

Conservative Approach for Treating Erosive Tooth Wear Patient : A Clinical Report

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Abstract

Diagnosis and Treatment planning for erosive tooth wear patient are not an easy task. The first step of treatment for this type of cases should be started with knowing the cause and try to treat it. However, treating this type of cases ranging from a simple direct restoration to a full mouth rehabilitation. With advancement of technology and material we are able nowadays to provide our patients with a conservative type of treatment which work as well as other type of treatment like what we did in this case. In this case report we will discuss a conservative approach for treating a patient who is diagnosed with erosive tooth wear.

Keywords: *Conservative Approach; Erosive Tooth Wear; Erosion; emax; Bonding*

Introduction

The progressive loss of dental hard tissues from causes other than dental caries, trauma or as a result of developmental disorders is known as Tooth wear [1]. There are many causes for tooth wear ranging from attrition (tooth loss due to tooth-to-tooth contact), abrasion (tooth loss due to mechanical tooth contact with other materials), Ablation (tooth loss due to hyperactivity of soft tissue), erosion (tooth loss due to chemical action) or it can be multifactorial [2-4]. Tooth wear can be regarded as pathological if the teeth become so worn that they do not function effectively. The distinction of acceptable and pathological wear at a given age is based upon the prediction of whether the tooth will survive the rate of wear [1]. Proper management of erosive tooth wear patient is difficult and complex. The first step in the management of this type of cases is to determine the etiology in order to get the most predictable outcome. Detailed dental and medical histories with meticulous clinical examination are crucial to identifying the causes of dental erosion [5-7]. It is commonly assumed that extensive occlusal wear results in decreased occlusal vertical dimension. But there is no definitive evidence to support this concept. Therefore, it is critical to verify loss of occlusal vertical dimension (OVD). Turner [8] have been classified the patient with excessive tooth wear into 3 categories:

- I. Excessive wear with loss of OVD.
- II. Excessive wear without loss of OVD but with space available
- III. Excessive wear without loss of OVD but with limited space

So, careful evaluation of etiology, history, and factors relative to OVD are essential to appropriate treatment planning. Nowadays, advancements of technology in dentistry have made possible the forming of dental restorations with high-performance materials that could not be easily shaped with conventional methods. Many of these materials can be adhesively bonded to the tooth allowing for less invasive

tooth preparations allowing dentists to deliver restorations that preserve more tooth structure which means better prognosis. In this case report we will discuss a conservative approach for treating a patient who is diagnosed with erosive tooth wear.

Clinical Report

History and Chief complaint

This patient was a 64-year-old Asian woman who came to our clinic with chief complaint: "I don't like the shape and color of the front 2 teeth. Food also sticks to the inside of my teeth (pointing on teeth with cupping) and would like them to look like normal" (Figure 1-3). Patient is not aware of any medical problem and she had no medical contraindications to prosthodontic treatment. Her diet is normal (no high Carbs, no soda or chocolates and no citrus). She was unaware of any parafunctional oral habits. Her oral hygiene regimen consisted of brushing twice a day without flossing.



Figure 1: Pretreatment frontal view.



Figure 2: Pretreatment Maxillary occlusal view.



Figure 3: Pretreatment Mandibular occlusal view.

Clinical Examination

The patient facial form is Square with a convex profile. Her Lymph nodes are non-palpable and her muscles are non-tender. Her mandibular range of motion was within normal limits, and the temporomandibular joints were asymptomatic. Lip is competent at rest, with a normal Lip length at 22 mm [9]. There is no incisal display at the rest position and upon exaggerated smile, 80% of maxillary teeth and 20 to 30% of mandibular teeth shows with no gingival display. She has straight smile line on the right side and reverse smile line on the left. F sound is normal and S sound was pronounced with lisping. Tongue position, size, and activity were normal. Salivary quantity and quality were normal. Posterior palatal form (House) and Lateral throat form (Neil) both were classified as class I. Lip, cheek, tongue, oral mucosa, and pharyngeal soft tissues were within normal limits. Periodontal examination revealed probing depth between 2 to 6 mm with localized bleeding on probing and furcation involvement class I for teeth # 2, 3, 17, 31 and class II for tooth # 30. Radiographic examination revealed generalized mild, localized moderate horizontal bone loss with no bony pathosis.

An examination of the hard tissues revealed distal carious lesions at tooth # 7, malposition teeth # 23, 24, 25, Erosive tooth wear especially at lingual and occlusal surfaces of maxillary teeth, Non-carious cervical lesions of teeth # 2, 3, 4, 6, 7, 13, 14, 15, 20, 21, 22 and missing tooth # 19 which have been replace with 3 units gold FPD. Teeth # 8 and 9 have single PFM crowns with open margins and crack line at crown #9. Patient occlusion examination revealed vertical overlap of 6 mm and horizontal overlap of 4 mm. In CR position, the Initial contact is between teeth # 3, 30, 15 and 18 and there is CR to MIP discrepancy of 1 mm. Interocclusal space is class I with 2 -3 mm and closest speaking space (Silverman) is 3 - 4 mm [10-13].

Diagnosis, Etiology, Clinical findings and Prognosis

From the above mentioned clinical examination, we have been diagnosed the patient with localized mild chronic periodontitis, dental caries, erosive tooth wear, non-carious cervical lesion. The patient was classified According to ACP Prosthodontic Diagnostic Index (PDI) as a Class IV [14,15]. The possible etiology are bacterial plaque, intrinsic acid and diet. The clinical findings were worn dentition, occlusal

plane discrepancy, loss of restorative space, porcelain crack line, mal-positioned teeth, over eruption of mandibular anterior teeth, class I furcation involvement and defective restorations with open margins. Regarding prognosis, assuming that she maintain good oral hygiene, wearing her occlusal splint (to maintain her restorations) and keeps her regular recall appointments, the prognosis is favorable.

Treatment plan and treatment sequence

Treatment plan objectives, options, limitations and treatment sequence have been discussed with the patient. The main objective of the treatment is to provide the patient with a long lasting restorations with minimal teeth preparation. The initial phase consist of periodontal treatment, prophylaxis with oral hygiene instructions and cleaning. These steps will help to maintain the remaining teeth and the supporting structures in a healthy state during the treatment.

The initial phase have been continued by making two sets of impressions using irreversible hydrocolloid impression material then poring them with a dental stone (Type III gypsum, Microstone, Whip Mix). A full diagnostic wax-up was performed at the proposed OVD (Figure 4). Provisionals have been made for teeth # 8 and 9. Putty have been made based on diagnostic wax up to press the provisional in the patient mouth (Figure 5,6). The existing maxillary PFM crowns #8 and 9 have been removed to investigate the abutment teeth underneath then provisional restoration have been relined. After that, provisional restoration (Protemp - 3M ESPE) have been pressed in the patient mouth at the increased vertical dimension and it have been kept for two weeks to evaluate and accommodate the new bite position. Two weeks later, the patient was happy with the new bite without any muscle discomfort.

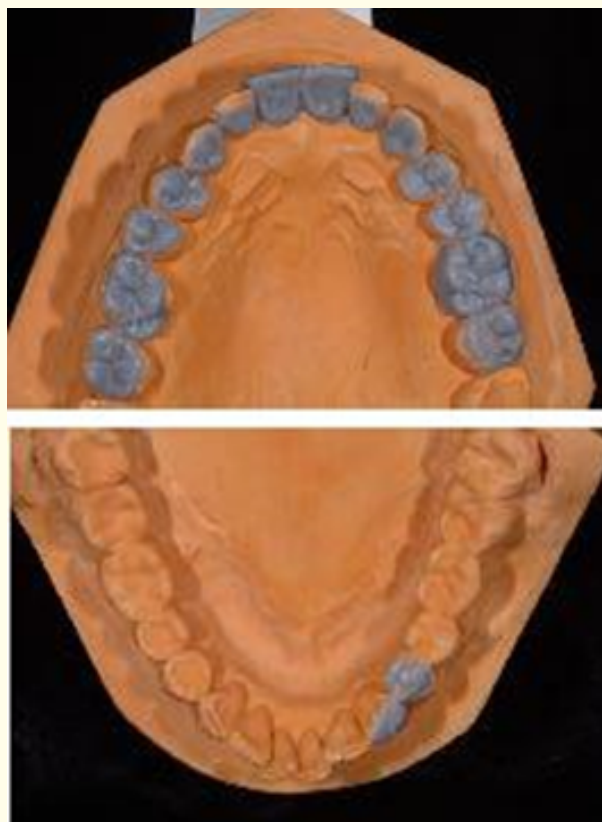


Figure 4: Diagnostic wax-up.



Figure 5: Frontal view of provisional restorations.



Figure 6: Occlusal view of provisional restorations.

The restorative phase continued with preparation the teeth in segments, starting with tooth #21 for onlay preparation and tooth #22 for Veneer preparation. Final impression has been made using Custom tray and PVS impression material. The final restoration were made with Lithium disilicate (IPS e.max Press) and bonded to teeth with Resin cement (Variolink Esthetic, Ivoclar Vivdent) (Figure 7,8). After

that minimal Onlay preparation have been done for teeth # 2, 3, 14,15 followed by the same steps for the previous teeth (Figure 9,10). Final segment was for teeth # 4,5,6,7,10,11,12,13 for onlay preparation and # 8 and 9 for Full coverage single crowns (Figure 11,12). At the conclusion of the treatment, an occlusal guard was provided to the patient helping her protecting her restorations (Figure 13-16).



Figure 7: Preparation of teeth No. 21 and 21 with final restorations.

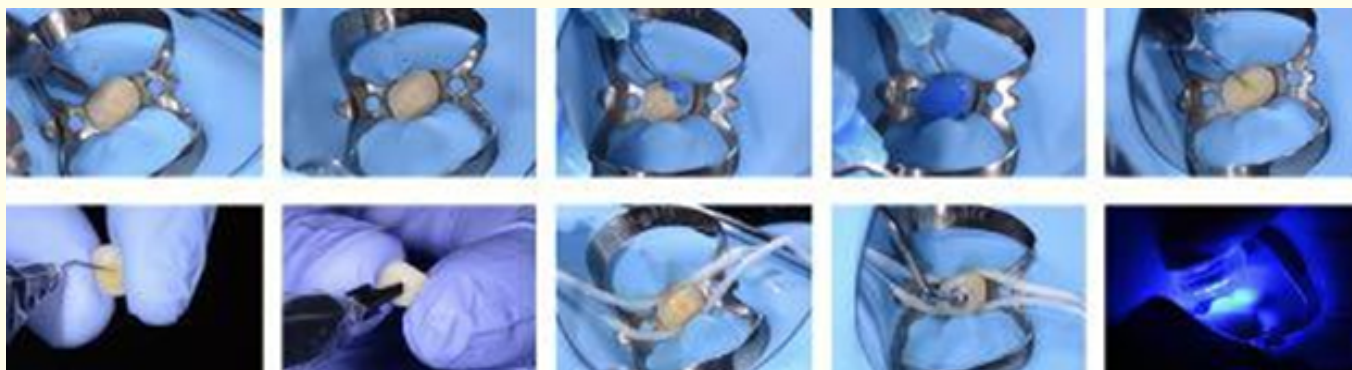


Figure 8: Steps of Bonding the restorations using Variolink resin cement.



Figure 9: Preparation of teeth No. 2,3,14,15 with final restorations.

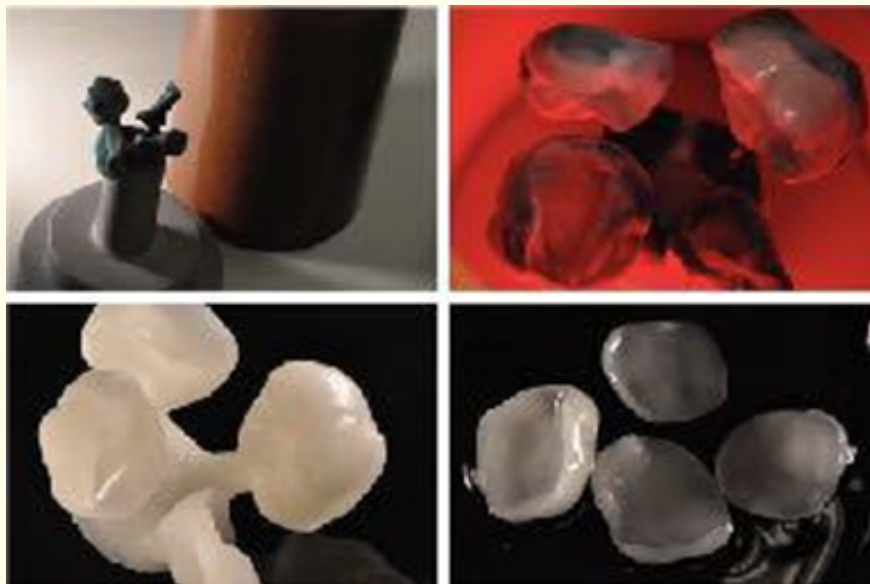


Figure 10: e.Max Press lab steps.



Figure 11: Preparation of teeth 4,5,6,7,10,11,12,13 with final restorations.



Figure 12: Restorations thickness ranged between 1 - 1.3 mm.



Figure 13: Final emax crowns restorations on teeth No. 8 and 9.



Figure 14: Final restorations - Occlusal View.



Figure 15: Final restorations - Frontal View.



Figure 16: Patient Smile - Post treatment.

Discussion

Diagnosis and Treatment plan for erosive tooth wear patient are not an easy task. The first step of treatment for this type of causes should be starts with knowing the cause and try to treat it. Dental erosion is a common condition in children and adults in all regions of the world. Prolonged contact between extrinsic or intrinsic acids with tooth surfaces will result in softening and dissolution of surface minerals [16]. If not recognized and treated early, erosive challenges may cause severe loss of dental hard tissues that adversely affects esthetics and function of the mouth. The dentist has a role to play in the diagnosis of the patient with anorexia nervosa and bulimia nervosa. He can be the first health professionals to identify signs and symptoms of disordered eating. Many specialities like psychologist, internal medicine, nutrition specialist should be involved in treating and prevention erosion patients [17].

In this clinical case we try to be conservative and do the least dentistry to return the patient's teeth to acceptable functional and esthetic situation trying to follow Devan famous quote "Our goal should be the perpetual preservation of what remains rather than the meticulous restoration of what is missing" [18]. In order to achieve our goal, we chose lithium disilicate as material of choice. In an investigation by Sasse, on optimum thickness of non-retentive Lithium disilicate partial coverage restorations, he suggests the thickness of 0.7 - 1.0 mm. However, other studies such as the one done by Lohse show that crowns 1.5 and 2.0 mm thick perform significantly better than 1.0-mm thick posterior full crowns [19-21]. Seydler recommends a reduced wall thickness of 1mm for posterior lithium disilicate crowns, he concludes that further reduction to 0.5mm wall thickness results in significant decrease of fracture load [22]. According to Cortellini [23], Knife edge design did not impair the strength of bonded lithium disilicate crowns. It is worth nothing that this is only true for pressed lithium disilicate, not milled. Milling a knife edge margin is virtually impossible as the thin margins tend to chip during milling process.

Lithium disilicate is a versatile material due to its relatively high flexural strength as well as translucency. It can also be bonded because of its silica content, therefore can be used where the retention form is minimal. It can be milled, or pressed; it can be utilized as monolithic, or layered with feldspathic porcelain. It can be used for full coverage crowns, inlays, onlays, partial crowns, and even veneers with good clinical outcomes. Sailer [24] reported an estimated 5-year survival rate of 95.7% for metal-ceramic crowns, 96.6% for leucite- or lithium disilicate-reinforced glass matrix ceramics, 94.6% for glass infiltrated alumina, and 96.0% for densely sintered alumina.

Conclusion

Diagnosis and treatment plan for erosive tooth wear is difficult and complicated. Defining the cause is the first step in treating this type of cases. However, treating this type of cases ranging from simple direct restoration to full mouth rehabilitation. With advancement of technology and material we are able nowadays to provide our patients with a conservative type of treatment which work as well as other type of treatment like what we did in this case.

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