How periodontitis may be linked to systemic diseases

IThe connection between periodontitis and systemic health is complex and multifaceted. Periodontitis is best understood as a chronic immune-inflammatory disease associated with a dysbiotic biofilm. It is thought to impact systemic health through 2 main mechanisms:

Direct spread of bacteria

- In a healthy state, the sulcular epithelium and innate immune system function as protective barriers, preventing bacteria from entering the bloodstream. In periodontitis, this protective barrier is weakened due to inflammation and ulceration of the subgingival epithelium, making it easier for bacteria to access the bloodstream. Once in the bloodstream, oral bacteria can cause bacteraemia and may contribute to infections in distant sites within the body.
- Bacteraemia can also result from everyday activities such as toothbrushing and chewing.
- While the body typically clears these bacteria without causing symptoms, there is evidence to suggest that, in some cases, bacteria may persist and have systemic effects.

Systemic inflammation

- Pro-inflammatory mediators, including IL-1β, IL-6, TNF-α, and PGE2, generated in inflamed gingival tissues may enter the systemic circulation. They may trigger leucocytosis (an elevated white blood cell count) and stimulate the production of acute-phase proteins.
- Systemically dispersed bacteria and bacterial antigens initiate responses from leukocytes, and endothelial cells, resulting in the release of pro-inflammatory mediators, such as cytokines, chemokines, and CRP.
- Prolonged exposure to these antigens leads to the formation of immune complexes when soluble antigens bind with circulating antibodies, further intensifying inflammation at their deposition sites.

Associations to systemic diseases

Epidemiological evidence has independently associated periodontitis with many systemic conditions, including: adverse pregnant outcomes, cardiovascular diseases, chronic kidney disease, chronic obstructive pulmonary disease (COPD), cognitive impairment, COVID-19 complications, diabetes, metabolic syndrome, obesity, obstructive sleep apnoea, pneumonia, and rheumatoid arthritis

It is important to highlight that associations do not imply causality. While there is evidence linking periodontitis to systemic diseases, further research is required to establish direct causal relationships for some of the above conditions. Nevertheless, by managing periodontal disease effectively, dental professionals can play a key role in reducing the potential risk of systemic complications.

References

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By **Dr Varkha Rattu** BDS MFDS RCS (Eng)