



Enhancing Dental Esthetics with Laminate and Veneers: A Case Report

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Abstract

Aesthetic dentistry has evolved significantly with the advent of laminates and veneers, offering conservative yet highly effective solutions for restoring form, function, and esthetics of anterior teeth. Dental veneers—thin layers of restorative material, commonly porcelain or composite resin—are bonded to the labial surfaces of teeth to correct discolorations, minor malformations, misalignments, and surface defects. Porcelain laminates, in particular, exhibit excellent optical properties, biocompatibility, and resistance to staining, closely mimicking natural enamel. Advances in adhesive technology, ceramic materials, and minimally invasive

tooth preparation techniques have enhanced their longevity and predictability. Careful case selection, meticulous shade matching, and precise bonding protocols are critical to achieving durable and esthetically pleasing outcomes. This paper reviews the classification, materials, indications, techniques, and clinical considerations involved in the use of laminates and veneers as integral components of modern esthetic restorative dentistry.

Keywords: Laminates, Veneers, Esthetic Dentistry, Porcelain, Adhesive Bonding, Minimal Invasive Dentistry.

Introduction

Dental diastema is characterized by a gap exceeding 0.5 mm between the proximal surfaces of neighboring teeth, resulting from various multifactorial causes¹. Patients are particularly concerned about maxillary anterior midline diastema because it impacts their appearance and self-esteem. Developmental disturbances, pathological migration, iatrogenic factors like mesiodens, microdontia, hypodontia, or unfavorable oral habits, high frenum attachment, etc., can all be the cause of midline diastema. The prevalence of midline diastema in adults ranges from 1.6% to 25.4%². Esthetically treating diastema closure is a challenging task for clinicians. Orthodontic treatment, direct and indirect composite restorations, and prosthetic restoration using full veneer crowns or laminate veneers can frequently effectively manage such diastemas.

Laminate veneers are a popular choice for the aesthetic treatment of diastema because of their mechanical qualities, color stability, resolution, and biocompatibility. Charles Pincus first used veneers in dentistry in 1938. Laminated veneers became the preferred treatment after Buonocore⁴ introduced the acid etch technique in 1955 and Bowen³ introduced silica resin direct filling material in 1958. Horn's 1983 introduction of bonded porcelain veneer and silanization of veneers have made laminate veneer results more predictable⁵. This case study focuses on a sequential strategy to closing the maxillary midline diastema using ceramic laminate veneer made of lithium disilicate glass.

Case Report

A 32-year-old female patient reported with a chief complaint of spacing in her upper front teeth and wanted it esthetically corrected. A clinical analysis showed a 5 mm maxillary midline diastema. Her dentition was healthy and periodontal tissues were sound. Although the

patient's oral hygiene was generally good, there were insignificant stains and calculus. Oral prophylaxis was suggested as her course of treatment followed by orthodontic correction of maxillary midline diastema.

The patient chose not to undergo orthodontic treatment due to time constraints. The patient was advised to go with lithium disilicate laminate veneers to close the anterior midline diastema. The patient chose the treatment plan after being informed of the risks and limitations associated. Informed consent was then obtained for the same.

Sequential method

Diagnostic impressions were made to obtain a study model. The model was poured using type III gypsum product (Kalabhai Karson Pvt LTd Mumbai, India.). Diagnostic wax up was done with maxillary central incisors to show the predictable outcome prior to the treatment. Before veneer preparation the shade selection was done using vita shade guide.

In order to determine the depth for preparation guidance, depth orientation grooves were created using the depth cut bur, and then the tooth surface was marked with a pencil. To achieve a chamfer finish line at the equigingival margin, the tooth preparation was maintained in enamel at a depth of 0.5 mm using a round-end tapered fissure diamond bur. The butt joint preparation technique with the incisal overlap was selected as the preparation method. The gingiva was displaced apically and laterally using gingival retraction cord. (000 Ultra Pak. The image showing final preparation prior to impression making. Impressions were made using a double mix double impression technique with silicone material (Hydroise, Zhermack). CAD/CAM polymethylmethacrylate provisional restoration was fabricated and non-eugenol temporary cement was the material chosen to cement the temporary

restorations that were fabricated (Meta Biomed, Meta Netc, Korea). The lithium disilicate veneers were tried in for shade, marginal fit, shape, symmetry and contacts and patient's approval was taken. The definitive anterior lithium disilicate glass ceramic prosthesis was obtained. Veneers' inner surfaces were etched for 10 seconds using 9.6% hydrofluoric acid (porcelain etch gel, Pulpdent, USA), rinsed and dried, and then silane agent () was applied for 60 seconds. The prepared teeth were etched with 37 % phosphoric acid for 20 seconds (), rinsed and dried and then the bond enhancer was applied to the tooth surface thoroughly, gently air dried and then cured () and the excess cement was removed. Zirconia monolithic prosthesis were cemented resin modified Glass Ionomer Cement (3M Rely X, USA).

Discussion

Diastases do in fact compromise aesthetics. A midline diastema has a multifactorial etiology and is more common in the maxilla than the mandible⁶. A clinical examination, radiographic analysis, dental history, and medical history are used to diagnose a diastema. There are various methods for managing diastemas once the cause has been identified. The options include surgical intervention, direct and indirect composite restoration, orthodontic correction, and prosthetic restoration using laminate veneers or full veneer crowns.

A basic Hawley retainer can close small diastemas in three to six months. However, in cases where there are multiple diastemas with malocclusion, orthodontic treatment is typically indicated. One of the more reliable and affordable treatment options is composite restorative material. Composite resin can be used to manage diastemas up to 1-1.5 mm, but it has drawbacks, such as being less wear-resistant and eventually building up stains.

The lithium disilicate structure can achieve flexural strength comparable to enamel (360-400 MPa) and biaxial flexural properties⁸. The strength is three times that of feldspathic ceramics. The substrate contains approximately 70% ceramic crystals. Despite its high crystalline content, the material has a low refractive index, making it highly translucent. It adheres to enamel and dentin and improves bond strength after microetching with 9% hydrofluoric acid⁹. Morimoto, et al. conducted a systematic review of 899 studies, but only 13 were analyzed. The review found an overall survival rate of 89% at nine years. Interestingly, glass-ceramic veneers had a higher survival rate (94%) than feldspathic porcelain veneers (87%).¹⁰

Incisal preparation can be divided into 2 broad categories: overlap and nonoverlap. The literature contains four distinct veneer preparation designs. 1) Intraenamel (window preparation), which preserves the tooth's incisal edge 2) Feather edge preparation: this involves making the tooth's incisal edge bucco-palatal but leaving the incisal length unaltered. 3) Bevel preparation (palatal chamfer), in which the tooth's incisal edge is prepared bucco-palatal and its length is barely shortened. 4) Bucco-palatal incisal overlap preparation (butt joint), where the tooth's incisal edge is prepared, and the veneer is extended to the tooth's palatal aspect because the length is shortened. The palatal chamfer and butt joint designs fall under the overlap category, while the window and feathered-edge preparation designs fall under the nonoverlap category.¹¹

In the study that was presented, incisal overlap (the butt joint) was prepared. The benefits of incisal overlap include thicker ceramic and reinforcement of the incisal edge, positive seating of ceramic veneers, and masking of the otherwise visible incisal finish line. Calamia stated

that the main cause of the low fracture rates was the butt joint's incisal overlap design.

An investigation conducted in vitro, Castelnuevo and associates demonstrated that the butt joint and feathered edge groups exhibited the highest fracture resistance¹². The authors explained that the butt joint preparation design was superior to the palatal chamfer preparation design for a number of reasons, such as its easier preparation, easier insertion into the palatal cavity, higher fracture strength, decreased chance of thin, unsupported palatal ceramic ledges breaking, better aesthetics at the incisal third of veneers, better bonding to exposed enamel prisms, easier impression, and easier finish line identification on the model.¹³

The butt joint preparation design showed a more favorable stress distribution for the four loading conditions than the feathered-edge design, according to a photoelastic analysis that contrasted the two designs for butt joint incisal preparation¹⁴. In a prospective clinical study, Guess and colleagues reported that veneers with a butt joint incisal preparation design had a marginally higher survival rate than veneers with a palatal chamfer design.¹³

The veneer was prepared with a chamfer finish line and an overall thickness of 0.5 mm. Gingival retraction chord (000) was used to perform the mechanical gingival retraction taking the patient's gingival biotype into account. One of the most important factors before creating an impression is gingival retraction. It aids in defining the finish line, which is the point where the prepared and unprepared teeth meet. Elastomeric impression material and silicone were used to create the impressions. The double mix double impression technique was used to make the impressions. The bonding process is heavily reliant on the teeth's structure, the ceramic veneers' condition, the materials used to

bond the veneers, and the tooth's preparation in order to produce the best results.¹⁴

Conclusion

A confident smile completes the image, and self-confidence has a direct impact on one's personality. Because lithium glass ceramic veneer is thin and translucent, it offers good aesthetics for midline diastema closure. The procedure is minimally invasive and has predictable results. Laminates, however, have drawbacks of their own; they shouldn't be applied when the remaining enamel is insufficient to offer sufficient retention. The prognosis for cases of midline diastema is contingent upon knowledge of the diastema's etiology and appropriate treatment selection. The choice of veneer material and the technique used for veneer preparation determine the success of ceramic laminate veneer.



Figure 1: Pre- operative extraoral photograph



Figure 2: Pre-operative maxillary occlusal view



Figure 3: Pre-operative mandibular occlusal view



Figure 4: Depth orientation grooves made with depth cut bur



Figure 5: Tooth preparation done for laminate veneer



Figure 6: Gingival retraction using 000 retraction cord



Figure 7: Gingival retraction done



Figure 8: Etching of the tooth and laminates done



Figure 9: Bonding done



Figure 10: Dual cure resin applied



Figure 11: Curing of the dual resin



Figure 12: Post-operative intraoral photograph



Fig 13: Post- operative extraoral photograph

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