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Periodontal Medicine: A Narrative Review on Linking Periodontal and Systemic Health Through Interprofessional Care

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Abstract

Periodontal medicine examines relationships between periodontal and systemic health and their implications for patient care. This narrative review considers proposed biological pathways and evidence relating periodontitis to diabetes, cardiovascular disease, adverse pregnancy outcomes, respiratory diseases, chronic kidney disease, and cognitive impairment. Diabetes and periodontitis have a recognized bidirectional relationship, and evidence from randomized trials indicates that periodontal treatment can modestly improve glycemic control in people with diabetes and periodontitis. Evidence linking periodontitis with several other systemic conditions is largely observational and should not be interpreted as proof of causation. Whether periodontal treatment prevents cardiovascular events, adverse pregnancy outcomes, or other systemic clinical outcomes remains uncertain. Periodontal assessment and treatment are important for controlling oral inflammation and preserving oral function. Communication, patient education, and appropriate referrals between dental and medical professionals can support coordinated care. Further well-designed studies are needed to clarify causal pathways and evaluate clinically important systemic outcomes.

Categories: Other, Oral Medicine, Dentistry
Keywords: chronic periodontitis, dental professionals, medical professionals, periodontal medicine, physician

Introduction And Background

Periodontal medicine considers the relationships between periodontal conditions and general health. Gingivitis is inflammation of the gingiva without the loss of periodontal attachment and supporting bone, characteristic of periodontitis. Periodontitis is a chronic inflammatory disease associated with a dysbiotic dental biofilm and a dysregulated host response, which can progressively damage the periodontal ligament and alveolar bone. The 2017 World Workshop classification, published in 2018, introduced staging and grading to describe disease severity, complexity, and risk of progression [1].

Inflamed periodontal pockets can provide a route for transient bacteremia and exposure to microbial products. Local inflammation may also contribute to circulating inflammatory mediators. These pathways provide biological plausibility for associations with systemic disease but do not alone demonstrate causation [2,3]. Diabetes and periodontitis have a recognized two-way relationship, while associations involving cardiovascular, pregnancy, respiratory, kidney, and cognitive outcomes differ in the strength and type of supporting evidence [2-4]. This narrative review aims to describe proposed biological pathways and selected evidence on periodontal-systemic relationships, distinguish observational associations from treatment effects, and discuss the role of collaboration between dental and medical professionals.

Review methodology and scope

This article is a narrative review of selected foundational studies, consensus reports, and systematic reviews relevant to periodontal and systemic health. The revision incorporated selected publications identified through targeted searches of PubMed, Cochrane, and web-indexed primary literature on October 27, 2026, using combinations of “periodontitis” or “periodontal treatment” with “diabetes,” “cardiovascular disease,” “pregnancy,” “respiratory disease,” “chronic kidney disease,” and “cognitive impairment,” together with terms such as “consensus,” “systematic review,” and “randomized trials.” The updated literature was selected for relevance to clinical mechanisms, associations, treatment effects, or interdisciplinary care. The original authors’ search procedures, date restrictions, and language restrictions were not documented in the supplied manuscript and should be confirmed by the authors. This targeted update was not a comprehensive or systematic search. No formal screening protocol, independent risk-of-bias assessment, or original meta-analysis was undertaken; consequently, the review is susceptible to selection bias and is not a definitive synthesis of all available evidence.

Biological plausibility

Periodontitis involves a complex interaction between a dysbiotic biofilm and the host immune response. Ulcerated pocket epithelium may facilitate entry of oral bacteria and their products into the bloodstream during daily activities or dental procedures. Local production of cytokines, including interleukin-1, interleukin-6, and tumor necrosis factor-alpha, may contribute to systemic inflammatory responses and elevated C-reactive protein [2,3]. Endothelial dysfunction, insulin resistance, and other pathways have been investigated as possible connections with systemic disease. These mechanisms do not establish that an individual systemic condition is caused by periodontitis, and shared factors such as smoking, age, socioeconomic conditions, and diabetes must also be considered. The major systemic conditions discussed in this review are summarized in Figure *1*.

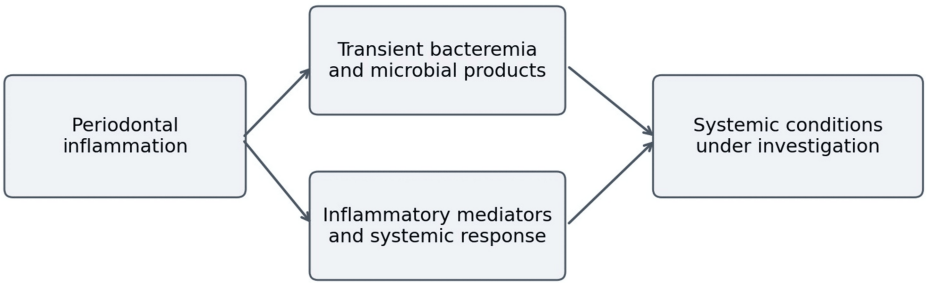


FIGURE 1: Proposed pathways connecting periodontal inflammation with systemic conditions

Arrows represent proposed biological pathways and do not establish causation.

Review

Periodontitis and diabetes mellitus

Diabetes and periodontitis are linked bidirectionally. Hyperglycemia is associated with higher risk and severity of periodontitis, while periodontal inflammation may hinder glycemic control through inflammatory and metabolic pathways. The International Diabetes Federation and European Federation of Periodontology consensus recommends closer cooperation between medical and dental professionals in the prevention and management of both conditions [4]. Observational studies also associate severe periodontitis with poorer glycemic control, although confounding and differences between populations complicate causal interpretation [5].

Interventional evidence provides a clearer basis for discussing glycemic outcomes. In a 2022 Cochrane review, subgingival periodontal instrumentation, compared with no active periodontal treatment or usual care, was associated with a mean reduction in HbA1c of 0.43 percentage points at three to four months (95% CI, −0.59 to −0.28; 30 studies; 2,443 participants; moderate-certainty evidence). The corresponding reduction at six months was 0.30 percentage points (95% CI, −0.52 to −0.08; 12 studies). Most participants had type 2 diabetes, and adverse effects were not evaluated in most studies [6]. Periodontal treatment complements, but does not replace, established diabetes management. An individual patient's response may differ from the average effect.

Periodontitis and cardiovascular disease

Observational studies have reported an association between periodontitis and cardiovascular disease. In an early case-control study, Mattila et al. observed an association between poor dental health and acute myocardial infarction [7]. The European Federation of Periodontology and World Heart Federation consensus subsequently reviewed evidence on periodontitis and cardiovascular disease and described plausible inflammatory and microbial pathways [3]. However, shared risk factors and residual confounding make it difficult to determine the extent of any independent causal contribution.

Some studies have reported improvements in surrogate measures of inflammation or vascular function following periodontal therapy, but these findings cannot be equated with prevention of myocardial infarction or stroke [3]. Patients should receive established cardiovascular risk assessment and treatment alongside periodontal care. Dental clinicians should record cardiovascular history and medications and coordinate with the treating physician when necessary.

Periodontitis and adverse pregnancy outcomes

Adverse pregnancy outcomes have multiple causes and contributing factors. Offenbacher et al. reported an early association between periodontal infection and preterm low birth weight [8]. Subsequent observational

studies have evaluated preterm birth, low birth weight, and pre-eclampsia, but variations in periodontal definitions and adjustment for smoking, socioeconomic factors, and obstetric history limit causal inference [9]. Pre-eclampsia generally develops after 20 weeks of gestation and involves new-onset hypertension with proteinuria or other maternal organ dysfunction; its diagnosis and management should follow current obstetric guidance.

Treatment evidence is mixed. A Cochrane review reported no clear difference in preterm birth before 37 weeks between periodontal treatment and no treatment during pregnancy (risk ratio 0.87; 95% CI, 0.70-1.10; 11 studies; low-certainty evidence), although a possible reduction in low birth weight was reported with limited certainty [10]. A later review found that reductions in preterm birth and low birth weight were not supported in its higher-quality studies [11]. Appropriate periodontal assessment and treatment remain important for maternal oral health, but prevention of adverse birth outcomes should not be promised.

Periodontitis and respiratory conditions

The oral cavity can serve as a reservoir for respiratory pathogens, and aspiration of oral secretions is a biologically plausible pathway to lower respiratory infection, particularly in vulnerable patients. Observational studies have also investigated associations between periodontitis and chronic obstructive pulmonary disease. The European Federation of Periodontology (EFP) and the European arm of the World Organization of Family Doctors (WONCA Europe) consensus identified associations between periodontal and selected respiratory diseases, while noting the need to interpret the available evidence in context [2].

Oral hygiene interventions studied in hospitalized or dependent patients are not equivalent to periodontal treatment for chronic obstructive pulmonary disease, and pneumonia, microbial colonization, and exacerbations are distinct outcomes. Their findings should therefore not be combined as proof that periodontal treatment prevents respiratory disease. Dental, nursing, and medical teams can coordinate oral care for patients with impaired self-care or respiratory vulnerability.

Periodontitis and chronic kidney disease

Chronic kidney disease and periodontitis share inflammatory pathways and risk factors, including diabetes. Observational research has investigated an association between periodontal disease and impaired renal function; Kshirsagar et al. reported such an association in the Atherosclerosis Risk in Communities (ARIC) study [12]. A systematic review and meta-analysis also examined the association between chronic kidney disease and periodontitis [13]. Differences in case definitions and adjustment for confounding limit causal interpretation, and the direction of the relationship remains uncertain.

The evidence is insufficient to promise that periodontal treatment will prevent kidney disease or reliably improve renal function. Dental treatment should address periodontal inflammation and oral function, with coordination regarding renal status, medications, dialysis schedules, bleeding risk, and other individual medical considerations.

Periodontitis and cognitive impairment

Some observational studies have reported associations between periodontal measures and cognitive impairment. Noble et al. described an association between markers of periodontitis and cognitive performance in older adults [14]. Potential mechanisms include systemic inflammation and microbial pathways, but reverse causation is plausible because cognitive decline can reduce the ability to maintain oral hygiene. Age, education, vascular disease, and socioeconomic factors may also confound observed relationships. Current evidence does not establish that periodontitis causes dementia or that periodontal treatment prevents cognitive decline. Practical support with daily oral care remains valuable for patients with cognitive impairment.

Interprofessional care and patient education

Physicians can ask about bleeding gums, loose teeth, pain, and difficulties with oral care and recommend a dental evaluation when appropriate. Dental professionals can document periodontal findings, relevant medical diagnoses, smoking status, medications, and treatment needs. In patients with diabetes, communication about glycemic status and periodontal findings may support coordinated follow-up. During pregnancy or in patients with cardiovascular or kidney disease, the dental team can consult the relevant clinician about individual treatment considerations [2-4].

With patient consent, referrals should state the reason for referral, relevant findings, urgency, medications, and the proposed follow-up. Patients should be encouraged to maintain daily plaque control, attend appropriate periodontal reviews, stop smoking where relevant, and continue their prescribed medical treatment. Communication should explain the established oral benefits of treatment and avoid promising unproven systemic benefits or suggesting that periodontal findings alone diagnose systemic illness.

Limitations and future research

This narrative review relies on selected literature and does not provide a comprehensive assessment of every study. Evidence across conditions differs in design, diagnostic criteria, populations, follow-up, and control of confounding. Observational associations are vulnerable to residual confounding and reverse causation, while changes in biomarkers do not necessarily predict clinical outcomes. The review did not perform a formal risk-of-bias assessment or quantitative synthesis.

Future studies should apply consistent periodontal definitions, assess confounders prospectively, and report periodontal and systemic outcomes separately. Well-designed trials should evaluate clinically meaningful outcomes, adverse events, duration of benefit, and the feasibility and equity of collaborative care. For pregnancy, cardiovascular disease, kidney disease, respiratory disease, and cognitive impairment, stronger evidence is required before periodontal treatment can be recommended as a means of preventing systemic outcomes.

Conclusions

Periodontal medicine highlights the relationship between oral and systemic health and the value of coordinated care. The diabetes-periodontitis relationship is well recognized, and periodontal treatment can modestly improve average glycemic control in people with both conditions. Associations with other systemic conditions warrant careful interpretation because causal relationships and systemic benefits of periodontal treatment remain uncertain. Periodontal care is important for oral health in its own right. Appropriate referrals, patient education, and communication between dental and medical professionals can support patient-centered care while further research addresses the remaining uncertainties.

Additional Information

Author Contributions

All authors have reviewed the final version to be published and agreed to be accountable for all aspects of the work.

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Disclosures

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References

1. Tonetti MS, Greenwell H, Kornman KS: Staging and grading of periodontitis: framework and proposal of a new classification and case definition. J Periodontol. 2018, 89:S159-S172. 10.1002/JPER.18-0006
2. Herrera D, Sanz M, Shapira L, et al.: Association between periodontal diseases and cardiovascular diseases, diabetes and respiratory diseases: consensus report of the Joint Workshop by the European Federation of Periodontology (EFP) and the European arm of the World Organization of Family Doctors (WONCA Europe). J Clin Periodontol. 2023, 50:819-841. 10.1111/jcpe.13807
3. Sanz M, Del Castillo AM, Jepsen S, et al.: Periodontitis and cardiovascular diseases. Consensus report. Glob Heart. 2020, 15:1. 10.5334/gh.400
4. Sanz M, Ceriello A, Buysschaert M, et al.: Scientific evidence on the links between periodontal diseases and diabetes: consensus report and guidelines of the joint workshop on periodontal diseases and diabetes by the International Diabetes Federation and the European Federation of Periodontology. J Clin Periodontol. 2018, 45:138-149. 10.1111/jcpe.12808
5. Taylor GW, Burt BA, Becker MP, Genco RJ, Shlossman M, Knowler WC, Pettitt DJ: Severe periodontitis and risk for poor glycemic control in patients with non-insulin-dependent diabetes mellitus. J Periodontol. 1996, 67:1085-1093. 10.1902/jop.1996.67.10s.1085

6. Simpson TC, Clarkson JE, Worthington HV, et al.: Treatment of periodontitis for glycaemic control in people with diabetes mellitus. Cochrane Database Syst Rev. 2022, 4:CD004714. 10.1002/14651858.CD004714.pub4
7. Mattila KJ, Nieminen MS, Valtonen VV, et al.: Association between dental health and acute myocardial infarction. BMJ. 1989, 298:779-781. 10.1136/bmj.298.6676.779
8. Offenbacher S, Katz V, Fertik G, et al.: Periodontal infection as a possible risk factor for preterm low birth weight. J Periodontol. 1996, 67 Suppl 10S:1103-1113. 10.1902/jop.1996.67.10s.1103
9. Xiong X, Buekens P, Fraser WD, Beck J, Offenbacher S: Periodontal disease and adverse pregnancy outcomes: a systematic review. BJOG. 2006, 113:135-143. 10.1111/j.1471-0528.2005.00827.x
10. Iheozor-Ejiofor Z, Middleton P, Esposito M, Glenny AM: Treating periodontal disease for preventing adverse birth outcomes in pregnant women. Cochrane Database Syst Rev. 2017, 6:CD005297. 10.1002/14651858.CD005297.pub3
11. Xu H, Cai M, Xu H, Shen XJ, Liu J: Role of periodontal treatment in pregnancy gingivitis and adverse outcomes: a systematic review and meta-analysis. J Matern Fetal Neonatal Med. 2025, 38:2416595. 10.1080/14767058.2024.2416595
12. Kshirsagar AV, Moss KL, Elter JR, Beck JD, Offenbacher S, Falk RJ: Periodontal disease is associated with renal insufficiency in the Atherosclerosis Risk In Communities (ARIC) study. Am J Kidney Dis. 2005, 45:650-657. 10.1053/j.ajkd.2004.12.009
13. Serni L, Caroti L, Barbato L, Nieri M, Serni S, Cirami CL, Cairo F: Association between chronic kidney disease and periodontitis: a systematic review and meta-analysis. Oral Dis. 2023, 29:40-50. 10.1111/odi.14062
14. Noble JM, Borrell LN, Papapanou PN, Elkind MS, Scarmeas N, Wright CB: Periodontitis is associated with cognitive impairment among older adults: analysis of NHANES-III. J Neurol Neurosurg Psychiatry. 2009, 80:1206-1211. 10.1136/jnnp.2009.174029