

## CASE REPORT

# A Novel Approach for the Closure of Multiple Diastema: A Clinical Technique

<sup>1</sup>Shirin Jha, <sup>2</sup>Sreekha Aswathanarayana, <sup>3</sup>Rupali Karale, <sup>4</sup>Lekha Santhosh, <sup>5</sup>Megha Kapadia

## ABSTRACT

Correction of multiple diastema without much preparation of the teeth is one of the challenges in clinical esthetic dentistry. Indirect restorative procedures render excellent esthetics; however, these are invasive procedures that lead to the removal of unnecessary tooth structure in order to achieve the desired result. Whenever possible, the most conservative approach is preferred over the invasive procedures. Many innovative techniques have been advocated, varying from restorative procedures, frenectomy, or orthodontic treatment for the closure of spaces in between the anterior teeth. When a relatively smaller diastema is present in between the teeth, extensive preparation of the tooth structure is not necessary and utilization of free hand bonding of composite resin may yield the desired result. So far, innumerable cases have been reported in the literature which has illustrated various techniques for closure of diastema. The following case report discusses a novel technique for closure of multiple diastema.

**Keywords:** Composite resin, Esthetics, Multiple diastema, Template.

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## INTRODUCTION

In this competitive era of cosmetics and beauty, a charming and pleasing appearance often decides the difference between success and failure in both our personal and professional lives. Anterior diastema or multiple diastema, in particular, can cause patients to feel dissatisfied with their smiles leading to ultimately lower their self-esteem in the long run.

A diastema can be defined as a space  $>0.5$  mm between the proximal surfaces of the two adjacent teeth.<sup>1</sup> It has always

been a challenging task for a clinician to restore the spacing present in between the teeth as per the patient's esthetic demands, following the most conservative approach.

Diastema can be treated in a multitude of ways including direct restorative therapy, indirect porcelain laminate veneers, orthodontic closure, surgical correction, or multidisciplinary approach depending upon the particular case and the etiology of diastema.<sup>2,3</sup>

Among all, the least invasive and the most conservative approach is the direct composite restorations, which is a learned technique. Although it requires skill and commitment from the clinician, it renders several advantages over porcelain restoration. Out of several benefits, it has an edge over others in having the ability to maintain control and customize the materials throughout the procedure. Whereas with porcelain, any modification requires a return to the laboratory for correction which involves high cost, becomes more time-consuming and tedious, both for the clinician and for the laboratories.

Before performing any restorative procedure, the clinician should have a sharpened sense of observation to visualize the properties (i.e., opacity, form, color, characterizations, and surface texture) of the natural teeth.<sup>4-7</sup>

With the emergence of the advanced and contemporary techniques, the time required for performing the restorative procedures have drastically reduced. Patients having spaces in between one or two teeth, demanding direct composite restorations can be completed in relatively lesser time, compared with the ones with spacing in multiple teeth. In this case report, a novel technique was tried for the closure of diastema, in multiple teeth using composite resins which greatly reduced the clinical chair side time, both for the operator and for the patient.

## TECHNIQUE

A 23-year-old female patient reported with multiple diastema (Fig. 1). The patient was unhappy with the appearance of her teeth and restrained herself from smiling due to self-consciousness. On examination, diastema was found in her maxillary and mandibular anterior region involving the canine in the right quadrant to the canine in the left quadrant in the upper arch and in between the incisors in the lower arch.

She was explained all the treatment options and it was her desire to close the spaces, using the direct restorative technique.

<sup>1,5</sup>Postgraduate Student (3rd Year), <sup>2,3</sup>Professor and Head  
<sup>4</sup>Professor

<sup>1,2,4,5</sup>Department of Conservative Dentistry and Endodontics  
The Oxford Dental College and Hospital, Bengaluru, Karnataka  
India

<sup>3</sup>Department of Conservative Dentistry and Endodontics, KLE  
Society's Institute of Dental Sciences, Bengaluru, Karnataka, India

**Corresponding Author:** Shirin Jha, Postgraduate Student  
(3rd Year), Department of Conservative Dentistry and Endodontics  
The Oxford Dental College and Hospital, Bengaluru, Karnataka  
India, Phone: +911149098110, e-mail: shirinjha485@gmail.com



Fig. 1: Preoperative image



Fig. 2: Mock-up prepared on a diagnostic cast



Fig. 3: Template



Fig. 4: Freehand composite placed and template tried in the patient

**Step 1**

The preoperative examination revealed healthy periodontium with ideal color. After thorough examination, impressions for diagnostic models were made in irreversible hydrocolloid (Heraplast, Heraeus Kulzer, USA). The models were studied to decide the shape and size of the restorations with the help of a diagnostic mock-up prepared using expired resin composite<sup>8</sup> from #13 to 23, which was well contoured and cured, wherein each teeth was separated using a Mylar strip in order to maintain a proper interproximal anatomy (Fig. 2).

**Step 2**

The model was placed on the platform of the pressure molding, vacuum former machine (Biostar, Scheu, Germany), and a clear coping thermoform sheet (Bioplast, Scheu, Germany, code 142) of 1 mm thickness was used to obtain a template (Fig. 3). Bioplast is low-density polyethylene, biocompatible clear coping material, available in varying thickness in round and square shapes.

**Step 3**

All the rough and ragged margins of the template were smoothed and a nick was created at the interdental area between each teeth from #13 to 23 using a 15 No. BP blade

and these areas were opened up faciolingually, to facilitate the subsequent placement of the Mylar strips back in place when the template is transferred to the mouth.

**Step 4**

At the onset of the treatment, required prophylaxis was performed and each teeth was etched using Scotchbond™ etchant 37% phosphoric acid (3M ESPE, St. Paul, MN, USA) on the proximal surfaces alone, for 20 seconds, avoiding contact on the facial surfaces, followed by which, teeth were washed and bonding agent (Adper Single Bond 2, 3M ESPE, St. Paul, MN, USA) was applied on the etched surfaces using an applicator tip, with enough material to keep the surface saturated with adhesive for 20 seconds, according to the manufacturer's instructions. The solvent was gently evaporated with a very light stream of air for 5 to 10 seconds and bonding agent was then light cured for 10 seconds. Nanohybrid composite resin composite (Filtek Z350 XT, A2; 3M ESPE, of 2 mm thickness was placed on the teeth over all the proximal surfaces at one go using freehand technique and template was placed over the teeth (Fig. 4), which were then separated using Mylar strip interproximally. Composite resin was light cured for 60 seconds using the light emitting diode curing unit (Lediton, Ivoclar Vivadent) following which the template and the Mylar strip were removed.



**Fig. 5:** Template was separated and Mylar strip was placed interproximally and light cured

The restoration was again cured for the same interval for further polymerization of any remaining unpolymerized composite resin (Fig. 5). After the curing was complete, the matrix was retrieved and the extra flash was removed with fine-grit flame-shaped diamond and finishing carbide burs.

### Step 5

The final finishing was done using fine composite finishing discs (Shofu, Inc., Japan). The final restoration resulted in the space closure, as well as overall esthetic improvement of the patient, meeting her expectations (Fig. 6).

### DISCUSSION

Treatment of diastema varies with every individual case and it requires correct diagnosis of its etiology, and early intervention relevant to the specific etiology. Various treatment modalities are currently available for diastema closure, among which direct composite veneering technique is widely adopted by most clinicians for the simple reason that it is economical, reversible, and requires less chairside time, rendering a satisfying and pleasing esthetics to the patient in less number of appointments. Another method of direct restoration involves the fabrication of silicon putty index followed by incremental buildup. Nevertheless, each method has its own limitation. The direct technique is quite time-consuming and requires a skilled operator to achieve satisfying results, whereas the wax up and fabrication of silicon putty index is a commonly practiced technique that helps in reproducing only the palatal anatomy. Additionally, there would be an added cost of the waxing executed by the prosthetic laboratory.

So, considering all the limitations of the various methods, a template was devised out of the clear coping material in this case, which served the following advantages, like multiple spaces were closed in a less chairside time, caused less fatigue to the patient as well as the operator, composite buildup was <2 mm, so incremental light



**Fig. 6:** Postoperative image

polymerization was not required, and was less tedious compared with the conventional incremental buildup technique of diastema closure for multiple teeth. Few limitations of this technique were: It is a two-visit procedure and not recommended in cases wherein the patient is too critical about the esthetics and wherein a layering technique is indicated with the use of various shades.

### CONCLUSION

The patient's esthetic expectations were successfully met through a conservative approach consisting of direct resin bonding and a template fabrication, in less time with pleasing results. The use of custom-made template greatly improved the control of the operator over the reproduction of the intricate details of the anatomy with excellent esthetics.

### CLINICAL SIGNIFICANCE

The present clinical technique describes a successful therapeutic treatment for the closure of multiple diastema in less chairside time, producing satisfying esthetic results.

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