



AN OVERVIEW OF DENTAL ABRASION CLINICAL FEATURES AND MANAGEMENT: A LITERATURE REVIEW

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ABSTRACT.

Background: Dental abrasion (DA) is an erosive process that occurs to teeth resulting in a surface loss. Mechanical wear is the main process by which the hard tissue of the dental unit erodes. Dental abrasion (DA) has the potential to be asymptomatic making patients unaware of its presence and only identified incidentally during a dental examination. However, it can also present with worrisome symptoms such as tooth hypersensitivity, function impairment, and negative cosmetic effects. **Objectives:** Dental abrasion (DA) is a commonly acquired dental condition that necessitates medical intervention. Therefore, in this paper, we will review the available literature discussing the classification, clinical features, and management of DA. **Methodology:** We conducted the literature search within the PubMed database using the keywords: "Tooth surface loss", "Tooth wear", "Non-carious cervical lesions", and "Dental abrasion" between 1990 and 2020. **Review:** There is a consensus among the dental community that DA is multi-factorial. In general, DA can be classified under four main categories, namely: attrition, abrasion, abfraction, and erosion. For a DA treatment to succeed, the etiological background that first resulted in DA needs to be unveiled. This can be achieved by gathering in-depth medical, dental, and dietary history. **Conclusion:** In conclusion, DA is an important clinical condition that clinicians encounter regularly. Thus, a systematic and thorough approach is essential in dealing with such a multi-factorial condition.

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Introduction

Dental Abrasion (DA) is an erosive process that occurs to teeth resulting in the surface loss. Mechanical wear is the main process by which the hard tissue of the dental unit erodes. For example, tooth-to-tooth contact is a major cause of DA. Among the commonly affected regions, premolars, canines, and the cervical margins get affected the most. The process of DA is irreversible and the lost material is never regenerated by the body [1, 2].

Regarding the etiology of DA, it could be a result of normal (i.e. physiological) or abnormal (i.e. pathological) processes. For instance, physiological DA happens as a result of the mastication process [3]. Additionally, tooth-to-tooth contact between adjacent teeth can also result in physiological DA [3].

On the other hand, pathological DA is defined as teeth hard tissue loss which is above the healthy margin (i.e. physiological DA). It results in a condition that requires medical intervention [3, 4]. Although pathological DA is observed in children and adults, its prevalence is directly proportional to age [4]. A study found that the prevalence of pathological DA increased almost 5 folds between the age of 20 years to 17% to the age of 70 years [4]. With the aging population now emerging in many parts of the world, the prevalence of pathological DA is only expected to grow [5].

Dental Abrasion (DA) has the potential to be asymptomatic making patients unaware of its presence and only identified incidentally during a dental examination. However, it can also present with worrisome symptoms such as tooth hypersensitivity, function impairment, and negative cosmetic effects [5].

Clinically, DA can be classified according to tooth wear in the cervical region. The Tooth Wear Index is a DA classification tool that was developed to help clinicians accurately and consistently stage the DA. Table 1 shows the different stages used to classify DA [6].

The diagnosis of DA can be challenging; however, the presence of specific features can help clinicians to accurately diagnose DA. Among the commonly encountered clinical features, are (1) Malposed involved tooth, (2) Faulty restoration, (3) Sub-gingival cervical lesion, and (4) history of bruxism (6).

Dental Abrasion (DA) is a commonly acquired dental condition that necessitates medical intervention. Therefore, in this paper, we will review the available literature discussing the classification, clinical features, and management of DA.

Methodology:

We conducted the literature search within the PubMed database using the keywords: “Tooth surface loss”, “Tooth wear”, “Non-carious cervical lesions”, and “Dental abrasion” between 1990 and 2020. We also used the Google Scholar database for additional literature search. After reading the abstracts, we manually selected the relevant papers for this review. In regards to the inclusion criteria, the articles were selected based on the inclusion of one of the following topics: tooth surface loss, tooth wear, and dental abrasion. Exclusion criteria were all other articles that did not have one of these topics as their primary endpoint.

Results:

There is a consensus among the dental community that DA is multi-factorial [7]. In general, DA can be classified under four main categories, namely: (1) attrition, (2) abrasion, (3) abfraction, and (4) erosion.

The process of direct tooth-to-tooth contact is defined as attrition [8]. Attrition usually results in a clearly-defined erosion pattern on the surface of one tooth in one jaw which mirrors the pattern appearing on the corresponding tooth in the other jaw. Multiple events can contribute to the occurrence of attrition such as coarse porcelain coating [9].

Repeated, external shearing mechanical forces on the surface of the tooth can result in a type of DA called abrasion [10]. Abrasion can result from mechanical stress induced by the use of an abrasive substance such as toothpaste, hard bristles, or coarse teeth-brushing.

Dental Abrasion (DA) induced by dental erosion is a condition where there is a dissolution of dental hard tissue acids [10, 11]. It is reported that almost one-third of adults between the ages of 18 and 55 have signs indicative of DA induced by dental erosion. Out-of-balance pH levels in the saliva can also greatly contribute to the occurrence of DA. An increase in the salivatory pH can precipitate de-mineralization which in turn compromises the tooth structure [11].

Discussion:

The decision to treat DA highly depends on the situation, tooth structure compromise, and patients' preference. There are multiple situations in which DA repair is indicated. For example increased sensitivity in the teeth that might be bothersome to the patient, the presence of tooth carious lesions, aesthetical reasons, halting the progression of the lesion, reduction on the potential onset of cavities, and increased risk of pulpal exposure.

For a DA treatment to succeed, the etiological background that first resulted in DA needs to be unveiled. This can be achieved by gathering in-depth medical, dental, and dietary history [12]. As previously stated, DA is multi-factorial and thus, all aspects of the disease should be investigated. The management process can only start once a definitive diagnosis has been established.

The degree and severity of DA dictate the treatment difficulty. Dental Abrasion (DA) tends to co-exist with other dental conditions such as dental decay. Studies have shown a decrease in the effect of dental abrasion with dental erosion if a fluoride-based varnish is applied to the damaged teeth [12]. Preventing disease progression is essential for successful treatment.

Cause removal is vital for successful DA treatment. If DA is a result of damaging habitual behaviors, such as seed consumption, the cessation, and alteration of practice is essential in preventing tooth loss [13, 14]. Besides, appropriate teeth-bruising techniques are vital and patients should be educated on how to correctly clean their teeth [14]. Further, DA is the result of a badly fitted denture, the cause should be corrected by replacing or recrafting the denture [12].

Chemical insult is a major contributor to DA. The correct choice of toothpaste is critical as toothpaste with coarse components can lead to DA [13, 14]. Additionally, toothpaste with high fluoride content can help to slow down DA [13].

Finally, tooth restoration using restoration materials can be used to treat already established DA [15, 16]. Ideally, a restoration material must possess certain qualities that make it helpful in restoring DA. For example, it should have good wear resistance, reduced modulus of elasticity, and good aesthetics. Restoration materials such as glass ionomer, amalgam, and resin composite are examples of restoration materials available for applications in DA [15].

Conclusion:

In conclusion, DA is an important clinical condition that clinicians encounter regularly. Thus, a systematic and thorough approach is essential in dealing with such multi-factorial conditions. The rule of prevention and education is vital in the process of protecting patients from the adverse effects of DA.

Table 1. The Tooth Wear Index.

Stage	Features
0	No Change in Contour
1	Minimal Loss of Contour
2	Defect <1 Millimeter Deep
3	Defect 1 Millimeter to 2 Millimeter Deep
4	Defect >2 Millimeter Deep, Pulp Exposure, or Exposure of Secondary Dentin

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