

Meth Mouth: The Effect of Drug Use Patterns, Behavior and Knowledge on Caries Status between Methamphetamine Users and Non-Users

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INTRODUCTION



Methamphetamine ("speed", "meth", "crystal", "ice") is the 2nd most widely abused drug in the world with an estimated 34 million annual abusers worldwide; 1.4 million of which are Americans

Methamphetamine use has emerged as a public health problem jeopardizing the health and safety of users, their families and the community. In 2005, the cost of methamphetamine use in the U.S. approached \$23.4 billion for rehabilitation, deaths, healthcare, crimes, environmental injuries and child endangerment.¹

"Meth Mouth", an accelerated form of decay, is the primary dental problem amongst users. The drug alters the oral environment and fosters the growth of bacteria that results in dental decay. Clenching, grinding, hypo-salivation (xerostomia) and poor diets are contributing factors of "meth mouth".

HYPOTHESIS

Meth users:

- Have more teeth affected by dental decay than non-users
- Have decay scores that are influenced by their pattern of drug usage (years of use, frequency, last time of use, route, amount)
- Believe that their oral health has declined since using the drug
- Are less knowledgeable about "meth mouth" than non-users
- Are more likely to report xerostomia than non-users

METHODS

Participants and Design:

60 adult inmates with a history of methamphetamine use (MA users) and 40 matched inmates without a history of meth use (non-MA users) were voluntary participants in this case-control study at the Main Adult Detention Facility, Santa Rosa, CA

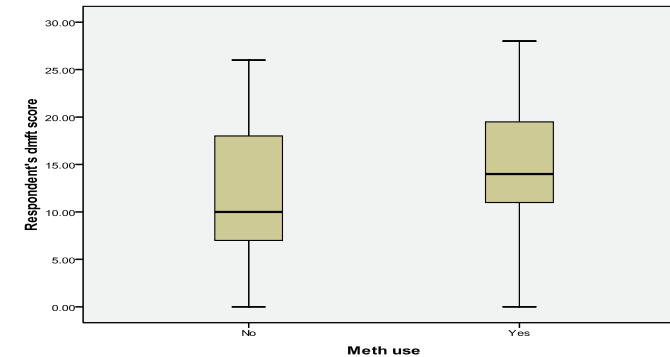
Measures and Instruments:

Participants completed a 35-item survey of dietary and oral hygiene behaviors, access to dental care and knowledge of "meth mouth". Specific questions for MA users addressed their pattern of drug use, history of xerostomia and perceptions of meth's impact on their dental health.

Oral examinations were performed and the number of decayed, missing and filled teeth were counted and combined to produce a DMFT score.

RESULTS

FIGURE 1: Box plot of DMFT Scores of MA Users and Non-Users (N=100)



The mean DMFT of the sample (n=100) was 13.810 and the median value was 13.000. The mean DMFT of MA-users was 15.0167 with a median value of 14.000. The mean DMFT of non-MA users was 12.000 with a median value of 10.000. The difference in means between MA-users and non-users was significant (T=2.212, p=0.029).

TABLE 1: DMFT Scores and Pattern of Methamphetamine Use amongst MA users

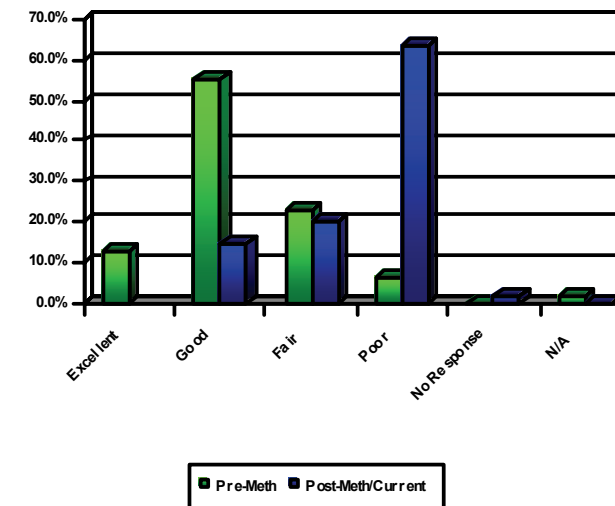
Pattern of Drug Use	Decay	Missing	Filled	DMFT
Number of Years of Use				
F Statistic	1.701	1.816	1.592	2.872
P Value	0.142	0.117	0.170	0.019
Frequency of Use				
F Statistic	0.788	1.506	0.155	2.222
P Value	0.536	0.207	0.960	0.072
Time of Last Use				
F Statistic	1.031	2.380	0.585	1.788
P Value	0.404	0.044	0.711	0.123
Route of Administration				
F Statistic	0.951	1.64	2.26	2.151
P Value	0.438	0.171	0.068	0.081
Amount of use				
F Statistic	0.931	2.882	0.14	2.454
P Value	0.45	0.027	0.967	0.051

There were no observed significant differences in DMFT scores with drug use patterns when a Bonferroni multiple comparison procedure was performed. The following trends were observed amongst MA users:

- More decayed and missing teeth with 10+ years of use
- More decayed teeth amongst those who reported that they last used methamphetamine 1-2 years ago
- More decayed, missing and filled teeth and higher DMFT scores amongst users who smoked methamphetamine vs. injecting or inhaling the drug

RESULTS

FIGURE 2: Bar chart of MA users perception of oral health before/after exposure to methamphetamine (N=60)



The difference in self-report of MA-users oral health before and after methamphetamine exposure achieved statistical significance. The greatest difference was the decline (40%) in the self-report of "good" oral health and the increase (56.5%) in the self-report of "poor" oral health ($\chi^2 = 22.498$, p=0.0323).

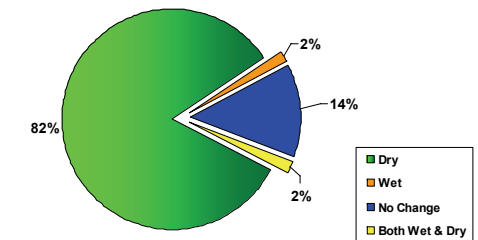
TABLE 2: Information about "Meth Mouth"

Received Information	Entire Sample (n=100)	MA Users (n=60)	Non-MA Users (n=40)	χ^2 (p value)
Yes	17 (17%)	14 (23.3%)	3 (7.5%)	
No	79 (79%)	44 (73.3%)	35 (87.5%)	
No Response/Missing	4 (4%)	2 (3.3%)	2 (5%)	
Total	100(100%)	60	40	$\chi^2 = 4.316$ (0.116)
Perceived Effect of Methamphetamine				
Improves Health of Teeth	1 (1%)	0 (0%)	1 (2.5%)	
Damages Teeth	93 (93%)	60 (100%)	33 (82.5%)	
Has No Impact on Teeth	1 (1%)	0 (0%)	1 (2.5%)	
No Response/Missing	5 (5%)	0 (0%)	5 (12.5%)	
Total	100(100%)	60	40	$\chi^2 = 11.290$ (0.010)
Source of Information about "Meth Mouth"				
Dental Professional	6 (6%)	6 (10%)	0 (0%)	
Medical Professional	2 (2%)	2 (3.3%)	0 (0%)	
Law Enforcement Personnel	0 (0%)	0 (0%)	0 (0%)	
Family, Co-worker, Neighbor, Friend	2 (2%)	1 (1.7%)	1 (2.5%)	
Other	13 (13%)	6 (10%)	7 (17.5%)	
Multiple Sources of Information	1 (1%)	1 (1.7%)	0 (0%)	
Not Applicable	73 (73%)	44 (73.3%)	29 (72.5%)	
No Response/Missing	3 (3%)	0 (0%)	3 (7.5%)	
Total	100(100%)	60	40	$\chi^2 = 11.684$ (0.071)

MA users were more knowledgeable about the negative oral effects of methamphetamine ($\chi^2=11.290$, p=0.010) than non-users. The majority (79%) of all participants had never received information about "meth mouth". Those receiving information cited dental professionals (6%), medical professionals (2%), personal contacts (2%) and other/multiple (15%) contacts as the source of this information. Law enforcement personnel were not selected by any of the participants.

RESULTS

FIGURE 3: Pie chart of xerostomia reported by MA-users (N=60)



The report of xerostomia amongst MA users achieved statistical significance ($\chi^2 = 95.9328$, p=0.000).

RECOMMENDATIONS

Dentists:

- Provide MA users with salivary substitutes to reverse the xerostomia experienced during drug use and arrest decay
- Provide MA users with simple and affordable care
- Provide all patients with "meth mouth" information

Law Enforcement:

- Provide educational training to staff personnel about "meth mouth" to curb future usage amongst detainees
- Provide all detainees with "meth mouth" information

Future Research:

- Continue investigating the impact of drug use patterns on the development of "meth mouth" using a larger sample size to identify meaningful effect sizes

CONCLUSIONS

The present study was unique in investigating drug use patterns, knowledge of "meth mouth", and temporal perception of oral health on cumulative caries experience (DMFT) amongst MA-users and non-MA users. This inquiry distinguishes this study from past published works that only compared caries scores against the single determinant of methamphetamine use.

"Meth mouth" is one of the most physically apparent signs of chronic methamphetamine use. The subsequent decay compromises the oral health and threatens the self-esteem of the user whose smile un masks the effects of chronic drug addiction.

1. Nicosia, N., Pacula, RL, Kilmer, B., Lundberg, R. & Chiesa, J. (2009). The economic cost of methamphetamine use in the United States, 2005. Accessed 02/14/09 from the World Wide Web: <http://www.rand.org/pubs/monographs/MG829>