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1 message

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Reply-To: pedro.Diz@usc.es
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Sincerely,
Dr. Pedro Diz Dios
Editor-in-Chief, Special Care in Dentistry
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# Oral Health Implications and Screening Protocol of Increased Marijuana Use among Dental Patients: Public Health Issue

| Journal: | *Special Care in Dentistry* |
|---|---|
| Manuscript ID | 3782 |
| Wiley - Manuscript type: | Review |
| Keywords: | oral health, dental education |
| Abstract: | Background: Marijuana is the third most widely used illicit substance in United States. It is estimated that 22.2 million Americans of age 12 years and older report current marijuana use. Massachusetts reported 45% of adults between the age of 18-25 years used marijuana along with 22% increase in marijuana consumption in 2017 after legalization. This review explores the latest trends in the use of marijuana and reviews oral health implications and guidelines for treating dental patients under the influence.<br>Review: Patient on marijuana use are high and impaired to provide informed consent, these patients are most often noncompliant, seek cosmetic dental treatment, such as veneers and whitening. As marijuana legalization gains more support for recreational use, there needs to be emphasis on screening tools in dental school training to help diagnose marijuana abuse and dental treatment considerations.<br>Conclusion: As dentist are primary care providers and see patient at close regular intervals, it is imperative that dental professionals understand the implications of treating such patients. Regular use of screening tools should be advocated during medical history examination to allow early identification of the substance abuse; discussion of consequences on oral and systemic health and management of dental treatments. |
| | |

**Oral Health Implications and Screening Protocol of Increased Marijuana Use among Dental Patients: Public Health Issue**

## Introduction:

Marijuana is the third most widely used illicit substance in the United States. In the past 20 years, its use has increased 30-fold and it is estimated that 22.2 million Americans of age 12 years and older report current marijuana use (NSDUH, 2015). Marijuana has a long history of being used as industrial, recreational and medicinal agent (Whiting et al., 2015). According to US Surgeon General Report, marijuana use is a growing public health issue. There are 33 states that have legalized medical marijuana, and of those 11 states have further legalized recreational consumption of the drug since July 24, 2019. Per the recent survey, Massachusetts reported that 45% of adults between the age of 18-25 years used marijuana along with 22% increase in marijuana consumption in 2017 after legalization (Zvonarev et al., 2019). In 2018, 37.3% of 12th grader reported vaping in the last 12 months compared to 27.8% with more than 1 in 10 eighth graders addicted to vaping in the past year. Due to the drastic upswing in availability and usage of marijuana among youth, adults and elderly population, dentists need to discuss possible effects of marijuana use on dental practices.

Previous studies have concluded that it is important for dental care providers to make clinical decisions based on scientific evidence regarding the pharmacologic and psychological effects of marijuana. Concerns have also been raised about marijuana use by patients seeking dental treatment since little is known about dentist's practices and attitudes when it comes to substance misuse screening in the dental setting (Parish CL et al., 2015). Since patients on marijuana use are high and impaired to provide informed consent, these patients are most often noncompliant, hence long-term treatment prognosis are questionable. Such patients also often seek cosmetic dental treatment, such as veneers and whitening. Due to these unaesthetic dental complications such as staining; this represents another opportunity for the dentist to discuss suspected substance misuse, provide appropriate referrals for treatment, and encourage cessation of use as part of the treatment process prior to initiating any cosmetic treatments that may otherwise fail (Ilgen M et al., 2014). There is an emerging evidence associated with the use of marijuana and its oral health implications. This report explores the latest trends in the use of marijuana and review oral health implications and guidelines for treating dental patients under the influence. With existing challenges in the American health care in terms of access and delivery of care, it is essential to discuss what is known about the effects of marijuana on oral health and address implications for education, public health policy and future research (Le A. et al., 2019).

## Trends in Marijuana Use:

The scope of practice and access to patients is not only inclined or limited to health-care physicians but also to the dental professionals including dental hygienist and dentist (Rechthand MM et al., 2016). Per the Substance Abuse and Mental Health Services Administration data, the use of Marijuana has increased to 17.5% in 2019 (48.2 Million) from 2018. According to the National Institute of Drug Abuse, more than 11.8 million young adults reported marijuana use in the past year and its use is more prevalent among adolescent young men than women in United States. The Drug Abuse Warning Network (DAWN), a system for monitoring the health impact of drugs, estimated that in 2011, there were nearly 456,000 drug-related emergency department visits in the United States that reported marijuana use in their medical records (21% increase over 2009). About two-thirds of patients were male and 13% were between the ages of 12 and 17.

This infers the potential increase of marijuana use among medical and recreational marijuana users. In addition, marijuana use and other illicit substance use such as alcohol, drug, misuse of prescription medications were more likely among older marijuana users (Choi et al., 2016).

According to National Institute on Drug Abuse, addiction is defined as a chronic, relapsing disorder which is characterized by compulsive, continued use of substance despite harmful consequences. It is considered both a complex brain disorder and a mental illness. Addiction is the most severe form of a full spectrum of substance use disorders, and is a medical illness caused by repeated misuse of a substance or substances.

Moreover, prevalence of Substance Use Disorder among older Americans has been increasing (Wang Andrade, 2013). Based on United States Census Bureau, 2017, the older American population projected to reach 72.8 million by 2030. However, should prevalence continue to increase to 4% in 2030, we estimate that some 2.9 million elders will be cannabis users. There are multiple factors such as education and financial burden that affect the use of marijuana among patients based on their demographics, social and behavioral aspects (Hill, 2016). In addition to an increasing older adult population, the United States is experiencing changes in the legalization, perception, and use of marijuana. Furthermore, difference in the level of education also plays an important role in the patient misuse of substance.

**Composition and Modes of Delivery:**

Cannabis is a broad term used to describe different forms that are derived from cannabis sativa plant, including marijuana and cannabinoids. Cannabinoids are a group of active chemical compounds found in cannabis such as is delta-9-tetrahydrocannabinol (THC) and other active compounds like cannabinoid (CBD). The main psychoactive and intoxicating compound in marijuana is THC that makes users "high" whereas other active compounds like cannabinoid (CBD) are not mind altering. The length of time marijuana remains in your body depends on level of use. THC will test positive within 2-5 hours of use. Heavy and frequent marijuana user usually have THC in blood for 15-30 days. There are multiple factors such as body weight, body fat, frequency of intake, mode and amount used that affect the THC level in the body.

Marijuana is delivered in form of inhalation, oral and topical. A common method of using marijuana is through smoking as a cigarette, bong, blunt or bubblers. A relatively new method of consuming marijuana either in liquid or dry form in an electric device called vaping devices are available. These devices are accessible in variety of small smokeless concealable shapes and sizes such as pens, USB flash drives, and other types of electronic devices. By the process of vaporization, these vaping devices expose users to high THC levels ranging from 40% to 80%. This exposed form of marijuana can be four times stronger in THC. However, there is no safety dosage available on vaping devices yet, heavy and frequent use of marijuana, especially THC, leads to the cannabis induced psychosis (Hasin, D. S et al., 2015).

**Dental Treatment Planning Consideration**

Prescribed consumption of marijuana is imputed with health benefits. It is noted for its anti-emetic properties especially in patients undergoing chemotherapy and its ability to reduce intraocular pressure in the treatment of glaucoma. Evidence show improved pain control in patients diagnosed with AIDS, cancers, multiple sclerosis and other chronic debilitating and terminal diseases (Volkow ND et al.,2019). Evidence suggests that extended marijuana use can lead to several adverse general and oral health problems (Cho CM et al., 2005). Heavy use of marijuana has been reported to cause euphoria, hyperactivity, tachycardia, paranoia, delusions, hallucinations, respiratory problems, bronchitis, diarrhea, abdominal cramps, tachycardia and impairment with short-term memory and motor skills (Maloney et al., 2015). Dentists face several challenges such as increased anxiety, paranoia, hyperactivity while treating patients intoxicated ("high") with marijuana during dental visit since these challenges increases the stress level (Cho CM et al.,

2005, Rechthand MM et al., 2016). Increased heart rate and other cardiorespiratory effects of cannabis make the use of epinephrine in local anesthetics (for procedural pain control) potentially life-threatening (Rechthand MM, et al., 2016, Maloney WJ et al., 2015, Keboa MT et al., 2020). Patients may be unwilling to self-report marijuana use or unable to answer reliably, but determination of intoxication may be possible during the routine cardiac risk assessment (Grafton SE, 2016). It is because of the dangers of administering epinephrine or products containing alcohol to a "high" patient (Cho CM et al., 2005, Rawal SY et al., 2016, Scully C., 2007, Goyal H, 2017), in addition to increased anxiety and paranoia, that dentists may refuse to treat the intoxicated patient (Schulte D, 2015) or consider postponing non-emergency treatment for at least 24 hour (Maloney WJ et al., 2015). Additionally, there may be legal implications regarding validity of informed consent with intoxicated patients, especially with irreversible procedures like extractions. Effects of acute intoxication effects are reported to subside within 2 to 3 hours (Joshi S et al., 2016, Grafton SE, 2016, Maloney WJ et al., 2015)

Marijuana smoking along with other etiological factors such as tobacco use, alcohol, poor oral hygiene and non-compliant dental history has been associated with poor oral health that leads to xerostomia which in turn contribute to number of oral health conditions. Furthermore, the main psychotropic agent, THC, is an appetite stimulant leading to high sugar intake that leads to increased incidence of smooth surface caries. The presence of smooth surface caries is concerning since such cavities can be prevented and maintained with regular oral hygiene measures (Schulz-Katterbach et al., 2009). Also, xerostomia caused by marijuana misuse is a strong risk factor for dental caries (Cho et al., 2005, Joshi S et al., 2016). Of most concern to dental providers is the development of dry mouth because saliva plays a crucial role in maintaining oral pH, reducing bacterial growth, and providing key minerals for the remineralization of teeth; dry-mouth causes dramatic increased rate of developing caries and oral infections (Brosky et al., 2007). Additionally, marijuana smoking leads to the gingival inflammation, gingival hyperplasia, development of deeper periodontal pockets, clinical attachment loss, alveolar bone loss and a higher risk of developing severe periodontitis (Shariff et al., 2017). Extended exposure to the active ingredients along with extensive inhalation is attributed to chronic and consistent inflammation of the periodontal tissue leading to destruction of the periodontal attachment (Thomson et al., 2008). A dose and duration dependence has been noted with marijuana consumption causing increased risk for attachment loss in sites that are 5mm or more in probing depth (Thomson et al., 2008). Moreover, chronic use amongst young adolescent and adults can impede growth and cognizance leading to a phenomenon of amotivational syndrome (Schwartz et al., 1987). This particularly cause reduced interest in self-care and decreased motivation in personal hygiene attributing to initiation and progression of oral diseases. It is prudent to note the importance of personal and oral hygiene and its impact on overall general health as diminished oral care can lead to plethora of irreversible conditions such as periodontal disease, carcinogenic conditions and open a gateway to numerous systemic conditions. Chronic marijuana smoking also causes rise in the temperature of oral cavity which leads to mucosal irritation, edema and erythema of the oral tissues causing gingival hyperplasia, stomatitis, leukoplakia, candidiasis and erythroplakia which may lead to the development of oral cancers (Zang et al., 1999). However, the link between chronic use of marijuana smoking and oral cancer is unclear based on research findings. There are neurological and biological effects of cannabis that causes not only cognitive but psychomotor impairment as well. Frequent and chronic use has also been associated with systemic health effects involving addiction and disruption of brain development, particularly in adolescents.

**Screening Protocol:**

Little is known about the implementation of substance misuse education in dental schools in pre-doctoral curriculum as most institutions are focused on management of the side-effects of substance misuse rather than training the upcoming health care professionals in identifying high risk behavior. This causes fresh graduates

to have minimal to none experience in managing patients with such endangered habits. Dental professionals are one of the key personnel in performing screenings for substance abuse because of their direct relationship with their patients, imminent cause and effect seen in oral cavity due to prolong substance misuse and poor oral hygiene habits. Clinical guidelines may need to be developed to help dental providers assess the patient's degree of cognitive impairment under marijuana substance abuse. This will help in improving their knowledge and perception on case selection for an extensive treatment modality. The three screening tools available are as follows

- Screening Brief Intervention and Referral to Treatment (SBIRT)
- Cannabis Use Disorder Identification Test (CUDIT)
-  CUDIT Revised (CUDIT-R) model

Screening Brief Intervention and Referral to Treatment (SBIRT): It is an evidence based effective tool aimed to assess any substance abuse in patients followed by providing early intervention and treatment referrals to help combat the disorder. The tool is highly effective in community-based screening and helps health care providers in identifying high risk behaviors and active substance abuse (Madras et al, 2009). It usually comprises of *screening* through demonstration of numerous activities such as employing evidence-based teaching modules, *brief intervention* via role-play exercise, mock interviews and "hands-on" activity and *referral for treatment* (Babor et al, 2005). SBIRT has been effective tool and well received by pediatric residents when employed as a part of a research with 92% expressing relevance in learning the screening tool (Schram et al, 2015). Another residencybased study found 99% dental residents to be satisfied with incorporating SBIRT and achieving clinical satisfaction; however, decreased motivation to use the screening tool was noted after 30 days due to reduced self-efficacy and precariousness in using the tool with different patient population (Bray et al 2014). SBIRT screening has been highly effective in identification of illicit drug users and improving the high risk behavior via effective treatment referral (Bernstein et al, 2005; World Health Organization Report, 2008).

Cannabis Use Disorder Identification Test (CUDIT): This is a 10- item screening tool developed as a measure to identify hazardous and extended use of cannabis and was inspired from Alcohol Use Disorders Identification Test. CUDIT was published as a highly efficacious tool however, it wasn't as effective due to some of the questions being obscure and confusing to the patients (Anageim, 2008).

Cannabis Use Disorders Identification Test - Revised (CUDIT-R): The revised screening tool is a short questionnaire designed to be brief and have superior psychometric properties thus making it highly effective tool (Adamson, 2010). The test included 4 items from the original tool with addition of 4 new items allowing effective identification of misuse especially in heavy users. It is shown to have 91% sensitivity and 90% specificity rate among heavy users (Adamson, 2010) equally sensitive with 70% specificity in young adults (Schultz et al, 2019).

These screening tools should be incorporated as a part of comprehensive health history taking. If the patient appears to be a user, it may be helpful to understand whether the use is medicinal, as this may suggest relevant comorbidities. Verification of cannabis use may be an opportunity to discuss other health consequences and inform the patient of the importance of fluoride, good oral hygiene practices, and healthy snacking. Keep advised of current changes in applicable laws on recreational or medicinal cannabis.

**Conclusion:**

As marijuana legalization gains more support for recreational use, there needs to be emphasis on the understanding of cannabis side-effects and its impact on the interrelationship between oral and general health. As dentist are primary care providers and often see patient at close regular intervals, it is imperative

that dental professionals understand the implications of treating patients under the influence. Regular use of screening tools should be advocated during medical history examination to allow early identification of the substance abuse, discussion of consequences on oral and systemic health and management of dental treatments should be promoted.

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# The Cannabis Use Disorder Identification Test - Revised (CUDIT-R)

**Have you used any cannabis over the past six months?**      YES / NO

**If YES**, please answer the following questions about your cannabis use. Circle the response that is most correct for you in relation to your cannabis use *over the past six months*

1.   How often do you use cannabis?

| Never | Monthly or less | 2-4 times a month | 2-3 times a week | 4 or more times a week |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

2.   How many hours were you "stoned" on a typical day when you had been using cannabis?

| Less than 1 | 1 or 2 | 3 or 4 | 5 or 6 | 7 or more |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

3.   How often during the past 6 months did you find that you were not able to stop using cannabis once you had started?

| Never | Less than monthly | Monthly | Weekly | Daily or almost daily |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

4.   How often during the past 6 months did you fail to do what was normally expected from you because of using cannabis?

| Never | Less than monthly | Monthly | Weekly | Daily or almost daily |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

5.   How often in the past 6 months have you devoted a great deal of your time to getting, using, or recovering from cannabis?

| Never | Less than monthly | Monthly | Weekly | Daily or almost daily |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

6.   How often in the past 6 months have you had a problem with your memory or concentration after using cannabis?

| Never | Less than monthly | Monthly | Weekly | Daily or almost daily |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

7.   How often do you use cannabis in situations that could be physically hazardous, such as driving, operating machinery, or caring for children:

| Never | Less than monthly | Monthly | Weekly | Daily or almost daily |
|---|---|---|---|---|
| 0 | 1 | 2 | 3 | 4 |

8.   Have you ever thought about cutting down, or stopping, your use of cannabis?

| Never | Yes, but not in the past 6 months | Yes, during the past 6 months |
|---|---|---|
| 0 | 2 | 4 |

***This scale is in the public domain and is free to use with appropriate citation:***

Adamson SJ, Kay-Lambkin FJ, Baker AL, Lewin TJ, Thornton L, Kelly BJ, and Sellman JD. (2010). An Improved Brief Measure of Cannabis Misuse: The Cannabis Use Disorders Identification Test – Revised (CUDIT-R). *Drug and Alcohol Dependence* 110:137-143.

## Brief Health Screening Questionnaire

We ask all our adult patients about substance use and mood because these factors can affect your health. Please ask your doctor if you have any questions. Your answers on this form will remain confidential.

_____

_____

**Alcohol:**     One drink =      12 oz. beer     5 oz. wine     1.5 oz. liquor (one shot)

| | None | 1 or more |
|---|---|---|
| **MEN:** How many times in the past year have you had 5 or more drinks in a day? | ○ | ○ |
| **WOMEN**: How many times in the past year have you had 4 or more drinks in a day? | ○ | ○ |

**Drugs:** Recreational drugs include methamphetamines (speed, crystal) cannabis (marijuana, pot), inhalants (paint thinner, aerosol, glue), tranquilizers (Valium), barbiturates, cocaine, ecstasy, hallucinogens (LSD, mushrooms), or narcotics (heroin).

| | None | 1 or more |
|---|---|---|
| How many times in the past year have you used a recreational drug or used a prescription medication for non-medical reasons? | ○ | ○ |

**Mood:**

| | No | Yes |
|---|---|---|
| During the past two weeks, have you been bothered by little interest or pleasure in doing things? | ○ | ○ |
| During the past two weeks, have you been bothered by feeling down, depressed, or hopeless? | ○ | ○ |

*(For the medical professional)*

**Interpreting the Brief screen:**

**Alcohol**: Patients who answer "1 or more" should receive a full alcohol screen (such as the AUDIT).*

**Drugs**: Patients who answer "1 or more" should receive a full drug screen (such as the DAST).*

**Mood:** Patients who answer "Yes" to either question should receive a full screen for depression (such as the PHQ-9).

More resources: www.sbirtoregon.org

* Smith P, Schmidt S, Allensworth-Davies D, Saitz R. "Primary Care Validation of a Single-Question Alcohol Screening Test." J Gen Intern Med 24(7):783–8. 2009

* Smith P, Schmidt S, Allensworth-Davies D, Saitz R. "A Single-Question Screening Test for Drug Use in Primary Care." Arch Intern Med 170 (13): 1155-1160. 2010

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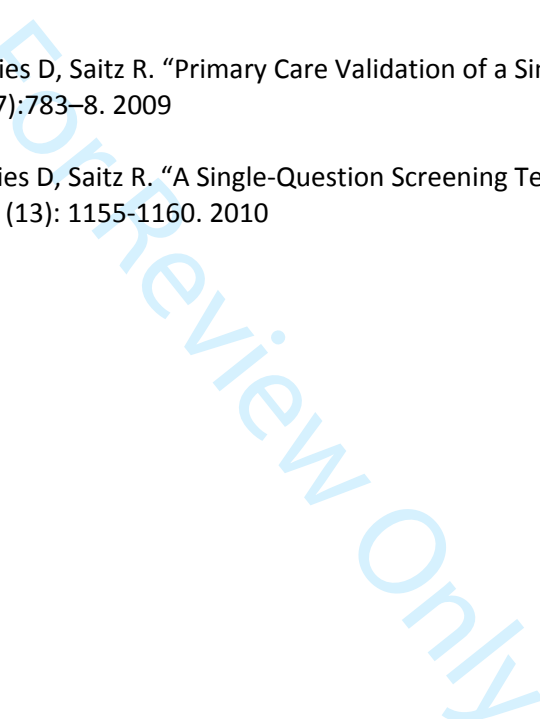
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25 February 2022
**Date**

Pedro Diz Dios
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