Beyond THC: Exploring the Topical Uses of Cannabis

Medical cannabis (or medical marijuana) refers to the use of cannabis and its constituent cannabinoids as medical therapy to treat a designated disease or alleviate symptoms. Currently, 20 states have medical cannabis available to their residents and four states; Colorado, Washington, Alaska and Oregon, consider it legal. Several countries are leading the way in cannabis research. Research on its medical benefits in the United States has been limited due to its legal status. The medical research that has been done has primarily focused on its harmful effects, reinforcing its place as an illegal narcotic. Cannabis's historical and contemporary taxonomy is as complex as its current legal status. Modern taxonomy considers all strains of cannabis as one species: *Cannabis* L, which includes *Cannabis sativa* and *Cannabis indica* (American Herbal Pharmacopoeia 2013).

Chemical Constituents

The cannabis plant contains an enormous variety of phytochemicals. Over 750 secondary metabolites in cannabis have been identified (AHP 2014). The primary phytocannabinoids include the well-known psychoactive Delta-9-tetrahydrocannabinol (THC), and two other cannabinoids including cannabidiol (CBD) and cannabinol (CBN). In Table 1 I have incorporated several authors' findings to provide a summary of currently identified phytocannabinoids and their potential therapeutics (Russo 2011, Brenneisen 2012/2011, American Herbal Pharmacopoeia 2013). The distinctive scent of cannabis is composed of 200 different terpenoids. Terpenoids are the chemical constituents that comprise the flavor and fragrance of many plants. They have been linked to an array of therapeutic affects. Some have speculated that it is possible that the combination of terpenoids and phytocannabinoids may play a role in cannabis's therapeutic actions and act to temper intoxicating effects of THC (Russo 2005,2011). Current research is focused on these individual chemical constituents and their effectiveness in addressing pain, inflammation, depression, anxiety, addiction, epilepsy, cancer, and fungal and bacterial infections (Ibid).

In the late 1980s, scientists researching the effects of cannabis consumption discovered the endocannabinoid (EC) system and the presence of cannabinoid receptor sites in the human body (Lee 2012). These sites were identified and categorized as CB1 and CB2. CB1 receptors are located on cells in the nervous system and CB2 sites are found in the immune system. Current research indicates that cannabis's phytocannabinoids react with the body's identified cannabinoid receptor sites, aiding in its therapeutic value (Lee 2012).

Topical Application of Cannabis: Historical Accounts

Historically topical use of cannabis is documented in healing traditions worldwide. The 18th-century Persian medical text *Makhzan-al-Adwiya* describes topical preparations including the leaves, the juice, the bark and flowers (Russo 2005). In both India and Arabic medicine the plant was utilized in similar ways. The oil was used as a painkiller for earaches, to soothe neurological pain, and to heal hemorrhoids (Ratsch 2001). A tea of the boiled leaves was used as a wash to remove lice, nits and other parasites (Ibid). A poultice of the fresh leaves was used to treat tumors and furuncles. The fresh juice of the leaves was used as a disinfectant wash for

skin diseases, abscesses, ear infections, dandruff, and lice (Lozano 2001). The dried flowers and leaves of cannabis were powdered, moistened and applied to wounds. In Northern India, it was reported that fresh juice was applied externally to hemorrhoids (Ibid.) In Malaysia, cannabis flowers and leaves were used with *Hydnocarpus anthelmintica* oil for the external treatment of leprosy (Ratsch 2001). Historically the Chinese burned the dried leaves and flowers of *da ma* (cannabis) over the surface of the skin as moxa to disperse swelling and promote tissue healing (Xiaorang et al, 2013).

Along with prominent historical physicians including Galen and Dioscorides, ancient Egyptians used cannabis shoots both internally and externally for medicinal purposes. Shoots were used for their antiseptic, antibiotic and analgesic qualities. In European folk medicine, cannabis leaves were used externally as a paste for wounds and as an analgesic for pain (Kabelik 1955). In Argentina there are reports of the use of the root bark as a febrifuge and the dried flowers and leaves were ground and mixed with fat as a burn medicine (Ratsch 2001). In Thailand, cannabis was combined with *Artemisia vulgaris, Myristica* sp., *Piper nigrum, Zingiber officinale, Cinnamomum,* and *Salacca flavescens,* along with alcohol and made into a tincture that was used to treat hemorrhoids, laryngeal polyps and ulcers in the intestinal and genital areas (Ibid.).
The *New English Dispensatory* of 1764 recommended boiling hemp roots and applying them to the skin to reduce inflammation. Seventeenth-century herbalist Nicholas Culpeper described a burn treatment made from fresh cannabis juice mixed with a little oil and butter (Ibid.).
In 1856, a popular Western treatment for rheumatism to relieve pain was oil made from cannabis flowers, poppy and henbane. Cannabis was first listed in 1851 in the U.S. Pharmacopeia's 3rd edition and remained there until its removal in 1942. Eli Lilly and other American pharmaceutical companies produced cannabis medicines until the federal Marihuana Tax Act of 1937 sharply reduced U.S. cannabis production and prescriptions (Hermes). In Canada cannabis was listed in its pharmacopeia until added to a list of restricted drugs in 1923. Michael Moore, a well-respected western herbalist, listed it in his materia medica for many conditions ranging from irritation of the genito-urinary tract, to menstrual headaches with nervous depression (Moore 1995).

Current Research and Anecdotal Data on Topical Applications for Cannabis

Despite its long history of topical use, cannabis' classification as an illegal substance has obstructed most investigations into its medicinal efficacy, used topically or otherwise. The research that has been undertaken has been limited to murine or in vitro, rather than human clinical trials. The last decade has yielded limited but promising research on the plant's usefulness for skin cancer, inflammation, and microbial and fungal infection. Several studies point to cannabis' effectiveness for a variety of skin conditions (Kupczyk, et al 2009), including inflammatory skin diseases (Karsak 2007) and eczema and psoriasis. One study found that topically applied THC might effectively decrease contact allergic inflammation without the side effects common to pharmaceuticals used for the same purpose (Gaffal, Cron et al 2013). Pain management is another area of research where topical cannabis may be found useful. In several studies there is evidence that cannabis can provide pain relief without apparent side effects. In the a study on the topical use of cannabis (Dogrul, Gul et al 2003) the researchers utilized extracts of CB1 and CB2, reporting topically administered cannabinoid agonists may reduce pain

without the psychoactive side effects of internal consumption of cannabis. In another recent study the use of other cannabis cannabinoids including THCA, CBD, and CBN were used to address pain. In the Journal of Pain Research, entitled "Topical Preparations for Pain Relief: Efficacy and Patient Adherence" (Jorge, Feres et al, 2011) it was similarly suggested that topically administered cannabinoid agonists, of which CBD is one, may reduce pain without the side effects of opiates (Jorge, Feres et al 2011).

Various delivery methods have also been investigated including a recent study which study, it was found that using ethanol concentrations of 30 to 33% significantly increased the transdermal transmission of THC and CBD (Stinchcomb, Valiveti et al 2004). This points to the possibility that utilizing ethanol in transdermal patch formulations or in liniments might help to potentiate its topical effects.

Thanks in part to patients and advocates, more attention is being given to potential uses for topical cannabis applications. Based on anecdotal and clinician reports, national advocacy group Americans for Safe Access says topical use of cannabis may benefit several conditions including dermatitis, psoriasis, herpes, furuncles, corns, certain nail fungi, rheumatism, and arthritic pain. http://www.safeaccessnow.org/

Topical Applications for Cannabis in Clinic

Dr. Jake Felice ND, LMP, an adjunct professor at Bastyr University, specializes in the treatment of chronic pain and the improvement of human performance. Dr. Felice mainly works with patients who use cannabis topically in cases of mild to moderate pain including in cases of adhesive capsulitus, neuralgia, and muscle spasms. In a personal interview, he said indicated that his patients report marked improvement within 24 hours after the application of a cannabis infused salve, with some improvement within two to four hours. Recently informing Dr. Felice's work are two research studies: The first investigated the use of ethosomes (highly malleable vesicles made of phospholipids, a high concentration of ethanol, and water) in the delivery of cannabidiol (CBD). The study's conclusion states that states "ethosomes enable CBD's skin permeation and its accumulation in a depot at levels that demonstrate the potential of transdermal CBD to be used as an anti-inflammatory treatment" (Lodzki, Godin et al, 2003). The second study highlighted the improvement in colonic inflammation through the combined use of CBD suppositories and systemic treatment (Schicho & Storr 2012). Dr Felice's has used this information to broaden his approach to treatment as well as expand his use of cannabis in other pain management scenarios

Recently I have begun manufacturing topical cannabis products including salves and liniments after being approached by a medical marijuana dispensary owner. I currently hold a medical marijuana card to ensure I stay within the legal guidelines of my state's Medical Marijuana program. My products focus on cannabis' analgesic qualities for the treatment of pain from arthritis, physical trauma, muscle spasms, and fibromyalgia. My guidance to clients is to apply it at two to four hour intervals, depending on the severity of pain. Clients report that they have some minor pain relief within one to two hours; by day two of consistent use most clients report a significant reduction in their pain levels.

In visiting a medical marijuana dispensary, one finds an array of topical products ranging from oils to salves. Currently many of the topical cannabis products on the market are not formulated or manufactured by herbalists, and in some cases utilize harmful chemicals in the processing of plant material. Due to the lack of regulation, an ingredient listing is often absent from the product label. Furthermore, the lack of regulation and coordination of state and local agencies where cannabis or where medical marijuana is legal has not helped to ensure that cannabis products are following current manufacturing guidelines nor are safe.

Recently the American Herbalists Guild (AHG) surveyed its professional members on the medical use of cannabis. Seventy-nine percent of AHG members who completed the survey reported that that they would potentially utilize it clinically if it were not considered illegal (Romm & Romm 2010). Now is an opportune time for herbalists to increase their knowledge base and become current with recent research into its internal and external uses. My hope is that cannabis' medicinal uses, topical and otherwise, will be discussed more frequently among herbalists whose expertise lies in the therapeutic use of plant medicine, rather than remaining on the fringe of mainstream herbalism. As herbalists, our materia medica encompasses many plants. Cannabis is just that, a plant that has chemical constituents and actions, like the hundreds of other plants used in clinical herbal practice. As laws change and there is increased research into its medicinal value, cannabis will return to a place in our materia medica.

Table 1 Identified phytocannabinoids and their potential therapeutics (Russo 2011, Brenneisen 2012/2011, American Herbal Pharmacopoeia 2013)

Compound		**Pharmacological Characteristics**
Cannabigerolic Acid	CBGA	Antibiotic
Cannabigerol	CBG	Antibiotic Antifungal Anti-inflammatory Analgesic GABA uptake inhibitor Reduces keratinocytes Proliferation in psoriasis Effective against MRSA
Cannabichromene	CBC	Antibiotic Antifungal Anti-inflammatory Analgesic (weak)
Cannabidolic Acid	CBDA	Antibiotic
Cannabidiol	CBD	Anxiolytic Antipsychotic Analgesic Anti-inflammatory Antioxidant

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		Antispasmodic Anti-emetic, Antifungal Anticonvulsant Antidepressant Antagonizes effects of THC, Decreases sebum/sebocytes proliferation, Effective against methicillin-resistant Staphylococcus aureus Pro-apoptotic against breast cancer cell lines
Cannabinol	CBN	Sedative Antibiotic Anti-convulsant Anti-inflammatory Decreases breast cancer resistant protein Effective against MRSA
Delta-9 tetrahydrocannabinol	THC	Euphoriant, Analgesic, Anti-inflammatory, Antioxidant, Antiemetic, Antipruritic, Bronchodilator
Delta 9 tetrahydrocannabivarin	THCV	Analgesic, Euphoriant, Anticonvulsant in vitro
Delta-9 Tetrahydrocanabinoid acid	THCA	Immuno-modulating

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