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The potential of salivary biomarkers in the early diagnosis of dental caries and periodontal pathology

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ABSTRACT

Introduction: Saliva is a biological fluid that reflects both oral and systemic health status. Its collection represents an effective and minimally invasive alternative to traditional blood analysis. Salivary testing enables the detection of biomarkers such as enzymes, proteins, hormones, and the characterization of the oral microbiome, thereby facilitating the early identification of various pathologies. The "Salivomics" approach allows for in-depth analysis of salivary molecular components, enhancing diagnostic capability.
Objectives: To conduct an integrative literature review demonstrating the utility of saliva as: a diagnostic tool for the early detection of dental caries and periodontal disease; an instrument for the development of personalized and precise treatment strategies for these oral pathologies; and a tool for monitoring disease progression and treatment response.
Methodology: The following research question was addressed: "Is there sufficient scientific evidence to support the applicability of salivary tests in the early diagnosis and monitoring of dental caries and periodontal disease, compared with conventional diagnostic methods, considering their sensitivity and specificity?" A bibliographic search was performed in the online databases PubMed, Wiley, and ScienceDirect. Article identification and selection were conducted according to predefined inclusion and exclusion criteria. Full-text articles published between 2015 and 2025 in English, Italian, and Portuguese were included, reporting human cohort studies and clinical trials that addressed the PICO question. Articles published in other languages, outside the defined time frame, or not aligned with the objective of the integrative review were excluded.
Results: Eight studies were selected for this integrative review, four addressing dental caries and four focusing on periodontal disease. The results are presented according to each biomarker and its respective pathology. These studies demonstrated that salivary biomarkers, including albumin, microbiome components, and salivary electrolytes, show a significant association with the presence and severity of dental caries. In periodontal diseases, salivary biomarkers exhibited high predictive capacity in distinguishing between health, gingivitis and periodontitis.
Conclusion: Salivary tests show considerable promise for the early diagnosis of oral pathologies; however, further validation and standardization are required to ensure safe and effective clinical application.

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