



Management of Midline Diastemas with Direct Composite Restoration: A Conservative Approach for Re-Establishment of an Attractive Smile-A Case Series

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Received: November 21, 2020; **Published:** March 19, 2021

Abstract

Re-establishment of smile defects is one of the most challenging task that commonly faced by the clinicians particularly by the esthetic dentists. Defects of smiles may be resulted from different etiological factors including iatrogenic such as traumatic injuries to the anterior teeth and developmental such as defects of enamel and dentine. Midline diastema is such a problem of anterior aesthesis that's may result from either or both etiological factors. There are different treatment options for management of those diastemas which includes direct composite restoration, laminate veneers, indirect veneers, prosthetic crowns and orthodontic treatment. But of them direct composite restoration is the most commonly accepted treatment approach readily accepted by the patient because of its less chair side exposure, less time consuming, no damage to the natural tooth structure and cost effectiveness. We are going to present tow patient in our case series who attended to the Department of Conservative Dentistry and Endodontics seeking for the management of 2 - 3 mm midline diastema. In case of the both of the patient the adjacent tooth were vital periodontally healthy. A conservative treatment plane of closing the diastema by direct composite restoration was given. Both of the patient were happy after treatment and were advised for periodic follow-up.

Keywords: *Midline Diastemas; Direct Composite Restoration; Conservative Approach*

Introduction

In the present days patients all around the globe are very much concern about their aesthetics of their smile. Patients with midline diastema are the most common aesthetic procedures encountered by general dentists today. Presence of spacing between maxillary central incisors results in visual disruption and aesthetic dis harmony, sometimes affect the face profile of the patients. Anterior spacing or diastema is one of the most common aesthetic problem of the beauty concern patients [1]. According to Keene midline diastema is anterior midline spacing more than 0.5 mm in the proximal surfaces of adjacent teeth in the mid-line [2]. Researchers suggests that maxillary midline diastema are more common than

mandibular mid-line diastema [3]. The persistence of a diastema in the maxillary central incisors in mature permanent teeth is identified an esthetic disharmony or malocclusion [4]. The mid-line diastema results from multiple etiological factors. The etiology may effect the physiological status of the patients. This may be resultant from a missing tooth, presence of one or more peg shaped lateral incisors, presence of supernumerary teeth in the midline, upper anterior proclination, high frenum attachment and tongue thrusting in between the incisors I early mixed dentition period. There are some childhood habits like finger sucking, lip sucking or habit of kipping of any object in midline area may often result diastema. In some cases, diastema is found to be related with other dental malformations and genetically inherited [5,6].

The goal of providing a natural and good looking smile is to minimize or reduce the inter proximal space of the incisors either upper or lower teeth. So, to achieve the predictable esthetic makeover a good selection of case with proper treatment planning is mandatory. Selection of treatment protocol and restorative materials is greatly influenced by individual patient’s physical condition, available time, emotional or psychological status and socio economical status [7,8]. Closure of midline diastema with direct composite restoration may be a treatment of choice because it provides complete authority of all the information of changes that is going to be achieved by the treatment both for the operator and the patients [9].

Manufactures around the world are trying to improve the quality of the materials as well as the property of the restorative materials and often they also do it along with the leading professionals to fulfill the demand of the patients that they attended. Very often they also introduces new technique and treatment protocols that is convenient for both the patient and the operators like introducing newer bonding systems [10]. In recent years the physical, mechanical, chemical and biological property of the restorative composite resins is such improved that it coincide with that of natural enamel and dentine [11]. The improved tooth to restoration bonding system that has been developed since the few last years provides the operator about the sustainability of the restorations.

Case Report

Case 1: A 24-year-old female patient reported to the Department of Conservative Dentistry and Endodontics of Update Dental College and Hospital, for management of spacing between maxillary central incisors teeth.



Fig: Before rubber dam placement.



Fig: During selection shade

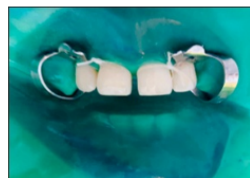


Fig: After rubber dam placement



Fig: During etching



Fig: Application of bonding



Fig: After final polishing

Case 2: A 20 year-old male patient reported to the Department of Conservative Dentistry and Endodontics of Update Dental College and Hospital, for management of spacing between maxillary central incisors teeth.



Before



After

Clinical examination

Both of the patient were evaluated following a standard protocol of history taking and clinical examinations and patient were diagnosed with midline diastema of maxillary central incisors resulting aesthetic disharmony. There were around 2 - 3 mm space between maxillary central incisors. Fortunately, there was no such problem

in mandibular anterior region. The treatment of choice for the cases were to close the diastema with direct composite restoration. The patient was also coincided for considering orthodontic or prosthodontics treatment options but they did not want consider. The treatment plan was explained to the patients describing the possible advantages and disadvantages. Both the patient agreed and give consent for the treatment.

Clinical procedure

Both cases were applied rubber dam for better isolation. Selection of shade done before rubber dam placement with VITA shade guide and direct placement procedure. For the both cases mouth preparation was done by scaling and polishing. Enamel of the mesial surfaces of central incisors was done with thixotropic etching gel (40% phosphoric acid) (k-Etchen gel, clearfill, kuraray) according to manufacturers instructions. Then rinsing was done by flowing water by three way syringe and followed by drying. Then bonding was (clear fill liner bond) given according to recommendations and cured using a LED curing unit. The adjacent teeth were separated by using Mylar strips. CLEARFIL™ AP-X Esthetics, k was used for the build-ups. The reason behind choosing this material are it exhibits a light diffusion property similar to natural tooth structure, good handling property and shade matching. A layering technique was used light-cured for 40 seconds each. Proximal contour was achieved carefully, particularly the gingival embrasure area. Finishing and polishing was done with Polishing Discs (polishing kit, shofu). Oral hygiene instructions were given. Both of the patient followed-up at one week, and then every month for 3 months.

Discussion

For the better outcome of treatment after a midline diastema closure a clinician must consider some points such as shape of the tooth, size of the tooth, mesio-distal width of the diastema gingival architecture, papilla form prep design, the type of the restorative material. It also includes the normal development and growth, tooth size versus jaw size discrepancy the vertical dimension, mesio distal and mesio lingual incisor angulation, presence or absence of generalized spacing and any other pathology [12]. The success of the treatment outcome depends upon the balance between long

lasting aesthetic and functional solution, conservative and minimal invasive treatment options. Properly evaluated differential diagnosis based on clinical knowledge and experiences of practice over the years guides the clinician to choose whether the orthodontic treatment or the restorative will be more effective for the patient in the long run. A sequential evaluation of history, proper clinical examinations, evaluation of tooth morphology and careful evaluation of the radiograph are the tools of diagnosis.

If the midline diastema is resulted due to tooth size discrepancy, then it is relatively easy to manage either by restorative or prosthetic interventions. The operator always should be carefully evaluate the width of the space to be closed during treating a diastema. It can be managed by simply adding composite restorative materials just mesial surface of the central incisors. But very often adding just at the mesials of the central incisors results in a increased width to height ratio and may become a un natural, boxy appearance of the teeth. If the width to height ratio is maintained with care in the aesthetic zone following a standard proportions as well as if the good gingival contour is maintained then it will provide a good and natural looking smile design. Whether the treatment option will be the orthodontic repositioning or a direct or indirect composite restorative procedure, is determined by the space to be closed. Direct composite restoration can be selected as a treatment of choice if the patient wants immediate aesthetic corrections. Direct composite restorations have some advantages over other procedures because it can be done at single visit, do not required models, no need of wax up preparations, no needs of any laboratory procedures and also cost effective. Direct composite restoration also have superior advantages over the ceramic veneer because if any fracture is reported it can be managed immediately which is not possible in case of ceramic veneer [13]. Recent development of the bonding system of composites and improvement of quality of the composite resin itself provides the clinician to be more conservative and to get more functional, aesthetic, economic, long term outcome in short chair side time [14,15]. Selection of composite resin is ideal choice for diastema closure also because of its being highly polishable, easily handling nature, more natural and close color match with the natural tooth. There are some disadvantages of direct composite restorations in comparison to indirect restorations such as it has less fracture toughness, less shear and compressive strength, are

not suitable for withstand ultra high stress which may required a some atypical cases [16,17]. Patient with some para functional jaw movement such as bruxism, edge to edge bite, having habits like nail biting, pipe smoking are not good candidate for direct composite restoration, because those conditions compromises the sustainability of the treatment [18,19]. The colour stability of the composite is not as good as glazed ceramics though it depends upon quality of the finishing and polishing [20,21]. Though direct composite restorations have disadvantages it becomes the treatment of choice for diastema closure even among the patients overcoming the drawbacks.

If any patient want to close a complex diastema then direct restoration should be the treatment of choice, because other techniques needs multiple appointment, takes long time, more expensive and also they irreversible. But in case of direct restoration if the patient is not happy with the treatment the restorations can be removed without damaging the tooth or teeth and the treatment cost is also much more less than that of orthodontic treatment or ceramic veneer and also less time consuming. Now a days restorative resins are available in variable colours and shades, hence it is very handy for the operator to find out the actual shade of the restoration which may be confirmed by the patients at the chair side during treatment by make-up trials.

Conclusion

Midline diastema of the both maxillary midline and mandible is a common aesthetic problem in the Bangladeshi community. Hence it is very important to establish a good, patient friendly, cost effective, less time consuming, durable and long lasting treatment protocol for the community so that everyone can effort the treatment. Considering this point of view direct composite restoration, which is totally painless, less invasive, cost effective and can be done in signal visit can be a very good treatment of choice for closing the midline diastema. Though more community survey and long term clinical evaluations of the cases is needed to confirm the success of the treatment.

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Volume 4 Issue 4 April 2021

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