

Management of severe maxillary midline diastema using digitally planned lithium disilicate veneers: A case report.

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Abstract

Midline diastema is a common esthetic concern that can negatively affect smile attractiveness and patient confidence. Although orthodontic treatment remains the preferred treatment modality for space closure, many adult patients seek immediate esthetic correction and decline prolonged orthodontic therapy. A female patient presented with a severe maxillary midline diastema and associated anterior spacing. A digital workflow incorporating smile analysis and CAD-based restorative planning was utilized. Minimally invasive tooth preparation followed by fabrication of lithium disilicate veneers was done. Complete closure of the midline diastema and associated spacing was achieved while maintaining harmonious tooth proportions and natural esthetics. The patient reported high satisfaction with the treatment outcome. This scientific case report shows that digitally planned lithium disilicate veneers provides a conservative and predictable treatment modality for immediate correction of anterior diastema in an appropriately selected and well-planned case.

Keywords: CAD/CAM, Digital smile design, Esthetic dentistry, Lithium disilicate, Midline diastema, Veneers.

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Introduction

The maxillary anterior region plays a crucial role in facial esthetics and social interactions. Midline diastema is generally defined as a space greater than 0.5 mm between the maxillary central incisors and is among the most frequent esthetic complaints encountered in clinical practice. The condition may arise from tooth-size discrepancies, abnormal frenal attachment, congenitally missing teeth, oral habits, or skeletal factors.^[1,2]

Orthodontic therapy remains a conventional approach for space closure; however, adult patients may seek faster esthetic alternatives because of treatment duration, personal preferences, or reluctance to undergo orthodontic therapy. Indirect ceramic veneers represent a conservative restorative option when case selection, tooth preparation and occlusal conditions are appropriate.^[3,4]

Lithium disilicate is an esthetic glass-ceramic with favourable optical and mechanical properties and is widely used for anterior adhesive restorations. Clinical evidence has demonstrated favourable medium- and long-term performance of porcelain veneers, while large clinical series have also reported high survival of CAD/CAM lithium disilicate veneers.^[5,6] Digital smile design and CAD/CAM workflows can further improve diagnostic visualization, communication and restorative planning, while supporting minimally invasive veneer treatment.^[7,8]

Case Report

A female patient reported with the chief complaint of spacing between her upper front teeth that adversely affected her smile and self-confidence. Clinical examination revealed a severe maxillary midline diastema

involving the central incisors. The periodontal tissues appeared healthy with no evidence of active pathology. Occlusal examination revealed a stable intercusp relationship and acceptable anterior guidance. Various treatment options including orthodontic treatment, direct composite restorations, and ceramic veneers were discussed with the patient. Although orthodontic therapy was considered the most conservative option for space closure, the patient declined this treatment because of the anticipated treatment duration and requested immediate esthetic improvement. Following informed consent, a restorative treatment plan involving lithium disilicate veneers on the maxillary central incisors and lateral incisors was formulated. Digital planning has been described as a useful adjunct for visualizing esthetic changes before minimally invasive ceramic treatment.^[7,8]

Digital Treatment Planning

Standardized clinical photographs and digital records were obtained. A digital smile analysis was performed and a virtual restorative design was generated using CAD software (Fig. 2). The digital workflow facilitated evaluation of tooth dimensions, symmetry, incisal edge position, emergence profile, and overall smile harmony. The virtual simulation was presented to the patient, who approved the proposed esthetic outcome.

Tooth Preparation

Minimally invasive veneer preparations were performed on the maxillary central and lateral incisors. The preparations were confined predominantly to enamel to maximize bonding effectiveness and preserve healthy tooth structure (Fig. 3). Following preparation, definitive impressions were obtained and forwarded for fabrication of lithium disilicate veneers based on the approved digital design.

Try-in and Cementation Procedure

The definitive lithium disilicate veneers were evaluated clinically for marginal adaptation, proximal contacts, phonetics, shade integration, and esthetics. For adhesive cementation, the internal surfaces of the lithium disilicate veneers were treated with 10% hydrofluoric acid and subsequently silanized. The prepared enamel surfaces were etched with 37% phosphoric acid, followed by application of a bonding agent and adhesive resin cement according to the manufacturers' recommended protocols. Resin-ceramic bonding literature supports appropriate surface conditioning and silanization for predictable bonding of silica-based glass ceramics.^[4] Excess cement was removed and each restoration was polymerized according to the recommended curing regimen. Following cementation, occlusion was verified and adjusted where necessary.

Outcome

Complete closure of the maxillary midline diastema was achieved with harmonious tooth proportions and an esthetically pleasing smile. The final restorations demonstrated satisfactory adaptation, morphology and surface appearance (Fig. 4). The patient expressed high satisfaction with the esthetic outcome. The favourable outcome is consistent with clinical reports demonstrating good esthetic performance and survival of lithium disilicate CAD/CAM veneers when appropriate case selection, preparation and adhesive protocols are followed.^[5,6]

Discussion

Management of maxillary midline diastema requires identification of the underlying cause and consideration of the patient's expectations, periodontal condition, tooth morphology, occlusion and available restorative space.^[1,2] In adults who decline orthodontic treatment, restorative closure may be considered when the amount of space can be managed without

producing disproportionate tooth contours. Porcelain laminate veneers have demonstrated favourable long-term clinical performance, particularly when enamel preservation and adhesive protocols are respected.^[3,5] Lithium disilicate offers a combination of esthetics, strength and adhesive potential that makes it suitable for anterior veneer applications.^[6] Clinical data on large cohorts of CAD/ CAM lithium disilicate veneers have reported high survival and favourable marginal and color outcomes, supporting its use in appropriately selected esthetic cases.^[6] The digital workflow used in the present case facilitated visualization of the proposed tooth proportions and restorative outcome before preparation. Recent clinical evidence also supports the use of digital smile design combined with minimally invasive lithium disilicate veneers for predictable esthetic rehabilitation.^[7,8]

Nevertheless, restorative closure of a severe diastema should not be considered a universal substitute for orthodontic treatment. Careful diagnosis and evaluation of the etiologic factors are essential, and the clinician should avoid excessive widening of the anterior teeth or violation of periodontal and occlusal principles.^[1,2]

Conclusion

Digitally planned lithium disilicate veneers offer a conservative, predictable, and highly esthetic solution for the management of severe maxillary midline diastema in patients unwilling to undergo orthodontic treatment. Appropriate case selection, meticulous digital planning, and adherence to established adhesive protocols contribute significantly to successful treatment outcomes and patient satisfaction.

Clinical Significance

Lithium disilicate veneers fabricated through a digital workflow provide a minimally invasive and predictable treatment option for rapid

closure of anterior diastema while preserving tooth structure and enhancing smile esthetics.

Declaration of Patient Consent

The authors certify that appropriate patient consent was obtained for clinical treatment, photography, and publication of clinical records and images. The patient understood that every effort would be made to maintain anonymity, although complete anonymity cannot be guaranteed

Conflict of Interest

The authors declare no conflict of interest related to this publication.

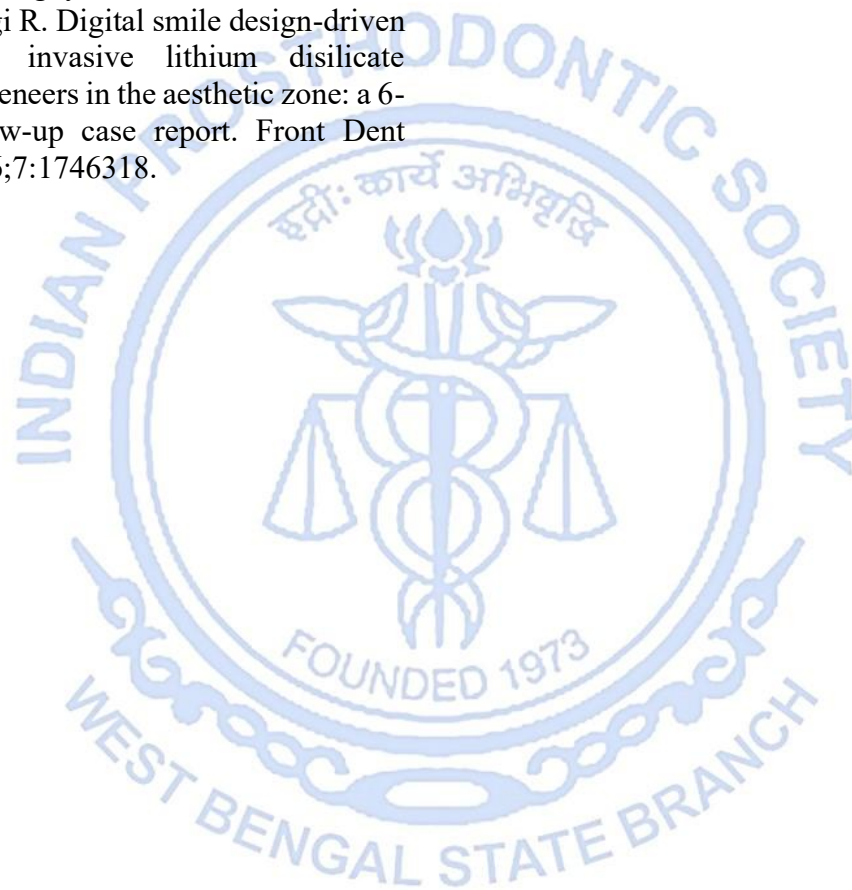
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FIGURES



Figure 1

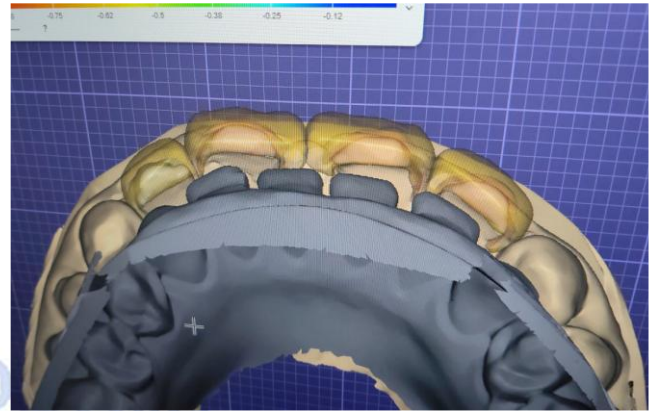


Figure 2



Figure 3



Figure 4