

Dental Trauma and Paediatric Dentistry: Management of Severe Intrusive Luxation Injuries. A Clinical Case Report

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Involvement of case: I was primarily responsible for the care of this patient, undertaking the decoronation and fabrication of an upper removable appliance. I will oversee ongoing care of this patient, under the oversight of Consultant colleagues. I am grateful for their support and the support of other colleagues in the Paediatric Department.

Word count: 999 words (excluding Title, Names, Affiliations, Legends and References)

ABSTRACT

Management of dental trauma presents dentists with clinical challenges. Within the paediatric patient cohort, dental trauma is distressing for patients and parents/guardians. Additional challenges such as anxiety and cooperation must be managed.

This case report presents the management of an 11-year-old male referred to the Paediatric Department following trauma resulting in severe intrusive luxation injuries and uncomplicated enamel-dentine fractures to the UR1 & UL1.

We aim to highlight the importance of timely and effective management of trauma to reduce the impact and burden on paediatric patients.

INTRODUCTION

Dental trauma commonly presents to dental practitioners, accounting for 5% of injuries sustained⁽¹⁾. Trauma affecting children/adolescents can adversely affect confidence when smiling or socially interacting, therefore, adversely affecting oral health related quality of life⁽²⁾.

In comparison to other forms of dental trauma, intrusive luxation injuries are considered rare, accounting for 1.9% of traumatic injuries^(3,4). Intrusion injuries result in tooth displacement into alveolar bone, disrupting soft tissue, periodontal ligaments, neurovascular supply of the pulp and alveolar bone. Long-term sequelae include pulp necrosis, root resorption and ankylosis.

CASE DETAILS

History

An 11-year-old male was referred to the Paediatric Department following trauma sustained on a waterslide 4-weeks earlier, whilst on holiday. The patient attended a dental practice on the day of trauma, however, no treatment was provided. Upon return to the UK the patient visited his GDP who initiated an urgent referral.

The patient regularly attended his GDP for routine examinations. He had an unremarkable social history and medical history.

Examination

Extraoral examination revealed no other notable injuries. Intraoral examination revealed a late mixed dentition with severe intrusive luxation injuries of UR1 and UL1, uncomplicated enamel-dentine fractures and surrounding soft tissue trauma.



Figure 1: Pre-operative photographs (recorded on the day of the new patient assessment) - demonstrating extent of intrusive luxation injuries.

Radiographically, UR1 and UL1 had closed apices. The periodontal membrane space was not clearly discernible and a radiolucency associated with UL1 suggested early replacement resorption (Figure 2).



Figure 2: USO and periapical radiographs demonstrating extent of intrusive luxation injury and loss of PDL space.

Diagnoses:

Severe intrusive luxation injuries with uncomplicated enamel-dentine fractures UR1 and UL1.

Treatment:

Treatment options were discussed, including risks/merits of each: no treatment/acceptance, surgical repositioning or extraction.

Surgical repositioning was the treatment of choice and performed on the day of presentation using upper straight forceps, with care taken to minimise damage to periodontium. The teeth were stabilised and splinted (Figure 3a). Endodontic therapy (RCT) was commenced and calcium hydroxide medicament placed.

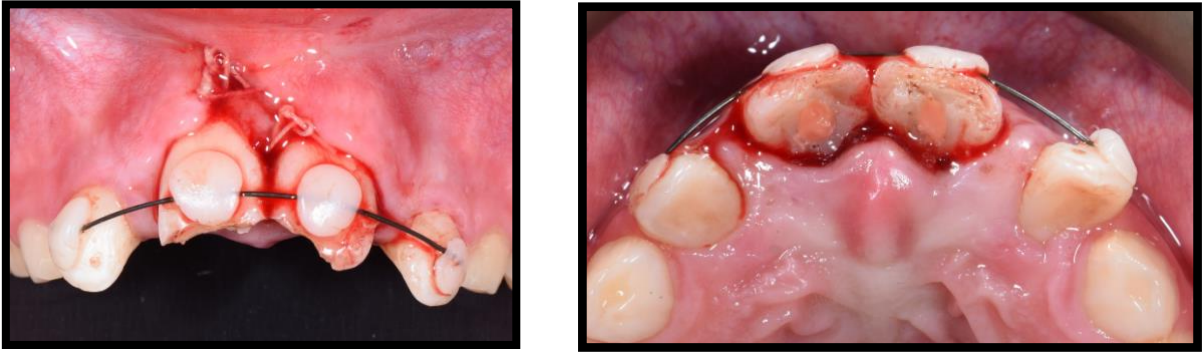


Figure 3a demonstrates repositioning and splinting of UR1 & UL1. Soft tissue lacerations closed with resorbable sutures.

A post-operative periapical (PA) demonstrated good repositioning but a moth-eaten appearance indicative of external root resorption of the UR1 and UL1 (Figure 3b).



Figure 3b: Periapical of UR1 & UL1 - Demonstrating post-operative positioning and radiolucency indicative of external root resorption.

8-weeks following trauma: Splint removal and calcium hydroxide change (Figure 4a). A PA confirmed progressive external root resorption of both roots (Figure 4b).



Figure 4a: photographs demonstrating the position of UR1&UL1 following repositioning and splint removal.



Figure 4b: Periapical UR1&UL1 illustrating radiolucencies indicative of progressive root resorption.

4-months following trauma: Enamel-dentine fracture repairs using composite and calcium hydroxide dressings change (Figure 5a). A PA demonstrated root resorption had halted (figure 5b).



Figure 5a and b.

A: Photograph demonstrating composite restoration of UR1&UL1.

B: Periapical UR1&UL1 - demonstrating stabilisation of root resorption when compared to figure 4b.

5-months following trauma: Full canal Biodentine™ obturation (Figure 6).



Figure 6: Periapicals of UR1 and UL1 illustrating full canal Biodentine™ obturation.

Due to COVID-19, subsequent reviews were postponed.

16-months following trauma: The patient complained his incisors appeared 'higher'. Intraoral examination revealed infraocclusion of UR1 and UL1, therefore, we planned an interdisciplinary clinic, with colleagues in Restorative Dentistry and Orthodontic Dentistry.



Figure 7: Photographs demonstrating Infraocclusion of UR1&UL1.

18-months following trauma: Interdisciplinary clinic: the patient reported reduced function when eating.

The UR1 and UL1 sounded ankylotic and a 4mm vertical step was noted between incisal edges of UR2 and UR1 and, similarly, 3mm between the incisal edges of UL1 and UL2.

Treatment options included, no treatment, acceptance of current occlusion/aesthetics, incisal edge composites or decoronation. If the patient opted to accept, the teeth could continue to infraocclude resulting in bony defects that could hinder future replacement options. Composite restorations could provide pleasing aesthetics initially.

Following discussion of the aforementioned options, the patient, parents and the dental team agreed decoronation of UR1 and UL1 was the most suitable.

20-months following trauma: The patient attended for decoronation UR1 and UL1 (Figure 8a-f). Under LA, an intrasulcular incision was made with mesial and distal relieving margins. A full thickness flap was raised and the crowns of the teeth were decoronated 2mm beneath the alveolar crest, ensuring no enamel remained. Bleeding was stimulated in the sites of UR1 and UL1 to encourage blood clot formation. Following decoronation, the soft tissue was replaced and sutured using 3/0 resorbable Vicryl Rapide™. A ridge concavity was present with insufficient soft tissue available to close with sutures, therefore, it was left to heal by secondary intention. A URA was fitted as an immediate restorative option.

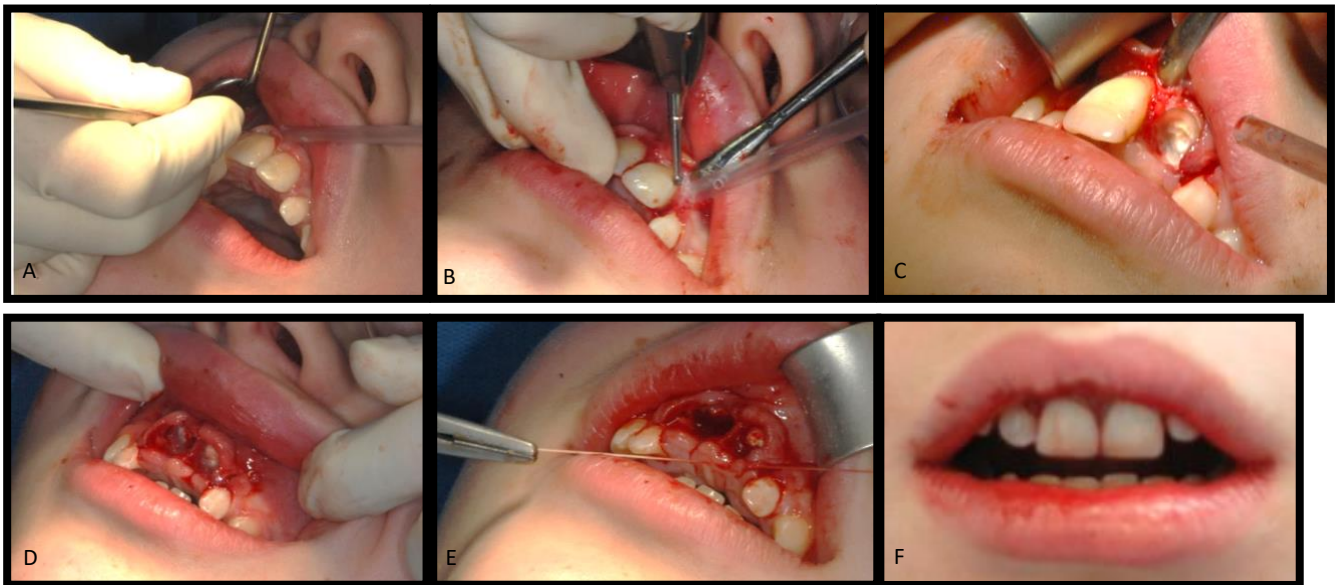


Figure 8 A-F: Photographs demonstrating stages involved in decoronation.

A: Intrasulcular incision made using blade.

B-D: Decoronation UL1 & UR1.

E: Soft tissues replaced and sutured with resorbable sutures.

F: Immediate URA placement.

Follow up: 4 week post decoronation: The patient was coping well with the URA and soft tissues were healing (Figure 9).



Figure 9: Photographs demonstrating healing 4-weeks following decoronation UR1 & UL1.

The care for this patient is ongoing. As the patient continues to grow, he will continue to wear the URA but when appropriate, care will be transferred to colleagues in Restorative Dentistry for definitive treatment.

Figure 10 illustrates the patient journey.



Figure 10A-C: Photographs demonstrating patient journey.

A: Patient on day initial assessment.

B: 16-months following trauma, demonstrating infraocclusion.

C: 20-months following trauma, following decoronation (URA not in situ).

DISCUSSION

Although considered rare, intrusive luxation injuries are severe and often have poor long term prognosis.

Treatment of intrusion injuries varies according to root development and severity. Where root formation is incomplete guidelines advise spontaneous re-eruption without intervention^(1,4,5). If no movement occurs within 4 weeks repositioning is advised, monitoring pulp status. Where root formation is complete, treatment varies. If intrusion < 3mm, allow spontaneous re-eruption. Where the tooth is intruded 3-7mm repositioning is advised. Where the tooth is intruded > 7mm, surgical repositioning is required. RCT should be provided within two weeks of trauma due to the high risk of pulpal necrosis and subsequent root resorption.

Alternative management of this case: Immediate treatment was sought but not provided which resulted in a 4-week delay. Ideally, immediate management would include rapid surgical repositioning and commencement of RCT.

CONCLUSION AND CLINICAL IMPLICATIONS

Management of paediatric dental trauma presents clinical challenges to dental professionals. Intrusion injuries are often complicated to manage and consequences are not always seen immediately, burdening paediatric patients with ongoing dental care, often throughout life.

Awareness of guidelines and knowledge regarding management of dental trauma is imperative for all dental professionals. This will provide clinicians with the confidence to provide emergency management and make appropriate referrals when required. Such actions will influence both the short and long term outcomes experienced by our paediatric dental cohort.

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