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(CASE REPORT)

Aesthetic rehabilitation of diastema closure with lithium disilicate veneers: A case report

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Abstract

The worth of one's teeth from a merely cosmetic perspective has increased in significance in today's society. There are numerous ways to handle challenges that occur in the area of high aesthetic sensitivity. Every form of treatment has its advantages and disadvantages as well. The use of ceramic veneers is becoming increasingly common in esthetic dentistry. This is considered as highly functional and esthetic indirect restoration with minimally invasive preparation. The success of a restorative treatment in anterior teeth depends on the esthetic integration between soft tissues and hard tissues. Aesthetic management of diastema using veneers is nowadays a well-established method. The purpose of this clinical report is to describe a conservative treatment approach to recover an esthetic disharmony caused by multiple maxillary diastemas.

Keywords: Veneers; Esthetics; Laminates; Diastema closure

1. Introduction

The presence of diastemas—caused by variations in tooth size—is one of the aesthetic concerns of a smile. A common aesthetic concern among patients is maxillary midline diastema (MMD). A distance more than 0.5 mm between the proximal surfaces of the two central incisors is referred to as MMD. During the primary and mixed dentition, the space may be a natural growth characteristic, but it usually closes by the time the maxillary canines erupt. However, the diastema does not always close on its own for individuals.. Treatment is mainly for esthetic and psychological reasons, rather than functional ones[(1).]

Esthetic treatment of diastema closure sometimes presents a challenge in clinical practice. With the emergence of esthetic dentistry, dental professionals have offered novel possibilities for conservative and aesthetic restoration approaches.

With the advancements in the area of cosmetic dentistry the dental professionals have been offered new opportunities in conservative and esthetic restorative procedures. Every form of treatment has its benefits and drawbacks.It has been proven that the application of porcelain laminate veneers to treat aesthetic and/or functional issues is an acceptable option, particularly for the anterior aesthetic zone [(2)]. Recent bonding chemicals and dual cure cements can be used to adhere them to the facial surface of anterior teeth.[(3).]

By the year 1938, Charles Pincus had introduced veneers into dentistry. The development of the silica resin direct filling material by Bowen in 1958 and the acid etch process by Buonocore in 1955 respectively spurred interest in laminate veneers.[(4)]

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Furthermore to the silanization of veneers and the introduction of bonded porcelainveneer in the early 1980s (Horn, 1983)[2], they are made of either by directly applying composite on the tooth surface or cementing processed composite, porcelain or pressed ceramic materials[1] . With the limited tooth preparation required, this surgery is highly conservative and produces excellent aesthetic outcomes in just two sittings. These acquire the strength of enamel when they are bond to enamel and approximate the strength of the original tooth structure. PLV has improved the outcomes' predictability. According to Peumans et al. (2004), survival rates have ranged from 92% at 5 years to 64% at 10 years.[2]Carefully placed PLV have reported very high survival rates of over 90% after 9 years, emphasising the need for careful patient selection and procedure (Strassler & Nathanson, 1989; Dunne & Millar, 1993).

This case report focuses on a diastema closure by using porcelain laminate veneers.

2. Case report

2.1. Diagnosis and Treatment Planning

A 37 year old female patient reported to the OPD of Department of Prosthodontics, Crown and Bridge & Implantology inKD Dental College and Hospital , Mathura with a chief complaint of discolored anterior teeth and gaps between the teeth. The patient was concern about her looks. On examination, diastemas were found in her maxillary anterior region involving both the centrals and laterals on both the side. (Figure 1) Patient had canine guided occlusion.

Figure 1 Preoperative View

She was previously referred to the orthodontic department. After analyzing the teeth proportions and calculating the Bolton Index, no orthodontic treatment was necessary for this case.

Oral examination revealed the presence of diastema between the maxillary anterior teeth of 1 to 2 mm evenly distributed. The teeth were caries free. Her oral hygiene was good.After thorough examination,complete radiographic and photographic data was recorded. impressions for diagnostic models were made in irreversible hydrocolloid (Algitex, DPI, India).

The models were studied to decide the shape and size of the restorations with help of a diagnostic wax up. To provide a long term solution, the patient was provided the option of PLV for the maxillary anteriors.

2.2. Mock Up Procedure

Composite mock up was done on the patient with respect to tooth 11 12 21 22 . (Figure 2).Any desired modification by the patient was examined, discussed, and modified on the subsequent appointment.

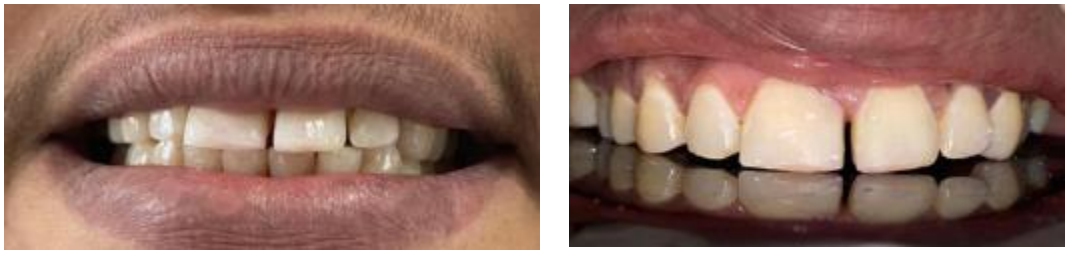

Figure 2 Mock up with composite

Four ceramic veneers were required to improve the patient's smile without impairing her occlusion. The final treatment plan was approved after form and function were evaluated and after patients consent .

2.3. Dental Preparation

At the onset of the treatment, thorough scaling and polishing was done. Before proceeding for tooth preparation, shade was selected using Vitapan Classical shade guide (Vita Zahnfabrik, Germany). The maxillary teeth were then prepared from right lateral incisor to the left lateral incisor to receive porcelain laminate veneers .Diamond burs of pre established depths are used to perform the reduction.

A Cervical groove is created with a rounded diamond bur to initiate a sketch of the future cervical finish line. Three horizontal groove are made with a depth marker bur on the labial surface. Then reduction of the labial surface was performed in three different inclinations (cervical, middle, and incisal thirds) at an enamel depth of 0,5-0,7 mm (Figure 3). Type III (Wrap around or 3/4 preparation} was done for the proximal coverage to avoid the visibility of the margin and the appearance of a black triangle. Incisal edge reduction of 1.5 mm was performed. Chamfer finish line was maintained in the cervical region at the level of the gingival margin.

Figure 3 Tooth preparation wrt 11 12 21 22

Gingival retraction was performed using Smart Retract . Polyvinylsiloxane impression material (light and putty) one step technique was used to make a full-arch impression.(Figure 4)

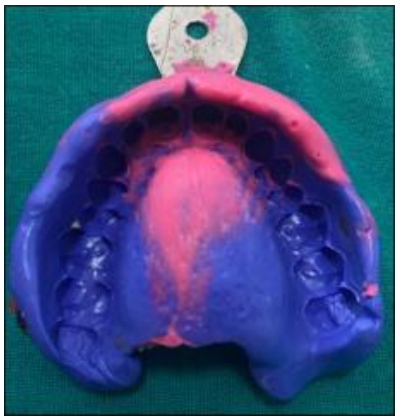

Figure 4 Final Impression

Provisionalisation was done using artifical tooth facing wrt 11 12 21 22 (Figure 5)

Figure 5 Provisionalisation

Ceramic laminate veneer restorations were fabricated with a VITABLOCS TriLuxe forte (VITA ZahnFabric Germany): polychromatic, tooth-colored feldspar blanks with integrated shade gradient to reproduce the natural play of colors using CAD/CAM technique (Figure 6). The ceramic veneers were designed on the computer and milled

Figure 6 IPS E.max Press Veneer Layering

The laminates were tried in for shade, fit, marginal adaptation, shape, size, symmetry and contacts. First they were tried-in individually using glycerin as a holding medium. After individual evaluation, collective try-in was done to appreciate the esthetic enhancement. Patient's approval was obtained at the time of try-in.

2.4. The cementation appointment:

2.4.1. Laminate Preparation

The laminates were arranged on a wax sheet denoting the position of the tooth in the arch to avoid incorrect placement and inadvertent breakage. The laminates were etched with 9 % Hydrofluoric acid (Ultradent Porcelain Etch Refill) for 2 minutes carefully avoiding contact on the facial surface . After etching, they were washed thoroughly using liberal amount of water. On drying, a coat of Silane coupling agent (Angelus Silano) was applied (Figure 7) .

Figure 7 Laminate Preparation

2.4.2. Tooth Preparation

The procedure for cementation was performed on two teeth at a time starting at the midline. The prepared teeth were etched using 37% Phosphoric Acid (Ivoclar Vivadent Eco Etch Phosphoric acid gel) for 15 seconds. On air drying bonding agent (Dentsply Prime & Bond Universal) was applied & light cured for 10 seconds. Dual cure composite crown and bridge luting agent (Dentsply Sirona Callibra Universal Self Adhesive Resin Cement) was used for cementation. The laminates were spot cured for 5 seconds initially. Excess cement was removed with explorer and then complete curing was done for 20 seconds.

On completion of the cemen-tation procedure, the occlusion was checked in centric and eccentric positions for interferences. The high points were removed and polished.

Figure 8 Preoperative and Postoperative View

3. Discussion

Maxillary anterior diastema can negatively affect the smile and have adverse psychological impact on an individual's social and professional life. The closure of diastema has become one of the aesthetic requirements of patients.[4] The first line of treatment for diastemas is to identify the cause. The following aspects may contribute to the aetiology of diastema[5, 6] Hereditary concerns include congenitally missing teeth, an imbalance between the size of the teeth and jaws, supernumerary teeth, and frenum attachments. Dental problems include poor habits, periodontal disease, tooth loss, and posterior bite collapse.Treatment planning for diastema correction include orthodontic closure, restorative therapy, surgical correction or multidisciplinary approach depending upon the cause of diastema. The restorative closure of diastema can be achieved by using any of the techniques mentioned ; direct composite veneers, indirect composite veneers, porcelain laminate veneers, all ceramic crowns, metal ceramic crowns and composite crowns.[2, 7]

Recently, porcelain laminate veneers have been widely and effectively used to treat diastemas, with high esthetic results [8]. Adult patients may refuse to opt for orthodontic treatment because of the lengthy process and the need for immediate esthetic results. In the present case, orthodontic treatment was treatment of choice but due to time concerns patient request was the closure of the diastemas in a short time with long-term esthetic results.

Smiles can be transformed painlessly, conservatively and quickly with dramatic, long-lasting results with the successful use of the porcelain laminate veneer. Tissue response is excellent, and the finished surface is very similar to the natural tooth. Veneers exhibit natural fluorescence and absorb, reflect, and transmit light exactly as does the natural tooth structure[8] .

The subsequent introduction of special acid etching techniques has improved the long-term retention of veneers.[9]. Simonsen and Calamia demonstrated that the bond strength of hydroflfluoric acid-etched and silanated veneer to the luting resin composite is generally greater than the bond strength of the same luting resin to the etched enamel surface[10].

Besides the creation of an esthetic proportion, another challenge involved how to prevent the formation of a black triangle between the central incisors. The appearance of the surrounding soft tissue is of major importance, and various techniques have been developed to guide and optimize its topography [11]. It is possible to condition gingival tissue for the formation of papillae with non surgical procedure. The soft tissue topography is guided prosthetically. This required work in the gingival architecture based on the concepts of cervical contouring [12] and location of the contact point[13]. In this approach, Intrasulcular placement of the cervicoproximal margins is required to improve management of the emergence profile. This leads to a more gradual and natural closure of the diastema[14, 15]

4. Conclusion

Bonded porcelain veneers can provide successful esthetic and functional long-term service for patients. Porcelain laminate veneers offers moreextensive applications when they are used cautiously and the results achieved have been gratifying for the cosmetic dentist and the patient alike. It has become increasingly apparent that conservation of tooth structure is a major factor in determining the long-term prognosis of any restorative procedure[2].

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

No conflict of interest

Statement of informed consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient has given her consent for her images and other clinical informationto be reported in the article.

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