

MANAGEMENT OF SEVERE EXTRUSIVE LUXATION WITH SURGICAL REPOSITIONING AND SPLINTING : CASE REPORT



Kalaiarasu Peariasamy

Department of Paediatric Dentistry, Sungai Buloh Hospital, Selangor, Malaysia



Introduction

Traumatic injuries to the teeth of children present unique challenges. In most cases, trauma lead to changes in the blood flow in the pulp, and when excessive, can prompt irreversible degenerative changes and pulp necrosis. In addition, when the injuries cause displacement of the tooth, the pulp tissue can become ischaemic from disruption of apical blood supply and complicate healing of the traumatized dental tissues.

Extrusive luxation (extrusion) is an injury in which the tooth is partially displaced out of its socket. The reported frequency of extrusive luxation in permanent teeth is about 11 percent (1). In extrusion, the extent of displacement may vary from mild to near avulsion or associated with protrusion and/or retrusion, and exposure of the root surface. Radiographic examination always reveals increased width of the periodontal ligament space.

The recommended treatment of extrusive luxation is by repositioning and splinting (2). For severely extruded tooth, this is especially challenging because the prognosis of the involved tooth is mostly dependent on timely early treatment and follow-up care.

This report illustrates a management approach comprising of surgical repositioning, splinting and endodontic therapy in two young patients with severely extruded teeth.

Case Report

CASE 1

An 8-year old boy presented two hours after a fall in which he sustained dental injuries to his upper central incisors.

Main clinical findings:

- Extrusive luxation with severe labial displacement (Fig. 1a)
- Incisors had closed apex, no root fracture, Grade 2 mobility
- Negative to pulp vitality tests
- No occlusal interference

Emergency treatment under general anaesthesia

- Envelope flap raised from pre-existing gingival laceration
- Exposed root surfaces irrigated with physiologic saline
- Extruded incisors repositioned and .014 Twist-flex wire/composite splint was placed (Fig. 1b)
- The gingival laceration was sutured with Vicryl 4/0
- Post-operative care - oral hygiene, a course of Amoxicillin, 0.2% Chlorhexidine rinse and soft diet for 1 week.

Follow-up treatment

- Pulp was extirpated from both teeth after one week (Fig. 1c)
- At 2 weeks, root canal treatment was initiated and non-setting calcium hydroxide was placed before composite/wire splint was removed
- Root filling with sealer and gutta-percha completed 1 month after surgical repositioning (Fig. 1d)
- Clinical/radiographic controls 2, 6 and 12 months (Fig. 1e).



Fig. 1a
11 and 21 extruded with severe labial displacement. The gingival tissues prevented teeth from being avulsed.



Fig. 1b
Clinical view of central incisors after 2 weeks.



Fig. 1c
Root canal treatment was initiated and non-setting calcium hydroxide was placed as canal dressing. Access was closed with IRM temporary dressing.



Fig. 1d
Periapical radiograph taken 12 months after endodontic treatment shows good periodontal healing and no root resorption.



Fig. 1e
Clinical view 12 months after surgical repositioning and endodontic treatment of extruded central incisors.

CASE 2

A 14-year old boy was a victim of an assault. He was seen in an hour with injuries to his upper right central and lateral incisors.

Main clinical findings:

- Severe extrusive luxation with palatal displacement (Fig. 2a)
- Incisors had closed apex, no root fracture, Grade 3 mobility
- Negative to pulp vitality tests
- Occlusal interference

Emergency treatment under local anaesthesia

- Exposed root surfaces irrigated with physiologic saline
- Extruded incisors were repositioned surgically and .016 SS round wire/composite splint was placed (Fig. 2b)
- The gingival laceration was sutured with Vicryl 4/0
- Post-operative care - oral hygiene, a course of Amoxicillin, 0.2% Chlorhexidine rinse and soft diet for 1 week.

Follow-up treatment

- Pulp was extirpated from both teeth after one week (Fig. 2c)
- At 2 weeks, root canal treatment was initiated and non-setting calcium hydroxide was placed before composite/wire splint was removed
- Root filling with sealer and gutta-percha completed 1 month after repositioning (Fig. 2d)
- Clinical/radiographic controls 2, 6 and 12 months (Fig. 2e).



Fig. 2a
Near avulsion of extruded incisors with >8mm root surface exposure.



Fig. 2b
Clinical view immediately after repositioning and splinting.



Fig. 2c
Pulp extirpated from both incisors, non-setting calcium hydroxide was placed and access closed with IRM temporary dressing.



Fig. 2d
Periapical radiograph taken 12 months after endodontic treatment. No pathological changes were seen on radiograph.



Fig. 2e
Clinical view 12 months after the initial visit. The gingival tissues are aesthetically preserved and the teeth fully functional.

Discussion

The most desirable outcomes after dental trauma are pulpal and periodontal ligament healing. In extrusive luxation, immediate repositioning and stabilization with a functional, non-rigid splint for 2-3 weeks optimizes healing of the periodontal ligament and neurovascular supply. The advantage of the surgical technique is that it, returns the adjacent tissues to the original anatomic situation to allow repair and further allows fast and adequate endodontic access (3).

Clinical evidence show that the risk of severe periodontal healing complications in extrusive luxation is generally low (4). However, in cases of extensive or total severance of the apical blood supply, there is considerable risk for pulp necrosis and pulp vitality is not expected to return with a few exceptions where revascularization occurs through a process of transient apical breakdown (5). In severely luxated teeth with pulp necrosis, root canal treatment should ideally be done during the second week after repositioning. Using calcium hydroxide for a short period of time (up to one month) before filling the root canal will help disinfect the root canal system.

These cases suggest that early surgical repositioning, short term splinting and timely endodontic treatment of severely extruded mature teeth can achieve favourable outcomes.

References

- Lauridsen E, Hermann NV, Gerds TA, Kreiborg S, Andreasen JO. Pattern of traumatic dental injuries in the permanent dentition among children, adolescents, and adults. *Dent Traumatol* 2012; **28**:358-63
- DiAngelis AJ, Andreasen JO, Ebeleseder KA, Kenny DJ et al. International Association of Dental Traumatology guidelines for management of traumatic dental injuries: 1. Fractures and luxations of permanent teeth. *Dent Traumatol* 2012; **28**:2-12
- Ebeleseder KA, Santler G, Glockner K, Hulla H, Pertl C, Quehenberger F. An analysis of 58 traumatically intruded and extruded permanent teeth. *Endod Dent Traumatol* 2000; **16**:34-9
- Hermann NV, Lauridsen E, Ahrensburg SS, Gerds TA, Andreasen JO. Periodontal healing complications following extrusive and lateral luxation in the permanent dentition: a longitudinal cohort study *Dent Traumatol* 2012; **28**:394-402
- Andreasen FM. Transient apical breakdown and its relation to color and sensibility changes after luxation injuries to teeth. *Endod Dent Traumatol* 1986; **2**:9-19.

Acknowledgement

Director General, Ministry of Health, Malaysia