61. Counseling to Prevent Dental and Periodontal Disease

RECOMMENDATION

Counseling patients to visit a dental care provider on a regular basis, floss daily, brush their teeth daily with a fluoride-containing toothpaste, and appropriately use fluoride for caries prevention and chemotherapeutic mouth rinses for plaque prevention is recommended based on evidence for risk reduction from these interventions. Educating parents to curb the practice of putting infants and children to bed with a bottle is also recommended based on limited evidence of risk reduction. The effectiveness of clinician counseling to change any of these behaviors has not been adequately evaluated. Appropriate dietary fluoride supplements are recommended for children living in communities with inadequate water fluoridation. While examining the oral cavity, clinicians should be alert for obvious signs of oral disease (see ***Clinical Intervention***). Screening for oral cancer is discussed in Chapter 16, and recommendations regarding counseling to promote healthful diets are provided in Chapter 56.

Burden of Suffering

A large proportion of the population of the U.S. suffers from dental caries (tooth decay) and periodontal (gum and bone) disease. Although the prevalence of dental caries among school-aged children has declined in recent years, the most recent national survey (1986–1987) indicates that the average schoolchild has at least one cavity in permanent teeth by age 9, three cavities by age 12, and eight cavities by age 17.[1] About one quarter have five or more decayed, missing, or filled teeth.[1] In 1986–1987, about 50% of children age 5–17 were completely free of decay and of restorations in their permanent teeth.[1] The average adult in the U.S. has 10–17 decayed, missing, or filled permanent teeth.[2]

About half of all adults have gingivitis (gum inflammation), and 80% have experienced some degree of periodontitis (inflammation of the gums leading to destruction of the bone supporting the teeth).[3,4] About 60% of children and adolescents have at least one tooth site with gingival bleeding.[5] Ninety-five percent of elderly persons have periodontitis, with more than one third experiencing moderate to severe periodontal disease (i.e.,

at least one site with attachment loss of 6 mm or greater).[2] About 22% of American adults over age 45, and over half of adults over age 65, are edentulous.[6] In 1989, dental conditions accounted for 164 million hours of missed work, 51 million hours of missed school, and 41 million restricted activity days in the U.S.[7] Dental expenditures in the U.S. exceeded $30 billion in 1990.[8] Dental and periodontal diseases are more common in persons whose personal behaviors (e.g., tobacco use, alcohol abuse, poor diet), medications, or coexisting medical illnesses (e.g., diabetes mellitus, xerostomia, Sjögren syndrome, human immunodeficiency virus [HIV] infection) increase the risk of oral pathology. Dental caries is also more common among minorities and children whose parents are of low socioeconomic status.[9]

Tooth and gum diseases are part of an overall category of oral health that includes conditions that fall outside the dental focus of this review (e.g., orofacial pain, salivary conditions, congenital anomalies). These include oral conditions that are manifestations of systemic diseases or treatment modalities. With the aging of the population, a growing number of older Americans are experiencing chronic diseases and taking medications that affect their oral health. The exclusion of these conditions from this discussion is not meant to minimize their important effect on other health behaviors (e.g., nutrition) and overall well-being, their importance as a source of morbidity or mortality in the U.S., the role of certain health behaviors (e.g., tobacco use) in causing these conditions, or the potential benefits of early detection by clinicians.[10]

Efficacy of Risk Reduction

Personal oral disease prevention practices can reduce the risk of developing caries and periodontal disease. These measures include regular use of fluoride and some antiplaque and antigingivitis chemical agents, reduced amount and frequency of dietary intake of foods containing refined sugars or adherent carbohydrates, and tooth brushing and flossing. The incidence of caries has been reduced significantly by the fluoridation of community water supplies.[11–16] Although 87% of the U.S. population is served by community water supplies, only 62% of these communities have optimally fluoridated water.[17] In locations where adequate community water fluoridation is not available, the risk of caries can be reduced by providing alternate sources of fluoride.[18–23] These sources include systemic (e.g., school water fluoridation, and fluoride tablets and drops) and topical (e.g., fluoride mouth rinse, professional fluoride treatment) forms. Virtually all toothpastes sold in the U.S. contain fluoride, which has been shown to be effective in reducing the incidence of caries by about 20–40%.[24,25]

The adverse effects of water fluoridation appear to be minimal. Although an increase in the prevalence of dental fluorosis has been observed,[26,27] this trend has been attributed to inappropriate use of fluoride supplements by health professionals and parents.[28,29] Inappropriate use of fluoride supplements and fluoride dentifrices is particularly common among infants and toddlers, who may swallow large amounts of fluoridated toothpaste.[30,31] Most cases are mild and do not affect the appearance of teeth. Observational studies have provided conflicting evidence regarding the association between fluoride ingestion and the incidence of osteoporosis and hip fractures.[32–37]

Nonfluoride chemicals contained in some mouthwashes and gels may also be effective as antiplaque and antigingivitis agents.[38–40] Regular use of some phenolic antiseptic mouthwashes (e.g., Listerine) has been associated with a 28–34% reduction in plaque and gingivitis at 6-month followup.[41–43] Chlorhexidine gluconate rinses, when combined with toothbrushing, have been reported to achieve 50–55% reduction in plaque and a 45% reduction in gingivitis[44–46] but the product can also stain teeth, increase calculus deposition, and produce an unpleasant taste. Dentifrices containing triclosan, when combined with zinc citrate or a copolymer of methoxyethylene and maleic acid, have been associated with a significant reduction in plaque and gingivitis,[47–50] but the products are currently not available in the U.S.

Reduced exposure of the teeth to certain dietary carbohydrates, especially refined sugars and carbohydrates that adhere to the teeth, may lower the risk of developing caries. Studies in the 1950s and 1960s conducted in institutionalized settings suggested that diets including large amounts or frequent consumption of sucrose and other sugary foods were associated with a higher incidence of caries.[51,52] The correlation has been more difficult to demonstrate in more recent studies, in which dietary intake was less carefully controlled, but the data are suggestive that the consumption of sugary foods, especially between meals, is cariogenic.[53–58] Some data from animal studies also support this conclusion. For ethical reasons, definitive studies to prove a causal relationship between diet and carious lesions in humans are unlikely to be performed.

Improper infant feeding practices are another postulated source of caries in young children, especially the cariogenic damage to the maxillary incisors seen in early childhood caries (baby bottle tooth decay). This condition was first attributed to prolonged pooling of liquids around the anterior primary teeth in infants who regularly fall asleep sucking the nipple of a baby bottle containing an acidic or cariogenic beverage (fruit juice, soda, and formula).[59] The etiology of the condition now appears to be multifactorial, and an association between infant feeding practices and early childhood caries is less clear.[60–62] Some evidence suggests that other dietary factors and vertical transmission of certain bacteria from the

mother may play an etiologic role.[62a] Education to curb the practice of putting children to bed with a bottle, encouragement of breastfeeding, early restoration and treatment of tooth decay, and optimizing the oral health care of the mother have each been proposed to decrease the risk of early childhood caries, but definitive evidence of effectiveness is lacking.

It is mainly the fluoride contained in toothpastes, rather than toothbrushing and flossing per se, that reduces tooth decay. It has been known for two decades, however, that brushing and flossing can prevent the development and progression of periodontal disease by removing bacterial plaque deposits.[63–65] Mechanical interdental cleaning (e.g., flossing) and toothbrushing appear to be more effective than toothbrushing alone or antimicrobial mouth rinses in reducing gingivitis.[66,67] Their efficacy, however, depends on the ability of the patient to keep teeth adequately plaque-free, and this necessitates thorough daily tooth brushing and cleaning between teeth with dental floss or other mechanical devices. It is unclear whether home electrical toothbrushes with rotating bristles are more effective than manual brushing in removing plaque and controlling gingivitis.[68–70] These devices may be of greater benefit for persons with physical limitations due to arthritis or other conditions. Due to the difficulty many patients have in adopting and maintaining these habits, personal oral hygiene measures often fail to remove plaque adequately and prevent gingivitis. For this reason, it is also important for patients to receive regular professional dental care.

Different types of professional care are provided by dental specialists, dental hygienists, and dental public health professionals. Among the most important measures performed by dentists and dental hygienists are primary preventive measures, such as prophylactic scaling and root planing of teeth, and secondary preventive maneuvers, such as careful oral and dental examination for the early detection and treatment of dental disease. Other potentially effective preventive interventions offered by dental health professionals include the application of topical fluoride[71,72] and occlusal sealants[73–75] to prevent caries, placement of orthodontic space-maintaining appliances to prevent malocclusion, and the early detection of oral cancer (see Chapter 16) and the oral manifestations of infection with HIV (see also Chapter 28). Experimental studies in the 1970s demonstrated that meticulous and very frequent dental prophylaxis can reduce the incidence of caries in schoolchildren,[76–81] but these studies required an intense program of professional dental care that would not be feasible under typical dental practice conditions in the U.S. Other studies suggest that topical fluoride application may be equally effective with or without dental prophylaxis, making it unclear whether the procedure needs to be restricted to dental practices.[39] Professional care can also delay progres-

sion of periodontal disease because the dentist or dental hygienist can remove plaque and calculus from subgingival areas generally not reached by the patient. Professional dental care alone, however, is inadequate to prevent periodontal disease. Failure by the patient to regularly remove plaque deposits between dental visits can lead to extension of supragingival plaque beneath the gum, bacterial recolonization of the gingival crevice, accumulation of calculus, and recurrent periodontitis.[83] Thus, regimens that combine personal oral hygiene with professional prophylaxis are most effective in the prevention of periodontal disease.[84]

Although annual (or more frequent) dental examinations and prophylaxis are often recommended, there is little scientific evidence that this frequency is necessary on a routine basis for the maintenance of oral health in asymptomatic persons. Regular examinations may be necessary to detect and treat disease processes before they threaten the viability of the teeth, gums, and other oral soft tissues; in addition, more frequent visits may be necessary for persons at increased risk by virtue of their age, risk factors (e.g., pregnancy, tobacco and alcohol use), state of periodontal health, rate of accumulation of tartar, personal oral hygiene practices, and medical and dental history (e.g., diabetes mellitus, xerostomia, HIV infection).

Effectiveness of Counseling

Survey data suggest that many patients, especially persons in minority groups or those of low socioeconomic status, lack adequate knowledge about how to prevent oral diseases.[85] There is little information on the effectiveness of physician advice in changing oral hygiene or dietary habits, increasing the optimal use of fluoride supplements, or increasing patient visits to dentists. Studies of patient education involving dentists, dental hygienists, dietitians, physicians, and other providers have reported mixed results in changing personal oral health practices and suffer from numerous design problems.[86–88] It is well known among oral health professionals that patients frequently face difficulties in complying with guidelines for proper tooth brushing and dental flossing without repeated reinforcement. Studies suggest that compliance with oral hygiene instruction is often poor.[89] There is little information regarding the willingness or ability of patients to comply with clinicians' advice to visit their dental care provider on a regular basis. The effectiveness of counseling to promote a healthy diet is discussed in Chapter 56.

In communities with inadequate water fluoridation, primary care physicians are an important source of supplemental fluoride drops or tablets to prevent dental caries in children. There is little information on patient compliance with such prescriptions. Studies have shown, however, that clinicians often fail to prescribe dietary fluoride supplements in accor-

dance with existing guidelines[90] or to determine the fluoride content of the local water supply before doing so.[91]

Recommendations of Other Groups

The Canadian Task Force on the Periodic Health Examination recommends water fluoridation, fluoride supplementation in low-fluoride areas, professional topical fluoride and self-administered fluoride mouth rinses for persons with active decay or specific risk factors, and use of fluoride dentifrices. It found insufficient evidence to recommend for or against toothbrushing and flossing, traditional prophylaxis prior to a topical fluoride application or given at a dental recall visit, and dietary counseling of the general population about cariogenic foods.[92] The American Dental Association (ADA) advises that the frequency of dental examinations be tailored to the individual.[93] The ADA and American Academy of Pediatrics (AAP) have issued new guidelines on the prescription of dietary fluoride supplements for children in areas with inadequate water fluoridation (see below).[94,95] The AAP[96] and other organizations have also issued guidelines on the prevention of early childhood caries (baby bottle tooth decay).

Discussion

Although there is little scientific evidence that clinician counseling can reduce the incidence of dental diseases such as caries and periodontal disease, it is reasonable to provide patients with information about methods to reduce the risk of developing these potentially painful and disfiguring conditions. There is sufficient evidence of benefit to justify efforts by physicians and other health care professionals to encourage frequent tooth brushing, daily dental flossing, appropriate use of fluorides and certain mouth rinses, healthful diet, and periodic visits to the dental care provider. There is, however, little evidence that this form of counseling must be performed frequently, or that annual or semiannual dental checkups are necessary for persons without clinical evidence of dental disease. Although it is likely that decreased or less frequent consumption of foods containing refined sugars or avoiding between-meal sweets will reduce the incidence of dental caries, this has not been demonstrated recently in a controlled prospective study involving humans (see Chapter 56 for information about the effectiveness of other forms of counseling to promote a healthy diet). Finally, clinicians can offer advice regarding effective measures to reduce the risk of developing oral cancer (see Chapter 16), such as discontinuing the use of tobacco products (see Chapter 54) and reducing the consumption of alcoholic beverages (see Chapter 52).

CLINICAL INTERVENTION

Counseling patients to visit a dental care provider on a regular basis is recommended based on evidence for risk reduction from such visits when combined with regular personal oral hygiene ("B" recommendation); the effectiveness of advising patients to visit a dental care provider has not been evaluated ("C" recommendation). There is little evidence regarding the optimal frequency of visits; this recommendation should be made by the patient's dental care provider. Counseling all patients to brush their teeth daily with a fluoride-containing toothpaste and to clean thoroughly between their teeth with dental floss each day is recommended based on the proven efficacy of risk reduction from doing so ("B" recommendation); the effectiveness of clinician counseling to encourage these behaviors has not been adequately evaluated ("C" recommendation). Parents of small children should be encouraged to perform or supervise their children's brushing and to monitor the amount of toothpaste used; wiping the teeth with a piece of gauze or damp cloth is typically recommended for cleaning the teeth of children who are too young to use a toothbrush. Parents of infants and young children should be encouraged to breastfeed (see Chapter 56). Providing advice to parents to put infants and children to bed without a bottle may reduce the risk of baby bottle tooth decay ("B" recommendation). See Chapter 56 for other recommendations regarding counseling to promote a healthy diet.

Clinicians caring for children should ascertain the fluoride concentration of their water supply. For children living in an area with inadequate water fluoridation (<0.6 parts per million [ppm]), the prescription of daily fluoride drops or tablets is recommended ("A" recommendation). According to recently revised guidelines,[94,95] in communities with a water fluoride concentration of less than 0.3 ppm, the recommended dose is 0.25 mg/day for children 6 months to 3 years of age, 0.50 mg/day for children aged 3–6, and 1.0 mg/day for children aged 6–16. In areas with a water fluoride level of 0.3–0.6 ppm, fluoride supplementation is not recommended for children 6 months to 3 years of age. For older children, the recommended dose is 0.25 mg/day for children aged 3–6 and 0.50 mg/day for children aged 6–16. Some groups have issued more conservative recommendations that limit fluoride supplementation to children age 3 and older living in communities with water fluoride concentrations of less than 0.3 ppm.[97]

When examining the oral cavity, clinicians should be alert for obvious signs of untreated tooth decay or mottling, inflamed or cyanotic gingiva, loose teeth, and severe halitosis, and for signs and symptoms of oral cancer or premalignancy in persons who use tobacco or excessive amounts of alcohol (see Chapter 16). All patients should be counseled to avoid the use of tobacco products (see Chapter 54). When examining children, clinicians

should be alert for evidence of early childhood caries (baby bottle tooth decay), mismatching of upper and lower dental arches, crowding or malalignment of the teeth, premature loss of primary posterior teeth (baby molars), and obvious mouth breathing. Patients with these or other suspected abnormalities should be referred to appropriate specialists for further evaluation.

The draft update of this chapter was prepared for the U.S. Preventive Services Task Force by Steven H. Woolf, MD, MPH, with contributions from materials prepared for the Canadian Task Force on the Periodic Health Examination by Amid I. Ismail, BDS, MPH, DrPH, Donald W. Lewis, DDS, DDPH, MScD, FRCDC, and Jennifer L. Dingle, MBA.

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