CASE REPORT

Restoration of fractured anterior permanent teeth using reference guide technique

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SUMMARY

The most common consequence of traumatic dental injury is uncomplicated crown fracture. The main techniques for reconstructing fractured teeth include the use of direct adhesive restorative materials. However, this type of treatment is time consuming and requires a skilled operator. An alternative to the direct restorative technique is the use of a reference guide. The advantage is that the restorative procedure can be carried out in two short clinical sessions with a drastic reduction in chair time. The size, shape and inclination of the teeth are determined in advance, which reduces the need for eventual adjustments. In addition, the use of a reference guide makes it possible for two or more teeth to be restored simultaneously; in contrast, with the conventional technique. This paper offers a step-by-step description, of a reference guide technique for restoration of permanent maxillary incisors fractured through trauma.

BACKGROUND

Traumatic dental injuries among children are caused mainly due to falls during recreational and sports activities, as well as road traffic accidents and acts of violence can be regarded as a public health issue.¹ The most common consequence of hard-tissue trauma is uncomplicated crown fracture,² and among children 6–15 years of age the incidence of this type of trauma ranges from 15% to 79.6%.^{1 3–5} The maxillary central incisors are the most vulnerable teeth,^{1 3–6} especially among boys.^{7 8} Inadequate lip coverage and increased overjet are predisposing factors.³ The main techniques for reconstructing fractured teeth include the use of direct adhesive restorative materials. However, this type of treatment is time consuming and requires a skilled operator who has complete mastery of the restorative materials. An alternative to the direct restorative technique is the use of a reference guide. This paper offers a step-by-step description, based on a specific case study, of a reference guide technique for restoration of permanent superior incisors fractured through trauma.

CASE PRESENTATION

A 10-year-old boy, accompanied with his parents, attended the paedodontics clinic with aesthetic concerns related to dental fractures caused due to fall. There was no associated relevant medical history. An intraoral examination showed that oral hygiene was good and dental caries were absent.

The patient had uncomplicated horizontal and oblique crown fractures in teeth 11 and 21

Figure 1 The fractured teeth 11 and 21.

(figure 1). An intraoral periapical radiograph (figure 2) revealed no pulpal and radicular involvement. Therefore, the reconstruction of fractured area with composite resin using a reference guide restorative technique was planned.

TREATMENT

An alginate impression of maxillary arch was made and the stone model was constructed (figures 3 and 4) on which the fractured teeth would be reconstructed by means of progressive waxing (figure 5). After that,

Figure 2 An intraoral periapical radiograph for the teeth 11 and 21.

To cite: Nayak UA, Khandelwal V, Nayak PA, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2013-010257

Figure 3 Dental stone model—front view.

Figure 4 Dental stone model—occlusal view.

mould with a heavy silicon base impression material was made (figure 6), reproducing the shape and contour of the needed restorations (figure 7). The restorative material and the matching shade were selected and noted in the patient's record.

During the next session, fit of the constructed mould was checked in the patient's oral cavity (figure 8). The palatal portion of the mould fits perfectly the palatal aspect of the teeth to be reconstructed, thus serving as a reference guide.

Figure 5 Reconstruction of the fractured teeth by progressive wax-up.

Figure 6 Rubber-based impression serving as guide.

Figure 7 Guide in place.

Polishing of the fractured tooth was performed with pumice slurry and water to remove plaque. The tooth was then etched for 15 s (figure 9) and washed with water. The adhesive protocol was performed according to the manufacturer's specifications (figure 10). The reference guide was then fitted to the palatal surface of the teeth (figure 8). A3 shade restorative material (Caulk DENTSPLY, Konstanz, Germany) was applied to the palatal portion of the reference guide, and photopolymerisation was applied for 40 s. A2 shade composite restorative material (Caulk DENTSPLY, Konstanz, Germany) was used for restoring the vestibular surface. To the incisal portion

Figure 8 Fit was checked in oral cavity.

Figure 9 Etching of bevelled enamel of the fractured teeth.

Figure 12 Palatal view of the restoration depicting the proper contour.

Figure 10 Bonding agent application.

translucent charisma restorative material (Kulzer, Hanau, Germany) was applied (figure 11). Finishing, polishing and adjustments were performed with multilaminated drills, abrasive straps and polishing paper discs (figures 12 and 13).

OUTCOME AND FOLLOW-UP

The patient and his guardian received instruction on postoperative care and were alerted to the importance of using a mouth guard.

Figure 11 Composite build-up.

Figure 13 After finishing and polishing.

The patient was recalled after 1 month for checkup (figure 14). Regular follow-up was advised at yearly intervals.

DISCUSSION

Direct adhesive restorations are frequently used for the reconstruction of uncomplicated crown fractures, as in the case of fracture of the enamel and dentin without pulpal involvement.^{1 3 4} However, the ideal for this type of reconstruction is to reattach the dental fragment by bonding. As the patient did not have fractured dental fragments, reconstruction of the fractured area with composite resin was planned. The restorative technique using reference guide used in this study facilitates the

Figure 14 At 1-month follow-up.

reconstruction of fractured anterior teeth. A reference guide is created from the teeth (as reconstructed on a model), which makes it possible for the clinician to increase the success rate. The advantage is that the restorative procedure can be carried out in two short clinical sessions, with a drastic reduction in chair time; this factor is important to ensure the child's cooperation. The size, shape and inclination of the teeth are determined in advance, which reduces the need for eventual adjustments. In addition, the use of a reference guide makes it possible for two or more teeth to be restored simultaneously, in contrast with the conventional technique. Besides functioning as a matrix for reconstructing the anatomy of the teeth, the reference guide functions as a baffle plate to hold the restorative material, facilitating its insertion into the area to be reconstructed. A limitation of the technique is that the impression and cast are needed, and progressive mock-up of the fractured teeth must be performed.

Learning points

- ▶ The restorative procedure can be carried out in two short clinical sessions.
- ▶ A drastic reduction in chair time ensures the child's cooperation.
- ▶ The procedure reduces the need for eventual adjustments.
- ▶ The size, shape and inclination of the teeth are determined in advance.

Competing interests None.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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