

Periodontal Health can Improve the Prognosis of Cardiovascular Disease



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Short Communication

Flossing at least once a week may be associated with a lower risk of stroke, caused by a blood clot blocking cerebral blood flow and with cardiac arrhythmias, according to a preliminary American study. Presented in February 2025 in Los Angeles at the American Stroke Association meeting, the study [1] adds to the growing body of evidence linking oral health to systemic health. This study, led by Prof. Souvik Sen, director of the University of South Carolina School of Medicine in Columbus (SC), aimed to assess whether good oral hygiene habits (brushing, flossing, and regular dental check-ups) have an impact on stroke prevention. This large-scale research evaluated the regular use of dental floss at home through a structured questionnaire administered to 6,000 people. Among the data collected from patients were various parameters, including hypertension, cholesterol levels, smoking habits, BMI, education level, brushing frequency, and frequency of dental check-ups. Over a 25-year follow-up period, 434 stroke cases were recorded, with a different distribution across stroke subtypes and artery sizes. Additionally, 1291 participants developed atrial fibrillation during the study. In this analysis, flossing was associated with a 22% reduction in the risk of ischemic stroke, a 44% lower risk of cardioembolic stroke, and a 12% reduction in the risk of atrial fibrillation. Other variables analyzed (brushing frequency, regular dental visits, or other oral hygiene techniques) did not show statistically significant correlations. Moreover, there was a significant decrease in atrial fibrillation events, the most common form of cardiac arrhythmia. Atrial fibrillation is a strong cardiovascular (CV) health modifier because it increases the risk of stroke, heart failure, and other peripheral cardiovascular complications.

Dr. Sen concluded that flossing might reduce stroke risk by significantly limiting inflammation and infections, demonstrating the strong connection between oral health, inflammation, and atherosclerosis. The study also highlighted the same positive effects of hygiene therapy, previously described, in preventing cavities and periodontal disease (PD). According to the Global

Health Observatory (World Health Organization) in 2024, approximately 45% of the global population was affected by hypertension, with prevalence increasing with age. Both diastolic and systolic blood pressure values are closely correlated with the risk of cardiovascular mortality and all-cause mortality, making hypertension the leading cause of death in the modern population [2]. A recent literature review and meta-analysis [3] on the effectiveness of blood pressure reduction in preventing cardiovascular events and mortality suggests that lowering blood pressure is beneficial, as evidenced by the numerous studies included in the meta-analysis. Hypertension causes multi-organ damage, irreversibly impairing the function of various body systems, including the eyes, kidneys, microcirculation, brain, and all cardiovascular system (leading to multiple heart diseases and arterial damages in medium and large blood vessels).

Periomedicine, the Link with Systemic Diseases

A 2019 systematic review by Seitz et al., published by the U.S. Centers for Disease Control (CDC), analyzed over 1,200 systematic reviews on systemic diseases linked to periodontal disease. Although the overall quality of the study, apex of the pyramid of scientific evidence the final analyses was limited because only 32 studies met the inclusion criteria. They showed a clear positive association between type-2 diabetes and cardiovascular disease with periodontitis, albeit with limited evidence and an unclear causal link.

A 2019 European observational study by Parl et al. based on public and private health records of over 247,000 participants, found a higher incidence of cardiovascular events among patients with poor oral hygiene habits with a 9% increased risk for those who brushed poorly and a 14% increased risk for those who rarely underwent professional dental cleanings, all compared to individuals with better oral hygiene habits. The study recorded results over a 10-year period.

A 2019 study [4] conducted at Harvard Dental School found

that periodontal disease and tooth loss affected over 50% of the population, with severity varying by sex, age, race, and other individual factors. Periodontal diseases are among the most common inflammatory conditions worldwide, with a prevalence very similar to that of cardiovascular diseases, making them frequently associated and detected in epidemiologic studies. Periodontitis is not only debilitating and painful but can also appear at a young age. More severe forms tend to manifest with aging or the presence of other individual risk factors. From stage three of the disease onward, treatment almost always requires complex, multidisciplinary approaches involving prosthetics, orthodontics, or implantology, which are costly in both time and financial resources, whether in public or private healthcare systems. The association between periodontal disease (PD) and systemic conditions was first suggested by observational studies nearly 30 years ago. Between 2004 and 2007, the first interventional studies by Prof. D'Aiuto and Prof. Tonetti demonstrated systemic effects of periodontal treatment. By 2010, epidemiological studies deepened the understanding of inflammatory mechanisms in both chronic oral infections and CV diseases. For the discussion relationship the first randomized controlled trials (RCTs) emerged around 2020. Between 2017 and 2018, a new classification of periodontal disease was introduced, based on clinical attachment loss as leading parameter but, finally, considering type-2 diabetes as a key aggravating factor in grading periodontal disease. This classification further solidified the link between diabetes and periodontitis/peri-implantitis, confirming that these conditions are interrelated through local and systemic inflammatory, chemical and immunological mechanisms influencing each other in both directions.

How Periodontal Inflammation Affects Cardiovascular and Neurological Health

The dysfunction of blood vessels in the cardiovascular system and shared risk factors are largely caused by severe dental, gingival, and periodontal inflammation. This occurs through the dissemination of pathogenic bacteria, inflammatory cells, and inflammatory mediators over long periods. This hypothesis is being explored not only for cardiovascular events but also for neurological diseases (such as Alzheimer's disease) with clear mechanisms. Inflammation caused by periodontitis may contribute to the buildup and worsening of atherosclerotic plaques, increasing the risk of heart attacks, strokes, and hypertension. This translates into a twofold increased risk of heart attack in periodontal patients [5], over a fourfold increased risk of stroke, and about a 2.5 times higher risk of peripheral cardiovascular events (TIA). At the same time, periodontal treatment reduces circulating inflammation levels, positively impacting two major cardiovascular risk factors:

- Lowering high-sensitivity C-reactive protein (CRP) levels
- Improving endothelial dysfunction (FMD), a key issue in

CV disease

Moreover, this treatment on oral health decreases the spread and translocation of periodontal and oral bacteria into the bloodstream, limiting the inflammatory mediators that could worsen atherosclerotic plaque prognosis.

The Mechanism Behind Periodontal Disease and Hypertension

A 2020 study published in Cardiovascular Research [6] analyzed 81 studies from 26 countries, confirming the association between periodontitis and high blood pressure. The study found that: Moderate-to-severe periodontitis increases hypertension risk by 22%, while severe periodontitis increases hypertension risk by 49%. Moreover, the risk of hypertension rises as gum disease worsens. Individuals with periodontal disease have on average, blood pressure levels 4.5 mmHg higher (systolic) and 2 mmHg higher (diastolic) than those with healthy gums. According to Eva Munoz Aguilera, lead Author of the study, a 5 mmHg increase in blood pressure corresponds to a 25% higher risk of death from heart attack or stroke.

Integrated Healthcare Approaches for the Future

The World Health Organization (WHO) has promoted the integration of oral and general health in prevention and health promotion policies. In October 2022, in Italy new guidelines were issued for patients with hypertension and periodontitis, with a profitable collaboration between the Italian Society of Periodontology (SIdP) and the Italian Society of Hypertension. These guidelines proposed an integrated clinical approach to assessing common risk factors, educating patients on healthy lifestyles, and fostering cooperation between cardiovascular and oral health professionals, including dentists, periodontists, paramedics and hygienists. This alliance should improve on patient affected by periodontal disease the effective and beneficial effects on CV parameters and function, often translated in a early diagnosis for the CV disease. This "special" oral care will probably orient for the first time PD affected patient to a specialist of CV cares for a very probable risk factor, often ignored till that moment from doctors and generalist. On the other side all medical figures involved in heart & CV disease treatments and cares, should positively advice and suggest an healthy oral status on CV patients before risky interventions (best prognosis and less morbidity and collateral sides effects), but also during all (drugs, surgery, endodscopy, etc etc.) treatments and in secondary active prevention phases.

References

1. Souvik Sen, Julie Marchesan, Stefanie Wood, Ryan Titus (2025) Abstract 19: Dental flossing may lower the risk for incident ischemic stroke, cardioembolic stroke subtype and AF. Stroke 56(Suppl_1).
2. Law MR, Morris JK, Wald NJ (2009) Use of blood pressure lowering drugs in the prevention of cardiovascular disease: meta-analysis of 147 randomised trials in the context of expectations from prospective epidemiological studies. BMJ 338: b1665.

3. Dena Ettehad, Connor A Emdin, Amit Kiran, Simon G Anderson, Thomas Callender, et al. (2016) Blood pressure lowering for prevention of cardiovascular disease and death: a systematic review and meta-analysis. *Lancet* 387(10022): 957-967.
4. Mohammad F Helmi, Hui Huang, J Max Goodson, Hatice Hasturk, Mary Tavares, et al. (2019) Prevalence of periodontitis and alveolar bone loss in a patient population at Harvard School of Dental Medicine. *BMC Oral Health* 19(1): 254.
5. Xiaodan Zheng, Xin Li, Juanying Zhen, Dai Xue, Jun Hu, et al. (2023) Periodontitis is associated with stroke. *Journal of Translational Medicine* 21(1): 697.
6. Eva Muñoz Aguilera, Jean Suvan, Jacopo Buti, Marta Czesnikiewicz-Guzik, Aline Barbosa Ribeiro, et al. (2020) Periodontitis is associated with hypertension: a systematic review and meta-analysis. *Cardiovascular Res* 116(1): 28-39.



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