CASE REPORT

Allogeneous tooth fragment reattachment

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diya2001_rastogi@yahoo.co.in**SUMMARY**

Coronal fractures of the anterior teeth are a common form of dental trauma and its sequelae may impair the establishment and accomplishment of an adequate treatment plan. Among the various treatment options, reattachment of a crown fragment obtained from a previously extracted tooth is a conservative treatment that should be considered for crown fractures of anterior teeth. This article reports reattachment of an allogeneous tooth fragment in a fractured maxillary lateral incisor in a 38-year-old patient. It is suggested that allogeneous reattachment in a fractured anterior tooth serves to be a better alternative and should be further researched. Aesthetic and functional rehabilitation of a fractured complicated anterior crown using allogeneous tooth fragment is a better alternative to other more conventional treatment options.

BACKGROUND

Coronal fractures of the anterior teeth have been found to have a severe impact on the social and psychological well-being of a patient.¹ Aside from minor luxation injuries such as concussion or loosening of the teeth, crown fractures are the most common consequences of dental trauma.²

Various treatment options available for the management of complicated crown fractures are direct pulp capping, pulpotomy or pulpectomy followed by aesthetic rehabilitation using one of the following techniques, viz., reattachment procedure, direct composite restorations and indirect ceramic restorations.³

Reattachment of the fractured fragment is currently the preferred technique.⁴ It represents a simple and low-cost method, allows the maintenance of incisal function in dental structure, provides better and long lasting aesthetic results which maintains the tooth form and colour as well as produces minimal tooth loss, increases wear resistance, and thus improves masticatory function.⁴⁻⁶ When the fractured fragment is available after the trauma and if it is in good condition, the reattachment represents the best treatment choice.⁵ Nevertheless, sometimes the original fragment is either lost or so damaged that reattachment is not feasible; in such situations bonding a fragment obtained from a previously extracted tooth to the fractured tooth is another novel possibility being explored.^{7,8}

This case report describes a clinical case of tooth reattachment performed in a fractured maxillary lateral incisor with pulp exposure, which was treated with conservative pulp therapy and restored with a dental fragment obtained from an extracted sterilised tooth.

Figure 1 Preoperative image of fractured 22.

CASE PRESENTATION

A 38-year-old man reported to the conservative dentistry clinic, 20 days after he had a fall from a bicycle. The patient presented with a class III fracture in 22 with distal margin 2 mm above free gingiva. Intraoral examination revealed no other hard or soft tissue injury (figure 1). Radiograph revealed ill-defined radiolucency in relation to 22 suggestive of chronic apical periodontitis, no other injury or lesion was found on adjacent teeth (figure 2).

A treatment plan was compiled that comprised endodontic treatment of tooth 22 followed by reattachment of a crown fragment from an extracted sterilised maxillary lateral incisor using a glass fibre reinforced composite post (*Easypost*,

Figure 2 Preoperative radiograph.

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Figure 3 Working cast after root canal completion.

Dentsply Maillefer) and a dual cure luting system (*SmartCem2*, *Dentsply Maillefer*).

Following cleaning and shaping, the root canals were obturated with gutta-percha and resin-based sealer using the lateral compaction technique, the access was temporarily sealed. Impressions were then taken using a very high viscosity precision impression material (*Aquasil Soft Putty—Regular Set*, *Dentsply Caulk*) followed by addition silicon-based, light body, elastomeric impression material (*Aquasil Ultra*, *Dentsply Caulk*) and working casts poured (figure 3).

An extracted presectioned, pulp tissue removed, disinfected and freeze stored maxillary left lateral incisor was selected having the same approximant morphology and shade, which was later sterilised. The tooth was then grinded selectively in the cervical area to adapt, replace and simulate the missing hard tissue on the working cast (figures 4–6).

Postspace preparation was performed in root canal treated 22 using precision drills for the selected post leaving apical 5 mm of the filling to maintain a good apical seal (figure 7) and a glass-fibre-reinforced composite root canal post was tried in the canal. A dual-cure luting system (*SmartCem2*, *Dentsply Maillefer*) and a glass-fibre reinforced composite root canal post (*EasyPost*, *Dentsply Maillefer*) were sequentially placed according to the manufacturer's instructions.

A trough was created in the centre of the allogeneous crown fragment, the intact coronal portion of 22 and the crown

Figure 5 Trough on the palatal aspect of the tooth.

fragment were etched with 37% phosphoric acid (*Etching Dental Gel*, *Dentsply/Caulk*) gel for 20 s, rinsed and dried. Dental adhesive (*Prime & Bond NT*, *Dentsply Caulk*) was applied and photopolymerised for 20 s. Flowable composite resin (*EsthetX Flow*, *Dentsply Caulk*) was applied on the etched surfaces, the crown fragment was accurately placed as performed on the master cast such that the coronal part of the glass fibre reinforced composite post occupies the trough created. It was then photopolymerised for 40 s. Thereafter, a round diamond bur was used to produce a circumferential chamfer in the adhesive interface. The chamfer was etched and conditioned, the same adhesive system was used and the chamfer region was filled with composite resin of the selected shade. The occlusion of the reattached tooth was checked to avoid the presence of premature contact. The reattached tooth was observed soon after the end of the treatment (figures 8 and 9). After 2 years, good functional and aesthetic resolution was observed with normal periapex (figures 10 and 11).

DISCUSSION

The technique described in this case report is reasonably simple, while restoring function and aesthetics with a very conservative approach. However, it has to be kept in mind that a dry and clean working field and the proper use of bonding protocol and materials is the key for achieving success in adhesive dentistry.

Figure 4 Sterilised sectioned extracted 22.

Figure 6 Fragment selectively grinded to simulate the missing tooth structure.

Figure 7 Postspace preparation after root canal therapy.

Figure 9 Postoperative radiograph.

Reports indicate that the reattachment of fractured coronal fragments results in successful short-term and medium-term outcomes.⁹

Bonding of the crown fragment is a logical restorative treatment option when the tooth fracture results in no or minimal violation of the biological width. The reattachment technique promotes immediate positive emotional patient response, excellent aesthetics, re-establishment of the tooth's natural surface texture and contours.⁴⁻¹⁰ Although studies indicate that teeth restored with a full coverage restoration would provide a more mechanically stable outcome when compared with reattachment technique with the rebonded fractured tooth not being as strong also as the intact natural tooth⁴⁻¹¹; it has been found that most failures of reattached teeth result due to new trauma.⁴ As far as the impact strength of the reattached fragment is concerned, it is mainly determined by the reattachment technique with circumferential chamfer technique showing better results than direct bonding technique.¹² Moreover, most flaws of reattached teeth occur due to new trauma.⁴

Even though the adaptation of the fragment obtained from the extracted tooth presents some advantages, similar to those produced with the reattachment of the proper fragment, certain limitations are observed with this technique. Decreased availability of teeth due to a more preventive approach in dentistry, this fact may hinder the availability of a tooth with colour and shape similar to that of the fractured tooth.⁸ More time is spent in preparing a correct adaptation of the fragment. In addition, careful procedures should be undertaken regarding sterilisation and storage of these teeth.⁸⁻¹³ To prevent cross contamination, which poses another hazard, the roots of the teeth stored should be sectioned and pulp tissue must be removed, before teeth disinfection in chlorhexidine digluconate and freeze storage. Before use, the teeth must be sterilised in humid heat (120°C for 15 min).⁸

We followed up the case for 2 years. Good functional and aesthetic outcomes were observed without any discolouration of the reattached fragment or abnormality at the periapex. Aesthetic and functional rehabilitation of a fractured

Figure 8 Postoperative view after reattachment.

Figure 10 Two-year follow-up showing good aesthetic outcome.

Figure 11 Two-year follow-up radiograph showing normal periapex.

complicated anterior crown using allogeneous tooth fragment proves to be a better alternative to other traditional and more conventional regimens.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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Learning points

- Reattachment represents a low cost method, provides incisal function and better as well as long lasting aesthetics.
- When the patient does not have the original fragment retained, this low-cost technique can be used to gain the original form and function without putting extra burden on the patient.
- Glass-fibre-reinforced composite root canal post can be processed in one time-saving visit, eliminates the dental laboratory steps, due to the direct technique in combination with an adhesive composite.
- This technique is also a procedure that is gentle to the tooth substance: thin dentine walls are stabilised by the plastic build-up composite and the composite resin cement.

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