

THE CHARACTERISTICS OF DENTAL ABRASION

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Keywords: tooth wear, erosion

Abstract: This report was generated because of a great interest on erosive tooth without regarding the erosive processes, so we considered this as a relevant topic. Saliva cannot prevent the erosive tooth wear, it can only modulate through formation of pellicle and by remineralisation, so we have to identify the tooth wear, in early time. Abrasion, attrition and erosion are processes that lead to tooth wear. The search of this topic was carried out on PubMed, Google, Dentistry Journal, Med Princ Pract and Web of Science. A detailed analysis of the history and causative factors must be made to identify the origin of the damaged enamel. In conclusion, the studies found reveal that erosive tooth wear is a common condition. Both primary and permanent teeth can be involved. By exposure to extrinsic or intrinsic acid the erosion can start when the first dental surface reaches the oral cavity.

INTRODUCTION

Erosive tooth wear is a chemical-mechanical process that is not induced by bacteria which in time causes the loss of hard dental tissue. In erosive tooth wear, the loss of morphology surface and shape of the teeth is specific.

Restorative management should only be used together with prophylactic planning. Restorative management aims to restore both esthetics and functions and also to reduce dentine hypersensitivity and symptoms of pain.

This report is based on all scientific literature that we found. The search was carried out on PubMed, Google, Dentistry Journal, Med Princ Pract and Web of Science.

The odontogenesis mechanism does not provide a repair mechanism for damaged enamel after post-eruption, because the amelogenesis of the enamel is already formed before dental eruption by the demise of the ameloblasts.

An inevitable result is the tooth wear due to their evolutionary shape for trituration, mastication and ingestion.(1)

Tooth wear is primarily a combination of factors such as eating and diet habits, xerostomia, bruxism, anorexia, bulimia, gastro-esophageal reflux disease, brushing habits, as well as dietary supplements and medications. The nutritional factors make refer to the composition of beverages and foods, with high buffer capacity and low pH, and concentration of calcium. The occupational factors refer to exposure of workers to acidic vapours or liquids. A need for a classification appeared and a standardization of these dental deterioration multiple factors has been proposed.(2) The analysis of the dental surface texture can provide a lot of information and evidence of the etiological factors that are involved in erosion and attrition.(3)

Preventive management of erosive tooth wear intends to reduce or stop the progression of the lesions.(4)

Abrasion, attrition and erosion are all processes that lead to tooth wear. These processes rarely act alone. The major factor in occlusal and cervical wear is the erosive damage caused by abrasion. Saliva cannot prevent the erosive tooth wear, it can only be modulated through formation of pellicle and by remineralisation.(5)

The wear facets upon the enamel by daily tooth to

tooth contact are caused by dental attrition. Ferdinand Graf von Spee was the first one who described a curvature in the mandible teeth from the anterior to posterior in ideal dentitions made by the occlusal wear pattern.(6,7) In the maxillomandibular occlusal plane we can see an upward U form shaped curvature that is the curve of Wilson, this can be seen in the coronal plane. Temporalis muscles and the masseter exert the main masticatory forces which insure all the forces that are favourable for loading on the teeth and are directly proportional with the attritional wear planes. So, the Monson curve of occlusion is created by the attritional tooth wear and it is considered a physiological phenomenon.

Abrasion is caused by foreign body and food contact with the teeth that may wipe the attrition wear patterns. This is considered a normal wear pattern and has to be distinguished from abrasive wear that is pathological and is caused by oral musical instrument usage, bruxism, jaw clenching, for gripping objects with the teeth and bottle cap opening.

Dental erosion is caused by acidic agents that leach dental tissues or carious pathological lesions. The erosion made by acid and based leaching and also the dismissal of the hydroxyapatite crystals from the enamel may overlap previous lesions of enamel.

In conclusion, identifying the initial origin of the deteriorated enamel, a critical analysis of the study of the history of damaged enamel and the causes needs to be done. The rates are different for each category of teeth wear. Thus, the incisors have 97% wear which is the highest, followed by the molars which have 85%, then the canines 74%, the least worn suffer the premolars 60–68%.(8) The common place of erosive tooth wear can be found on the incision and occlusal surfaces of mandibular and maxillary teeth and also on palatal surfaces of the maxillary anterior teeth.

Enamel is thick in the molar tooth crown found in modern humans, but the fractures appear to start in the enamel.(9) Food makes critical contacts with the enamel surfaces of the crown in the mouth. The tissue volume is occupied by 40–70 nm in cross-sectional dimensions of elongate crystals of hydroxyapatite. Long multi-crystalline cylinders are

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Article received on 27.11.2018 and accepted for publication on 21.03.2019
ACTA MEDICA TRANSILVANICA March 2019;24(1):96-98

crystals that are clumped together and are called prisms. The paths of prisms are from the proximity of the junction with the supporting dentine near to the enamel surface. A chipping can occur if the crack runs from the outside tooth surface towards the inside, by decussation of the enamel prisms the crack is being deviated back in to the surface.(10,11) Straight into the surface we can find inside-to-outside (radial) cracks that are very common in modern human teeth.(12) Soft foods in contact with the tooth crown can smother the crown and the result is the abfractions in the margin cracks. The dentine and pulp complex when forces are sufficiently strong, generate an internal hoop stress and the margin cracks grow.(13) Pre-existing faults in the enamel that are called "tufts" can initiate margin and radial cracks. In the unerupted teeth we find in-built flaws that are passing 1/3 of the way into the enamel like wavy strands.(14) When forces increase, a "forest" of pre-cracks made by an enormous numbers of tufts are in competition against each other to extend. Damage tolerance and not producing large cracks are provided by the competition in which neighbouring tufts act as a shield extending through the enamel.(15,16)

A result of fatigue tolerance and crack healing made by tufts are the microscopic amount of fractures that lead to teeth wear that are more common than the large-scale fractures.

A source of protection can be physiological. Abrasive mouthfuls can be quickly detected and discarded at correspondingly tiny loads minute, and hard particles can be detected between teeth this is evidenced in humans, from the two isolated particle presentation tests (17,18) and chewing experiments.(19,20,21,22) The wear particles have to be sharp to become capable of abrasion because of the line of defence of the enamel.(23,24)

This report was generated because of a great interest in erosive tooth without regarding the erosive processes, so we considered this a relevant topic.

CONCLUSIONS

The mechanical action of tooth tissues has been approached by scientists from a multitude of perspectives. Some of them have disposition to focus more on tooth function and on all the reasons that disturb this, for example the tooth wear. On the other hand, other scientists have been more focused on the mineralized tissues as a whole and how it managed to survive so far without destroying himself. Even if there is a damage control where two approaches have to coincide, often they do not coincide.

Erosive tooth wear is a clinical condition that needs to have an increased attention of the dental offices and the cooperation with other medical specialties is needed.

Prevalence data show that erosive tooth wear is a common condition. Both primary and permanent teeth can be involved. By exposure to extrinsic or intrinsic acid the erosion can start when the first dental surface reaches the oral cavity.

From tooth wear a lot of information can be gleaned and this is a subject of many interpretations of their etiology after a lifetime of dental usage. A lot of history is showed when teeth tell tales about lived lives and diets for a long period after death.

A detailed analysis of the history and causative factors must be done to identify the origin of the damaged enamel. Evaluating all etiological factors and screening for early signs of erosive tooth wear can be an efficient management of erosive tooth wear.

There is still a lot to learn and little has yet been done on tooth crown fractures and root fractures.

Data on the nature of dietary components in early human dentitions can be provided with the differentiation

between attrition and abrasion.

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