Assessment and Management of Dental Erosion

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KEYWORDS

• Tooth erosion • Risk factors • Diagnosis • Prevention

The pattern of oral disease has been influenced by the ever-changing human lifestyle. Tooth wear, especially tooth erosion, has drawn increasing attention as a risk factor for tooth damage or loss. Dental erosion and caries lesions result from acids on tooth structure. The acids causing caries lesions are produced by bacteria in the mouth. The acids that are responsible for tooth erosion, on the other hand, stem from extrinsic (eg, soft drinks, acidic foods) or intrinsic (eg, reflux fluid) sources. Structurally, caries lesions are characterized by a subsurface partial demineralization in which the subsurface lesion body is covered by an intact surface layer (**Fig. 1**, *left*). By comparison, tooth erosion is characterized by initial surface softening and subsequent bulk material loss. In the early stage, acids diffuse into the tooth and remove calcium and phosphate ions from the outer few micrometers of hard tissues, forming a demineralized, weakened overlying layer. In the advanced stage, the apatite crystals of the tooth are destroyed and dissolved away layer by layer from the tooth surface, leading to a generalized loss of tooth volume (**Fig. 1**, *right*).

There is some evidence that the prevalence of dental erosion is growing.[1] In a study in the United Kingdom, 1308 adolescents of mixed ethnicities were examined at the age of 12 years and then 2 years later. Almost 5% of the subjects at baseline and more than 13% 2 years later had deep enamel or dentin lesions. In this study, approximately 12% of the erosion-free adolescents developed erosive lesions in the following 2 years.[2] The spread of tooth erosion, especially in children, adolescents, and young adults, has been largely linked to the high consumption of acidic drinks and foods. However, it is impossible to avoid potentially erosive agents from contact with the teeth during a lifetime. After applying rehabilitation treatment, restorative materials also exhibit degradation in acids. Therefore, to prevent or inhibit further erosion, the emphasis should be on early diagnosis and adequate preventive strategies. Restorative measures should be taken only when tooth loss caused by erosive wear reaches a certain threshold.

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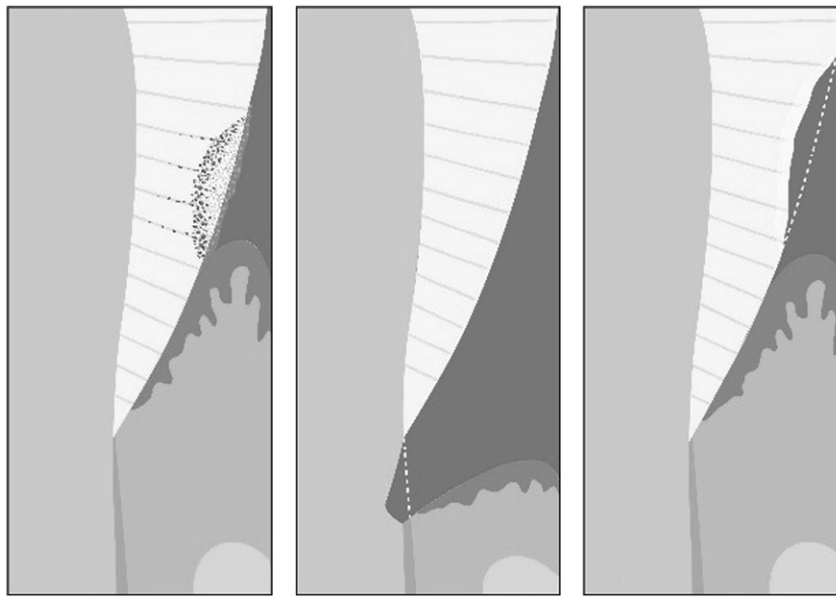

Fig. 1. Comparison of the pattern of caries (*left*), wedge-shaped defects (*middle*), and erosion with the intact enamel adjacent to the gingiva (*right*).

DIAGNOSIS

In the early stages, it is difficult to diagnose erosion, as erosion is associated with few signs and fewer, if any, symptoms such as pain or sensitivity. There is no device available in routine dental practice for the specific detection of dental erosion and its progression. Therefore, clinical appearance has to be applied as the most important feature for dental professionals to diagnose tooth erosion.[3] In the more advanced stages, dentin may become exposed. To determine this condition, disclosing agents can be used to render dentin visible.

The appearance of smooth, silky-glazed, sometimes dull enamel with the absence of perikymata and intact enamel along the gingival margin are some typical signs of enamel erosion. An enamel ridge may persist at the crown margin. The presence of this phenomenon can be explained on the one hand by plaque residues, which can act as a diffusion barrier to acids, and on the other hand by sulcular fluid, which leads to neutralization of the acids in the gingival region.[4] The initial features of erosion on occlusal and incisal surfaces are the same as described earlier. Further progression of occlusal erosion leads to a rounding of the cusps and restorations rising above the level of the adjacent tooth surfaces. In severe cases, the entire occlusal morphology disappears. Extensive loss of enamel can lead to dentin exposure and even lead to pulp exposure in some extreme cases.[5] The exposed surface becomes sensitive to cold and warm foods and to tactile stimuli. To record the progress of the erosion, photographs or models should be taken periodically. **Fig. 2** shows the typical pattern of dental erosions.

Erosion has to be distinguished from attrition and abrasion. For the latter, tooth surfaces are often flat, with glossy areas with distinct margins and corresponding features on the antagonistic teeth. It is not always possible to differentiate these wear lesions because they frequently occur simultaneously with different proportional