

Management of Apical Resorption in a Traumatized Upper Central Incisor: A Clinical Case Report

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Abstract:

When dealing with dental trauma, clinicians are often posed with challenges in treatment planning and management, which subsequently affect the long-term outcome. Treatment and follow-up of patients should be evidence-based and in accordance with current guidelines.

This case aims to share the immediate and long-term management of a patient with an extrusion-luxation injury in a maxillary central incisor. Extrusive luxation injury is the partial displacement of a tooth from its socket. There is separation of the periodontal ligament, whilst the alveolar bone is intact. Research shows that the risk of repair-related resorption is around 15%¹ in mature teeth with extrusive luxation. Monitoring the pulpal condition with sensibility testing and radiographic investigation at regular intervals is essential. Once pulpal necrosis and/ resorption are established, endodontic treatment should be undertaken.

History:

A 22-year-old female attended the Trauma Clinic in the Restorative Dentistry department at King’s College Hospital, after being head-butted by a male in a lift the previous day. She reported her upper central incisors had been hit and the upper left central incisor was tender to touch.

She was medically fit and well and worked as a sales assistant. She smoked 5 cigarettes a day and drank 1 unit of alcohol a week.

Examination:

Extra-oral examination revealed a swelling on the left hand side of the upper lip. There were no lacerations, step deformities, disturbances in mouth opening or closing, and no numbness or tingling. Vision and eye movements were normal.

The intra-oral examination showed a class I occlusion, low smile line, and restored dentition. The UR1 was mildly tender to tap. The UL1 was extruded by 1mm, ~1mm proclined, grade 1 mobile and tender to tap. She had good oral hygiene, and no evidence of periodontal disease.

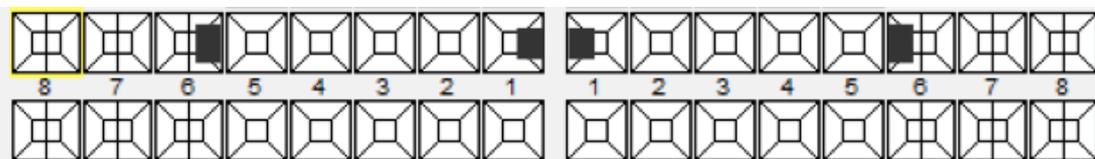


Fig. 1 Dental Chart

BPE:

0	1	0
0	0	0

Radiographs:

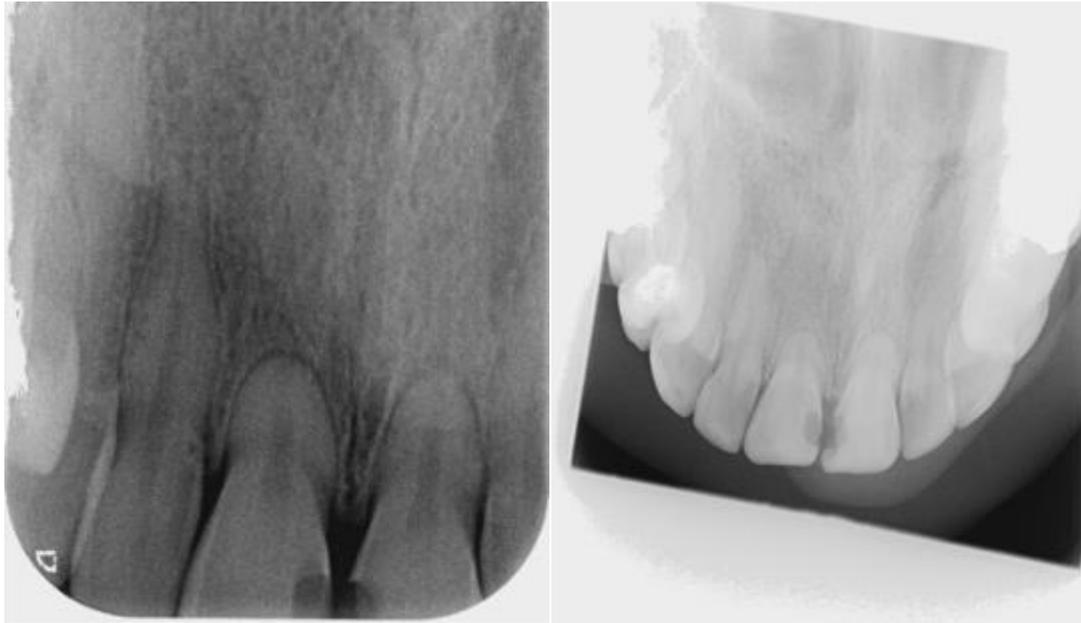


Fig. 2 Periapical radiograph of UR2, UR1, UL2. Fig. 3 Upper occlusal radiograph of UR2- UL2

Radiographs show mesial radiolucencies on the UR1 and UL1 (representative of composite restorations seen clinically). Crowns are intact with no fracture lines. The roots of UR1 and UL1 are short, with widening of the PDL space in the UL1 apical region. Good bone levels.

The patient had fallen and banged her front teeth at the age of 7 – which could explain the stunted roots of UR1 and UL1. There was no history of orthodontic treatment.

All teeth gave a positive response to ethyl chloride.

Diagnosis:

- UR1: concussion
- UL1: extrusion and buccal luxation

Management:

Consent for repositioning was obtained and local anaesthetic with articaine infiltrations was administered. The UL1 was repositioned manually and held with finger pressure. Gel clear fluid resin was used to hold the tooth in position, before taking a check radiograph.



Figure 3. Periapical radiograph showing UL1 following repositioning and fixation with resin fluid.

A 0.5mm flexible wire secured with composite was used to splint UR1, UR2, UL1, UL2 and the gel resin was removed.



Fig. 4.1, 4.2 and 4.3. Following repositioning and splinting with flexible wire.

The patient was advised regarding sequelae of trauma e.g. discolouration, mobility, sinus, tooth loss and an information leaflet given. Corsodyl mouthwash was prescribed and a soft diet advised.

The splint was removed in accordance with the IADT guidelines² 2 weeks later. There was no discolouration, all teeth responded positively to ethyl chloride and EPT, no mobility, no tenderness on palpation or percussion, no sinus or swelling.



Fig. 5.1, 5.2 and 5.3. Following repositioning and splinting with flexible wire 2 weeks after injury.

At 8 week review, the patient complained of pain in the UL1. On examination, the UL1 was tender to tap and palpate buccally, and grade 1 mobile. The tooth was in fremitus, and 1mm composite was added to the occlusal surfaces of UR4, UR5, UL4, UL5 in order to relieve occlusion.



A periapical radiograph showed the UL1 was 1mm extruded, with apical resorption and radiolucency. Advantages and disadvantages of all treatment options were discussed with the patient and she preferred having endodontic treatment, whilst understanding resorption of the tooth may continue long term.

Mineral trioxide aggregate (MTA) was the material of choice; it may be considered as an ideal material for apexification, root perforations and retrograde filling due to its high compressive strength and high pH which can stimulate cementoblasts/ osteoblasts³.

Figure 6. Periapical radiograph of UR1 and UL1

Root canal treatment was carried out, using irrigation with 3% sodium hypochlorite throughout. K-files were used to a working length of 14mm, confirmed with an apex locator. Non-setting calcium hydroxide was placed, and 1 week later the canal was re-instrumented, irrigated and dried with paper points. A Machtou plugger was used to fill the canal with MTA to just below the ACJ (beyond this would result in darkening of the tooth). The canal was sealed with glass ionomer cement.



Fig. 7 Root canal treatment with hand files under rubber dam isolation



Fig. 8 (left) and Fig. 9 (right) showing obturation with MTA.

An intra-oral periapical radiograph taken 3 months after obturation showed good resolution of the UL1 apical radiolucency. There did not appear to be any change in

the extent of resorption. A trauma stamp revealed no abnormalities and normal response to sensibility tests in adjacent teeth.



Fig. 10 periapical radiograph of UR1 and UL1 3 months after obturation with MTA.

Outcome:

The case highlights the importance of regular follow-up in order to detect and treat pathology early on. The long term prognosis of the UL1 remains uncertain due to the short roots, however the patient continues to be reviewed almost 2 years on.



Fig. 11.1



Fig. 11.2



Fig. 11.3

References:

1. Hermann, N. V., et al Periodontal healing complications following extrusive and lateral luxation in the permanent dentition: a longitudinal cohort study (2012) , Dental Traumatology, 28 (5): 394-402
2. <https://dentaltraumaguide.org/dental-guides/permanent-extrusion/>
3. Pace, R. et al Mineral trioxide aggregate as repair material for furcal perforation: a case series (2008), Journal of Endodontics, 34:1130-1133