



COVER STORY

Dental disease patterns in methamphetamine users

Findings in a large urban sample

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Accelerated and unusual dental disease patterns have been associated with the use of methamphetamine (MA), a popular and highly addictive stimulant drug. Although there have been sporadic reports on the dental effects of MA and its derivatives since the 1960s, 2 emergency department physicians were the first to alert the dental and medical communities to the peculiar and extreme patterns of dental destruction manifest in MA users.¹ Their article stimulated a flurry of reports corroborating the severe dental consequences encountered in MA users.²⁻⁷ Along the way, the patterns of MA-

associated dental disease that Richards and Brofeldt¹ described acquired the moniker *meth mouth*, which began to seep into public awareness because of extensive, and sometimes sensational, media coverage. This nickname originated from a perfunctory statement in a press release by the Academy of General Dentistry publicizing a report⁸ in its December 2003 newsletter on the treatment of substance

users in the dental office. Neither the Academy of General Dentistry report nor the accompanying press release corroborated the depiction of a “sudden, massive onset of tooth decay, gum disease and worn down teeth” with any supporting data or research



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ABSTRACT

Background. The authors used a large community sample of methamphetamine (MA) users to verify the patterns and severity of dental disease and establish a hierarchy of caries susceptibility by tooth type and tooth surface.

Methods. Using a stratified sampling approach, 571 MA users received comprehensive oral examinations and psychosocial assessments. Three calibrated dentists characterized dental and periodontal disease by using National Health and Nutrition Examination Survey protocols. The authors also collected data on substance use history and other attributes linked to dental disease.

Results. On all dental outcome measures, MA users evidenced high dental and periodontal disease, with older (≥ 30 years) and moderate or heavy MA users disproportionately affected. Women had higher rates of tooth loss and caries, as well as a greater prevalence of anterior caries. Current cigarette smokers were more likely to manifest 5 or more anterior surfaces with untreated caries and 3 or more teeth with root caries. Nearly 3% were edentulous, and a significant percentage (40%) indicated embarrassment with their dental appearance.

Conclusions. MA users have high rates of dental and periodontal disease and manifest a dose-response relationship, with greater levels of MA use associated with higher rates of dental disease. Women and current cigarette smokers are affected disproportionately. The intraoral patterns and hierarchy of caries susceptibility in MA users are distinctive.

Practical Implications. The prevalence and patterns of dental and periodontal disease could be used to alert dentists to possible covert MA use and to plan treatment. Concerns about dental appearance have potential as triggers for behavioral interventions.

Key Words. Dental disease; methamphetamine use; patterns; severity.

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findings.⁹ The only incidental evidence available to support the 2003 Academy of General Dentistry narrative of the meth mouth phenomenon was composed of 8 articles on amphetamine-related dental disease, primarily brief case reports and case series.^{1,7,10-15}

In an effort to anchor the accumulating anecdotal evidence in a scientifically rigorous framework, we previously used the infrastructure of a large multisite clinical study (Methamphetamine Treatment Project) to examine the oral health consequences of chronic MA use systematically in a prospectively collected sample of users.¹⁶ Participating physician examiners performed brief dental evaluations as part of comprehensive medical assessments conducted in a cohort of 301 MA users. We compared the dental findings in the MA users to the dental status of a sociodemographically similar group of non-MA using participants enrolled in the National Health and Nutrition Examination Survey (NHANES). Our main finding was that dental disease was one of the most prevalent (41.3%) medical comorbidities in long-term MA users who otherwise tended to be generally healthy.¹⁶ On average, MA users had significantly more missing teeth than did demographically comparable people in the general population (4.58 versus 1.96; $P < .001$) and were more likely to report having oral health problems. The findings from the physician-conducted oral assessments supported the prevailing assertion of higher rates of dental disease in MA users.

Building on our precursor findings, we conducted a follow-up study involving a new and larger sample of MA users with a range of MA use behaviors. To provide greater granularity and validity, the oral examinations were performed by experienced dentists who were rigorously trained and calibrated by the reference dental examiner for NHANES. The dental examiners performed all decayed, missing, or filled teeth (DMFT) and periodontal evaluations by using well-articulated assessment protocols supported by a quality assurance program.¹⁷ Our overarching goal was to characterize the patterns of dental caries and periodontal disease in MA users and use the data to inform dental management strategies. Moreover, a methodical understanding of relevant behavioral underpinnings would facilitate the development of Screening, Brief Intervention, and Referral to Treatment approaches applicable to dental settings.¹⁸ The specific objectives of this study were to characterize the patterns and severity of dental disease in MA users and establish a hierarchy of caries susceptibility by tooth type and tooth surface.

METHODS

Study design. We conducted a cross-sectional study of a broad sample of community-based MA users by using snowball sampling approaches.¹⁹ To maximize power to perform key statistical tests, we recruited MA users balanced across substance use patterns stratified into light, moderate, or heavy use. Because we reached our

recruitment target for light MA users first, we oversampled users in the moderate and heavy use categories relative to their representation in the local population of MA users. We controlled important confounding variables (age, sex, other drug use) through matching or other statistical adjustments.

Study setting. The study was conducted in Los Angeles County, one of the largest and most populous urban areas in the United States and beset with high rates of MA use.^{20,21} Between February 9, 2011, and August 26, 2013, 571 MA users recruited from local communities underwent comprehensive oral examinations and psychosocial assessments at dental clinics associated with 2 large community health centers: the AIDS Project Los Angeles center that primarily serves a sociodemographically diverse group of people with human immunodeficiency virus or AIDS, and the Mission Community Hospital in the San Fernando Valley that caters to a large, underserved migrant population. We chose the study sites to provide access to a diverse cohort of Angelenos with a broad range of MA use behaviors.

Participants. We recruited participants by using a combination of street outreach (for example, posting flyers within the community, distributing advertising matchboxes in bars and restaurants), Craigslist postings, newspaper advertisements, referrals from local drug treatment centers, and word of mouth. People were eligible to enroll in the study if they were 18 years or older, spoke either English or Spanish, had used MA in the past 30 days, were able to undergo a detailed dental examination and psychosocial assessments, and were willing to provide a urine sample. Of the 1,793 potential participants who contacted the research team, 1,120 were eligible, 576 enrolled in the study, and 571 completed the assessments. The informed consent process and the assessments were accomplished according to procedures that the University of California, Los Angeles institutional review board reviewed and approved. A federal Certificate of Confidentiality ensured unconditional confidentiality to the interviews, thus minimizing participant concerns regarding the disclosure of sensitive drug-use behaviors. Each participant received \$60 for taking part in the study.

Assessments. The main oral health outcome variables were the rates and patterns of dental caries and the periodontal disease status of the participants. To maximize comparability with national data sets, we ensured that assessments for dental caries and periodontal status adhered to NHANES examination protocols, which have been described in greater detail elsewhere.^{22,23} We assessed dental caries at the surface level by using the National Institute of Dental Research (now the National

ABBREVIATION KEY. DMFT: Decayed, missing, or filled teeth. MA: Methamphetamine. NHANES: National Health and Nutrition Examination Survey.

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