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Review Article

Medicinal Marijuana's Mechanism of Action and Utility for Managing Low Back Pain

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Abstract

Chronic low back pain poses a significant global health challenge, affecting millions of individuals and contributing to substantial economic burdens. This article explores the complex pathophysiology of chronic pain, particularly low back pain, and delves into the limitations and challenges of conventional treatment approaches. The opioid epidemic has underscored the need for alternative and supplemental treatments, leading to the investigation of medicinal marijuana, specifically cannabinoids such as Tetrahydrocannabinol (THC) and Cannabidiol (CBD). The authors will discuss the intricate mechanisms of chronic pain, highlighting the role of nociceptive nerve fibers and the centralization of pain. Conventional treatments often yield suboptimal outcomes. The authors will review the widespread medical uses of CBD in various medical conditions. To assess the efficacy of medical marijuana in low back pain, this article will present evidence from clinical trials, observational studies, and retrospective analyses. The findings suggest a role for cannabinoids in reducing pain, improving sleep quality, and decreasing opioid use among individuals with low back pain. Consensus-based recommendations for dosing medical cannabis are discussed as well. While acknowledging the current limitations, this review advocates for continued research to unlock the full potential of medical marijuana in managing chronic low back pain.

Keywords: Cannabinoids; Endocannabinoid system; Medicinal marijuana; Low back pain; Pain management; Mechanism of action; Clinical studies; Therapeutic effects; Cannabidiol (CBD); Tetrahydrocannabinol (THC)

Pathophysiology, Prevalence, Causes of Chronic Pain

The International Association of the Study of Pain (AISP) defined pain as "an unpleasant and emotional experience associated with actual or potential tissue damage or described in terms of such damage" in 1979 which was used until 2018 when a special presidential task force revised the definition. After over a 2-year period, the definition was revised to "an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage" [1]. This process of revising the definition of pain is an example of the complex interplay between sensory signals coupled with an emotional experience therefore making measuring pain very difficult. Due to the subjectivity of an emotional experience, there is no reliable tool or method of measurement; however, there are neural processes involved in the transduction and transmission of noxious stimulus to the brain via the pain pathway known as nociception which are measurable [2].

There are two types of nociceptive nerve fibers: 1) small-diameter, unmyelinated nerves that conduct nerve impulses slowly called C fibers and 2) large diameter, lightly myelinated nerves that conduct nerve impulses faster called Aδ fibers. The slower C-fiber nociceptors respond to thermal, mechanical, and chemical stimuli producing delayed, dull pain while the faster Aδ-fiber nociceptors respond to mechanical and thermal stimuli producing the sensation of sharp, fast pain [3]. The cell bodies of these nerve fibers reside in either the dorsal root ganglia or trigeminal ganglion and terminate in the dorsal horn of the spinal cord where they synapse with second-order neurons. They then ascend to the brain via the spinothalamic and spinoreticular tracts [4].

Chronic pain is defined as pain that is persistent for greater than 3 months. Chronic pain effects nearly 50 million adults and is one of the most common reasons for adults to seek medical care in the United States [5-10]. Chronic pain affects 11 to 40% of adults with high prevalence among women, elderly, adults in poverty, adults with public health insurance, and adults in rural areas [5,7,11,12]. Chronic pain has profound physical and emotional costs as it has been associated with restrictions in mobility and daily activities. In the US, 10% of adults with chronic pain

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experience health problems that limit their ability to be in the workforce [5,7,13-15]. Furthermore, the impact of chronic pain on the workforce may add up to hundreds of billions of dollars, resulting in direct medical costs and loss of wages that has been estimated to be higher than those of cancer, heart disease, and diabetes combined [11,16]. Resultant pain interference from chronic pain has been predictive in increasing the hazard of exit from the labor force as well as developing a health-related work limitation [17].

Chronic pain can result from a variety of pathologies. Acquired causes can rise from post-surgical, obstetric, and oncological complications, while hereditary causes such as hypermobility syndromes, or sickle disease. Chronic pain can result in somatic, visceral, or neuropathic pain symptoms, and often have multiple elements contributing to the symptomatology. An important element to discuss is the centralization of pain, wherein synaptic neuronal plasticity within the brain results in neuronal responsiveness increases following painful insults. This upregulation of pain signaling, coupled with neuroinflammation within the central as well as peripheral nervous system, results in biochemical changes as well as chemokine and cytokine that alter the perception of pain, with subsequent development of hyperalgesia and allodynia [18].

Prevalence of Back Pain

Low back pain is one of the most common causes of chronic pain. Causes of low back pain are multiple. Examples include myofascial sources within the lower back musculature, osteoarthritis changes within the lumbar zygophyseal joints resulting in facet arthropathy, or spondylytic changes resulting in neuronal encroachment within the central spinal canal or the exiting nerve roots as they pass through the neural-foramen [18]. Low back pain is one of the main reasons for people to seek health care services making it responsible for high treatment costs, work leave, and individual suffering [19]. Roughly 5% of individuals affected by acute low back develop chronic low back pain.[20] Despite the small percentage, this small group of patient's economic cost significantly exceeds those for the treatment of acute low back pain as the annual bill for low back pain is estimated at more than 50 billion.[21,22] Globally, low back pain is the leading cause of years lived with disability and further attention and management options are needed to counter its widespread prevalence among age, sex, and region [23].

Traditional Treatment of Low Back Pain

Determining the workup and management for low back pain is burdensome for providers leading to suboptimal treatment outcomes [24]. Imaging studies are the most commonly performed tests in evaluating low back pain, however abnormalities found when imaging patients without back pain are just as prevalent as those found in patients with back pain [25].

Referral to therapeutic exercise and manual therapy is common for low back pain, however optimal timing of referral, frequency, duration, and combination of physical treatment are not clearly established. While most acute back pain symptoms resolve within two to four weeks, there has been an interest in identifying patients who are at higher risk for prolonged symptoms at an earlier stage to avoid premature referrals and physical treatment in an effort to decrease the high medical cost associated with low back pain. Physical treatment should be reserved for patients with chronic symptoms and includes specific stretching, strengthening, and aerobic exercises [26]. Low-stress aerobic activity early in the course has been shown to be superior to bed rest or activity despite being the cornerstone of treatment for low back pain from the 1950s through the 1980s [27]. Manual therapy for back pain is the most common treatment provided by complementary and alternative medicine providers and treatment such as spinal manipulations may modestly hasten recovery by decreasing symptoms however outcomes after three to six months are no different than for patients conservatively treated [28]. A variety of behavioral approaches are used to reduce disability through modifying a patient's response to pain and compared to no treatment, behavior treatments are effective; however, they have not demonstrated additional benefit when combined with other treatments [29,30].

Acetaminophen and non-steroidal agents have been shown to be equally efficacious in the treatment of acute back pain, however their role in chronic pain is unclear [31]. The same can be said regarding muscle relaxers and opioids treating chronic pain. There is no evidence that muscle relaxers are effective with chronic symptoms. It is recommended that both muscle relaxers and opioids be prescribed for short, clearly defined periods as they offer few advantages and have more side effects. Although oral corticosteroids are often prescribed for patients with low back pain, evidence supporting their use is lacking and given their significant side effect profile, they should not be used for chronic pain [29].

Invasive treatments including injections of a variety of substances including anesthetics, corticosteroids, or opioids into various spinal structures have been tried in patients with a range of low back disorders. While epidural and facet joint injections are used to avoid surgery in patients with back pain, they are not recommended in patients with acute or subacute pain [29].

Finally, when conservative and minimally invasive treatments are exhausted, surgical intervention is explored. There are more than 250,000 elective lumbar spine operations performed each year in the United States [32]. There is insufficient evidence to recommend surgery compared to conservative treatment in patients with chronic low back without prominent radicular symptoms [33].

Opioid Epidemic and Alternative/Supplemental Treatments

The administration of opioids has been used for centuries as a viable option for pain management. Administered at appropriate doses, opioids proved effective at not only eliminating pain but preventing its recurrence. This is due to the pharmacokinetics of opiates as they bind to the kappa and delta opioid receptors, resulting in modulation of pain. However, as the receptor affinity begins to wane, patients suffer a rebound analgesia, and the threshold to achieving a similar analgesic effect increases in a dose dependent manner. While effective, opioid exposure provides opportunities for long-term opioids misuse and abuse leading to dependence and addiction [34]. As such, significant literature has demonstrated the need to shift away from opiate use as it pertains to chronic pain, citing its deleterious effects [35,36].

With the considerable, consistent negative individual and economic impact associated with back pain treated with the current traditional options, it is imperative that the medical community consider alternative or supplemental treatments in a combative effort. There are various forms of alternative treatments to combat chronic pain and are a valuable tool for

the management of pain. Among these alternatives include acupuncture, manipulation, massage therapy, relaxation techniques, and select natural product supplements [37]. Complementary and Alternative Medicine (CAM) also includes several herbal supplements including capsicum frutescens (cayenne), Salix alba (white willow bark) Symphytum officinale L. (comfrey), and lavender essential oil among others. Gagnier et al, suggests that these herbal supplements provide relief of low back pain more than placebo [38]. With evidence suggesting that the previously mentioned herbal supplements provided pain relief to participants it can be inferred that there are other natural compounds and supplements that could aid in the treatment of low back pain, such as medical marijuana.

While there have been trials demonstrating various levels of significance in pain relief through CBD it is important to discuss the effect of medical marijuana on the use of opioids in the treatment of chronic pain. As previously discussed, the use and misuse of opioids can lead to poor quality of life, debilitating dependence, and death. The Tilray Observational Patient Study in Canada sought to investigate the impact that medical marijuana could have on opioid use and quality of life over 6 months. The study included over one thousand participants and included 21 medical clinics. Baseline opioid use was 28.1% with a Morphine Milligram Equivalent (MME) of 152mg. After the 6-month implementation of medical marijuana in various routes of administration, opioid use dropped to 11% with an MME of 32.2mg [39]. This evidence supports the use of medical marijuana in conjunction with other medications for chronic pain management to mitigate the severe risks and abuse potential associated with opioid dependence.

Complementary and Alternative Medicine including medical marijuana has a role in pain management. Further randomized control trials are needed to investigate the optimal route and dosage for pain reduction. Through discussion of the mentioned trials and reports, the evidence for medical marijuana to be used for acute low back pain is lacking and the statistically significant reduction in chronic low back pain compared to placebo warrants further investigation. The opioid epidemic has disrupted the lives of thousands if not millions of individuals and there appears to be profound evidence that medical marijuana has the potential to alleviate chronic opioid use and dependence. Due to the potential for chronic low back pain reduction, limited options available for pain management, significant adverse effects related to current options for pain medications, and potential for abuse with opioids, further clinical trials are reasonable to optimize the use of medical marijuana in the management of chronic low back pain.

Cannabinoid Background/Mechanism of Action

Cannabis is a 38-million-year-old plant-based product that can be traced to the ancient world as evidence suggests it was used more than 5,000 years ago in present day Romania [40]. During the 19th and early 20th centuries cannabis began to be recognized and utilized medicinally in the United States [41]. Cannabinoids come from three forms; phytocannabinoids derived naturally from flora, endocannabinoids produced endogenously, and synthetic cannabinoids created artificially. The most common cannabinoids utilized and studied includes phytocannabinoids Tetrahydrocannabinol (THC) and Cannabidiol (CBD). These cannabinoids function by stimulating two G-protein-coupled receptors, Cannabinoid receptor type 1 (CB1) and type 2 (CB2) within the endocannabinoid system which are found throughout the body including the nervous system, internal organ, connective tissue, glands, and immune cells [41-43]. CB1 receptors are predominantly in the central nervous system for which THC has a high affinity toward and is known to be responsible for the psychoactive component of cannabis [41-43]. CBD has a high affinity for CB2 receptors which are found within the enteric nervous system and on immune cells located in the tonsils, thymus, spleen, and bone marrow [42]. CB2 receptors do not possess psychoactive potential but serve more important roles in immune and inflammatory functions. Together, they make up the endocannabinoid system which plays a homeostatic role with functions including but not limited to pain, memory, movement, appetite, metabolism, lacrimation/salivation, and immunity [43].

Both CB1 and CB2 are transmembrane G-protein receptors that result in decreased activity of adenylate cyclase upon activation through a pertussis toxin sensitive GTP-binding protein [44]. The diminished activity of adenylate cyclase leads to inhibition of Cyclic Adenosine Monophosphate (cAMP) and protein kinase A (PKA). When adenylate cyclase activity decreases, the conversion of ATP to cAMP is disrupted, leading to reduced levels of cAMP within the cell. Decreased levels of cAMP can have numerous consequences, such as changes in intracellular signaling, neuronal excitability, and potential influence on the function of immune cells. With lower cAMP levels, there is less activation of PKA, thus CB1R/CB2R indirectly results in diminished levels of PKA. One of the functions of PKA includes the activation of transcription factors to bind to cAMP response elements (CRE) in the promoter region of certain genes, which is inhibited by activation of the cannabinoid receptors [45]. Downstream signaling that is reliant on PKA-mediated phosphorylation is affected resulting in alterations in gene expression and cellular metabolism. Activation of these cannabinoid receptors also results in increased intracellular calcium through the activation of Inositol Triphosphate (IP3) receptors [46]. The subunit may directly activate phosphoinositide 3-kinase (P13K) which leads to activation of Phospholipase C (PLC) (Figure 1). PLC catalyzes the hydrolysis of phosphatidylinositol 4,5-bisphosphate (PIP2) into two secondary messengers: Diacylglycerol (DAG) and Inositol Trisphosphate (IP3) [47]. IP3 functions to release calcium into cells by binding to its receptor located primarily in the Endoplasmic Reticulum (ER) membrane [48]. These cannabinoid receptors also function through activation of several Mitogen-Activated Protein Kinases (MAPKs) including p38 and ERK1/2 as well as the phosphoinositide 3-kinase (P13K)/protein kinase B (Akt) pathway [49]. P13K is able to interact with the Akt pathway through the production of phosphatidylinositol 3,4,5-trisphosphate (PIP3), which binds to the PH domain of Akt [50]. Akt is involved in the development of chronic pain and neuropathic pain [51,52]. The effects of CBD on the Akt pathway are complex and vary widely based on the cell type. Some of these effects include anti-inflammatory properties, neuroprotection, and the potential to induce apoptosis.

CBD has further effects on receptors and molecules in the CNS beyond CB1 receptors. Fatty Acid Amide Hydrolase (FAAH) is a homodimeric enzyme that regulates degradation of N-arachidonoylethanolamine (AEA) [54]. Through CBDs inhibition of FAAH, the endocannabinoid, AEA, is able to maintain its presence and continue activation of the CB1, CB2, and Transient Receptor Potential Vanilloid 1 (TRPV1) receptors. Upon binding of AEA to CB1, a conformational change occurs resulting in activation of associated G proteins. The activated G proteins dissociate into subunits, particularly Gα resulting in reduced cAMP and G resulting in activation of PLC, as previously discussed (Figure

1) [53]. The activation of CB1 via AEA results in improvement in decision making and cognitive flexibility performance [55]. CBD is able to inhibit the TRPV1 receptors directly through inducing allosteric modulation (Figure 2). TRPV1 activation in nociceptive neurons triggers the release of neuropeptides and transmitters resulting in action potentials that will often be perceived as pain [56]. Through the interaction between CBD and TRPV1, CBD may be able to induce nociceptor desensitization and therapeutic relief of acute and chronic pain [57]. There is evidence that suggests CBD acts as a partial agonist at dopamine D2 receptors which may account for its antipsychotic effects [58] and modest affinity for 5HT1a receptors [59].

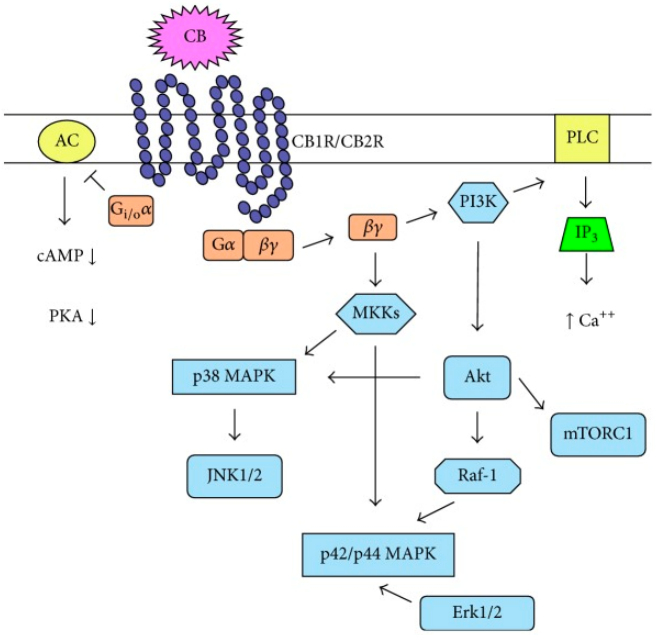

Figure 1: Cannabinoid receptor signaling pathway. Once cannabinoid receptors are activated by cannabinoid the Gi/o protein α subunit inhibits adenylate cyclase resulting in decreased cAMP and leading to decreased PKA activity. The dimer stimulates P13K to activate PLC resulting in increased intracellular calcium. PI3K can also activate the MAPK pathways. Akt may lead to mTORC1 activation. The βγ dimer can activate MKK leading to activation of the MAPK pathways. CB: Cannabinoid; CB1R: Cannabinoid type 1 Receptor; CB2R: Cannabinoid type 2 Receptor; AC: Adenylate Cyclase; PKA: Protein Kinase A; PI3K: Phosphatidylinositol-3 Kinase; PLC: Phospholipase C; IP3: Inositol Trisphosphate; mTORC1: Mammalian Target of Rapamycin Complex 1; MKK: Mitogen-Activated Protein Kinase Kinases; MAPK: Mitogen-Activated Protein Kinase; JNK: Jun Kinases; Erk: Extracellular Signal-Regulated Kinases [53].

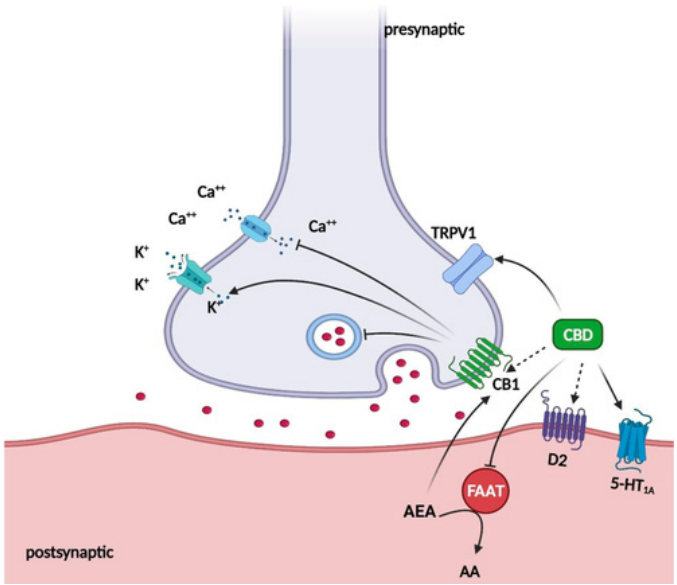

Figure 2: The proposed mechanism of CBD's effects on psychotic disorder. CBD inhibits FAAH, which results in increased anandamide levels. Anandamide activates CB1, CB2 and TRPV1 receptors. CBD can activate TRPV1 receptors directly. Partial agonism at D2 dopamine receptors might account for the effects of CBD on emotional memory processing by the ventral hippocampus. 5-HT1A: 5-Hydroxytryptamine 1A Receptor; AEA: Anandamide; CB1: Cannabinoid Receptor1; D2: Dopamine Receptor 2; FAAH: Fatty Acid Amide Hydrolase; TRPV1: Transient receptor Potential Vanilloid 1 [60].

Furthermore, there are CB1 receptors in the brain including the neocortex, basal ganglia, hippocampus, cerebellum, brainstem, hypothalamus, and amygdala (Figure 3A) [61]. Endogenous compounds such as the endocannabinoids, 2-arachidonoylglycerol (2-AG) and AEA inhibit neurotransmitter release similar to the neurotransmitters inhibited through binding of THC and CBD to CB1 and CB2 receptors, respectively (Figure 3B) [61]. Some of these inhibited transmitters include GABA and glutamate as well as inhibited glycinergic, cholinergic, noradrenergic, and serotonergic neurotransmission [62]. THC and AEA are similar in their effect as a partial agonist of CB1 receptors but differ in that the effects of AEA have a shorter duration of action due to breakdown via FAAH as shown in Figure 2 [63]. Both THC and AEA exert their effects through inhibiting the release of certain neurotransmitters such as GABA and glutamate. The inhibited release of these neurotransmitters results in several previously mentioned side effects of CB1 activation including effects on pain and appetite stimulation [64,65]. It is important to note that further research into the effects of THC and CBD on these pathways is needed as the activation and inhibition of the numerous signaling pathways varies depending on cell type, context, dose concentration of CBD, and general physiology.

Widespread CBD Medical Uses

The use of cannabinoids has been investigated for the management of multiple conditions including but not limited to anxiety, depression, insomnia, seizure disorders, and low back pain [66]. CBD has been demonstrated to have a significant therapeutic effect on neurologic disease states. Adjunct CBD usage in patients with Lennox-Gastaut syndrome or Dravet syndrome suffering from uncontrolled seizures experienced a greater reduction in seizure frequency when used concomitantly with an anti-epileptic regimen [67]. Initial research demonstrated CBD can aid in the alleviation of Parkinsonian tremors [68]. Similarly, CBD has been shown to therapeutically address spasticity [69,70], and Tourette's syndrome [69].

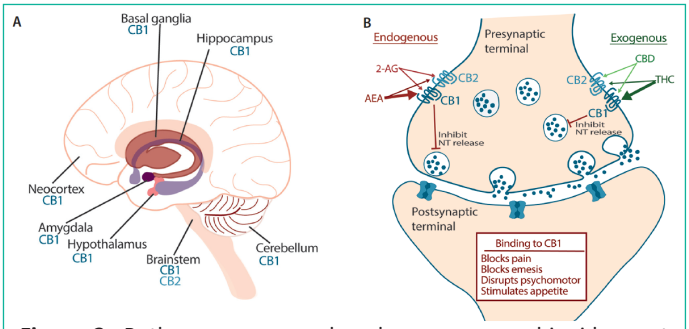

Figure 3: Both exogenous and endogenous cannabinoids exert central effects through the CB1 receptor, present on presynaptic neurons in the cerebral cortex, hippocampus, hypothalamus, amygdala, basal ganglia, and cerebellum (A). Presynaptic CB1 receptor activation inhibits neurotransmitter release (GABA, glutamate, acetylcholine, noradrenaline) resulting in disinhibition of inhibitory input (B). Abbreviations: 2-AG: 2-Arachidonoylglycerol; AEA: Anandamide; CB1: Cannabinoid Receptor 1; CB2: Cannabinoid Receptor 2; CBD: Cannabidiol; THC: Delta9-Tetrahydrocannabinol [60].

Recent evidence showcases potential therapeutic effects for certain psychiatric conditions, including substance abuse, psychosis, and anxiety [71,72]. Utilizing CBD for post-traumatic stress disorder is under review as well, where cannabis compounds modulate mood and memory processes via agonism at 5HT1A receptors in the brain [73]. As it pertains to anxiety, the role of CBD has been examined within patients suffering from generalized anxiety disorder, social anxiety disorder, and the anxiety aspect of post-traumatic stress disorder. Results computed via anxiety assessment scales showcased improved outcomes in these patient populations with minimal adverse effects [73].

CBD has been implemented for sleep related deficiencies irrespective of cause. CBD specifically has the potential to be used as an insomnia treatment as studies suggest that CBD alone or with equal quantities of THC may be beneficial in alleviated symptoms of insomnia [74]. There is potential therapeutic benefit in obstructive sleep apnea as well, due to the modulation of serotonin-mediated apnea via synthetic cannabinoids such as nabilone and dronabinol. And nabilone may decrease nightmares stemming from post-traumatic stress disorder.

Efficacy and Uses of Medial Marijuana in Low Back Pain

Multiple sources have discussed the potential benefits of CBD in addressing low back pain, citing favorable results regarding pain and fear reduction which are major components of the disease process [75].

Evidence in the role of cannabinoids for low back pain is sparse; however, the findings are expanding and have provided a glimpse into the future role of CBD as an additional treatment option for pain management. A case series of two patients utilizing CBD cream demonstrated relief of symptoms related to lumbar compression fracture [76].[76] The CANBACK trial included 100 participants in an Emergency Department that received a single dose of oral CBD for acute low back pain and the results suggested that the role of oral CBD was not superior to placebo for relieving acute non-traumatic low back pain [77].

There is evidence from over five thousand participants in 32 trials to suggest that oral and topical medical cannabis can provide a small to very small improvement in pain relief, physical function, and sleep quality [78]. An Observational Study was conducted to evaluate the efficacy of cannabidiol in the management of low back pain among 48 participants with lumbar spinal stenosis. The study demonstrated statistical significance in reducing the usual pain level and worst pain level over weeks but did not have significance in alleviating the “pain right now” and best pain level [79].

These studies suggest that CBD in management of low back pain may have a significant role in the individual's chronic pain but may have little efficacy in the acute setting. Evidence suggests that the route of administration is a significant factor in pain relief from CBD as oral administration of CBD has not resulted in statistically significant relief of symptoms, while intramuscular cannabinoids have resulted in statistically significant reduction in pain compared to placebo [80]. As it pertains to the centralization of pain resulting from the sequelae of low-back pain, a double-blind, randomized, placebo-controlled phase II clinical trial has been developed that investigates the neuroinflammatory pathways associated with chronic low-back pain and if these markers can be modulated by CBD when compared to a placebo [81].

A retrospective analysis showcased that individuals who obtained legal medical cannabis certifications while concurrently taking opioid medications resulted in an average decrease in opioid use of 31.4% compared to those taking opiates who did not ascertain a medical cannabis certificate. Specifically, individuals with low back pain had a 29.4% decrease in opioid use [82]. An open label extension study specifically focused on the long-term efficacy of delta-9-Tetrahydrocannabinol (THC)/Cannabidiol (CBD) oromucosal spray treatment over a 38 week, when added to a conventional analgesic therapy. Resultant findings showed a decrease in pain within the 0-10 numerical rating scale from a mean of 6.9 points to a mean of 4.2 points, with half of the 234 participants reporting a clinically relevant improvement in pain of 30%. In secondary endpoints, adjuvant CBD treatment improved sleep quality as well as neuropathic pain scale scores. Furthermore, in a single-arm prospective cohort study investigating the effect of CBD on opioid, over half of the patients reduced or eliminated their opioids within 8 weeks after adding CBD-rich hemp extract to their regimens [83].

While the primary focus of cannabis science literature is on the major cannabinoids, THC and CBD, there has been a recent focus on the minor cannabinoids such as terpenes and flavonoids. Terpenes are the primary constituents of essential oils and are responsible for the aroma characteristic of cannabis [84]. Evidence suggests that these constituents play significant roles in influencing one another resulting in a synergistic relationship. This synergy and interaction between cannabis compounds is referred to as the “cannabis entourage effects” which could produce synergy with respect to treatment of pain, inflammation, depression, anxiety, addiction, epilepsy, cancer, fungal and bacterial infections [85].

Due to the recent increase of legalization of medical cannabis, there has been a need to supply providers with expert guidance on how to dose and administer medical cannabis safely and effectively. Consensus-based recommendations to dose and administer medical cannabis in patients with chronic pain using a multistage modified Delphi process with twenty global experts across nine countries has been developed. After compiling data into how clinicians around the world were treating patients with medical cannabis, recommendations consist of beginning with a CBD-predominant medication with a starting dose of 5 mg twice daily titrating as needed to 40 mg daily. If a patient is not reaching treatment goals at this time, consider adding THC starting dose at 2.5mg per day titrating as needed to a max dose of 40mg per day [86].

Conclusion

Chronic pain is a known disease state that continues to grow in terms of its adverse personal, societal, and global effects. Low back pain continues to be a significant contributor to chronic pain, especially in sedentary societies with an aging population. In light of the recent opioid epidemic, alternates should be considered to address the deleterious effects of low back pain. CBD has been demonstrated to be beneficial in a variety of disease states, with research supporting its use within chronic pain, especially low back pain. Further research is needed to further encapsulate the effectiveness of CBD in addressing low back pain before it can be utilized as a primary treatment modality.

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