

Dental Management of 2 Different Tooth Wear Cases

SUMMARY

Tooth wear is considered to be pathologic when the loss of tooth surface is excessive to the extent that it affects the appearance or function of the dentition or causes discomfort. Tooth wear has been subdivided into 3 categories: attrition, abrasion and erosion, usually based on etiologic factors and clinical manifestations. In this article, 2 patients (30 and 56 year old men), who complained about aesthetics and sensitivity related to tooth surface loss and were treated with metal-ceramic crowns, are reported.

Keywords: Erosion; Attrition; Abrasion; Tooth Wear; Occlusion.

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CASE REPORT (CR)

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Introduction

Tooth surface loss (TSL) or tooth wear is usually found in every dentition and may have physiologic and pathologic causes. The wear of teeth is irreversible and cumulative with age. Tooth wear is considered excessive or pathologic when compared with the amount of wear typical for the patient's age and when an intervention is necessary for cosmetic or functional purposes^{1,2}.

TSL can arise as a result of attrition, abrasion and erosion, based on etiologic factors and clinical appearances. *Attrition* is a gradual loss of the dental hard tissues as a result of functional or parafunctional activity of the teeth; *abrasion* is a pathologic tooth wear caused by the frictional action of a foreign body on the teeth, such as that caused by tooth brushing; *erosion* is the loss of hard tooth substance due to a chemical process not involving bacteria¹⁻³. In many cases a combination of etiologic factors complicates the diagnosis and modifies the clinical appearance or pattern of tooth wear¹.

The rate of wear may be greater by the factors such as: age, gender, occlusal condition, parafunction, gastrointestinal disturbances, excessive intake of acidic fruits or beverages with a low pH, environmental and salivary factors, and congenital anomalies such as amelogenesis imperfecta and dentinogenesis imperfecta².

Although a classical clinical appearance has been described for attrition, abrasion and erosion, it is unlikely that the appearances described are a result of a single

factor. Certain clinical features can indicate a dominant etiological factor³.

Attrition produces wear facets on the occluding surfaces of teeth, including the incisal edges. This commonly begins soon after eruption or may start later in life. Eventually the cusps become flattened, the incisal edges are shortened, and dentin is exposed⁴. Following dentine exposure, the clinical appearance is determined by the relative contributions of the etiologic factors. If the TSL is primarily attritional, then the dentine will wear at the same rate as the surrounding enamel. In this situation the shape of the facet will be determined by the movement of the opposing tooth⁵.

Abrasion has been assumed to be associated with over-zealous tooth-brushing, especially along the cervical margins of the canines and premolars⁴. Cervical lesions caused by an abrasive force tend to be angular and V-shaped⁵.

Erosions typically present as bilateral concave defects without the chalkiness or roughness normally associated with bacterial acid decalcification. In its early stages, erosion affects enamel, resulting in a shallow, smooth, glazed surface that usually lacks developmental ridges and stain lines¹.

TSL may cause an increase in tooth translucency both interproximally and at the incisal edges. Continued TSL may produce fractures of the enamel and shortening of the teeth. The loss of enamel may also increase the

visibility of the underlying dentine, producing a more yellow tooth colour³.

As the person becomes older and the wear continues, there is gradual reduction in cusp height and consequent flattening of the occlusal inclined planes. This gradual loss of enamel and dentin does not usually result in tooth sensitivity because of secondary dentin formation. In severe cases the length of the crowns is markedly shortened which may lead to a reduction in the vertical dimension of occlusion (VDO)⁶. Owing to compensatory eruption of teeth, the extent of occlusal surface loss is not always reflected by a similar decrease in the VDO or increase in inter-occlusal distance¹. Inter-occlusal distance may be measured by the distance between 2 points; one marked on the patient's nose and another on the chin. It is made in centric occlusion to find the VDO and in centric relation; the mandible in rest position to find the vertical dimension of rest (VDR)^{2,7}. For the patient with a loss of VDO, an occlusal splint and/or prosthodontic rehabilitation is necessary to prevent the posterior teeth interferences in lateral and protrusive movements; reduces eccentric loading on the temporomandibular joint (TMJ)^{2,7-10}.

This clinical report describes the treatment plan of 2 patients (30 and 56 year old men) who complained about aesthetic and sensitivity because of erosion and abrasion related TSL.

Case Reports

2 patients (30 and 56 year old men) were referred to the Prosthetic Dentistry Department of Marmara University Faculty of Dentistry for the treatment of severe tooth wear.

Case 1

A 30-year-old man was referred for treatment of poor aesthetics and considerable sensitivity of his teeth. Intraoral examination revealed metal-ceramic crowns at the maxillary anterior region (Fig. 1) and eroded occlusal tooth surfaces of the cusp tips of the maxillary posterior teeth (Fig. 2). There were no eroded areas at the mandibular teeth. These lesions are thought to be the result of the tongue directing gastric contents forward during voluntary and prepared vomiting with the lateral spread of the tongue protecting the lower teeth. He was vomiting consciously in order to lose weight. It was examined that there was no decrease in the VDO, because the anterior metal-ceramic restorations were not affected by the acid exposure during vomiting.

For the treatment of the patient, it was decided to restore all of the maxillary teeth with metal-ceramic fixed dentures in the same VDO. To obtain the same VDO, wax bite records were taken from the side of prepared teeth

when the other side were not prepared. All maxillary teeth were prepared in chamfer type margin and impression was taken by using silicone material (Speedex; Coltène/Whaldent Inc, Cuyahoga Falls, Ohio). The casts were formed and mounted in a semi-adjustable articulator (Artex; Girschbach Dental GmbH, Pforzheim, Germany) with the dies of prepared maxillary teeth trimmed. All teeth were restored with metal-ceramic crowns (VMK-95 Metall Keramik; Vita Zahnfabrik, Bad Säckingen, Germany - Fig. 3) that also provided canine protected occlusion and were luted with glass ionomer cement (Ketac Cem μ ; 3M Company, Seefeld, Germany). At the sixth month recall the patient own appreciation of the prosthetic therapy was high.



Figure 1. Case 1 - Anterior aspect

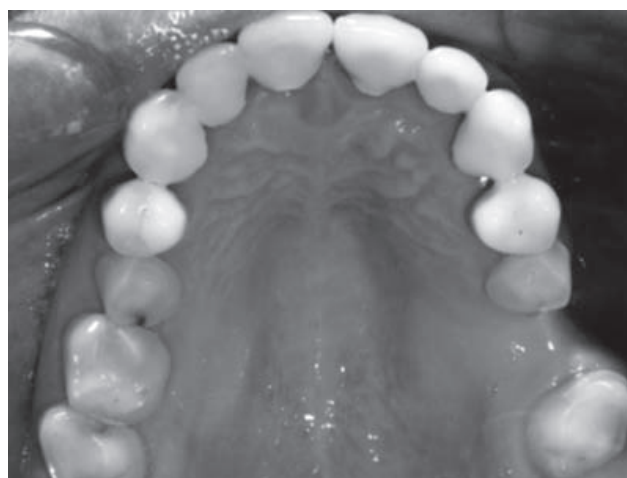


Figure 2. Case 1 - Eroded maxillary posterior teeth



Figure 3. Case 1 - Definitive restorations

was instructed to wear the provisional crowns for a period of 2 weeks, to determine whether any functional problems existed.



Figure 4. Case 2 - Anterior aspect

Case 2

A 56-year-old man complained about the poor appearance of his teeth which had worn away. Intraoral examination of this patient revealed severe TSL on the occlusal and incisal surfaces of maxillary and mandibular teeth due to aging (Figs. 4 and 5).

The patient's dental treatment was extensive and required interdisciplinary care. The VDO and VDR of the patient were measured and the difference between 2 measurements were 4 mm. Diagnostic casts were made and mounted in centric relation by the records of face-bow (Artex Rotofix-Facebow; Girrbach Dental GmbH, Pforzheim, Germany) in a semi-adjustable articulator. To increase the VDO, an occlusal splint for maxillary arch was made using auto-polymerizing acrylic resin (Fortex; International Dental Surgical and Industrial Polymer Suppliers, Durham, England). The splint was made 4 mm thick to increase VDO as VDR with canine protected occlusion (Fig. 6). The patient was instructed to wear the splint except when eating. The vertical dimension of the splint was reduced once a week for a 3-week period. After this period of time, when the patient reported no discomfort, the prosthodontic treatment was started. The splint was separated at the midline and was used in the reduction of right maxillary and mandibular teeth for fixed crowns (Fig. 7). By referencing the left part of the splint, provisional acrylic resin (Dentalon plus; Heraeus Kulzer GmbH & Co. KG, Hanau, Germany) crowns were prepared for the right maxillary and mandibular prepared teeth. By referencing of the provisional crowns on the right side, the tooth reduction and provisional crowns were prepared for the maxillary and mandibular left quadrants. All of the provisional crowns were luted with eugenol-free zinc oxide cement (Prevision Cem; Heraeus Kulzer GmbH & Co. KG, Hanau, Germany). The patient



Figure 5. Case 2 - Abraded maxillary occlusal and incisal surfaces



Figure 6. Case 2 - Maxillary occlusal splint in situ



Figure 7. Case 2 - Separated splint in situ

All maxillary and mandibular teeth were prepared in shoulder type margin and impressions were taken by using silicone material (Speedex; Coltène/Whaldent Inc, Cuyahoga Falls, Ohio). The casts were formed and mounted in a semi-adjustable articulator with the dies of prepared teeth trimmed. The casts were mounted in the articulator by the reference of wax bite records which were taken when the one side provisional crowns *in situ*, so that the other side of wax record was obtained. By this method, the VDO with provisional crowns was copied to provide the same VDO for definitive restorations. All teeth were restored with metal-ceramic crowns (VMK-95 Metall Keramik; Vita Zahnfabrik, Bad Säckingen, Germany) that provided canine protected occlusion (Fig. 8). All of the metal-ceramic crowns were luted with glass ionomer cement (Ketac Cem μ ; 3M Company, Seefeld, Germany). At first year recall, the patient reported no problem.



Figure 8. Case 2 - Definitive restorations

Discussion

The reconstruction of a severely worn dentition is a very complex and difficult problem, representing a real challenge to the dentist². This manuscript represents 2 case reports which have different clinical appearance of TSL and their prosthodontic rehabilitations. Case 1 differentiates from the second one according to their aetiology. In Case 1, severe erosion lesions were seen because of patients' vomiting. However, in Case 2, attrition was seen due to the old age of the patient.

A careful clinical examination and a thorough case history (dental, medical, diet and eating habits, occupation, bruxism, or any other oral habits) are important for diagnosis and treatment planning¹. When teeth become worn, a serious problem is created; especially if there is no vertical space for restorations and the patient has reduced facial height, an alteration in the VDO is necessary². In Case 2, an increase in VDO was needed. However, in Case 1, there was no decrease in the VDO because the anterior metal-ceramic restorations prevented tooth wear and erosion of anterior teeth by acid exposure during vomiting. Sato² has applied a maxillary occlusal splint to increase VDO to a patient that had tooth wear. The patient was instructed to use the splint for 4 months. Also, in the same case, provisional crowns have been used for 6 months². In Case 2, the patient was instructed to use the splint for a month and the provisional crowns for 2 weeks. Although the periods of the patient's occlusal splint and provisional crowns usage were shorter than in the Sato's case², the patient reported no problem.

In these case reports, a satisfactory clinical result was obtained by constructing the correct VDO, with an improvement in aesthetics and function.

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