

ORAL HEALTHCARE CONCERNS AND THE MARIJUANA USER

Smoking tobacco products has been linked to health hazards related to the heat of combustion and the inhalation of many chemicals and adjuvants into the lungs. Users of marijuana and healthcare professionals hold similar concerns about marijuana smoking. The herb can be rolled into a cigarette for smoking, called a “joint,” or smoked using a water pipe or “bong.” In a bong, the smoke from the burning marijuana bubbles through the bong water, where it is cooled. It is important to note that particulate matter from the burning action is not removed by the water. Hashish is typically smoked using a pipe or bong, or mixed with marijuana and smoked as a joint or vaporized.

There are many people who smoke both tobacco and marijuana. A joint (marijuana cigarette) prepared with tobacco is known as a “spliff” or “kiff.” A systematic review of 28 studies showed that marijuana users who also smoked tobacco were more dependent on marijuana, had more psychosocial problems, and had poorer cessation outcomes than those who used marijuana but not tobacco (Peters, Budney, & Carroll, 2012).

As electronic cigarettes (e-cigarettes) are becoming more popular with tobacco smokers, “vaping” with e-cigarettes and electronic vaporizers is emerging as a possible method for inhaling marijuana (Tashkin, 2015). People who use e-cigarettes believe that vaping is healthier, as well as more discreet because it produces less odor than smoking. Disadvantages are that vaping produces dry mouth and fewer positive marijuana effects (Etter, 2015). Marijuana buds and oil are often the product of choice for these devices rather than hashish, wax, or butane honey oil. In an exploratory study (Etter, 2015), 45% of individuals who smoked and vaped marijuana reported that vaping reduced their marijuana use, 37% said it had no impact on their marijuana use, and 6% said that it increased their marijuana use. Vaping is also less expensive than traditional smoking. One in vitro study concluded that “temperature-controlled, electrically-driven vaporizers efficiently decarboxylate inactive acidic cannabinoids and reliably release their corresponding neutral, active cannabinoids. Thus, they offer a promising application mode for the safe and efficient administration of medicinal cannabis” (Lanz, Mattson, Soydaner, & Brenneisen, 2016).

One literature review revealed something about marijuana that is somewhat counterintuitive: It suggests that marijuana increases rather than reduces forced vital capacity (FVC) in patients (Ribeiro & Ind, 2016). This effect may be related to the anti-inflammatory effects of the plant. However, the review also cited several community-based studies, all but one of which showed significant increase in symptoms of chronic bronchitis and use of acute care services for respiratory illness in people who frequently smoke marijuana.

An analysis of survey questions and standardized spirometry data from a cross-sectional study of adults in the United States who participated in the National Health and Nutrition Examination Survey from 2007 to 2010, showed that 59.1% had used marijuana and 12.2% had used marijuana in the last month. The effect of smoking marijuana was measured as the ratio or relationship between lung function scores recorded as forced expiratory volume and FVC. The study concluded that, despite marijuana smoke being a known irritant to the airways of the lungs, cumulative lifetime marijuana use, up to 20 joint-years, is not associated with adverse changes in the above spirometric measures of lung health. However, people who smoke marijuana for more than 20 joint-years may have a significant increased risk of lung disease when compared with those who have never smoked marijuana (Kemper, Honig, & Martin, 2015).

Marijuana-Induced Oral Pathology

In general, marijuana users have poorer oral health than non-users, with higher plaque scores, higher decayed, missing and filled (DMF) teeth scores, and less healthy gingiva (Darling & Arendorf, 1992). One of the most significant adverse effects of marijuana use is xerostomia, thus, chronic use of marijuana increases the risk of caries (Darling & Arendorf, 1993 and Cho, Hirsch & Johnstone, 2005). Marijuana smoking causes changes in the oral epithelium, termed ‘cannabis stomatitis’; this includes hyperkeratosis and leukoedema of the buccal mucosa. Acute signs and symptoms include sialostasia, xerostomia and irritation and superficial anaesthesia of the oral epithelium (Maloney, 2011). With chronic use, ‘cannabis stomatitis’ presents as chronic inflammation of the oral epithelium and leukoplakia, which may progress to neoplasia. Marijuana can elicit variable parasympathetic effects, which in combination with a stress response, such as a visit to the dentist, may be associated with syncopal episodes. Dental treatment on patients who are active users or intoxicated can result in acute anxiety, psychotic-like paranoid thoughts and dysphoria. The use of local anesthetic solutions containing epinephrine may seriously prolong

tachycardia already induced by an acute dose of marijuana (Maloney, 2011, and Cho, Hirsch & Johnstone, 2005, and Jones, 2002). Table 3 summarizes the dental implications of treating marijuana users.

Marijuana-related oral cancer usually occurs on the tongue and the anterior floor of the mouth (Zhang et al, 1999, and Marks et al, 2014, and Firth, 1997). The mechanism by which marijuana smoke acts as a carcinogen relates to the presence of benzopyrene, nitrosamines and aromatic hydrocarbons, in twice the concentration as found in the same amount of tobacco smoke (Tashkin, 2018). Marijuana smoke is associated with dysplastic changes within the epithelium of the buccal mucosa (immature cell forms, anucleated squamous cells, increased nuclear pleomorphism and increased mitotic activity and abnormalities). Smoking marijuana is associated with oral premalignant lesions, including erythroplakia and leukoplakia. One study found that the association between marijuana use and head and neck cancer was stronger among younger patients (less than 50 years old) (Zhang et al, 1999). The long-term prognosis in young patients with head and neck cancer is poorer than in older patients because tumors appear more aggressive in younger patients, and require more extreme treatment such as radiotherapy and surgical resection. A synergistic effect between marijuana and tobacco smoke has also been observed, suggesting the interactions of different risk factors further increases the risk of developing oral cancer (Zhang et al, 1999). The relationship between the presence of oral papilloma and marijuana smoking may be related to suppression of the immune response by different cannabinoids, although the human papilloma virus may also play a significant role (Darling & Arendorf, 1993).

Oral candidiasis and the density and intra-oral prevalence of candidal species are increased in marijuana smokers, most likely due to the presence of hydrocarbons in marijuana, which act as an energy source for certain candida species (Marks et al, 2014). Additional factors such as a compromised immune response due to chronic marijuana use, nutritional factors and poor denture hygiene should also be considered.

A fiery-red and painful gingivitis with associated white patches has been documented on the gingiva of marijuana smokers (Darling & Arendorf, 1993). Diffuse gingival hyperplasia and concurrent alveolar bone loss was also noted in this study in chronic abusers of marijuana. However, for both conditions, other etiologies were not fully considered, and therefore supporting evidence is lacking. Current knowledge on the effects of cannabinoids on periodontal health is inadequate because the frequency, amount, duration and mode of administration of marijuana

differs amongst individuals, rendering controlled epidemiological studies difficult to undertake. Personal risk factors including oral hygiene, general health, age, concurrent tobacco smoking and polypharmacology make it difficult to identify the specific influence of cannabis abuse on susceptibility to periodontitis.

Marijuana-Dental Drug Interactions

Table 4 delineates the medications most commonly used in dentistry (Donaldson & Goodchild, 2012, and Rosenberg, 2010). In reviewing potential drug interactions between marijuana and these particular medications, there are only a few, but important, considerations.

Analgesics and Antiinflammatory Agents

Acetaminophen has a synergistic effect when administered with a nonsteroidal anti-inflammatory drug (NSAID) and the combination has repeatedly shown superior analgesic efficacy compared to either drug alone (Moore & Hersch, 2013 and Aminoshariae, Kulild, Donaldson, & Hersch, 2016). This therapeutic combination also has a better side effect profile and less potential for abuse compared to opioids. For example, NSAIDs have been shown to be associated with a reduced incidence of postoperative nausea and vomiting by up to 30% compared to narcotics (Elia, Lysakowski, & Tramer, 2005). Knowledge and understanding of individual maximum recommended doses cannot be over-emphasized since the most effective dose for the shortest period of time will provide the greatest pain relief balanced against patient safety concerns. There are no specific concerns in combining acetaminophen with an NSAID to insure appropriate pain relief in patients who may be concurrently taking marijuana. While this is also true for the coadministration of glucocorticoids, the same cannot be said for narcotic-containing analgesics (i.e., codeine, hydrocodone and oxycodone).

Unfortunately, there is an historical and unfounded belief that patients with significant orofacial pain should be prescribed opioid-containing analgesics and this misinformation has added to our current opioid epidemic. Opioids are frequently prescribed for short-term orofacial pain management associated with dental procedures in emergency and clinical settings, despite the fact that they are not anti-inflammatory agents, and therefore do not target the underlying pathophysiology of orofacial pain (Moore & Hersch, 2013 and Aminoshariae, Kulild, Donaldson, & Hersch, 2016). Opioids should definitely not be prescribed in patients who may be

concurrently taking marijuana because both of these agents act as central nervous system (CNS) depressants.

Antibiotics and Antifungals

While there are no specific drug interactions between the most common antibiotics prescribed in dentistry and the use of marijuana, certain antibiotics can increase the effects of specific cannabinoids such as cannabidiol which are metabolized through the cytochrome (CYP) isoenzyme system. Erythromycin may be the classic example of a drug which acts as an inhibitor of CYP3A4. Taking erythromycin with cannabidiol can lead to increased effects of cannabidiol, because cannabidiol is also metabolized by CYP3A4. The best strategy would be to avoid this combination, and if a macrolide antibiotic is indicated, prescribing azithromycin instead of erythromycin would be an excellent alternative. Azithromycin is not metabolized through the cytochrome enzyme system.

The antifungal fluconazole is a strong CYP2C19 inhibitor and moderate inhibitor of CYP3A4, therefore concurrent administration with marijuana can lead to the increased effects and side effects of cannabidiol. If an antifungal agent is desired to help treat oral candidiasis in a marijuana user, the swish and swallow approach with nystatin would be a better choice in order to avoid this drug interaction.

Local and Topical Anesthetics

There are no drug interaction concerns between marijuana and the local or topical anesthetics typically used in dentistry.

Sedative Agents

Given the high incidence of dental fear in the general population, many patients who visit the dentist will inquire about the opportunity for sedation services. In most cases the intervention will be with either oral or inhalational pharmacological modalities, and each of these present specific concerns in the marijuana user. In the case of the marijuana smoker, an odor from the patient may be indicative of recent usage, even if the patient does not admit this directly. These patients have already self-medicated with a sedative and the addition of another oral or inhalational sedative would be moot. It is more difficult to discern patients who may have recently ingested

marijuana in a topical or edible formulation. If the practitioner's level of suspicion is high, but unconfirmed by the patient, the prudent practitioner may choose to avoid additional sedative(s). In the highly fearful patient, low, conservative doses of any additional CNS depressant may be considered (i.e., nitrous oxide – oxygen inhalational sedation, or oral medicines such as the benzodiazepines).

Chronic marijuana users who have severe dental anxiety may choose to work with oral healthcare professionals to insure their oral or inhalational sedation is not compromised by their marijuana use. In these cases, topical and edible formulations of marijuana should be avoided for at least twenty-four hours prior to the dental appointment (or longer if possible), in order to avoid the potentiated effects of this drug combination.

In the case of chronic marijuana smokers, there is a greater concern as to the overall respiratory health of the patient, in which case nitrous oxide – oxygen inhalational sedation may in fact be contraindicated. According to one study, smoking both tobacco and marijuana synergistically increased the risk of respiratory symptoms two and a half times over baseline while the risk of developing chronic obstructive pulmonary disease (COPD) increased three fold (Tan et al, 2009). If the patient has COPD, nitrous oxide – oxygen inhalational sedation is contraindicated, and the OHCP is therefore left with oral sedation as the pharmacological alternative (Donaldson, Donaldson, & Quarnstrom, 2012).

Similar to the analgesics above, in patients who may concurrently take marijuana and another CNS depressant, monitor for excessive sedation and somnolence during coadministration is advisable.

A recent study of 138 tobacco smokers surveyed concerning their marijuana use found that anxiety sensitivity was related to marijuana use. In other words, users of marijuana seemed to experience anxiety more easily than they might when not using marijuana. The 25-item and 5-subscale Marijuana Motives Measure and the Anxiety Sensitivity Index-3 were the instruments employed in the study (Norberg, Olivier, Schmidt, & Zvolensky, 2014). Healthcare professionals may want to consider helping clients who are low in anxiety sensitivity and who use both marijuana and tobacco to focus on choosing alternative recreational behaviors that are associated with less health risk than smoking marijuana.

Marijuana-Herbal Interactions

One reason for the record of safe use of herbal remedies is that plants are made up of hundreds of different biochemical constituents. Used in whole form, whether decocted as tea or used as an extract or salve, the action of whole-plant therapies is complex when looked at through a reductionist lens. The chemical constituents in plants occur in very small amounts. Herbs, although they have healing properties and the ability to create change and can even cause chemical reactions in the body, are not pharmaceutical drugs typically produced from one substance. They are much more complex. When people ingest, apply, or inhale herbs, they are taking in very small “doses” of particular substances that are in a natural, rather than synthetic, state and are in formulation, so to speak, as they occur in nature. The safe use of whole plants is related to the use of a plant in its complex natural state. Often, botanical science reveals that medicinal plants contain constituents in balance, with seemingly opposing actions. Plant pharmacology is replete with examples of such balance or contradiction. For example, the hypericin constituent in St. John’s wort (*Hypericum perforatum*) “induces the cytochrome P450 system (inducing CYP3A4 in hepatocyte cells) and at the same time contains the bioflavonoid quercetin, which is a 3A4 inhibitor” (Libster, 2002, p. 74). However, when people decide to use a standardized extract of a single constituent of an herb, such as hypericin, much like a drug, or use an herb in a form that departs from traditional use, the historical safety record is no longer applicable. For example, if the safety record of traditional medicinal use of garlic is related to eating the fresh chopped bulb in food or as an infused oil, new safety data will have to be collected for use of powdered garlic tablets. Whereas safety “information” related to traditional use of herbs is shared through oral tradition (e.g., where and when to harvest, how to gather and prepare and apply, how much to take and when) biomedical use of herbs compels research and further gathering of population safety information about new forms of herbal remedies and applications. When herbs are used in the treatment of biomedically defined diseases, the same safety standards are followed as are used with drugs. Marijuana has been used for centuries and is relatively safe when compared with other illicit drugs. However, when the herbs’ constituents are removed and placed in pharmaceutical single-constituent drug form, a new history of use begins. Safety cannot be inferred for these or any whole-plant products that diverge from traditional use. Marijuana-based pharmaceuticals and innovative products such as cannabinoid-terpenoid synergy drugs require a clinical-trial evidence base. At this time, herbal medications are not part of the typical dental armamentarium so that herbal interactions with marijuana are not a specific current concern. The interaction between

herbal medicines and dental drugs has been covered in other modules (Donaldson, 2016).