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Dental erosion

Abstract

Dental erosion is described as an irreversible loss of dental hard tissue resulting from exposure to non-bacterial acids or chelating substances. It may be caused by exogenous or endogenous factors. In the former case, food, drink, as well as the environment might be sources of acids; in the latter, acids flowing into the oral cavity from the stomach and duodenum.

Exogenous dental erosive lesions are localized mainly on the labial surfaces of the anterior teeth of the maxilla, while the endogenous ones can be found on the palatal and masticatory surfaces of the maxilla and the masticatory and buccal surfaces of the mandible.

Reduced saliva secretion, which occurs in a number of diseases, also influences dental erosion, while erosion-causing factors and aggressive tooth brushing immediately after consuming acidic food increases the range and depth of erosion cavities.

The consequence of dental erosion is teeth hypersensitivity, which results from exposure of dental tubules and of the pulp leading to the loss of tooth vitality and decrease in occlusal height.

Treatment of exogenous dental erosion consists in changing nutritional and hygienic habits. In the case of endogenous erosion, however, the therapy should address mainly an underlying disease. Worn teeth surfaces should be restored with conservatory or/and prosthetic methods.

In the context of an increasing prevalence of dental erosion in the population, it is necessary to develop and implement prophylactic measures, including broadly understood health education on the risk factors, preventive activities, and possibilities of diagnosis and therapy.

Keywords: tooth erosion, etiology, diagnosis, prevention.

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INTRODUCTION

Dental erosion (*erosio dentinum*) is a chronic, localized loss of tooth hard tissues resulting from their dissolution by non-bacterial acids or from the action of chelating substances on teeth surfaces. Two types of erosion can be distinguished: erosion caused by extrinsic factors, where the acids that cause erosive lesions come from food, drink, drugs or the surrounding environment, and erosion caused by intrinsic factors, where the factor that dissolves dental tissues is hydrochloric acid from the stomach and duodenum [1-7].

The clinically found lesions are smooth-surfaced, scoop-like or cup-like losses of dental tissues. A narrow stripe of undamaged enamel is often found at the edge of the gum, which can be explained by the remineralising action of gingival cervical fluid. In the case of the action of acids on incisors, the thinning of biting edges may be observed. With time, deeper dental tissue layers are affected, which leads to the exposure of the dentine, and consequently of the pulp. The exposure of dentine tubules is a cause of dental hypersensitivity, and the exposure of the pulp, as a result of a considerable loss of the dentine covering the pulp chamber, leads to its inflammation and vitality loss, and consequently,

makes endodontic treatment necessary. The loss of dental tissues on the masticatory surfaces of the lateral teeth leads to occlusal height decrease. Occlusal abnormalities, face and neck muscle pains, as well as temporomandibular joint disorders may also occur [1-4,6-10].

The localization of erosive cavities depends on the source of the acids (endo- and exogenous acids), and the depth of cavities, as well as the dynamics of erosive changes – on the presence of risk factors and the frequency of exposure. Exogenous erosive lesions are localized mainly on the labial surfaces of the anterior maxillary teeth, while the endogenous ones – on the palatal and masticatory surfaces of the maxilla and the masticatory and buccal surfaces of the mandible [1,2,7,8,11].

To evaluate the progress of dental erosion various indices are used, including: Dahl index, Eccles and Jenkins index, Smith and Knight TWI (Tooth Wear Index), Lussi index, BEWE (Basic Erosive Wear Examination), and Mannerberg index [1,2,6,12-14].

Among the exogenous causes of dental erosion, diet is the most important. Consumption of low pH (lower than 5.5) products dissolves enamel hydroxyapatites, whose clinical pH is 5.5, while products with pH lower than 4.5 contribute

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to fluoroapatite dissolution. Fruit juices, sweet carbonated and non-carbonated drinks, wine, acidic fruit (among others, apples, grapes, citrus, plums) and fruit teas may be highly erosive. Phosphoric acid is the most frequently ingested acid, present in groceries, and especially in fresh fruit. Ascorbic acid (vitamin C) is also generally consumed as an ingredient of drinks, candies and drugs that dissolve in the oral cavity. Those acids cause enamel erosion. Adding phosphates and calcium compounds to drinks reduces the development of erosive changes to a certain degree and favours remineralisation of teeth surfaces [1-10,15-19].

In recent years, an increasing number of people have been leading an active and healthy lifestyle, which is related to drinking isotonic drinks and greater consumption of vegetables and fruit.

On the other hand, people who swim regularly are exposed to chlorine contained in swimming pool water, and consequently to erosive lesions on the labial surfaces of the incisors [2,3,12,17,20]. Also among vegetarians, whose diet is based on vegetables and fruit, dental erosion was more often found than in people having varied foods [1]. Exogenous dental erosion may be caused by some drugs, including effervescent tablets containing vitamin C and iron preparations administered as liquids or chews [2,8], as well as factors related to professional activity present in the work environment – at plants producing fertilizers, dynamites, or batteries, and also in professional wine tasters and chemical laboratory workers [4,8]. Endogenous dental erosion is an effect of intrinsic acids – hydrochloric acid from the stomach and duodenum. The acid enters the oral cavity during emesis and reflux. Alcohol disease, eating disorders, such as bulimia and anorexia, pregnancy, gastric and duodenal ulcer, as well as gastric and duodenal reflux are listed among the causes [2,4,6-8,11]. Numerous publications show a strong connection between reflux and dental erosion. The disease occurs both in children and in adults. Sometimes oral cavity disorders are the symptoms of the reflux disease. Endogenous erosive lesions are called perimolysis [2,4,6-8,11,21].

Saliva plays numerous important functions in the oral cavity, including protection of teeth from bacterial and non-bacterial acids that contribute to dental erosion. The buccal surfaces of maxillary teeth are protected by saliva produced by the parotid gland, while buccal surfaces of mandibular teeth are washed by saliva from the submandibular and sublingual glands. Reduced saliva secretion is an important risk factor in the development of enamel erosion. Smaller amount of saliva is secreted in Sjögren syndrome, some mental diseases, salivary glands diseases, rheumatoid arthritis, Leśniowski-Crohn disease, systemic lupus erythematosus, cirrhosis, diabetes, during chemotherapy, in arteriosclerotic vascular disease and during medication with drugs reducing saliva secretion (antihistamine, psychotropic drugs, atropine). Reduced saliva secretion occurs at night, thus consuming products with high erosive potential before sleep increases susceptibility of tissues to erosion [2-4,7].

It is known that the effect of acids combined with mechanical action on the enamel causes an increased loss of dental hard tissues, e.g. when teeth are brushed with a hard toothbrush directly after ingestion of highly erosive products [2,7,8,16,17].

Treatment of dental erosion consists mainly in the elimination of risk factors. In the case of endogenous erosion, the underlying disease should be treated first. To minimize the development of exogenous erosive lesions, the patient's nutritional habits should be analyzed and the amount of acidic foods and drinks should be reduced. Drinks should be taken quickly and preferably through a straw. Teeth should not be brushed immediately after meals, especially after those with high erosive potential, but about 30-60 minutes after eating or drinking. Teeth should not be brushed with a hard toothbrush nor using excessive pressure. Lost dental tissues should be replaced with traditional fillings, and in the case of extensive crown erosion, the use of prosthetic crowns should be considered. The professional fluoride prophylaxis should also be conducted.

Summing up, dental erosion is an increasingly frequent pathology of dental hard tissues related to civilization changes. An adequately early diagnosis and elimination of the risk factors is of great significance for maintaining the dentition in a good condition. A decrease in the age of patients with dental erosion is becoming an increasingly important problem, as children and youth are a group particularly exposed to dental erosion due to, among others, unlimited access to drink with a high erosive potential [13,15,19]. It is necessary to develop and implement prophylactic measures, including broadly understood health education on the risk factors, preventive activities, possibilities of diagnosis and therapy, as well as to popularise correct health-promoting behaviour.

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