Tobacco Cessation for the Dental Team: A Practical Guide
Part 1: Background & Overview

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Abstract

Dental professionals are strategically placed to be the leaders in tobacco prevention and cessation as they provide preventive and therapeutic services to a basically healthy population on a regular basis. By expanding the dental exam, diagnosis, and treatment to include tobacco cessation, a potentially life saving element of care is added to an established service. In addition periodontal disease and the potential for oral cancer mandate the inclusion of tobacco cessation services into dental care. Though dental professionals are aware of the health issues associated with tobacco use, they often feel ill prepared or uncomfortable presenting patients with a clear cessation message.

In this, the first of a two-part article, the purpose is to provide dental professionals with the foundational knowledge necessary to provide effective tobacco cessation as a normal part of patient care.

Keywords: Tobacco cessation, dental hygiene, dental care, tobacco history, tobacco use, nicotine dependence, nicotine addiction, consequences of tobacco use, oral cancer, periodontal disease


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Introduction
Throughout the world tobacco has been chewed, snuffed, smoked, traded, used as money, applied to wounds and tumors, and eaten. For decades, society saw smoking as a normal and acceptable part of life by seeing movie stars, public officials, soldiers and later, TV actors having cigarettes, pipes, or cigars in their hands (Figure 1).

The first modern research linking smoking to disease and death emerged in the 1940s and 1950s. Scientists reported tumors developing on mice where cigarette tar was applied to their skin. In 1964 the First Surgeon General’s Report on Smoking was published calling for research and analysis exploring the effects of smoking on health and society as a whole. In 1965 tobacco use in the United States peaked with 42% of the adult population smoking.

Tobacco Use - Morbidity And Mortality
The successful combination of health warnings, educational programs in schools, policy and legislative efforts, and higher cost of tobacco products due to taxes contributed in the decline of smokers in the U.S. Data from the 2002 National Health Interview Survey estimates around 45.8 million or 22.5% of Americans smoke with 37.5 million smoking daily and 8.3 million smoking some days. Approximately 80% of the people who use tobacco will start using before the age of 18.

Facts
• Smoking is the leading cause of death in the US; over 440,000 people die of a cigarette smoking related illness.
• Smoking is the leading cause of PREVENTABLE death in the US.
• A smoker loses an estimated 14 years of life expectancy.
• An estimated 38,000 Americans die from second hand smoke related cancers and heart disease each year.
• Although the incidence of breast cancer is higher than lung cancer in women, the survival rate of lung cancer is much lower (13%) than breast cancer (78%).
• An estimated 27,700 new cases of oral cancer were diagnosed in 2003 with 7,200 deaths. Approximately 70% of oral cancers are associated with smoking.

Nicotine Dependence
Our emotional and physical well-being is mediated by both biologic and psychological factors. The biologic aspect of the central nervous system is directed and mediated by a multitude of chemical reactions. This biochemical reaction is a delicate one and affects the person’s personality, feelings, memory, behavior, and movement.

The use of nicotine alters the normal chemical functions to the point the brain compensates for the “new” chemical and becomes “dependent” on this psychoactive drug. The presence of nicotine eventually replaces the normal neurotransmitter acetylcholine, causing an increase of cognition and alertness. In addition there is an increase of dopamine released which creates an artificially produced feeling of well-being and calm. As a result, an individual begins to associate tobacco use with a positive expectation of pleasant, calm feelings combined with an increase of alertness.
Over time, the amount of nicotine must be increased and re-supplied as receptor sites increase. The combination of positive expectations, avoidance of feeling ill, and neurons physiologically changing results in a psychological and biological drug dependence. Slowly, tobacco users develop habits and rituals associated with their smoking or smokeless tobacco activities. Nicotine addiction is now viewed as a chronic disease where a user is treated over an extended time and has periods of relapse and remission.

Oral Consequences Of Tobacco Use
The evidence of disease associated with tobacco use is substantial and difficult to ignore. Unfortunately, 57.9 million Americans, twelve years and older, continue to try to beat the odds and smoke; 7.6 million continue to use smokeless tobacco. With the consequences of tobacco use often not becoming evident until after years of exposure, people may convince themselves smoking is not affecting them.

Tobacco smoke contains over 4,000 chemicals with 43 known carcinogenic agents. A few of these toxic chemicals include carbon monoxide, ammonia, toluene, and formaldehyde. High concentrations of tobacco specific carcinogenic nitrosamines have also been identified in smokeless tobacco juices. As a result of exposure to these chemicals, it is widely recognized tobacco use is one of the most important risk factors in the development of oral lesions and periodontal diseases.

Esthetic Concerns
Tobacco often leaves behind a discoloration on teeth. In light of oral cancer and periodontal disease stain may not seem that important. However, for patients who are conscious of their body image, stain, mouth odor, brown hairy tongue (Figure 2), or an increase in calculus may have a profound impact on encouraging someone to make a quit attempt.

Oral Pathology: Tobacco Related Red and White Lesions
Leukoplakia is a white plaque or lesion that cannot be wiped off with a gauze square and cannot be classified as any other disease (Figure 3).

These pre-malignant plaques have a variety of appearances including: white, gray, white-yellow, or a mix of white and red; smooth or wrinkled; cracks and fissures to finger-like projections.

The location of leukoplakias has a strong correlation with the potential for malignant or premalignant changes. Lesions located on the
floor of the mouth (42.9%), tongue (24.2%), and lips (24.0%), respectively, have the highest risk of transformation.5 More than 80% of patients with leukoplakia are smokers with 5%-25% going on to become dysplastic or invasive carcinoma.6

Smoker’s palate, or nicotine stomatitis, is a result of trauma caused by the heat from pipes and cigars, though it can be seen with any type of smoked tobacco. In early stages tissue on the palate turns red or slight grey in appearance (Figure 4).

Oral and Pharyngeal Cancer
Squamous cell carcinoma accounts for 90%17 of all oral cancers and can present in different forms but is often ulcerated (Figure 5).

Oral and pharyngeal cancer includes malignancy of the buccal mucosa lip, floor of the mouth, tongue, palate, gingival, or oropharynx and accounts for 1.4% to 2.1% of cancers diagnosed annually in the United States.8,18 The symptoms of oral and pharyngeal cancer include: a sore that does not heal; a thickening or lump that does not go away in the mouth, throat, or neck area; persistent white or red patch in the mouth; difficulty chewing or swallowing; or weight loss. In the early stages malignant lesions are often painless and not noticed.

The Need for Oral Cancer Screening
Annually in the United States an estimated 27,700 new cases of oral pharyngeal cancers will be discovered and an estimated 7,200 deaths will occur.9 Therefore, it is very important for clinicians to carefully assess each patient by providing a periodic oral cancer screening. An excellent Internet site for more information, articles, and outstanding oral cancer slides is the Oral Cancer Foundation at www.oralcancerfoundation.org.

Periodontal Disease
Just as tobacco use is a risk factor for the development of leukoplakia and oral/pharyngeal cancer, smoking is a well-established risk factor for periodontal disease.19-25 Smoked tobacco compromises the host immune system, causes a reduction in oxygen and nutrients to the lamina propia and gingiva, and possibly increases gram negative pathogens causing the smoker to have a greater risk of developing periodontitis.20,26

Patients who smoke have been reported to heal slowly and do not respond well to periodontal therapy due to the compromised immune response and altered tissue regeneration.22,23 Even when an adjunctive therapy of metronidazole is administered following non-surgical periodontal therapy, smokers have a poorer treatment response than non-smokers.27 The clinical presentation of a smoker can vary, but many have stain, an increase in calculus29 (Figure 6), and fibrotic, pale gingiva due to decreased vascularity and fibrosis from the toxins found in tobacco smoke.
Conclusion
In summary, smoking contributes to:

1. An increase of prevalence and severity of periodontitis.\textsuperscript{20}
2. An increase of pocket depths, marginal bone, and attachment loss.\textsuperscript{25, 28}
3. Deceased healing following periodontal therapy.\textsuperscript{29}
4. An increase of tooth loss.\textsuperscript{19}
5. A strong association between periodontal disease, smoking, and heart disease.\textsuperscript{29}

In addition to periodontitis smoking has been shown to be strongly associated with necrotizing ulcerative gingivitis (Figure 7). In a study of 100 patients presenting with necrotizing ulcerative gingivitis (NUG) 98 reported being smokers.\textsuperscript{30} The exact mechanism of smoking to this multifactorial condition is unknown but may be a combination of poor oral hygiene, stress, poor diet, and smoking related physiological changes such as constricted blood vessels and lowered immune response.\textsuperscript{30}

References

About the Author

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Ms. Davis has practiced dental hygiene for 29 years and is an Assistant Professor in Health Care Professions, Dental Hygiene, at Southern Illinois University Carbondale in Carbondale, IL. She teaches advanced periodontics and pain control. As a result of various grants and fellowships, she has developed a comprehensive tobacco control curriculum, Leading the Way; for dental hygiene faculty which is available on the Internet for download at no charge at www.siu.edu/HCPTobacco. She is currently involved as co-principal investigator on a three-year grant from the American Cancer Society, Illinois Division, evaluating her tobacco control curriculum.

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