Oral Infections: Causes, Types and Links to Systemic Health

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Key points:

- Introduction
- Common types: Dental caries, periodontitis, oral candidiasis
- Link between oral and systemic health
- Treatment, overview and conclusion

Introduction

The link between systemic and dental health has a strong biological foundation. The condition of our teeth, gums, and oral hygiene directly influence overall well-being. Dental caries and periodontitis, for example, significantly impact systemic health, especially chronic conditions like diabetes and hypertension.[1]

Dental caries, caused by *Streptococcus* and *Lactobacillus* species, can permit bacterial translocation into the bloodstream. Similarly, periodontitis may cause chronic inflammation and is linked to rheumatoid arthritis, diabetes, and cardiovascular disease.[2]

Dental Caries

Dental caries is the demineralization of dental hard tissues through metabolic processes within the oral biofilm.[3]

It affects enamel, dentin, and cementum, resulting from a disturbance in the biofilm's pH and mineral balance.

Periodontitis

Periodontal disease triggers inflammatory conditions in the gums, bone, and ligaments supporting teeth. A bacterial imbalance in dental plaque activates the immune system, inflaming tissues and potentially leading to tooth loss.[4]

Preventive strategies include home hygiene and regular dental visits every 3 – 6 months. Treatments involve scaling, immune modulation, antibiotics, laser therapy, and tissue regeneration.

Oral Candidiasis

Oral candidiasis is a fungal infection common in older adults, denture wearers, and immunocompromised individuals.[5]

It is caused by the *Candida* species—especially *C. albicans*—and leads to discomfort and, in severe cases, systemic complications. Oral candida carriage rates vary, as shown below:

- 45% in newborns
- 45–65% in healthy children

- 30–45% in healthy adults
- 50–65% in denture wearers
- 65–88% in care home residents
- 90% in chemotherapy patients
- 95% in people with HIV

Link Between Periodontal and Cardiovascular Disease

Studies suggest a correlation between gum disease and heart conditions.[6]

New diagnostic tools, including microbial analysis and serological testing, strengthen this link. While there's no conclusive proof that gum treatment prevents heart disease, integrated dental-medical care is gaining recognition.

Treatment

Oral infections are resilient due to biofilms. Broad use of antibiotics is not ideal as it contributes to resistance. As a result, alternative therapies aim to target harmful species while preserving beneficial bacteria. Promising approaches include photodynamic therapy, enzyme inhibitors, probiotics, peptides, and nanoparticles.

Conclusion

Oral infections—from caries to candidiasis—impact both oral and systemic health. Emerging research reinforces the importance of early diagnosis and comprehensive care. Preventive strategies and continued investigation are key to reducing the public health burden.

References

1. Natarajan P, Madanian S, Marshall S. Investigating the link between oral health conditions and systemic diseases. *Sci Rep.* 2025;15(1):10476.
2. Fejerskov O, Nyvad B, Kidd EA. Pathology of dental caries. In: *Dental Caries: The Disease and Its Clinical Management*. Oxford: Blackwell Munksgaard; 2008.
3. Kinane DF, Stathopoulou PG, Papapanou PN. Periodontal diseases. *Nat Rev Dis Primers.* 2017;3(1):1–4.
4. Akpan A, Morgan R. Oral candidiasis. *Postgrad Med J.* 2002;78(922):455–9.
5. Demmer RT, Desvarieux M. Periodontal infections and cardiovascular disease. *J Am Dent Assoc.* 2006;137(Suppl):14–20.
6. Belibasakis GN, Mylonakis E. Oral infections: clinical and biological perspectives. *Virulence.* 2015;6(3):173–6.