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Editorial: Genetic and environmental interactions in oral disease: advancing diagnostic and therapeutic strategies

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Editorial on the Research Topic

Genetic and environmental interactions in oral disease: advancing diagnostic and therapeutic strategies

Pathology in dentistry is a critical field that delves into the study of diseases affecting the oral cavity and its surrounding structures (1–4). This area of research is pivotal for identifying, diagnosing, and understanding a wide array of oral health conditions, such as infections, inflammations, developmental abnormalities, and neoplastic growths (2–4). The exploration of these conditions is essential not only for dental health but also for overall health, as oral diseases can have systemic implications. Despite significant advancements, there remain gaps in our understanding of the underlying causes, mechanisms, and progression of these diseases. Recent studies have highlighted the importance of precision medicine in addressing these gaps, yet there is a need for more comprehensive research that integrates clinical and pathological aspects to improve patient care (5–7). The ongoing debate in the field revolves around the integration of genetic and environmental factors in oral disease etiology, necessitating further investigation to enhance diagnostic and therapeutic strategies (8–11).

The articles in this topic highlight the advances in the field of oral diseases by promoting research that covers both clinical and pathological aspects. The primary objective was to enhance the standard of care for patients by integrating precision medicine approaches into dentistry.

In his work, [Petrucci](#), describe a simple technique for assessing the presence of blisters and vesicles on the oral mucous membranes using the air syringe, which is a standard component of every dental unit.

Specific questions to be addressed include the identification of genetic risk factors for oral diseases, the interaction between genetic and environmental factors, and the causal links between oral and systemic diseases. By fostering interdisciplinary and collaborative

research, this topic seeks to bridge existing knowledge gaps and contribute to the development of innovative diagnostic and therapeutic solutions.

In their study [Padmanabhan et al.](#) aims to evaluate salivary alpha-amylase levels in children diagnosed with Early Childhood Caries (ECC) and Rampant Caries (RC), and to compare these levels with those found in children without ECC or RC. Additionally, it investigates the relationship between salivary alpha-amylase concentrations and increased caries activity in children affected by ECC or RC.

Oral potentially malignant disorders (OPMDs), including conventional leukoplakia (OL) and proliferative verrucous leukoplakia (PVL), have distinct risks of progression to oral squamous cell carcinoma (OSCC).

[Intini et al.](#), aimed to analyze and compare the oral microbiota in patients with OL, PVL, and OSCC using 16S rRNA gene sequencing of saliva samples to identify microbial signatures associated with disease progression and to uncover potential biomarkers that would justify an aggressive treatment of OPMDs.

Previous studies have suggested that genetic polymorphisms may influence the clinical manifestations of temporomandibular disorder (TMD). Accordingly, [Baratto et al.](#) study aimed to examine the association between polymorphisms in the *Dopamine Receptor D2 (DRD2)* and *Ankyrin Repeat and Kinase Domain Containing 1 (ANKK1)* genes and the oral health-related quality of life in male patients with TMD.

Finally, in a review, [Myo et al.](#) explores the role of *Msx1* in cleft palate, offering a detailed overview of its functions and the molecular mechanisms by which it regulates palatal development. We highlight recent research findings, including studies on *Msx1* mutations, signaling pathways, and gene–environment interactions, to shed light on the complex association between *Msx1* and cleft palate. Furthermore, ongoing advances in research may position *Msx1* as a key target for the development of innovative therapeutic approaches to craniofacial disorders.

In conclusion, all the articles dispensed an update on the latest evidence regarding the Genetic and Environmental Interactions in Oral Disease, highlighting the advancing Diagnostic and Therapeutic Strategies.

Author contributions

AB: Writing – original draft, Writing – review & editing. NS: Writing – review & editing. FP: Writing – review & editing. DD: Writing – original draft.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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