Silicone Index: An Alternative Approach for Tooth Fragment Reattachment

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ABSTRACT

Tooth fragment reattachment is a simple, conservative, fast, and affordable treatment option for fractured teeth when the fragment is available. However, this technique can present some difficulties, among which is the possibility of the fragment being positioned and bonded inadequately. To avoid this situation, it is necessary to establish a reference for the adequate positioning of the fragment using a silicone index.

CLINICAL SIsignificance

This article presents an alternative approach for better handling of tooth fragments resulting from trauma by using a silicone index as a guide to proper positioning and bonding.

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INTRODUCTION

Tooth fractures are the most common type of traumatic injuries in permanent teeth.[1] On average, one in four people will suffer a crown fracture,[1] involving mainly the central upper incisors.[2] Different restorative techniques can be considered for fractured teeth, from just polishing a small portion of fractured enamel to using a veneer or a crown. Treatment choice depends on the patient's age, the quantity of lost dental structure, the endodontic status, and the involvement of soft tissues of the affected tooth and adjacent teeth.[3]

Despite the recent developments in adhesive materials and restorative techniques, there is no restorative material that can reproduce the esthetic and functional needs as well as the natural dental structures.[4] Based on this, in clinical situations where the dental fragment is available and adequate for use, tooth fragment reattachment should be considered the treatment of choice,[5] as the reattached fragment maintains the natural characteristics of wear, shape, surface texture, and color. It can also be considered a simple, conservative, fast, and inexpensive treatment option, which can cause an immediate, positive emotional response from the patient. Therefore, it is our responsibility to inform patients and parents that, in case of an accident, they should look for the dental fragments and, if

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possible, keep them in an appropriate solution. The degree of hydration of the dental fragment is crucial for treatment success. Fragments dehydrated for periods longer than 1 hour have their fracture resistance significantly reduced, whereas teeth restored with hydrated or rehydrated fragments were shown to maintain their resistance.[6]

The reattachment technique can present some difficulties, including the possibility of the fragment being positioned and bonded inadequately.[7,8] To avoid this situation, it is not only necessary to check how the fragment fits the remaining tooth structure but also to establish a reference for the adequate positioning of the fragment.

The objective of this article was to present an alternative approach for better handling of the tooth fragment by using a silicone index as a guide to proper positioning and bonding.

CLINICAL CASE REPORT

A 10-year-old patient presented with fractured central upper incisors (teeth #8 and #9) (Figure 1). Clinical and radiographic evaluations were made, and no signs of pulpal involvement, root fracture, or damage to soft or hard tissues were noticed. Two fragments were available, and both were from the same tooth (#8). The fragments were immersed in 0.12% of chlorexidine solution for disinfection, and their adaptation was then tested (Figure 2). In spite of presenting some structure loss, the fragments adapted satisfactorily to the tooth remnant. At this point, a decision was made to first bond the two fragments and then reattach it to the tooth remnant.[9]

Figure 1. Frontal retracted view of the fractured central incisors.

The reattachment surfaces were etched with 37% phosphoric acid for 15 seconds (Figure 3), washed for 30 seconds, and lightly dried. The adhesive system (Single Bond, 3M, St. Paul, MN, USA) was applied, and once the fragments were appropriately positioned, the adhesive was light-cured for 30 seconds (Figures 4 and 5). The fragment was positioned and stabilized to the remnant with a sphere of composite resin, without previously etching or bonding (Figure 6). Then, an impression of the anterior teeth was subsequently made with silicone, which included the tooth and fragment in position (Figure 7). The silicone index was removed, and the facial aspect was cut with a #15 scalpel blade, keeping only the palatal portion (Figure 8).

As suggested by previous reports, no further preparation was conducted.[10–12] Conventional adhesive procedures (etching and bonding) were performed on the fragment and on the tooth remnant (Figures 9 and 10); however, no light-curing was performed. An increment of an opaque microhybrid composite resin (A2 Dentin, 4 Seasons, Ivoclar-Vivadent, Amherst, NY, USA) was placed on the tooth, and the fragment was then positioned with the support of the silicone index (Figure 11). Resin excess was removed with a spatula (Figure 12), and light-curing was performed for 60 seconds on the facial surface

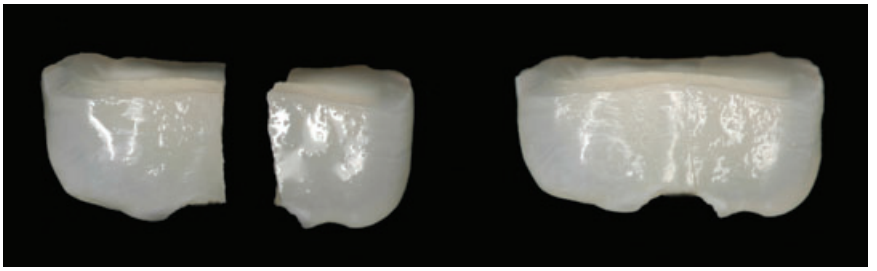

Figure 2. The adaptation between the fragments was tested.

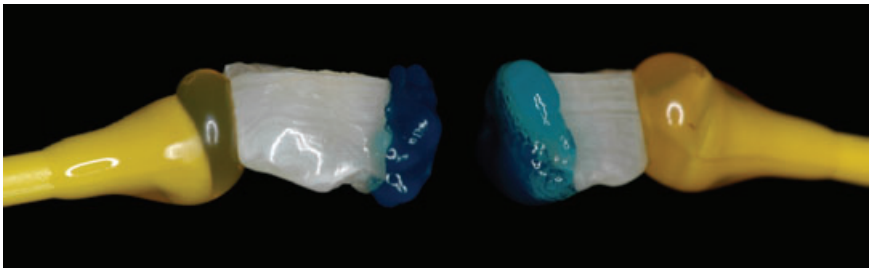

Figure 3. Fragments were etched with 37% phosphoric acid gel.

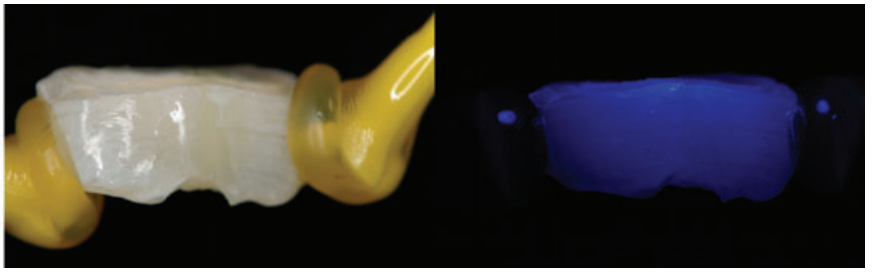

Figure 4. A single-component adhesive material was applied and light-cured with the fragments in position.

Figure 5. Aspect of the bonded fragments.

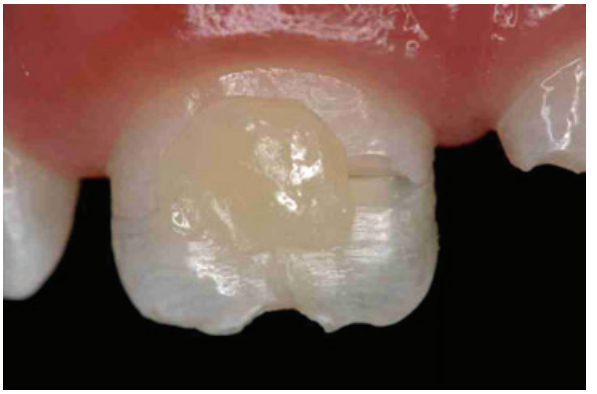

Figure 6. The fragment was adapted to the tooth remnant and kept in place with a sphere of composite.

Figure 7. A silicone impression was made with the fragment in position.

Figure 8. The facial aspect of the silicone index was cut with a #15 scalpel blade.

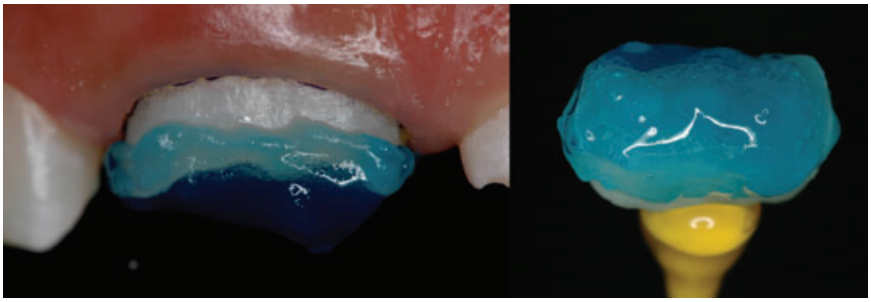

Figure 9. The tooth and the fragment were etched with 37% phosphoric acid gel.

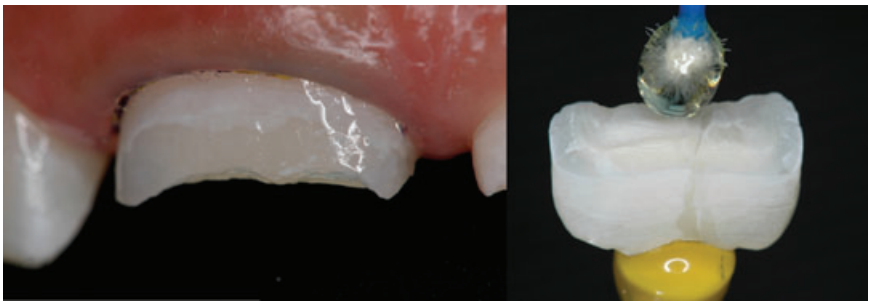

Figure 10. The adhesive was applied on the tooth and the fragment.

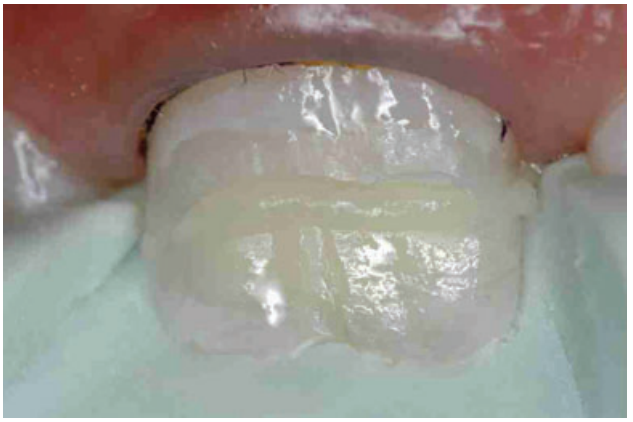

Figure 11. An increment of composite resin was applied on the fragment, and it was positioned with the aid of the silicone index.

Figure 12. Excess composite was removed.

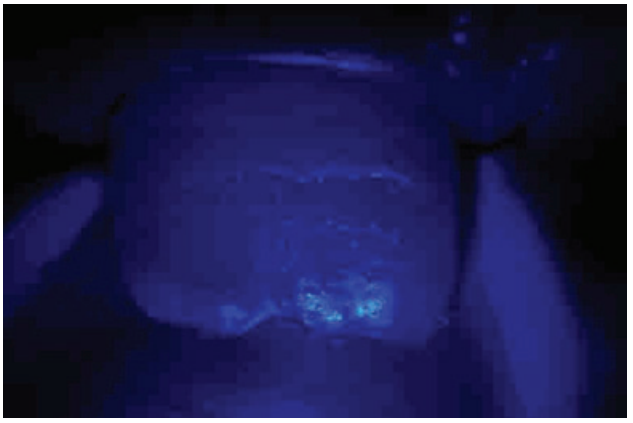

Figure 13. The facial aspect was light-cured for 60 seconds.

Figure 14. An enamel shade composite was lightly feathered between the fragment and the tooth structure to mask the fracture line.

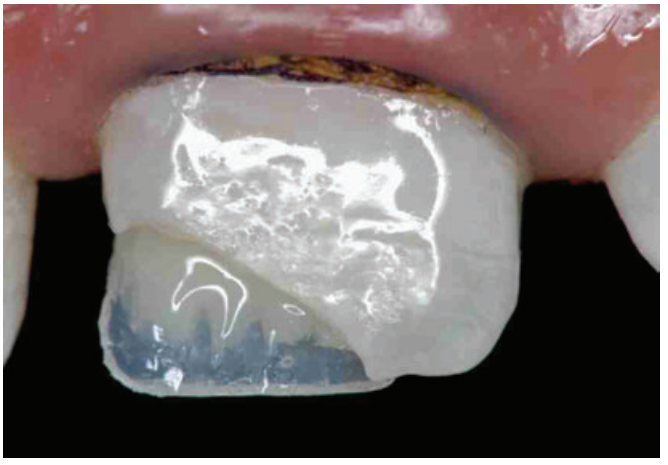

Figure 15. The artificial palatal enamel was built with a translucent composite while the dentin lobes were sculpted with a more opaque shade.

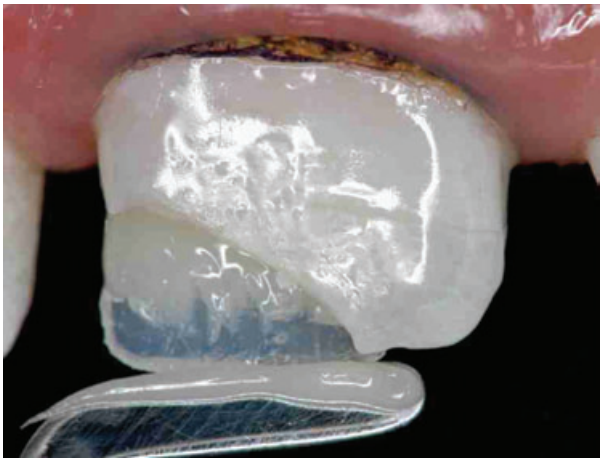

Figure 16. The opaque incisal halo effect was recreated with an opaque composite.

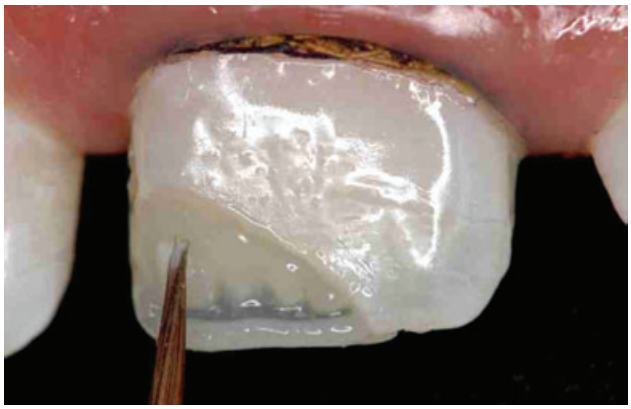

Figure 17. A white tint was used to simulate the effect of some craze lines present on the remaining tooth structure.

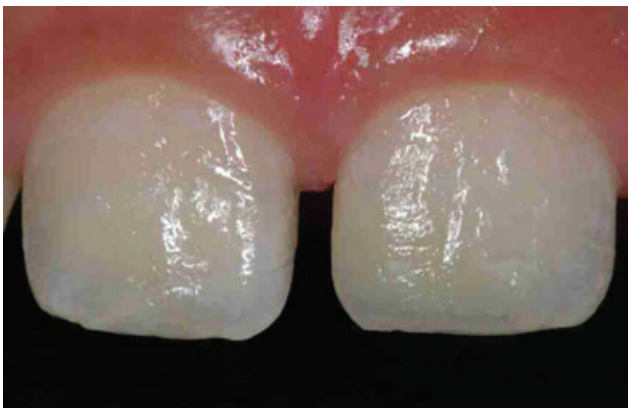

Figure 18. Final aspect of the tooth fragment reattachment and composite restoration.

(Figure 13). After removal of the silicone index, the lingual side was also light-cured for another 60 seconds. An enamel shade composite (A2 Enamel, 4 Seasons) was lightly feathered between the fragment and the tooth structure to mask the fracture line (Figure 14). The small chip present on the incisal edge of tooth #8 as well as the fracture on tooth #9 were restored with contemporary layering techniques (Figures 15–17). The final aspect of the tooth reattachment and the polished restoration is shown in Figure 18.

CONCLUSION

Handling some critical situations with creativity and support by research has been shown to be helpful in this case through the use of a silicone index as a reference for the predictable adaptation between the fragment and the tooth remnant.

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