

THE IMPACT OF METHAMPHETAMINE ABUSE ON ORAL HEALTH

INSTRUCTIONS: Read and study the narrative. Complete the test and registration form at the back of the course and mail (along with registration fee) to: **University of Tennessee Health Science Center, Continuing Dental Education, 875 Union Avenue, Memphis, TN 38163** or fax completed test, registration form and credit card information to **(901) 448-1514**. Please direct all questions or comments to the Office of Continuing Dental Education, (901) 448-5386 or email utcde@utmem.edu. For more information or a list of continuing education activities, visit our website at <http://cde.utmem.edu>.

TUITION: \$50 per registrant or \$40 per registrant for multiple registrants in the same office.

CREDIT: 2 hours ****(Registrant must correctly answer 75% of the test questions to receive credit.)****

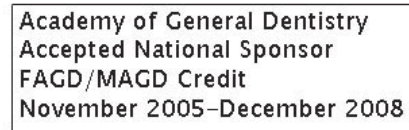
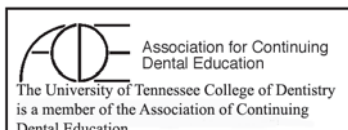
COURSE OBJECTIVES: At the end of this course the registrant will be able to:

1. Discuss oral signs of methamphetamine use.
2. List three negative health effects on general health.
3. List two dental treatment modifications that should be incorporated into the methamphetamine user's treatment plan.
4. List two possible causes of "meth mouth."



INSTRUCTOR: Nancy Williams, RDH, EdD is a Professor of Dental Hygiene in the College of Allied Health Sciences and Associate Professor of the Department of Biologic and Diagnostic Sciences at the University of Tennessee Health Science Center College of Dentistry. Dr. Williams serves as the Tennessee Dental Hygienists' Association representative to ADHA's Smoking Cessations Initiative. She has been at the University since 1980. Dr. Williams also serves as a member of the State of Tennessee and Tennessee Dental Association's Concerned Dental Health Professional's Committee, Symposia Coordinator for the American Association for Dental Research's Oral Health Research Group. She was recently invited by Delta Dental of Minnesota and Hazelden drug treatment and recovery center to serve on a panel of oral health professionals who presented at the Minnesota and Hazelden program, "Meth - The Ice That Shatters." She also continues to practice dental hygiene on a part-time basis in a general dentistry practice. She is a member of the American Dental Hygienists Association, Society for the Research on Nicotine and Tobacco, and the American/International Association for Dental Research.

For additional information or questions concerning this course, please contact Dr. Williams at njwilliams@utmem.edu.



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by Nancy Williams, RDH, EdD

According to the Agency for Toxic Substances and Disease Registry in April 2005, methamphetamine or “meth” is considered the fastest growing illicit drug in America¹. The continuous use of this extremely addictive drug results in devastating oral diseases. Users also present a unique challenge in patient management since those who are high or “crashing” on this drug must have dental treatment deferred because drugs commonly used in dentistry may interact with meth and endanger the patient. Also, meth users may pose a danger to the staff since meth use produces paranoid and/or delusional behavior resulting in violence.

Terms Associated with “Meth Use:”

Addiction: Total loss of control over use of a substance. Addiction results in serious negative social, physical, emotional, psychological, and spiritual consequences. It is a progressive, chronic disease characterized by periods of remission and relapse. If left untreated, it will result in death.

Crashing: Effects of meth use are fading or ending followed by long periods of sleep

Meth, speed, crank, ice, and tina: Street names

On a Run: Using meth for several days without sleeping

Spun: High on a drug

Tweaking or binging: Using meth over a several day period. During this time, users will use as much as a gram of methamphetamine every 2 to 3 hours over several days until they run out of the drug or are too dazed to continue use.

Tweaker: A chronic meth user who may pose danger to self and/or others

Yaba: A meth tablet that has been confiscated in the United States. Yaba tablets are sometimes flavored (grape, orange, and vanilla) tasting like candy. The tablets are obviously marketed to a young audience, particularly at raves or parties where Ecstasy (a similar looking drug) has been well established. The tablets are commonly reddish-orange or green, and fit inside the end of a drinking straw. They have a variety of logos, with “WY” being the most common. Methamphetamine pills are normally ingested orally, although they can be crushed into powder and administered.”²

Methamphetamine: History of Use in Our Society

Methamphetamine has a long history of use in our society. In the 1930’s, Benzedrine® and other amphetamines were initially used for treatment of low blood pressure and asthma. During World War II, these stimulants were given to Allied, Japanese, and German forces to boost energy and decrease appetite. Methamphetamine remained in use for medical purposes such

as an appetite suppressant, antidepressant, and for treatment of narcolepsy. In the 1960’s, amphetamines were readily available but were curtailed by the Controlled Substances Act of 1970. During the 1990’s, home-made methamphetamine began to emerge, use increased, and the meth epidemic spread throughout the United States, including Hawaii.³ In the late 1990’s and 2000’s meth was referred to as “the blue collar drug” due to its association with use by white, rural male blue collar workers. Its street name “crank” was given to the drug because it was transported by motorcycle gangs in motorcycle crank shafts.

Today, reports reveal that methamphetamine is used by diverse groups in all regions of the country. The National Institutes of Drug Abuse report that 12.3 million or five percent of Americans age 12 and older had tried methamphetamine⁴. It is referred to as the “new moonshine” since clandestine labs have appeared in various locations ranging from farming areas to hotel rooms to vans and car trunks.

Chemicals used in the manufacture of methamphetamine include such agents as anhydrous ammonia, hydrochloric acid, drain cleaner, red phosphorus, battery acid, lye, lantern fuel, antifreeze, nail polish remover, iodine, and ephedrine and pseudoephedrine commonly found in decongestant cold remedies and asthma medications^{3,5}. Production of meth in clandestine labs can produce odors such as those found in car body shops, diaper pails, and cat litter boxes. These distinctive odors have alerted law enforcement officials and the educated public that methamphetamine was being manufactured in the area.

Health Consequences

Methamphetamine is an extremely addictive stimulant drug that releases high levels of the neurotransmitter dopamine which stimulates brain cells, enhancing mood and body movement. It also appears to have a neurotoxic effect, damaging brain cells that contain dopamine as well as serotonin, another neurotransmitter. Over time, methamphetamine appears to cause reduced levels of dopamine, which can result in symptoms like those of Parkinson’s disease.

The central nervous system (CNS) actions that result from taking even small amounts of methamphetamine include increased wakefulness, increased physical activity, decreased appetite, increased respiration, hyperthermia, and euphoria. Other CNS effects include irritability, insomnia, confusion, tremors, convulsions, anxiety, paranoia, and aggressiveness. Methamphetamine causes increased heart rate and blood pressure and can cause irreversible damage to blood vessels in the brain, producing strokes. Other effects of methamphetamine include hyperthermia, respiratory problems, irregular heartbeat, and extreme anorexia. Its use can result in cardiovascular collapse and death.⁴

Action upon peripheral nerve endings results in a condition known as “formication” or a sense that insects are crawling across the user’s skin and body. This results in users scratching their bodies producing wounds and sores on their

faces, arms, and legs. Less affected areas may appear as acne while more severe areas may present as skin abscesses.

Cost of Methamphetamines

When methamphetamine was used as a prescription drug, 50 milligrams per day was a usual dose. Tolerance occurs quickly with use and the addict may easily use 5,000 milligrams over a 24 hour period to achieve a high or when “on a run.”³

According to Shelby County Metro Narcotics located in Memphis, Tennessee, Tennessee has 75% of the market share in the southeastern U.S. An ounce sells for approximately \$1500 while a gram sells for approximately \$55.00.

Oral Effects



Picture 1 Dental Caries and Other Hard Tissue Alterations

Note, in picture 1, early Class V caries lesions beginning at the cervical margins of tooth numbers 9 and 11. Also, note the marked attrition on the tooth in the position of the lower left first molar (Oral presentations by Dr. Charles Tatlock, University of New Mexico Health Science Center, Division of Dental Services and Dr. Steven Wagner, private practice prosthodontist, Albuquerque, New Mexico at the Hazelden and Delta Dental Plan of Minnesota Conference: *Meth: The Ice that Shatters, Shedding Light on Meth and Oral Health*, held in St. Cloud, MN, November 1, 2005).

According to Dr. David Clemens, a former correctional system and now private practice dentist, who has treated numerous meth addicts, restoring these lesions are difficult and recommends use of composite restorations (Oral presentation by Dr. David Clemens, Wisconsin Dells, Wisconsin at the Hazelden and Delta Dental Plan of Minnesota Conference: *Meth: The Ice that Shatters, Shedding Light on Meth and Oral Health*, held in St. Cloud, MN, November 1, 2005).

No other illicit drug's oral effects have been so pronounced nor have received as much attention as a condition known as meth mouth. While meth may be ingested, snorted, smoked (inhaled) or injected, it is believed that smoking meth results in the greatest harm to the oral cavity.

A paucity of scientific based research has been conducted on “meth mouth,” so most of the information presented in this article is from case reports and interviews. Scientific studies are now underway that will provide better evidence related to dental caries and other harmful oral conditions related to meth use.

The devastating oral effects in pictures 2 and 3 are most likely multifactorial in nature. Contributing factors include:



Picture 2 courtesy of Dr. Dan Peterson⁶



Picture 3 courtesy of www.MAPP_SD.org⁷

Health Behavior - Poor oral hygiene: When a meth user is under the influence of the drug, he or she may stay “high” or “on a run” for as long as ten days at a time followed by long periods of sleep. The psychoactive effects of a “dose” of meth last for six to eight hours. During a “run” or “binge” the user ignores sound oral hygiene practices such as brushing and flossing and other forms of plaque removal. During long periods of sleep plaque continues to accumulate and salivary flow is lessened. As seen in the pictures, large amounts of dental plaque and debris are present. Often dental plaque appears gray - the reason is not known at this time.

Diet: Meth is also a potent appetite suppressant. Soft drinks containing both high amounts of caffeine and sugar are consumed to strengthen or prolong the high. Mountain Dew™ is consistently used and these self reports have revealed that users may consume several liters per day. This beverage not only contains high amounts of sugar, it also contains high amounts of citric acid. Again, relationship to caries patterns have not been scientifically established (Oral Presentation by Dr. Chris Heringlake, prosthodontist, Minnesota Correctional Facility, St. Cloud, MN, presented at the Hazelden and Delta Dental Plan of Minnesota Conference: *Meth: The Ice that Shatters, The Ice that Shatters, Shedding Light on Meth and Oral Health*, held in St. Cloud, MN, November 1, 2005).

Bruxism: Due to the stimulant nature of the drug, the user becomes tense and anxious. Again, the user does not sleep for several days on end. These factors lead to extreme clenching and grinding of the teeth.

Loss of tooth structure: Personal interviews with correction system dentists revealed that teeth that do not easily fracture, cuspids and premolars, fracture easily after continued meth use. Clinical crowns of all affected teeth fracture at the cemento-enamel junction. Anterior teeth, which are more susceptible to

fracture, do so. Users' self-reports revealed loss of anterior teeth due to fights, violence, and falls while under the influence of meth.

Xerostomia or dry mouth: Meth causes dry mouth which results in a change of both the quality and quantity of saliva. Saliva's buffering effects are altered along with an increase in virulence and quantity of oral bacteria.

Concomitant Drug Use: Personal interviews with correction systems and other dentists revealed that the majority of meth users also smoke tobacco and use other drugs such as alcohol. It is well established that tobacco use alone contributes to oral diseases ranging from periodontal disease to oral cancer. How concomitant drug use does and will affect the user's oral health has not been established.

Chemicals Used for Manufacturing: The acidic nature of the toxic and caustic ingredients used in the manufacture of meth may be partially responsible for erosion of enamel, dental caries formation and damage to dental restorations.

Vasoconstriction: Methamphetamine use also produces vasoconstriction which may contribute to periodontal disease.

Summary of Oral Health Effects

Since it is well established in the literature that dental caries results from bacteria found in dental plaque, ineffective plaque removal, continuous consumption of refined carbohydrates, xerostomia, and acidic status of the oral cavity, it stands to reason that methamphetamine users will most likely develop carious lesions. The quick progression of these lesions is most likely influenced by marked xerostomia and oral effects of chemicals used in the manufacture of the drug. Future research must establish the etiology, epidemiology, and natural history of meth mouth as well as best practices for restoring optimal dental health and oral function.

The Role of the Oral Health Team

Prevention: Dental offices and clinics should augment what children and adolescents are taught through schools, civic clubs, and faith based organizations. The oral health team must seize an educational opportunity by providing information related to meth mouth. This can be easily accomplished by placing educational posters and pamphlets in the office's waiting area, providing educational DVDs to parents and patients (see additional resource list,) and speaking to groups about meth mouth. Another venue is to publish articles in local and school newspapers.

Screening and Detection: Dental caries develop on the cervical margin, other smooth surfaces and interproximal surfaces of anterior teeth. One case study revealed that caries first developed on the buccal smooth surfaces of molars prior to appearing in anterior teeth.

Directing users for assessment and treatment: Should a patient admit they are using meth, recommend that they seek treatment. Keep a list of treatment centers and support groups in your area. Narcotics Anonymous is an active support group in most cities and the telephone number is published on the Internet and in print telephone directories.

Preventing medical emergencies: Of primary importance is the recognition of a "tweaker." The website www.mapp_sd.org provided characteristics of a patient who may be under the influence of meth.⁸ Included in this list are:

1. Slurred, rapid speech
2. Dilated or pinpoint pupils
3. Persistent cough
4. Skin lesions on face, arms and legs
5. Unexplained weight loss
6. Inflamed, eroded nasal septum
7. Track marks/injection sites
8. General pattern of the black decay
9. Frequent falls, unexplained bruises or fractures
10. Non-responsiveness to treatment for diabetes, elevated blood pressure or ulcers
11. Frequent hospitalizations
12. Prescription drug-seeking behavior
13. Marked change in habits, friends
14. Suicide talk/attempt, depression
15. The sores on the arms are from something called "formication." The feeling that ants are crawling on them and biting them. They pinch at the area causing bleeding to bruising.
16. Possibly "high strung"
17. Other sources have reported that the user has a body odor similar to mayonnaise.

Patient Management of a Tweaker: Members of the office staff should:

1. Keep their distance. Coming too close can be perceived as threatening
2. Avoid bright lights. The tweaker is paranoid and bright lights may cause them to react violently.
3. Slow your speech, lower your voice.
4. Slow your movements. The tweaker is paranoid and may misunderstand your movements.
5. Keep your hands visible, or they may feel threatened and become violent.
6. Keep the tweaker talking. A tweaker who falls silent can be extremely dangerous. Silence often means that his/her paranoid thoughts have taken over reality, and anyone present can become part of the tweaker's paranoid delusions.

According to the text, *Dental Management of Medically Compromised Patient*⁸, it is recommended that dental treatment be deferred for six hours after the last dose of amphetamines is used. Drug interactions include use with epinephrine, narcotics, and benzodiazepines. As stated previously, use can result in aggressive and paranoid behavior. Should a patient present for treatment who poses a danger to staff, treatment should be deferred and law enforcement should be summoned. This is in no way a violation of the American with Disabilities Act that

protects recovering addicts or alcoholics or HIPAA. Both are overridden by issues of public safety.

Providing Dental Treatment for the Recovering Meth Addict: Often users do not seek routine dental care due their addiction and subsequent life styles. When these patients seek dental services, they often present lacking routine or proper oral care and related oral diseases such as gingivitis, periodontal disease, and dental carious lesions ranging from decalcified areas to non-restorable teeth. Patients who used drugs intravenously should be premedicated using the AHA regimen for prevention of bacterial endocarditis⁸.

Restoring Optimal Oral Health

Dental Plaque Control: The first challenge for the oral health team is to restore optimal oral hygiene and oral health. Traditional methods of improving dental plaque control must be implemented. Mechanical toothbrushes, dental floss, and antimicrobial agents such as stannous fluoride and chlorhexidine glutonate should be recommended. One company, OMNII® Oral Pharmaceuticals offers a product, *Compliance*®, a 28-day treatment kit that includes the essential oral care medicines to help re-establish optimal oral health⁹.

Tobacco Cessation: The oral health team should reinforce the importance of quitting all forms of tobacco use.

Dental Caries and Decalcification: Decalcified surfaces may be controlled with fluoride varnishes such as Duraphat® by Colgate® Oral Pharmaceuticals, Inc., Duraflor® by Pharmascience, Fluor Protector® by Ivoclar/Vivadent®, and Cavity Shield® by OMNII® Oral Pharmaceuticals. In addition, an intensive preventive care regimen must be quickly implemented. In addition to routine plaque control measures, both in-office and patient applied fluoride treatments are recommended. Prescription strength fluoride toothpastes such as Colgate's Prevident 5000® Plus and Omnii® Oral Pharmaceuticals' Control Rx®.

Dietary Counseling: Instruct the user to decrease or avoid the continuous consumption of sugary soft drinks and other refined carbohydrates.

Xerostomia: Products used to relieve xerostomia distributed by Biotene® and Omnii® Oral Pharmaceuticals must be included to control caries and preserve optimum oral health. Xerostomia should diminish after meth use is discontinued.

Periodontal diseases: Periodontal disease may be masked by meth's vasoconstrictive properties. An extensive periodontal examination must be a part of each meth addict's dental treatment plan.

Minimizing relapse: Prescribing for meth addicts who present with pain should not present a challenge if the dentist consults with the patient's drug treatment center for advice.

Additional Resources

Publications

1. *Newsweek Magazine*, August 8, 2005. "America's Most Dangerous Drug" by David J. Jefferson.
2. *Uppers, Downers, and All Arounders* by Darryl Inaba. This text is available at local libraries and bookstores. It can also be purchased via internet at such websites as Amazon.com. The text's ISBN number is 0926544276.
3. *Street Drugs: A Drug Identification Guide*. Available from Publishers Group, LLC, 2805 Alvarado Lane N., Plymouth, MN. 55447. Telephone: 763.473.0646.
4. *Meth: The Home Cooked Menace* by Dirk Johnson. Available from Hazelden Bookstore, Item: 7794 ISBN-13: 9781592853052 or ISBN-10: 1592853056, also available on the web at web at websquare.com or phoning 1-800-257-7810.

Websites

www.dea.gov/pubs/states/tennessee.html
www.NIDA.gov
www.niaaa.nih.gov
www.cdc.gov
www.narcoticsanonymous.org
www.mappsd.org/Meth%20Mouth.htm
www.MethFreeTennessee.org
www.ada.org/prof/resources/topics/methmouth.asp
www.whitehousedrugpolicy.gov/publications/factsht/methamph
www.streetdrugs.org

Hotlines

Crank Hotline at 1-888-664-4673.

DVDs and Educational Videos

Wright, Jerrod. *Meth=Death*. Available from Jerrod Wright, Putnam County Health Department, Cookeville, TN. http://www.tntech.edu/techtimes/2005/05_04/04_29/meth.html

Phelps County Prosecutor's Office, Ken Clayton, County Prosecutor. *The Misery of Meth*. To obtain telephone 573.458.6170.

REFERENCES

1. Retrieved from <http://www.atsdr.cdc.gov/HS/HSEES/methgrowth.html>, October 12, 2005.
2. Retrieved from: <http://www.streetdrugs.org/methamphetamine2.htm>, October 12, 2005.
3. Inaba, Darryl and Cohen, Williams. (2003) *Uppers, Downers, and All Arounders*, 5th edition, CNS Publications; pages 102-108. ISBN: 0926544276.
4. USDHHS, National Institutes of Health, National Institute on Drug Abuse. Accessed from <http://www.drugabuse.gov/infofacts/methamphetamine.html> Revised May, 2005. Accessed on November 5, 2005.
5. Retrieved from http://www.kci.org/meth_info/making_meth.htm retrieved October 16, 2005.
6. Retrieved from http://www.dentalgentlecare.com/drug_use_&_oral_clues.htm#gum%20disease "Meth mouth" courtesy of .DR. Dan Peterson, 1415 Sage St., Gering, Nebraska 69341, 308-436-3491, October 12, 2005
7. Retrieved from <http://www.mapps.org/Meth%20Mouth2.htm> October 12, 2005
8. Little, J., Falace, D., et al. *Dental Management of the Medically Compromised Patient*, 6th ed. C.V. Mosby, March 2005, ISBN: 0323011713.
9. OMNII OralPharmaceuticals, 1500 N. Florida Mango Road, W. Palm Beach Florida. 33409. Telephone 800-445-3386 or www.omniipharma.com

Acknowledgements:

The author wishes to thank all dentists mentioned throughout the self study course. Randall Prince, DDS and Staff, Dyersburg, TN are also thanked for sharing their time and expertise in helping produce this course.

****Please duplicate and complete one form for each registrant.****

Instructions: Answer the questions by choosing the best possible answer. Registrants must correctly answer 75% of the test questions to receive CE credit.

THE IMPACT OF METHAMPHETAMINE ABUSE ON ORAL HEALTH

1. A slang term for methamphetamine is
 - A. Crack
 - B. Crank
 - C. Ludes
 - D. Reefer
2. Dental caries related to meth use are best described as
 - A. Small lesions that first appear in the pits and fissures of molars.
 - B. Black, aggressive lesions that appear on the interproximal surfaces of anterior teeth
 - C. Smooth surface lesions that appear on buccal surfaces posterior teeth
 - D. Both B and C
3. Methamphetamine's oral effects includes dental caries and
 - A. Oral cancer
 - B. Oral candidiasis
 - C. Herpes Labialis
 - D. Periodontal disease
4. Which of the following statements is FALSE?
 - A. Methamphetamine acts on the neurotransmitters dopamine and serotonin.
 - B. Methamphetamine users present with lethargy, slurred speech, and hunger
 - C. Methamphetamine was once given to soldiers in order boost energy and decrease appetite.
 - D. Methamphetamine is highly addictive
5. Cooking or manufacturing meth produces an odor similar to
 - A. Diaper hamper odor
 - B. Baking bread
 - C. Eugenol
 - D. Nitrous Oxide
6. Extensive carious lesions may be caused by
 - A. Diet high in sugar
 - B. Poor oral hygiene
 - C. Xerostomia
 - D. All of the above
7. Meth users who injected the drug should be premedicated prior to dental treatment following the American Heart Association's guidelines. Users who reported smoking meth do not need to be premedicated.
 - A. Both statements are true.
 - B. Both are false.
 - C. The first is true and the second is false
 - D. The first is false and the second is true.
8. Dental treatment should be deferred since drug interactions may occur. Meth users may also become violent and pose a danger to the dental office staff.
 - A. Both statements are true.
 - B. Both are false.
 - C. The first is true and the second is false
 - D. The first is false and the second is true.
9. Which of the following restorations is recommended for treatment of "meth mouth" caries?
 - A. Amalgams
 - B. Composites
 - C. Either is acceptable
 - D. All carious teeth must be extracted.
10. Dental caries are more pronounced in those who used meth by
 - A. Injecting
 - B. Swallowing meth pills or capsules
 - C. Snorting
 - D. Smoking
11. The epidemiology and etiology of "meth mouth" is well established in the scientific literature. Approximately five percent of the U.S. population reports using this drug.
 - A. Both statements are true.
 - B. Both are false.
 - C. The first is true and the second is false
 - D. The first is false and the second is true.
12. The role is to prevent initial experimentation along with other educational organizations. It is not appropriate for the oral health team to encourage users to quit.
 - A. Both statements are true.
 - B. Both are false.
 - C. The first is true and the second is false.
 - D. The first is false and the second is true.

Registration Form: Duplicate and complete one registration form for each registrant.

Name _____ Last 4 digits of SS# _____

Mailing Address _____ City, State, ZIP _____

Email Address _____ Day Phone _____ Fax _____

Total Amount _____ Circle one: Check VISA MasterCard Card No. _____

Expiration Date _____ Signature _____



Make checks payable to The University of Tennessee.
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Continuing Dental Education, 875 Union Avenue, Memphis, TN 38163
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