



May 08, 2017

“Monday Morning Pearls of Practice by Bobby Baig”

baig@buildyoursmile.com

Prosthodontic Associates
2300 Yonge St, suite 905
Toronto, M4P1E4
www.buildyoursmile.com

Dental Erosion and Early Diagnosis

By Bobby Baig

Dental Erosion:

Introduction:

During a lifetime, teeth are exposed to a number of physical and chemical insults, which to a various extent contribute to the wear and tear of dental hard tissues. Interest in dental erosion and its role in tooth wear increased considerably since the mid-1990s. While searching on PubMed I found there are 3122 articles and 55 systematic reviews. The earliest form of tooth wear was found mainly on occlusal, incisal and proximal surfaces, whereas modern erosive tooth wear has additional characteristics that include the buccal and palatal/lingual surfaces.

Etiology of Erosion:

Erosive tooth wear is a multifactorial condition that involves acidic dissolution of tooth structure. Unlike carious lesions, which are caused by acid from specific plaque bio- film, the etiology of dental erosion is conventionally divided into “extrinsic” and “intrinsic” factors.

Extrinsic Erosion: Extrinsic exposure is frequently due to consumption of soft drinks, sports drinks, or other acidic beverages.

Intrinsic Erosion: Due to intrinsic exposure may result from gastric acid, either from gastric esophageal reflux disorder (GERD) or bulimia. Rumination is a special form of gastric disease, which is believed to affect mainly intellectually disabled patients, although its occurrence in the normal population may have been underestimated. The condition involves GERD in combination with voluntary or involuntary regurgitation of swallowed solid food which is then rechewed and reswallowed; the erosive damage might well be severe.

Pathophysiology:

1. The ensuing destruction of tooth structure is characterized by the softening of the enamel and underlying dentin, subsequently resulting in bulk tooth loss.
2. A large number of diseases and syndromes are associated with dental erosion. The net effect may be that acid reaches the tooth surface while there is also present a deterioration in the quantity/quality of saliva, a reduction of oro-motor function, various medications, or mouth breathing.
3. Enamel exposed to acid loses its mineral form, a layer that extends a few micrometers below the surface.
4. This phenomenon is known as demineralization or softening. With time this demineralization extends deeper into the enamel as the superficial layers are lost. Thus, the breakdown is the result of two events:
 - a) The direct dissolution of the surface enamel layer.
 - b) The eroding effect that creates a softened and thin, subsurface layer. These events can act synergistically to accelerate tooth wear secondary to mechanical wear (i.e., dental attrition and abrasion).
5. The pH of the tooth can drop in a short, transitory fashion due to a single exposure of an acidic beverage; however, repeated intake may result in dental erosion.
6. Similarly, swishing or holding the beverage in the mouth can increase exposure time, which translates to a greater erosive effect.
7. When dentin is exposed to acid, the dissolution of the peritubular and intertubular dentin initially occurs followed by the widening of the dentinal tubules.
8. With the removal of the mineralized dentinal phase, a superficial layer of demineralized collagenous matrix forms. This layer may offer some transient protection from erosive change, but it is very susceptible to mechanical and proteolytic breakdown.
9. Ultimately, this collagenous matrix is lost, and the erosive process progresses. It has been shown that dentin of both the permanent and primary dentition is equally vulnerable to erosive effects.

Early Diagnosis:

- 1) Early diagnosis is important. Dental professionals will typically ignore or overlook the very early stages dismissing minor tooth surface loss as a normal and inevitable occurrence of daily living, being 'within normal limits' and thus not appropriate for any specific interventional activity.
- 2) Only at the later stages in which dentine has become exposed and possibly sensitive, and the appearance and shape of the teeth altered that the condition becomes evident at routine examination.
- 3) There is no device available for the specific detection of dental erosion in routine practice.
- 4) Therefore, the clinical appearance is the most important feature for dental professionals to diagnose dental erosion.
- 5) This is of particular importance in the early stage of erosive tooth wear.
- 6) The appearance of a smooth silky-glazed appearance, intact enamel along the gingival margin, change in color and cupping and grooving on occlusal surfaces are some typical signs of early erosion.
- 7) However, it is difficult to diagnose erosion at an early stage and it can be very difficult to determine if dentine is exposed or not.
- 8) Even if a clinician is able to diagnose tooth wear, the differential diagnosis of erosion, abrasion or attrition may be a challenge either through lack of awareness of the multifactorial and overlying etiologies.



A) Occlusal erosive tooth wear with involvement of dentine with a composite filling rising above the level of the adjacent tooth surface. Age of the patient: 30 years. Known risk factors: soft drinks (sip-wise), gastroesophageal reflux.

B) Same patient as in fig A (5 years later). The progression on the premolars and on the first molar is clearly

visible.

C) Occlusal erosive tooth wear of a child aged 14 years. He suffered from dentine hypersensitivity. Known risk factors: gastroesophageal reflux, iced tea, acidic beverages.

D) Same patient 2 1/2 years later. Progression is clearly visible.

Conclusion:

1. Only a dentist with the diagnostic capability of distinguishing early erosion from the other non-cariious defects will be in a position to deliver timely preventive measures.
2. Indeed, these conditions may occur simultaneously. In children, the most commonly reported areas with wear are occlusal surfaces of molars and incisal surfaces of incisors. These surfaces are also associated with attrition and it can be difficult to separate what is being caused by erosion from what is being caused by other tooth wear factors

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