CASE REPORT

Extrusion of Fractured Teeth

TARIQ AJAZ ANSARI, BDS
AKHTER HUSAIN, MDS
ROHAN MASCARENHAS, MDS
VIVEK AMIN, MDS

Tooth fractures that extend subgingivally can be difficult to treat. The crown of the fractured tooth may be too short to allow placement of an artificial crown, or an artificial crown may be esthetically unacceptable because of a poor relationship between the fractured tooth and the surrounding soft tissue. Although preservation of the natural tooth is preferable, in many cases the fractured tooth must be extracted and replaced.

Diagnosis and Treatment

A 27-year-old male presented with an Ellis Class IV fracture (Fig. 1) of the maxillary left central and lateral incisors subsequent to maxillary anterior trauma (Fig. 2). The patient had a Class I malocclusion.

Endodontic treatment was performed (Fig. 3), but the crown lengths of the fractured central and lateral incisors (3mm and 4.5mm, respectively) were insufficient for artificial crown placement. Although the patient was advised to undergo extraction and replacement of the central incisor, he wanted to preserve the natural tooth. Extrusion of the two fractured teeth was planned to allow artificial crowns to be placed on both teeth.

Enough of the lateral incisor's crown remained to allow a bracket to be bonded. However, because the crown length of the central incisor was inadequate for bracket placement, a J-hook was

Fig. 1 Ellis Class IV fracture extends subgingivally to affect root of tooth as well as enamel, dentin, and pulp of crown.

Dr. Ansari is a postgraduate student, Dr. Husain is Professor and Head, Dr. Mascarenhas is a Professor, and Dr. Amin is an Associate Professor, Department of Orthodontics, Yenepoya Dental College, Mangalore 575018, Karnataka, India. E-mail Dr. Ansari at dr_tariqansari@yahoo.com.

Dr. Ansari

Dr. Husain

Dr. Mascarenhas

Dr. Amin

Fig. 2 27-year-old male patient with Ellis Class IV fracture of maxillary left central and lateral incisors before treatment.

Fig. 3 Endodontically treated maxillary left central and lateral incisors.

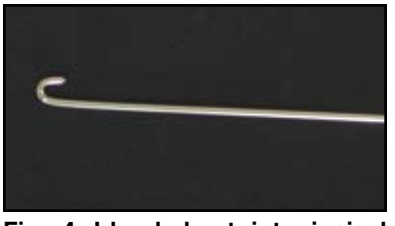

Fig. 4 J-hook bent into incisal end of 1mm stainless steel wire.

made from 1mm round stainless steel wire for insertion in the root canal (Fig. 4). The J-hook was roughened with sandpaper to improve mechanical retention. Part of the root canal filling of the central incisor was drilled out. After the canal was carefully dried, the J-hook was inserted into the canal and fixed with zinc phosphate cement (Fig. 5).

Fig. 5 J-hook inserted into root canal of left central incisor.

Fig. 6 Begg brackets bonded in maxillary arch and .016" Special Plus Australian archwire* placed, with central and lateral incisors ligated to archwire.

Begg brackets were bonded in the maxillary arch, and an .016" nickel titanium archwire was inserted. After initial alignment, an .016" Special Plus Australian archwire* was placed. A vertical downward bend was made from the right central incisor to the left canine to increase the distance between the archwire and the J-hook and to avoid any undesirable extrusive force on the adjacent teeth. The J-hook was tied to the archwire with a stainless steel ligature wire, and the Begg bracket on the left lateral incisor was also ligated to the archwire (Fig. 6).

Fig. 7 Periodontal pack placed for five days.

Fig. 8 Periodontal pack removed and Begg brackets debonded.

The patient was seen weekly, with the archwire activated slightly at each visit to ensure delivery of a light, constant, and controlled extrusive force to the fractured teeth. The force needed for extrusion was only about 40-50g. After 40 days of extrusion, the crown lengths of the central and lateral incisors had increased to 7mm and 7.5mm (an extrusion of 4mm and 3mm), respectively—enough for the placement of artificial crowns.

*A.J. Wilcock, 45 Yea Road, Whittlesea, Victoria 3757, Australia; www.ajwilcock.com.au.

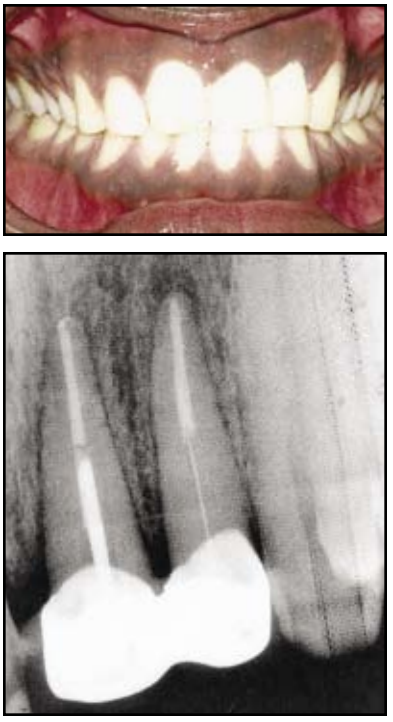

Fig. 9 Ceramic crowns placed on extruded central and lateral incisors.

After orthodontic treatment, gingival-contouring surgery was performed to properly shape the gingivae of the fractured teeth. A periodontal pack was placed at the surgical site and left for five days (Fig. 7), after which the Begg brackets were debonded (Fig. 8). The J-hook was then removed from the root canal after being loosened by the vibrations from an ultrasonic scaler.

A resin-reinforced fiber post was cemented to the root canal of the central incisor using Panavia F2.0 resin cement.** Composite was built up on both of the extruded teeth with the ParaPost Para-Core dual-cure build-up system.*** Finally, ceramic crowns were placed on the central and lateral incisors (Fig. 9).

Discussion

Extrusion of a fractured tooth has several advantages over extraction and prosthodontic replacement. It is a conservative approach that preserves the natural tooth and maintains the periodontal architecture. A disadvantage of the approach is the long treatment duration compared to extraction and replacement.

We have successfully used the technique described above in several patients, and we have never had a case where the J-hook detached during extrusion. All these patients showed satisfactory periodontal health after treatment. ❑

**Kuraray America, Inc., 101 E. 52nd St., 26th Floor, New York, NY 10022; www.kuraraydental.com.

***Registered trademark of Coltène Whaledent Inc., 235 Ascot Parkway, Cuyahoga Falls, OH 44223; www.coltenewhaledent.com.