

## Esthetic Closure of Diastema by Porcelain Laminate Veneers: A Case Report

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### Abstract:

From a purely cosmetic standpoint, value of the appearance of one's teeth has taken on a greater importance in today's society. Multiple options are available to treat the problems arising in the zone of high esthetic sensitivity. Every treatment modality offers some advantages and disadvantages. The use of porcelain laminate veneers to solve esthetic and/or functional problems has been shown to be a valid management option especially in the anterior esthetic zone. This case report discusses a patient having diastema in the anterior region with discolored and chipped off old composite restorations. The patient was treated with porcelain laminate veneers in the maxillary arch for the closure of diastema and replacement of old worn out restoration to obtain satisfactory esthetic result.

**Key Words:** Diastema, Esthetics, Porcelain, Veneers.

### Introduction:

Confidence is important aspect of one's personality and confident smile makes the picture complete. From a purely cosmetic standpoint, the value of the appearance of one's teeth has taken on a greater importance in today's society. People are giving an increasing importance to a healthy and attractive smile. With the advancements in the area of cosmetic dentistry the dental professionals have been offered new opportunities in conservative and esthetic restorative procedures. Multiple options are available to treat problems arising in the zone of high esthetic sensitivity. Every treatment modality offers some advantages and disadvantages. The use of porcelain laminate veneers to solve esthetic and/or functional problems has been shown to be a valid management option especially in the anterior esthetic zone. The techniques and the materials employed to fabricate porcelain laminate veneers offer satisfactory, predictable and lasting results.

There are various ways to treat cosmetic dental problems depending upon the problem per se. Diastema, tooth size discrepancy, discolorations, staining, fractures in teeth, endodontic treatment, and smile designing are some of the reasons for which patient seek esthetic dental treatment. Some restorative techniques are conservative such as use of adhesives and lasers while others are subtractive methods.

Porcelain laminate veneers (PLV) were introduced into dentistry around 1938 (Pincus, 1938). With the introduction of acid etch technique by

Buonocore (1955) and silica resin direct filling material by Bowen (1958), interest was generated in PLV. Coupled with silanization of veneers and the introduction in the early 1980s of bonded porcelain veneer (Horn, 1983), the results with PLV have become more predictable. Survival rates have ranged from 92% at 5 years to 64 % at 10 years (Peumans et al, 2004). Carefully placed PLV have reported very high survival rates of over 90% after 9 years stressing the need for the proper case selection and technique (Strassler & Nathanson, 1989; Dunne & Millar, 1993). This case report focuses on a multiple diastema closure by using porcelain laminate veneers.

### Case report :

A 31 year old female patient reported to the OPD of Department of Prosthodontics, Crown and Bridge & Implantology in People's College of Dental Sciences and Research Centre, Bhopal with a chief complaint of discolored anterior teeth and gaps between the teeth. The patient was unhappy with the appearance of her teeth and restrained herself from smiling due to self-consciousness. On examination, diastemas were found in her maxillary and mandibular anterior region involving the first premolar on the maxillary left side (Fig. I & Fig. II). Maxillary left second premolar was Patient had group function occlusion.



Fig. I:Extraoral pre-treatment photograph.

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Fig. II: Intraoral pre-treatment photograph showing diastema and discolored composite restorations.



Fig. III: Photograph showing tooth preparation for porcelain veneers

missing. The first molar on same side of maxilla was root canal treated and had a full coverage gold crown with occlusal perforation and short gingival margins. Patient had undergone composite veneering on her maxillary incisors which got discolored and chipped off.

After thorough examination, impressions for diagnostic models were made in irreversible hydrocolloid (Heraplast, Heraeus Kulzer, USA). 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. The patient agreed and opted for maxillary correction only as the mandibular anteriors were less visible.

At the onset of the treatment, thorough scaling and polishing was done. The gold crown on the maxillary left molar was replaced by a metal ceramic crown. Before proceeding for tooth preparation, shade was selected using Vitapan Classical shade guide (Vita Zahnfabrik, Germany). The maxillary teeth were then prepared from right first premolar to the left first premolar to receive porcelain laminate veneers. The tooth preparation was kept in enamel at a depth of 0.5 mm using a depth cutting diamond and a tapered diamond 1 mm in diameter. 0.25 mm chamfer was maintained in the cervical region (Fig. III). The chamfer finish lines were kept at the level of gingival margin.

The length of the extruded left maxillary lateral incisor was adjusted corresponding to the incisal plane. The incisal chamfer was extended palatally as little increase in height was desirable. The centric stops were carefully avoided during preparing the palatal finish line. The proximal preparation was extended beyond the contact area to avoid visibility of the tooth restoration junction.

After finishing the sharp line angles and point angles, gingival retraction was performed. Impression of the maxillary arch was made in addition silicone (Affinis, Colte'ne Whaledent) by single step double mix technique (Fig. IV). In this technique a prefabricated perforated tray was coated with tray adhesive (Coltene adhesive, Coltene Whaledent) and putty consistency addition silicone was loaded on the tray. At the same time light body material was syringed around the prepared teeth to record the fine details and the previously loaded tray was inserted in the mouth to make the impression. Provisional restorations were not required as the tooth reduction was minimal and restricted to enamel. The porcelain laminates were fabricated by refractory die technique (IPS d.SIGN Ivoclar Vivadent, USA). 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.

*The cementation appointment:*

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 4 % Hydrofluoric acid (Porcelain Etchant, Bisco, USA) for 3 minutes carefully avoiding contact on the facial surface (Fig.V). After etching, they were washed thoroughly using liberal amount of water. On drying, a coat of Silane coupling agent ( Porcelain Primer, Bisco, USA ) was applied (Fig.VI) .

Tooth Preparation: The procedure for cementation was

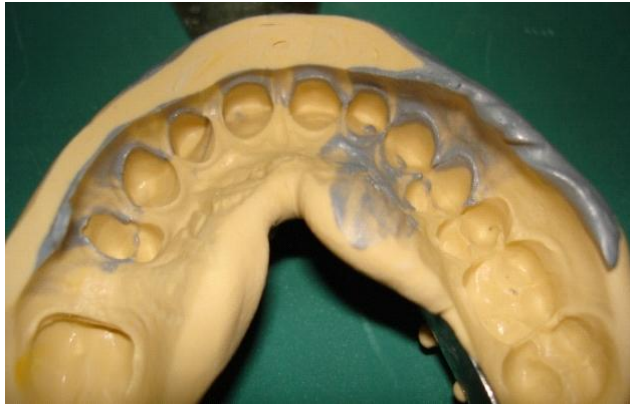


Fig. IV: Photograph showing impression made in addition silicon impression material.



Fig.V: Photograph showing Laminates after etching with hydrofluoric acid.



Fig. VI: Photograph showing silane coupling agent applied on fitting surface of veneers.



Fig.VII: Intraoral post treatment photograph.

performed on two teeth at a time starting at the midline. The prepared teeth were etched using 37% Phosphoric Acid (Meta Etchant- 37, Meta Biomed Co. Ltd, Korea) for 15 seconds. On air drying bonding agent (Meta P & Bond, Meta Biomed Co Ltd, Korea) was applied & light cured for 10 seconds. Dual cure composite crown and bridge luting agent (Duolink, Bisco, USA) 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 cementation procedure, the occlusion was checked in centric and eccentric positions for interferences. The high points were removed and polished (Fig.VII & Fig. VIII).



Fig.VIII: Extraoral post treatment photograph.

**Discussion:**

The etiology of diastema may be attributed to the following factors: (a) Hereditary- congenitally missing teeth, tooth and jaw size discrepancy, supernumerary teeth & frenum attachments; (b) Developmental problems- habits, periodontal disease, tooth loss, posterior bite collapse (Oesterle & Shellhart, 1999). Treatment planning for diastema correction include orthodontic closure, restorative therapy, surgical correction or multidisciplinary approach depending upon the cause of diastema (Dlugokinski et al, 2002). 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 ((Dlugokinski et al, 2002; Rammelsberg et al, 2005).

Composite resin and porcelain are the most frequently used veneering material for diastema closure conservatively. Smaller diastema can be closed with microfilled and hybrid resins if the diastema is about 1- 1.5 mm in dimension. Composite resin is easy to use, requires less appointments, is economic but offers less wear resistance and surface staining, which makes it inferior to dental porcelain. Besides, failure of the same prompted the patient to opt for porcelain laminates in the current case (Cho et al, 1998).

It has become increasingly apparent that conservation of tooth structure is a major factor in determining the long term prognosis of any restorative procedure. One of the most important advantages of bonded porcelain veneers is that they are extremely conservative in terms of tooth reduction. In the current case, only 0.5 mm reduction on the labial surface was done. This minimal reduction rarely, if ever, leads to pulpal involvement which is a major advantage. The highly glazed surface of the porcelain laminates prevents plaque accumulation, considered important to attain a healthy periodontal response. Excellent esthetics could also be achieved due to lifelike appearance of porcelain and scattering effect of the luting cement.

However, porcelain laminates have their own limitations too. They should not be used when remaining enamel is inadequate to provide adequate retention. Large Class IV defects should probably not be restored with veneers because of the large amount of unsupported porcelain and the lack of tooth-colored backing. The amount of unsupported porcelain should be carefully evaluated in cases with a large diastema. Darkly stained teeth are not optimally restored with veneers. The prognosis for veneers in bruxing is doubtful. Certainly, such patients should be instructed to use a night guard after final restoration (Sheets & Taniguchi, 1990).

Even, if the laminates fail in the long run, the conserved tooth can still be treated with a full crown restoration. Porcelain laminate veneers offer a predictable and successful treatment modality that preserves a maximum of sound tooth structure. An increased risk of failure is present only when veneers are partially bonded to dentin. The estimated survival probability of porcelain laminate veneers over a period of 10 years is 91% (Dumfahrt & Schäffer, 2000).

**Conclusion:**

Bonded porcelain veneers can provide successful esthetic and functional long-term service for patients. Porcelain laminate veneers offers more-extensive 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.

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