

Dental Erosion- A Monograph

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Review Article

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Abstract: Dental erosion is a condition prevalent worldwide. A number of risk factors have been postulated for its occurrence. Diet is the most common risk factor. The condition is increasing at an alarming rate in India and abroad. Effective measures need to be taken to prevent the condition.

Keyword: Dental erosion, diet, risk factor.

INTRODUCTION

Dental erosion according to Pindborg [1] is “superficial loss of dental hard tissue by a chemical process that does not involve bacteria.” It is a common condition in developed societies that affects people of all ages [2]. The prevalence of dental erosion is not well documented and rarely include measures of erosive tooth wear [3]. In addition, it is often difficult to compare the outcomes of different epidemiological studies on dental erosion due to the use of different examination standards, including scoring systems, samples and groups examined [2]. The hard dental tissues, including enamel, dentin, and cementum, are critical to the integrity of the dentition [4] and the loss of these tissues can have significant consequences for the patient.

Classification

Tooth erosion is classified under idiopathic, extrinsic or intrinsic, employing that, according to the case history; the acids producing tooth destruction may be of unknown, exogenous or endogenous origin [5].

Idiopathic erosion is the result of contact with acids of unknown origin where neither any tests nor the history taking are capable of providing an etiologic explanation.

It is apparent that many clinical case reports of enamel erosion in the literature reflecting idiopathic erosion are the result of a multi-factorial aetiology that has not been elucidated [5].

Causes for dental erosion

The extrinsic causes include acidic beverages, foods, medications and environmental acids. Most of the fruits and fruit juices, carbonated drinks and sports drinks have a low pH rendering them acidic in nature. Different studies have proved the direct relationship of erosion with higher consumption of acidic beverages [6, 7]. This finding is particularly important since children and adolescents are the primary consumers of these drinks making them prone to erosion [6, 7].

However, erosive potential of a beverage is not dependent on pH alone. Other factors like mineral content of the beverage, frequency, method of intake and proximity of tooth-brushing after intake also influence the susceptibility to erosion.

Acidic medications such as Vitamin C supplements may also lead to erosion via direct contact with teeth while chewing [8-10].

Besides these, as far as environmental conditions are concerned, certain occupations predispose an individual to an acidic environment. Eg: occupational wine tasters, people working in industrial electrolytic processes. Acidic vapours in the environment have significant erosive potential. Dental erosion has also been reported in swimmers who workout regularly in pools with excessive acidity [11, 12].

The intrinsic causes of erosion comprise of gastric acid regurgitation into the oesophagus and mouth in conditions such as gastro-oesophageal reflux disease and excessive vomiting related to eating disorders. Gastric acids with low pH reach the oral cavity and come in contact with teeth leading to erosive wear of teeth.

Dental erosion associated with GERD has also been reported in children [13, 14]. Besides these, chronic excessive vomiting is also one of the major intrinsic causes of erosion. Erosion associated with vomiting is primarily seen on the palatal surfaces of maxillary teeth as during the episodes of vomiting, the acidic gastric contents frequently come in contact with palatal surfaces of maxillary teeth. Chronic vomiting results from eating disorders such as anorexia and bulimia which is a common problem seen in teenagers especially girls [5].

Other than these factors, there are many biological modifying factors that influence erosion caused by acidic food and drinks. These include: saliva, tooth composition and structure, dental anatomy and occlusion, the anatomy of soft tissues in relation to the teeth and physiological soft tissue movements such as swallowing patterns [5].

Saliva is known to have many properties that can serve a protective function against dental erosion. It causes dilution and clearance of a potentially erosive agent from the mouth. It acts as a buffer and neutralizes the dietary acid. It helps in the formation of the acquired pellicle by the adsorption of salivary proteins and glycoproteins, which have the ability to protect the enamel surface from demineralization by dietary acids. It contains calcium, phosphate and fluoride which are necessary for re-mineralization of tooth.

There is a clear relationship between reduced salivary flow rate and the inability to clear dietary acids from the mouth. In addition, the bicarbonate level in saliva is positively correlated with salivary flow rate; therefore, saliva produced at a low flow rate has a lower pH and has a lower buffering capacity [15, 16] Mc Cay CM and Will L [17] have reported lowered salivary flow rate and buffer capacity in patients with erosion as compared to that of controls. In addition several medications of diseases also reduce the salivary flow rate.

Besides these, the composition of human teeth is known to be highly variable with respect to trace element concentrations. Various clinical studies have shown marked difference in the response of various human teeth to acid beverages that could be attributed to difference in tooth structure and composition [5]. The shape and contour of teeth and their prominence in the mouth relative to drinking and swallowing patterns have been identified as factors that may modify the erosion process [5].

Acid eroded enamel is considered more susceptible to attrition [3] and thus, dental occlusion is likely to play an important role in the manifestation of erosion induced tooth wear patterns. Conversely, tooth wear, primarily caused by para-functional habits such as

bruxism, will be greatly accelerated in the presence of an erosive challenge to the teeth.

Soft tissue may also play a more direct role in tooth wear. The anatomy of oral soft tissue in relation to the teeth and physiological soft tissue movements can also influence the tooth sites that frequently come in contact with and will thus influence the clearance pattern of acidic substances from the mouth. Jarvinen V *et al.* [18] observed that the most severe erosion was found on the palatal surface of teeth touched by the tongue with a lower pH.

Manifestation of dental erosion

Dental erosion manifests itself in various forms. Early stages of an erosive lesion results in matting appearance of enamel surface, most frequently on the labial and buccal surfaces. However, proximal and lingual surfaces may also be involved in acid regurgitation and bulimia. Clinically the loss of tooth substance is manifested by a shallow, broad, smooth, highly polished wedge shaped depression on enamel surface adjacent to the cemento-enamel junction. Some cases of erosion that progress to involve dentin provoke secondary dentin formation that might protect the tooth against pulp exposure. However, caries is an uncommon occurrence in patients with erosion because eroded teeth do not tend to retain plaque [5].

Erosive wear in children

Erosive tooth wear in children is a common condition. In children and adolescents (like in adults) chemical, biological and behavioural factors and their interplay are possible reasons for this condition [5]. Case reports have linked erosion with abusive or unusual behaviours [19]. Frequent and excessive consumption of specific dietary elements such as citrus fruits, lemon juice, orange juice, fruit squashes, cola-flavoured soft drinks and citrus flavoured drinks have all been implicated. Unusual eating, drinking and swallowing habits; for example holding an acid beverage in the mouth before swallowing, increase the contact time of an acidic substance with the teeth and thus increase the risk of erosion. It can be stated that dietary factors represent the most important external risk factor for children to develop dental erosion [20].

Management of dental erosion

Enamel is a tough layer surrounding the teeth. However, it lacks regenerative capacity and is unable to repair itself if it undergoes physical or chemical damage. Prevention of dental erosion is an essential component of managing the condition and protecting the dentition against further damage. When this substance loss begins at a young age, there is a greater chance of losing tooth substance continuously over a lifetime if no adequate preventive measures are performed [13, 14]. If the cause is not correctly identified and treated, the destructive process will continue. The patient is instructed to drink plenty of

water and avoid brushing of teeth immediately before or after consumption of food. Improving salivary flow and applying fluoride to the teeth are also important preventive measures [4]. Restorative therapy for erosion is other essential factor in the management of the condition. Restorations should be conservative, using adhesive materials that require minimal preparation of the teeth in order to be effectively adapted to the remaining tooth structure [21].

CONCLUSION

Dental erosion can affect all age group of individuals. However, it is more worrying when this condition is found in an alarming proportion among children. If this condition is not controlled and stabilized, the child may suffer from severe tooth surface loss, tooth sensitivity, over closure, poor aesthetics, or even dental abscesses in the affected teeth [22]. Dental health education needs to be provided to the children as well as adults and screening activities should be carried out as part of school oral health promotion programs.

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