

Case Report

“Meth Mouth”: Rampant Caries in Methamphetamine Abusers

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ABSTRACT

Rampant dental caries is a characteristic finding in methamphetamine abusers. The popularity of methamphetamine, particularly among the gay community where it is linked to the spread of HIV, its ready availability, and rapid spread across the nation have placed methamphetamine use in an epidemic status in many communities unaccustomed to dealing with drug abuse. We present a case of a 25-year-old male “meth” abuser of unknown HIV, hepatitis B virus (HBV), and hepatitis C virus (HCV) status to promote recognition by the health care team of the association of rampant dental caries with methamphetamine abuse for appropriate intervention to ensure successful treatment and prevention of disease progression.

INTRODUCTION

RAMPANT DENTAL CARIES is one of the hallmarks of chronic methamphetamine (MA) abuse.¹ Other more serious health conditions include memory loss, aggression, psychotic behavior, severe cardiac dysfunction, hyperthermia, stroke, and irreversible brain damage.²⁻⁴ An indirect-acting sympathomimetic with prolonged stimulant action and disinhibitory qualities, MA contributes to an increased transmission of HIV and hepatitis B and C through both unsafe injection practices and unprotected and uninhibited sex.^{2,5-7} Methamphetamine is rapidly surpassing other illicit drugs in popularity throughout the United States, particularly among homosexual men, and is considered to be in epidemic proportions in the western and midwestern states.^{2,8-14} Dentists

working in the prison system in these states have noticed an extremely destructive rampant caries pattern among their patients who have a history of MA abuse.^{1,15} This caries pattern is distinctive in that, initially, it involves the buccal smooth surface of the posterior teeth and the interproximal of the anterior teeth progressing to complete destruction of the coronal portion of the tooth.

Methamphetamine abusers rapidly develop tolerance and a psychological addiction that is extremely resistant to treatment.¹⁰ Because MA use is spreading eastward across the United States, knowledge of the drug coupled with the ability to recognize signs and symptoms of abuse should be increasingly important to health care personnel. Recognition of the association of rampant dental caries with MA abuse is important for early intervention to ensure



FIG. 1. Anterior interproximal and posterior buccal smooth surface caries. Reprinted with permission from the *Journal of the Michigan Dental Association*.

successful treatment and prevention of disease progression. The purpose of this paper is to alert health care providers to the dental signs and symptoms of MA abuse.

CASE REPORT

A 25-year-old white male reported with a chief complaint of badly decayed teeth and generalized pain. Medical history review revealed a 7-year history of MA abuse. The initial route of administration was inhalation, however, after 2 years of use his preferred method of administration became intravenous injection or snorting. Drug use was daily and continuous throughout the abuse period. Additionally, the patient indicated marijuana and

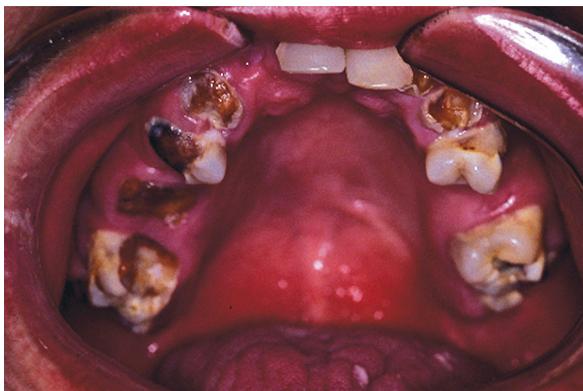


FIG. 2. Maxillary arch demonstrating multiple non-restorable teeth characteristic of methamphetamine (MA) abuse. Reprinted with permission from the *Journal of the Michigan Dental Association*.



FIG. 3. Mandibular arch with multiple carious amputated crowns and retained roots. Reprinted with permission from the *Journal of the Michigan Dental Association*.

alcohol abuse for 10 years and sporadic use of cocaine. With the exception of marijuana, the patient's drug use discontinued 12 months prior to reporting to the clinic. The medical history was negative for HIV, HBV, and HCV. The patient reported the presence of dry mouth while using MA resulting in the consumption of approximately 2 liters of carbonated beverages per day. He also noted periods of clenching and often felt temporomandibular joint discomfort on waking. In the last few months the patient noted extreme discomfort and increased bleeding when brushing and often avoided brushing due to the pain. Prior to this, the patient would, at most, brush one time per day but often overlooked oral hygiene when high on drugs. Intraoral and radiographic examination revealed rampant caries involving both interproximal and cervical surfaces. Mul-



FIG. 4. Gross carious destruction of the crowns of the maxillary anterior teeth.

tiple posterior teeth were decayed to the level of the alveolar crest. Generalized calculus deposits were present and a plaque index of 95% was calculated.

DISCUSSION

MA abuse presents a serious challenge to HIV treatment and prevention. Numerous studies document MA use by men who have sex with men to enhance sexual activity, especially at "circuit parties" involving multiple partners, contributes to unsafe sex behaviors that increase the risk of HIV transmission, leads to noncompliance with prescription medication to treat HIV, and interferes with antiretroviral therapy.^{9-14,16} Because of the serious health risk associated with MA, identifying and entering users into substance abuse treatment is critical.

Dental symptoms of MA are xerostomia and clenching or grinding (bruxism). The oral signs of MA abuse are rampant caries, gingival inflammation (gingivitis/periodontitis), and, to a lesser extent, occlusal wear. The primary mechanism for both the caries and periodontal disease is the combination of xerostomia, frequent sipping of carbonated soft drinks to relieve the sensation of dry mouth, extremely high dental plaque levels, and nonexistent or inadequate oral hygiene.^{1,17-18} The rampant caries clinically resembles early childhood caries (baby bottle caries) and has been referred to as "meth mouth" by the press.^{1,15} A distinctive caries pattern is seen on the buccal smooth surface of the posterior teeth and the interproximal surfaces of the anterior teeth (Fig. 1). This aggressive carious process progresses resulting in complete destruction of the coronal portion of the tooth leaving multiple retained roots throughout the mouth (Figs. 2-4).

Xerostomia is a predictable side effect of methamphetamine use.^{17,18} A recent study involving 119 poly-drug users, in which 80% of the participants used MA and 58% used 3,4-methylenedioxy-methamphetamine (ecstasy), found that almost all (95%) reported "dryness of their mouth."¹⁹ Because the action of MA can last for 8 hours or more, the sustained reduction in saliva quantity and quality fosters rapid

cariogenic bacterial growth. Additionally, this prolonged reduction in saliva leads to increased demineralization of enamel, because there is insufficient saliva to buffer the decrease in plaque pH during the abuser's frequent consumption of soda or other refined carbohydrate-containing beverages. A study involving young drug addicts in a long term residential treatment program reported a 73% reduction in stimulated parotid salivary secretion in amphetamine users and a 59% reduction in the stimulated parotid secretion in subjects abusing both amphetamine and marijuana compared to healthy controls.¹⁷ The caries rate in the amphetamine abusers was four times higher than that of the controls.

Although the exact mechanism for the MA-induced xerostomia is not known, it has been postulated that it is a combination of MA stimulation of inhibitory α_2 -sympathetic adrenoreceptors in the brain causing inhibition of salivary secretion and a generalized dehydration resulting from the increased basal metabolic rate, physical over activity, excessive sweating and hyperthermia.¹⁸

Lack of general body hygiene, which also manifests as nonexistent or inadequate oral hygiene, is a long-term behavioral effect of MA abuse. Inadequate oral hygiene, which permits accumulation and maturation of bacterial dental plaque, is a significant contributor to the development and progression of the caries. A case report in the literature documented a MA patient whose repetitive stereotype behavior, a feature of MA abuse, uncharacteristically focused on tooth brushing and presented clinically with minimal caries.¹⁹ This suggests that meticulous oral hygiene, which prevents dental bacterial plaque colonization and maturation, can counteract the xerostomic effects of MA.

The rampant caries associated with MA use has also been attributed, erroneously, to the "acidic" nature of the drug. Initial speculation on the etiology of the rampant caries in MA abusers centered on the corrosive or "acid" contaminates in "crystal meth" when it is smoked. Caries is a bacterially mediated disease.²⁰ The primary organisms involved in this infectious process belong to a group functionally labeled *Streptococci mutans*. The develop-

ment of a carious lesion is a complex process involving acidogenic bacteria, poor oral hygiene permitting bacterial plaque accumulation to a cariogenic threshold, frequent exposure to refined carbohydrates which are metabolized by *S. mutans* in the plaque to produce acids, and inadequate saliva that normally serves to buffer any drop in pH at the enamel-plaque interface. Teeth exposed to extrinsic (mainly dietary) and intrinsic acid (gastric acid) develop erosion lesions resulting in a bulk stripping or dissolving of enamel and then dentin. This is frequently seen in long-term lemon suckers involving the facial enamel surface, and in patients with gastroesophageal reflux disorder and bulimia involving the palatal/lingual and occlusal surfaces.²¹ As a further blow to the "contaminant" theory, patients taking oral prescription MA for narcolepsy or attention deficient hyperactivity disorder (ADHD) developed the characteristic carious lesions seen in MA abusers.²²

The clenching and grinding in MA abusers has also been attributed to numerous "toxic" impurities or contaminants resulting from incomplete processing by the amateur chemists or "meth cooks" in their homemade laboratories. It is, however, highly speculative that the contaminants are the cause of the bruxing. Studies on the effects of ecstasy report the incidence of "grinding or clenching their teeth together" to be from 70%–89%.^{19,23–25}

CONCLUSION

Methamphetamine abuse is an extremely serious and growing problem due to its wide appeal and availability. Rampant caries is one of the signs of MA abuse. Patients who present with a highly destructive caries appearance involving the buccal smooth surfaces and interproximal of anterior teeth should be questioned for the history of MA abuse. The severe caries process has been reviewed and is a result of the xerostomia, dehydration, frequent soda pop sipping, and inadequate oral hygiene. Recognition of the association of rampant dental caries with MA abuse can lead to appropriate intervention to ensure successful treatment and prevention of disease progression.

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