

The Impact of Chronic Pain on Life and Work

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Abstract

This article addresses the subject of chronic pain, and how it can affect function through its bidirectional impact on the central nervous system and the peripheral nervous system. It is through this action and reaction that every aspect of the human organism's ability to interact with the world affects activities of daily living, instrumental activities of daily living, and work, i.e., the functional and vocational impact of chronic pain. Chronic pain can become a disease in itself, independent of the injury site. When called upon in a forensic setting, practitioners in life care planning and vocational rehabilitation practice are often asked to educate the jury how different forms and levels of chronic pain can affect a variety of aspects of a person's life such as physical, mental, coordination, and performance. Chronic pain can affect the ability to function at a competitive job level in any of these spheres.

Introduction

In the 2016 publication of the National Health Interview Survey, the prevalence of chronic pain in the United States was reported at 20.4% (50.0 million people), while 8% (or 19.6 million people) reported "high impact" chronic pain, defined as a limitation in at least one major life activity (Dahlhamer et al., 2016). Many life care planners and rehabilitation professionals face the dilemma presented to them through medical records and interviews with evaluatees, of the dichotomy of subjective versus objective evidence. Those in forensic practice have undoubtedly faced the question "*Isn't it true that pain is subjective?*" when providing expert testimony. Pain is, in fact, intersubjective because the vast majority of humans experience it. In fact, only a small number of people have a rare condition called Congenital Insensitivity to Pain (CIP), where they cannot feel physical pain. Pain is also objective to the extent that it can be observed and measured.

Defining Pain

The central nervous system (CNS) is principally composed of the brain, brainstem, and spinal cord and coordinates the functioning of the entire body. Central pain syndrome is a neurological condition caused by damage to or dysfunction of the CNS. The peripheral nervous system is the part of the nervous system outside of the CNS and includes cranial nerves, spinal nerves and peripheral nerves. Permanent changes in the responsiveness of both the peripheral and central nervous systems can persist even after all tissue healing from an original injury has completed. As a

result, persistent pain can become a self-perpetuating condition in which changes in the nervous system propagate dysfunctional neuropathic pain (Galer & Dworken, 2006). In central sensitization, otherwise innocuous sensations encode painful stimuli and previously normal functioning tissues become hyperexcitable.

Trede et al. (2008) define neuropathic pain as a form of chronic pain arising as a direct consequence of a lesion or disease affecting the somatosensory system. Wallace & Rice (2008) indicate that although the biological advantage of nociceptive (i.e., pain caused by harmful stimuli) pain is easily identified, this is not as true for neuropathic pain, and there is a likelihood that neuropathic pain is the result of a pathological process which represents a disordered, regenerative response to damage to the nervous system. This can lead to hypersensitivity after peripheral nerve injury. Central neuropathic pain is generally severe, often debilitating, and difficult to treat (Watson, 2008).

Chronic pain is any pain that lasts over 3-6 months, or beyond that time during which the wound or lesion is expected to have healed (Medical Dictionary Inc., 2020). As noted by both of the Fifth and Sixth editions of the *American Medical Association Guides to the Evaluation of Permanent Impairment* (American Medical Association, 2001; 2008) and other literature on the impact of chronic pain, chronic pain is classified as a disease of the central nervous system (CNS). The course, sequelae and significance of chronic pain have been memorialized in the *AMA Guides to the Evaluation of Permanent Impairment* (2001, 2008). They are summarized as follows:

Processes have been identified by which unilateral inflammation, trauma, or illness can lead to pain and sensitivity in uninvolved, often contralateral structures. Physiologic processes underlying such symptoms, which were often dismissed as "not real", have been found at the level of the dorsal horn, thalamus, and sensory cortex...These findings are of major import. They demonstrate that pain need not be symptomatic of a disease or injury, but, in fact, can become a disease unto itself. (American Medical Association, 2001, p. 34).

In this article, the terms chronic pain, neuropathic pain, and central pain will be used interchangeably.

Pain Effects on Brain Structures

The processes of peripheral and central sensitization are a normal consequence of tissue injury and they offer significant protection to the organism. Following tissue injury, sensitization serves as a reminder that the region is injured and should be closely guarded until the tissue has

healed. However, these same neuronal mechanisms can lead to persistent pain, even after all evidence of the initial inciting disease or injury have resolved. Although pain has been traditionally regarded as a symptom that serves as a warning signal of an underlying disease process, there is accumulating evidence that persistent pain should be considered a disease entity in its own right (American Medical Association, 2008).

Central sensitization has been described as a brain illness that causes cortical reorganization has become increasingly thought to play a role in many different chronic pain disorders. It can occur with chronic low back pain, chronic neck pain, whiplash injuries, chronic headaches, rheumatoid arthritis, osteoarthritis, endometriosis, motor vehicle accidents, and after surgeries. Fibromyalgia, irritable bowel syndrome, and chronic fatigue all seem likely to be related to central sensitization as well (Institute for Chronic Pain, 2017; McCallister 2014.).

Central sensitization has no single pain generator, but rather multiple mutually reinforcing resonances (Apkarian et al., 2004; Baliki et al., 2008; Grachev et al., 2000; Kuchinad et al., 2007; Llinás et al., 1999; & Schmidt-Wilcke et al. 2006). Anatomical reorganization in the dorsal horn occurs as a result of low threshold misinterpretation within the spinal cord, leading to hypersensitivity. Supraspinal mechanisms are thought to play an important role in neuropathic pain (Ossipov et al., 2000). Under pathological conditions, enhancement of descending controls to the spinal cord are likely to allow excitations influence to maintain central sensitization.

Gudin (2004) noted that changes in neuroanatomy are seen after repeated experiences with pain. Kasdan (1998) notes that reprogramming in the brain and spinal cord is involved in the context of chronic pain. Schweinhardt and Bushnell (2010) reported brain changes and altered pain modulating circuits in the forebrain and brainstem in imaging of patients with chronic pain and biochemical alterations associated with chronic pain that could underlie neurotoxicity caused by long-term activation. Bushnell (2009) stated:

...chronic pain has a much larger impact on an individual than the direct effects of the pain itself. There is now accumulating evidence that chronic pain actually changes the structure and function of the central nervous system...Associated with these neurological changes are deficits in long- and short-term memory and emotional decision making (p. 10-14).

Experiencing Chronic Pain

Chronic pain can result in suffering that can affect every quarter of human existence. Pain sensations are commonly described as:

- Hot burning
- Cold/freezing
- Prickling, tingling

- Pins and needles
- Electrical
- Shock like
- Shooting/stabbing
- Itching
- Sensitivity to light touch, brush up, cold

It is also important to recognize other sensations that a person might experience that are not clearly describable, are compound sensations, or may vary over time.

In 1925, the modern surrealist and social realist artist, Frida Kahlo was involved in a disabling and painful streetcar accident at the age of 18. Her injuries included a fractured spine, fractured collar bone, fractured ribs, fractured pelvis, 11 comminuted fractures of her right leg, a crushed and dislocated right foot, a dislocated shoulder, and perforation of her abdomen and uterus by a metal handrail. After her hospitalization and during her recovery, she began painting and finished the first of several self-portraits. One of her most famous portraits, "The Broken Column", is one of the greatest visual representations of the experience of chronic pain, and was painted by Kahlo in 1949, 24 years after her near-fatal injuries.

Daily chronic pain can take a toll on emotional and physical health. The British Pain Society (2009) reports that episodic and persistent pain significantly interfere with multiple aspects of a person's life, in excess of that interference from acute pain. This translates to performance of ADLs, IADLs, and vocational dysfunction. Pain can lead to other problems such as anxiety, depression, poor sleep, irritability, guilt, loss of interest in sex, drug or alcohol use, job loss, suicidal thoughts and/ or marriage or family problems (Institute for Chronic Pain, 2017). Approximately 25% of people with chronic pain will go on to have a condition called chronic pain syndrome (CPS), when the pain and accompanying disorders (e.g., depression, insomnia, anxiety) interfere with their daily lives.

The effects of chronic pain can cross physical, psychological, social and cultural domains, and interact in complex ways. Examples include how sleep deprivation and reduced ability to perform activities of daily living can lead to deteriorating mood, depression, anxiety, anger, and loss of self-esteem. Arising from these are deteriorating family relationships, deteriorating intimacy, and increasing social isolation. Societal consequences include increased health care costs, disability, and vocational collapse.

Behavioral Changes

Przekop and Przekop (2013) reported that cortical abnormalities associated with chronic pain underlie specific cognitive and behavioral changes including depression, anxiety, and hypervigilance. Saylor, Arikan, and Yontem (2002) found that patients with chronic pain were more anxious, more depressed and had poorer sleep compared to healthy control subjects. Hooley et al. (2014) note that

chronic pain conditions are associated with an elevated risk for suicide as chronic pain may engender the development of fearlessness about death, a key suicide risk factor. They point out that chronic pain can result in, and be aggravated by depression, hopelessness, and facilitation of a desire for escape through death. They hypothesized that depression may cause chronic pain through its increase in pain sensitivity and lowering of thresholds of pain tolerance (Sayar, Arıkan, & Yontem, 2002). Chronic pain can also affect the roles people have in their family. They may miss out on typical family activities, causing guilt.

Central sensitization is also associated with cognitive deficits, such as poor concentration and poor short-term memory. Central sensitization also corresponds with increased levels of emotional distress, particularly anxiety (Yunus, 2007). Coppieters et al. (2015) demonstrated significant cognitive impairment and decreased quality of life measures in patients with centrally sensitized pain.

Sleep Changes

Oliver and Taylor (2001) estimate that 60% to 80% of patients with pain experience trouble falling asleep and/or staying asleep. Disrupted sleep causes fatigue and behavioral irritation that can be difficult to tolerate over time. For those who become unable to work, the stress and worry about their financial future further aggravate their sleep disruption/problems with insomnia. Insomnia may be aggravated by compulsive and intrusive thoughts.

Impact of Pain on Work

Chronic pain can impact fine motor coordination, finger dexterity and manual dexterity, as well as cause other changes in worker-trait function levels from pre- to post-injury. Dexterities and coordination of the upper extremities are critical to even sedentary work. Post-injury testing in individuals with chronic pain may also reveal loss of general reasoning ability, concentration, verbal reasoning, numerical ability, and clerical perception; all factors deemed important to vocational capacity.

It is important to note that the purpose of vocational testing is to compare an individual's current performance with their past performance as documented by their education, training, experience, and the standard worker trait factors associated with that history. Current performance is likely affected by the sequelae of disability, including pain. An assessment of vocational potential and earning capacity requires an examination of a complex interplay of factors. It is an evaluation wherein aptitudes, skills, and abilities must be considered as a whole in determining an individual's human capital in the competitive labor market. As with all markets, the supply of skills and abilities must be balanced by a demand for those skills and abilities given the individual's current manipulative, mental, and physical limitations. This is particularly true in vocational evaluation with regard to the foundation provided by objective and standardized testing.

Intersubjective Communication of Chronic Pain

"Measure What You Can, And Make Measurable That Which You Cannot."

Galileo Galilei, Early 17th Century

Most life care planners and case managers are familiar with the visual analog pain scale, which has been used extensively, both in verbal description as well as facial expression analogues. References to this scale appear in nearly every medical and therapy record regarding pain. The near universality of this simple 10-point scale speaks to its acceptability as a bridge between the subjective, the intersubjective, and the objective description of the interference of pain in functional activities. An example of the analog scale can be found in Appendix A.

There are other instruments which can be used to measure the impact of pain on daily activities. Two examples include the *Functional Capacity Checklist* (Dillman & Burke, 1984), which can be found in Appendix B of this article and the Pain Disability Questionnaire, published in the *AMA Guides to the Evaluation of Permanent Impairment*, 6th edition (2008), found in Appendix C of this article. These instruments can be useful in understanding an individual's experience of pain and the impact of pain upon each person's individual daily function.

Alternative Chronic Pain Treatment

Chronic pain does not always get better on its own and there is a myriad of ways to attempt to treat pain. Some of these treatments include "traditional" medical management including medication management and interventional procedures. It is beyond the scope of this article to discuss these treatments. There are also treatments to chronic pain that may be considered "alternative" treatments, which will be briefly discussed here.

Cannabinoids are showing some promise in chronic pain treatment research (Boychuk et al., 2015). A 2011 review of randomized controlled studies of cannabinoids for treatment of chronic non-cancer pain found significant effects on pain relief as well as significant improvements in sleep. Most of the studies were of neuropathic pain, with one study each of fibromyalgia and rheumatoid arthritis which reported positive results with no serious adverse effects (Lynch & Campbell, 2011). A 2014 survey by the National Pain Foundation of Fibromyalgia Patients found that 62% of those who tried marijuana said it was very effective at treating their pain symptoms, 33% said it helped a little and only 5% said it did not help at all (National Pain Report, 2019). Medical cannabis use is also associated with decreased opiate medication use in a retrospective cross-sectional survey of patients with chronic pain (Boehnke et al., 2016).

In a survey of 100 medical marijuana patients who were returning for their annual recertification in Hawaii, 97% used marijuana primarily for relief of chronic pain. They reported an average 64 percent decrease in pain – a decrease on a 10-point pain scale from 7.8 to 2.8. Half also reported relief from

stress and anxiety, 45% reported insomnia relief, and 71% reported no negative side effects. Some of the patients reported that they were able to reduce or eliminate their use of opioids (Webb & Webb, 2014). In a 2015 review of controlled studies of cannabinoids in the treatment of chronic neuropathic pain, the authors concluded that cannabinoids provided significant pain relief in chronic neuropathic pain in conditions where other treatments did not work, with only minor side effects reported (Boychuk et al., 2016).

Chronic pain can also be somewhat responsive to such therapies as attention management, cognitive restructuring, and varieties of cognitive behavioral therapy (CBT) (Elomaa et al., 2009). Non-medication therapies, such as relaxation techniques, self-regulation therapies, tai chi, acupuncture, TENS, yoga, Qigong, structured exercise, massage, aqua therapy, guided imagery and biofeedback have shown promise in reducing chronic pain and allowing chronic pain sufferers to reclaim their productive lives. With any treatment, however, the longer treatment is delayed, the harder it may be to alleviate.

Conclusions

Chronic pain involves complex changes in the brain and nervous system that lead to dysfunction. The underlying mechanisms of chronic pain may be difficult to detect. Assessment and treatment of chronic pain should address all dimensions of the biopsychosocial experience. While complete relief and cure may not often be obtainable, much can be done to mitigate effects or to focus on function. For example, chronic pain treatment often focuses on empowering the individual to manage the pain using positive coping skills, lifestyle changes and use of medical treatments. These issues are important to life care planners in developing the proper foundational questions for care providers and properly including the degree of supportive assistance needed to restore the individual to an effective and efficient lifestyle.

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Online Pain Resources

- <https://www.webmd.com/pain-management/chronic-pain-syndrome-overview#1>
- <https://www.ninds.nih.gov/Disorders/All-Disorders/Central-Pain-Syndrome-Information-Page>
- www.instituteforchronicpain.org/understanding-chronic-pain/what-is-chronic-pain-syndrome
- <https://www.instituteforchronicpain.org/understanding-chronic-pain/what-is-chronic-pain/central-sensitization>
- www.instituteforchronicpain.org/understanding-chronic-pain/complications
- <https://www.painmanagementdirectory.com/posts/marijuana-vs-opioids-for-pain-420>

www.ncbi.nlm.nih.gov/pmc/article/PMC324308/
www.nationalpainreport.com/marijuana-rated-most-effective-for-treating-fibromyalgia-8823638.html
<https://www.paintreatmentdirectory.com/posts/marijuana-vs-opioids-for-pain-covid-19-update>
<https://stanfordhealthcare.org/medical-conditions/pain/pain/treatments/non-pharmacological-pain-management.html>

<https://www.drugs.com/cg/non-pharmacological-pain-management-therapies-for-adults.html>
<https://www.nccih.nih.gov/health/tai-chi-and-qi-gong-in-depth>
<https://medlineplus.gov/nondrugpainmanagement.html>
<https://www.instituteforchronicpain.org/blog/item/152-55stress-inflammation-and-chronic-pain>

Appendix A

COMPARATIVE PAIN SCALE CHART (Pain Assessment Tool)

										
0 Pain Free	1 Very Mild	2 Discomforting	3 Tolerable	4 Distressing	5 Very Distressing	6 Intense	7 Very Intense	8 Utterly Horrible	9 Excruciating Unbearable	10 Unimaginable Unspeakable
No Pain	Minor Pain			Moderate Pain			Severe Pain			
Feeling perfectly normal	Nagging, annoying, but doesn't interfere with most daily living activities. Patient able to adapt to pain psychologically and with medication or devices such as cushions.			Interferes significantly with daily living activities. Requires lifestyle changes but patient remains independent. Patient unable to adapt pain.			Disabling; unable to perform daily living activities. Unable to engage in normal activities. Patient is disabled and unable to function independently.			

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Appendix B

For each of the questions choose one of the following responses for how you are able to perform **after** the injury as compared to before.

(0) I don't know.
 (1) No change.
 (2) A little more difficult to do.
 (3) Can be done but **only with some pain**.
 (4) **Very difficult** to do.
 (5) **Impossible** to do or can do only with **great pain**.

Place your answers in the space provided to the left of each question.

Walking short distances (several yards)

_____ 1. within your own residence.
 _____ 2. over smooth ground outdoors.
 _____ 3. over uneven ground.
 _____ 4. on gravel.
 _____ 5. on pavement.
 _____ 6. up a ramp.
 _____ 7. down a ramp.
 _____ 8. Sitting on a soft surface that moves, like a car or truck seat.
 _____ 9. Standing, moving your feet occasionally, as you would if you were waiting in line.

Lifting relatively heavy objects (like a small child, a chair, or a portable television set)

_____ 10. from the floor.
 _____ 11. from waist level.
 _____ 12. up above your head (lifting up).
 _____ 13. from above your head (lifting down).

Bending from your waist from a standing position, to pick up something from the floor with your

_____ 14. right arm.
 _____ 15. left arm.

Climbing steps (5 or fewer)

_____ 18. going up.
 _____ 19. going down.

Reaching for an object above your head with your

_____ 20. right arm.
 _____ 21. left arm.
 _____ 22. Balancing on flat, small surface several inches from the ground, like a stool.

Focusing your eyes on reading material for an hour or more

_____ 23. at eye level.
 _____ 24. below eye level.
 _____ 25. above eye level.

Picking up and holding

_____ 26. a pen or pencil.
 _____ 27. a knife, fork or spoon.
 _____ 28. a hairbrush or comb.
 _____ 29. your house or car keys.
 _____ 30. stamps (loose).
 _____ 31. coins.
 _____ 32. Pulling a stopper out of a bottle.

Walking moderate distances (several hundred yards)

_____ 33. over smooth ground outdoors.
 _____ 34. over uneven ground.

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Appendix C

Pain Disability Questionnaire

The Pain Disability Questionnaire is used in Chapter 3 Pain (6th ed, 43-44) and Chapter 17 Spine (6th ed, 599-600). The format provided utilizes a centimeter scale to score, however the size in the *Guides* does not correspond with the same scale. An alternative approach (illustrated below) provides easily administered and scored numerical scales.

Patient Name _____ Date _____

Instructions: These questions ask your views about how your pain now affects how you function in everyday activities. Please answer every question and mark the ONE number on EACH scale that best describes how you feel.

1. Does your pain interfere with your normal work inside and outside the home?
 Work normally _____ Unable to work at all _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
2. Does your pain interfere with personal care (such as washing, dressing, etc)?
 Take care of myself completely _____ Need help with all my personal care _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
3. Does your pain interfere with your traveling?
 Travel anywhere I like _____ Only travel to see doctors _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
4. Does your pain affect your ability to sit or stand?
 No problems _____ Cannot sit /stand at all _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
5. Does your pain affect your ability to lift overhead, grasp objects, or reach for things?
 No problems _____ Cannot do at all _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
6. Does your pain affect your ability to lift objects off the floor, bend, stoop, or squat?
 No problems _____ Cannot do at all _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
7. Does your pain affect your ability to walk or run?
 No problems _____ Cannot walk/run at all _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
8. Has your income declined since your pain began?
 No decline _____ Lost all income _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
9. Do you have to take pain medication every day to control your pain?
 No medication needed _____ On pain medication throughout the day _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
10. Does your pain force you to see doctors much more often than before your pain began?
 Never see doctors _____ See doctors weekly _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
11. Does your pain interfere with your ability to see the people who are important to you as much as you would like?
 No problem _____ Never see them _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
12. Does your pain interfere with recreational activities and hobbies that are important to you?
 No interference _____ Total interference _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
13. Do you need the help of your family and friends to complete everyday tasks (including both work outside the home and housework) because of your pain?
 Never need help _____ Need help all the time _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
14. Do you now feel more depressed, tense, or anxious than before your pain began?
 No depression/tension _____ Severe depression / tension _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10
15. Are there emotional problems caused by your pain that interfere with your family, social and or work activities?
 No problems _____ Severe problems _____
 0 ----- 1 ----- 2 ----- 3 ----- 4 ----- 5 ----- 6 ----- 7 ----- 8 ----- 9 ----- 10

Anagnostis C, Gatchel RJ, Mayer TG. The Pain Disability Questionnaire: A New Psychometrically Sound Measure for Chronic Musculoskeletal Disorders. *Spine* 2004; 29 (20): 2290-2302.