



ORAL HEALTH IN AMERICA: A REPORT OF THE SURGEON GENERAL¹ **Excerpts From Chapter 10: Factors Affecting Oral Health over the Life Span**

The Effects of Tobacco on Oral Health

The use of tobacco products—cigarettes, cigars, pipes, and smokeless (spit) tobacco products (snuff and chewing tobacco) - has emerged as a major preventable risk factor for a number of oral diseases and disorders.

Oral and Pharyngeal Cancers

Cigarettes - Tobacco smoke contains over 4,000 compounds, some of which are carcinogenic, toxic, or mutagenic (USDHHS 1989). An extensive review of the literature has clearly established a causal relationship between cigarette smoking and oral cancer (USDHHS 1982, 1989). Indeed, about 90 percent of oral cancer deaths are attributable to smoking (Shopland 1995, USDHHS 1989), and smoking cessation can significantly reduce the risk (USDHHS 1990).

Smokeless (Spit) Tobacco - These products are causally linked to oral and pharyngeal cancers (IARC 1985, Nash 1986, USDHHS 1986). About 30 carcinogens have been found in spit tobacco, including tobacco-specific N-nitrosamines, benzo[alpha]pyrene, and formaldehyde (Hoffman and Djordjevic 1997). Spit tobacco users have an oral cancer risk 4 to 6 times that of nonusers (Blot et al. 1988, Winn et al. 1981). Characteristic mucosal lesions are associated with spit tobacco use (Axéll et al. 1976, Holmstrup and Pindborg 1988, Peacock et al. 1960, Pindborg and Renstrup 1963) and can be found even among adolescent users (Greer and Poulson 1983, Offenbacher and Weathers 1985, Poulson et al. 1984, Tomar et al. 1997b, Wolfe and Carlos 1987). They are considered potentially premalignant (USDHHS 1986).

Cigars and Pipes - Cigar smoke contains the same toxic and carcinogenic compounds found in cigarette smoke (Hoffmann and Hoffmann 1998). A recent review of case-control and cohort studies also shows a consistent elevation in risk for oral and pharyngeal cancers among cigar smokers, with cigar smokers having 2 to 22 times the risk of non-smokers of cigars (USDHHS 1998). The risk of oral and pharyngeal cancers increases with the number of cigars smoked per day and the depth of inhalation.

Although data for pipe smoking and oral cancer risk are more limited than data for use of other forms of tobacco, relative risk estimates from longitudinal studies are similar for pipe smokers and cigarette smokers (USDHHS 1982, 1989).

Periodontal Diseases

Reviews of the literature have long implicated cigarette smoking as a risk factor for periodontal diseases. More recent studies such as Grossi et al. (1994, 1995) showed that smoking was a

major risk factor for periodontal disease in a group of 1,500 adults. Measured either by radiographic bone height or probing attachment level, and after adjusting for age, sex, socioeconomic status, and plaque and calculus levels, the investigators found that smokers were 7 times more likely to develop periodontal disease than nonsmokers. They also found a direct linear dose-response relationship between the level of smoking, assessed by pack years (number of cigarettes smoked per day times years smoked), and destructive periodontitis. Smoking is also a prognostic indicator: current smokers are at a significantly greater risk for further loss of periodontal attachment than are nonsmokers, with an odds ratio of 5.4 (95 percent confidence interval of 1.5 to 19.5).

Mechanisms explaining the association suggest that smoking depresses immune responses (Holt 1987, Sasagawa et al. 1985), including diminishing white blood cell activity (Gala et al. 1984, Kenney et al. 1977). Toxic and vascular effects as well as effects on the subgingival flora are also suggested. In addition, smokers do not heal as well as nonsmokers after periodontal disease therapy and experience less reduction in levels of periodontal pathogens (Grossi et al. 1997). The negative effects of smoking can be reversed with cessation of tobacco use. After 10 years, former smokers appear to be no more likely than nonsmokers to have severe loss of periodontal attachment (Tomar and Marcus 1998).

Spit Tobacco - Reports indicate that oral tobacco use results in gingival recession at the usual site of snuff or chewing tobacco placement. In a study of adolescent males, Offenbacher and Weathers (1985) found that 60 percent of users had gingival recession, compared with 14 percent of nonusers.

Dental Caries

The strongest evidence for an association of tobacco use and risk for dental caries relates to the use of chewing tobacco and increased risk for root caries. The causative factor relates to the sugar content of the product. Several popular brands of chewing tobacco have high levels of fermentable sugars (between 30 and 60 percent by weight). In a cross-sectional study of older adults in North Carolina, chewing tobacco users had a higher number and percentage of root surfaces affected by caries than those who used other forms of tobacco or had never or formerly used tobacco (Tomar et al. 1997a). This finding was confirmed in an analysis of data from NHANES III (Tomar and Winn 1998).

Trends in Tobacco Use

In 1995, 47 million adults - 25 percent of the U.S. adult population - were smokers (CDC 1997). This figure represents a steady decline from the 52 percent of the population reported to be smokers in 1965, the year following the release of the first Surgeon General's Report on Tobacco (Giovino et al. 1995). The prevalence of smoking in women was 34 percent in 1965, 30 percent in 1979 (Giovino et al. 1994), and 23 percent in 1995 (CDC 1997).

In contrast, cigarette smoking in adolescents has been increasing. Daily smoking among high school seniors increased from 17 percent in 1992 to 22 percent in 1996 (Johnston et al. 1997). High school students who reported smoking in the preceding month increased from 27.5 percent in 1991 (USDHHS 1994) to 36 percent in 1997 (CDC 1998).

Spit tobacco use has also increased. Sales of moist snuff - the most popular form of spit tobacco used by young people (Tomar et al. 1995) - have increased every year since the mid-

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1970s (FTC 1997, Maxwell 1992, USDA 1997). About 20 percent of male high school students reported using spit tobacco during the previous month (CDC 1996, Johnston et al. 1997). About 6 percent of adult males use spit tobacco (CDC 1993). Nearly all regular users are male.

Aggressive marketing has also led to explosive growth of sales and consumption of cigars. Between 1993 and 1997, cigar consumption increased nearly 50 percent (Gerlach et al. 1998). In 1997, 22 percent of high school students smoked at least one cigar in the preceding 30 days (CDC 1998).

Implications of Trends

For Oral and Pharyngeal Cancers - The increases in spit tobacco and cigar use among young people do not bode well for the oral and general health of coming generations of Americans. Over the past 35 years the decline in the incidence and mortality rates of oral cancer has been attributable to declines in cigarette smoking primarily in adult white males. Cigarette smoking among African American males over the same time period was higher. This practice contributed to the higher rates of oral cancer among black males during these years. However, recent studies indicate precipitous declines in smoking among black males, so that their smoking rates are approaching the rates seen in white males (USDHHS 1998). Indeed, figures on smoking among adolescent and younger African American adults have even been lower than those for their white counterparts. These trends could result in substantial reductions in the risk for oral cancer among African Americans, were they to continue. Unfortunately, there is recent evidence that cigarette smoking among African American high school students is increasing (CDC 1998).

For Periodontal Diseases - The growing popularity of cigar smoking may counter the declines in cigarette smoking and maintain the percentage of periodontal disease attributable to tobacco use.

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