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Case Report

Management of Dental Erosion with Dahl Technique

Jawaher Shhada*and Nabil Alhouri

[1]*Department of Fixed Prosthodontics, Faculty of Dental Medicine, Damascus University, Damascus, Syrias*

***Corresponding Author**: Jawaher Shhada, Department of Fixed Prosthodontics, Faculty of Dental Medicine, Damascus University, Damascus, Syria.

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Abstract

Aims: This report aims at presenting the diagnosis and management of patient with localized tooth wear in anterior teeth using Dahl technique.

Clinical Synopsis: The anterior worn teeth were restored utilizing direct resin to obtain space adequate for restorations through increasing the occlusal vertical dimension (OVD). After three months, the space was created. Then, the anterior teeth were restored with full ceramic as final restorations.

Conclusion: Within the limitation of this report, Dahl technique is a safe and successful method to manage the worn teeth. There is a need for further research.

Keywords: *Tooth Wear; Erosion; Occlusal Vertical Dimension*

Introduction

Tooth wear or tooth surface loss (TSL) is the loss of a tooth structure caused by actions other than tooth decay or dental trauma; it can be considered a normal physiological process which occurs during lifetime [1]. Nonetheless when tooth wear is utterly rapid or it causes concern to the patient, it is considered a pathological case [2].

The adult dental health survey (ADHS) reported prevalence of tooth wear in 2009 where 77% of dentate adults showed some tooth wear in their anterior teeth, 15% showed moderate wear, and 2% showed severe wear [3].

Tooth wear is classified into four groups: (a) attrition, which is the wear of dental hard tissues or restorations through tooth-to-tooth contact during mastication or parafunction, (b) abrasion which is the loss of tooth surface caused by factors other than tooth contact, (c) erosion, which is the loss of hard dental tissue by chemical processes not involving bacterial action, (d) abfraction, which is a microstructural loss in the cervical area caused by occlusal stresses [4].

There are several treatment modalities available to create an inter-occlusal space: (a) restoration of the posterior teeth at an increased OVD, (b) reduction of teeth in the same or opposing arch, (c) occlusal reorganization, (d) elective root treatment and placement of post crowns, (e) surgical crown lengthening, (f) orthodontics, (g) Dahl appliances [5].

In 1975, Dahl described a simple removable cobalt-chrome appliance acting as an anterior bite platform covering the palatal surfaces of the maxillary anterior teeth to create the interocclusal space without affecting the clinical crown height to restore worn maxillary anterior teeth [1]. In 1982, Dahl and Krogstad demonstrated that the possible mechanism for the creation of inter-occlusal space involves both intrusion (40%) of the anterior teeth in contact with the appliance and the eruption (60%) of the posterior teeth free of contact, which usually occurred over a period of approximately 4 to 6 months [6]. The main reason for the failure of space creation is poor patient compliance associated with removable appliances that led to cementation of the appliances to ensure full time wear [7].

There are many materials that can be used with Dahl technique: a removable or cemented cast metal appliance, resin composite, provisional crowns [5,8] and direct composite which can be applied in several techniques such as free hand technique and matrix technique; the selected technique depends on the individual preference [12].

Case Presentation

Case history: A 22-year-old female patient was presented with the esthetic and functional inadequacy of maxillary anterior teeth; she wanted to improve the appearance of them.

A detailed medical, dental and social history was obtained. The History revealed that she used to intake acid food (lemon) for a long time.

Clinical examination: The patient was presented with normal TMJ, and class I incisor relation; the oral examination revealed severe wear of hard dental tissue in the maxillary anterior teeth involving the palatal and incisal edge, yellowing of the teeth as the underlying dentin was exposed, shortening of the clinical crown height; the (OVD) was maintained but there was a reduction in the inter-occlusal space and this lead to treatment difficulties unless space is created (Figure 1).

Figure 1: *Pre-operative.*

Diagnosis and treatment: According to the history and the clinical findings, the diagnosis was erosion on the maxillary anterior teeth caused by eating citrus fruit.

The maxillary anterior teeth needed to be restored, but the necessary space of restoration was not available, so the vertical dimension was increased; in this case the desired space was obtained by Dahl technique and composite resin was the material used with the freehand technique.

First of all, the etiological factors were controlled, the patient has been informed of possible problems with this technique, where the patient might complain about sensitivity, difficulty in eating, speaking or sleeping, tempporomandibular joint pain and periodontal symptoms [9].

The worn teeth were built using a free hand technique. Initially, the canines were built with composite which is to control the occlusion. Before the curing, the mandible was manipulated to close into the centric occlusion. When the desired anterior space was obtained, the composite was cured and the process was repeated for the central and lateral incisors. The restoration was trimmed and finished with fine diamonds [10] (Figure 2).

Figure 2: *Free hand technique.*

The occlusion was checked and modified with articulating paper to ensure even contact on the anterior teeth. The posterior teeth were out of occlusion that allowed to move back into contact.

The patient was given some instruction, including: limite acide foods and drinks on meal times, reduce the intake frequency, avoid tooth brushing after acidic substances, finish meals with something alkaline and check any medication or mouthwashes [11].

The first review was a week later to detect any complication and then the patient was followed clinically monthly. She showed some discomfor at the first review, but during the next review there were no symptoms and the oral and periodontal health was within the acceptabe levels.

The occlusion was re-established over a period of three months and the opposite posterior teeth were in contact (Figure 3).

Finally, the maxillary anterior teeth were prepared for full ceramic restrations; an impression was made with polyvinyl siloxane impression material using the stock tray, and an interocclusal record was taken. Then, the zirconia crowns were cemented into the prepared teeth with a glass ionomer cement (Figure 4).

Figure 3

Figure 4: *Final restoration.*

Discussion

Tooth wear is often localized to the maxillary anterior teeth and that is caused predominantly by erosion [12]. The localized loss of anterior teeth is often accompanied by dento-alveolar compensation which allows contacts between the opposing teeth which maintains the effectiveness of the masticatory system [2]. As a result of this compensation, the occlusal vertical dimension (OVD) is maintained [12]. Therefore, this causes difficulty due to the lack of inter-occlusal space required for placing the restoration [13].

The used technique to create the space for restoraion in this case is Dahl technique; it has been previously presented in several case reports [8-10], because it is conservative procedure that does not cause much destruction of tooth structure [10]. The alternative treatments to create the space involving reduction of palatal surfaces or restoration of posterior teeth at an increased OVD are destructive

and expensive. Surgical crown lengthening does not create more space but it exposes more tooth tissue for improved retention of the final restoration where patient may experience sensitivity from the exposed root surfaces. The patient may be left with a dark, triangular spaces which are poor aesthetically and the reduction is still required, which lead to pulpal exposure. Orthodontics can be used to create interocclusal space. Increasing the overjet and decreasing the overbite, the disadvantages of this method include an extended treatment time, poor patient compliance and the intrusion of the teeth may be difficult and increases risk of root resorption.

Direct composite was utilized to build up the palatal and incisal surfaces of the maxillary anterior teeth because it can be applied directly in the mouth, cheaper than other materials and easier to replace or repair.

Dahl technique is a safe and successful method that can be considered when managing the worn teeth and producing a localised space. It avoids the destructive procedures on teeth in the same or opposing arch, although there is a need for further research [7,14].

Conclusion

This report presented management of dental erosion localized in maxillary anterior teeth with Dahl technique using direct composite to build the worn teeth. Within the limitation of this report, it can be concluded that Dahl technique is a safe and successful method to create the required space to place restoration. Besides, it is a simple and inexpensive technique compared to other ones.

Bibliography

1. Dahl BL., *et al*. "An alternative treatment in cases with advanced localized attrition". *Journal of Oral Rehabilitation* 2.3 (1975): 209-214.

2. Berry DC and Poole DF. "Attrition: possible mechanisms of compensation". *Journal of Oral Rehabilitation* 3.3 (1976): 201-206.

3. Steele JG., *et al*. "Adult Dental Health Survey 2009: transformations in British oral health 1968-2009". *British Dental Journal* 213.10 (2012): 523-527.

4. Imfeld T. "Dental erosion. Definition, classification and links". *European Journal pf Oral Sciences* 104.2 (1996): 151-155.

5. Saha S and Summerwill AJ. "Reviewing the concept of Dahl". *Dental Update* 31.8 (2004): 442-447.

6. Dahl BL and Krogstad O. "The effect of a partial bite raising splint on the occlusal face height. An x-ray cephalometric study in human adults". *Acta Odontologica Scandinavica* 40.1 (1982): 17-24.

7. Gough MB and Setchell DJ. "A retrospective study of 50 treatments using an appliance to produce localised occlusal space by relative axial tooth movement". *British Dental Journal* 187.3 (1999): 134-139.

8. Mizrahi B. "A technique for simple and aesthetic treatment of anterior tooth wear". *Dental Update* 31.2 (2004): 109-114.

9. Wong TL and Botelho MG. "Restorative Management of Severe Localized Tooth Wear Using a Supraoccluding Appliance: A 5-Year Follow-Up". *Case Reports in Dentistry* (2018): 9864782.

10. Robinson S., *et al*. "Techniques for restoring worn anterior teeth with direct composite resin". *Dental Update* 35.8 (2008): 551-558.

11. Shaw L and Smith AJ. "Dental erosion--the problem and some practical solutions". *British Dental Journal* 186.3 (1999): 115-118.

12. Mehta SB., *et al*. "Current concepts on the management of tooth wear: part 2. Active restorative care 1: the management of localised tooth wear". *British Dental Journal* 212.2 (2012): 73-82.

13. Chu FC., *et al*. "Restorative management of the worn dentition: 2. Localized anterior tooth wear". *Dental Update* 29.5 (2002): 214-222.

14. Poyser NJ., *et al*. "The Dahl Concept: past, present and future". *British Dental Journal* 198.11 (2005): 669-720.

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