Genetic Characteristics of Dental Caries and Dental Erosive Wear

John Fejerskov*

Department of Dental Pathology, Royal Dental College, University of Aarhus, Aarhus, Denmark

Received: 24-Oct-2022, Manuscript No. OHDM-22-19159; **Editor assigned:** 27-Oct-2022, Pre QC No. OHDM-22-19159 (PQ); **Reviewed:** 10-Nov-2022, QC No. OHDM-22-19159; **Revised:** 17-Nov-2022, Manuscript No. OHDM-22-19159 (R); **Published:** 24-Nov-2022, DOI: 10.35248/2247-2452.22.21.1027.

Description

It is challenging to separate dental erosion and dental caries in a single mouth as teeth are frequently subjected to a combination of different types of wear, including erosion and attrition (wear caused by tooth-to-tooth contact), abrasion (wear caused by contact with foreign objects), and abfraction (fatigue of the cervical region of the tooth). The same condition is therefore sometimes referred to by the names "dental erosive wear" and "erosive tooth wear." Nowadays, there is a significant prevalence and incidence of tooth erosion and caries. Dental erosion is widely acknowledged to be a multifactorial disorder brought on by multiple extrinsic and intrinsic acid sources due to the large number of factors connected with its aetiology. Exposure to acid from dietary or industrial sources might result in extrinsic dental erosion. Citrus fruits, acidic beverages, and sour candies are just a few examples of foods and beverages that typically include these acids. Also, some drugs, particularly antidepressants, asthma medication, and chewable vitamin C tablets, are linked to erosion. Other risk factors for dental erosion include occupation, socioeconomic status, and eating and drinking habits with a regular intake of dietary acids.

The most common cause of intrinsic dental erosion is the exposure of teeth to stomach acid. This generally happens to people who have frequent regurgitations, gastroesophageal reflux, or ruminations. Dental erosion has been described as a surface process, meaning that the tooth's surface is largely damaged. Research has demonstrated that chemical assault also causes demineralization just below the tooth surface. Because of this, it is also known as a near-surface phenomenon. Dental caries, the most common disease in poor nations, is a multifaceted and complex condition. This is a chronic illness that can impair one's ability to eat and communicate, as well as cause pain and suffering. Dental plaque, a sticky biofilm made up of a variety of bacterial species embedded in a polymer matrix, covers the tooth's surface. The development of a caries lesion is the outcome of a metabolic process in the dental plaque in which certain acidogenic bacteria colonise the damaged area, create acid from fermentable carbohydrates, and cause a localised chemical disintegration of the tooth. When there is an imbalance in the balance between the minerals in the teeth and the dental plaque, the caries process (biofilm) begins. When the enamel is exposed to acid and comes into contact with tooth plaque, it loses calcium and phosphate.

The end result is a "white spot" lesion with porous, visible enamel. The caries process is a balance between pathological factors and protective factors, similar to dental erosion. Caries lesions progress when the pathological factors outweigh the protective factors. Pathological elements that contribute to demineralization include culturable bacteria, fermentable sugars, and abnormal salivary function. Regarding the morphology of the tooth, areas of retention and deep grooves are frequent sites for caries lesions. Demineralization will eventually result in a cavity if it is not stopped or corrected. The advancement of caries is significantly influenced by dietary choices, regular dental care, and the composition and movement of saliva. However, the frequency of food consumption and the type of diet are also important factors in the development of caries. Saliva flow assists in practically rapid food and pathogen removal from the tooth surface, along with dietary recommendations. Saliva helps bacteria group together so they can attack the teeth more quickly.

Dental erosion and caries susceptibility are both increased by the genes for the enamel matrix proteins amelogenin, enamelin, tuftelin, and tuftelin interaction protein. Numerous studies have revealed that hereditary factors influence the risk of dental caries. The genes of interest are mostly involved in taste, food preferences, the immune system, saliva, and enamel production. Higher caries experiences are linked to enamel production genes, including tuftelin, enamelin, amelogenin, and ameloblastin. The developing and calcified tooth expresses tuftelin and amelogenin. Ameloblastin is involved in the creation and mineralization of the enamel matrix, whereas enamelin regulates the mineralization and structural organisation of the enamel. Despite the fact that other studies have found no link, enamelin and amelogenin are primarily linked to high caries experiences. The tufteline interaction protein has also been linked to the onset of carious lesions and higher caries experiences, according to two studies. Five studies, however, find no proof of a relationship. Last but not least, environmental and genetic factors influence taste preferences. Accordingly, other taste and food preference genes, including TAS2R38, TAS1R2, and GNAT3, have been linked to variations in caries severity.

The negative effects of orthodontic treatment should be mentioned as a risk factor for the emergence of erosive and carious lesions. In about 50% of orthodontic patients, demineralization of the enamel surface has been seen, usually as a result of poor oral hygiene. Moreover, orthodontic treatment may change the pulp's vitality, the soft dental tissue's volume, and the pulp chamber's overall size. Dental caries and dental erosion have different pathological mechanisms, but they share some biological characteristics, such as salivary components and flow rate, tooth formation and structure, the immune response, or a person's individual taste preferences.

Corresponding author: John Fejerskov, Department of Dental Pathology, Royal Dental College, University of Aarhus, Aarhus, Denmark, Email: fejerskovj@yahoo.com

Conclusion

Furthermore, because these variables are influenced by genes, the dynamics of the development of oral disorders are influenced by genes. The investigations have demonstrated that individuals exposed to similar risks had significantly different susceptibilities to erosion and caries. It is conceivable that genes control the makeup and flow of saliva, the immunological response, behavioural habits, and hard dental substances. Understanding the complex gene-environment relationships opens doors for additional associations that have not yet been discovered, whereas traditional dentistry has focused more on environmental risk factors for erosion and caries development. We may learn more and better comprehend tooth erosion and caries if we combine genetic analysis like gene expression, metagenomics, and protein-protein interaction networks. Additionally, thorough knowledge of the hereditary component could aid in identifying patients at risk before it manifests itself. The development of a prognostic genetic test with predictive capability may pave the way for the development of more specialised treatments that address the individual risk.