Oral Health: A Healthy Mouth Equals a Healthy Body

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At first glance, supporting periodontal health seems like the least likely way to keep the entire body healthy. Yet, many fascinating studies are showing that good oral health is linked to optimal cardiovascular function, blood sugar metabolism and even cognitive health.

Much of the connection between periodontal health and other bodily systems involves inflammatory responses and micro-inflammatory responses. Suboptimal periodontal health directly activates micro-inflammatory molecules such as nuclear factor kappa B (NF-kB), which impacts both endothelial and epithelial layers.1

This periodontal-related imbalanced inflammatory response leads to effects on various parts of the body including the heart, brain, liver and kidneys.2 Additionally, as noted in more detail later in this article, blood sugar metabolism also affects periodontal health.

Further evidence supporting the link between periodontal and overall health is the fact that in patients with suboptimal gum health, telomere length is shorter and that telomere measures correlate with the oxidative stress and severity of disease.3 Telomeres are “caps” at the end of chromosomes and longer telomeres have been linked to increased longevity.

Periodontal health is therefore linked to wide-reaching aspects of health.

The Heart-Periodontal Link

Periodontal health has been closely tied to vascular health in many studies. Suboptimal periodontal health occurs when specific types of bacteria proliferate in the gums and mouth, causing imbalanced inflammatory responses. Maintaining vascular health is dependent upon healthy inflammatory responses.

In one study investigating the link between heart and gum health, researchers administered a type of oral bacteria to mice. They found that the oral bacteria affected the gene expression profiles in the aorta and liver, irrespective of imbalances in the serum lipid profile. Additionally, the oral bacteria accelerated the development of excess lipids impacting the endothelial (inner) lining of the blood vessels, initiating changes that can affect blood circulation and lead to changes in cardiovascular health and function. Long-term presence of the oral bacteria was associated with more imbalances in serum high-density lipoprotein (HDL) cholesterol. Long-term presence of the oral bacteria also resulted in imbalances in very low-density lipoprotein (VLDL), LDL and total cholesterol. After this shift in the lipid
profile, a significant change in vascular health was observed. Furthermore, the presence of the oral bacteria resulted in changes in the way cholesterol is transported via targeting the expression of LDL receptor-related genes. This affected cholesterol metabolism in macrophages.4

Oral bacteria have been shown to affect platelet function and activation through the expression of collagen-like proteins. These proteins may play a role in arterial health maintenance.5

Other animal studies have shown that changes in arterial calcium distribution occur when mice are exposed to oral bacteria. Increasing the length of exposure to the oral bacteria increases the amount of calcium available for soft tissue deposition.6

A large number of human studies also have further established a link between periodontal and cardiovascular health.7

Another group of researchers conducted two separate case control studies totaling 100 patients with suboptimal cardiovascular health. The researchers compared these subjects with 102 control subjects selected from the community. The first study found that subjects with evidence of poor dental health were 30 percent more likely to present with heart health concerns compared to controls.8

In the second case control report, the researchers noted an association between the presence of dental bacteria and arterial health in the subjects. This connection remained significant even after adjusting for other known heart health factors such as total cholesterol, HDL, smoking, blood pressure, socioeconomic status and body mass index.8

Other studies have reached similar conclusions. When researchers used data from the National Health and Nutrition Examination survey (NHANES) I, which followed subjects for 14 years, they found that among the 9,760 subjects examined, those with better periodontal health were more likely to also have more optimal coronary health. Males younger than 50 years of age who had better periodontal health were more likely to maintain optimal coronary health.9

A meta-analysis of the scientific literature of studies published between 1989 and 2007 found that the ability to maintain optimal heart health was found to be significantly higher in subjects whose gums were healthy.10

Periodontal Health and Cognitive Function

The excessive production of lipid peroxide that occurs following imbalanced periodontal inflammatory responses affects the DNA in the brain. Furthermore, healthy and balanced levels of bacteria in the mouth are associated with cognitive function. When mammalian neuronal and glial cells are exposed to common oral bacteria, the hallmarks of suboptimal cognitive function are seen in the cells. As the immune system continues to be engaged, this leads to an imbalanced inflammatory response and the deposition of abnormal proteins in the brain. These connections between brain and periodontal health led researchers to suggest that cognitive function might be improved by supporting healthy levels of oral bacteria as well as supporting a healthy inflammatory response.11
Blood Sugar and Periodontal Health

The imbalanced inflammatory responses seen in people with less than optimal gum health are exacerbated in people who also have imbalanced blood sugar metabolism. Suboptimal glycemic control causes reduced mucosal barrier integrity, which results in an exacerbation of the already present imbalanced inflammatory response that exists in people with less than optimal periodontal health. Toll-like receptor 4 (TLR4) and the receptor for advanced glycated end products (RAGE), which are formed as a result of poor dietary choices as well as blood sugar imbalances, play a role in this process by cooperating to induce responses in oral epithelial cells.12

Nutritional Support for Oral Health

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<td><strong>Xylitol</strong></td>
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**Hyaluronic Acid**

HA lozenges can be used as an effective way to support oral health. Hyaluronic acid is also known as hyaluronan or hyaluronate. It is a high molecular weight polysaccharide (glycosaminoglycan) and plays a vital role in the functioning of extracellular matrices, including those of mineralized and non-mineralized periodontal tissues.

Hyaluronic acid has been shown to support healthy inflammatory responses and contribute to optimal periodontal health.13

In one randomized, controlled trial, 14 subjects who had suboptimal gum health were randomly assigned to undergo oral surgery. In conjunction with the oral surgery they also either had hyaluronan applied to their gums or a placebo. In the subjects receiving the hyaluronan, statistically significant differences were noted for clinical attachment level and gingival recession. The researchers concluded that hyaluronan appears to improve oral health after surgery.14

Using HA lozenges is therefore an excellent way to support periodontal health.

**Coenzyme Q10**

One study investigated the topical application of coenzyme Q10 (CoQ10) to the periodontal pocket. Ten male patients with suboptimal periodontal health participated. During the first 3 weeks, the subjects did not receive any periodontal therapy except the topical application of CoQ10. After the first 3-week period, root planing and subgingival scaling were performed in all sites. CoQ10 was applied in 20 of the pockets once per week for a period of 6 weeks. The researchers applied soybean oil to the remaining 10 sites as a control. In the first 3-week period, in the sites where CoQ10 had been applied, there was a more balanced gingival crevicular fluid flow and enhanced periodontal health. After the first three-week period the researchers also treated the subjects with mechanical subgingival debridement,
and noted that in the sites where CoQ10 had been applied, bleeding on probing was reduced and the activity of periodontal bacteria was inhibited.

The researchers concluded that topical application of CoQ10 supports periodontal health both when used alone and when used together with traditional nonsurgical periodontal therapy.15

CoQ10 levels also have been found to be significantly reduced in subjects with suboptimal oral health.16 CoQ10 also has been found to enhance salivary secretion in the mouth. Researchers gave 66 subjects ubiquinol (CoQ10-H2™) or ubiquinone (CoQ10) at a dosage of 100 mg/day orally or a placebo for 1 month. Both salivary secretion and salivary CoQ10 content were significantly improved with either form of CoQ10.17

**Xylitol**

Xylitol is a five-carbon polyol sweetener with specific, beneficial effects on oral health. Xylitol promotes mineralization by increasing saliva flow. Xylitol is practically nonfermentable by oral bacteria, which counteracts low pH-values in the oral cavity.18-19

In a double-blind, randomized clinical trial, xylitol, when administered to children, had significantly beneficial effects on oral health, while no such effect was detected in the control group receiving high-sorbitol syrup.20

In October 2011, Seti et. al, published a study of 3-4 year old Japanese preschoolers assessing the influence of xylitol chewing gum consumption on levels of oral bacteria and oral health. Two hundred and forty-eight subjects were examined at baseline and were followed up at 6, 9, and 12 months after the baseline. Of those subjects, 142 were selected to use xylitol gum for 3 months (from months 6 to 9) and 106 were controls. There was a significant association between xylitol consumption and balanced levels of oral bacteria.

The researchers concluded that xylitol gum is effective in balancing levels of oral bacteria linked to dental health in young children.21

In this study, a small number of the children had increased incidence of diarrhea after use of xylitol. I have found that it’s best to introduce xylitol into the diet slowly and when this is done, diarrhea is rarely a problem.

**Conclusion**

Research that a healthy mouth is tied to a healthy body continues to be published in the scientific literature. Therefore, supporting healthy gums and teeth with HA lozenges, coenzyme Q10, and xylitol is an ideal way to maintain not only dental health, but also the health of the whole body.

**References:**