

The heart of the matter

Nina Garlo explores the link between oral health and heart health



Oral health has long been linked to overall wellness. However, a growing body of scientific research has uncovered an even deeper connection: the relationship between oral and heart health.

Cardiovascular disease (CVD) is the leading cause of death in the western world. The most common cardiovascular diseases are:

- Coronary heart disease
- Heart failure
- Cerebrovascular disorders.

More than 20.5 million people die from these diseases each year.

Cardiovascular diseases affect the heart and blood vessels, leading to severe and possibly even fatal complications. However, the World Heart Federation (WHF) estimates that 80% of premature deaths from the disease are preventable.

By making small changes to our lifestyles, we can better manage our heart health and beat cardiovascular disease, the WHF encourages.



Nina Garlo

Nina is a health and science journalist and communications manager at Koite Health Ltd.

Such changes include actions that help improve oral health. Good oral hygiene is more than just a beautiful smile. It is essential to look after your teeth and mouth because even seemingly harmless oral conditions can put you at risk of serious diseases.

Oral pathogens not limited to the mouth

Tommi Pätilä, a cardiac and transplant surgeon at the New Children's Hospital (HUS), stresses that a healthy heart requires a healthy mouth and thorough daily oral hygiene. Oral biofilm bacteria are the cause of 95% of dental diseases.

Simple measures, such as regular brushing and cleaning of the interdental spaces and regular dental check-ups, can help prevent the onset of gum disease. At the same time, this minimises the risk of bacteria or their structures in the mouth entering the bloodstream and spreading to the rest of the body, says Dr Pätilä.

Even chewing food can spread bacteria or parts of bacteria that cause oral infections to the rest of the body through infected gums. This results in a persistent inflammatory condition within the body, which may subsequently give rise to serious health conditions, including cardiovascular disease.

On the other hand, sudden problems

occur when live bacteria infect the heart valves.

In 2016, Dr Pätilä operated on a severe bacterial heart valve infection and was motivated to make a difference in oral health.

It turned out that the cause of the patient's severe heart infection was bacteria from the mouth. According to Dr Pätilä, it was at this point that he knew something had to be done to combat the residual plaque that causes disease in the mouth despite brushing and flossing.

Dr Pätilä is one of three Finnish researchers who have developed the antibacterial Lumoral method. Lumoral is a patented medical device that treats and prevents oral diseases at home. The Lumoral treatment has been found to remove 99.99% of plaque bacteria from the tooth surface (Pakarinen et al, 2022).

Prevention and early diagnosis pay off

In contrast to commonly held beliefs, a toothbrush is only capable of eliminating approximately 60% of oral biofilm. It's no surprise then that cavities and gingivitis stand as the most prevalent diseases worldwide. If we want to improve oral health outcomes, we need to tackle the plaque left behind by toothbrushing, says Timo Sorsa,



professor of oral and maxillofacial diseases at the University of Helsinki.

In Finland, it is estimated that up to two out of three people over the age of 30 years suffer from periodontitis. This common gum disease can lead to tooth loss if left untreated – but it is also linked to severe heart events. According to Rydén and colleagues (2016), individuals with periodontal disease are 30% more likely to experience a first heart attack compared to their healthy counterparts of the same age.

According to Nesarhoseini and Khosravi's (2010) study, people with periodontal disease were almost twice as likely to develop coronary artery disease (CAD) than those with healthy gums.

Meanwhile, a *European Journal of Preventive Cardiology* report found that poor oral health was associated with an increased risk of cardiovascular disease, particularly among those with gum disease (Pussinen and Könönen, 2016).

Professor Sorsa stresses that periodontal disease prevention is vital to maintaining a patient's oral and overall health.

Untreated periodontitis leads to low-grade inflammation that affects the whole body, contributing to conditions like cardiovascular disease, diabetes, Alzheimer's disease and potentially even cancer.

Rapid diagnosis

According to Professor Sorsa, in the long term, the prevention and rapid diagnosis of periodontal disease benefits the patient, public health and the economy. This is also possible with the new modern diagnostic and treatment methods available that are revolutionising the whole field of dentistry.

Professor Sorsa's extensive research career has long focused on developing an

immunological rapid test for active matrix metalloproteinase-8 (aMMP-8). The quick test can detect whether a person's gum tissue is undergoing periodontal breakdown before it is visually apparent. It, thus, makes invisible and often symptomless developing periodontitis visible by alarming before clinical manifestations.

The test can be performed by a healthcare professional or the patient independently at home – similar to the COVID-19 antigen test or the traditional rapid pregnancy test (Sorsa et al, 2022).

The aMMP-8 rapid test can measure and assess active periodontal adhesive tissue loss and the risk and grade/rates of its progression within five minutes in the dental chair non-invasively, without disturbing the tissue under examination. The test complements the diagnosis, follow-up, and maintenance treatment of periodontitis and peri-implantitis, says Professor Sorsa.

When discussing new treatment methods and prevention of periodontitis, he highlights Lumoral therapy, calling it a drug-free alternative for treating and preventing severe gum disease.

Lumoral enhances the effects of the toothbrush, and studies show that it also significantly improves in a preventive manner the results of professional oral care. At the same time, the device can potentially reduce the need to use drugs traditionally used to treat gum disease, such as antibiotics, chlorhexidine, and sub-antimicrobial dose doxycycline. Additionally, Lumoral is anti-microbial, anti-inflammatory and anti-proteolyti (Pakarinen et al, 2022; Sorsa et al, 2022).

Based on photodynamic therapy, a light-activated antibacterial effect, Lumoral slows down plaque formation significantly,

reduces the burden of harmful bacteria in the mouth and reduces tissue destructive proteolytic aMMP8 (Pakarinen et al, 2022; Sorsa et al, 2022). The product's user profile is suitable for all ages, but it is particularly recommended for those with a history of problems with common oral diseases, tooth decay and gum disease (Sorsa et al, 2022). ■

References

- Nesarhoseini V, Khosravi M (2010) Periodontitis as a risk factor in non-diabetic patients with coronary artery disease. *ARYA Atheroscler* 6(3): 106-11
- Pakarinen S, Saarela RKT, Välimaa H, Heikkinen AM, Kankuri E, Nojonen M, Alapulli H, Tervahartiala T, Räisänen IT, Sorsa T, Pätälä T (2022) Home-applied dual-light photodynamic therapy in the treatment of stable chronic periodontitis (HOPE-CP) three-month interim results. *Dentistry Journal* 10(11): 206
- Pussinen PJ, Könönen E (2016) Oral health: A modifiable risk factor for cardiovascular diseases or a confounded association?, *European Journal of Preventive Cardiology* 23(8): 834-838
- Rydén L, Buhlin K, Ekstrand E, de Faire U, Gustafsson A, Holmer J, Kjellström B, Lindahl B, Norhammar A, Nygren Å, Näsman P, Rathnayake N, Svenungsson E, Klinge B (2016) Periodontitis increases the risk of a first myocardial infarction. A report from the Parokrank study. *Circulation* 133: 576-583
- Sorsa T, Nwhator SO, Sakellari D, Grigoriadis A, Umeizudike KA, Brandt E, Keskin M, Tervahartiala T, Pärnänen P, Gupta S, Mohindra R, Bostanci N, Buduneli N, Räisänen IT (2022) aMMP-8 Oral Fluid PoC Test in Relation to Oral and Systemic Diseases. *Frontiers Oral Health* 3: 897115