Minimally Invasive Restoration of Erosive Lesions With Direct Composite Laminate Veneers: A Case Report

Mağrur KAZAK[1]

Abstract

Background: Non-carious cervical lesions (NCCLs) which may be caused by erosion, abrasion, abfraction and attrition are commonly observed in clinic practice. Dental erosion is defined as loss of dental hard tissue due to a chemical irritant that does not involve the influence of bacteria. In case of such lesions progress over time, teeth hypersensitivity and aesthetical problems arise.

Objective: The purpose of this case report was to restore erosive lesions on maxillary central teeth with direct composite laminate veneers.

Case Description: A 34 years old female patient presented to Istanbul Aydın University Dental Faculty Restorative Dentistry Department because of aesthetic reasons. After clinical examination; erosive defects mainly at the maxillary central teeth and worn incisal edges were diagnosed. As a result of the patient's anamnesis, it was understood that, the patient consumes lemon regularly every week. The erosive lesions were restored with an adhesive system and a nanofill resin composite. Finishing and polishing procedures were performed immediately. After aesthetical restorations, information is given to the patient about the elimination of the factors which cause erosive lesions.

Practical Implications: When clinically evaluated, direct composite laminate veneers are based on the principles of minimally invasive dentistry and reversibility that can be used for the rehabilitation of NCCLs aesthetically.

Keywords: *Dental erosion, non-carious cervical lesions, direct composite restoration, dental laminate veneer, minimally invasive restoration*

Eroziv Lezyonlarin Direkt Kompozit Lamina Venerler ile Minimal İnvaziv Restorasyonu: Olgu

Özet

Giriş: Erozyon, abrazyon, abfraksiyon ve atrizyon nedeni ile ortaya çıkan çürüksüz servikal lezyonlar klinikte yaygın olarak görülmektedir. Diş erozyonu, bakteri etkisi içermeyen bir kimyasal iritan sebebi ile diş sert dokusunun kaybı olarak tanımlanmaktadır. Bu tip lezyonların zaman içerisinde ilerlemesi durumunda, dişlerde aşırı duyarlılık ve estetik problemler ortaya çıkmaktadır.

[1] ***(DDS PhD)*** *İstanbul Aydın University Faculty of Dentistry Restorative Dentistry Department, magrurkazak@aydin.edu.tr*

Amaç: Bu olgu sunumunun amacı; üst çene santral dişlerde oluşan eroziv lezyonları direkt kompozit laminate venerler ile restore etmektir.

Olgu Raporu: 34 yaşındaki kadın hasta estetik sebeplerden ötürü İstanbul Aydın Üniversitesi Diş Hekimliği Fakültesi Restoratif Diş Tedavisi Bölümü'ne başvurmuştur. Hastanın yapılan klinik muayenesi sonucunda; en fazla üst çene santal dişlerde olmak üzere eroziv defetler ve kesici kenarlarda da aşınmalar tespit edilmiştir. Hastadan alınan anamnez sonucunda, hastanın her hafta düzenli olarak limon tükettiği öğrenilmiştir. Üst çene santral dişlerin eroziv lezyonları, bağlayıcı ajan ve nano dolduruculu kompozit bir rezin materyali kullanılarak restore edilmiştir. Bitirme ve cila işlemleri yapılmıştır. Estetik restorasyonlardan sonra hastaya erozyona sebep olan faktörlerin elimine edilmesi konusunda bilgi verilmiştir.

Pratik Uygulamalar: Klinik açıdan değerlendirildiğinde, minimal invaziv diş hekimliği ve reverzibilite ilkelerine dayanan direkt kompozit lamina venerler ile çürüksüz servikal lezyonlar estetik olarak restore edilebilirler.

Anahtar Kelimeler: *Dental erozyon, çürüksüz servikal lezyonlar, direkt kompozit restorasyon, dental lamina vener, minimal invaziv restorasyon*

Introduction

Non-carious cervical lesions (NCCLs) which may be caused by erosion, abrasion, abfraction and attrition are commonly observed in clinic practice.[1] Dental erosion is defined as loss of dental hard tissue due to a chemical irritant that does not involve the influence of bacteria.[2] A chemical irritant involves acids that reach the mouth and have extrinsic or intrinsic origin.[3] Extrinsic acids from the diet are becoming the most important source of erosive attacks due to the increasing consumption of acidic drinks.[4]

Progressive erosive lesions can be clinically difficult to diagnose at an early stage and patients often unaware of the tooth loss because of no pain or esthetic problem. More pronounced changes in macromorphology occur when the erosive damage is more severe. Once the restorative treatment is indicated, dental practitioner has to know that esthetic restorations of erosive teeth present challenges. One of the challenge is the presence of sclerotic dentin. Sclerotic dentin is a common substrate that occurs in response to tooth wear caused by attrition, abrasion, abfraction or erosion. This substrate has demonstrated to be a challenge for bonding procedures.[5] Currently, there are several options for the treatment of erosive lesions, which can range from a conservative (adhesive and composite resins restorations) to more invasive procedures (crowns, bridges, or even full-mouth reconstructions) according to the severity of the lesions.[6,7] When a restorative treatment is required, it is important to choose a material resistant to erosion that allows the preservation of the tooth as much as possible. In terms of conservative treatment options, composite resin restorations seem to the best materials for the restoration of NCCLs.[8,9]

Direct composite laminate veneers (DCLVs) are minimally invasive restorations and the teeth are prepared in a conservative manner. These restorations can be applied on a minimally prepared tooth

surface with resin composite materials directly in the dental clinic. Easy preparation available for all dentists, good aesthetic, low cost, no need for an additional adhesive cementing system and reversibility of the treatment procedure are the main advantages of this technique.[8]

The aim of this case report was to restore maxillary central teeth due to erosive lesions with DCLVs.

Case Description

Diagnosis and Treatment Planning

34 years old female patient referred to Istanbul Aydın University Faculty of Dentistry Restorative Dentistry Department because of aesthetic complaints. Patients' main problem was the erosive lesions especially on the maxillary central teeth (Figure 1). A detailed history was taken to determine the reasons of erosion lesions. On questioning about her eating habits related to tooth erosion, the patient declared that she had been consuming lemon regularly every week and during her pregnancy she had eaten at least one kilo of orange every day. She also stated that she was brushing very hard and clenching her teeth. On clinical examination, erosive defects mainly at the maxillary central teeth and worn incisal edges were observed. There were also NCCLs on #32,33,34,35 and #42,43,44,45 due to traumatic tooth brushing. The patient did not complain about dentin hypersensitivity. Periodontal examination revealed no signs of periodontal disease. Medical anamnesis showed of no evidence of systemic disorders.

Figure 1. *Initial appearance of the maxillary central teeth with erosive lesions and worn incisal edges*

A treatment plan was made and presented to the patient. In the plan, direct composite laminate veneer restorations for #11, 12, 13 and #21, 22, 23 were recommended. After restorations, occlusal splint was also proposed due to the teeth clenching. The patient consented the treatment procedure for only the restorations of the maxillary central teeth.

Preparation of the Teeth and Application of the Direct Composite Laminate Veneers

Prior to the preparation of the teeth, shade was selected as A2 with Vita Scale. Then, #00 sized retraction cords (Ultrapak, LOT: 400224, Ultradent Products, Inc. USA) were placed into the gingival sulcus in order to protect the gingival tissue during the preparation of the teeth. First

affected dentine was removed with a round bur and later the enamel margins were beveled. Incisal edges of the teeth were reduced 1mm in order to manage incisal edge coverage.

After preparation, the teeth were isolated with cotton rolls then for the mesial and distal proximal margins; transparent Mylar strip bands were placed and fixed with wooden wedges. Total-etch technique with 37 % phosphoric acid (Scotchbond, LOT: N431099, 3M ESPE, Dental Products, USA) was applied to the surfaces (30 seconds to enamel, 15 seconds to dentine), rinsed with water spray for 20 seconds and dried slightly. Adper Single Bond 2 dentin bonding agent (LOT:N489607, 3M ESPE, Dental Products, USA), was applied to the etched tooth surfaces by using a bonding brush and then polymerized with a light curing unit (Built in C, Guilin Woodpecker Medical Instrument CO., LTD., PRC). For the restoration of the teeth, a nanofill composite Filtek Ultimate (3M ESPE, Dental Products, USA) was chosen. First, A2 Dentine (LOT: N498646) then A2 Enamel (LOT: N535853) were applied. All of the resin composites were applied to the tooth surfaces in the form of very thin layers of less than 1mm and after every composite placement polymerization was completed according to the manufacturer's suggestions. As the restoration finished, wooden wedges and the translucent matrix bands were removed and from vestibule and palatal surfaces polymerization was repeated in order to eliminate any uncured monomers left in the composite material.

For the finishing and polishing procedures, first a green-banded then a yellow-banded needle bur was used under water-cooling. Early contacts were controlled with the articulation paper. For the advanced polishing, discs (Sof-Lex XT Discs, 3M ESPE, Dental Products, USA) were applied from coarse to fine grits. At the end, a white polishing rubber was used for the final view (Figure 2).

After aesthetical restorations, information is given to the patient about the elimination of the factors which cause erosive lesions.

Figure 2. *The final view of the maxillary central teeth restored with direct composite laminate veneers*

Discussion

NCCLs due to erosion are becoming more significant, therefore the dentist should have knowledge about its etiology and be prepared for early diagnose. When dental erosion involves dentin with pain, function and aesthetic limitation, restoration is needed.

In this case report, the patient was not complaining about dentin hypersensitivity. But loss of tooth structure, yellow color on maxillary central teeth and worn incisal edges were the reasons that made the patient refer to Restorative Dentistry Department. The erosive lesions of the patient were

mainly localized on the facial surfaces of maxillary central teeth that were caused by the extrinsic acids. The most prominenet of these extrinsic acids, citric acid, with a reported pH value of 2.5, is present in fruit juices (such as lemon juice).[7] In this case, it was determined that, the patient was consuming lemon regularly every week which explained the erosive lesions.

The treatment of tooth wear due to erosion process presents challenge in contemporary dentistry. So the choice of the restoration type is important in such cases. Even with advanced destruction, minimally invasive restoration, such as sealing or covering with composite material, should be the first therapy of choice. In this case, DCLVs were planned for the central teeth. This conservative option was chosen in order to preserve dental hard tissues. Also this type of procedure is a lower cost option when compared to indirect restorations. The reversible nature of this procedure allows for the other treatment options in the future. Also the possibility of repairing intraorally without the risk of modifying aesthetics or mechanical performance is another positive advantage of this technique.[8] Porcelain laminate veneers (PLVs) are another options for restoring these teeth. Although these kinds of restorations are long-lasting, esthetical and functional they have some handicaps as well. First of all, PLVs planed teeth are prepared with irreversible procedures. Also; more tooth preparation, more than one appointment, technical difficulties, difficult reparation and high prices are the other disadvantages.[10]

Conclusion

As of result, it is important for the dentist to recognize the early signs and symptoms of erosive lesions and understand its pathogenesis. Preventive strategies are the essential first line in management and will include the patients' lifestyle changes.

When the restoration of erosive lesion is indicated, it should preferably, and if clinically and technically possible, be based on the principles of minimally invasive dentistry and reversibility. Direct composite laminate veneer restorations are such restorations that can be used for the rehabilitation of NCCLs aesthetically. Even after adequate treatment and patient instruction are accomplished, aesthetic restorations will only be successful if the patient complies the stated treatment and recommendations for behavioral modifications.

Minimally invasive treatment applied in this case was very satisfactory with the natural tooth like appearances and acceptable clinical performance to the patient.

References

[1] Levitch LC, Bader JD, Shugars DA, Heymann HO. Non-carious cervical lesions. J Dent 1994; 22:195-207.

[2] Pindborg JJ. Patholohy of Dental Hard Tissues. Munksgaard, Köpenhamn, Denmark, 1970.

[3] Ten Cate JM, Imfeld T. Dental erosion summary. Eur J Oral Sci 1996; 104(2(Pt 2)): 241-4.

[4] Lussi A. Erosive tooth wear- a multifactorial condition of growing concern and increasing knowledge. Monogr Oral Sci 2006; 20:1-8.

[5] Georgescu A, Iovan G, Stoleriu S, Topoliceanu C, Andrian S. Atomic force microscopy study regarding the influence of etching on affected and sclerotic dentine. Rom J Morphol Embryol 2010; 51: 299-302.

[6] Tuncer D, Çelik Ç, Yamanel K, Arhun N. 1 year clinical evaluation of microhybrid composites used in the restoration of non-carious cervical lesions. Oral Dent Health Manag 2014; 13(2): 366-71.

[7] Güldağ MU, Büyükkaplan UŞ, Ay ZY, Katırcı G. A multidisciplinary approach to dental erosion: A case report. Eur J Dent. 2008; 2(2):110-4.

[8] Passos VF, de Souza AM, Rodrigues LK, Bombonatti JC, Santiago SL. A conservative treatment approach using direct composite resins for anterior teeth eroded by lemon sucking. Gen Dent 2013; 61(5):e1-4.

[9] Perez Cdos R, Gonzalez MR, Prado NA, de Miranda MS, Macêdo Mde A, Fernandes BM. Restorations of noncarious cervical lesions: when, why, and how. Int J Dent. 2012; 2012: 687058.

[10] Belcheva A. Reconstruction of fractured permanent incisors in schoolchildren using laminate veneers (Review). J of IMAB 2008; 14(2): 101-4.