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Review Article

RECREATIONAL ILLICIT DRUG USE

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ABSTRACT

Drug abuse is a major problem in most countries of the world today. Many studies, surveys, and case reports have described the adverse social and medical effects of drug abuse; yet surprisingly little is known about the specific effects of many of these drugs in the oral cavity.. The dentist must be aware of this drug use in their individual patients in order to: 1) avoid possible contraindications during dental treatment; 2) be aware of the many oral and craniofacial manifestations of such drug use; 3) be able to provide necessary dental treatment to combat the dental oral ravages of drug use and 4) be able to refer such patients, if so desired by the patient, to the proper professionals for counselling. This review describes systemic and oral effects of Recreational Illicit Drug

Keywords: Illicit, Drugs, Oral, Cavity, Dentist.

INTRODUCTION

The use and abuse of recreational drugs is not a topic routinely found, or at least not covered in depth, in the dental curriculum. It is a subject in which information is usually obtained and shaped from cultural and sociological attitudes, media reports or just hearsay. Mood-altering drugs have been used by man for many purposes throughout recorded history¹. The pattern of drug abuse varies somewhat from infrequent abuse in particular social contexts termed 'recreational' abuse to continuous chronic abuse characteristic of drug addiction. The sensations or short term effects associated with drug abuse in relation to general health are well recognised and include exhaustion, nausea, hallucinations, chills, sweating, increase in body temperature, tremors, muscle cramping, blurred vision and anxiolysis. The long term effects of abusing drugs are the risk of developing permanent brain damage with various psychological, cognitive and behavioral effects that may manifest as depression, anxiety, memory loss and various neuropsychotic disorders. In some cases drug abuse can result in death by various means: malignant hyperthermia, internal bleeding, fatal overdosing and through allergic reactions⁵.

Studying the oral sensation of illicit drugs is important on many fronts: it may provide information on the underlying pathological processes and thus help to explain the clinical features observed. It may also enable clinicians to identify such drug abuse from patients' reported symptoms and thus facilitate a more comprehensive and multidisciplinary approach to the management of addiction. Moreover, in the fight against illicit drug use, a better understanding of the effects of substance abuse can provide the public with greater information in order to make a more informed decision about their use⁵.

Mood-altering agents were and are used for medical purposes. Cocaine, for example, was widely available in the U.S. during the late 19th century for use as a stimulant, or a local anesthetic in dentistry, ophthalmology, and otolaryngology¹.

Drug abuse has both direct and indirect consequences for oral health and can exacerbate. Oral problems indirectly through its adverse effects on the users' behavior and life style²⁵.

CANNABIS

Cannabis is the dried (marijuana) or processed (hashish) plant of Cannabis sativa, C. indica and C. ruderalis. It is a mild hallucinogen and relaxant and has been used for its medicinal and psychoactive effects for thousands of years.

The effect sought by users of cannabis is euphoria, producing a state of contentment, loss of inhibitions, and heightened self-awareness. As many as 2000 metabolites are produced in the body when cannabis is smoked. These accumulate in fat, liver, lung, and spleen and may remain in fat stores for weeks after ingestion. Cannabis smoking may produce adverse effects on the brain, resulting in an acute panic reaction or a toxic psychosis, such as acute paranoia, or mania with associated delusions and hallucinations. It has been advocated as an antiemetic for patients receiving cancer chemotherapy and to alleviate pain and anxiety in terminally ill cancer patients. It has also been demonstrated to reduce intraocular pressure when topically applied to the eye in treatment of glaucoma. It is also reported to be of some value in relief of involuntary muscle spasms and as an anticonvulsant. Xerostomia as a physiologic effect of heavy use. It is also effective in reducing central neuropathic pain and sleep disturbance^{1,6,9,25,30}.

Marijuana can impair memory and learning, distort perception, cause difficulty in thinking and problem solving and impair coordination, and may trigger psychoses – development of which is often delayed^{6,9}.

Marijuana can also have systemic effects, affecting blood pressure and heart rate and lowering the oxygen-carrying capacity of blood: the risk of myocardial infarction may more than quadruple in the first hour after using it. Babies born to women who used marijuana during pregnancies displayed abnormal responses to visual stimuli, tremulousness and a high-pitched cry. Smoking marijuana frequently leads to respiratory illnesses such as infections, daily cough and sputum production, and obstructed airways. Cannabis smoke may be less carcinogenic than that from tobacco⁶.

Cannabis abusers have poorer oral health. They suffer with an increased risk of dental caries and periodontal diseases, and may be prone to oral infections, possibly aggravated by an immunosuppressive effect. Dental treatment of patients using cannabis can result in acute anxiety and paranoid thoughts, and epinephrine-containing local analgesics may prolong the tachycardia induced by cannabis^{6,9}.

Users generally suffer from fiery-red gingivitis, gingival leukoplakia, alveolar bone loss, gingival inflammation, gingival hyperplasia, oral papillomas, hyperplastic gingiva, uvulitis, tongue carcinoma and an increased risk of dental caries^{18,25,30}.

A shift toward an immature epithelial cell type on the tongue and palate of heavy marijuana smokers. Edema and erythema of the uvula have been reported with heavy use of hashish. Oral leukoedema and occasional hyperkeratosis has also been described in conjunction with marijuana smoking. Clinical evidence associate heavy marijuana use with an increased incidence of squamous cell carcinoma. Dental patients who use marijuana heavily should be advised to discontinue use for at least 1 week before dental treatment^{1,22,25}.

MDMA(Ecstasy)

Ecstasy- 3,4-methylenedioxymethamphetamine is a synthetic hallucinogenic amphetamine. Medically it is used by psychotherapists to treat post-traumatic stress disorder. Recreationally its popularity in the 1990s rave subculture was due to its entactogenic effect defined as a sense that the world is a favorable place to be. Ecstasy causes a feeling of

openness, energy and well being. Ecstasy is normally sold as tablets, which have different colours, shapes and logos⁷.

Ecstasy induces a euphoric feeling, suppresses tiredness, increases sensory perception and induces a sense of closeness to other people. Other symptoms are tachycardia, tremor, dilated pupils, an increased body temperature, nausea, suppressed appetite, insomnia and restlessness. The induced neuromuscular stimulation results in muscle rigidity and breakdown of muscle fibres (rhabdomyolysis). Fulminant hyperthermia has a poor prognosis, as it might lead to further rhabdomyolysis, acute renal and liver failure and disseminated intravas-cular coagulation⁷.

Ecstasy users report more frequently TMJ tenderness compared to individuals who use other illicit drugs. Half of ecstasy users report speech changes, one third report palpitations. Nystagmus and motortics, presenting as trembling of the face, occur less frequently. The severity of oral side effects can be positively correlated with both the total number of doses consumed and the frequency of use⁷. Tooth wear and periodontal disease, xerostomia and bruxism associated with 'ecstasy' use^{5,7}.

If dental treatment must be provided to a patient who has recently used ecstasy, the dentist must be cautious in administering a local anaesthetic containing epinephrine. Ecstasy induces a systemic increase in blood pressure, which may be potentiated by this vasoconstrictor and/or anticipated stress of dental treatment⁷.

Increased risk of dental erosion among these patients is associated with consumption of high amounts of acidic sugary drinks in order to relieve xerostomia and dehydration following use of this drug at dance parties.

Furthermore, mucosal involvements such as ulcers, vestibular swelling, edema, and necrosis have been case-reported in ecstasy users²⁵.

LSD (lysergic acid diethylamide)

Lysergic acid diethylamide is a powerful semisynthetic psychedelic hallucinogen. It is synthesized from lysergic acid derived from ergot, a grain fungus that grows on rye. It is by weight the most potent drug yet discovered. It is used in medicine as an analgesic for chronic cancer pain and cluster headaches. Lysergic acid diethylamide result in several oral complications including dry mouth, bruxism and problems associated with malnutrition caused by drug-induced anorexia²⁵.

METHAMPHETAMINE

Crystal methamphetamine hydrochloride is a synthetic amphetamine and potent central nervous system (CNS) stimulant. It is produced from ephedrine and pseudoephedrine by chemical reduction. Medically it has been used to treat attention deficit hyperactivity disorder, narcolepsy and obesity. It is used to increase mental alertness, motivation, euphoria and a heightened sexual stimulation.

The pharmacological effects of amphetamine based drugs are clinically observed as xerostomia^{5,12,35}.

“Meth mouth” is commonly used to describe the numerous dental problems seen in some methamphetamine abusers. Mild intoxication with methamphetamine is marked by dizziness, headache, irritability, hypertension, tachycardia, mydriasis, tremor, hyperpyrexia and hyperreflexia. Toxic doses of

methamphetamine are extensions of the effects of mild intoxication and may cause confusion, diaphoresis, palpitations, nausea, vomiting, hallucinations, convulsions, and coma^{12,15,18,23,24,38}.

Methamphetamine can be snorted, smoked, swallowed, and injected. Methamphetamine is extremely addictive and a potent stimulant of the central nervous system. The caries of a patient who uses methamphetamine progress more slowly. Despite generalized severe caries with obvious pulpal involvement, patients often report no pain but may seek the advice of a pharmacist for cosmetic or supportive assistance. The pH change after ingestion of MDMA does not significantly contribute to caries formation. During times of acute use, users tend to grind and clench their jaws, further contributing to tooth wear. Rampant caries is caused by high-sugar intake in the absence of protective saliva and bruxism as a result of hyperactivity^{24,35,38}.

The teeth of Methamphetamine users have been described as "blackened, stained, rotting, crumbling, or falling apart"²⁵. Often, the teeth are in such disrepair that they are unsalvageable and must be extracted¹⁵.

The buccal smooth surfaces of the teeth and the interproximal surfaces of the anterior teeth are affected by decay in methamphetamine users. Other oral findings in methamphetamine users include clenching and grinding of teeth, temporomandibular disorders, xerostomia, and poor oral hygiene. The rampant caries clinically resembles early childhood caries^{23,25}.

The duration of action for methamphetamine can be 8–12 hours and up to 24 hours in cases of intoxication. If local anesthesia must be administered during this time, a plain solution (i.e., sterile water for injection or saline) without a vasoconstrictor should be used. In addition, the use of local anesthetic containing a vasoconstrictor should be further avoided for 24 hours after methamphetamine use¹⁸.

Dental pain, principally mediated by inflammation, should be controlled with nonsteroidal antiinflammatory drugs. Topical Fluoride should be administered¹².

COCAINE

Cocaine is a crystalline tropane alkaloid obtained from the leaves of the coca plant. It is a CNS stimulant. In its various forms it is second only to cannabis as the most popular illegal drug. Medically it is useful as a topical anesthetic and vasoconstrictor in ophthalmic and ENT surgery. It was also used to treat alcoholism and opiate addiction. It is available as a white crystalline powder, which can be taken orally, intranasally, vaginally, rectally, or injected subcutaneously or intravenously. Cocaine is a euphoric, capable of producing hallucinations and enhanced feelings of mental and physical prowess. The drug is rapidly absorbed when smoked or injected intravenously, creating an intense euphoria and the potential for rapid tolerance. There is an increased risk for toxicity and a powerful addiction to crack¹.

Cocaine abuse may result in severe psychopathologic effects such as delirium, paranoia, anxiety or depression, schizophrenia, or mania^{1,2,17,18,25,34,39}.

Toxicity may produce anxiety, convulsions, hypertension, cardiac arrhythmia, and elevated body temperature. Atypical angina, myocardial ischemia, infarction, and death may occur.

Snorting of cocaine powder intranasally often results in irritation of the nasal mucosa, causing sneezing, sniffing, rhinitis, and ulceration or perforation of the nasal septum following heavy longterm use^{1,2,25,28,35}.

Oral Manifestations of Levamisole-Adulterated Cocaine Use is cocaine-induced midline destructive lesion(CIMDL) is a full-thickness midline defect of the hard and soft tissues resulting in a communication between the oral and nasal cavities or between the oral and maxillary antral cavities. Upper aerodigestive tract (UADT) manifestations include aphthous ulcerations, nasopharyngeal ulcerations oral candidiasis, pharyngitis, and odynophagia¹³.

Cocaine intoxication may be associated with cervical abrasion of teeth and gingival laceration due to overly vigorous tooth brushing and flossing while "high".

Severe bruxism and flattened cuspal inclines may also be more common among cocaine addicts, accompanied by increased frequency of temporomandibular joint disorders¹⁸. Cocaine users rub the drug on the gingiva or oral mucosa. It occasionally results in the development of grossly inflamed, profusely bleeding gingiva associated with epithelial desquamation^{1,25}.

There are many dental effects of cocaine use. They are: gingival lesions, bruxism, occlusal wear, corrosion of gold dental restorations, excessive hemorrhage after tooth extraction, increased rate of tooth decay and increased rate of periodontal disease. Other intra-oral and craniofacial manifestations include oral candidal infections, nasal necrosis, headaches, perforation of palate, oral ulcers, bilateral cleft lip and palate in fetus, xerostomia, angular cheilitis, halitosis, glossodynia, and erosive lichen planus. Use of epinephrine-impregnated retraction cords is also contraindicated^{18,34,35}.

The palatal defects caused by the use of Cocaine creates functional deficits in speech and swallowing. Speech is hypernasal and unintelligible, as the air and the speech sounds escape into the nasal or sinus cavities^{2,25,34,39}.

Chronic exposure to crack cocaine in vivo results in enhanced antibacterial and antitumoral activities of Polymorphonuclear^{4,16,17}.

Cocaine decreases the ability of macrophages to kill bacteria and tumor cells, likely by suppressing their capacity to generate effector molecules such as nitric oxide. The ultimate outcome of these effects may be an enhanced susceptibility to infectious disease, cancer, hepatitis C virus (HCV), tuberculosis (TB) and AIDS⁴.

Crack cocaine smokers are known to have a high prevalence of oral and lip lesions, including burns, blisters, and sores, which may facilitate the transmission of blood-borne infections⁴.

Crack cocaine is able to induce inflammatory alterations and increases keratinization in the oral epithelium³.

In healthy nasal tissue, the mucociliary system moves foreign particles to the nasopharynx with a clearance time of approximately 20 minutes. A cocaine concentration of 2.5% reduces the clearance by 58%, and a concentration of 10% causes irreversible ciliary damage. Palatal defects create functional difficulties with speech and swallowing. Subsequent prosthetic rehabilitation with an obturator is required to restore function in such patients^{2,16}.

Due to the high temperatures required for smoking crack, the unsafe quality of the

Paraphernalia used and the high frequency of repeated inhalation, users often have chronic cuts, burns and open sores or wounds in their oral cavity area (i.e., lips, gums, inner mouth lining)³³.

GHB

Gamma-hydroxybutyrate has been used as a general anesthetic agent and CNS depressant in the treatment of insomnia. As an intoxicant it gained notoriety as a date-rape drug in the 1990s¹⁷. Recreational use at low doses induces a state of euphoria, sociability and intoxication.

KETAMINE

It is a dissociative general anesthetic agent valued for its minimal respiratory depressant and potent analgesic properties. It is popular for both human and veterinary use. Recreationally it produces hallucinatory effects, impairing the senses of sight, balance and time⁵.

ALCOHOL

Alcoholism is chronic, progressive, and potentially fatal. Tolerance and physical dependency develop and pathologic organ changes may occur as a direct or indirect consequence of alcohol ingestion. Unlike users of many of the illicit drugs of abuse, alcoholics are found in all socioeconomic and educational strata. As a socially accepted mood altering substance, ethyl alcohol has been used throughout history for a variety of religious, societal and medicinal purposes. Encephalographic changes are sometimes noted in alcoholics, suggesting altered neurotransmitter responses in the brain. The fetal alcohol syndrome is found in the offspring of mothers who consume relatively large quantities of alcohol during pregnancy. There is an increase in tolerance in alcoholics for local anesthetics and other drugs. Phagocytosis is decreased in the liver, altering the host resistance to viral infection and perhaps predisposing the alcoholic to viral hepatitis. Liver dysfunction may affect clearance of very low density serum lipoproteins, putting the patient at an increased risk for cardiovascular disease. Platelet function and numbers are diminished. Oral epithelial cells have been demonstrated to atrophy in animals subjected to large quantities of ethanol^{1,11}. Basal cell pleomorphism occurs and there is a tendency toward epithelial dysplasia. Ethyl alcohol may be a cancer promoter capable of causing chemical irritation and increased absorption of carcinogens dissolved in the alcohol²². Salivary gland function may be impaired in alcoholics and asymptomatic enlargement of the parotid glands and, occasionally, the submandibular gland occur. Fatty degeneration of the salivary glands may take place for unexplained reasons, leading to xerostomia^{1,20}.

OPIATES

The term opioid is an all-inclusive grouping of synthetic and naturally occurring peptide drugs that act on various membrane-bound receptors to produce morphine-like effects. The primary incentives for opioid use are its ability to induce a state of euphoria as well as mental detachment. Side effects with opioid drug use are common and include nausea, vomiting and constipation together with the risk of hypotension and respiratory depression⁸.

Should a drug dependent suddenly terminate the use of a strong opioid, they may precipitate a withdrawal syndrome characterized initially by restlessness, anxiety, insomnia, sweating, lacrimation, rhinorrhoea and craving for the drug⁸.

Morphine

Morphine, a natural opiate, is believed to depress the body's immune system, which could at least contribute to the propensity for periodontal disease described in opiate addicts. Increases in oral fungal and viral infections and has also been associated with advancing periodontal disease¹.

Heroin

Heroin or diacetylmorphine is a semi-synthetic opioid. It is synthesized from morphine by acetylation. Opium poppies are grown in the Middle East, India and Asia, however, the major supply to North America is Mexico and Columbia.

The agent may be injected intravenously or subcutaneously, and it may be taken orally or nasally. The heroin addict suffers from a marked increase in dental caries and periodontal disease for a variety of reasons, including neglect of oral health, failure to seek dental care, malnutrition, intense craving for sweets, and anxiety regarding dental treatment.

Complications include overdose, infective endocarditis and other infections, pulmonary emboli, fibrosis and hepatitis or other liver disorders. Overdose leads to respiratory depression, coma, hypotension and bradycardia¹.

Long term clinical effects of heroin abuse on oral health is dental caries^{5,31,32}.

This might be the result of their intense craving for sweets, anxiety regarding dental treatment and poor oral hygiene. There is increased incidence of periodontal disease, oral fungal infections, oral viral infections and hyperpigmentation of the tongue^{18,26}. About a third noticed 'numbness' in their mouth after abusing drugs and this in part may reflect the analgesic properties of drug such as 'heroin'⁵.

The plaque more cariogenic, particularly in an environment of readily available sugars. Other problems of chronic salivary hypofunction include a dry or burning mouth, taste impairment, eating difficulties, mucosal infections and periodontal disease²⁶.

CONCLUSION

The expansion of dental practice office hours into evenings and weekends has potentially overlapped traditional recreational time. Coupled with a general lack of concern regarding casual drug use, patients may not freely admit their customary illicit substance use or the pre-appointment use of a recreational drug to alleviate dental anxiety. We have attempted to describe some of the characteristic nonverbal signs induced by these agents to encourage a dialogue with those patients that may be acting inappropriately. This assessment includes patients who are actively abusing alcohol, prescription drugs or patients who are in recovery. Hopefully, an awareness of the prevalence and a familiarity with these substances has provided a foundation to question a patient in a professional and tactful manner. Just as a patient who repeatedly attends your office with undiagnosed hypertension

requires a medical referral; perhaps, the recreational drug user by their admission is demonstrating warning signs that warrant further attention. It is further supported by beneficial effect of dentistry in association with cessation of smoking.

In addition to the widely recognized risk factors for dental hygiene, dental loss and chronic periodontitis, tobacco and alcohol, other drugs of addiction, particularly methadone, morphine and cannabis, have the capacity to potentially exacerbate dental disease¹⁰.

Becoming more knowledgeable about substance use, abuse and dependence can benefit a dental surgeon and their patients. While the majority of Americans use alcohol or drugs in moderation or not at all, millions are at-risk users, dependent users, or in recovery from alcohol and drug addiction. We likely have patients in all three categories. Additionally, with the nation's pending health care reforms, it is expected that more doctors and other health care professionals, including dentists, will be treating more patients with substance abuse issues.

The clear connection between oral health and alcohol and drugs opens the door to conversations with patients about their substance use—conversations many patients would support. Finally, given the risk of interactions between drugs a dentist prescribes and the drugs or alcohol some patients consume, along with the potential risk of patients being or becoming addicted to prescribed pain medications, dentists have a legal and ethical responsibility to be aware of substance abuse issues and to ask patients about their current and past alcohol and drug use.

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