Case Report

Achieving Improved Esthetic Results with Minimally Invasive Midline Diastema Closure Using a Palatal Silicone Putty Index: A Detailed Case Report

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ABSTRACT

This case report presents a minimally invasive approach to diastema closure, prioritizing tooth preservation. A 32-year-old female presented with a 4 mm diastema between her maxillary central incisors, expressing concerns about esthetics and requesting a conservative treatment plan. The chosen approach utilized composite resin bonding with minimal tooth preparation, achieving successful diastema closure while preserving tooth structure and maintaining the natural contours of the teeth. This case highlights the potential of minimally invasive techniques to attain optimal esthetic outcomes with minimal intervention, promoting long-term tooth preservation and patient satisfaction.

Key words: Composite bonding, Diastema closure, Minimal intervention, Tooth preservation

INTRODUCTION

Diastemas, or gaps between teeth, are a common concern among individuals seeking esthetic dental care. Traditional treatment options often involve extensive tooth preparation, potentially weakening tooth structure, and increased sensitivity. However, minimally invasive approaches are gaining popularity with restorative materials and techniques advancements. Composite resins permit conservative treatment and, at the same time, offer quicker results.[1] This case report demonstrates a conservative treatment plan for diastema closure using composite bonding with minimal tooth preparation, prioritizing tooth preservation while achieving esthetic harmony.

CASE PRESENTATION

A 32-year-old female patient came to our Institute's Department with a concern about gaps in her upper front teeth. During the clinical examination, we identified a 3 mm gap (diastema) between her central incisors in the upper jaw (maxillary arch) [Figure 1a and b].

The patient's oral hygiene was favorable; no noteworthy hard and soft-tissue findings were identified. The labial frenum correlated with the diastema was normal in size and location.

Treatment planning

The patient was told of alternative treatments. In line with the patient's consent, it was decided that minimally invasive composite restorations would be performed in a single visit because it was quick and cost-effective.

Maxillary and mandibular diagnostic impressions using irreversible hydrocolloids (Tropicalgin, Zermack, India) were created and immersed with dental stone [Figure 1c]. A diagnostic wax-up was performed on teeth 11 and 21 to address the diastema. To close the 3 mm gap between these central incisors, inlay wax was added to the mesial sides of both teeth, increasing the width of each tooth by 1.5 mm. In addition, wax was placed

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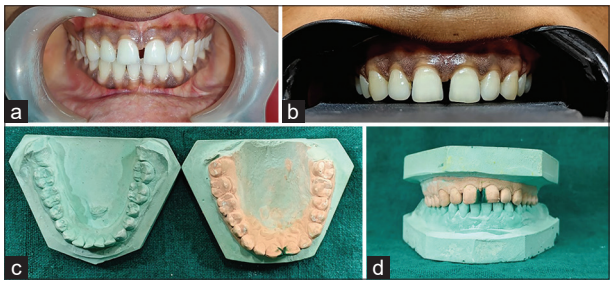

Figure 1: (a and b) pre-operative photographs (c) maxillary and mandibular casts made, (d) diagnostic wax-up, performed with green inlay wax and a dental stone model

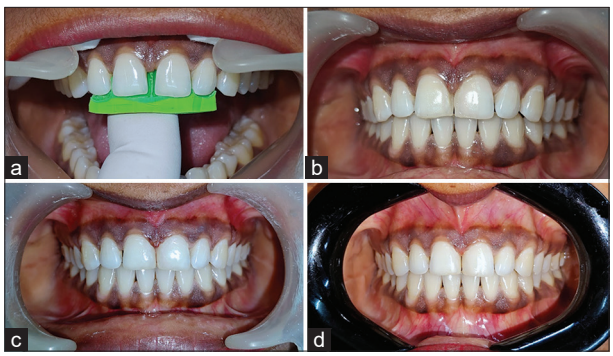

Figure 2: (a) palatal silicone putty index seated in the mouth (b) palatal shelf created with the help of putty index (c) immediate post-operative picture (d) after final finishing and polishing

between teeth 11 and 21 to further close the space between them [Figure 1d].

A palatal silicone index was fabricated using vinyl polysiloxane, a material known for its excellent detail replication and high final hardness. Excess material was carefully removed with a scalpel to ensure the stability of the matrix. The fit of the silicone index was then verified intraorally to ensure proper adaptation [Figure 2a].

Shade selection for the restoration was performed using the VITA Tooth Guide 3D Master under natural daylight conditions. Following standard etching and bonding procedures, the palatal putty index was placed back into position, and the palatal shelf was built using direct composite resin for teeth 11 and 21 [Figure 2b].

The index has been used during the composite build-up process to ensure precise contouring. Finishing and polishing were originally conducted using a composite polishing kit (Shofu Inc, Kyoto, Japan) to produce a suitable esthetic finish [Figure 2c]. The patient was given detailed oral hygiene instructions, including the use of finger massage on the gingival tissue to mechanically stimulate the interdental papilla in the area of the midline diastema. The patient was also advised to floss regularly and to avoid consuming colored drinks that could stain the restorations. A final finishing and polishing session was conducted after 3 days to refine the restoration further [Figure 2d]. Regular follow-up appointments were scheduled for 6 months to monitor the restoration and ensure long-term success.

DISCUSSION

A key aspect of dental treatments involving anterior teeth is their shape. The shape of teeth, especially anterior ones, considerably influences how they are perceived. When the shape of these teeth is accurately designed to resemble natural tooth structures, minor differences in color can be less noticeable.[2-4] Composite resins need to have excellent handling properties to allow for easy manipulation and shaping to achieve the desired form and contour of the restoration. To enhance the material's viscosity and handling, the composite should be carefully shaped into smaller, spherical increments. This process should be done while wearing clean, uncontaminated gloves or using specialized tools along with modeling resin.[5,6] This approach can significantly improve the ease of working with the composite material. Resin-based composite restorations are single-visit procedures that bypass laboratory work and reduce treatment costs.

It is important to note that the final finishing and polishing of restorations do not necessarily need to be done in a single appointment. Practitioners may achieve better results by completing the final shaping and polishing in a separate session, allowing them to reassess the case with a fresh perspective.[7,8] To maximize the longevity of direct anterior composite restorations, dentists must consider factors beyond just following procedural guidelines. A thorough evaluation of the patient's bite is essential when selecting candidates for anterior composite restorations. In scenarios requiring direct anterior restorations, particularly when the teeth are lengthened, there is a greater chance of incisal fractures if sufficient occlusal guidance is not given. Patient awareness is also essential for the effectiveness of these restorations. It is important to properly advise patients about the required post-treatment care and precautions related to direct restorations.[4]

The joint effort from both the patient and the practitioner in anterior direct restorations eventually improves the benefit provided by additive thickness. This commitment to excellence in everyday practice should primarily be driven by the clinician's deep appreciation for the natural characteristics of teeth, which are unmatched and irreplaceable.[9,10]

In this case, the reliability of the direct approach was enhanced by developing a lingual incisal silicone index. Furthermore, the formation of a layered repair in the mouth with the same form as a prior wax-up is achievable with the putty index. This method is relatively easy to do, with the establishment of an accurate midline and ideal contact area, but it takes expertise and competence.

Finally, the composite finishing and polishing protocol enabled a highly polished surface and resulted in a satisfied patient.[11]

CONCLUSION

This case report demonstrates that minimally invasive composite bonding is an effective and conservative treatment option for diastema closure. Using minimal tooth preparation and skilled composite bonding techniques can achieve esthetic outcomes while prioritizing tooth preservation. This approach aligns with the contemporary dental philosophy of minimally invasive dentistry, promoting long-term tooth health and patient satisfaction.

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