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Chronic Pain: Physiological Foundations, Psychological Effects, Common Treatments, and New Directions

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Chronic Pain:

Physiological Foundations, Psychological Effects, Common Treatments, and New Directions

By
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An Honors Thesis Submitted in Partial Fulfillment of the
Requirements for Graduation from the
Western Oregon University Honors Program

Dr. Sara Budge,
Thesis Advisor

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Honors Program Director

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Abstract

Acute pain is categorized by a length of 3 to 6 months, is directly related to soft tissue damage, and gradually resolves as the injured tissues heal. Chronic pain is defined as any pain lasting longer than 12 weeks. Over 100 million Americans suffer from chronic pain, and the health care costs and productivity losses approach \$635 billion annually (Institute of Medicine Committee on Advancing Pain Research and Education, 2011). The lack of clear quality standards for ethical/legal use of opiates, the presence of individuals abusing the system, and the lack of updated, and involved public policy make finding a doctor willing to treat chronic pain quite difficult. During a personal struggle with chronic pain, I participated in a 10-week program consisting of education about chronic pain and common treatments, yoga and other strengthening and movement-oriented exercises, and recent research on chronic pain and corresponding treatments. I learned about many new, alternative ways to fix my body, reduce my pain, and help me live a better life. The purpose of this project is to bring awareness to the prevalence of chronic pain, the truth about current treatments, and education about alternative treatments.

Chronic Pain: Physiological Foundations, Psychological Effects, Common Treatments, and New Directions

During June of 2016, I began experiencing debilitating, constant pain throughout my lower back. No injuries or accidents seemed to be the cause and there was no easily identified reason I should be feeling severe pain. Over the course of a few months, I saw multiple doctors concerning my back pain. One suggested this was the result of normal aging, despite only being 20 years old. Others simply gave me a 2-day prescription of small doses of muscle relaxers.

Following months of failed attempts to get some pain relief, a doctor finally took an x-ray and found that I have a mild case of scoliosis. Scoliosis itself does not typically cause pain, but the lack of stability in my spine caused my muscles to take the brunt of my hard, physical work and caused me immense pain. Surgery would be too risky in my case, as the curve of my spine begins in the lumbar region.

I was prescribed a long list of prescriptions medications and began opioid therapy. Eventually, I was referred to a clinic that worked with chronic pain patients. I participated in a 10-week program consisting of education about chronic pain and different common treatments, Acceptance and Commitment Therapy (ACT), and yoga/other strengthening and movement-oriented exercises. The onset of my chronic pain and my journey through treatment made me aware of the prevalence of chronic pain in the United States and the efforts in the medical field to find adequate treatments for chronic pain.

Chronic pain is a pervasive health issue that many people around the world experience, which exacts major costs on personal quality of life and society.

According to the National Institute on Drug Abuse, over 100 million Americans suffer from chronic pain, and the Institute of Medicine Committee on Advancing Pain Research and Education report that health care costs and work productivity losses approach \$635 billion annually (Institute of Medicine, 2011).

Pain can manifest in many forms and is classified as acute or chronic. Acute pain is expected during the recovery period following injury. When pain persists longer than 12 weeks and impedes daily function it is referred to as chronic pain. Although the source of the pain may be similar, chronic pain states are different from acute pain in underlying mechanisms, symptomatology, and treatment responses. Recent research on human and animal subjects have shown that the brain undergoes structural changes to the reward circuits within the brain when experiencing chronic pain, affecting functionality and activity in those sites (Navratilova et al., 2016). As pain progresses from acute to chronic, pain sensitivity is exacerbated by negative emotional states and comorbidities such as depression, anxiety, anhedonia, sleep disturbance, decision-making abnormalities, and suicide risk are common (Navratilova et al., 2016). Many researchers have uncovered correlations between chronic pain and poor perception of health, lower functional capacity, poor social relationships, isolation, financial difficulties, and higher healthcare expenses (Butchart et al., 2009; Morasco et al., 2011).

In addition to the physical pain and comorbid negative affect, many chronic pain patients also encounter stigma associated to chronic pain patients. Often resulting from cases where medical imaging is unable to locate a specific source of the pain, stigma surrounding chronic pain patients is manifest in judgement, blame,

or disbelief from health care professionals, the larger community, friends and family, and the workplace (Slade et al., 2009). Judgements assuming malingering or pursuit of some gain leave chronic pain patients hesitant to seek care, creating an additional roadblock to pain relief.

As the societal costs grow, the motivation to find adequate relief from chronic pain is widespread. With the establishment of the “Decade of Pain Control and Research” in 2000, the use of opioids to treat pain became more commonplace, and opioids continue to be the most common treatment used to treat chronic pain (Krashin et al., 2013). This has resulted in a growing epidemic of opioid use in the United States and has encouraged research into alternative treatments for chronic pain. Psychological methods of cognitive and behavioral therapy have been used to treat chronic pain and comorbid affective disorders. In addition, research into medical cannabis has added to the progress toward pharmaceutical-free relief of chronic pain. Findings suggest that increasing safe access to medical cannabis may reduce the growing problematic use of pharmaceutical opiates, and can reduce harms associated with addiction (Lucas, 2012).

While the array of treatment options for chronic pain patients is expanding, many of the common treatments for pain are often inadequate in isolation, and make it hard to manage comorbid conditions in addition to the source of pain. The treatment methods covered are those with the largest bodies of available research. Through analysis of the structural brain changes resulting from chronic pain, as well as various common treatments, it is clear that the best approach to chronic pain

treatment is interdisciplinary, integrating multiple treatment approaches to address chronic pain.

Comorbidity

Chronic pain can have many possible sources and many different manifestations. For many cases, nonmalignant pain originating from soft tissues or neuropathy cannot be seen with diagnostic imaging techniques. The lack of objective evidence can delegitimize the suffering of the patient: many chronic pain patients are labeled as suffering from psychosomatic symptoms (symptoms originating from a psychological factor), implying that the physical symptoms are not real (Ablin & Buskila, 2012). Portenoy et al. (2004) argue that although pain originating exclusively from psychological factors does occur, it is still less prevalent than pain associated with body processes that are influenced by psychosocial factors and comorbid psychiatric conditions. Attributing pain to psychosomatic sources is an incomplete answer without established cause.

The incorrect attribution of pain to psychosomatic sources is further complicated by the actual prevalence of psychological disorders co-occurring with chronic pain. Asmundson and Katz (2012) found that among adults from 17 countries, those with chronic back or neck pain are two or three times more likely to have experienced panic disorder, agoraphobia, or social anxiety disorder, and three times more likely to have generalized anxiety disorder or post-traumatic stress disorder. Depression has also been shown to increase pain intensity and duration, as well as negatively affect pain treatment outcomes (Garland et al., 2014). These results were corroborated by findings that chronic pain patients with anxiety or

depression tend to have more physical symptoms and that, as the quantity of symptoms increases, so does the likelihood of an anxiety disorder or depression (Kroenke et al., 1994). Gureje et al. (2001) found this same pattern cross-culturally. Chronic pain patients are also three times as likely to experience suicidal ideation as compared to the general population (Tang & Crane, 2006). These findings support the notion that chronic pain and psychological disorders often co-occur. The frequent co-occurrence is likely due to the chronic pain and psychiatric symptoms influence one another in a mutually maintaining way, in that the pain exacerbates the psychiatric symptoms and the psychiatric symptoms exacerbate the pain, or that there is a third variable that acts on both the pain and mental health. These possibilities are not mutually exclusive, making it harder to find the true driving force. The truth is that the source of chronic pain is much too complex to be considered simply psychosomatic.

The brain is integral to the experience of pain and to responses to pain. Neuroimaging has provided a lot of information regarding how pain is processed in the brain and the role that psychological disorders play in chronic pain. Navratilova and colleagues (2016) used neuroimaging to investigate changes in brain processing resulting from chronic pain, hoping to find a link between chronic pain and depression, anxiety, anhedonia, sleep disturbance, and risk of suicide. The hypothesis that motivation circuits were affected by chronic pain is based on the concept that pain is a homeostatic emotion that causes autonomic responses similar to other aversive states like hunger or fear.

Researchers found that structural and functional changes occur in emotional and reward circuitries in the brain and that chronic pain patients often process pain in these affective circuits to a greater extent than those suffering from acute pain with an ultimate recovery (Navratilova, et al., 2016). The findings highlight that as pain persists, emotional circuits in the brain are changed, indicating a link between the high incidence of chronic pain patients experiencing comorbid affective disorders. Some patients truly do have comorbid psychiatric symptoms, while others suffer from chronic widespread pain, yet do not suffer from psychiatric symptoms. In individuals that do not experience comorbid psychiatric symptoms, their intact mental health seems to be almost protective regarding their general condition (Ablin & Baskila, 2012).

In response to the affirming evidence of the comorbidity of psychological disorders and chronic pain, the current literature recognizes that “pain is a complex perceptual experience determined by sensory as well as psychological and social influences” (Asmundson & Katz, 2009, p. 889). In order to examine the complexities of pain and comorbid disorders, a biopsychosocial model is used to better understand health and illness through analyzing the complex interactions between biological, psychological, and social factors (Gatchel, 2014). The biopsychosocial approach asserts that to comprehensively assess a patient’s pain, it is necessary to examine the interrelationships between biological changes, psychological well-being, and sociocultural environment (Gatchel, 2004).

Opioid Treatment

For any pain not managed with over the counter medications such as aspirin, ibuprofen, or acetaminophen, the common next option is treatment with opioids. According to Bailey and Vowles (2015), “chronic pain is particularly challenging to manage when it comes to opioids because most individuals will build tolerance to the drug and any reduction in use is likely to produce withdrawal symptoms (indicating dependence)” (p. 342). This creates the potential for significant increases in opioid dependence based on predictions that the prevalence of chronic pain will grow as the population ages.

The growth of opioid treatment began when President Clinton signed a law dedicating the decade from 2000 to 2010 the “Decade of Pain Control and Research” (Lippe, 2000). This decade saw the inclusion of pain as a vital sign and contributed to a major increase in the use of opioid treatment resulting from a strong moral argument to treat all chronic pain with opioids when other treatments failed to provide adequate relief (Krashin et al., 2013). Many efficacy trials indicated that opioid treatment is useful in reducing the intensity of neuropathic, nociceptive, and musculoskeletal pain experience over a period of 6 months or less. This combination of factors led to a rise in opioid prescriptions, as well as the prevalence of opioid misuse, with misuse being defined as “use of a medication (for a medical purpose) other than as directed or indicated, whether willful or unintentional, and whether harm results or not” (Denisco et al., 2008). While the number of cases of opioid misuse has leveled off in the past several years, the 2006 National Survey of Drug Use and Health (NSDUH) shows increasing mortality associated with opioids,

resulting from the increased availability of the medications, rather than misuse by those prescribed them (SAMHSA, 2007). The NSDUH reports that 55.7% of those who misused opioids said they received the medication from friends or family, and that 80.7% reported that the friend or relative had obtained the opioids from one doctor. Only 3.9% of respondents reported obtaining the drug from a drug dealer or stranger, and 0.1% reported buying the drug from the Internet.

Chronic pain patients typically respond well to opioids initially, but regular use is associated with long term complications including dependence, addiction, and withdrawal. The DSM-V (APA, 2013) defines substance dependence as a combination of three or more of the following symptoms within a 12-month period: tolerance to the effects of a substance, withdrawal upon abrupt cessation, using larger amounts than intended, spending a great deal of time on the substance, limiting social, occupational, or recreational activities because of substance use, and use despite psychological or physical problems from the substance. The American Pain Society (2002) defined addiction as one or more of the following symptoms: impaired control regarding the use of the drug, compulsive drug use, continued drug use despite consequences, and unmanageable drug craving.

According to the Center for Disease Control and Prevention, in 2014 approximately 2 million Americans abused or were dependent on prescription opioids. In 2016 a total of 42,249 individuals died of opioid overdose, approximately 115 individuals each day (CDC, 2017). Of the long-term users of prescription opioids for chronic pain, the CDC reports that as many as 25% struggle with addiction. The risk of dependence or death, coupled with the short-term success of opioid

treatment, creates a dilemma for chronic pain patients and medical providers alike. In the interest of safety, opioids began to be viewed as a form of comfort care for patients who have exhausted all other treatment options and the prospect of recovery (Krashin et al., 2013).

While the use of opioids can be costly on an individual basis, resulting in addiction or dependence, the costs to the larger society are a close rival. According to Birnbaum and colleagues (2011), workplace, health care, and criminal justice costs totaled \$55.7 billion in 2007. Workplace costs manifest in lost productivity, premature death, lost wages/employment, presenteeism, and absenteeism. In 2007 the workplace costs totaled \$25.6 billion, which is 46% of total societal costs. Health care costs accounted for \$25 billion, which consisted mainly of excess medical and prescription costs. Criminal justice costs occurred in the form of correctional facilities and police costs, totaling \$5.1 billion (Birnbaum et al., 2011).

Ballantyne and Shin (2008) found that opioid treatment beyond three months is not associated with sustained improvement in pain or function for most patients, and that opioids are actually associated with worse functional and occupational outcomes in cases of musculoskeletal pain. The collective findings that addiction, overdose, and prescription diversion (medications not being taken by the person prescribed them, often sold or given to others) are common results of opioid therapy left the medical field and public policy makers struggling to address chronic pain patients. The major challenge is to minimize the likelihood of opioid misuse, without limiting the legitimate use of opioid medications. Attempts to control abuse can result in discouraging treatment and restricting the medical profession

(Rosenblum et al., 2008). Hesitancy to prescribe opioids also results from the perceived and real risks of legal scrutiny regarding the prescribing of a controlled substance (Rosenblum et al., 2008).

The current solution to the dilemma regarding opioid treatment is to identify individuals who are at a higher risk of abuse, allowing those with low risk to receive the medication while protecting those who are at high risk of addiction. A majority of chronic pain patients who are exposed to chronic opioid analgesic therapy will not develop addiction or abusive behaviors (3.27%, compared to 10% in the general population), while the prevalence of patients who will demonstrate aberrant drug-related behaviors (including not having prescribed medicines in urine, having unprescribed drugs in urine, or other behaviors indicating abuse of or diversion of opioids) is higher (11.5%) (Fishbain et al., 2008). If chronic pain patients are screened for current or past history of alcohol or illicit drug use, abuse, or addiction, the percentage of chronic pain patients misusing opioids is much lower (3.27% in non-selected groups, as opposed to 0.19% in preselected groups) (Fishbain et al., 2008). These findings highlight that the concept of de novo addiction (addiction without a previous history of addiction) is rare with chronic opioid analgesic therapy.

While evidence does support the efficacy of opioid treatment, it is important to be aware that the results indicate short term success, and do not highlight long-term risks. It is also important to note that studies regarding opioid therapy lacked inclusion of a control group given a placebo, a control with no opioid therapy, or a control using a different, nonopioid therapy (Dowell et al., 2016). For this reason,

opioid prescription should not be considered the gold standard. Treatment for chronic pain should include other psychosocial interventions and possibly other physical treatments to target the pain from multiple sides of the biopsychosocial framework (Bailey & Vowles, 2015). Dowell et al. (2016) compiled a list of recommendations regarding treatment of chronic pain including beginning with nonpharmacological therapy or nonopioid pharmacologic therapy, establishing treatment goals for pain and function, evaluating benefits and harms with the patient, when beginning opioid therapy, begin with the lowest effective dose, and considering periodic urine drug testing to assess possible misuse or diversion of medications. In addition to these recommendations, multidisciplinary therapies can help reduce pain and improve function more effectively than single modality treatments (Dowell et al., 2016).

Medical Use of Cannabis

Beginning in 2015 the legalization of medical marijuana has swept across the United States (Hill, 2015). Legalization facilitates access to marijuana as a treatment for a variety of medical conditions. Medical marijuana has also been decriminalized in Washington, Colorado, Alaska, Oregon, and Washington D.C. Meanwhile, marijuana is still federally illegal: the U.S. Drug Enforcement Administration states that until the FDA approves its use, cannabis is not considered a legitimate medication. The DEA considers marijuana to be a precursor to abuse of other drugs, and to be a danger to the user and to others. This is countered by research that shows it is not cannabis itself that leads to further drug use, but rather the combination of family history/predisposition to psychoactive substance use, early

introduction to cannabis, more rapid progress towards regular use, frequenting deviant environments, and availability of various substances from the same dealers (Lucas, 2012). Despite arguments for or against its use, marijuana is the most commonly used illicit drug in the United States, with 12% of people aged 12 years or older reporting use in the last year. A declining perception of risk associated with the spread of legalization has increased rates of use among teens (Hill, 2015).

While differentiated in name, medical and recreational marijuana are identical in form. Both are dried material from the *Cannabis* plant, consisting of tetrahydrocannabinol (THC), cannabidiol (CBD), and other cannabinoids (Hill, 2015). In contrast to THC, the psychoactive component of marijuana, CBD does not involve the reward center in the brain, and has limited misuse or diversion potential. CBD also has very low risks of causing mortality, reducing concerns regarding potential overdose (Hurd, 2017). Human and animal studies show that CBD can moderate anxiety via activation of the amygdala during negative emotional processing (Hurd, 2017).

Medical marijuana is purchased from dispensaries in a variety of preparations or grown by patients or licensed growers (because of its status as federally illegal, medical marijuana cannot be obtained in pharmacies). Cannabinoids can be administered orally, sublingually, or topically, smoked, inhaled, mixed with food, or made into tea. Prescribed cannabinoids come in the form of dronabinol capsules, nabilone capsules, and oromucosal spray nabiximols (Whiting et al., 2015).

Medical marijuana is commonly used to mitigate nausea and vomiting due to chemotherapy, appetite stimulation in HIV/AIDS, chronic pain, spasticity due to multiple sclerosis, depression, anxiety disorder, sleep disorder, psychosis, intraocular pressure in glaucoma, and Tourette syndrome (Whiting et al., 2015). The efficacy of medical marijuana varies widely by affliction, but shows high efficacy for chronic pain, neuropathic pain, and spasticity due to multiple sclerosis (Hill, 2015). Compared with placebo, cannabinoids are associated with greater reduction in pain and a greater average reduction in numerical rating pain assessment (Whiting et al., 2015). The average number of patients who reported a reduction in pain of at least 30% was also greater with cannabinoids than with placebo, with smoking having the greatest beneficial effect. Comparisons of low THC cannabis and high THC cannabis report that both methods are effective at reducing pain, with no clear correlation between dose levels and pain relief (Lucas, 2012).

Common adverse reactions to marijuana use include asthenia, balance problems, confusion, dizziness, diarrhea, dry mouth, nausea, fatigue, euphoria, vomiting, disorientation, drowsiness, confusion, loss of balance, and hallucinations (Whiting et al., 2015). Marijuana also impairs short-term memory, motor coordination, and judgement, which double the risk of involvement in a motor vehicle crash while driving (Hill, 2015). Paranoid ideation and psychotic symptoms are rare, but can occur. Recent studies have found that occasional marijuana users undergo structural brain changes in the nucleus accumbens and the amygdala. In people younger than 20, brain development can be impaired, with regular marijuana use affecting functional connectivity and possibly declining IQ. Regular

marijuana use can also produce physical problems, including increased incidence of chronic bronchitis, increase rates of respiratory tract infections and pneumonia. There is also a potential link between regular marijuana use and heart attack, stroke, and peripheral vascular disease. Before beginning medical marijuana, patients should have exhausted other treatment options, and have no history of substance use disorder, psychotic disorder, unstable mood disorder, or anxiety disorder. Patients with conditions such as major depressive disorder, anxiety disorders, and viral upper respiratory tract infections may find that marijuana use exacerbates these conditions (Hill, 2015). Marijuana use comes with its own risks to assess, which must be balanced with potential medical benefits.

The typical adverse effects of marijuana use may be outweighed by its medical potential to treat many pain manifestations, and its potential benefits to reducing opioid dependence and deaths. When used in conjunction with opiates, cannabinoids can lead to a greater cumulative relief of pain, which can result in a reduction in the use of opiate and associated side effects (Cichewicz et al., 1999). Multiple studies indicate that cannabinoid receptors may interrupt signaling in the opioid receptor systems, affecting craving for opiates and withdrawal severity (Lucas, 2012). States with legalized marijuana laws have reported a reduction in opioid use as evidenced by lower number of prescription opioid painkillers, reduced number of opioid overdoses, and lower opioid-positive screens associated with car fatalities (Hurd, 2017). The resulting public health benefits from reductions in opioid use and treatment of chronic pain could include lower rates of alcohol-related automobile accidents, reduced domestic violence, reductions in drug-related

crimes, and reduced drug and alcohol-related morbidity and mortality (Lucas, 2012). Further than having an impact on patient pain levels and overall quality of life, medical marijuana has the potential to reduce overall morbidity and mortality associated with pharmaceutical opiates and opioid addiction.

Acceptance and Commitment Therapy

Chronic diseases and long-term conditions such as diabetes, HIV, cancer, or brain injury have a detrimental effect on quality of life, mood, and overall well-being. This similarity indicates that well-being is affected by factors that are not associated with the specific ailment, but rather perceptions of the illness, coping strategies, self-efficacy, psychological flexibility, and emotion regulation (Graham et al., 2016). Psychological flexibility is defined as being open, aware, and in contact with the present moment, and flexibly engaging in behaviors which facilitate overarching life goals. This psychological flexibility involves experiential acceptance, contact with the present moment, self-as-context, values, and committed action. Distress is considered a normal part of being human, manifest in self-doubt, fear, uncertainty, self-criticism, negative thinking, and dysphoria. This is the theoretical basis for Acceptance and Commitment Therapy (ACT), a newer form of Cognitive Behavior Therapy that see one's beliefs as the central process involved in therapy. ACT does not aim to reduce distress per se, but rather to work through distress and focus on values and goals rather than on problems. Individuals are encouraged to allow their negative feelings, but try to identify what they can control and make changes where they can (Barrett & Chang, 2016).

Research around ACT proliferated in the past decade, and indicates that ACT is associated with significant changes in acceptance, values-based action, and mindfulness (Scott et al., 2016). As predicted, measures of committed action have shown correlation with emotional well-being and general daily functioning (Scott et al., 2016). Improvements have also been observed regarding pain, physical and social functioning, and depression. Barrett and Chang (2016) found lower depression, higher overall improvement ratings, higher pain acceptance, and no change in pain severity or disability ratings.

While the total number of studies investigating ACT is low, the present literature indicates a negative correlation between sample size and effect size, meaning that the positive results found could be due to chance and small sample sizes (Graham et al., 2016). Publishing bias likely keeps null results from being published, furthering possible bias in the overall literature. The subjective nature of the qualities that ACT targets require self-report from participants, which could also skew results (Scott et al., 2016).

The Mid Valley Pain Clinic in Salem, Oregon serves to provide chronic pain sufferers with pain management as well as treatment of emotional challenges associated with chronic pain, and to educate patients regarding medical and non-medical resources available to them. Treatment is offered in a 10-week course format, where patients meet for a 3-hour session once a week. The 10-week program includes a review of medications to assure optimal treatment, pain management techniques to improve quality of life, setting goals to move from being a chronic pain sufferer to a person living with chronic pain, training in relaxation,

movement, coping, and managing pain, education about pain, medication, and treatments, and the opportunity to share experiences and support with other chronic pain sufferers.

Each weekly session begins with 1.5 hours of yoga, breathing, and mindfulness exercises. Following movement therapy, the group moves to a classroom for education regarding chronic pain and therapeutic activities. Following the initial meeting, each week patients are assigned a chapter of reading from *Living Beyond Your Pain: Using Acceptance and Commitment Therapy to Ease Chronic Pain* (Dahl & Lundgren, 2006; See Appendix A).

The first meeting begins with education regarding the distinction between acute and chronic pain and an introduction to mindfulness. Mindfulness requires focusing one's attention on what the individual is experiencing physically, mentally, and emotionally in the present moment. The session continues with an overview of relaxation techniques (deep, abdominal breathing, progressive muscle relaxation, guided imagery, and biofeedback), and posture/body mechanics. The group collectively participates in guided imagery led by the instructor, and practice proper posture for various everyday situations: driving, cleaning, lifting, and laying down.

The second meeting begins with a look at the serenity creed: "Grant me the courage to change the things I can, the serenity to accept the things I cannot change, and the wisdom to know the difference," (Dahl & Lundgren, 2006). This is followed with an explanation of the "pain chain": actual physical pain sensation, the mind's reaction to the pain, avoidance or escape behaviors based on the mind's reaction, and long-term choices based on avoidance and escape behaviors (Dahl & Lundgren,

2006). Each participant establishes values that are important to them, and learn to recognize and halt avoidance behaviors. Instructions for the use of ice and heat treatments for pain are provided. A large portion of the meeting focuses on communicating with primary care physicians regarding pain treatment, and explaining the Pain Patient Bill of Rights (See Appendix B).

The third weekly meeting covers information regarding opioid treatment and a brief overview of medical marijuana. The opioid treatment portion addresses the effects of opiates and common side effects. Patients are informed that long term treatment with opiates often requires a material risk notice for controlled substances for intractable pain contract between the patient and doctor. Distinctions are explored between addiction and dependence, and patients are educated regarding aberrant drug-taking behaviors and how to avoid them. Education regarding medical marijuana explains that many doctors are governed by federal laws, and for this reason many primary care physicians do not condone medical marijuana, nor can they prescribe it. The class closes with patients considering which values are meaningful to them in their personal lives.

The fourth weekly meeting reviews the distinction between dependence and addiction, and focuses on values and goals. The class goes over the importance of setting goals and how to set achievable goals. With the values determined in the previous meeting, patients work through how to turn their aspirations into progression toward their personal values.

The fifth weekly meeting focuses on the power of thoughts. ACT is built on the concept that an individual is not their thoughts (Dahl & Lundgren, 2006). Many

patients live with the implicit attitude that they are a person with chronic pain, and this concept governs their lives. Cognitive fusion refers to the blurred lines between one's thoughts and one's sense of self. The group practices observing thoughts and separating themselves from their thoughts.

The sixth weekly meeting dives deeper into mindfulness. Multiple relaxation techniques are employed in an effort to practice mindfulness: repetitive motion, word repetition, meditation, guided imagery, and deep breathing. The remainder of the class explores the three senses of self that are identified in ACT: the conceptualized self, the self as ongoing awareness, and the observer self. The conceptualized self is the mentally defined concept an individual has of who they are, the self as ongoing awareness refers to one's sense of personal history, and the observer self is always with the individual and will always be (Dahl & Lundgren, 2006).

The seventh weekly meeting addresses acceptance and willingness. Acceptance as defined by ACT refers to the act by which one allows oneself to willingly engage their pain (Dahl & Lundgren, 2006). Allowing pain to be and focusing elsewhere allows one to focus on where they want to be and how to get there. The remainder of the class involves imagining common difficult scenarios from individual's lives, and practicing using mindfulness to get through these situations.

The eighth weekly meeting centers around committed action. Following acceptance of pain, one can begin shaping the direction of your life instead of letting pain be in control (Dahl & Lundgren, 2006). Acceptance offers a change in

perspective, but commitment is required to enact the values that are important to the individual. Acceptance allows the individual to recognize that they are in control, and commitment is what it takes to get where one wants to be (Dahl & Lundgren, 2006).

The ninth weekly meeting explores alternative treatment methods. Treatment methods covered included relaxation therapy, massage therapy, chiropractic, aromatherapy, and acupuncture. Contact information is provided for local providers of the treatment methods covered.

The final weekly session had patients create a unique, comprehensive pain plan including as many treatment options as the patient chose from the “Pain Management Shopping List”:

- Guided imagery
- Distraction
- Continued group therapy
- Meditation
- Relaxation techniques
- Continue to identify values and goals to reach them
- Give a hug daily
- Three deep breaths twice a day
- Continue to use effective communication techniques with my doctor/build a better relationship with my doctor
- Work on developing good sleep habits
- Get more exposure to sunlight

- Take hot baths/showers
- Eliminate or decrease alcohol
- Eliminate or decrease caffeine
- Eliminate or decrease smoking
- Explore dietary supplements
- Work on posture and body position
- Walk 5 to 15 minutes a day
- Local anesthetic creams
- Ice
- Monitor and treat medication side effects
- Aromatherapy
- Pacing
- Community volunteering
- Prayer or spirituality
- Journaling or art
- Keep a pain log
- Using touch or vibration
- Chiropractic
- Acupuncture
- Continued individual therapy
- Maintain healthy body weight

Following completion of the 10-week program, participants were awarded certificates of completion (See Appendix D).

Discussion

Chronic pain can impair work, social, recreational, and household duties. It can have a negative impact on financial security, familial, and marital relationships which directly affects quality of life. It is clear that treatment is necessary for chronic pain sufferers, but the current common treatments are often inadequate in isolation and may cause more harm than good.

The dramatic increase in opioid misuse and addictions resulting from increases in opioid prescriptions shows that opioid treatment is not an adequate long-term treatment. Tolerance is quick to develop, and reductions in use produce withdrawal symptoms. Even at its best, opioid treatment does not provide true relief from all symptoms of chronic pain. As tolerance to the medication increases, dosage can only safely increase to a certain degree, ultimately leaving the patient with an addiction and without adequate pain relief. In addition, opioids do not address the psychosocial issues that are often associated with chronic pain.

Research into the efficacy of medical marijuana treatment shows potential for successfully treating chronic pain, but many questions remain unanswered. Research into the medicinal benefits of cannabis is relatively new and the existent literature is limited due to a lack of controlled studies. Like opioids, cannabis has numerous side effects, though they are likely less dangerous and can be mitigated. Side effects such as memory loss, depression, and anxiety responses require further investigation into long-term effects.

The prevalence of studies investigating ACT is constantly growing, but is still in its infancy. Compared to other common treatments for common pain, ACT has the

fewest potential risks and is the only one to address the psychosocial ailments that commonly co-occur with chronic pain. While ACT does address psychosocial factors, physical pain relief may also be necessary in some cases. ACT is limited in that treatment is expensive, access is limited, and success requires time and commitment on the part of the patient. By emphasizing a psychological approach, there is the risk of making both patients and physicians believe that pain is “all in their heads,” delegitimizing pain. Widespread implementation of ACT would require a cultural shift in how pain is perceived and how we think it should be treated.

Because chronic pain sufferers are a heterogeneous group, it is clear that personalized treatment regimens are needed. This heterogeneity coupled with the limits of current treatment methods indicate that the best treatment plan is one that is multidisciplinary. Dowell and colleagues (2016) recommend beginning the treatment process with nonpharmacological/non-opioid therapy, establishing treatment goals for pain level and level of functioning, and beginning with the lowest effective dose if opioid therapy is deemed appropriate. Biopsychosocial treatment approaches have been shown to improve chronic pain, while targeting all sources of distress/pain. While current treatments do show improvements, a multidisciplinary treatment is best at quickly and effectively reducing the negative effects from chronic pain.

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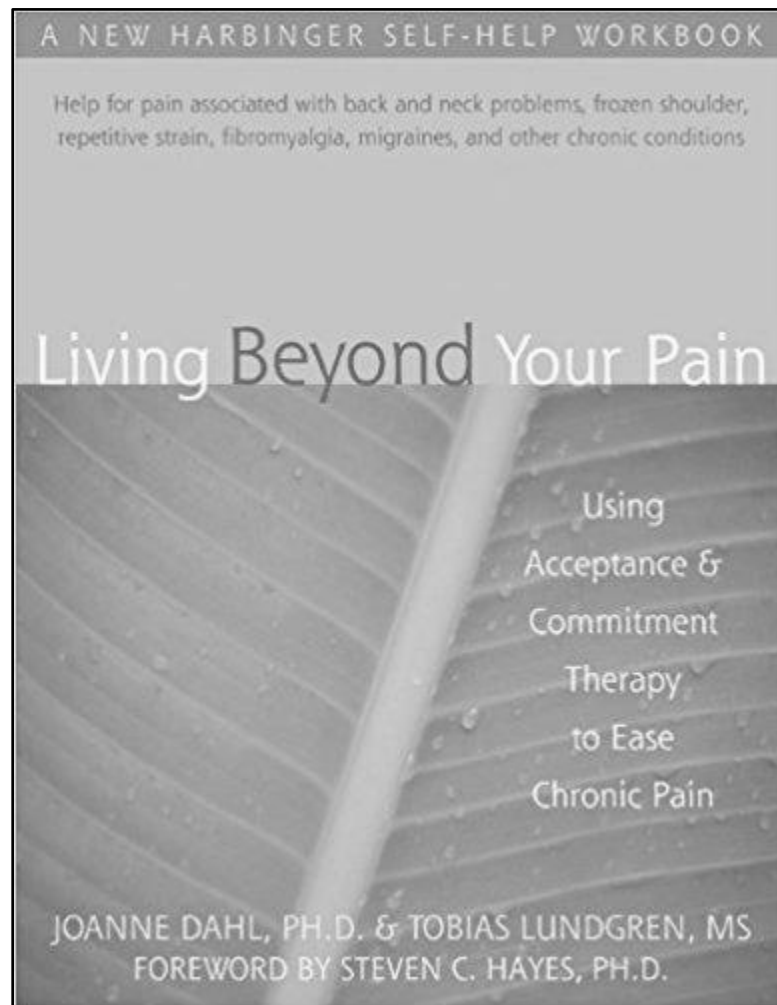
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Appendices

Appendix A



The 10-week course followed a book written by Joanne Dahl, *Living Beyond Your Pain: Using Acceptance and Commitment Therapy to Ease Chronic Pain*.

Appendix B



SYLLABUS: 10 WEEK CLASS

CONTROLLING, MANAGING, AND LIVING WITH CHRONIC PAIN

Beginning: _____ Ending: _____ Day Thursday Time 9:30am

Leader Erica Check-in appt _____ MD appt. _____ Rick appt. 11/18/2015

DATE	TOPIC/ACTIVITIES	NEXT WEEK'S PREP.
1:	Introductions, Housekeeping, How does staying focused on the pain reduce the pain? Acute v. Chronic Pain, Mindfulness, Breathing, Stress response	Read Introduction and Chapter 1, practice abdominal breathing
2:	Intro. To ACT, Serenity Creed, Communicating with your PCP, Mental Scripts, Avoidance Behaviors, Values Illness, Clean/ Sticky Pain.	Read Chapter 2, Exercise: Pain Chain
3:	Values, part 1—what is meaningful to you? Opiates: Effects, Side Effects, What you need to know.	Read Ch: 3. See how Values Statements might be worded. Work on translating dreams into Values.
4:	Values, part 2—translating dreams into Valued Directions, understanding goals. Dependence vs. Addiction.	Continue working on developing Values Statements and Compass. Read Ch 4
5:	Thoughts: Cognitive fusion, observing thoughts	Kick your Buts. Read Ch 5.
6:	More on Mindfulness. The self.	Practice mindful awareness. Read Ch 6
7:	Acceptance and willingness. Encountering the pain monster. Difficult situations.	Values and Goals exercise. Read Ch 7
8:	Committed Action. Valued Path exercise. Vital Actions. Exploring committed action for obstacles.	Values-goals-tasks-obstacles exercise. Read Ch 8
9:	Various topics.	Complete Values Action Plan Worksheet. Read Conclusion.
10:	Developing support system. Moving forward from here. Comprehensive Pain Plan. CELEBRATION.	KEEP UP THE GOOD WORK!

ATTENDANCE: If you will be absent for any class, please call to inform the clinic. Due to the volume of material presented, if you miss 2 sessions, you need to start the series again.

The 10-week course followed the above syllabus.

Appendix C

Pain Care Bill of Rights

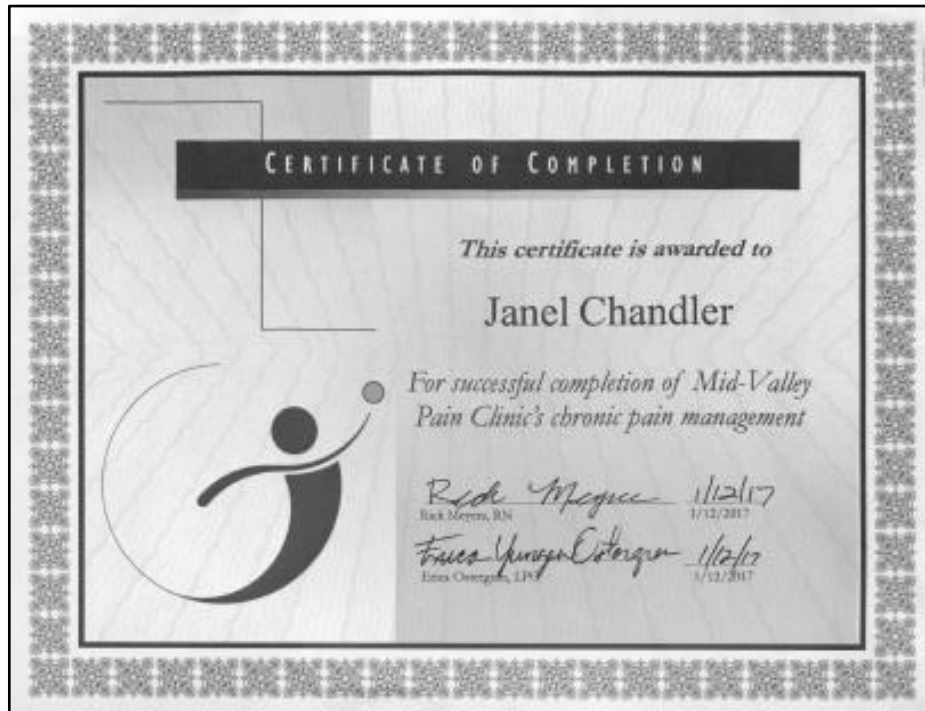
As a person with pain you have a right to:

- Have your report of pain taken seriously and be treated with dignity and respect by doctors, nurses, pharmacists, social workers, physician assistants and other healthcare professionals.
- Have your pain thoroughly assessed and promptly treated.
- Participate actively in decisions about how to manage your pain.
- Be informed and know your options; talk with your healthcare providers about your pain - possible causes, treatment options and the benefits, risks and cost of each choice.
- Have your pain reassessed regularly and your treatment adjusted if your pain has not been eased.
- Be referred to a pain specialist if your pain persists.
- Get clear and prompt answers to your questions, take time to make decisions, and refuse a particular type of treatment if you choose.

Mid • Valley Pain Clinic takes a holistic approach to pain management. No medications are prescribed or dispensed.

The Patient Bill of Rights.

Appendix D



Upon completion of the course, participants were awarded a certificate of completion.