hudspith, M., & Craig, K. D. (2021). Towards health equity for people experiencing chronic pain and social marginalization. *International Journal for the Equity of Health, 20*(1), 53. https://doi.org/10.1186/s12939-021-01394-6

Wilson, Y., White, A., Jefferson, A., & Danis, M. (2019). Intersectionality in clinical medicine: The need for a conceptual framework. *The American Journal of Bioethics, 19*(2), 8–19. https://doi.org/10.1080/15265161.2018.1557275

World Health Organization. (2019). *International statistical classification of diseases and related health problems* (11th ed.). https://icd.who.int/

Wu, A., March, L., Zheng, X., Huang, J., Wang, X., Zhao, J., Blyth, F. M., Smith, E., Buchbinder, R., & Hoy, D. (2020). Global low back pain prevalence and years lived with disability from 1990 to 2017: Estimates from the Global Burden of Disease Study 2017. *Annals of Translational Medicine*, *8*(6), 299. https://doi.org/10.21037/atm.2020.02.175

Zajacova, A., Grol-Prokopczyk, H., & Zimmer, S. (2021). Pain trends amond American adults, 2002–2018: Patterns, disparities, and correlates. *Demography, 58*(2), 711–738. https://doi.org/10.1215/00703370-8977691

Zelaya, C. E., Dahlhamer, J. M., Lucas, J. W., & Connor, E. M. (2020). *Chronic pain and high-impact chronic pain among U.S. adults, 2019* (NCHS Data Brief No 390). National Center for Health Statistics. https://www.cdc.gov/nchs/data/databriefs/db390-H.pdf