

Management of luxation injuries in line with International Association of Dental Traumatology guidelines – Two case reports

Kavita Sule, Akanksha Malik, Anjali Kothari, Vinay Rao

Department of Conservative Dentistry and Endodontics, AMC Dental College and Hospital, Ahmedabad, Gujarat, India

Abstract

Luxation injuries represent significant traumatic events for permanent teeth. This article presents the management of intrusive and extrusive luxation injuries, following the International Association of Dental Traumatology (IADT) guidelines, through two case reports. The first case involves a 30-year-old female with an intruded maxillary left central incisor, managed through surgical extrusion, stabilization, and endodontic treatment. The second case features a 15-year-old female with an extruded maxillary left central incisor, repositioned and splinted. Follow-up examinations revealed the resolution of symptoms in both cases. These cases highlight the efficacy of IADT guidelines in diagnosing and treating luxation injuries, resulting in favorable outcomes.

Keywords: Favorable; luxation; stabilization; surgical extrusion; traumatic

INTRODUCTION

Traumatic dental injuries (TDIs) often cause significant damage to the pulp and periodontium, particularly affecting young permanent teeth, commonly in the maxillary anterior region.^[1] Untreated injuries may lead to pulp necrosis and inflammatory root resorption.^[2]

Luxation is defined as the displacement of a tooth from its original position in the alveolus without total avulsion, resulting from acute trauma.^[3] Luxation encompasses various types of injuries, such as concussion, subluxation, lateral, extrusive, and intrusive luxation.^[4] Luxation injuries account for 15.0%–61.0% of trauma in permanent teeth.^[1]

The present case reports describe an attempt to manage luxation injuries per the International Association of Dental Traumatology (IADT) guidelines.

Address for correspondence:

Dr. Kavita Sule,
301, Rutukulash Complex, Tulsidham Crossroad, Manjalpur,
Vadodara - 390 011, Gujarat, India.
E-mail: kavita.sule@yahoo.com

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CASE REPORTS

Case I

A 30-year-old female patient presented at the Department of Conservative Dentistry and Endodontics with the chief complaint of trauma in the upper front teeth region after 2 days of injury. Clinical examination revealed apical displacement of #21 [Figure 1a]. The injured tooth did not have mobility but was sensitive to percussion. Radiographic examination showed the absence of periodontal ligament (PDL) space apically and the apical shifting of the cemento-enamel junction. Both clinical and radiographic examinations confirmed intrusive luxation injury, which was calculated at 3–4 mm.

A treatment plan was established, involving the surgical repositioning of the tooth under local anesthesia (lignox 2% A) using artery forceps, followed by stabilization with a wire splint and composite resin (Tetric-N-Ceram) extending from tooth #13 to #23 [Figure 1b]. After 2 weeks, the patient returned for endodontic therapy, which included access cavity preparation, pulp extirpation, and biomechanical preparation using the K-file system, along with irrigation

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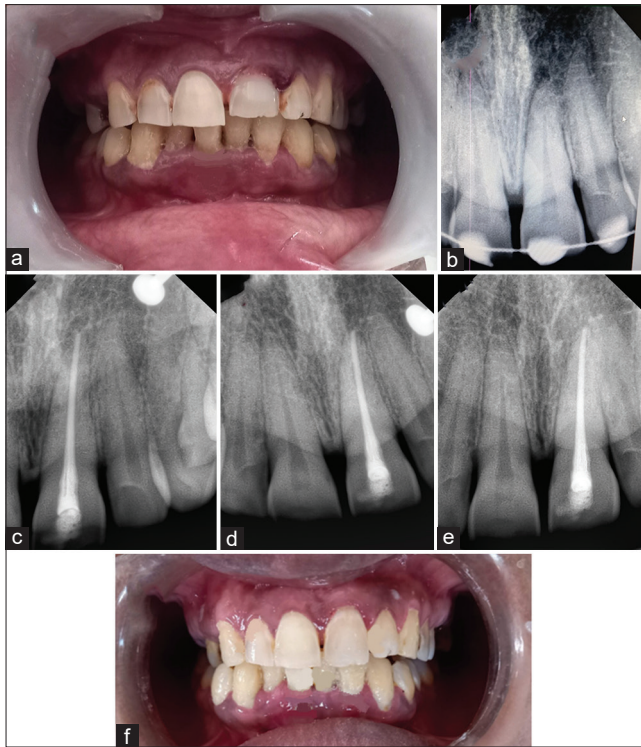


Figure 1: (a) Preoperative clinical photograph of an intruded central incisor. (b) Radiograph after surgical repositioning and splinting. (c) Postobturation radiograph. (d) Radiograph at 6-month follow-up. (e) Radiograph at 1-year follow-up. (f) Postoperative clinical photograph

using 3% NaOCl and 17% EDTA. Calcium hydroxide was placed as an intracanal medicament. The patient was recalled after 2 weeks, and splint removal was done. Obturation was done with Gutta-percha (Dentsply) and zinc oxide-eugenol sealer (Prevest Denpro) using a cold lateral compaction technique [Figure 1c].

Two weeks later, the splint was removed, and obturation was performed using Gutta-percha and zinc oxide-eugenol sealer through the cold lateral compaction technique. The patient underwent follow-up appointments at 4 weeks, 12 weeks, 6 months, and 1 year [Figure 1d-f], with the tooth demonstrating complete asymptomatic functionality, normal soft-tissue appearance, and no signs of root resorption on radiographic examination at the 1-year mark.

Case 2

A 15-year-old female patient presented at the department of conservative dentistry and endodontics with the chief complaint of trauma in the upper front teeth region after 2 h of injury. Clinical examination revealed an extrusion of #21 [Figure 2a]. Radiographic examination showed increased PDL space apically as well as laterally [Figure 2b]. The tooth was not seated in its socket and elongated incisally. Both clinical and radiographic examinations



Figure 2: (a) Preoperative clinical photograph of an extruded central incisor. (b) Preoperative radiograph. (c) Splinting. (d) Radiograph at 6-month follow-up. (e) Radiograph at 1-year follow-up. (f) Postoperative clinical photograph

confirmed extrusive luxation injury, which was calculated at 2–3 mm.

The treatment plan involved repositioning the tooth under local anesthesia (lignox 2% A) and stabilizing it with composite resin (Tetric-N-Ceram) from tooth #13 to #23 [Figure 2c]. After 2 weeks, the splint was removed, and at the 3-week mark, the patient exhibited a positive response to cold and electrical pulp sensibility testing. Follow-up appointments were scheduled at 4 weeks, 12 weeks, 6 months, and 1 year [Figure 2d-f], during which the tooth remained asymptomatic and exhibited positive responses to cold and electrical pulp sensibility tests.

At the 1-year follow-up, partial calcific metamorphosis was observed, known as sequelae, following displacement of young permanent teeth with incomplete root development.

DISCUSSION

Luxation injuries pose significant challenges in management, affecting both dental and periradicular structures.^[5,6] Therefore, the management and consequences of these injuries are multifactorial.^[7] The updated guidelines from the IADT have been developed following an extensive review of dental literature and collaborative discussions.^[8]

The presented cases underscore the importance of timely and accurate treatment immediately following injury, which can significantly influence the outcomes. In both cases, the patient was examined for soft-tissue injury, position of the tooth as well as pulp sensibility tests were done. Among all the types of luxation injuries, intrusion injury is the rarest one.^[9] The treatment of intruded permanent incisors can be challenging. If the tooth is intruded 3–7 mm, surgical (preferably) or orthodontic repositioning is recommended.^[10] In the present case, surgical repositioning was performed, followed by stabilization for 4 weeks. In teeth with completed root formation, when traumatized by intrusive luxation injury, the pulp almost always becomes necrotic. Traumatic injuries are also prone to disrupt the protective precegmental layer of the root surfaces. The bacterial toxins travel through the open dentinal tubules that trigger osteoclastic activity externally. This leads to external inflammatory root resorption, which may occur anywhere along the length of the tooth roots.^[11] Therefore, root canal treatment, initiated within 2 weeks and utilizing corticosteroid antibiotics or calcium hydroxide as intracanal medication, is crucial to prevent root resorption.^[12]

In extrusive luxation injuries, the IADT guidelines recommend repositioning of the tooth and stabilization followed by pulpal monitoring. In the present case, after repositioning and stabilization, a pulp sensibility test was carried out at 4 weeks, 12 weeks, 6 months, and 1 year. A positive response to the pulp sensibility test was obtained at each follow-up. However, the temporary loss of pulp sensibility is common following TDIs, particularly luxation injuries.^[13,14]

Splinting plays a vital role in maintaining corrected tooth position and controlled function, with varying durations depending on the injury type.^[15] In the present case reports, the splinting (semirigid) time was 4 weeks for the intrusive luxation injury, whereas it was 2 weeks for the extrusive luxation injury. These cases involving intrusive luxation injury and extrusive luxation injury have been followed up for 1 year with no periapical changes or root resorption. However, healing is, in part, unpredictable, and a favorable outcome is not guaranteed even by following the guidelines.

CONCLUSION

The successful management of luxation injuries, as depicted in these cases, underscores the importance of adhering to IADT guidelines. A multidisciplinary approach involving repositioning, timely endodontic interventions, and meticulous follow-up enhances treatment outcomes for traumatized teeth. While favorable outcomes are

achievable with guideline adherence, the healing process remains unpredictable.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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