Atatürk Üniv. Diş Hek. Fak. Derg.
J Dent Fac Atatürk Uni
Cilt:25, Sayı:3, Yıl: 2015, Sayfa: 390-394

Olgu Sunumu/ Case Report

DIRECT RESIN COMPOSITE LAMINATE VENEER RESTORATIONS OF SEVERELY DISCOLORED AND FRACTURED MAXILLARY NON-VITAL CENTRAL INCISORS: A CASE REPORT

AĞIR RENKLEŞMİŞ VE KIRILMIŞ ÜST ÇENE KANAL TEDAVİLİ SANTRAL KESİCİ DİŞLERİN DİREKT REZİN KOMPOZİT LAMİNA VENERLER İLE RESTORASYONU: OLGU SUNUMU

Yrd. Doç. Dr. Mağrur KAZAK* **Prof. Dr. Şölen GÜNAL***

Makale Kodu/Article code: 2210
Makale Gönderilme tarihi: 26.03.2015
Kabul Tarihi: 19.08.2015

ABSTRACT

The purpose of this case report was to restore severely discolored and fractured non-vital maxillary central incisors with direct resin composite laminate veneers and to discuss the short-term follow-up.

A 17 years old male patient presented to Istanbul Aydın University Faculty of Dentistry because of aesthetic reasons. After radiographic and clinical examination, severe discoloration and fracture of maxillary central incisors were diagnosed. First of all, endodontic retreatment and internal bleaching were performed. Then the teeth were prepared for resin composite laminate veneer restorations. The teeth were etched with 37% phosphoric acid, restored with an adhesive system and a nano-hybrid composite. Finishing and polishing procedures were performed immediately.

As a result of the six-month control, the patient was very satisfied with the image of his teeth that still preserve the natural tooth like appearance.

Direct resin composite laminate veneer is a cost-effective treatment option to restore anterior teeth aesthetically. This treatment procedure is useful for the growing patients before any definite restoration planning.

Key words: Non-vital, tooth discoloration, bleaching agent, hydrogen peroxide, tooth fractures, direct resin composite restoration, dental laminate veneer.

ÖZET

Bu olgu sunumunun amacı; ağır renkleşmiş ve kırılmış üst çene santral kesici dişleri direkt rezin kompozit laminate venerler ile restore etmek sonrasında ise bu restorasyonların kısa süreli takiplerini tartışmaktır.

17 yaşındaki erkek hasta estetik sebeplerden ötürü İstanbul Aydın Üniversitesi Diş Hekimliği Fakültesi'ne başvurmuştur. Yapılan radyografik ve klinik muayenesi sonucunda hastanın üst çene santral dişlerinde ağır renkleşme ve kırık tespit edilmiştir. Önce endodontik tedavi sonrasında ise devital beyazlatmalar yapılmıştır. Daha sonra dişler kompozit laminate vener restorasyonların yapılabilmesi için prepare edilmiştir. Hazırlanan dişlere sırası ile % 37'lik fosforik asit, bağlayıcı ajan ve nano-hibrit bir rezin kompozit uygulanmıştır. Bitirme ve cila işlemleri yapılmıştır.

Altı aylık kontrol sonucunda, yapılan restorasyonların doğal diş görünümünü halen koruması sebebiyle hastanın çok memnun olduğu tespit edilmiştir.

Ön dişlerin estetik restorasyonunda, direkt rezin kompozit lamina venerler, düşük maliyetli bir tedavi seçeneğidir. Ayrıca, büyüme ve gelişmesi devam eden hastalarda, kesin bir tedavi planlanmadan önce, bu tedavi prosedürünün uygulanması çok daha faydalıdır.

Anahtar Kelimeler: Cansız diş, dişte renk değişikliği, beyazlatıcı ajan, hidrojen peroksit, diş kırıkları, direkt rezin kompozit restorasyon, dental lamina vener.

* İstanbul Aydın Üniversitesi Diş Hekimliği Fakültesi Restoratif Diş Tedavisi Anabilim Dalı

INTRODUCTION

Esthetic restorations of anterior non-vital teeth present a challenge to dental practitioner. It is also a common esthetic concern for most of the patients because of the high expectations of their appearances and the importance of smile within the society.

Discolorations can be extrinsic or intrinsic origin.[1] An intrinsic discoloration is defined as it is originated from the pulp chamber. This type of discoloration can be caused by pulpal necrosis, intrapulpal hemorrhage (following severe trauma), pulp tissue remnants after endodontic therapy, endodontic materials (medications / irrigants, root canal sealers), coronal filling materials, root resorption and aging.[2] After endodontic treatment, bleaching should be done before any kind of aesthetic restoration in order to overcome this displeasing discoloration. One of the most popular technique for non-vital tooth bleaching is walking bleaching technique that is relatively reliable, fairly simple for the clinicians and for the patients.[3] Following the bleaching process, the most frequently used treatment for discolored teeth was resin composite laminates. In terms of conservative treatment options, resin composite laminate veneers (CLVs) are the restorations that are widely preferred to correct the abnormalities, restore aesthetic defects and fractures, close diastemas.[4-9] Porcelain laminate veneers (PLVs) are another option for restoring these teeth. Although these kinds of restorations are long-lasting, esthetical and functional, they have some handicaps as well.[10,11] First of all, PLVs planed teeth are prepared with irreversible procedures.[12] Also; more tooth preparation, more than one appointment, technical difficulties, difficult reparation and high prices are the other disadvantages.[13]

Direct resin composite laminate veneers (DCLVs) are minimally invasive restorations and the teeth are prepared in a conservative manner.[4] These restorations can be applied on a minimally prepared tooth surface with resin composite materials directly in the dental clinic.[6] 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.[12,13]

In this case report, DCLV technique is used for a patient with an aesthetic problem related to a severely discolored and fractured anterior non-vital teeth and the six-month follow-up is discussed.

CASE REPORT

Diagnosis and Treatment Planning

A 17 years old male patient with severe discolorations and fractures of his maxillary central incisors referred to Istanbul Aydın University Faculty of Dentistry with aesthetic complaints (Figure 1). During the anamnesis, the patient reported that he had a bicycle accident when he was 14 years old. He also indicated that after the accident endodontic treatments were done but in course of time discoloration appeared and he began to complain about this. After clinical and radiographic examinations, it was confirmed that both of the incisors had endodontic treatments. While previous endodontic treatment of maxillary left central incisor (21) revealed a complete root canal obturation without periapical pathology, maxillary right central incisor (11) required retreatment due to the lesion in the periapical area (Figure 2). During intraoral examination both teeth revealed dark pink and brown discoloration, a color that is not on Vita scale. It was explained to the patient that his maxillary right central incisor needed endodontic retreatment and then internal bleaching procedure for both of the maxillary central incisors. He consented the retreatment and the bleaching therapy to correct the discolored teeth and then the restorations of the same fractured teeth with DCLVs.

Figure 1. Initial appearance of the discolored maxillary central incisors

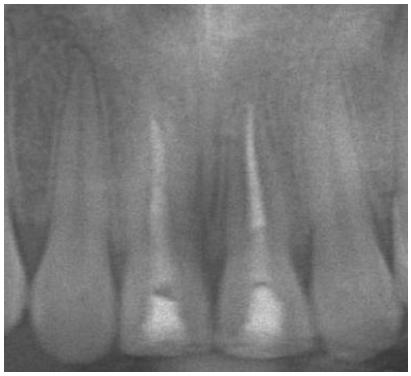

Figure 2. Initial diagnostic radiography of maxillary central incisors

Walking Bleaching Technique

After the endodontically retreatment of the maxillary right central incisor (11), the old restorations were all removed carefully from the palatal surfaces and 2mm of root canal gutta-percha was also removed from apical to cemento enamel junction (CEJ) from each tooth. The objective of removing root canal gutta-percha was to create a space for the restorative material over the endodontic seal and to expose dentinal tubules directed toward the cervical region of the tooth for the bleaching agent.[14] This 2mm depth of the cervical root canal access was sealed with a flowable restorative material and light cured for 20 seconds (Filtek Ultimate Flowable Restorative A2 Shade, LOT: N474059, 3M ESPE, St. Paul, MN, USA) and then 35% hydrogen peroxide gel (Opalescence Endo, LOT: B7SX4, Ultradent Products, Inc. USA) was placed into the pulp chamber avoiding soft tissue. A tiny cotton pellet was put over the bleaching agent and the access cavity was sealed with a light curing resin modified glass-ionomer cement (Ionoseal, LOT: 1344334, VOCO GmbH, Cuxhaven, Germany) for 20 seconds. Protrusive and laterotrusive movements were checked out to avoid premature contacts that could cause fracture resulting leakage and loss of bleaching material from the access cavity. The bleaching procedure was repeated every 3 to 5 days until the desired color change was achieved (Figures 3 and 4). After achieving the desired color, bleaching agents were all removed, the cavities were rinsed and then it was waited 2 weeks for the shades of the teeth to be stabilized. The teeth were ready to be restored with DCLVs.

Figure 3. The intraoral view of the teeth after first bleaching session

Figure 4. The final intraoral view of the teeth at the end of bleaching sessions

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

First, #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 for the LVs. 0.8-1mm deep walls (horizontal facial depth cut) were prepared with a cylinder rounded (shoulder) diamond bur (SWS FG Diamonds I, ISO No:140-012, Gülsa Group LTD., TURKEY) under water cooling on the labial surfaces of the teeth. Then, definite chamfer finish lines were prepared paralleling the entire gingival margin. We continued to form the definite chamfer finish lines with the same diamond bur from the papilla tip toward the incisal edge on both of the mesial and distal proximal surfaces. The long axis of the bur was rolled in to the proximal chamfer area in order to eliminate any sharp line angles. Incisal edges of the teeth were reduced 1-1.5 mm in order to manage incisal edge coverage. After finishing the preparations (Figure 5), shade was selected as A1 from the Vita scale.

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 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, Kuraray Clearfil Majesty ES-2 resin composite (LOT: 041/37, Kuraray CO., LTD. , Japan) was chosen. First, A1Dentine (A1D) then A1Enamel (A1E) were placed. Then to create the incisal edge translucency, Translucent Clear was used. 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 then 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 (SWS FG Diamonds I, ISO No: 166-017, 166-017XF, Gülsa Group LTD., TURKEY) 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 6).

Figure 5. Tooth preparations

Figure 6. The final view of the teeth restored with direct resin composite laminate veneers

DISCUSSION

An intrinsic discoloration of non-vital permanent anterior teeth due to trauma may have a significant esthetic and social impact on children and adolescents. In our case, our patient was a teenage (17 years old) who has high expectations of his appearance and smile after aesthetic restorations.

Prior any treatment options for the discolored non-vital teeth, internal bleaching should be applied to overcome this displeasing discoloration. One of the most popular technique for lightening non-vital teeth is the walking bleaching technique.[3] Hydrogen peroxide is one of the bleaching agent that can be used with walking bleaching technique. In our study, this agent was used due to its effective bleaching.[15]

In our case report, after internal bleaching, aesthetic restorations were planned due to the remaining discoloration, although not too much, along cervical regions. The second reason for planning aesthetic restorations was the length of the teeth because of fracture. Due to trauma, maxillary right and left central incisors had fractures and needed to be lengthening.

In this case, DCLVs were planned for the 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.[16]

For the restorations of the fractured teeth, a nano-hybrid resin composite was chosen. One of the reason for selecting a nano-hybrid resin based composite is, these composites are proposed as universal restorative dental materials in a wide range of applications.[17] Also nano-hybrid composites are

promoted as materials with improved mechanical properties which are showing an acceptable clinical performance.[18,19.] The most important reason for choosing a nano-hybrid composite is the excellent aesthetic properties of this material that is very important especially when restoring anterior teeth.[18]

In our case report, after six-month follow-up, the patient was very satisfied with the image of his teeth, which still preserve the natural tooth like appearance with an acceptable clinical performance.

CONCLUSIONS

Direct resin composite laminate veneer is a cost-effective treatment option to restore anterior teeth aesthetically. This treatment procedure is also useful in growing patients before more definitive restorations are planned.

REFERENCES

1. Watts A, Addy M. Tooth discolouration and staining: a review of the literature. Br Dent J 2001;190:309-16.
2. Plotino G, Buono L, Grande NM, Pameijer CH, Somma F. Nonvital Tooth Bleaching: A Review of the Literature and Clinical Procedures. JOE 2008; 34:394-404.
3. Zimmerli B, Jeger F, Lussi A. Bleaching of Nonvital Teeth. Schweiz Monatsschr Zahnmed 2010; 120:306-13.
4. Seyfioğlu Polat Z, Tacir İH, Eskimez Ş, Özcan M. Esthetic Rehabilitation of Anterior Teeth (Direct Laminate Veneer Restorations) in Three Cases. Turkiye Klinikleri J Dental Sci 2008;14: 27-30.
5. İzgi AD, Ayna E. Direct restorative treatment of peg-shaped maxillary lateral incisors with resin composite: a clinical report. J Prosthet Dent 2005; 93:526-9.
6. Korkut B, Yanıkoğlu F, Günday M. Direct Composite Laminate Veneers: Three Case Reports. J Dent Res Dent Clin Dent Prospects 2013; 7:105-11.
7. Özel E, Karapınar Kazandağ M, Soyman M, Bayırlı G. Two-year follow-up of fractured anterior teeth restored with direct composite resin: report of three cases. Dent Traumatol 2008;24:589-92.
8. De Araujo EM, Fortkamp S, Baratieri LN. Closure of Diasteme and Gingival Recontouring Using Direct Adhesive Restorations: A Case Report. J Esthet Restor Dent 2009;21:229-41.
9. Helvacıoğlu KB, Arısu HD. Direkt Kompozit Rezin Venerlerle Diasteme Kapatılması: Olgu Raporu. ADO Klinik Bilimler Dergisi 2009;3:285-8.
10. Chen YW, Raigrodski AJ. A Conservative Approach for Treating Young Adult Patients with Porcelain Laminate Veneers. J Esthet Restor Dent 2008;20: 223-38.
11. Freire A, Panka Archegas LR. Porcelain Laminate Veneer on a Higly Discoloured Tooth: A Case Report. J Can Dent Assoc 2010;76:126-9.
12. Bello A, Jarvis RH. A review of esthetic alternatives forthe restoration of anterior teeth. J Prosthet Dent 1997;78:437-40.
13. Belcheva A. Reconstruction of Fractured Permanent Incisors in Schoolchildren Using Laminate Veneers (Review). J of IMAB 2008;14: 101-4.
14. Baratieri LN, Ritter AV, Monteiro S Jr, Caldeira de Andrada MA, Cardoso Vieira LC. Nonvital tooth bleaching: guidelines for the clinician. Quintessence Int. 1995;26:597-608.
15. Attin T, Paque F, Ajam F, Lennon AM. Review of the current status of tooth whitening with the walking bleach technique. Int Endod J 2003;36:313-29.
16. Magne P, Belser UC. Porcelain versus composite inlays/onlays: effects of mechanical loads on stress distribution, adhesion and crown flexure. Int J Periodontics Restorative Dent 2003;23:543-55.
17. Frauscher KE, Ilie N. Depth of cure and mechanical properties of nano-hybrid resin-based composites with novel and conventional matrix formulation. Clin Oral Invest 2012;16:1425-34.
18. Ilie N, Rencz A, Hickel R. Investigations towards nano-hybrid resin based composites. Clin Oral Invest 2013;17:185-93.
19. Frankenberger R, Reinelt C, Kramer N. Nanohybrid vs. fine hybrid composite in extended class II cavities: 8-year results. Clin Oral Invest 2014;18:125-37.

Yazışma Adresi
Yrd. Doç. Dr. Mağrur Kazak
İstanbul Aydın Üniversitesi
Diş Hekimliği Fakültesi
Beşyol Mah. İnönü Cad. Akasya Sok. No:6
Sefaköy-Küçükçekmece.
e-mail: magrur@hotmail.com