

Closing Gaps with Composite Resin – The Aesthetic way**Mayuri Naik**

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ABSTRACT:

Presence of midline diastema is a fairly common aesthetic problem encountered by restorative dentists. It poses a critical challenge when it comes to choosing the correct method of treatment depending on the different variables associated with the treatment. Utilising composite resins in the treatment of midline diastema as a single visit, esthetic and cost effective procedure is highly welcomed by patients. However this mode of treatment is highly technique sensitive, hence all the steps have to be thoroughly studied and executed precisely to yield optimal results. This paper very effectively describes the various steps involved in restoring midline diastema simulating natural teeth very closely. An optimally restored anterior dental esthetics can positively boost patients confidence and life.

Keywords: Anterior teeth spacing, Composite Resins, Midline Diastema.

INTRODUCTION:

Patient demands for aesthetic dentistry with minimally invasive procedures have resulted in the extensive utilization of freehand bonding of composite resin to anterior teeth. Midline diastemata (MD) are spaces of varying magnitude between the crowns of fully erupted maxillary and mandibular central incisors. Keene¹ described MD as anterior midline spacing greater than 0.5 mm between the proximal surfaces of adjacent teeth.

ETIOLOGY

The etiological factors responsible for formation of diastemata can be summarised as follows:²

- a. Developmental: microdontia, missing laterals, mesiodens, macroglossia, fibrous frenum;
- b. Pathological: midline cysts, tumours and periodontitis;
- c. Neuromuscular: oral habits, such as tongue thrusting during speech, swallowing or abnormal pressure during rest.

PROCEDURE OF CLOSURE OF MIDLINE DIASTEMA BY COMPOSITE RESTORATION

1. The exact etiology of the midline diastema has to be recognised which will help in formulating the treatment plan. Also if there is a high frenal attachment or pathological/ neuromuscular causes, than they have to be treated first or there can be relapse of treatment.³
2. The distance between the central incisors has to be measured with the help of callipers. Correction of midline diastema with direct composite restoration can be carried out only if the spacing is less than 2.5-3mm or else orthodontic intervention would be necessary.⁴
3. Impression of the upper and lower arches can be taken to study the occlusal and incisal contacts. A wax mock up can also be made on the casts to make a putty impression which can be used as a palatal guide during the restorative procedure.³
4. When the teeth are in proper orthodontic alignment, no preparation of the tooth

structure is necessary. If there is an alignment problem or proximal caries than minor tooth preparation will be necessary.³

5. Mesial proximal surfaces of the central incisors are prepared with pumice slurry, or with coarse polishing discs.⁴ Some authors suggest slight roughening of the surface using 12 fluted tungsten carbide burs. The subgingival tooth structure can be roughened with coarse interproximal polishing discs.⁵

6. Shade selection technique^{6,7,8}

The dentin shade is best obtained from the gingival third of the tooth. It should be noted that microhybrids generally get darker on light curing, and microfills get lighter when light cured. The enamel shade is conveniently obtained in the middle third of the tooth. The incisal or translucent shade is observed in the incisal third of the tooth and proximal line angles.

7. In case putty impression guide is not made prior to restoration than a flowable frame technique can be used to form the palatal wall prior to the layering procedure.

The Flowable Frame Technique²

Step1—After the completion of etching(20 secs with 37% phosphoric acid), and bonding of the tooth surfaces, insert a mylar strip to the level of gingival sulcus of the tooth to be restored.

Step2—Support the plastic matrix strip lingually with your index finger to create a lingual contour

Step3—Inject the flowable composite resin of desired shade (either opacious or translucent) and smooth it to a thin layer with a hand instrument or a composite brush if necessary.

Step 4—Light cure the flowable composite and remove the plastic strip. The length, shape and thickness of the flowable frame can be adjusted using the sharp edge of the hand instrument or a diamond point if required. (Figure 1)

8. Layering techniques⁹

Composite mirroring is the natural replacement of teeth with minimal or no additional removal of the intact, healthy

dentition to normal form and function with tooth-colored material.

Clinically, a microhybrid can be used in any area requiring strength or dentin replacement and a microfill for polishability and enamel replacement and effects.



Figure 1: Insertion of matrix band

Simple layering technique

This technique should be considered for patients with minimal esthetic concerns. One or two shaded materials (with different opacities and the same or different chroma range) suffice. (Figure 2)

Less simple layering technique

This technique should be considered for the patient who has moderate esthetic concerns. It entails one or two shaded materials and addition of a translucent zone internally to help distinguish the dentinal lobes and create incisal effects. (Fig 2)

Three - dimensional advanced layering technique

This technique should be considered for the patient who has a moderate to extensive understanding of esthetics. Two shaded materials with different chromas are used to replace dentin, with an enamel layer for enamel effects and a translucent zone (T) internally to help distinguish the dentinal lobes. Lingual hashed enamel layer can be the E shade or the D2 shade. (Figure 2)

Three-dimensional characterized layering techniques

This technique should be considered for the patient who is very esthetically demanding.

Two shaded materials with different chromas are used to replace dentin, two shaded materials with different chromas are used for the enamel layer for enamel effects, and another layer uses incisal shaded material. A

characterization layer is placed between the incisal and enamel layers or the two enamel layers. Tints are placed internally to mirror the unique characterizations. (Figure 2)

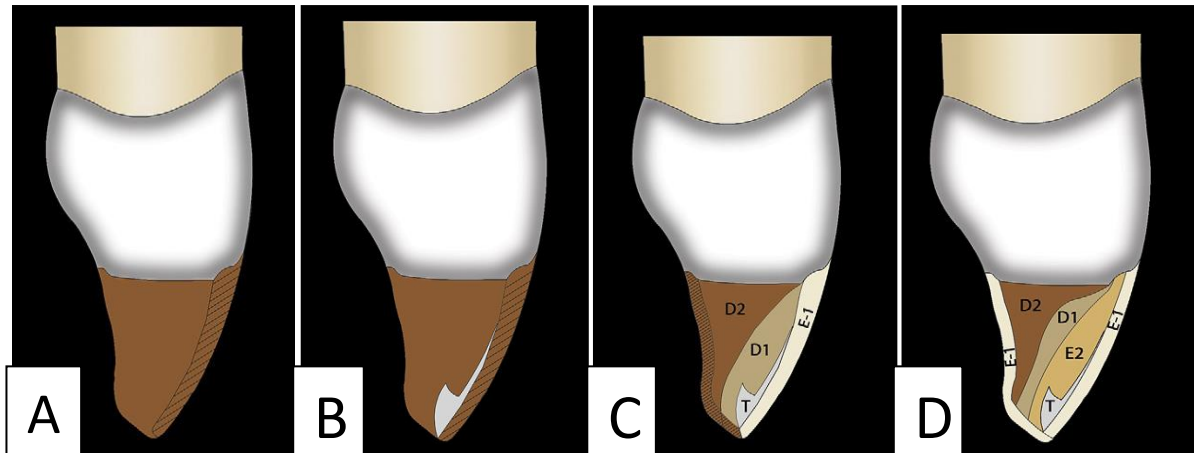


Figure 2: Schematic representation of various layering technique

- A. Simple Layering technique
- B. Less simple layering technique
- C. Three - dimensional advanced layering technique
- D. Three - dimensional characterised layering technique

9. Seamless margins¹⁰

Listed are multiple steps that must be followed to create undetectable margins:

- i. In case there is a carious lesion place a proper bevel.
 - a. Facially on enamel: 2-mm knife-edge type. An additional starburst bevel with varying depths and lengths is an added benefit. These multiple bevels extend from the cavosurface margin outward.
 - b. Lingually on enamel: chamfer margin preferably not in the contact zone.
- ii. Etch past the end of the bevel
- iii. Roll the outer layer with clean gloved hands for sculptability and to prevent inclusions or voids.
- iv. Sculpt the outer layer and get the geometric outline form, transition line angles, and primary anatomy to approximately 85% before curing.
- v. Super cure the composite and wait 10 minutes before finishing.

- vi. Finish the margin back to between the etched area and the end of the bevel.
- vii. Rotate finishing armamentarium from restoration to tooth.
- viii. Do not use rubber on the margins because the rubber shavings can get embedded in the margin.
- ix. High polish appropriate for the natural dentition. An appropriate polish and lustre is the key that maintains itself for a long period of time.

10. Customization^{11,12}

It must be noted that tints are very strong, and while performing the layering technique many times the tints tend to disappear. Tints must never be placed on the surface, because finishing and polishing lead to their removal.

Paint and thin: Using a thin paintbrush with the desired tint, usually white or brown, place the tint to mirror the adjacent tooth and thin the material from both sides leaves a thin, nonstraight line. Then light cure.

11. Finishing¹³

The finishing sequence includes

a. Diamonds burs, specifically submicron diamonds of 50 µm or less.(e.g. UCLALeSage Anterior Preparation Bur System,Brasseler USA)

b.Course and fine polishing disc.
(e.g. KerrHawe, Kerr,, CA; EP Polishers, Brasseler,; Sof-Flex Disc, 3M,; Flexi-discs, Cosmodent,).

c.Gingivally, the use of hand instrumentation with Bard-Parker #12 or #15 blades is recommended, but carbide compositecarvers(Brasseler, Savannah) are consideredequally effective.Thin diamond discs (e.g. VisionFlex Disc, Brasseler) on a straight or contra-angle handpiece can also be used.

d.Interproximally, the use of metal finishing strips is recommended (e.g. VisionFlex Strips, Brasseler,GC InternationalMetal Strips).The use of plastic interproximal strips (e.g. Sof-LexStrips, 3M; Vivadent Strips, Vident) of

two grits is essential to attain the ideal polished surface in this stain-susceptible zone.

e.Texture creation -tapping or dragging a course or medium diamond bur or disc with a handpiece, using the corner or side of a cross-cut fissure bur, or using a white or green stone with various motions can be carried out for creating natural looking textures.

12. Polishing⁵

To obtain the appropriate high polish the use of chamois-type buffing wheels and discs (Flex-Buff Disc, Cosmedent; Chammy wheel, Brasseler), is required.

The use of a polishing paste (Luster Paste, Kerr; Enamelize, Cosmodent; Truluster, Brasseler,) or Prisma-Gloss, Dentsply/Caulk) first applied on a wet surface and then followed by polishing on a dry surface, adds gloss to the final restoration.

This procedure creates a composite restoration that not only mimics the beauty of dentin and enamel, but also defies detection.

Clinical Cases

Preoperative

Post operative



CONCLUSION

Taking a systematic approach in closure of diastemata by composite restorations can greatly enhance the treatment outcome. To achieve esthetics in composite restorations,, the clinician must have a thorough understanding of tooth morphology and topography, tooth shade analysis, composite systems, layering techniques and the use of tints, opaquers, and maverick colors to create restorations that mimic nature.

REFERENCES

1. Keene HJ. Distribution of diastemas in the dentition of man. *Am J Phys Anthropol* 1979;21:437–41.
2. Koirala AS. Midline diastema closure with direct-bonding restorations. *Journal of cosmetic Dentistry* 2010;6–11.
3. Hwang SK, Ha JH, Jin MU, Kim SK, Kim YK. Diastema closure using direct bonding restorations combined with orthodontic treatment: a case report. *Restorative dentistry & endodontics* 2012;37(3):165–9.
4. Toughness F, Kulzer H, Bis-gma T, Matrix CA. Diastema closure with a micro-hybrid composite resin. *Journal of Dental Practice* 2006;156–9.
5. Gochar PW. Accreditation clinical case report, case type iv: anterior direct resin (diastema closure). *Journal of Cosmetic Dentistry* 2009;25(1):40–8.
6. Terry DLK. An integration of composite resin with natural tooth structure: the CL IV restoration. *Pract Proced Aesthet Dent* 2004;16(3):235–42.
7. Sproul RC. Color matching in dentistry. Part 1. The three-dimensional nature of color. *J Prosthet Dent* 2001;86:453–7.
8. Vanini L. Light and color in anterior composite restorations. *Practical periodontics and aesthetic dentistry*. PPAD 1996;8(7):673–82.
9. Lesage BP. Aesthetic Anterior Composite Restorations : A Guide to Direct Placement. *Dent Clin N Am* 2007;51:359–78.
10. Jefferies SR, Barkmeier WW, Gwinnett AJ. Three composite finishing systems: a multisite in vitro evaluation. *Journal of esthetic dentistry* 4(6):181–5.
11. Powers JM, Fan PL, Raptis CN. Color stability of new composite restorative materials under accelerated aging. *Journal of dental research* 1980;59(12):2071–4.
12. Güler AU, Duran I, Yücel AÇ, Özkan P. Effects of air-polishing powders on color stability of composite resins. *J Appl Oral Sci* 2010;5:123-8.
13. Newton Fahl. A polychromatic composite layering a pproach for solving a complex class iv / direct learning objectives. *Pract Proced Aesthet Dent* 2007;19(1):17–22.

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