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Genetics and Dental Health: Exploring the Erosive Wear and Caries Connection

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Abstract

Dental health has long been associated with lifestyle, oral hygiene, and dietary choices. However, recent advances in genetic research have unveiled the intricate relationship between genetics and two common dental issues: erosive wear and caries. This abstract provides a concise overview of the connection between genetics and dental health.

Genetic factors have been identified as significant contributors to an individual's susceptibility to erosive wear, characterized by the loss of tooth enamel due to acid erosion. Specific genes associated with enamel formation and mineralization can influence enamel strength and resistance to erosive wear. Likewise, genetics play a crucial role in determining an individual's predisposition to dental caries, or cavities. The structural and compositional variations in teeth, influenced by genetics, can impact their vulnerability to caries development.

This emerging field of dental genetics is revealing valuable insights. Researchers are identifying susceptibility genes, developing polygenic risk scores, and exploring genetic counseling in dentistry to provide personalized preventive strategies and treatment plans. The future of dental care may involve incorporating genetic information to offer tailored interventions, strengthening enamel, and reducing susceptibility to dental issues.

Introduction

Dental health has long been associated with oral hygiene, diet, and lifestyle factors. However, recent advancements in genetic research have shed light on the role of genetics in predisposing individuals to dental issues such as erosive wear and caries. This article delves into the fascinating world of genetics and its connection to these common dental problems, offering insights that may revolutionize the way we approach oral healthcare [1].

As many factors are associated with the pathology of dental erosion, it is commonly accepted to be a multifactorial condition caused by various extrinsic and intrinsic acid sources. Extrinsic dental erosion can be a consequence of exposure to acid from industrial or dietary sources. These acids are mainly found in some types of food and drinks such as citrus fruits, acid beverages, and sour candies. Furthermore, some medications are associated with erosion, particularly antidepressants, asthma drug therapy, and chewable vitamin C tablets [2]. Eating and drinking habits with a frequently intake of dietary acids, occupation, and socioeconomic aspects are also risk factors for dental erosion. Intrinsic dental erosion is generally caused by the exposure of teeth to stomach acid. This mainly occurs with frequent vomiting, in patients with regurgitations, and gastroesophageal reflux or ruminations. Dental erosion has been described as a surface phenomenon, namely destruction that primarily affects the surface of the teeth. In addition, studies have shown that chemical attack also leads to demineralization just beneath the tooth surface. Therefore, it is also described as near-surface phenomenon. Even though dental erosion appears in low pH, there is no fixed critical pH value for acidic solutions [3].

The prevalence and incidence of both caries and dental erosion is high, nowadays. Even though the pathological mechanisms of these two diseases are different, they share some common biological factors such as salivary components and flow rate, tooth formation and structure, immune response, or an individual's variation in taste preferences. Additionally, these factors are under genetic control, and therefore, the genetic background features the dynamic of the development of oral diseases [4]. The studies have shown that susceptibility to erosion and caries varies considerably among individuals exposed to similar risk. It is plausible that genes regulate the structure of hard dental substance, the salivary composition and flow, the behavioral patterns, and the immune response.

The genetic basis of dental health

For many years, dental health was primarily attributed to external factors, including sugar consumption, oral hygiene practices, and exposure to fluoride. While these factors undoubtedly play a significant role in dental health, it is becoming increasingly clear that genetics also plays a vital part in determining an individual's susceptibility to dental issues [5].

Genetic variation and erosive wear

Erosive wear, characterized by the loss of tooth enamel due to acids, is a significant dental concern. Some people seem more prone to erosive wear than others, and genetics plays a substantial role in this predisposition. Studies have identified specific genes that regulate the formation and mineralization of tooth enamel. Variations in these genes can affect enamel strength and resistance to acid erosion. Consequently, individuals with certain genetic profiles may be more vulnerable to erosive wear [6].

Genetic factors and caries susceptibility

Dental caries, commonly known as cavities, are also influenced

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by genetic factors. While sugar consumption and oral hygiene habits contribute to the formation of caries, the structure and composition of an individual's teeth can affect their susceptibility to these lesions [7]. Genetics influence the development of teeth, including their shape, size, and density, all of which can impact the likelihood of caries formation.

Genetic research and dental health

Recent research in the field of dental genetics has unveiled some promising findings:

Identification of susceptibility genes: Scientists have identified specific genes that are associated with an increased risk of dental erosive wear and caries. Understanding these genes can lead to targeted preventive strategies and personalized dental care.

Polygenic risk scores: Researchers are developing polygenic risk scores, which combine information from multiple genes to predict an individual's risk of dental issues. This approach holds the potential for more accurate risk assessment and tailored preventive measures [8].

Genetic counseling: Genetic information can be used for genetic counseling in dentistry, allowing individuals to understand their genetic predisposition to dental problems and make informed decisions about their oral healthcare [9].

The future of dental care

While we are still in the early stages of understanding the intricate relationship between genetics and dental health, this emerging field holds great promise. In the future, dentists may incorporate genetic information into treatment plans, allowing for more personalized and effective care. Moreover, genetic insights may lead to the development of innovative therapies to strengthen tooth enamel or reduce susceptibility to dental issues [10].

Conclusion

Genetics and dental health are intimately connected, with genes influencing an individual's vulnerability to erosive wear and caries. This exciting field of research is shedding light on the genetic factors that contribute to dental issues, offering the potential for more personalized and effective preventive strategies and treatments. As our understanding of dental genetics deepens, we may witness a transformative shift in the way we approach oral healthcare, ultimately leading to healthier smiles for generations to come.

References

1. Leslie JE, Marazita LM (2013) Genetics of Cleft Lip and Cleft Palate. Am J Med Genet C Semin Med Genet 163: 246-258.
2. Shkoukani AM, Chen M, Vong A (2013) Cleft Lip – A Comprehensive Review. Front Pediatr 1: 53.
3. Burg LM, Chai Y, Yao AC, Magee W, Figueiredo CJ (2016) Epidemiology, Etiology, and Treatment of Isolated Cleft Palate. Front Physiol 7: 67.
4. Khan ANMI, Prashanth CS, Srinath N (2020) Genetic Etiology of Cleft Lip and Cleft Palate. AIMS Molecular Science 7: 328-348.
5. Schutte BC, Murray JC (1999) The many faces and factors of orofacial clefts. Hum Mol Genet 8: 1853-1859.
6. Bender PL (2000) Genetics of cleft lip and palate. J Pediatr Nurs 15: 242-249.
7. Stanier P, Moore GE (2004) Genetics of cleft lip and palate: syndromic genes contribute to the incidence of non-syndromic clefts. Hum Mol Genet 13: R73-81.
8. Dixon MJ, Marazita ML, Beaty TH, Murray JC (2011) Cleft lip and palate: understanding genetic and environmental influences. Nat Rev Genet 12: 167-178.
9. Chang JYF, Lin TC, Wan LH, Cheng FC, Chiang CP (2021) Comparison of Virtual Microscopy and Real Microscopy for Learning Oral Pathology Laboratory Course Among Dental Students. J Dent Sci 16: 840-845.
10. Liu CM, Huang PS, Chang YC (2021) Perspectives on the Challenge and Change of COVID-19 Crisis on Dental Education. J Dent Sci 16: 1039-1040.