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Beyond the Smile: The Link Between Oral and Systemic Health

The Inseparable Connection Between Oral and Systemic Health

Society often perceives oral health as cosmetic, with the ultimate goal being an attractive smile. The popularity of aesthetic dental procedures, such as teeth whitening, veneers, and dental implants, further perpetuates the belief that oral health is primarily about appearance. Routine dental visits are more likely to be postponed than medical visits because oral-health preventive care and related concerns are viewed as less serious. For many patients, oral care interventions, including brushing, flossing, and using mouthrinses, serve only to prevent cavities and maintain fresh breath. In reality, the value of periodontal and dental health extends far beyond the oral cavity. Increasing evidence has demonstrated important associations between oral health and systemic health, identifying the mouth as a gatekeeper to an individual's overall well-being.[1] Despite the well-established relationship between oral and systemic health, dental and medical care continue to be largely separated across insurance coverage, clinical practice, and patient record systems.

Over 90% of the world's population is affected by gingivitis,[2] a mild form of gum disease that is preventable and reversible with proper oral hygiene. When left untreated, gingivitis can progress to periodontal disease, characterized by chronic inflammation, oral bacteria colonization, bone loss, and gingival recession. Periodontal disease is associated with an increased risk or presentation of several systemic diseases, including diabetes, cardiovascular disease, pregnancy complications such as low birth weight and preeclampsia, chronic obstructive pulmonary disease, lung cancer, asthma, bacterial pneumonia, Alzheimer's disease, chronic kidney disease, rheumatoid arthritis, and liver cirrhosis.[1] A potential mechanism linking oral and systemic health is the elevation of systemic inflammatory markers resulting from chronic inflammation in the oral cavity.[3] Another proposed mechanism is the dissemination of pathogenic oral bacteria into the bloodstream, affecting distant sites throughout the body.[3] The American Dental Association (ADA) recommends that patients receive dental care before medical procedures to optimize their oral health and minimize the risks of oral infections, gingival disease,[3] and infective endocarditis caused by oral bacteria traveling to the heart. More importantly, the benefits of oral care extend beyond the dental setting. Recent studies show that improving oral hygiene among hospitalized patients can reduce serious healthcare-associated infections, including non-ventilator hospital-acquired pneumonia, bacteremia, and urinary tract infections, thus reinforcing oral care as a fundamental, yet often overlooked, pillar of patient safety and whole-person health.[4,5] Although additional research is needed to understand the complex correlations and potential causal effects between periodontal disease and systemic diseases, these known associations warrant proper care and treatment to maintain good oral health.

Periodontal Disease and Diabetes: A Two-Way Relationship

The relationship between periodontal disease and diabetes is among the most well-established examples of the bidirectional connection between

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oral and systemic health.[6] Diabetes is characterized by insufficient insulin production or impaired insulin sensitivity resulting in elevated blood glucose levels. Patients with diabetes have a higher prevalence of periodontal disease than those without diabetes.[6] Advanced periodontal disease is associated with poor glycemic control, as evidenced by increased levels of hemoglobin A1C and triglycerides and decreased levels of high-density lipoprotein cholesterol.[7] According to the ADA, periodontal disease has been linked to an increased risk and severity of diabetes-related complications.[8] In addition to gingivitis and periodontitis, uncontrolled diabetes can manifest in the oral cavity as xerostomia, burning sensation, impaired wound healing, increased incidence and severity of infections, and parotid salivary gland enlargement.[8]

Public awareness of the oral-systemic-health connection is lacking, despite increasing scientific evidence. For example, approximately 26% of patients with diabetes surveyed in a phase 4 clinical study were unaware that they had an increased risk of periodontal disease due to their diabetes, and nearly 38% reported not receiving counseling from health care providers about their oral health.[9] These findings underscore the need for improved education on the connection between oral and systemic health, particularly among patients, dental professionals, and medical clinicians, as well as stronger integration between dental and medical care to ensure that oral health is recognized and managed as a critical component of diabetes care.

Maintaining good oral health is essential, particularly in patients with diabetes, who are at increased risk for periodontal disease. Although treatment outcomes were mixed, some studies suggest that treatment for periodontal disease, including scaling and root planing, may improve glucose control in patients with diabetes by reducing hemoglobin A1C levels after 3 and 6 months.[8] A recent clinical study investigated the safety and effectiveness of essential-oil–containing mouthrinses in patients with diabetes.[9] Enrolled participants were at least 18 years of age, diagnosed with type 1 or type 2 diabetes, in otherwise good general and oral health, and had at least 20 gradable teeth.[9] Participants (N = 154) were randomized to twice-daily brushing with adjunct alcohol-containing essential-oil mouthrinse, alcohol-free essential-oil mouthrinse, or alcohol-containing mouthrinse without essential oils (negative control) for 12 weeks.[9] The alcohol-containing essential-oil or alcohol-free essential-oil mouthrinses significantly reduced plaque accumulation, gingival inflammation, and gingival bleeding compared with the negative control mouthrinse.[9] These findings highlight the importance of individualized periodontal management strategies that combine professional care with patient-specific home-care recommendations. For individuals living with chronic conditions, such as diabetes, personalized preventive care plans should consider clinical needs, risk factors, patient preferences, and the likelihood of long-term adherence. Mechanical plaque control through toothbrushing and interdental cleaning remains the foundation of oral hygiene; however, adjunctive therapies may further enhance plaque and gingivitis control.

These results are consistent with a large body of evidence that demonstrates that adjunctive use of mouthrinses, along with mechanical measures, significantly reduces gingivitis and plaque in the general population.[10] Mouthrinses containing essential oils, including eucalyptol, menthol, methyl salicylate, and thymol, improve periodontal health by decreasing plaque, biofilm, and gingivitis. Mouthrinses are well tolerated, come in a variety of flavors, are relatively inexpensive, require minimal dexterity, are available over the counter, and are designed to reach areas of the mouth that are missed with brushing and flossing. The adjunctive use of antiseptic mouthrinses to protect against gingivitis has been endorsed by the ADA home oral care recommendations,[11] as well as by guidelines from the American Academy of Periodontology[12] and the European Federation of Periodontology.[13] When selected as part of a personalized home-care plan, mouthrinses may represent a simple and effective strategy for improving oral hygiene outcomes.

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Looking to the Future

Given the robust body of evidence demonstrating the connection between periodontal health and systemic health and, importantly, the benefits of improved oral health on systemic-health outcomes, future efforts should focus on policy reform initiatives aimed at increasing access to preventive oral care products, including toothbrushes, fluoride toothpaste, interdental cleaning products (eg, floss, interdental brushes, water flossers), and antiseptic mouthrinses. Third-party payors are more likely to invest in inexpensive preventive measures when evidence demonstrates that the measures have the potential to reduce the risks and costs associated with chronic diseases over time. For example, some medical insurance companies reimburse gym memberships, fitness classes, or exercise equipment because of the health benefits associated with increased physical activity. Moreover, certain risk-reducing surgeries are covered for patients who are at an increased genetic risk of developing certain cancers (eg, double mastectomy for patients with *BRCA1* or *BRCA2* mutations). Although Medicare, Medicaid, and private insurance companies cover in-office preventive oral care interventions (eg, routine dental prophylaxis, radiographs, and fluoride treatments), they do not cover many at-home oral hygiene tools, such as power toothbrushes and antiseptic mouthrinses. If inexpensive oral-health interventions, such as mouthrinses, improve periodontal health and subsequently reduce systemic inflammation, improve metabolic outcomes, or decrease disease-related health care utilization, the potential implications for public health could be substantial.

Call to Action

October is National Dental Hygiene Month, a time to raise awareness about the importance of the connections between oral and systemic health. Dental hygienists play a critical role in providing predictive, preventive, personalized, and participatory care for patients across the lifespan.[14] Their work enables the identification of early signs of localized disease or potential underlying conditions (eg, gingivitis) in patients, putting them on the front lines of health care. Every dental appointment is an opportunity for dental hygienists to educate their patients about oral care best practices, enabling dental hygienists to address inflammation in the mouth before it contributes to broader health consequences. In addition to education, it is important to empower patients to adopt healthy routines and evidence-based strategies that they can implement at home, such as brushing and flossing with adjunctive use of mouthrinses, to control gingivitis and periodontal disease.

Researchers are only beginning to uncover the complex relationship between oral dysbiosis and chronic disease. Additional studies are needed to elucidate the underlying mechanisms and evaluate the impact of preventive oral-care interventions on systemic-health outcomes and their potential economic value within health care systems. As evidence continues to emerge, dental hygienists are uniquely positioned to serve as advocates for oral-systemic health by raising awareness, promoting preventive behaviors, and helping bridge the longstanding divide between oral health and overall health care. Through these efforts, dental hygienists can empower patients to take a more active role in managing their oral health and broader health and well-being.

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