

Time-Saving Techniques for **COMMON EMERGENCIES**

Class IV Direct Resin “Pearls”

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Abstract

This article describes a quick and easy technique to create an index that can be used in an emergency situation to allow the dentist to fix a broken anterior tooth in 30 minutes or less. Also illustrated is a simple technique using a silicone index and a Mylar strip to quickly and predictably restore a diastema.

Key Words: emergency putty technique, emergency appointment, silicone index, fractured front tooth, Class IV restoration, diastema

This article offers a few “pearls” on how to quickly and esthetically restore a Class IV restoration and/or a diastema during a short emergency appointment.

Introduction

How often do dentists get calls from patients who have chipped or fractured a front tooth and demand to be seen immediately? It happens regularly in the author's practice, and to the patient it is a catastrophic event that requires an immediate and flawless solution before they can again show their face in public. In a busy practice it can be challenging to find time to satisfy these patients' demands at a high-quality level. This article offers "pearls" on how to quickly and esthetically restore a Class IV restoration and/or a diastema in a short emergency appointment.

The AACD's hands-on workshops and *Journal of Cosmetic Dentistry* are among the best resources from which to learn how to master the techniques of layering and sculpting dental composites. In almost every case, the most predictable and widely used method is the use of a silicone index wherein a lingual shelf is established that allows easy access for stratification of subsequent layers.¹ The silicone index can be made indirectly from a diagnostic wax-up or directly from a composite mock-up done on the patient's tooth/teeth.² These methods are ideal but require some time. In an emergency situation the diagnostic wax-up is not realistic because it would take too much time to pour up the impression in stone or plaster and then complete the wax-up. A direct composite mock-up is a better choice but still requires some time and materials to create the mock-up and fabricate the silicone index.

The Emergency Putty Technique

Most of the fractured front tooth emergencies the author sees occur in children and adolescents as the result of an accident. When fitting in such patients on a last-minute basis, there often is not time to do a direct or indirect mock-up. Therefore, a silicone index (Panasil Fast Set Putty, Kettenbach LP; Hauppauge, NY) of the whole maxillary anterior segment is taken first (Fig 1). If necessary, a hygienist can administer anesthesia while the author modifies the index in the laboratory. However, if the fracture is small enough, this often is not required.

A disposable #12 blade (Miltex; York, PA) is used to trim excess putty off the incisal edge to give a clean and clear edge to the facial incisal line angles (Fig 2). A laboratory carbide bur is then employed in a straight electric handpiece to trim away the excess material on the area of the fractured tooth (Fig 3). The idea is to visually assess the contour of the lingual surface and try to get an incisal embrasure and contact area (Fig 4). Various laboratory burs can be equally effective for this (a larger size is best for getting a smooth lingual surface, while a smaller size is better for refining the incisal embrasure and contact area). Since this is going to be used to establish the lingual shelf, it does not need to be perfect; it just needs to be good enough to lay the initial foundation, which can easily be modified once the lingual shelf is bonded in place. It should take only a minute to modify the silicone index. The author calls this the "emergency putty technique" (EPT). The following cases describe use of the technique in a variety of emergency situations.

It should take only a minute to modify the silicone index.



Figure 1: Silicone index of maxillary anterior segment including the fractured tooth.



Figure 2: Trim the index with a surgical blade along the incisal edge.



Figure 3: Use a round-ended carbide laboratory bur to modify the silicone index on the fractured tooth.



Figure 4: Try-in of silicone index to verify fit.

Tips for Using the EPT

First Case

A male college student had injured tooth #8 in a physical altercation (Figs 5 & 6). He reported that the tooth did not hurt and had only mild sensitivity to cold. After an x-ray and evaluation of the entire upper anterior area and temporomandibular joints determined that there were no other traumatic injuries, the EPT was fabricated as previously described. Minimal preparation of the enamel was completed by beveling the cavosurface margin and lightly abrading the enamel with an intraoral air microabrasion unit (MicroEtcher II; Danville Materials; San Ramon, CA) (Figs 7 & 8).³ Isolation was achieved using an OptraGate retractor (Ivoclar Vivadent; Amherst, NY) and the standard total-etch bonding protocol was followed (OptiBond Solo Plus, Kerr; Orange, CA) (Figs 9 & 10).⁴ Once the lingual shelf was formed (Fig 11), the subsequent layering of chromatic and achromatic colors was simple (Figs 12-17).^{5, 6}



Figure 7: Try-in of modified silicone index to verify fit.



Figure 8: Tooth #8 prepared with long bevel and air abrasion.



Figure 5: Fractured #8, 1:2 front retracted view.



Figure 9: Phosphoric acid etch.



Figure 6: Fractured #8, 1:1 front retracted view.



Figure 10: Total-etch bonding.



Figure 11: Lingual shelf in place using shade WE.



Figure 12: Ball of dentin shade DA2 to show color match with natural dentin before sculpting.



Figure 13: Dentin layer in place. The fracture line is still visible so a little more was added.



Figure 14: A thin layer of enamel shade EA2 in addition to a bleach shade BL1 used on the incisal tip to subtly accentuate the halo effect.



Figure 15: Thin layer of translucent shade TRANS on incisal tip and mesial edge.



Figure 16: Enamel shade EA1.

When restoring a diastema, it is important that the palatal enamel is also cleaned and etched to allow for a smooth transition of the composite from labial to palatal.



Figure 17: Final thin top layer of MW over entire facial surface.

The common protocol of using a variety of diamond and carbide burs and disks was followed to finish and polish the restoration⁷⁻¹⁰. A slow-speed handpiece was employed for better control and tactile sensation. A coarse Sof-Lex disk (3M ESPE; St. Paul, MN) was used to get the initial line angles and smooth the interface between the composite and enamel (Fig 18). A reflective powder was then dusted on to help visualize the reflective and non-reflective zones and clearly see the secondary and tertiary anatomy of #9, to which #8 was to be matched (Fig 19). A medium- or coarse-grit diamond bur (Axis Dental; Coppell, TX) was utilized to subtly form the vertical aspects of the lobes and grooves (Figs 20 & 21). Because the patient had fairly smooth enamel, a flame-shaped fine-grit diamond and round-tipped carbide bur (Axis) were used to refine the lobes and line angles (Figs 22 & 23). A reapplication of the reflective powder was helpful in visualizing the progress before the final polish (Fig 24). Once the author was satisfied with the secondary and tertiary anatomy, final polishing was accomplished with rubber wheels, a PDQ diamond brush (Axis), and Enamelize paste with a felt disk (Cosmedent; Chicago, IL) (Figs 25-27). A final dusting of the reflective powder confirmed that the composite blended in seamlessly and matched well to #9 (Fig 28). Figures 29 and 30 show the final result.

Including the examination and x-ray, this emergency appointment took only 30 minutes in the middle of the day, and did not disrupt the afternoon schedule. The patient and his mother were very happy that we were able to fit him in and fabricate a nice, immediately functional restoration.



Figure 19: Reflective powder to evaluate initial line angles and reflective zones.



Figure 20: Coarse diamond to initiate secondary anatomy.



Figure 21: Evaluation of lobe formation.



Figure 18: Initial contouring with a coarse disk.



Figure 22: Fine-grit flame diamond to further develop and smooth lobes and line angles.



Figure 23: Round carbide bur to replicate surface texture and refine lobes and line angles.



Figure 24: Reapplication of reflective powder to evaluate progress.



Figure 25: Rubber polishing wheel to smooth surface.



Figure 26: Diamond brush to shine surface without removing surface texture.



Figure 27: Polishing paste and felt disk for final polish.



Figure 28: Final coat of reflective powder to verify secondary and tertiary anatomy and texture.



Figure 29: Final photograph, 1:2 front view.



Figure 30: Final photograph, 1:1 front view.

Second Case

A teenage male presented with fractured #7 and #8 due to a basketball injury (Figs 31 & 32). He did not report any pain or sensitivity, and an examination and periapical radiograph confirmed there was no damage to the roots or periodontium. Once it was determined that it was safe to proceed with the restorations, the EPT was employed (Figs 33-38). Tooth #8 was restored first, then #7. This appointment (including the examination and x-ray) was completed in 45 minutes.



Figure 31: Fractured #7 and #8, 1:2 front view.



Figure 32: Fractured #7 and #8, 1:1 front view.



Figure 33: Silicone index of maxillary anterior segment including fractured teeth.



Figure 34: Modification of the silicone index to create lingual shelf.



Figure 35: Try-in of modified index to verify fit.



Figure 36: Lingual shelf established using shade WE.



Figure 37: Final photograph, 1:2 front view.



Figure 38: Final photograph, 1:1 front view.

Most of the fractured front tooth emergencies the author sees occur in children and adolescents as the result of an accident.

Third Case

A young boy had chipped the incisal edge of #8 and fractured #9 while roughhousing with his brother (Figs 39 & 40). Tooth #9 was fractured deep enough that it was sensitive to air, so anesthesia was necessary. While the anesthetic set in we took an x-ray and evaluated for any other damage. Because there was no exposure of the pulp, it was undesirable to temporarily bond the tooth with one single shade of composite only to have to re-traumatize the pulp later by drilling on it to place a more esthetic restoration. It makes sense to do it right the first time. Even though this patient was seen at the end of the day there was not enough time to do a direct or indirect mock-up, so the EPT was employed (Figs 41-44). Although not an ideal solution in this case due to the large amount of missing tooth and having to guess how much to trim the silicone index, it can be sufficient to get a very acceptable result when time is limited.



Figure 41: Modification of silicone index.



Figure 42: Try-in of modified index to verify fit.



Figure 39: Preoperative full smile, 1:2 front view.



Figure 43: Final photograph; full smile, 1:2 front view.



Figure 40: Fractured #8 and #9, 1:1 front view.



Figure 44: Final photograph, 1:1 front view.

Fourth Case

An 11-year-old boy fell while skateboarding and chipped tooth #9 (Figs 45 & 46). He did not complain of any sensitivity and the x-ray showed no further damage to the supporting tissues. He arrived at the office in the middle of the afternoon and, due to the EPT, his appointment was completed in less than 30 minutes. Trimming the silicone index was a little more challenging with this case due to the accentuated mamelons, so most of the detailing of the mamelons was done during the polishing phase (Figs 47-49).



Figure 45: Preoperative, 1:2 front view.



Figure 46: Fractured #9, 1:1 front view.



Figure 47: Try-in of modified silicone index to verify fit.



Figure 48: Final photograph, 1:2 front view.



Figure 49: Final photograph, 1:1 front view.

He did not complain of any sensitivity and the x-ray showed no further damage to the supporting tissues.

Discussion

The EPT is most easily used when fractures are smaller than the incisal third. Larger fractures are best approached using a direct or indirect mock-up for a more accurate silicone index, but when time is limited the EPT can still be employed for all sizes of fractures. Figures 50 through 53 illustrate use of the EPT to restore larger fractures.

Restoring a Diastema in the Anterior

During an EPT to restore a small chip on a maxillary central incisor, the patient asked if the small diastema between his centrals could be fixed at the same time (Fig 54). He was only in for a 30-minute appointment and the author was not sure how everything could be accomplished in such a short time. Common approaches to restore a diastema include the Mylar pull technique or simply freehand layering each side of the diastema.¹¹⁻¹³ The author's usual approach to restoring a diastema with composite is with a diagnostic wax-up and silicone index, first restoring one side of the diastema and placing polytetrafluoroethylene tape over it, then restoring the other side. This works very well but takes extra time. Because this was a smaller diastema it seemed it would be much quicker if a clear Mylar strip could be made to fit within the silicone index and then both sides could be restored simultaneously. The technique worked quite well on this patient—not only did it save a significant amount of time, but it also allowed more accurate maintenance of the midline and contact area.

To accomplish this technique a silicone index is required. In this specific example it was done in conjunction with the EPT so the silicone index was already made. A disposable #12 blade was used to carefully cut straight down the midline in the silicone index (it is much easier to make a smooth straight slice if the index is not too thick). Once the slice was made it was tried in the patient's mouth to verify that the Mylar would fit all the way to the level of the gingival. Adjustments were made until it fit well (Fig 55).

When restoring a diastema, it is important that the palatal enamel is also cleaned and etched to allow for a smooth transition of the composite from labial to palatal (Fig 56). Once the enamel was ready for the composite a small rope of MW composite (Estelite Omega Composite System, Tokuyama Dental; Tokyo, Japan) was placed on the mesiopalatal line angles of #8 and #9 within the silicone index with the Mylar in place (Fig 57). The silicone index was then placed in the mouth and pressed labially with enough pressure to ensure proper fit and to express excess composite labially through the diastema (Fig 58).



Figure 50: Fractured #8 and #9, 1:1 front view.



Figure 51: Final photograph, 1:1 front view.



Figure 52: Fractured #8 and #9, 1:1 front view.



Figure 53: Final photograph, 1:1 front view.



Figure 54: Fractured #9 and diastema, 1:1 front view.



Figure 55: Try-in of silicone index with Mylar strip.



Figure 56: Phosphoric acid etch for diastema extending onto palatal surface.



Figure 57: Thin layer of shade MW on mesiolingual line angle of silicone index with Mylar in place to maintain contact area.



Figure 58: Excess composite expressed labially with Mylar in position.

With the Mylar strip in place, the contact point was maintained. A composite spatula was used to remove excess composite to the midfacial point and also to contour the gingival emergence of the composite (Fig 59). This layer acts in a similar way to the lingual shelf of a Class IV restoration. With the Mylar still in place, a small layer of EB1 (Tokuyama) was added to prevent the interproximal area from being overly translucent (Fig 60). A final thin layer of MW was placed and feathered into the mesiofacial for the final contour using a sable brush. The facial and palatal gingival embrasures were refined with a #12 blade and the contact area was smoothed with medium- and fine-grit interproximal reduction strips (Axis) (Figs 61 & 62).

Summary

The time-saving techniques described in this article have proved to be valuable tools in the author's practice to manage emergency appointments to restore fractured incisors and diastemas. Previously, such patients had been asked to allow an impression to be taken for a diagnostic wax-up and then to come back at the end of the day—or even the next day—so that an accurate silicone index could be fabricated. This approach was not always appreciated by patients, nor was it considerate of their busy schedules. Employing the emergency putty technique has enabled the author to satisfy these patients' desire to be seen quickly, as well as their demand for a high-quality restoration. As a result, it has also become an effective practice-building tool.

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Figure 59: The Mylar was removed after the composite was light-cured.



Figure 60: With the Mylar back in place, the final layers of composite were placed and contoured.



Figure 61: Final result, 1:1 front view.



Figure 62: Palatal contour and embrasure form, 1:1 incisal view.

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Dr. Brown is an AACD Accredited Member. He practices in Bellevue, Washington.

Disclosure: The author did not report any disclosures.