

Case Report

Closing the Diastema and Teeth Spacing Using Direct Composite Resin Build-Up

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Abstract— Teeth spacing is commonly seen in the upper anterior teeth, which affect patient's confidence due to disagreeable appearance. Teeth spacing may be due to low frenal attachment, which causes median diastema, small teeth with large maxilla, and bi-maxillary procline anterior teeth. Some patients will seek for options to close the space in order to get better aesthetic appearance. We reported this case of a 25-year-old woman who requested to close her median diastema between the teeth 11 and 21 as she felt that her smile was not nice and attractive. She also presented with mild spacing between her upper anterior teeth apart from the diastema. The treatment given to her was direct composite resin build-up, a minimal invasive treatment to close the spacing of between 1 to 2mm. The treatment has provided satisfaction to the patient. Being a conservative treatment, it can be reversible and repairable.

Keywords— diastema; composite resin; spacing; teeth; composite build-up

I. INTRODUCTION

Teeth spacing is characterized by spaces in between the teeth with discrepancy in contact points. Teeth spacing is commonly presented in the upper anterior teeth, either generalised or localised. Spacing that presented between two upper central incisors is called median diastema [1]. Median diastema occurs in about 98% of 6 years old and up to 49% of 11-18 years old [2]. In common physiologic situation, diastema at the beginning of the tooth eruption will close with the erupting path of anterior maxillary teeth. Nevertheless, diastema may not close spontaneously in some individuals due to several local factors including dentoalveolar discrepancy, low frenal attachment, physiological effect, and presence of abnormal teeth shape [2,3]. In dentistry, diastema is an aesthetic concern that might need treatment to improve social confidence.

Several treatment options have been proposed to close the diastema, commonly conservative treatment options. Orthodontics is the best option with some multidisciplinary cooperation. However, some patient may have economic limitations or prefer immediate effect and painless treatment. Thus, direct composite build-up is the preferred option as compared to indirect composite or porcelain veneer and tooth-coloured crowns [4,5]. The sophisticated composite technology has offered a wide range of shades and opacities allowing the dentist to mimic natural tooth and fulfil aesthetic demands [6]. Additionally, composite also allows repairs to achieve best effect.

II. CASE REPORT

A 25-year-old female university student presented to the Dental Specialist Clinic at the Faculty of Dentistry, Universiti Sains Islam Malaysia complaining of a gap in her upper front teeth. She had noticed the gap since secondary school and felt that the gap was quite big. The big gap reduced her social confidence in view that she would be graduating soon, and she was unsure to enter the working life.

Clinically, the space between the central incisors was about 2mm and there was mild spacing in between the incisors and canine (Figure 1.0). The lateral incisors were slightly smaller than the normal size with short and round curve angle as compared to her long and square shape of centrals. The gingival contour was even which did not need adjustment. Her oral hygiene was good, and she was caries free. She has Class I incisor, canine and molar relationship, which were not indicated for orthodontic treatment (Figure 2).

The diagnostic wax-up was made on a duplicated study model to plan the treatment by measuring and distributing the space for restoration (Figure 3). After discussion about the treatment options, she preferred composite build-up which involved all centrals and laterals to close the gap as it was less invasive with short visiting time.



Fig. 1 Pre-operative frontal view showing the size of midline diastema was 2mm



Fig. 2 Lateral view of study model



Fig. 3 The diagnostic wax-up on the upper laterals and upper centrals by space distribution method

Treatment was started by shade-taking using Ceram-X Universal Shade guide. Silicone index putty was fabricated from the diagnostic wax-up cast as a guide following the exact shape on the diagnostic wax-up (Figure 4). The silicone index putty was placed intraorally to check the fitting on the teeth and to confirm if any adjustment of the teeth has to be done to follow the space distribution (Figure 5). Cotton roll and gauze with saliva ejector and high-volume suction was used for isolation.

To ensure the incisors look aesthetically normal, minor enameloplasty on both central incisors were done 0.5mm distally to give space for adjusting the lateral incisors and distribute the space to create even size and shape of the incisors. High-speed needle polishing bur was used to control the amount of enameloplasty.

The composite build-up procedure was started by etching the right central incisor using 37% phosphoric acid (Ultradent™ Ultra-Etch) for 20 seconds, rinsed for ten seconds, and air-dried. Bonding agent (3M ESPE™ Single Bond Universal Adhesive) was applied and cured using LED light (Elipar™ DeepCure-L LED Curing Light) for ten seconds. The silicone putty index with composite resin Shade E2 (Universal Ceram.X™ Duo System) was sculpted on the putty and placed palatally to create palatal shell which follow the shape from diagnostic wax-up.

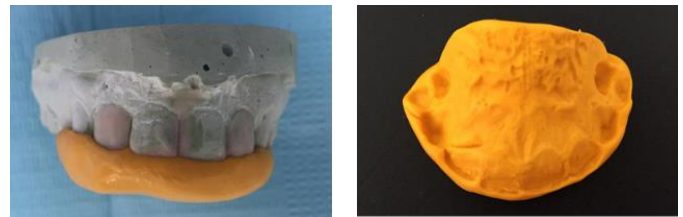


Fig. 4 Fabricated silicone putty index as a stent for composite build-up



Fig. 5 The silicone putty index was placed on the teeth to check the fitting orally.

This thin layer shell-like was for reference to maintain shape during layering the composite. Then, dentinal composite (shade D2) was used as dentin layer. Shade E1 half of crown towards to incisal and E2 half of crown gingivally was used as labial surface to mimic the natural tooth shade. Removal of any excess composite was done before continuing to the adjacent teeth.

In order to maintain separation and contact point between teeth, Mylar strip was used (Figure 6). When starting to involve adjacent tooth, the palatal shell and layering technique was not sculpted until interproximally leaving minimal space for later finishing the interproximal area. The interproximal surface and contact point were created by using the flowable composite and Mylar strip, pulling it back and front, and light cured to confirm the flowable composite flowed completely without voids.



Fig. 6 Mylar strip was used as separator between the teeth during interproximal contouring.

Once the build-up was completed, final shaping of the teeth was done using high-speed, white stone bur and coarse polishing disc. The composite was polished using slow speed polishing discs from coarse to fine grains, rubber wheel and white rubber disc bur (Figure 7) and polishing paste (Ultradent™ Diamond Polish Mint).

The patient was happy with the result (Figure 8). She was advised to have regular dental check-up and maintain good oral hygiene for long-term success.

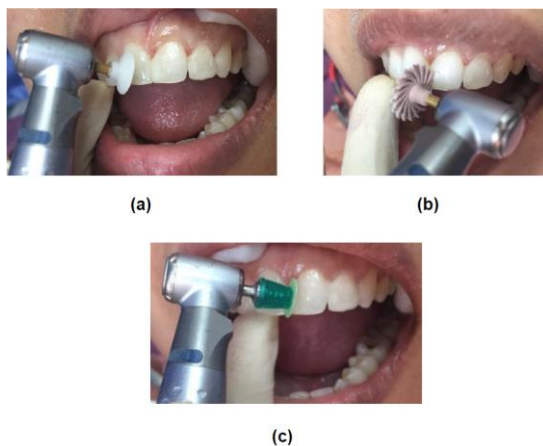


Fig. 7 The composite resin was polished using different type of polishing burs: (a) rubber disc, (b) rubber wheel, and (c) polishing discs.

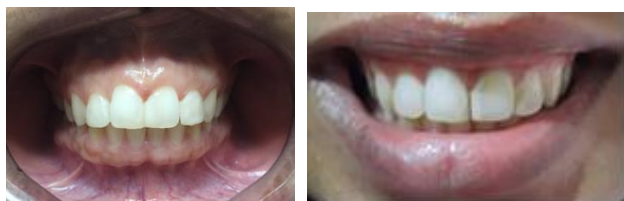


Fig. 8 Teeth and smile view post-operative outcome.

III. DISCUSSION

Diagnostic wax-up from the study models is important in managing teeth at aesthetic zone [7,8]. Diagnostic wax-up is used as one of the aesthetic evaluation tools for dentist and also as an effective tool for communication between patient and dentist [7,8]. It helps patient to visualize the result of the treatment proposed and complement the explanation given by dentist. The treatment plan using diagnostic wax-up can still be adjusted according to patient's expectation and dentist's skills before starting the treatment. Diagnostic wax-up also aids the dentist to fabricate silicone index putty, which will help to restore aesthetically natural look to match the expected outcome. Compared to free hand composite build-up, silicone index putty prevents inappropriate contouring far from wax-up especially on large diastema.

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The use of thin Mylar strip as an interproximal separator helps to create close contact between the teeth. Mylar strip aids in achieving aesthetics anatomic contour and labial surface finishing. It also allows curing to penetrate for complete composite resins polymerisation. Teflon band can also be the alternative to separate the teeth. In our presented case, using Mylar strip was an easier way to create smooth and normal contact point tightness without any void and irregularity. Flowable resin composite can flow completely filling the interproximal surface when the pushing and pulling forward and backward technique was applied [8]. Round and curve interproximal surface were created by slight pulling of Mylar labially during curing. The interproximal polishing strip was not needed thus avoiding over-trimming of the created contact point.

The enameloplasty done on distal both centrals was to create space for adequate composite thickness creating natural tooth shape. Composite resin has better bonding on enamel compared to dentin. Due to this, only 0.5mm of enamel was removed to maintain great bonding on enamel layer. Flowable composite was used at interproximal as it has high better flow to tooth surface therefore it was easy to penetrate and flow in the small gap to form layers of minimum thickness without void [9].

Most composite materials are not suited for highly ultra-stressed areas due to less structural toughness and compressive strength. Certain situations can jeopardize the longevity of direct composite restorations such as bruxism and edge-to-edge, deep bites and class II division 1 incisor relationship. In our presented case, the patient was aware of the situations that might threaten the composite resins. She did not have any teeth-grinding habit and malocclusion that could put the restoration at risk.

IV. CONCLUSIONS

Direct composite resin build-up to close median diastema can be one of the best less invasive treatment, as it is repairable and save time. However, it needs proper planning and good skills to provide excellent outcome and long-term success.

CONSENT TO PARTICIPATE

A written consent was obtained from the patient for the anonymized information to be published in this article before and after the treatment was given and before this publication was submitted.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest.

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