

Review

Oral Hygiene and Cardiovascular Health

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Abstract: The human oral microbiome plays a vital role in maintaining oral and systemic health. This diverse microbial community includes over 700 bacterial species, some of which are implicated in developing systemic diseases, particularly cardiovascular diseases (CVDs). Research highlights a strong association between periodontal disease and increased cardiovascular risk, suggesting that good oral hygiene practices may reduce the incidence of CVDs. *Porphyromonas gingivalis* and *Fusobacterium nucleatum* drive chronic inflammation in periodontal disease; these bacteria can extend beyond the mouth and contribute to systemic inflammatory responses. The inflammatory factors, including C-reactive protein (CRP), interleukins (IL-1, IL-6), and tumor necrosis factor-alpha (TNF- α), damage blood vessels, impair endothelial functions, and promote atherosclerosis, all key events in CVD progression. Additionally, oral pathogens may accelerate plaque formation in arteries, increasing the risk of ischemic heart and brain diseases. Studies show a 28% increased risk of heart disease in individuals with periodontal disease. Treating periodontal disease can improve endothelial function and reduce inflammatory markers, emphasizing oral health management as a potential preventive strategy for CVD. Public health initiatives that emphasize oral hygiene and early periodontal disease treatment are crucial for broader cardiovascular care.

Keywords: oral microbiome; periodontal disease; systemic inflammation; cardiovascular disease; public health



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1. Introduction

The human body is home to trillions of microorganisms that form the microbiome, some of which are crucial for maintaining overall health. The oral microbiome—which is composed of bacteria, fungi, viruses, and protozoa—plays an essential role in oral and systemic health [1,2]. Studies have increasingly shown the possible link between the oral microbiome and a variety of systemic diseases, including diabetes, respiratory disease, cancer, Alzheimer’s disease, and cardiovascular disease (CVD) (American Academy of Periodontology 2024) (Figure 1). CVD remains one of the leading causes of death and disability worldwide [3,4]. A growing body of research emphasizes the importance of maintaining oral hygiene and oral microbial balance as part of CVD prevention strategies.

The oral microbiome is a highly complex community that hosts more than 700 species of bacteria, primarily from the genera *Streptococcus*, *Porphyromonas*, *Fusobacterium*, and *Veillonella* [5]. These microorganisms can form biofilms, such as dental plaque, which, in a healthy balance, may offer protection against harmful pathogens. However, when this

balance is disrupted, these microbes can contribute to the onset of systemic diseases, such as diabetes and CVD [6]. Under normal circumstances, the oral microbiome is harmonious, supporting oral and overall health. However, factors such as poor oral hygiene, smoking, an unhealthy diet, and underlying medical conditions can upset this balance, leading to dysbiosis, where harmful bacteria become dominant, increasing the risk of various health issues [7–9]. Many studies have demonstrated the connection between poor oral health and an increased risk of cardiovascular disease [8,10,11]. Treating periodontal disease has been shown to improve endothelial function, suggesting that reducing oral inflammation may lower cardiovascular risk [12].

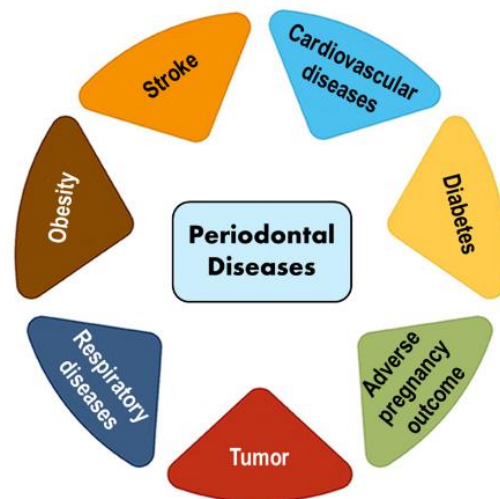


Figure 1. Periodontal diseases may contribute to the development of multiple systemic diseases.

An imbalanced oral microbiome can contribute to cardiovascular disease in several ways. One of the strongest links is periodontal disease, a chronic inflammatory condition caused by bacterial infections of the gums. Periodontal disease creates a chronic, low-level inflammatory state contributing to the overall systemic inflammatory burden. This condition leads to elevated levels of pro-inflammatory molecules, such as interleukin-1 (IL-1), tumor necrosis factor-alpha (TNF- α), and C-reactive protein (CRP). These markers are not only characteristic of periodontitis but are also closely linked to the development of atherosclerosis. Systemic inflammation driven by these factors disrupts endothelial function, which plays a critical role in the progression of cardiovascular disease.

Periodontal disease is a chronic inflammatory condition primarily caused by a bacterial infection that can affect the gums, periodontal ligament, and alveolar bone [13]. Bacteria commonly associated with periodontal disease, such as *Porphyromonas gingivalis* and *Fusobacterium nucleatum*, can enter the bloodstream through inflamed gum tissues. Once in circulation, these bacteria, or their toxic byproducts such as lipopolysaccharides (LPS), can induce inflammation and promote atherosclerosis—the thickening and hardening of arterial walls due to plaque formation [10,14].

Studies suggest that chronic inflammation is a key contributor to CVDs, and that the oral microbiome may play a significant role in triggering systemic inflammation via two primary pathways. First, bacteria from the oral cavity can directly invade the cardiovascular system, leading to endothelial dysfunction, where the inner lining of blood vessels is compromised, and normal function is lost. Second, the body's immune response to these bacteria may become overstimulated, resulting in widespread inflammation that triggers the development of atherosclerotic plaques [10]. These plaques can obstruct blood flow, increasing the risk of myocardial infarction, heart attack, or stroke. Studies have shown that patients with gum disease are 28% more likely to experience a heart attack than those

without such issues. Poor oral health has also been linked to an increased risk of contracting human papillomavirus (HPV), which can further increase the likelihood of heart-related problems [15].

Given these established connections, further research is needed to determine how chronic inflammation from periodontal disease contributes to systemic inflammation and increases the risk of morbid conditions such as hypertension, coronary artery disease, and heart failure. This paper aims to explain the relationship between oral health and cardiovascular disease, emphasizing the vital importance of maintaining good oral hygiene for both oral and cardiovascular well-being, and how preventive actions can protect oral health and reduce the risk of cardiovascular problems.

2. Epidemiology of Oral Hygiene and Cardiovascular Disease

Oral hygiene has long been regarded as vital for overall health. Studies have revealed that its implications extend well beyond dental health, showing a significant link between oral hygiene and cardiovascular disease (CVD) [3,8,16–19]. Studies have consistently shown a significant connection between gum disease and heart health. Individuals with gum disease face a 19% greater risk of developing heart disease than those with healthy gums [20]. This association, which is caused mainly by periodontal diseases, shows how poor oral health can harm cardiovascular health. Understanding this is key to creating public health policies that improve oral and heart health.

Periodontal Disease: Periodontitis is the sixth most prevalent disease affecting 740 million people worldwide [21]. Studies consistently reveal that individuals with periodontal disease are at a higher risk of developing CVDs [3,17,18]. Poor oral hygiene practices, such as inconsistent brushing, infrequent flossing, and the absence of routine dental care, may allow plaque to accumulate, leading to gingivitis, and if untreated, periodontitis [22].

Periodontitis triggers a systemic inflammatory response that significantly contributes to the development of cardiovascular disease by increasing the levels of inflammatory markers such as CRP, IL-1, IL-6, and TNF- α in both periodontal disease and atherosclerosis [23]. This inflammation damages the inner lining of blood vessels, impairing endothelial function and promoting the progression of atherosclerosis, a condition that leads to the narrowing and hardening of blood vessels [24].

Patients with severe gum disease are twice as likely to have ischemic stroke than those with healthy gums [25]. A study from Finland revealed that untreated dental infections, even those without symptoms, can greatly increase the risk of heart attack [26].

Demographic Factors: Demographic factors play a key role in oral health. Younger people with early-stage gum disease are at a higher risk for heart problems, suggesting that taking care of oral health early in life can have lasting effects on cardiovascular health [15]. Socioeconomic status is another important factor. People of lower socioeconomic status may have limited access to dental care and often face higher rates of oral health issues [27,28]. Given that oral health is linked to cardiovascular diseases, there is a pressing need to address health disparities in oral care to mitigate cardiovascular risks.

Tooth Loss and Cardiovascular Mortality: Oral health independently predicts cardiovascular outcomes. Tooth loss, which commonly results from severe periodontal disease, is another warning sign of increased cardiovascular risk. Research has revealed a modest but significant link between tooth loss and an increased risk of both heart-related and overall mortality [29,30].

3. Biological Connections Between Gum Disease, Systemic Inflammation, and Cardiovascular Health

Periodontal disease is more than just a dental issue. It can seriously affect overall systemic health, particularly cardiovascular disease.

Gum Disease and Inflammation: As mentioned earlier, periodontal disease arises from inflammation caused by bacterial infection affecting the gums and the supporting structures of the teeth. It can develop in two main stages: gingivitis, the milder and reversible form, and periodontitis, the more advanced and serious stage [31]. Gingivitis can be managed and reversed with timely and proper dental care; however, if left untreated, it can evolve into periodontitis, which is characterized by deep pockets around the teeth, the loss of connective tissue, and bone deterioration [32]. Addressing the early signs of this condition is key to preventing long-term damage to oral health.

The primary bacterial species linked to periodontal disease include *Porphyromonas gingivalis*, *Tannerella forsythia*, and *Treponema denticola*, which are collectively known as “red complex” bacteria [33]. These bacteria provoke an immune response in the body, leading to the release of inflammatory mediators such as cytokines, interleukins, and prostaglandins [34]. Although this initial response helps fight infection, ongoing inflammation can become chronic, and it can have far-reaching systemic effects.

Bacterial Translocation: Periodontal disease-induced systemic inflammation involves the movement of oral bacteria into the bloodstream. When the gums are damaged or ulcerated, particularly in cases of severe periodontitis, bacteria from the mouth can enter the circulatory system. Once in the bloodstream, these bacteria can travel to other parts of the body, including the cardiovascular system, where they may play a role in the development of atherosclerotic plaques and increase the risk of heart attack and stroke by further damaging cardiovascular tissues [35,36]. These findings reveal how gum disease can affect overall health, especially cardiovascular conditions.

Endotoxemia: Another important mechanism is the release of bacterial endotoxins, such as LPS, into the bloodstream [37]. LPS, which is produced primarily by Gram-negative bacteria like *P. gingivalis*, can trigger systemic inflammation by stimulating the release of inflammatory agents, such as interleukin-1 β (IL-1 β), tumor necrosis factor-alpha (TNF- α), and IL-6 [38,39]. These cytokines then circulate throughout the body, contributing to widespread inflammation. This process highlights how bacterial activity in the mouth can extend beyond oral health, influencing broader systemic responses.

Inflammatory Mediator Release: Chronic inflammation in gums triggers the production of local cytokines, which can diffuse into the bloodstream and contribute to systemic inflammation [40,41]. These include the following:

IL-1 β : A potent pro-inflammatory cytokine that intensifies the immune response, aggravates tissue damage, and promotes the progression of inflammatory conditions.

TNF- α : This inflammatory cytokine produced by immune cells plays a significant role in the destruction of connective tissue and bone in periodontal disease. Additionally, it contributes to vascular inflammation, which can affect systemic circulation.

IL-6: Known for its involvement in liver stimulation. IL-6 triggers the production of CRP, a well-established marker of systemic inflammation and a potential predictor of cardiovascular events.

The persistent elevation of these cytokines highlights the critical connection between oral health and systemic conditions. This highlights the need to effectively manage periodontal disease to reduce broader health risks and promote overall well-being.

4. Association of Oral Hygiene with CVD

Chronic systemic inflammation caused by gum disease may play a role in the development and progression of cardiovascular disease through various interconnected mechanisms:

Atherosclerosis: Systemic inflammation is widely recognized as a key factor in the development of atherosclerosis, a condition characterized by the accumulation of plaques within the arterial wall [42]. These plaques can obstruct blood flow, potentially leading to serious ischemic heart conditions such as angina, heart attacks, and strokes [43]. Inflammatory cytokines, such as IL-6 and TNF- α , generated in response to periodontal infections, can contribute to endothelial dysfunction, a critical early event in atherogenesis, and the progression of plaque formation [40].

Endothelial Dysfunction: Healthy endothelial cells play a vital role in regulating vascular tone, ensuring smooth blood flow, and preventing abnormal clot formation. Endothelial inflammation disrupts this balance by increasing the expression of adhesion molecules, which attract immune cells to the walls of blood vessels [44]. The ongoing immune response promotes the development of fatty elements, early markers that can eventually evolve into mature atherosclerotic plaques [45].

Additionally, toxins from oral bacteria can directly damage endothelial cells, further contributing to the development of atherosclerosis. Research has identified bacterial DNA from periodontal pathogens within atherosclerotic plaques, reinforcing the idea that these bacteria may directly contribute to both plaque formation and plaque destabilization [46,47].

C-Reactive Protein (CRP) Elevation: Elevated levels of CRP are among the most recognized biomarkers connecting periodontal disease to heart disease. IL-6 released from inflamed periodontal tissue triggers the liver to produce CRP, which serves as a marker of inflammation and actively contributes to the progression of atherosclerosis [48]. CRP can bind to low-density lipoprotein (LDL) particles, promoting their accumulation in arterial walls and accelerating the development of atherosclerotic plaques [49].

Plaque Instability and Thrombosis: Periodontal disease may contribute to the instability of atherosclerotic plaques. The chronic inflammation driven by cytokines and bacterial toxins can weaken the fibrous cap of these plaques, increasing their vulnerability to rupture. When a plaque ruptures, it exposes the underlying thrombogenic material, triggering the formation of a thrombus. If this clot obstructs a coronary artery, it can lead to a heart attack [21,50].

Heart Valve Infection by Bacterial Endocarditis: Infective endocarditis (IE) is caused by bacteria that can seed the heart valves and cardiac devices (Figure 2). The oral microbiome is a significant risk factor for IE. Dental procedures and periodontal disease are associated with IE. The dissemination of periodontal pathogens and subsequent low-grade chronic inflammation are risk factors for cardiovascular disease [51]. Common oral pathogens that cause IE are the species *Staphylococcus* and *Streptococci viridines*. Patients with cardiac conditions, like valve replacement, congenital heart disease, and a previous history of IE, are at higher risk [52]. Acquired or congenital heart diseases damage the endothelial lining, increasing the risk of developing IE. A loss of endothelial integrity and the subsequent disruption of the inner cell layer induce platelet-derived thrombus formation with the consequent activation of the corresponding inflammatory cascade. Subsequently, microorganisms gain access to the bloodstream causing bacteremia [53]. In IE, microorganisms adhere to the cardiac endothelium and trigger an inflammatory process.

The cause of bacteremia is the lack of integrity of the skin or mucous membrane, which harbors numerous commensals but also opportunistic pathogens. Up to 90% of IE cases are caused by the Gram-positive species *Staphylococcus*, *Streptococcus*, and *Enterococcus* [54]. Traumatic injury to the oral mucosa or gum is part of physiological processes such as chewing food or brushing teeth [51]. Poor oral hygiene leading to dental

caries or periodontitis as well as in oral and dental procedures can cause the transfer of bacterial pathogens from the oral cavity into the bloodstream resulting in bacteremia. Periodontitis and gingivitis are inflammatory diseases, of the gum and adjacent structures of teeth, that are caused by bacterial species [53]. The surface of inflamed and ulcerated gingival crevicular tissue around teeth is the portal of entry for the *Streptococci viridians*, which cause as many as 50% of IE cases in the United States annually.



Figure 2. Bacteria, primarily from species such as *Staphylococci*, *Streptococci*, and *Enterococcus*, can spread from gum infections to infect heart valves, leading to infective endocarditis. This condition can result in serious cardiac complications, some of which may be life-threatening.

Clinical Evidence Connecting Gum Disease to Cardiovascular Health: Individuals with periodontal disease face a higher risk of developing heart disease than those with healthy gums. Epidemiological studies highlight a significant link between periodontal disease and cardiovascular health [3,8,18,19]. A significant study published in 2016 reported that individuals with severe periodontitis had a 49% greater risk of heart attack than those with mild or no periodontitis [20].

Moreover, interventional research has demonstrated that treating periodontal disease can improve endothelial function and reduce the levels of systemic markers of inflammation, such as CRP [23,55]. These findings highlight the importance of oral health as a potential factor in improving cardiovascular health, particularly in individuals already at risk for heart disease.

5. Risk Factors Linking Periodontal Disease and Cardiovascular Health

Recent research has highlighted the growing link between periodontal disease and cardiovascular health. Both conditions are widespread, affecting millions of patients globally [21], and share risk factors that can influence each other [8,16,18,19]. Periodontal disease, ranging from mild gingivitis to severe periodontitis, not only leads to tooth loss but also increases the risk of heart disease, stroke, and atherosclerosis [11].

The connection between periodontal disease and cardiovascular disease is rooted in shared risk factors. Understanding these factors can help manage and reduce the risks for both. Key factors include chronic inflammation, poor oral hygiene and unhealthy lifestyles, diabetes, aging, and social influences.

Poor Oral Hygiene and Lifestyle Choices: Poor oral hygiene is a major risk factor for periodontal disease and can also affect heart health. When oral care is neglected, plaque accumulates, leading to gum irritation and infection. This often reflects broader lifestyle choices that harm both oral and cardiovascular health.

Smoking is a key example, as it significantly increases the risk of both periodontal disease and heart disease. Smokers are more likely to develop severe periodontal disease, and they face higher risks for cardiovascular problems. Smoking damages blood vessels, impairs circulation, worsens periodontal disease, and accelerates heart disease. Similarly, poor diet and a lack of exercise increase cholesterol, blood pressure, and obesity risk, which are linked to cardiovascular disease [56–58].

Encouraging healthy habits, such as good oral care, quitting smoking, eating a balanced diet, and remaining active, can help reduce the risk of periodontal and heart diseases.

Diabetes and Metabolic Syndrome: Diabetes, especially when poorly managed, is a common risk factor for both periodontal disease and cardiovascular disease [59]. Di-

abetes increases the risk of heart disease by increasing the likelihood of issues such as atherosclerosis [60,61].

High blood sugar weakens the immune system, allowing harmful bacteria to thrive and cause gum infections. In turn, inflammation from gum disease can make blood sugar control more difficult, creating a cycle that worsens both conditions [62]. Metabolic syndrome, which involves high blood sugar, hypertension, high cholesterol, and excess body fat, is similarly linked to both periodontal disease and heart disease [63]. Proper diabetes management and regular dental care are crucial for controlling blood sugar and reducing the risk of both conditions.

Age and Genetic Factors: Age is a significant risk factor for periodontal and cardiovascular problems. The American Dental Association reported that more than 68% of Americans aged 65 years and older have some form of gum disease [64]. With age, the body's ability to fight infections weakens, making it harder to prevent or manage gum disease. Aging also causes arteries to stiffen, increasing the risk of cardiovascular disease [65].

Genetics also contributes, as some individuals are more prone to inflammation, making them more susceptible to both conditions [66]. Although genetic makeup cannot be altered, early intervention and regular preventive care can help reduce these risks.

Socioeconomic Status and Access to Healthcare: Social determinants of health, including socioeconomic status, education, and access to healthcare, significantly impact the risk of both gum disease and cardiovascular disease [67,68]. Individuals with a lower socioeconomic status often struggle to access dental and medical care, increasing their vulnerability to both conditions.

6. Public Health Strategies

To effectively address the link between periodontal disease and cardiovascular health, public health strategies should adopt a comprehensive approach that includes prevention, early detection and collaboration between medical professionals, collaboration, providing education and creating awareness for the public, and efforts to reduce health disparities. Public health strategies focused on education and affordable care can significantly improve overall health outcomes.

Prevention, Early Detection, and Collaboration Between Medical Professionals: Prevention is key in managing periodontal disease and cardiovascular health [69]. Public health campaigns should emphasize regular oral hygiene practices, such as brushing and flossing, and the importance of early detection through affordable dental care. As previously stated, screening programs that integrate routine dental and medical check-ups can identify individuals at risk for both conditions. Collaboration between dentists and primary care providers can further support the early detection and management of shared risk factors such as smoking, diabetes, and hypertension, helping to reduce systemic inflammation and lower cardiovascular risk.

Dentists and primary care providers can assess overall health, identify risk factors, and create comprehensive treatment plans for patients. For example, dentists could screen for cardiovascular risks, whereas cardiologists may refer patients for dental evaluations when needed. The accessibility of health records, such as electronic health records can facilitate communication between providers, ensuring coordinated care.

Education and Awareness: Public awareness of the connection between periodontal disease and heart health is essential. Educational campaigns should highlight the importance of maintaining oral hygiene to prevent periodontal diseases and cardiovascular problems. Targeted education programs for high-risk groups, such as people with diabetes or a family history of heart disease, can further help individuals manage their risk through

regular dental check-ups, healthy habits, and diet. Healthcare providers should also be trained to inform patients about this link.

Reducing Health Disparities: Healthcare disparities disproportionately affect low-income people and rural communities [70]. Expanding affordable dental services through mobile clinics, community health centers, and school programs can provide much-needed preventive care in underserved areas. Public health policies should also aim to provide affordable dental insurance coverage for low-income populations.

Addressing the social elements of health, such as education, income, and access to healthy food, can further reduce the prevalence of periodontal disease and cardiovascular problems. Promoting healthier food habits and reducing smoking are key strategies in this effort.

By implementing these measures, public health initiatives can improve both oral and cardiovascular health, contributing to a healthier population overall.

7. Prevention Strategies and Clinical Implications

This paper presents a persuasive argument for prioritizing oral disease prevention as a key strategy to reduce the risk of CVDs. By addressing oral health as an early intervention point, the following strategies are emphasized:

Holistic Preventive Approach: By emphasizing the essential role of oral health in overall well-being, this paper advocates for a comprehensive approach to disease prevention. It details the connection of oral disease with systemic inflammation and cardiovascular complications, highlighting the need to address root causes rather than just treating cardiovascular symptoms.

Evidence-Based Insight: This paper provides solid scientific evidence linking periodontal disease and chronic inflammation to a heightened risk of cardiovascular events. The presented information highlights the urgent need to incorporate oral health prevention into broader public health strategies for cardiovascular disease reduction.

Interdisciplinary Relevance: By bridging dentistry and cardiology, two important healthcare fields, this paper encourages collaboration between healthcare professionals. This interdisciplinary perspective enhances the paper's value, promoting a more unified healthcare model that prioritizes early detection and intervention across specialties, encouraging an integrated care approach.

Public Health Impact: The paper's emphasis on preventive strategies—such as promoting oral hygiene, routine dental check-ups, and patient education—emphasizes its potential for large-scale public health impact. Preventing oral disease could significantly reduce healthcare costs associated with the treatment of advanced cardiovascular diseases.

Patient-Centered Approach: By advocating for the prevention of oral disease before it impacts cardiovascular health, this paper promotes a patient-centered approach. This focus on early intervention empowers individuals to take proactive measures to safeguard their overall health, which can enhance their quality of life and prevent more serious health complications.

Balanced Nutrition: Healthy dietary habits and adequate nutrient intake are essential to maintain optimal oral and systemic health. The general recommendation is to limit sugar intake to prevent dental caries and gum diseases [71–73]. Mineral-rich foods such as peanuts, almonds, dairy products, and wholegrain foods are considered to have protective effects against dental decay and other gum diseases [74]. Nutrient deficiencies, particularly in vitamins A, B, C, D, magnesium, and zinc can lead to various infectious and erosive oral diseases that might induce damage beyond the oral cavity [75]. Focusing on consuming fresh vegetables and fruits, while limiting artificially added sugars, preservatives, and fats, could be protective against chronic oral conditions such as dental caries, periodontal infec-

tions, and oral malignancy [76]. Emphasizing the importance of proper nutrition before conception and during pregnancy is crucial for supporting proper dental organogenesis and maxillofacial development [77]. Dietary counseling to guide the selection of foods that promote oral health could reduce oral diseases. By adopting these nutritional approaches and understanding the clinical importance of nutritional inadequacy in oral health, healthcare providers can help patients maintain optimal oral health to reduce cardiovascular disease burdens.

8. Limitations and Future Research

As discussed above, while there is substantial evidence linking oral health to cardiovascular disease, a direct causal relationship has not been definitively proven. Many studies are observational, and confounding factors such as socioeconomic status, smoking status, and healthcare access may affect the findings. More randomized controlled trials and long-term studies are needed to determine whether improving oral health can directly reduce cardiovascular risk.

Future research should also investigate the molecular mechanisms connecting oral bacteria to cardiovascular events, as well as the potential impact of periodontal treatment in preventing heart disease. Understanding these pathways could lead to new therapeutic strategies addressing both oral and cardiovascular health.

9. Discussion

Periodontal disease, commonly known as gum disease, results from plaque buildup, a sticky film of bacteria on the teeth, that can cause inflammation, infection, and eventually tooth loss if untreated [22,26,32]. However, its effects extend beyond the mouth. Studies have shown a strong link between periodontal disease and cardiovascular disease, which is one of the leading causes of death globally [11,18,21,29].

This review explores the connection between periodontal disease and cardiovascular disease (CVD), highlighting the broader health implications of gum disease beyond oral health. These findings emphasize the role of chronic inflammation in linking the two conditions with periodontal disease potentially triggering inflammation that contributes to atherosclerosis and other cardiovascular issues. The review also discusses how systemic inflammatory markers like C-reactive protein (CRP) and oral bacteria entering the bloodstream may affect heart health [48,78].

A key takeaway from this review is the need for a more integrated approach to healthcare, where oral health is considered in the broader context of cardiovascular disease prevention [68,69]. It stresses the importance of addressing shared risk factors, such as chronic inflammation, lifestyle habits, and conditions like diabetes, to reduce both periodontal and cardiovascular risks [60–62]. This holistic perspective encourages coordinated care between dental and medical professionals, which is often overlooked in other reviews.

By calling for dental evaluations in routine cardiovascular risk assessments, the review promotes early detection and prevention, particularly for high-risk populations. It also reinforces the idea that periodontal disease is not just an isolated oral issue but a potential indicator of systemic health problems, especially cardiovascular disease.

While the review provides valuable insights, it could benefit from further exploration of the biological mechanisms linking these diseases, as well as a more detailed discussion of treatment efficacy and variations across different populations. Nonetheless, its strengths lie in its comprehensive, multidisciplinary approach to disease prevention and healthcare integration.

10. Conclusions

The strong link between periodontal disease and cardiovascular disease emphasizes the importance of considering oral health as a predictor of cardiovascular events. Efforts to improve oral hygiene, promote healthier lifestyles, and ensure regular dental and medical check-ups can have significant benefits for both gum and heart health. Public health strategies should integrate oral care into broader efforts aimed at preventing heart disease, with a focus on education, early detection, and addressing common risk factors.

A collaborative approach involving both dental and healthcare professionals is essential for identifying individuals at risk for both periodontal disease and cardiovascular disease. Regular oral health assessments and timely periodontal treatment, along with promoting good oral hygiene practices, can help reduce systemic inflammation and potentially lower cardiovascular risk. The incorporation of oral health evaluations into cardiovascular risk assessments, especially for high-risk populations, could serve as a preventive measure against the development of cardiovascular complications, further emphasizing the need for integrated care.

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