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Gum disease – a silent killer?

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Healthy nutrition may be key to helping fight gum disease, which is not only important to oral health, but also to general health and wellbeing.

Gum, or periodontal, diseases are ubiquitous long-lasting inflammatory diseases of humans. The most common type is chronic gingivitis, which affects approximately 90% of adults, but is reversible with professional and careful home tooth cleaning. Chronic periodontitis is a more severe form of gum disease that destroys the tissues supporting the teeth and associated bone in the jaws, leading ultimately to tooth loss. Periodontitis affects half of UK adults and this proportion increases as we get older. It is a silent disease, and frequently the only visible sign is seeing blood in the sink following tooth brushing, until the disease reaches an advanced stage when teeth move position or become mobile. Approximately one in ten adults are highly vulnerable to periodontitis, whereas 10–15% appear to be completely resistant to it, and the remainder vary between these two extremes. Risk is determined by many factors including smoking, stress and poor nutrition.

Periodontitis is 'kick started' by bacterial plaque accumulating at or below the gum boundary with the teeth, which triggers inflammation both locally and in other parts of the body. If the bacteria are the 'keys that start the engine', it is the strength and efficiency of the body's immune response that continues to 'drive the car'. A large proportion (about 80%) of periodontal tissue damage is caused by an overly aggressive inflammatory-immune response by the body, which fails to kill the bacteria and causes collateral tissue damage. The bacteria can also enter the blood where they stimulate a protective response from the liver and also excessive release of damaging antibacterial agents from the white blood cells. Both responses aggravate the inflammation, which may damage blood vessel walls and other distant organs/tissues. A recent European/American consensus has described the impact of periodontitis on conditions such as diabetes mellitus, heart disease, rheumatoid arthritis, chronic kidney and lung diseases, available free at **http://onlinelibrary.wiley.com/doi/10.1111/jcpe.2013.40.issue-s14/issuetoc (http://onlinelibrary.wiley.com/doi/10.1111/jcpe.2013.40.issue-s14/issuetoc)**

There is good evidence that periodontitis affects blood sugar levels in diabetes patients, and makes heart and kidney complications of diabetes worse. Interestingly, treating periodontitis reduces these diabetes complications and also improves blood sugar levels on a par with adding a second drug to a diabetes treatment regime. The University of Birmingham Periodontal Research Group has shown that particular white blood cells, known as neutrophils, from the blood stream of periodontitis patients exhaust the body's inbuilt antioxidant systems in trying to remove the bacterial challenge to the gums. These antioxidant systems are needed to keep the delicate balance between health and disease in favour of health. Indeed, decreased levels of antioxidants in periodontitis may actually trigger type-2 diabetes by allowing damage to the essential insulin-producing beta cells to happen. The Birmingham team, in collaboration with colleagues at Aston University, have found that periodontitis patients have lower levels of antioxidants in their blood and neutrophils – the white blood cell first to arrive at the site of infection. Our research has shown that the deficiency of antioxidants (particularly one called glutathione) in neutrophils from periodontitis patients prevents activation of certain genes that reduce inflammation. This means that these white blood cells, with decreased amounts of antioxidants inside, have an exaggerated response to bacteria. The team are now exploring dietary and topical methods of introducing antioxidant micronutrients to the body and gums. Addition of antioxidants, such as vitamins C and E and natural chemicals from broccoli, can reduce the production of damaging antibacterial responses. A randomised trial examined ingesting capsules, available on the high street, containing dried fruit and vegetable concentrates, that were high in antioxidants, as an addition to hospital based periodontal therapy. Initial results look promising: taking the capsules may be associated with helping to heal the tissues after periodontal therapy. A larger multi-centre study, with groups in Holland and Germany, has been set up to determine the clinical value of such an approach. Healthy nutrition may therefore be key to helping fight gum disease, which is not only important to mouth health but also to general health and wellbeing. Indeed, several studies have shown that patients with severe gum disease have a significantly higher risk of mortality.

So 'an apple a day' may keep the dentist *and* the doctor away!

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