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Prepless anterior aesthetic restoration using novel approach – A case report

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Introduction

Anterior teeth spacing is a common aesthetic concern for patients in recent times. Etiology of midline diastema or generalized spacing is multifactorial in nature. Some of the causes of midline diastema are proclination of maxillary incisors, high labial frenum attachment, pseudo microdontia, anatomic variations such as pegshaped lateral incisors, mesiodens, habits such as thumb sucking as well as discrepancies in skeletal and dental parameters.^[1] Therefore, management of such cases demand a careful analysis to decide an efficient treatment protocol for the patient. Once the aetiology has been identified, a decision must be made regarding, whether to use a multidisciplinary strategy or to simply close the spaces using direct or indirect restorative treatment.^[2] Present day composite materials allow the practitioner to reproduce the details of natural dentition, allow conservative preparations and are long-lasting due to their superior mechanical and polishing capabilities.^[3] Compared to indirect restorations, they are less expensive, provide quick results, and are easier to restore.An inevitable challenge during the anterior composite build-ups is the establishment of proper form, contact and contour of the teeth. Application of matrices is a crucial step to accomplish this goal. Different matrix systems have been introduced to create anatomic contours without formation of 'black triangles' for restoring the anterior teeth.^[4] The most commonly used and frequently applied technique for the treatment is the mylar strip and putty index. However, establishing the proper contact and contour still remains challenging to some extent.

Keywords: Space closure, aesthetics, modified putty index, modified matrix, composites

Case report

A 25 year old female patient reported to the Department of Conservative Dentistry and Endodontics with a chief complaint of spacing in front teeth. Clinical examination revealed interdental spacing between maxillary central and lateral incisors as well as mandibular lateral incisors and canines (Figure 1). Patient had a satisfactory oral hygiene with no significant hard and soft tissue findings. The labial frenum was normal in size and position. Various treatment modalities were discussed with the patient including orthodontics, direct restorations. prosthetic procedures such as veneers and crowns. The patient decided to go ahead with direct composite restorations due to conservative nature of the procedure. After obtaining patient consent, a minimally invasive approach with direct composite restoration was planned to restore the diastema and other interdental spaces.



FIGURE 1: PRE-OPERATIVE CLINICAL IMAGES

Clinical procedure

Diagnostic impression was made and cast was poured. Mock-up was done using mock-up wax. (figure2a) shade selection was done by 'button try' technique. The dentinal shade was determined based on cervical third matching, while the enamel shade was chosen based on incisal thirds.(figure 2b). The teeth were isolated using split rubber dam technique to ensure proper fit of the putty index. (figure 2c) etching of all tooth surfaces was done using 37% phosphoric acid gel (total etch, ivoclar vivadent, schaan, leichenstein) and bonding of the surfaces of teeth was done using universal bonding agent (tetric n-bond universal, ivoclar vivadent, schaan, leichenstein). The putty index and the matrix system were modified for composite build-up of the maxillary central and lateral incisors for improving adaptation and enhancing the emergence profile.

Putty Index modification

Index was made using addition silicone impression material (Aquasil, Dentsply USA), which was split using BP blade no. 11 and placed along with the posterior sectional matrix to enhance the adaptation and improve the emergence profile. Lingual shelf was created for each teeth using A2 composite (Tetric N-Ceram, Ivoclar Vivadent, Schaan, Leichenstein). (Figure 2D)

Matrix Modification

The Tofflemire matrix band was modified using sharp scissors and the edges were rounded using the polishing burs. (Figure 2E)This modification ensured better adaptability and contouring in the proximal regions.



FIGURE 2: A. DIAGNOSTIC CAST WITH MOCK-UP B. SHADE SELECTION C. ISOLATION USING SPLIT RUBBER DAM TECHNIQUE D. CONVENTIONAL PUTTY INDEX WAS MODIFIED INDEX WAS SPLIT AND POSTERIOR SECTIONAL MATRIX BAND WAS PLACED ON BOTH PROXIMAL SIDES E. MATRIX MODIFICATION STEPS

The matrices were then stabilized using the wedges and composite build-up was done incrementally. A3 shade composite (Tetric N-Ceram, Ivoclar Vivadent) was used for dentin and A2 shade was used for the enamel. (Figure 3)



FIGURE 3: PALATAL SHELF AND COMPOSITE BUILD-UP DONE USING MODIFIED PUTTY AND MATRIX BAND CONVENTIONAL PUTTY INDEX TO ENHANCE ADAPTATION AND IMPROVED EMERGENCE PROFILE

Mandibular canines were built-up to close the space using the conventional putty index method using same shades of the composites. Gross finishing of the restoration was done to remove any occlusal

interferences. Figure 4A shows the immediate post operative image. At the second appointment (2 weeks later), the finishing and polishing procedure was done using abrasive discs (Super-Snap Discs, Shofu, Japan), interproximal strips (Super-Snap Polystrips, Shofu, Japan) in sequential order, along with polishing paste (Prisma glosstm Composite Polishing Paste System, Dentsply Sirona, gmbh, Germany), in order to refine the shape and texture of the teeth.(Figure 4B) Patient was instructed regarding the oral hygiene maintenance.



FIGURE 4: A. IMMEDIATE POST-OPERATIVE CLINICAL IMAGE B. FINISHING AND POLISHING DONE IN SECOND APPOINTMENT

One- month follow-up showed healing of the soft tissues and interpapillary region.(Figure 5A) Two-month follow-up revealed completely healed interdental papilla and a good emergence profile was noted.(Figure 5B) The patient was satisfied with the treament and was more confident on smiling.



Discussion

Diastema closure is a common clinical procedure in restorative practice which aims at achieving symmetry and desired aesthetics. Its multifactorial nature demands a careful treatment planning keeping in mind the functional and aesthetic needs. Evaluation of clinical crown dimensions, occlusion, gingival display and periodontal health are crucial for long-term and predictable results. With the advancements in resin composites, restoration of the diastema cases with direct composite build-ups has become a common treatment modality as they allow maximum tooth conservation and have good aesthetic properties. ^[5] achieving proper contacts and contours require the use of matrix systems and proper layering techniques. The present case report depicts a novel approach used for anterior composite build-ups by modifying the matrix band and the putty index to enhance the contours and emergence profile.

Diagnostic wax-up was done initially to estimate the restorative space availability, the occlusal scheme and hence, improved the predictability of the final restoration.^[6] the process of colour-matching in anterior restorations is another critical step in aesthetic dentistry, which can be done by using various methods. The "button try" technique was used in the present case, which consists of placement of small amounts of different shades of the composite and curing them. It allows clinicians to choose the best shades of the composite and analyse the cervical, middle and incisal third of the tooth specifically. A putty index was prepared using addition silicone impression material (aquasil, dentsply usa) and modified by splitting to adapt individual posterior sectional matrix bands to reproduce the details and enhance the emergence profile for the final restoration. Split rubber dam was preferred for isolating the teeth as it allowed ideal conditions for bonding and provided good adaptation of the modified putty and matrix bands around the teeth with perfect fit at the cervical areas, hence avoiding black triangle formation. The buccolingual technique, as first described by didier deitschi, was used in the present case. The initial shape was provided from the diagnostic wax-up to provide initial shape to the teeth. The first layer of enamel shade was placed on the index and palatal shell

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was constructed. Successive layers of dentin composite were then placed, to achieve natural opalescence and translucency effect. [7] Furthermore, the metal matrix band was modified as shown in the figure 2e. This modification can be particularly helpful in cases of multiple spacing to achieve perfect symmetry. It is easy to adapt around the tooth, adjusts perfectly in the cervical region and allows simultaneous reshaping of the proximal contacts. This clinical report thus, showcases the novel approach for enhancing the aesthetics with promising results. It is important to note that the application of rubber dam, although crucial for isolation, makes the teeth more dry, which results in more evident colour differences between the natural teeth and the composite restorations. Therefore, the final result for the present case has been evaluated in the second appointment. This allows accurate assessment of shade matching as well as final integration of the restoration with the natural tooth.^[8] finishing was done to provide proper contour and enhance the details of the restoration as well as remove any excess material more accurately. Polishing was done to provide lustre and smooth finish gingival irritation to prevent any or plaque accumulation.^[9] The results of the present case-report showed significant improvement in shape of the teeth as well as the symmetry and general aesthetic appearance of the patient. The patient was satisfied with the treatment outcome. Two-month follow up showed complete growth of the interdental papilla. Also, the existing stability and health of the periodontal tissues played a key factor in determining overall predictability as well as aesthetic results for the patient, which contributed to the success of the treatment. The patient compliance and oral hygiene maintenance practices further aided in achieving the desired long-term clinical success for the treatment. However, regular follow-ups

are critical for assessing the gingival tissue response and correction of any defects at early stages. ^[10]

Conclusion

A successful aesthetic treatment requires a combination of restorative materials with good aesthetic and mechanical properties along with proper layering techniques. The novel technique used in the present case showed good results and hence, it can be definitely used to enhance and achieve good emergence profiles due to its ease of use, quick and more efficient results as obtained for the patient. However, good oral hygiene maintenance and follow-ups are crucial to assess the long-term outcome.

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