

Closing Diastemas with Resin Composite Restorations; a Case Report

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Abstract: Maxillary anterior spacing is a common aesthetic complaint of patients. Midline diastema has a multifactorial etiology such as labial frenulum, microdontia, mesiodens, peg-shaped lateral incisors, agenesis, cysts, habits such as finger sucking, tongue thrusting, or lip sucking, dental malformations, genetics, proclinations, dental-skeletal discrepancies, and imperfect coalescence of interdental septum. Appropriate technique and material for effective treatment are based on time, physical, psychological, and economical limitations. Direct composite resins in diastema cases allow dentist and patient complete control of these limitations and formation of natural smile. This case report describes direct aesthetic midline diastema closure with direct composite technique.

Keywords: Diastema closure, Direct resin bonding, Midline diastema,

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I. Introduction

The midline diastema is a space between the maxillary central incisors.[1] The incidence of diastemas varies greatly with age and race. The space can be a normal growth characteristic during the primary and mixed dentition and generally is closed by the time the maxillary canines erupt.[1,2,3] In adults, the most common factors in the development of diastemas are tooth-size discrepancies and excessive vertical overlap of the incisors.[4] Other less frequent, but important, contributing factors are Incisor mesiodistal angulations, generalized spacing, labiolingual incisor inclination, frenums and pathological conditions.[2,3,5]

Maxillary midline diastemas are considered as esthetic problems by majority of the patients and thus are an esthetic liability just like crowding or protrusion of incisors. A study evaluating the influence of incisal malocclusion on social attractiveness of young adults in Finland found that patients with a broad midline diastema were perceived as being less socially successful and of lower intelligence.[4,5] Diastemas can be treated in a multitude of ways including orthodontic closure, restorative therapy, surgical correction or multidisciplinary approach depending upon the particular case and the etiology of diastema.[1,3] A carefully developed differential diagnoses allows the practitioner to choose the most effective treatment plan. Diastemas based on tooth-size discrepancy are most amenable to restorative solutions.[4] The restorative closure of diastemas can be achieved by using any of the techniques mentioned; direct composite veneers, indirect composite veneers, porcelain laminate veneers, all ceramic crowns, metal ceramic crowns and composite crowns.[4,5]



Figure 1: Preoperative view of a patient who presented with a diastema between teeth #8 and #9.

The increased patient demand for minimally invasive aesthetic procedures and the improved physical properties of current composite materials has resulted in the extensive utilization of direct bonding of composite resin to anterior teeth.[6] Contemporary composite materials can be handled throughout the restorative process to achieve the desired morphology and color of the final restoration.[7] Direct resin build up can be a worthy choice to treat diastemas based on tooth-size discrepancy.[4,5] However, direct placement of composites for veneering is a laborious process particularly for multiple teeth. Simpler techniques using matrix have been advocated to make the procedure less technique sensitive. Use of matrix in placing composite simplifies the chair side treatment procedure. [8,9] This paper proposes a new simplified direct composite veneering using a modified matrix to achieve diastema closure and desirable esthetics in single visit.

Case Presentation:

A 19-year-old male patient reported with a complaint of spacing in the anterior teeth region. His history reveals that he had the spacing from the time of permanent dentition and he had problem with smiling because of the same. Patient medical history was noncontributory. It was the first dental visit Patient wanted an esthetic correction for the closure of the multiple spaces because it restrained him from his self-confidence. On examination there was gap in between his social six from canine to canine in the maxillary arch. (Fig: 1,2) Overjet was more than 3mm.



Figure 2: *The enamel surface of the teeth is minimally prepared for composite placement, Maxillary anterior teeth were isolated with rubber dam and the central incisors were retracted with retraction cord.*

The patient was explained about the reason for his diastema being tooth material arch length discrepancy (Bolton's discrepancy). Various treatment modalities were explained to the patient such as

1. Fixed orthodontic therapy
2. Ceramic veneering
3. Composite veneering
4. Full coverage restorations (crown)
5. Direct composite build up

Closure of midline diastema and overall smile build up using a customized matrix technique. The teeth were restored with a nano-hybrid composite, Tetric N Ceram by a three step etch rinse and bond technique. Etching was done for 20 seconds with **N-Etch**, a phosphoric acid gel for enamel etching and dentin conditioning (fig.3). Bonding was done by **Tetric N-Bond**, a light-curing, single-component bonding agent for enamel and dentin bonding used in combination with the total-etch technique.

In the process of resin build up after etching and bonding, a light-curing, radiopaque nano-hybrid restorative composite was applied on the tooth surfaces and then the transparent custom matrix was placed. The curing was done with a light emitting diode (LED) curing through the transparent matrix for 60 seconds for each tooth (fig.4). After the curing was complete the matrix was removed and the extra flash was removed with fine-grit flame shaped diamonds and finishing carbide burs. The final finishing of the restorations was done by fine composite finishing (fig.5). The final restorations resulted in the diastema closure and as well as overall aesthetic improvement of the patient, both meeting the patient's expectations (fig.6).



Figure 3: *The enamel surface of teeth #8 and #9 is etched.*



Figure 4: *Two increments of composite resin are applied to the diastema simultaneously and contoured to optimal proportion on the mesial aspect.*



Figure 5: The facial surface is finished using a finishing disk

II. Discussion

Diastema closure with direct resin is a recommended procedure, which is frequently accomplished in clinic. However, in cases where there is a wide space between the teeth, the simple closure may not offer a natural and pleasant solution to the patient.[4,5,7] The remodeling with composite resin can solve the problem of tooth architecture, but because of an unwanted black triangle between the teeth, such remodeling may not solve the problem of gingival architecture.[1,2,8,9]

The modern composite restorative materials are remarkable with their improved physical and esthetic properties, if manipulated properly they can be used to create good quality esthetic restorations with sufficient wear resistance providing satisfactory years of service. [8,9,10]They are conservative esthetic options of restorative dentistry since minimal or no tooth preparation as compared to ceramics[4,5]. Direct resin veneering can be done by hand sculpting or free hand bonding, but that is a cumbersome process, requiring a lot of effort, time and often it is not possible to veneer multiple teeth in the same appointment. [1,2,3]To simplify composite placement –a customized matrix for individual patients can be made which is less technique sensitive and provides greater opportunity and freedom to deliver optimized aesthetic goals. [11]The only limitation to the customized matrix technique can be the need for wax up of the models and then the accurate fabrication of the matrix. However, keeping in view the benefits of using a customized anatomical matrix for direct resin veneering this extra effort is worth. The advantage of using a laboratory-fabricated template is, of course, the freedom from having to sculpt perfect dental anatomy.[12] In the present case report the fabrication of the customised matrix helped to achieve optimal aesthetics in a single visit.[13]



Figure 6: Postoperative view after the diastema between teeth #8 and #9 was closed with direct composite resin.

Direct composite restoration is the simplest among all procedures for diastema closure. Direct composite resins in diastema closure cases allow dentist and patient complete control in formation of natural smile.[4,8] In terms of aesthetic dentistry, these restorations offer numerous advantages that other possible treatment options such as ceramic veneers and orthodontic treatment do not have. They are kinder to the opposing dentition compared to ceramic materials[9]. Recent aesthetic composite resin materials have similar physical and mechanical properties to that of the natural tooth and possess an appearance like natural dentin and enamel.[4,5]

The presence of a midline diastema or spaces in between anterior teeth can be a major esthetic concern for patients. There are various treatment options available for diastema closure in adults like orthodontic movement, restorative and prosthodontic treatment. Amongst these, the use of direct resin restorations seems to be conservative and more practical [13,14]. In this case report patient's esthetic expectations were successfully met through conservative direct composite resin restorations.

Direct bonded composite resin restorations may be preferable in clinical cases wherein conservative, esthetic correction of the appearance of anterior teeth is indicated. [4,5]The advantages of this technique far outweigh those of other techniques. However sometimes, for better esthetic results, an interdisciplinary approach is often required. In this case, the use of conservative direct resin bonding provided the symmetrical and harmonious arrangement of the teeth.

III. Conclusion

Direct composite veneer provides good esthetic result at the lesser cost and time due to absence of laboratory procedure and completion of work in single appointments. This minimally invasive technique is a better option in treatment of dental fluorosis, peg laterals and midline diastema compared to full crown.

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