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Aesthetic Management of Maxillary Diastema Using Porcelain Laminate Veneers: A Case Series

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ABSTRACT: The demand for aesthetically pleasing dentition has increased markedly in modern dental practice, particularly in the anterior aesthetic zone. Multiple treatment options exist for the management of aesthetic discrepancies, each with specific indications, advantages, and limitations. Porcelain laminate veneers (PLVs) represent a conservative and highly aesthetic restorative modality for the correction of functional and cosmetic concerns. When performed following proper clinical guidelines, PLVs demonstrate predictable and long-term outcomes.

This case series presents the management of anterior diastema using porcelain laminate veneers. Such clinical reports contribute to evidence-based practice by enhancing clinical understanding, supporting practitioner training, and guiding treatment planning for similar cases. In the presented cases, PLVs were successfully used to close diastemas in the maxillary anterior region, achieving satisfactory aesthetic results.

KEYWORDS: aesthetics, porcelain laminate veneers, porcelain, PLVs, diastema

I. INTRODUCTION

Self-confidence is a fundamental component of an individual's personality, with an aesthetically pleasing smile contributing significantly to overall facial harmony. In modern dental practice, the aesthetic appearance of teeth has gained considerable importance, particularly from a cosmetic standpoint. Increased patient awareness and expectations have resulted in a growing demand for healthy and visually appealing smiles. Consequently, advancements in cosmetic dentistry have provided clinicians with a range of minimally invasive and conservativerestorative modalities capable of achieving predictable and aesthetically satisfactory outcomes.

Maxillary midline diastema represents a prevalent aesthetic complaint among dental patients and is characterized by a separation exceeding 0.5 mm between the maxillary central incisors [1]. While such spacing is commonly observed during the primary and mixed dentition periods and is considered a normal phase of dental development, it usually resolves with the eruption of the permanent maxillary canines. In certain individuals, however, the diastema persists beyond adolescence. This condition may adversely influence smile aesthetics and patient self-confidence, leading aesthetic and psychosocial factors to assume greater importance than functional considerations during treatment planning[2].

A variety of minimally invasive approaches exist for managing anterior spacing[3]. Direct composite restorations and indirect ceramic veneers remain the preferred methods for closing anterior spaces while preserving a natural appearance. Not all diastemas require treatment, and careful case selection is essential. Successful outcomes depend on aligning treatment withthe patient's aesthetic expectations and clinical needs. Porcelain laminate veneers (PLVs), thin ceramic shells bonded to the tooth surface using modern adhesives and light-cured resin cements, offer a predictable and durable solution for aesthetic diastema closure [4].

Compared to full-coverage ceramic crowns, laminate veneers require less tooth reduction while achieving excellent aesthetic results[5–8]. Direct composite veneers have gained popularity as an alternative conservative option, but they present limitations such as polymerization shrinkage, limited shade modification, difficulty in finishing and polishing, and potential discoloration over time. This case report describes the conservative management of a patient with midline diastema and spacing in the maxillary anterior region using porcelain laminate veneers to achieve the desired cosmetic outcome.

II. CASE REPORT

CASE 1

A 26-year-old male presented with a midline diastema between the maxillary central incisors (11 and 21), causing aesthetic concern and

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self-consciousness while smiling (Figure1). Clinical examination revealed mild spacing in the lateral and canine regions bilaterally, no caries, a 2 mm overbite and overjet, and a class I molar-canine relationship. Diagnostic impressions were obtained, and study models were mounted on a semi-adjustable articulator. A diagnostic wax-up and CAD/CAM analysis were used to determine the optimal size and form of restorations, planning closure of the midline diastema and proper gingival zeniths. Laminate veneer preparations were scheduled for anterior teeth to achieve a conservative aesthetic correction.

Figure 1: Preoperative clinical picture

Figure 2: Markings on labial Surface

Shade selection was performed using the VITAPAN Classical shade guide. Tooth preparation involved 0.5 mm enamel reduction with a tapered diamond and depth-cutting bur, 0.25 mm cervical chamfer, 1.5 mm incisal reduction, and proximal extension beyond the contact to prevent black triangles. Gingival retraction was performed, and a full-arch impression was obtained using a one-step polyvinyl siloxane technique. Temporary veneers were fabricated with Luxatemp material using a putty index from the mock-up, and final veneers were designed and milledusing exocad 5XT CAD/CAM software from polychromatic feldspathic ceramic blocks

Figure 3:Toothpreperation

Veneers were evaluated for shade, fit, marginal adaptation, contour, symmetry, and contacts using glycerin, followed by a group try-in. The intaglio surfaces were etched with 4% hydrofluoric acid for 30 seconds, rinsed, dried, and treated with silane. Teeth were cleaned, etched with 37% phosphoric acid for 15 seconds, and an adhesive bonding agent applied and light-cured. Veneers were seated with dual-cure resin-modified glass ionomer cement, spot-cured for 5 seconds to remove excess, and finally cured for 20 seconds.

Postoperative evaluation confirmed proper fit, shade, and aesthetics, with complete closure of the midline diastema and restoration of a natural, harmonious smile. Figures 7 and 8 show pre- and postoperative views demonstrating the successful aesthetic outcome.

Figure 4: Application of etchent

Figure 5: Application of Bonding agent

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Figure 7: Preoperative clinical picture

Figure 8: Postoperative clinical picture

Figure 9: Postoperative occlusal view

CASE 2

A 28-year-old female patient presented with spacing between her maxillary central incisors, which she perceived as an aesthetic concern. A detailed case history was recorded, and preoperative intraoral and extraoral photographs were obtained. Diagnostic impressions were taken, and study models were prepared to assess tooth morphology and occlusion. Shade selection was performed at theinitial visit using the VITA 3D-Master shade guide under natural light to ensure an accurate match for the final restorations.

Figure 6: Trial on Working Cast

An incisal overlap preparation was planned to enhance tooth length and provide stable seating for the veneers. Labial reduction was guided by orientation grooves created with depth-cutting burs (DM-305), achieving 0.3 mm near the gingival margin and 0.5 mm at the incisal edge. Two-plane facial reduction was performed with a round-end tapered diamond bur (TR-13) to ensure uniform thickness and mimic natural tooth contours. A chamfer finish line was placed at the gingival crest, and all internal angles were rounded. Following gingival retraction, a final impression was obtained using the double-step polyvinyl siloxane wash technique.

The porcelain laminate veneers were conditioned by etching the intaglio surfaces with 10% hydrofluoric acid for 90 seconds, rinsed, and dried. A silane coupling agent was applied and allowed to evaporate, followed by adhesive application without light activation. The prepared teeth were cleaned with pumice, isolated, and etched with 37% phosphoric acid for 15–20 seconds. Adhesive was applied to the teeth without light activation, and the veneers were seated using adhesive resin cement. Initial light curing for 10 seconds facilitated the removal of excess cement, followed by a final 40-second polymerization on both vestibular and palatal surfaces to ensure complete bonding.

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Figure 10: Preoperative clinical picture

Figure 11: Shade selection

Figure 12: Tooth preparation

Figure 13: Trial on working cast

Figure 14: Postoperative clinical picture

The procedure successfully closed the midline diastema, achieving optimal contour, shade, and aesthetic harmony. The patient's smile was restored to a natural and visually pleasing appearance, meeting both functional and cosmetic expectations.

III. DISCUSSION

Closure of a maxillary anterior diastema has become a common aesthetic demand among patients. Addressing this requires a comprehensive treatment plan that considers both functional and aesthetic aspects, supported by effective communication between the patient and the dental team. Diastemas can negatively impact smile aesthetics and may have psychological and social implications[7].

Etiological factors include hereditary causes—such as congenitally missing teeth, tooth and jaw size discrepancies, supernumerary teeth, and frenum attachments—and developmental factors like parafunctional habits, periodontal disease, tooth loss, and posterior bite collapse. Identifying the underlying cause is essential before treatment. Prosthodontic, orthodontic, and operative dentistry approaches are typically employed, with restorative options including all-ceramic crowns, metal-ceramic crowns, porcelain laminate veneers (PLVs), direct composite veneers, and composite crowns[8].

For conservative closure, ceramic and composite veneers are commonly preferred. Adult patients often opt for veneers to achieve immediate aesthetic results rather than undergoing lengthy orthodontic treatment. In the presented case, the diastema was evenly distributed, and the patient requested rapid closure with durable aesthetic outcomes. PLVs were selected due to favorable occlusion, a good smile line, absence of parafunctional habits, and adequate enamel thickness. These restorations offer chemical stability, biocompatibility, smooth surfaces that minimize plaque accumulation, and durable

adhesion when combined with etched enamel, silane, and resin-luting agents.[9].

Limitations include risk of failure in cases of weak enamel, pre-existing restorations, or improper technique. Excessive thickness of luting resin relative to ceramic can increase fracture risk; an optimal ceramic-to-resin ratio of 3:1 minimizes cracking. Composites may wear, fracture, or discolour over time but remain useful for minor corrections or masking discoloration. PLVs are not recommended for teeth with insufficient enamel, extensive unsupported porcelain,severe discoloration, or heavy bruxism; night guards are advised in such cases.[10].

Porcelain laminate veneers preserve maximal healthy tooth structure and offer long-term reliability, with survival rates reported at approximately 91% over ten years. In the event of failure, complete crown restoration remains a viable alternative.

IV. CONCLUSION

This case study demonstrates the effectiveness and aesthetic advantages of porcelain laminate veneers (PLVs) in modern dentistry. Positive outcomes highlight the importance of careful case selection, precise execution, and ongoing follow-up for long-term success and patient satisfaction. As a conservative aesthetic restoration, PLVs require objective assessment and clear communication between the clinician, ceramist, and patient to achieve predictable and satisfactory results.

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