DOI: 10.26717/BJSTR.2018.05.001135
Saafi Jilani. Biomed J Sci & Tech Res

BIOMEDICAL Journal of Scientific & Technical Research

ISSN: 2574-1241

Case Report Open Access

Esthetic Restoration by Two Glass Ceramic Crowns Due To Failure of Porcelain Laminate Veneer on Discolored Maxillary Central Incisors: A Case Report

Saafi Jilani*, Asbia Salem, Asiri Ahmad Yahia and Khribech Hager

Faculty of Dentistry, University of Monastir, Tunisia

Received: May 19, 2018; **Published:** May 29, 2018

***Corresponding author:** Saafi Jilani, Faculty of Dentistry, University of Monastir, Avicenna Street Monastir, Tunisia

Abstract

Porcelain veneers represent a reliable, predictable procedure for conservative treatment of unaesthetic anterior teeth with an estimated survival probability of 93.5% over 10 years. Fracture, chipping, color change and parafunctional habits were the most frequent complication. This case report highlights an esthetic restoration of two discolored maxillary incisors by tow glass ceramic crowns after failure related to debonding of two porcelain laminate veneers due to pen biting.

Keywords: Esthetic; Veneers; All ceramic crowns; Lithium disilicate; Failure; Parafunctional habit; Fluorosis

Introduction

Dental fluorosis is an irreversible condition caused by excessive ingestion of fluoride during the tooth forming years [1]. It is the result of chronic endogenic intake of fluorides in amounts exceeding the optimal daily dose of 1 ppm [1]. Brown stains and some pits may be observed on the surfaces as a result of damage to the poorly mineralized enamel. In the mild cases of dental fluorosis, clinical appearance is characterized by opaque white areas presenting as horizontal lines and cloudy patches on the enamel surface [2]. The treatment of enamel fluorosis usually ranges from ceramic veneer to free hand bonding restorations [3]. Porcelain laminate veneers restorations constitute an alternative to full-coverage restorations considered as aggressive. They require not only minimal tooth preparation, but also they allow treatment of unaesthetic anterior teeth [4].

Ceramic veneers are considered a conservative solution for patients requiring improvement of the shape, color, hypocalcifications, chipped teeth or position of their anterior teeth [5]. These restorations are highly esthetic, biocompatible, and resistant to staining and wear [6]. Although porcelain is inherently brittle, when it is firmly bonded to a tooth, it becomes very strong and durable [7,8]. Laminates, mask or reduce the discoloration [9,10] with a biomimetic behavior which allow them to behave similarly to natural teeth in terms of strain and stress transference [11]. It is also the most conservative restoration, which preserves a significant proportion of the natural enamel. Therefore it is considered as more conservative restoration than a crown, which requires significant removal of sound tooth structure [12,13]. After dental bleaching, the most frequently used treatment for discolored teeth involves laminates, which mask or reduce the discoloration [9,10] and can reproduce the characteristics of the tooth structure [14]. After few months of cementation of laminate veneers, it is uncommon that patient may present with debonding of restorations. Early debonding of laminate is likely due to insufficient clinical skills [4] and parafunctional habits.

Case Report

The patient, a 40-year-old female, presented to the department of fixed prosthodontics at the dental clinic of Monastir (Tunisia) for restoring her staining maxillary central incisors teeth. She was displeased with her smile and seeked for aesthetic, pleasing and natural appearing like life smile and functional restorations. She had no medical history. Intra-oral examination showed an average lip line exposing the maxillary teeth and only the interdental papillae and discolored buccal surfaces of the central incisors. Her oral hygiene was sufficient with no gingiva inflammation .All teeth

were vital and had no carious were detected. The anterior guide is functional with absence of posterior interferences, but the overbite was almost 4mm. She complained about stained maxillary central incisors (Figure 1) due to dental fluorosis. After clinical examination, radiographs, photographs, study casts (Figures 2-4) were performed.

Figure 1: Intraoral View: discolored maxillary central incisors teeth.

Figure 2: Study cast.

Figure 3: Index for reduction control.

Figure 4: Shade selection.

Esthetic correction with glass ceramic lithium disilicate laminate veneers (IPSe. maxCAD, Ivoclar Vivadent) for maxillary central incisors was planned. The preparations were performed with diamond burs. Depth orientation grooves were placed on the facial surface of the tooth with 0.3mm and 0.5mm three wheel diamond depth cutter on the gingival one third and incisal two third respectively along the longitudinal axis of each tooth. The preparation margins were finished with diamond burs to perform a supra gingival chamfer. An incisal preparation was carried over the incisal edge from buccal to palatal, with up to 1.5 mm of incisal reduction. Preparation of the proximal area was stopped just short of the interproximal contact (Figure 5). The shade of maxillary teeth was selected using Vita 3D master. After gingival retraction (Figure 6), impression was made with polyvinylsiloxane by heavy body –light body combination (Figure 7). The temporary restoration was done with resin acryl using the silicone index .It was bonded to the teeth only at 2 to 3 spots with composite resin.

Figure 5: Final preparations.

Figure 6: Gingival retraction.

Figure 7: Impression.

In the lab the working cast was scanned and the laminate veneers were manufactured with computer-aided manufacturing after the step of computer-assisted design using CAD/CAM indirect technique.

Every laminate veneer requires always a try-in step to confirm fit, insertion retention, marginal integrity, esthetic, occlusion relationship. The internal surfaces of the veneers were etched with 9.5% hydrofluoric acid for 20 seconds (as per the manufacturer's instructions). The surfaces were washed with water, and silanized with a silane coupling agent and 37% phosphoric acid was applied on preparations for 60 seconds (Total Etch, Ivoclar Vivadent). The adhesive agent was applied on the enamel and photo-cured for 20 seconds the luting cement was initially light cured for 1-2 seconds and excess was gently removed using a no. 12 blade, followed by thorough curing of the luting agent [15].

Follow Up

After two months, the patient came back and complained of debonding of the two veneers. After a thorough investigation she has informed us that the decementation was occurred by pen bitting as a parafunctional habit not declared during the initial clinical exam. Esthetic correction with glass ceramic lithium disilicate crowns (IPSe. maxCAD, Ivoclar Vivadent) was Once more used for maxillary central incisors. Lithium disilicate crowns were indicated as all ceramic esthetic because they have been considered as a desirable restoration for a bi-layer crown due to its sufficient strength properties and more tooth-like appearance. The new decision was to change the protocol undertaken in the last preparations. The modifications were in favor of full coverages on #11 and #21 to ensure retention on behalf of the longevity of these restorations. The preparations were carried on with diamond bur with a finish line as a deep chamfer and respecting the shared preparation principles in the anterior for all systems (i.e., single-unit and FPD abutment) (Figure 8) [16]. It was extended to the proximal and lingual faces of the two central incisors.

Figure 8: Preparation for two glass ceramic crowns.

Most CAD/CAM and copy milling systems recommend that the minimum axial wall reduction for anterior crowns is 1 mm to 1.5 mm. The total occlusal convergence angle can range between 4° to 6° (Figure 9). The interim crowns were performed with acrylic resin using the index and cemented with temporary cement. After final impression, the working cast was scanned and frameworks were manufactured using CAD/CAM indirect technique and tried in the mouth to check marginal fit, stability and the space left for cosmetic. After performing ceramic stratification in the lab, in the clinic glass ceramic lithium disilicate ceramic crowns were tried again to verify esthetic, occlusion relationship and cemented using dual cure adhesive cement.

Figure 9: Cementation of two glass ceramic crowns.

Discussion

The use of porcelain laminate veneers to solve aesthetic and/or functional problems has been shown to be a great treatment option [17,18]. Treatments of fluorosed include microabrasion, direct composite restorations, esthetic veneers or crowns or combination of the above mentioned techniques [19]. Although vital bleaching does improve the esthetics to certain extent it has only met with partial success in regard to moderate to severe fluorosis [1]. Bonding procedure to the fluorosed enamel and dentin can be challenging. Some modifications in the preparation etching time and selection of adhesive system had been reported [5-6] in the mild or moderate cases of fluorosis [20,21]. The best etching result were obtained at 30 seconds for the moderate fluorosed enamel, Torres [22]. Etch-and-rinse systems provide the highest bond strength to fluorosed enamel [23].

Nevertheless, etch-and-rinse systems are not recommended for bonding the dentin in the affected teeth [24,25]. A study of Porcelain laminate veneers intitled clinical survey for evaluation of failure conducted by Diemah F. and et al. concluded that three patients showed incisal wear due to bruxism and one patient showed debonding due to pen biting. Parfunctional habits can increase microleakage and gap formation, which may impair the retention of porcelain laminate veneers [26]. Patients with bruxism or tooth-to-foreign object contact may not be ideal candidates for veneers. In cases of minor incisal wear owing to bruxism, it is often possible to restore the incisal length using PLVs. It is very important to evaluate the occlusal scheme and manage the occlusal forces before any treatment with PLVs is attempted in these cases; an occlusal guard is indicated to assist in the prevention of postoperative ceramic fracture [27].

In this clinic case the early deboning of the two veneers was likely due to the insufficient time necessary for etching related to fluorosis or caused by the deep bite during functional occlusion. Whereas elsewhere the patient reported a dislodgment of her two laminate veneers related to her parafunctional habit. On another hand the use of all ceramic crowns instead of laminate veneers provide an enhancement of retention and strength.

Conclusion

Failures of laminate veneers can be one of the more technically challenging procedures dentists perform .They are likely due to

a lack of clinical skills, operator experience and clinician ability to select the appropriate case through a thorough clinical examination Glass ceramic crowns, as full-coverages, constitute an alternative to Porcelain laminate veneers restorations related to a failure caused by a par functional habits.

References

1. Sherwood IA (2010) Fluorosis varied treatment options. Journal of Conservative Dentistry 13(1): 47-53.
2. Jain AR, Varma S, Hemakumar V (2016) Evaluation of Esthetic Rehabilitation of Teeth with Severe Fluorosis Using Direct and Indirect Laminate Veneer: A Case Report. Biol Med (Aligarh) 8: 358.
3. Nazirkar G, Meshram S (2011) An Evaluation of Two Modern All-Ceramic Crowns and their comparison with Metal Ceramic Crowns in terms of the Translucency and Fracture Strength. International Journal of Dental Clinics 3(1): 5-7.
4. Diemah F Alhekeir, Rana A Al Sarhan, Abdulmohsen F (2014) Porcelain laminate veneers: Clinical survey for evaluation of failure Al MashaanSaudi Dent J 26(2): 63-67.
5. Burcin Akoglu Vanlıoglu, Yasemin Kulak Ozkan (2014) Minimally invasive veneers: current state of the art Clin Cosmet Investig Dent 6: 101-107.
6. Goldstein RE, Haywood VB (1998) Principles, Communications, Treatment Methods. In: Esthetics in Dentistry. 2nd (Edn.). 1: 470.
7. Gurel G, ed (2003) The science and art of porcelain laminate veneers. Carol Stream, IL: Quintessence Publishing Co.
8. Christensen GJ (1985) Veneering of teeth. State of the art. Dent Clin North Am 29(2): 373-391.
9. Aristidis GA, Dimitra B (2002) Five-year clinical performance of porcelain laminate veneers. Quintessence Int 33(3): 185-189.
10. Fradeani M, Redemagni M, Corrado M (2005) Porcelain laminate veneers: 6 to 12 year clinical evaluation-a retrospective study. Int J Periodontics Restorative Dent 25(1): 9-17.
11. Magne P, Douglas WH (2000) Cumulative effects of successive restorative procedures on anterior crown flexure: intact versus veneered incisors. Quintessence Int 31(1): 5-18.
12. Pincus C (1938) Building mouth personality. J Calif State Dent Assoc 14: 125-129.
13. Peumans M, Van Meerbeek B, Lambrechts P, Vanherle G (2000) Porcelain veneers: a review of the literature. J Dent 28(3): 163-177
14. Anusavice KJ (1992) Degradability of dental ceramics. Adv Dent Res 6: 82-89.
15. Kapil J, Harsh H S,Ashutosh P, Viral P, Shrikant P (2015) Aesthetic Management of Fluoresced Teeth with Ceramic Veneers and Direct Composite Bonding – An Overview and A Case Presentation Clin Diagn Res 9(6): ZD28-ZD30.
16. Raigrodski AJ (2003) Clinical and laboratory considerations for the use of CAD/CAM Y-TZP-based restorations. Pract Proced Aesthet Dent 15: 469-76
17. Dlugokinski MD, Frazier KB, Goldstein RE (2002) Restorative treatment of Diastema. Esthetic in Dentistry (Vol 2) In: RE Goldstein, VB Hoywood (Eds.). 2nd (Edn.). BC Decker Inc. London, UK, pp: 703-732.
18. Jordan RE, Suzuki M, Senda A (1998) Clinical evaluation of porcelain laminate veneers: a four- year recall report. Journal of Aesthetic & Restorative Dentistry 1(4): 126-132.
19. Denbesten P, Li W (2011) Chronic fluoride toxicity: dental fluorosis. Monogr Oral Sci 22: 81-96.
20. Ermis RB, De Munck J, Cardoso MV, Coutinho E, Van Landuyt KL, et al. (2007) Bonding to ground versus unground enamel in fluorosed teeth. Dent Mater.
21. Weerasinghe DS, Nikaido T, Wettasinghe KA, Abayakoon JB, Tagami J (2005) Micro-shear bond strength and morphological analysis of a self-etching primer adhesive system to fluorosed enamel. J Dent 33: 419-426.
22. Gallegos I, Zavala Alonso V, Patino Marin N, Martinez Castanon GA, Anusavice K, et al. (2012) Enamel roughness and depth profile after phosphoric acid etching of healthy and fluorotic enamel. Aust Dent J 57: 151-156.
23. Rtugrul F, Turkun M, Turkun LS, Toman M, Cal E (2009) Bond strength of different dentin bonding systems to fluorotic enamel. J Adhes Dent 11: 299-303.
24. Waidyasekera PG, Nikaido T, Weerasinghe DD, Tagami J (2007) Bonding of acid-etch and self-etch adhesives to human fluorosed dentine. J Dent 35: 915-922.
25. Ermis RB, Gokay N (2003) Effect of fluorosis on dentine shear bond strength of a self-etching bonding system. J Oral Rehabil 30: 1090-1094
26. Heymann HO, Sturdevant JR, Bayne S, Wilder AD, Sluder TB, et al. (1991) Examining tooth flexure effects on cervical restorations: a two-year clinical study. J Am Dent Assoc122: 41-47.
27. Vanlıoglu BA, Kulak Ozkan Y (2014) Minimally invasive veneers: current state of the art Clin Cosmet Investig Dent 6: 101-107.