



(CASE REPORT)



Effective splinting technique for traumatized immature permanent tooth: A case report

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Abstract

Background: Dental trauma is one of the oral health problems with high incidences among children and adolescents. According to WHO, 1 billion people have a history of dental trauma, with a prevalence of around 20% for children up to 12 years old. Lateral luxation is the type of displacement injury in permanent teeth with the highest prevalence. Improper treatment can result in pulp necrosis, damage to periodontal tissue, tooth mobility, aesthetic problems, occlusal interference, and moreover tooth loss.

Purpose: Discuss the management of lateral luxation in immature permanent tooth.

Case: A 5-year-old boy came with a dislocated upper front tooth after accidentally falling. The tooth displaced further back, causing pain, bleeding, discomfort, difficulties in eating, and occlusal interference.

Case Management: Digital pressure under local anesthesia was used to reposition the luxated tooth, which was then stabilized with splinting using orthodontic brackets and monitored regularly. The treatment result showed no tooth mobility, root development, corrected occlusion, function, and aesthetics.

Conclusion: Management of lateral luxation in immature permanent teeth using digitation repositioned and splinting is recommended to prevent pulp and periodontal pathology. This method provides fast procedures, good aesthetics, function, and patient comfort. However long-term observation is required to confirm the success rate.

Keywords: Lateral Luxation; Trauma; Splinting; Immature Permanent Tooth; Good Health; Well-Being

1. Introduction

Traumatic dental injuries in young patients, particularly involving permanent teeth, are a significant concern in dental practice. Epidemiologic studies indicate a high prevalence of traumatic dental injury throughout the world. It shows that one fourth of all school children and almost one third of adults have suffered a permanent dentition trauma.^{1,2} Consequently, traumatic dental injuries have a strong negative effect on the social, emotional and functional aspects in children's life.³

Avulsion, intrusion, extrusion, and luxation are some possible cases of dental trauma. Among these injuries, lateral luxation injuries are one of the most common dental trauma injuries experienced. The current literature reports that lateral luxation makes up 29.5%-57% of all dental injuries.⁴ Lateral luxation involve a displaced tooth in the palatal/lingual or labial direction. The alveolar process could fracture due to the injury and as a result, the tooth

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becomes mobile. Percussion tests can result in an ankylotic sound and sensibility tests often provide negative results. Lateral luxation injuries often present a widened periodontal ligament space that can be identified from radiographs.⁵ Improper treatment can result in pulp necrosis, damage to periodontal tissue, tooth mobility, aesthetic problems, occlusal interference, and moreover tooth loss.⁶

Proper diagnosis, treatment planning and follow up are important to ensure a favorable outcome. This case report focuses on the management of lateral luxation in young permanent teeth, highlighting the clinical approach and outcomes observed.

2. Case

A 5-year-old boy came with his parents to Airlangga University Tooth and Mouth Hospital with complaints of tooth mobility and displacement after falling while playing bicycle last night. He was given painkillers and antibiotics by his parents. The patient was in good general health with no significant medical history. Extraoral findings show abrasions on the right cheek, chin, lip area, crusts on the perioral area, and oedema on the upper lip (Figure 1).



Figure 1 Extraoral Examination

Upon intra oral examination, maxillary central incisor (teeth 11) was found to be displaced palatally with mobility and display sensitivity to percussion and druk. Bleeding from the periodontal ligament was noted, indicating damage to the supporting structures of the teeth. There were also aceration on interdental of tooth 11 and ulceration on labial mucosa of upper lip (Figure 2). Radiographic assessments confirmed the diagnosis of lateral luxation without any associated alveolar fractures (Figure 3).



Figure 2 Intraoral Examination

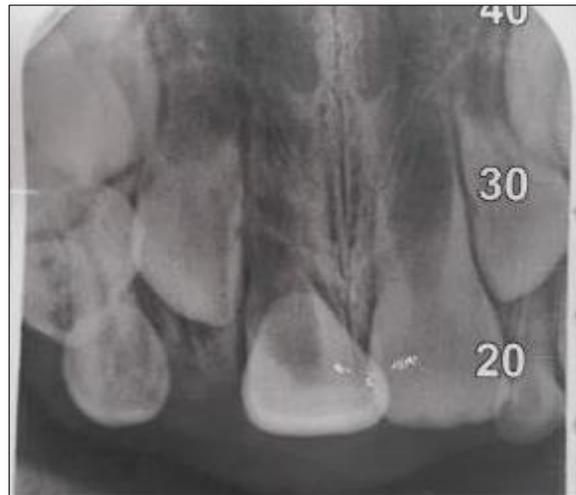


Figure 3 Radiographic Examination

3. Case management

The immediate treatment involved repositioning and stabilization. The luxated teeth were gently repositioned using digital pressure while ensuring proper alignment within their sockets under local anesthesia. Care was taken to apply force towards the apex of the teeth to minimize further trauma to the periodontal ligament. A splint was applied for one month to maintain the position of the repositioned teeth. This was accomplished using orthodontic bracket and wire to secure the teeth to adjacent stable teeth (Figure 4).

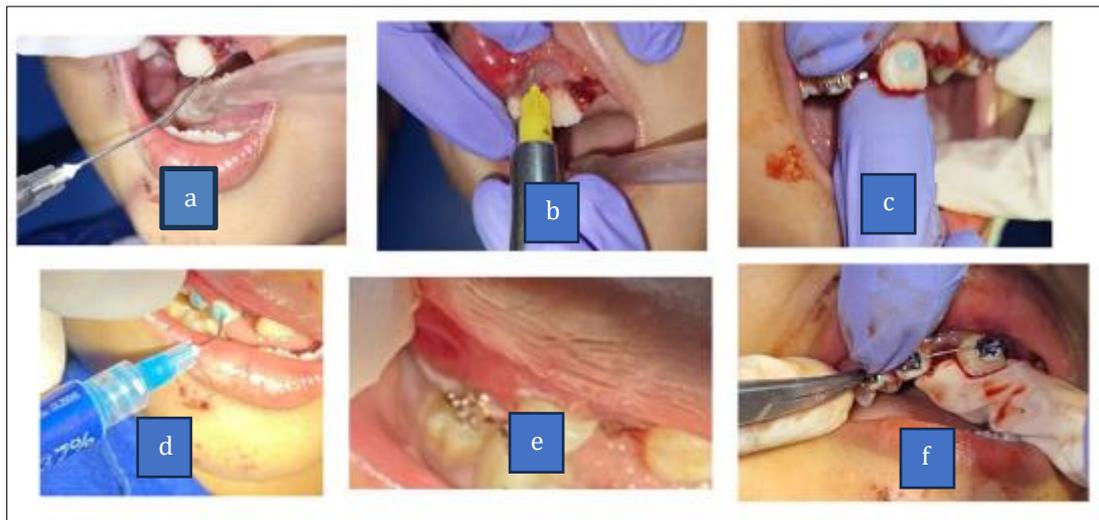


Figure 4 a. Tooth debridement b. Local anesthesia c. Tooth reposition d. Etching e. Bracket placement f. Wire placement



Figure 5 After tooth reposition and stabilization with orthodontic bracket

Regular clinical and radiographic follow-ups were conducted at one-week post-treatment. The results showed restoration of normal function and aesthetics of the maxillary incisors and improve stability of the periodontal structures surrounding the treated teeth. Splint continued until one month as instructed in The International Association for Dental Traumatology guideline. On one month follow-up radiographic examination showed continued root development and reduced in tooth mobility. These findings underscore the importance of timely intervention and comprehensive follow-up in managing luxation injuries in young patients.



Figure 6 One week follow up



Figure 7 Splint removed on one month follow up



Figure 8 One month radiographic follow up

4. Discussion

Lateral luxation is a serious dental trauma that involves the periodontal complex and alveolar bone. However, correct management of the cases could lead to a successful resolution. The International Association for Dental Traumatology has published guidelines for the treatment of dental trauma injuries. The guidelines include treatment options for teeth with lateral luxation. Currently, if a patient presents with lateral luxation, the clinician is responsible for repositioning the tooth to its original location. The tooth should then be stabilized using a splint for 4 weeks and the condition of the tooth should be monitored. Reposition the tooth was done digitally by disengaging it from its locked position and gently reposition it into its original location under local anesthesia.⁷

The time elapsed between the trauma and the correct diagnosis of lateral luxation may determine the prognosis for treatment. Late repositioning (>48 hours) is difficult if a clot forms at the end of the tooth socket. All teeth that have been repositioned require splinting, as do all teeth that are mobile. There is numerous splinting techniques described in the literature. What matters most is that the splints are flexible to allow the physiological movement of teeth, and they should be easy to remove.⁸⁻⁹

In immature permanent teeth, this is of utmost importance to allow continued root development and apex formation and every effort should be made to preserve the pulp. For young patients with immature teeth, the pulp has considerable healing capacity after a dislocation injury. The width of the apical foramen plays an important role in traumatic tooth dislocation, the smaller it is, the more likely the pulp is disrupted and the less likely it is repaired by revascularization. A diameter of less than 1 mm has been described as critical but does not necessarily exclude revascularization. As a general rule, root canal treatment should not be initiated until there is confirmed evidence of pulp necrosis and infection in the root canal. A lack of response to pulp sensibility testing, particularly during the first few months, is not the sole indication to initiate root canal treatment.

Follow-ups are mandatory after traumatic injuries. Clinical and radiographic assessments are necessary: after 2 weeks, 4 weeks, 8 weeks - after 3 months, 6 months, after 1 year - then every year for at least 5 years. Patients (and parents) should be informed that they should be alert to any unfavorable change and that they should return if one is observed. Each follow up should include questioning of the patient about any signs or symptoms, plus clinical and radiographic examinations and pulp sensibility testing. Photographic documentation is strongly recommended. Therefore, patients need to understand the importance of maintaining regular follow up appointments.¹⁰

5. Conclusion

Lateral luxation of anterior teeth is one of the most severe types of dental injuries. Accurate assessment of the traumatic injury before any treatment is essential. This case illustrates a management strategy for lateral luxation in young permanent teeth, emphasizing early repositioning and stabilization. Continued monitoring is still essential to detect any late complications such as pulp necrosis or resorption, which may arise even years after initial treatment.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this document.

Statement of informed consent

Informed consent was obtained from patient included in the study.

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