Journal of Life Care Planning, Vol. 15, No. 2, (27-34)

The Inclusion of Cannabinoids and Medicinal Marijuana as a Treatment Option for Individuals with Disabilities in Life Care Plans

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Abstract

With the growth in popularity of marijuana as a legitimate form of treatment in the United States, the inclusion of it as a viable treatment option for individuals with a number of disabilities and chronic illnesses has become evident to life care planners. The utilization of marijuana and its related products, unlike other medical services and medication, is complicated by the conflicting ideals outlined in state and federal legislation as well as the variations among the laws in each individual state. The use of these products, coupled with having to navigate the guidelines governing their use, can create challenging situations through which care planners and their clients must transverse. To obtain information about how life care planners in the United States are incorporating these products in their current plans, interviews were conducted with four life care planners in states where marijuana is legal in some form. This article will explore how life care planners are addressing the needs of their clients by including marijuana in life care plans when appropriate; it will also include a basic overview of the pharmacological properties of marijuana and provide a brief summary of disorders commonly by treated by medicinal marijuana and included in state medicinal marijuana laws.

The Inclusion of Cannabinoids and Medicinal Marijuana as a Treatment Option for Individuals with Disabilities in Life Care Plans

Over the last 15 years, the American economy has seen the growth of legal sales of marijuana and its related products. As of 2017, largely as a result of consumer demands, medicinal marijuana has been made legal in 29 states and the District of Columbia (ProCon.org, 2017). These states include Alaska, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Hawaii, Illinois, Maine, Maryland, Massachusetts, Michigan, Minnesota, Montana, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Dakota, Ohio, Oregon, Pennsylvania, Rhode Island, Vermont, Washington, and West Virginia. Sixteen additional states have cannabidiol-specific (CBD) marijuana laws (Norml, 2017) including Alabama, Florida, Georgia, Indiana, Iowa, Kentucky, Mississippi, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Utah, Wisconsin, and Wyoming. Several states have laws which permit the recreational use of marijuana (i.e., Alaska, California, Nevada, Colorado, Maine, Massachusetts, Oregon, and Washington).

Life Care Planners are responsible for preparing a concise plan for current and future medical and rehabilitation goods and services for individuals with disabilities along with the associated costs for these items. Life care planners work with individuals with various disabilities and are charged with understanding not only the symptoms of the disabilities but also the treatment protocols for the disabilities, which are typically evolving as a result of medical research and changing policies. Life care planning Standards of Practice note that in their practice, life care planners rely on "state-of-the-art knowledge and resources" (International Academy of Life Care Planners, 2015, p.34). One treatment option that is considered novel and emerging is medical marijuana. For life care planners to make an informed recommendation for the inclusion of medicinal marijuana and its related products in a life care plan, an understanding of the basic pharmacology of the plant's active ingredients should be obtained as well as an understanding of its impact on the brain and body.

The Pharmacology of Marijuana

Cannabis, the species to which marijuana belongs, contains more than 400 chemicals and approximately 60 of these chemicals are cannabinoids. Marijuana is defined as dried cannabis flowers, and its primary cannabinoid is Δ9-tetrahydorcannabinol (THC) (Appendino, Chianese, & Taglialatela-Scafati, 2011), which was isolated in 1964 by Raphael Mechoulam. This discovery led to a better understanding of marijuana's psychoactive and medicinal properties. While THC is the cannabinoid that produces marijuana's desired psychoactive effects, very little is present in its natural state. The precursor to THC, Δ9-tertrahydrocannibinolic acid (THCA), which has no psychoactive active properties and is found in fresh plants, is converted into THC via a decarboxylation process. When heated, TCHA releases a carboxyl group and carbon dioxide thus converting THCA into psychotropically active THC (Dussy, Hamberg, Luginbühl, Schwerzmann, & Briellmann, 2005). As such, marijuana must be exposed to heat via smoking, vaporizing, cooking, etc. to create THC (Baker, Taylor, & Gough, 2011; Eichler et al., 2012; Hazekamp et al., 2006). THC is easily decomposed when exposed to air, heat, or light; therefore, storage in "amber silicate glassware" prevents or slows down this process (Sharma, Murthy, & Bharath, 2012, p. 150). Once THCA is converted to THC, it

is then metabolized, or broken down, by enzymes in the liver producing two primary metabolites, 11-hyrdroxy-Δ9-carboxytetrahydrocannabinol (11-OH-THC) and 11-nor-9-carboxy-Δ9-tetrahydrocannabinol (THCCOOH) (Sharma, Murthy, & Bharath, 2012). THC is stored in the fatty tissues of the body and its metabolites can be re-released into the body for days or even weeks depending upon the amount and the length of time used (Sharma, Murthy, & Bharath, 2012).

A second cannabinoid noted for its special properties is cannabidiol (CBD). Like THC, CBD is produced via a decarboxylation process when cannabidiolic acid (CBDA) is converted to CBD utilizing heat. Once metabolized by the liver, several metabolites are formed with 7-hydroxy-CBD and CBD-7-oic acid being the most prominent (Hanus, Tchilibon, Ponde, Breuer, Fride, & Mechoulam, 2005). While CBD is not psychoactive like THC, it boasts numerous pharmacological benefits.

Cannabinoid Receptors

The brain and body are able to respond to the psychoactive and/or medicinal properties of THC and CBD by means of receptors. Receptors are sites on cells that help to send signals throughout the body using chemical messengers such as neurotransmitters (e.g., dopamine and serotonin) (Heiss & Herholz, 2017; National Institute on Drug Abuse [NIDA], 2012). The characteristic effects of THC and CBD result because their chemical structure is similar to that of endogenous neurotransmitters (NIDA, 2017a), which are naturally occurring chemicals in the body. Seven endogenous cannabinoid neurotransmitters have been identified, with anandamide, which is a Sanskrit word meaning "extreme delight," being the most common. THC and CBD act through two main cannabinoid receptors, CB1 and CB2. CB1 receptors are located mostly throughout the central nervous system (brain and spinal cord) and are primarily concentrated in areas of the brain associated with movement coordination, memory, and cognition (Herkenham et al., 1990). CB1 receptors are targets when treating conditions that impact movement such as Parkinson's disease, Huntington's disease, Wilson's disease (dystonia), and Tourette Syndrome (Kluger, Triolo, Jones, & Jankovic, 2015; Moghaddam, Khodayar, Abarghouei, & Ardestani, 2010). CB2 receptors are found primarily in immune cells (Ameri, 1999; Cabral & Griffin-Thomas, 2009; Pertwee, 2008). CB2 receptors have been identified as the target for medications, including medicinal marijuana, that treat conditions where chronic pain and/or inflammation (e.g., cancer, rheumatoid arthritis, atherosclerosis) are the primary symptoms or for neurodegenerative conditions (e.g., multiple sclerosis, Lou Gehrig's disease, Huntington's disease) (Dhopeshwarkar & Mackie, 2014; Ehrhart et al., 2005). Issues associated with movement and chronic pain are primary symptoms of numerous conditions; therefore, determining the appropriate use of THC and CBD so that both CB1 and CB2 receptors are engaged is best. This can be accomplished through the use of specific cannabis species or through the production of cannabis hybrids.

Cannabis Species and Hybrids

There are three species of cannabis: *Cannabis sativa L., Cannabis indica, and Cannabis ruderalis*. *Cannabis sativa*, which grows as long narrow leaves on plants that average 5 to 13 feet high, has higher levels of THC (NIDA, 2017b). Psychological and physiological characteristic effects of *C. sativa* include "euphoria, analgesia, sedation, memory and cognitive impairment, appetite stimulation, and anti-emesis" (El-Alfy et al., 2010, p. 434). *C. sativa* is generally preferred for the enhancement of euphoria and energy (Pearce, Mitsouras, & Irizarry, 2014). Broad, deep green leaves are characteristic of *Cannabis indica*, which tends to have lower levels of THC but higher levels of cannabidiol (CBD) (Alghamin & Almirall, 2003; Amar, 2006; Medical Genomics, 2014). C. *indica's* psychological and physiological effects include reduced pain, sedation, and sleep (Pearce, Mitsouras, & Irizarry, 2014). *Cannabis ruderalis*, also known as "weedy hemp," produces varied sized leaves and possess few desired properties making it less likely to be utilized for recreational or medicinal purposes. Cannabis hybrids, which result from cross-pollination of any of the three species, allow growers to produce plants that have varying amounts of both THC or CBD, which can be used to treat a number of conditions. It is important to note that cannabis is the species; it is how the plant is classified and distinguished from other living organisms. When discussing its medicinal properties, however, the term medicinal marijuana is used as opposed to cannabis.

Cannabinoids and Medicinal Marijuana

The primary active compound, THC, and CBD are the two cannabinoids that have undergone the most extensive research trials and have the most promising associated treatment outcomes. The therapeutic effects of marijuana vary depending upon the strain and the different concentrations of THC and CBD. Dronabinol (Marinol®) and nabilone (Cesamet®), synthetic replicas of THC, are the only two cannabinoid-containing medications approved by the US Food and Drug Administration (FDA), and both are considered controlled substances. Both of these medications are used as an antiemetic to treat nausea and vomiting associated with cancer treatment; dronabinol is also used to treat wasting illness, which is characterized by decreased appetite and excessive weight loss among individuals with HIV/AIDS (Hill, 2015). Dronabinol (a light-yellow oil administered in 2.5 mg, 5 mg, or 10 mg soft gelatin capsules) has an onset of action of 0.5-1 hour, and its effects last upwards to 4-6 hours (FDA, 2004; May & Glode, 2016). Nabilone is an off-white crystalline powder administered in 1 mg capsules, has an onset of action of 1 to 1.5 hours, and the duration of action lasts anywhere from 8 to 12 hours (Ware, Daeninck, and Maida, 2008). Other forms of treatment

utilizing THC are not considered cannabinoids, but fall under the category of "medicinal marijuana".

Marijuana is considered a Schedule I drug by the Food and Drug Administration (FDA) indicating that it has no accepted medical use and has a high potential for abuse and dependence. As such, marijuana cannot be prescribed, but can only be recommended or certified by a physician to treat disorders outlined by state laws. It is also important to note that because marijuana is deemed illegal, it cannot be purchased at a federally regulated pharmacy; as such, it is generally bought and sold at state-regulated dispensaries or cultivated in personal residences as allowed by law.

While there are obvious medicinal benefits associated with its use, the various ways in which marijuana can be ingested is considered a bonus as well in that it increases the likelihood of identifying a dosing mechanism that optimizes the alleviation of symptoms. Most medications come in only one dosage form (e.g., the cannabinoids dronabinol and nabilone in capsule form); however, medicinal marijuana can be consumed through various mediums including smoking, ingesting edibles (e.g., brownies, candy, tea), consuming concentrates (e.g., wax, oil, shatter), dabbing (concentrates heated, vaporized, and inhaled), and via CBD oils (Stockburger, 2016). It is noted that the effects of smoking or vaping marijuana are different from that of consuming edibles or concentrates. These forms of ingestion have been identified as effective ways to administer THC and/or CBD for a number of chronic illnesses and disorders including, but not limited to neurodegenerative conditions. neuromuscular conditions, autoimmune disorders, chronic pain, and psychiatric disabilities.

Neurodegenerative conditions. "Neurodegenerative diseases represent a large group of neurological disorders with heterogeneous clinical and pathological expressions affecting specific…neurons; they arise for unknown reasons and progress in a relentless manner" (Przedbroski, Vila, & Jackson-Lewis, 2003, p. 3). These disorders are characterized by loss of nervous system functioning because of neuronal (nerve cell) death in the brain, they are irreversible, incurable, and debilitating, and they cause problems with movement and cognitive functioning. Medicinal marijuana is noted to have neuroprotective and antioxidant factors that help to slow down the progression of these disorders by preventing the release of enzymes that might destroy neurons (Rossi, Bernardi, & Centonze, 2010). Individuals with Alzheimer's disease have shown improvement in overall symptomology when using marijuana. The primary active ingredient, THC, blocks the production of enzymes that destroy key areas of the brain (Eubanks et al., 2006). Eubanks et al. (2006) found that THC was superior in the treatment of Alzheimer's disease symptoms when compared to other currently approved medications. Studies utilizing THC as a form of treatment for those with Parkinson's disease demonstrated an increase in neuronal protective effects of THC (Carroll, Zeissler, Hanemann, & Zajick, 2012; Garcia-Arencibia et al., 2007). Other studies on neurodegenerative conditions demonstrate similar effects: amyotrophic lateral sclerosis (Lou Gherig's disease) (Rossi, Bernardi, & Centozone, 2010; Shoemaker, Seely, Reed, Crow, & Prather, 2006); multiple sclerosis (Pryce, Riddal, Selwood, Giovannoni, & Baker, 2015; Rossi, Bernardi, & Centozone, 2010), and glaucoma (Carins, Baldridge, & Kelly, 2016; Tomida, Pertwee, & Azuara-Blanco, 2004).

Neuromuscular disorders. The term neuromuscular disorder is a wide encompassing term used to describe conditions that impair muscle functioning. These disorders are characterized by a weakening and eventual disintegration of the muscle. While neurodegenerative disorders affect nerve cells in the brain, neuromuscular disorders impact the nerve cells leading to muscles within the periphery of the body such as the arms and legs. As with neurodegenerative disorders, medicinal marijuana has the potential to slow the progression of damage to these cells and alleviate many of the associated symptoms. Muscular dystrophy is a genetic disorder that results in the progressive degenerative of nerves leading to the muscles; it is commonly characterized by pain and fatigue. Medicinal marijuana has been shown to reduce muscle spasms and significantly improve pain and discomfort when compared to other forms of treatment (Baker et al., 2000; Woodhams, Sagar, Burston, & Chapman, 2015).

Autoimmune disorders. The immune system, where the majority of CB2 receptors are located, is responsible for defending and protecting the body against foreign substances. When an unknown antigen (e.g., bacteria, virus) enters the body, the immune system forms antibodies that attack and destroy it. As such, the antigen-antibody reaction is the basis of the immunity (Falvo, 2014). In autoimmune disorders, the body recognizes itself as foreign, and an antigen, and responds by synthesizing antibodies for attack. Studies conducted utilizing medicinal marijuana for autoimmune conditions have demonstrated positive effects such as: decrease in inflammation and osteoclastogenesis in patients with rheumatoid arthritis (Fukuda et al., 2014; Gui, Tong, Qu, Mao, & Dai, 2015); significant reduction of pain and stiffness and increased relaxation, somnolence, and feelings of well-being among individuals with fibromyalgia (Fiz, Durán, Capellà, Carbonell, & Farré, 2011); and improved clinical benefits (e.g., reduction in abdominal pain, cramping, and diarrhea) among those with Crohn's disease and irritable bowel syndrome (Schicho & Storr, 2014).

Chronic pain conditions. According to the National Institute of Health (2011) chronic pain is defined as any pain lasting 12 weeks or more, oftentimes persisting for months or longer. Medicinal marijuana has proven effective in alleviating the symptoms associated with chronic pain and neuropathic pain. Aggarwal et al. (2009) report that individuals with chronic pain conditions such as myofascial pain syndrome, neuropathic pain, discogenic back pain, osteoarthritis, diabetic neuropathy, central pain syndrome, phantom pain, spinal cord injury, fibromyalgia, rheumatoid

arthritis, HIV neuropathy, visceral pain and malignant pain all experienced significant pain alleviation when using medicinal marijuana.

Cancer is a condition that causes numerous complications and the side effects from medications used to treat this disorder can result in additional problems. Pain is a common characteristic of cancer as well as nausea, vomiting, and decreased appetite. Cannabis sativa, which has high rates of THC, has proven effective in decreasing the nausea and vomiting associated with treatment, and it has been shown to produce proteins that kill the cancer cells (Machado Rocha, Stéfano, de Cássia Háiek, Rosa Oliveira, & da Silveira, 2008; Prowles et al., 2005). CBD, which is more prevalent in *Cannabis indica*, inhibits tumor growth (Ramer et al., 2012; Russo & Guy, 2006).

Psychiatric disabilities. Numerous studies note the positive effects of marijuana on psychiatric disorders such as a reduction in post-traumatic stress disorder (PTSD) symptom severity and nightmares and an improvement in sleep quality (Greer, Grob, & Halberstadt, 2014; Roitman, Mechoulam, Cooper-Kazaz, & Shalev, 2014). Other studies note a decrease in anxiety and depression symptoms (Walsh et al., 2013). Dronabinol, synthetic THC, was found effective in significantly increasing weight gain among participants with anorexia (Andries, Frystyk, Flyuvjerg, & Støving, 2013). Other studies related to other conditions that impact appetite noted marked increases in weight gain among those with wasting illness associated with cancer, cachexia, and HIV/AIDS (Argilés, Lopez-Soriana, & Busquets, 2008; Woolridge, Barton, Samuel, Osorio, & Dougherty, 2005).

How to Include Medicinal Marijuana in Life Care Plans

When including medicinal marijuana and related products in a life care plan, it is treated methodologically like any other medication. Upon review of medical records, use of medicinal marijuana and its related products may be noted in a client's medical records depending upon the jurisdiction and acceptance in the medical community. Historical usage may be corroborated or disclosed in the personal interview. Like all medications, inquiry is made about pre- and post-injury use of medicinal marijuana products. If there is use of these items prior to the injury, this is noted and only the difference in use is potentially included in the life care plan. If the individual resides in an area where the medicinal marijuana use is not documented in medical records, the interview may be the sole source of information about the type of administration (e.g. oil, lotion, edible), dose and frequency of use of these products.

To determine whether to include these products in a life care plan, the first step that life care planners take is to determine the legality of the substance in the geographic area of the client. Because laws governing the legality of these products are rapidly changing, this step is critical. Medicinal marijuana, and its derivative cannabidiol, is now used in some form in over 40 states and the District of Columbia (Norml, 2017; Procon.org, 2017). State laws govern factors including who can receive marijuana for medicinal purposes, the amount a person can possess, who can recommend or certify marijuana for medicinal purposes, as well as who can grow it and distribute it. One resource identified as a potential tool for life care planners to use in researching what medical conditions can be treated with marijuana in each state is the National Council of State Legislatures website, http://www.ncsl.org/research/health/state-medical-marijuana-laws.aspx.

Once the legality of the product is established, consideration of how to include the medicinal marijuana product in the life care plan occurs. As established by Life Care Planning Standards of Practice (International Academy of Life Care Planners, 2015) and Consensus and Majority Statements (Johnson, 2015), collaboration with medical professionals is undertaken by the life care planner; this is where the discussion of the use of medicinal marijuana and related products will ensue. Various medical professionals including neurologists, physiatrists, and family practice physicians may recommend use of these products based upon their familiarity with a specific diagnosis. However, the products are not usually prescribed by these individuals. Rather, marijuana dispensaries typically have physicians whose practice it is to evaluate patients for the use of cannabis products. Therefore, if a medical foundation is required for the use of medicinal marijuana and related products in the life care plan, either a treatment team member must be familiar with its use for treatment of the disability-related symptoms or a physician with such training may be consulted. Based upon interviews with life care planners throughout the country, typically dispensary-affiliated physicians are not consulted in the preparation of the life care plan. However, treatment team members often recommend the products based upon familiarity with the literature, reports by the patient of symptom relief, and/or reduction in consumption of other products (including opioids) with the introduction of medicinal marijuana products. While most practicing physicians were not formally trained in cannabis use or dosing, many are educating themselves, sometimes through their patients, of the science of cannabis use.

Once a medical foundation is established for inclusion of the medicinal marijuana product(s), research is performed by the life care planner to determine historical usage patterns and cost of the products. The most common way to establish historical usage patterns is by examination of receipts, as one would with other medications or supplies included in the life care plan. This may also be a way to document the cost of the medicinal marijuana products being used. In some areas, dispensaries can be contacted for information about product pricing. Some life care planners report obtaining information online or by telephone from the company providing the product to the individual. No life care planners who were interviewed for this research reported these products being covered by health insurance, so it is likely that the individual

is incurring these costs through private pay. In some states where medicinal and recreational marijuana are both legal, the cost for medicinal marijuana is less than recreational marijuana. Life care planners report seeing monthly cost of medicinal marijuana related products from $100-$1600 per month, depending upon the number of products used, the frequency of use and the dose of the products being consumed.

Unlike other medications, there are not specific dosing recommendations indicated for medicinal marijuana, making it difficult to determine what an appropriate dose for any disorder or condition may be. Additionally, considerations for potency and route of administration must be made. Unlike the traditional restrictions on number of pills dispensed or the number of refills allowed, an individual may purchase lotions, creams and edible products without such limits. Without specific dosing guidance from a physician, the life care planner may be faced with the determination of how to schedule long-term use of the medicinal marijuana related product. One method may be to continue the individual's current usage pattern into the future. Again, this determination may be addressed during collaboration and consultation with healthcare practitioners involved in the person's care. When these decisions are made, medicinal marijuana and related products are typically included in the life care plan tables section entitled "Medications."

In some cases, if the individual is consuming or using medicinal marijuana or a related product, ancillary services will be required that may be included in other parts of the life care plan. For example, in Georgia where possession of low THC oil is legal for certain medical conditions, individuals using this product are required to see a physician four times per year to maintain a "Low THC oil registry" card. The card, which is recommended by a physician for a patient with certain conditions, is issued by the State of Georgia. It is not a prescription for the THC product, but allows the person to legally possess 20 fluid ounces of low THC oil, a medicinal marijuana related product. In these cases, the required physician office services would be included in the "Future Medical Care- Routine" section of the life care plan.

Like the low THC oil, medicinal marijuana related products may be used to treat a range of disabilities for which life care planners create plans. Life care planners report inclusion of these products for diagnoses including chronic pain, phantom pain, seizure disorder, and nausea and report inclusion of the products in both pediatric and adult life care plans. Some of the diagnoses for which medicinal marijuana is currently used are discussed above.

Discussion and Implications

As life care planners practice in all states as well as internationally, there are differences in how they approach the inclusion of cannabinoids and medicinal marijuana in their life care plans, largely depending upon the laws governing the product in their state. Unlike other items to be included in the life care plan, this product primarily remains illegal in the eyes of the United States government. While it may be appropriate for the life care planner to include cannabinoids and medicinal marijuana products in the life care plan to be presented in a state court where the products are legal, it may not be included in cases that are to be presented in a federal court. For each life care plan, the life care planning professional must investigate the legality of the products as a first step in determining if the product can be included as a life care plan recommendation. As widespread, legal, use these products is relatively recent, understanding a juror's (or trier of fact) perceptions of these products will be an interesting phenomenon to document and is a suggested area of future research in life care planning.

While navigating the conflicting state and federal laws is difficult for the life care planner in and of itself, other challenges mentioned by life care planners include: 1) how a family might travel across state lines or internationally with these products; 2) how to handle cannabinoid or medicinal marijuana use when transitioning from a pediatric to adult healthcare team; 3) how small hospital or medical centers approach the use of these products; and 4) how to determine when to terminate the use of the substance in the life care plan. These are all valid concerns and will require much forethought and proactive planning. The decision to add these products to a life care plan must take into consideration numerous mitigating factors all of which lead to the success of the plan or a lack thereof. Because of this, knowledge of marijuana's pharmacology, its impact on the brain and body, and it success in treating chronic conditions and disorders is paramount, along with understanding the unique needs and circumstances of each client.

Even though life care planners have medical backgrounds or training, very few, if any, life are planners have received training in areas related to medicinal marijuana. Most medical schools, in fact, do not provide training as part of their curriculum. Therefore, as a profession, life care planners are often educating themselves about the properties of marijuana and its usefulness in treating disability-related symptoms. This is an area where ongoing research in the life care planning field should be focused. Additional research allows for a better understanding of marijuana's exact mechanism of action in treating disabilities and other chronic conditions, and it creates an opportunity to develop specific guidelines pertaining to dosing, both of which are important for both life care planners and their clients. As states continue to legalize marijuana for medicinal use and research continues to show the benefits of its use, opportunities for large-scale projects may materialize followed by opportunities for further training and advancement of the field of life care planning.

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