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New evidence on bacteraemia

Oral health can have a significant impact on the overall health and well-being of individuals. The significant role that scientists, dentists, dental hygienists, and other health professionals play in the prevention of oral disease and disability involves educating about safe and effective disease prevention measures that patients can adopt to improve oral health and prevent disease. Animal and population-based studies have demonstrated an association between periodontal diseases and diabetes, cardiovascular disease, stroke and adverse pregnancy outcomes. Further research is needed to determine the extent to which these associations are causal or coincidental. In promoting and maintaining oral health and well-being, the individual should exercise appropriate self-care and adopt healthy behaviours, and the provider should incorporate knowledge emerging from science in a timely manner for prevention and diagnosis, risk assessment and risk management, and treatment of oral diseases and disorders. This article will review new research in the area of bacteraemia originating from the oral cavity.

Bacteraemia is simply the presence of bacteria in the blood. In most situations, the body can effectively eliminate the bacteria before it causes disease. However, oral microorganisms and cytotoxic by-products associated with local infections can enter the bloodstream or lymphatic system and cause damage or potentiate an inappropriate immune response elsewhere in the body (1). Oral bacteria can invade the mucosal tissue directly through injured or ulcerated tissue, and cause a local or systemic immune response. Dissemination of oral bacteria into the bloodstream can occur after most invasive dental procedures including tooth extractions, endodontic therapy, periodontal surgery, and scaling and root planing. Routine oral hygiene procedures such as daily toothbrushing, subgingival irrigation and flossing can also cause bacteraemia. The oral–systemic link is attributed to a number of theories, one that proposes that endogenous plaque microorganisms found in a periodontal pocket can obtain access into the blood circulation and attach to organs distant from the oral cavity and cause damage (2, 3). They may act as exogenous and harmful agents and contribute to an increased risk for diseases such as coronary heart disease, stroke, preterm delivery and renal disease (4–9).

Moreover, bacteraemia has been implicated in infective endocarditis (IE). As a result, guidelines have been published by the American Heart Association to decrease the risk of IE (10). Bacteraemia has also been associated with joint replacement infections. Joint guidelines were published in 2003 by the American Dental Association (ADA) and the American Academy of Orthopaedic Surgeons (AAOS), regarding antibiotic prophylaxis for dental patients with total joint replacements (11). In 2009, the AAOS issued an information statement for patients undergoing certain medical and dental procedures who have had a total joint replacement, saying, 'Given the potential adverse outcomes and cost of treating an infected joint replacement, the AAOS recommends that clinicians consider antibiotic prophylaxis for all total joint replacement patients prior to any invasive procedure that may cause bacteraemia (12).' This was different from the previous statement, which recommended routine antibiotic prophylaxis only within the first 2 years after replacement surgery and beyond 2 years only for patients with comorbidities that might place them at an increased risk for haematogenous total joint infection (i.e. immunocompromised patients). The ADA and the AAOS Surgeons are working together to develop evidence-based, clinical practice guidelines for antibiotic prophylaxis for dental patients with total joint replacement. The new guidelines, expected to be complete by 2011, will undergo a rigorous evidence-based approach by the AAOS, ADA and others who participate in the work group put together by the AAOS Guidelines and Technology Oversight Committee.

Toothbrushing alone will not prevent gingivitis interproximally. Interproximal cleaning and toothbrushing are needed to maintain optimal oral health (13). The teeth represent only about 25% of the surface area inside the mouth and brushing alone removes about 50% of the plaque in your mouth. Studies have shown that when flossing is combined with brushing, up to 70% of plaque is removed. Brushing, flossing and interdental mechanical cleaning disrupt biofilm but do not kill biofilm bacteria, allowing it to recolonize on dental and oral surfaces. An antiseptic essential oil (EO) mouthrinse was shown to penetrate and kill both planktonic biofilm and biofilm that is still attached to the teeth, gums or cheeks (14). A Special *Supplement* to the JADA® November 2006 issue offers a comprehensive compilation of scientific information showing the value of brushing, flossing and rinsing with an antimicrobial mouthrinse as an essential daily routine, versus brushing and flossing alone (15). A 6-month study of adding a rinse to toothbrushing and flossing showed that the addition of EO mouthrinse provides a meaningful and significant incremental benefit to brushing and flossing (16).

Some studies have shown that antimicrobial mouthrinses can have a significant impact on the levels of supragingival plaque microorganisms and resulting gingivitis (17–19). A new study was designed to question whether an essential oil mouthrinse (EOM) could affect the microbial flora sufficiently to result in a reduction in blood-borne bacteria caused by a traumatic challenge to oral tissues stimulated by chewing an apple (20). The objective of this randomized, single-centre, double-blind, placebo-controlled, 2-week, cross-over design clinical trial was to determine if consistent use of an antimicrobial mouthrinse could reduce the bacteraemia induced by eating an apple in vulnerable individuals with mild-to-moderate gingivitis. A

study presented at the 2009 IADR/AADR meeting by Fine, *et al.* showed that 2 weeks of rinsing with an essential oil mouthrinse significantly reduced bacteraemia in patients with gingivitis. This 2010 study confirmed the results of 2009 study.

The study suggests that the role of antimicrobial mouthrinses known to assist in the maintenance of good health can conceivably reduce levels of bacteraemia in susceptible individuals. After 2 weeks of twice-daily rinsing, total induced aerobic and anaerobic counts in the blood were significantly lowered in those subjects who used an EOM compared with those subjects who used the control rinse (20). This placebo-controlled, randomized, double-blinded, 2-week cross-over study showed that the use of an EOM reduced the amount of blood-borne bacteria resulting from chewing an apple in a susceptible group of subjects that had mild-to-moderate gingivitis. This study has been submitted as an abstract to American Heart Association (AHA) annual convention November 2010 (21).

The American Heart Association has issued a Special Report: Infective Endocarditis, The importance of good oral health and understanding infective endocarditis. It is an eight-page brochure that explains what infective bacterial endocarditis is, who is at risk, the symptoms, how endocarditis is treated, the possible complications, prevention techniques and how one practises good oral hygiene.

In summary, we have reviewed how oral health can have a significant impact on the overall health and well-being. Moreover, a new study was presented that demonstrated the role of antimicrobial mouthrinses in reducing the levels of bacteraemia in susceptible individuals.

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Maria Perno Goldie
President Elect, IFDH
Seminars for Women's Health
E-mail: mgoldie@sbcglobal.net