



REVISITED DENTAL WEAR- A REVIEW ARTICLE

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ABSTRACT

Tooth wear is an ever – increasing problem, and younger patients are particularly at risk. The problem is likely to continue as patients demand and expectations rise and as more natural teeth are retained into old age. In this text we aim to discuss the various standard terminologies relating to tooth wear, etiology and systematic management of the same.

INTRODUCTION

Dental attrition is caused by tooth to tooth contact forming acquired wear facets upon pristine enamel, whereas abrasion is caused by food and foreign body contact (e.g., tooth brushing) that may obliterate attrition wear patterns.^[1] Finally, erosion by acid-based leaching and dissolution of the hydroxyapatite crystals of enamel may override previous lesions of enamel. Accordingly, critical analysis of the causes and history of damaged enamel needs to be undertaken in identifying its initial origin.^[2] Tooth wear is thus multifactorial in origin, based upon diet and eating habits, oral hygiene, bruxism, brushing habits, xerostomia, anorexia, gastro-esophageal reflux disease (GERD), vomiting, bulimia as well as medications and dietary supplements. A need for standardization and classification of these multiple determinants of dental deterioration has been proposed. Dental surface texture analysis provides evidence of the etiological factors implicated in attrition and erosion.^[3]

DEFINITION^[4]

- Wear – Damage to a solid surface, generally involving progressive loss of material due to relative motion between the surface and the contacting surface.
- Abrasive wear – Wear due to hard particles or hard protuberances forced against and moving along a solid surface
- Adhesive wear – Wear due to localized bonding between contacting solid surfaces leading to material transfer between the two surfaces or loss from either surface.
- Corrosive wear – Wear in which a chemical or an electrochemical reaction with the environment is Significant.

- Erosive wear – Progressive loss of original material from a solid surface due to mechanical interaction between that surface and a fluid, a multicomponent fluid or impinging liquid or solid particles.
- Fatigue wear – Wear of solid surface caused by fracture arising from material fatigue.
- Pitting – Wear characterised by presence of surface cavities whose formation is attributed to process such as fatigue, local adhesion or cavitation.
- Ploughing – The formation of grooves by plastic deformation of the softer of two surfaces in relative motion
- Scratching – The mechanical removal and /or displacement of material from a surface by the action of abrasive particles or protuberances sliding across the surface.
- Spalling – the separation of microscopic particles from a surface in the form of flakes or chips.
- Tribochemical wear – The development of reaction products as a result of chemical reactions between the wear couple and the interfacial medium.

Etiology of tooth wear

The distinct definition for each class of tooth wear reinforces the traditional point of view that these processes occur independently and may occur in concomitance of other processes as well. Hence, it may be that combining the etiologies probably reflects the true clinical scenarios. Identification of the etiology is essential for the successful management of the pathology. Saliva can lessen the tooth wear processes via pellicle formation and remineralization; however, cannot prevent it.^[5]

ABRASION^[6,8]

Both patient and material related factors influences the prevalence of this condition. The brushing technique, brushing frequency, and the force applied while brushing are common patient-related factors. The type of bristle material of toothbrush, stiffness of toothbrush bristles, the abrasiveness, and pH of dentifrice used are factors related to material.

The most commonly cited effect of abrasion is the V-shaped defect, which usually is ascribed to the use of an intensive horizontal brushing technique. Cervical areas are susceptible to toothbrush abrasion, particularly cuspids and first premolars, where thin buccal plates, gingival recession, and exposed root surfaces predispose cervical notching. Habits involving other intraoral objects (e.g., pipe smoking, toothpick use, and thread biting) can cause defects on the incisal and occlusal surfaces. Dietary abrasion is not very prominent in modern days, as the typical western diet tends to be very soft, as opposed to primitive man's diet which was more abrasive, and thus contributed greatly to tooth wear.

ABFRACTION^[8-10]

These lesions are usually located subgingivally, where the influence of tooth brushing abrasion is unusual; and hence, are hypothesized to be the result of eccentrically applied occlusal stresses leading to tooth flexure, rather than to be the result of abrasion alone. Weakening of the hydroxyapatite present near the cervical region of the teeth is weakened due to tensile stresses, which produces the classical wedge-shaped defects having sharp edges near to the cemento-enamel junction.

Attrition^[12]

Attrition mainly results from contact between opposing teeth and well-defined wear facets are shown in the condition. The causal factors for attrition are parafunctional habits, bruxism, clenching, developmental defects, coarse diet, and natural teeth opposing porcelain. It is caused not only by diet or the habits, but a class III incisal relationship and lack of posterior support also lead to attrition. Attrition occurs almost entirely on occlusal and incisal surfaces, although it may also effect the buccal and palatal sides of the maxillary and mandibular anterior teeth in deep vertical overlap occlusal relationships.

Erosion^[13]

Dental erosion results when there is chronic and painless loss of dental hard tissue. The surfaces are usually etched off from the teeth surfaces due to the effect of acid and/or chelation with no involvement of bacteria. Evidence also suggests that that erosive wear also predisposes to attrition, and that the two mechanisms very often act together causing tooth surface loss. Erosion caused due to the industrial acids has shown to be associated with severe attrition of teeth and it has also been highlighted that severe attrition found in

young individuals is mainly due to dietary erosive factors.

There are intrinsic and extrinsic causes of dental erosion. Intrinsic causes are mostly of gastric reflux and include vomiting in case of anorexia, bulimia nervosa, and rumination. Extrinsic causes include dietary soft drinks, citrus fruit, and food pickled with vinegar. Medications, vitamin C, iron preparations, and aspirin are acidic in nature. Lifestyle where people use mood improving drugs, that is, ecstasy, may also cause greater risk of erosion.

Treatment recommendations**MANAGEMENT OF ACUTE CONDITIONS**^[14]

This usually involves adjustments of the incisal edge and sharp cusps of teeth and also, the application of a desensitizing agent or glass ionomer cements over those areas where dentine is exposed. Pulp extirpation may also be required and in cases of tooth wear which are severe, a dental extraction may be advised. In those cases where esthetics has been severely compromised, composite restorations and porcelain veneers may be provided to the patients. When underlying parafunctional tooth grinding habits exist, acute symptoms of temporomandibular joint pain may be present which will require instant consideration.

Prevention

The early management of patients with tooth wear should always be preventive, attempting to halt the disease process, and avoid any worsening. In patients who have habits of smoking and alcohol consumption, counseling should be done and their dietary habits should also be documented. A thorough dietary enquiry is often needed if it is alleged that an abnormal dietary or an eating disorder is present. A 3-day consecutive comprehensive diet diary is recommended for the patients who are affected by severe tooth wear and have abnormal dietary habits. It is often beneficial that such patients reduce the daily intake of fruits, fruit juices, carbonated drinks, or any other acidic substrates. It should also be recommended to such patients that they limit the consumption of erosive foods/beverages during their meals.^[15]

Once acid beverages have been taken, it is advised that hard cheese or dairy products are consumed as this is helpful in promoting the rehardening of enamel. Chewing gum containing carbamide may help in reduction of erosive agents as they cause a rapid rise in salivary pH. Habitual changes, that is, drinking of the acidic beverages using a straw and prevention of swishing beverages in the mouth, will reduce the rate of erosive tooth wear. Avoiding overzealous tooth brushing habits and the use of less abrasive toothpastes will also be beneficial.

Fluoride reduces the erosive characteristics of soft drinks, while topical applications serve protection against

tooth wear after their intake. A 0.05%, alcohol-free sodium fluoride mouth rinse can be used daily and helps to battle acidic damages and remineralizing toothpastes help to increase the hardness of the tooth surfaces which are exposed to acidic substances. Patients complaining of hypersensitivity from erosive lesions may benefit from the application of a highly concentrated fluoride varnish in the dental surgery, while daily use of a potassium-containing sensitive toothpaste may also bring relief.^[16]

When dentinal hypersensitivity is a worry for individuals, the application of 0.7% fluoride solution may be applied professionally, followed by the home application of 0.4% stannous fluoride by the patient. This regime has shown to be clinically beneficial. Those toothpastes which contain potassium are also considered to be suitable for dentinal sensitivity management.

Full coverage hard acrylic splints may be provided in patients when nocturnal bruxism is confirmed, that is, a Michigan splint or a Tanner appliance. However, precautions must be undertaken when providing stabilizing splints to such patients suffering from erosion, especially to the ones with gastric reflux, as there is a risk of accumulation of acidic substances within the splint which could further worsen the condition.^[17]

CONCLUSION

The wear of the teeth is a complex process. The real aetiology is largely unknown but a number of contributing factors can be listed. The management of tooth wear is a major challenge to the dental profession and is likely to continue as changing lifestyles highlight particular etiologic factors. It is important that these causes be identified and if possible eliminated before restorative therapy is initiated. Failure to eliminate the cause may comprise the long term survival of restorations and further deterioration of the dentition.

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