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Management of spacing between maxillary anterior teeth with direct composite restoration

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Abstract

Diastemas are one of the most common forms of malocclusion seen frequently in the midst of the maxillary central incisors. Along with midline diastema, there can be generalized spacing in anterior teeth, especially in the maxillary arch. The etiology for the same is considered to be multifactorial. These can be managed either by surgical, orthodontic, periodontal, restorative, and prosthodontic procedures or by a combination of procedures to fulfill patient’s esthetic and functional demands. Recent advances in the adhesive dentistry enable practitioners to perform difficult restorative procedures in a conservative manner, producing results that are highly esthetic and efficient in function. Direct composite resin restoration is an immediate conservative, cost effective and less time-consuming treatment procedure. This article introduces a case report of esthetic management of maxillary anterior spacing including midline diastema with direct composite resin.

Keywords: Diastema, Direct composite resin, Study model, Putty index technique

Introduction

Maxillary anterior spacing or diastema is a common aesthetic complaint of patients [1]. Keene described diastema as spacing greater than 0.5mm between the proximal surfaces of adjacent teeth [2]. According to previous reports maxilla has a higher prevalence of midline diastema than mandible [3]. The diastema has a multifactorial etiology which includes extremely wide dental arch, congenital tooth absence, anomalous tooth size, and labial frenum hypertrophy.[2] In addition to the labial frenulum, microdontia, mesiodens, peg-shaped lateral incisors, lateral incisor agenesis, cysts in the midline region, habits such as finger sucking, tongue thrusting, and/or lip sucking, dental malformations, genetics, maxillary incisor proclination, dentalskeletal discrepancies, and imperfect coalescence of the interdental septum should also be considered factors that can cause diastema [4, 5].

Diastema can be managed either by surgical, orthodontic, periodontal, restorative, and prosthodontic procedures or by a combination of procedures to fulfill patient's esthetic and functional demands. The appropriate technique and material for a patient are also based on time, physical, psychological, and economic limitations [6, 7]. Recent advances in the adhesive dentistry enable practitioners to perform difficult restorative procedures in a conservative manner, producing results that are highly esthetic and efficient in function.

Direct composite resins in diastema closure cases allow dentist and patient complete control in formation of natural smile [8]. It is an immediate conservative, cost effective and less time-consuming treatment procedure. leading professionals to endless improvement while fulfilling their patients 'aesthetic demands.

This case report describes closure of spacing between maxillary anterior teeth with direct composite restoration.

Case Report

A 21year female reported to the Department of Conservative dentistry and Endodontics with the complaint of spacing between the upper front teeth since 2 years and were gradually increased over time. The patient gave history of orthodontic treatment done for the same complaint 5 years back but got relapsed. Clinical examination revealed 3 mm of midline diastema in the maxillary arch along with interdental spaces (from distal aspect of right lateral incisors to distal aspect of left lateral incisors). The oral hygiene of the patient was satisfactory, and no significant hard and soft tissue findings were found. No dental caries were observed in both clinical and radiographical examinations. [Figure 1-3].

Angle's Class I occlusion with normal overjet and overbite (corrected with orthodontic treatment) was noted. The labial frenum associated with the diastema was normal in size and position. Various treatment modalities (conservative restorative and prosthetic procedures including veneers and crowns) were discussed with the patient. Patient was not willing for re orthodontic treatment or for any invasive procedures. Therefore, a minimally invasive approach with a direct composite resin restoration was planned to restore the diastema and other interdental spaces.

Clinical Technique

Maxillary and mandibular diagnostic impressions using irreversible hydrocolloid (Coltene President) were made and poured with dental stone. In study model, mock preparation of the lost tooth structure was done using wax and putty template – silicon index was fabricated using impression material. [Figure 4-6]

Rubber dam segmental isolation was done from molar to molar using medium type rubber dam sheet and molar clamps, and were stabilized on tooth using dental floss. [Figure 7]

The silicone index was checked in the mouth [Figure 8-9]. Shades selection was done using a (VITA Tooth guide 3D Master) under natural daylight. Mesial surface of both the central incisors and proximal surfaces of lateral incisors and canines were roughened using a diamond point. Standard etching and bonding protocol were followed. Palatal silicon index was reseated, and incremental layering of direct composite resin restorative material was done on all maxillary anterior teeth. Body composite, enamel, and translucent shade composites were used in accordance with the enamel gloss and translucency of the adjacent anterior teeth. The index was used throughout the composite build-up procedure. The mesial and distal aspects were shaped using mylar strips that can be placed with the putty index on the teeth. Finishing and polishing were done using the composite polishing kit (Shofu Inc, Kyoto Japan) to achieve esthetically pleasing diastema closure [Figures 10-11]. Oral hygiene instructions were given to the patient. Finger massaging of gingival was advised for the mechanical stimulation of interdental papilla in the region of midline diastema. Figure 12 and 13 showed the difference in appearance of patient before and after the treatment respectively.

Discussion

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. [9,10,11]. They are conservative esthetic options of restorative dentistry since minimal or no tooth preparation as compared to ceramics [12,13]. The direct composite resin restorations can be placed in a single visit, often do not require preliminary models or wax-ups, and do not involve laboratory fees that escalate costs. 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 [14] and, in the event of an unforeseen fracture, they can be repaired easily compared to costly and time-consuming repairs or remakes for porcelain alternatives [15]

The case was resolved in a single session with minimal wear of tooth structure, reproducing the excellent contour. The diastema was closed using the composite material as it was the most conservative option available and also the patient was not ready for an expensive treatment.

Excellent results have been shown by various authors who have used composites for diastema closures. [16-18] The composite material used for restorations should have proper handling (nonstick and non-slumping) and esthetic (polish ability) characteristics with high filler content and small particle size.[19] In this case, Filtek Z350XT; 3ESPE with filler loading of 78.5% by weight and a filler particle size of 0.6–1.4 μm was used.[17]

Hereby, the predictability of the direct technique was enhanced by producing a lingual incisal silicone index and allowed the creation of a stratified restoration in the mouth with the same form as a previous wax-up.

The use of silicone index is one of the biggest game changers in dentistry for many clinicians in the anterior composite build up. The palatal silicone index is an imprint of the wax-up through which required information is transferred into the mouth during treatment. Putty index perfectly defines the sagittal

dimensions, the length, and the incisal edge position of the desired final restoration, the incisal thickness, mesial and distal line angles, the labial curvature of the restoration. Hence, the practitioner can fully concentrate on the application of composite layers. The approval of the patient is taken during the mock-up phase, and then the details are transferred to the mouth through the Silicone Index, this will reproduce the exact shape and form of the tooth.[20]

The patient was highly satisfied after seeing the esthetic result. The patient was instructed to floss before tooth brushing regularly and to avoid pigmented liquids that may cause staining of restoration. The patient was asked for regular follow-up visits 6 months.

Conclusion

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 with proper case selection, using an appropriate technique and modern materials, one can perform highly aesthetic and durable direct composite resin restorations that can satisfy patients as under the conditions of the case presented.

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Legend Figures

Figure 1: Pre operative view

Figure 2: Pre operative view

Figure 3: Pre operative view

Figure 4: Study Cast

Figure 5: Wax mock up

Figure 6: Putty index fabrication

Figure 7: Rubber dam isolation.

Figure 8: Putty Index Technique.

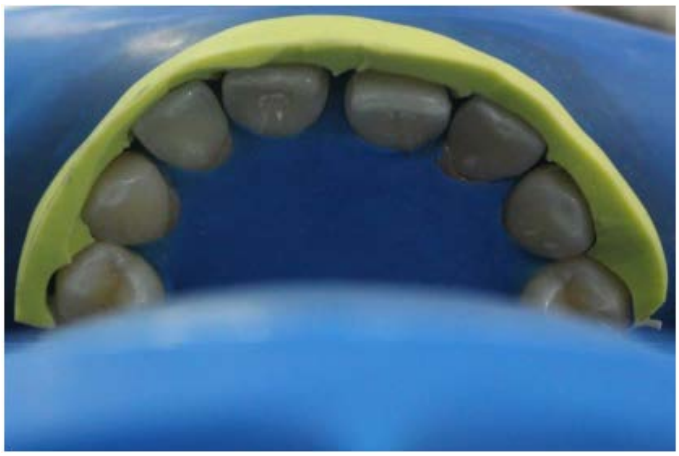

Figure 9: Putty Index Technique.

Figure 10: After Finishing & Polishing -Frontal View.

Figure 11: After Finishing & Polishing – Palatal View.

Figure 12: Pre operative view.

Figure 13: Pre operative view.

Figure 14: Post operative view.

Figure 15: Post operative view.