Marijuana Use and Oral Health

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Continuing Education Units: 1 hour


Disclaimer: Participants must always be aware of the hazards of using limited knowledge in integrating new techniques or procedures into their practice. Only sound evidence-based dentistry should be used in patient therapy.

The legalization of marijuana for medical use and additionally for recreational use in several states has stimulated the need for oral health professionals to be aware of the incidence of use among their patients and the impact on oral health. Upon completion of this course, oral health care professionals will have a better understanding of the demographics, mechanisms, general health and oral health implications of marijuana.

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• Dr. Arteaga is a member of the dentalcare.com Advisory Board.

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Overview
The legalization of marijuana for medical use and additionally for recreational use in several states has stimulated the need for oral health professionals to be aware of the incidence of use among their patients and the impact on oral health.

Learning Objectives
Upon completion of this course, the dental professional should be able to:
• Be familiar with the demographics of marijuana use among all age groups.
• Understand the mechanism of action of THC, consequences on the general health and the oral health implications with the use of marijuana.
• Understand the risks of oral cancer development, caries and periodontal disease in the marijuana user.

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Introduction
The legalization of marijuana use in some form in 21 states of the United States (U.S.) and the District of Columbia to date (April 2014) has called attention for providers to the potential impact on general and oral health of patients.

The states of Colorado and Washington have legalized marijuana for recreational use, in addition to medical uses. Interestingly, the revenues expected from this legalization have fallen short of $30 million of tax revenue predictions in Colorado, where the tax rate is set at approximately 31% (15% excise tax, 10% state retail tax, 2.9% state sales tax and a local sales tax of 3.5%) with actual collections of tax to be $21 million this past year. Taxes in the state of Washington are imposed at 44% for the sale of marijuana. Marijuana is considered a Schedule I substance by the federal government under the Controlled Substance Act, which is described to have no recognized medicinal use and a potential risk for abuse. The controversy over the medical uses for marijuana (cannabis) continues as the American Medical Association (AMA) has released a November 2013 statement that “cannabis is a dangerous drug and as such is a public health concern... but acknowledged the changing attitudes toward marijuana among the American public.” The AMA encourages continued research of marijuana and potential medical uses. Currently the medical conditions for which patients can use cannabis as determined by legislation are: cancer, glaucoma, HIV/AIDS, muscle spasms, seizures, severe pain, severe nausea and cachexia (weight loss, muscle atrophy, fatigue and loss of appetite). Specifically, therapeutic benefits for spasticity symptoms of Multiple Sclerosis (MS) are being studied, and the use of cannabis for cancer pain is suggested. In certain states, other debilitating medical conditions can warrant the use of cannabis: amyotrophic lateral sclerosis (ALS or Lou Gehrig’s Disease), Alzheimer’s disease and post-traumatic stress disorder (PTSD). Synthetic cannabinoids that are prescribed such as Marinol (Dronabinol) and Cesamet (Nabilone) are classified as Schedule II and III and used for the nausea and loss of appetite with chemotherapy patients. Clinical trials using Sativex for use in MS spasticity and cancer pain are currently in Phase II and III studies in the U.S, but already in use in Europe.

Recent statistics of marijuana use in the U.S. from a national survey in 2009 by the National Institute on Drug Abuse indicate that more than 104 million Americans over the age of 12 had tried marijuana at least once. Peak usage for marijuana occurs in the late teens and early twenties, yet slightly less than half of adults polled by the Pew Research Center reveal using marijuana with 12% using it in the past year.
Figure 1. Marijuana Laws in 50 States.

Figure 2. Marijuana Use Increased Over the Last Decade.
The chemical in marijuana, delta-9-tetrahydrocannabinol (THC) that targets the cannabinoid receptors has been determined to be more potent today than it was just a few decades ago in the 1980s. The THC concentrations averaged 15% in 2012, compared to 4% in the 1980s. This higher concentration may increase the risk of effects from the drug and/or the potential addiction.

The number of emergency room visits in 2008 documented in the U.S. connected to marijuana use has steadily increased to over 370,000, particularly in the 12-17 year old age group. Due to the impact on judgment and perception, driving can be dangerous when smoking marijuana and after alcohol, it is the second most frequent substance found in drivers implicated in fatal automobile accidents.

**Mechanism of Action and General Health Changes**

The dried leaves, stems or flowers of the *Cannabis Sativa* hemp plant are used to produce marijuana. The sticky resin from the plant can be concentrated to produce hashish or hash oil. The concentrations of THC differ in each component: 7-12% in the leaves, 2-8% in hashish and 15-20% in the hash oil. The most common way of using cannabis is through smoking, similarly to smoking a cigarette (hand rolled), in a pipe or water pipe (bong) or through ingestion in food. Other chemicals are found in marijuana: cannabidiol, cannabinol and β-caryophyllene, which adversely affect health.

THC effects are immediate, with absorption directly to the bloodstream via the lungs if smoked, and carried to other organs and the brain. The psychoactive effects occur within the endocannabinoid system, affecting parts of the brain and cognitive impairment. Certain areas in the brain, such as the hippocampus, the cerebellum, the basal ganglia and the cerebral cortex, have a higher concentration of cannabinoid receptors. These receptors influence sensory and time perception, coordinated movement, thinking, concentration and memory. Several studies document the loss of short-term memory and other reports detail a compromise of longer-term memory based on the amount and duration of use. One study related a loss of 8 points in IQ tests between the ages of 13 and 38 with those individuals who smoked heavily, beginning in their teen years. These cognitive abilities are unable to be restored in adulthood.

Other health effects of marijuana include an increase in respiratory rate, heart rate, and blood pressure, with this effect lasting more than three hours. The risk of a heart attack increases by up to 4.8 fold in the first hour after smoking marijuana. This risk is greater in those with risk factors such as high blood pressure, arrhythmias or other cardiac diseases. Changes within the lungs from smoking marijuana involve enlargement of the bronchial passages after relaxation of the blood vessels. In addition, engorgement of the blood vessels in the eyes causes a reddened appearance. The hydrocarbons found in marijuana smoke are 50-70% more carcinogenic than tobacco smoke and an irritant to the lungs. Respiratory conditions common in tobacco smokers such as daily cough, phlegm production and risk of lung infections are also found in marijuana smokers. There are currently no studies that confirm the risk for lung cancer with marijuana smoke.

Links to mental illnesses with marijuana use have been observed with suicidal thoughts among adolescents, depression, anxiety and an increase risk of developing schizophrenia or other psychoses. The impairment to judgment with marijuana use allows for the contribution to the risk of injury, particularly in motor vehicle accidents. A study from Columbia’s Mailman School of Public Health collected data from toxicology reports on drivers of over 20,000 fatal automobile accidents and found that marijuana was involved in 12% of those crashes. Addiction to marijuana is possible, contrary to common beliefs, with 9% of users becoming addicted to marijuana, particularly with those who start in their teens with 25-50% who use marijuana daily.

**Oral Health Implications Consistent with Marijuana Use**

Research confirms an association with poor oral health and alcohol dependence and marijuana use due to a number of reasons: hygiene habits, poor diet choices, attitudes about care or limited access to care. Marijuana use induces salivary reduction causing xerostomia along with an increased
appetite after marijuana use, in particular for cariogenic foods, which in turn can increase the risk for caries. A higher level of DMFT (decayed, missing and filled teeth) scores has been documented as described by Cho. In addition, a trend analysis by Ditmyer et al. has supported these findings over an eight year span looking at the effect of tobacco and marijuana use in adolescents residing in Nevada with “an increased prevalence and severity of caries.”

Additional effects of marijuana on oral health involve the periodontium. Oral mucosa and gingival tissues exhibit changes such as leukoedema, which may be in part due to the irritants in the marijuana smoke. Gingivitis and alveolar bone loss are documented with chronic inflammation and gingival hyperplasia. The risk of periodontal diseases may be related to this inflammation and the “increased prevalence of opportunistic infections.”

The suppression of the immune regulatory system with the “inhibition of lymphocytic proliferation, antibody production, natural killer cell activity and macrophage activity” are the major mechanism of action to reduce resistance to bacterial or viral infection. Furthermore, an increased prevalence of Candida albicans can be demonstrated with this diminished immune response and the ability of C. albicans to use the hydrocarbons from cannabis as an energy source.

Risk of Oral Cancer Development
Several studies endeavor to relate oral cancer with marijuana use and smoke, with mixed results. In one study described by Hall, Zhang found a 2.6 times more likely association of primary squamous cell carcinoma of the head and neck in marijuana users after adjusting for cigarette smoking, alcohol use and other risk factors. The mechanism by which marijuana may act as a carcinogen is unclear, and the reported cases of marijuana use with squamous cell carcinoma cannot adjust other risk factors in other studies. In a case control study included in an epidemiologic review of marijuana use and cancer risk, increased risk to oral cancer is suggested, but the difficulty exists when measuring the use of marijuana, tobacco, alcohol and other drugs in this population of patients.

Summary
With the recent escalation of marijuana use due to legalization for both medicinal and recreational use in the U.S., the importance of understanding the demographics, mechanisms, general health and oral health implications is crucial for health care providers. The side effects created by marijuana use and the risk for oral cancer that can impact treatment for patients are significant considerations.
**Course Test Preview**

To receive Continuing Education credit for this course, you must complete the online test. Please go to:

1. More than twenty states have legalized marijuana for medical use; which states have legalized recreational use?
   a. New York and New Jersey
   b. California and Texas
   c. Colorado and Washington
   d. Washington DC and Oregon

2. The American Medical Association has endorsed and encourages the use of medical marijuana for specific conditions such as Alzheimer’s disease and post-traumatic stress disorder.
   a. true
   b. false

3. THC, the chemical in marijuana, attaches to which receptors?
   a. cannabinoid receptors
   b. endonoid receptors
   c. addiction centers of the brain
   d. delta receptors

4. Marijuana has been found in drivers responsible for fatal automobile accidents:
   a. when used in conjunction with alcohol
   b. in over 370,000 cases
   c. involving 12% of fatal accidents reviewed in one study
   d. in young adults aged 17-21

5. The *Cannabis Sativa* plant produces marijuana in what form?
   a. as dried stems and leaves
   b. in a sticky resin form
   c. hashish and hash oil
   d. all of the above

6. Health effects from using marijuana include:
   a. increased heart rate
   b. increased respiratory rate
   c. increased blood pressure
   d. decreased peripheral blood flow
   e. a, b, c only

7. What specific mental illness can be linked to marijuana use?
   a. depression
   b. anxiety
   c. schizophrenia
   d. all of the above
   e. none of the above
8. **The risk of a heart attack after marijuana use increases:**
   a. by half
   b. 4.8 fold
   c. 3 hours after use
   d. 10 times

9. **Oral health changes noted with marijuana use include:**
   a. caries
   b. leukoedema
   c. gingival hyperplasia
   d. a and b
   e. a and c
   f. a, b and c

10. **The risk of oral cancer has been documented in every case study presented with marijuana use.**
    a. true
    b. false

11. **Candidica albicans can thrive in an environment with marijuana use because:**
    a. the warm environment from the smoke
    b. the hydrocarbons act as an energy source
    c. poor oral hygiene
    d. ingestion of cariogenic foods

12. **One of the proposed mechanism of action for implicating marijuana in periodontal changes includes:**
    a. suppression of the immune regulatory system
    b. poor attitude towards hygiene
    c. lack of adequate care of the patient
    d. incorrect brushing techniques
References

About the Author

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Dr. Arteaga is an Associate Clinical Professor at the University of Connecticut School of Dental Medicine, teaching Operative Dentistry and Prosthodontics in the Department of Reconstructive Sciences. She attained a Mastership from the Academy of General Dentistry and is a member of numerous dental associations, including the Hispanic Dental Association, Academy of General Dentistry, National Dental Association, and American Dental Education Association. Sarita is the Past-President for the Hispanic Dental Association and currently serves as the President of the HDA Foundation.

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