

# Management and Assessment of Success in the Treatment of Dentoalveolar Fractures with Avulsion in Children: Case Report

Timotius Andi Kadrianto<sup>1</sup>, Endang Sjamsudin<sup>2</sup>

<sup>1</sup>Oral and Maxillofacial Surgery Resident, Faculty of Dentistry –RSGM, Universitas Padjadjaran Bandung, Indonesia

<sup>2</sup>Department of Oral and Maxillofacial Surgery, Faculty of Dentistry- RSGM, Universitas Padjadjaran, Bandung, Indonesia

**Abstract:** ***Introduction:** About 25% of children had a dentoalveolar trauma. This is because children are more active, lack balance coordination, and children mental development. Management of dentoalveolar trauma in children differs from an adult because of mixed dentition conditions. It is important to determine the indications, contraindications, and correct methods of treatment. The case report aims to discuss the treatment of dentoalveolar fracture to restore and maintain the position of the permanent teeth. After 3 months, the result showed negative mobility, normal growth of permanent tooth, and intact occlusion. **Case report:** One case of dentoalveolar fracture of teeth 52-21 region with avulsion of tooth 52 and palatoversion with mobility grade 2 of tooth 11 and intrusion with mobility grade 2 of tooth 21. Repositioning of teeth 11,21 was performed followed by simple wiring with a composite of teeth 55-65. **Conclusion:** Management of dentoalveolar trauma in children need special attention because of mixed dentition condition. So it is important to consider that the use of a wiring device doesn't interfere with the development of teeth and jaw.*

**Keywords:** Dentoalveolar fracture, mixed dentition, simple wiring

## 1. Introduction

Dentoalveolar trauma can have a negative effect on children both from a functional, aesthetic, and psychological perspective.<sup>1</sup> Dentoalveolar trauma mainly occurs in children of pre-school or school-age, as well as in teenagers. From a 12-year study, it was found that 25% of school-age children experienced dental trauma and 33% of adults experienced trauma from permanent tooth replacement, with the majority of injuries occurring before the age of 19.<sup>2</sup> Incidence of trauma to baby tooth mostly occurs at the age of 2-3 years, which is a period of development of children's motor coordination.<sup>1</sup> The most common injuries in dentoalveolar trauma during primary teeth are luxation injuries, while those for permanent teeth are crown fractures. The most common causes of dentoalveolar trauma are falls, traffic accidents, violence, and sports.<sup>1</sup>

Examination of a patient who experiences a fracture consists of an emergency examination and a further examination. The emergency examination includes collecting vital data, patient medical history, and patient complaints. While further investigation includes re-checking full clinical examination consisting of an inspection of the extra-oral and intra-oral condition and supporting examination, including radiologic examination to investigate the development of the roots, the size of the pulp and the distance of the fracture line, abnormalities in the support networks, as well as the state of the permanent tooth germ.<sup>3,4</sup>

The diagnosis is made based on history, clinical examination, and supporting examinations in the form of radiographs, electrical tests, and thermal tests. In fractures that can be seen clinically, such as enamel fractures, crown fractures, avulsions, and displacement generally can be

confirmed only by history and clinical examination.<sup>5</sup> For cases of fractures that are thought to occur in the root of the tooth or alveolar bone, a supporting examination in the form of radiographs is needed to confirm it.<sup>6</sup>

Management of dentoalveolar trauma in children is different from an adult because children are often hard to cooperate because of fear resulting in more detailed examination and management.<sup>3</sup> It is often distressing both to the child and the parents.<sup>3</sup> Apart from that, anatomically, dentoalveolar treatment in children needs to consider the transitional tooth condition.<sup>3</sup> The purpose of this case report is to describe the management of dentoalveolar trauma by splinting and wiring.

## 2. Case Report

A 5-year-old girl presented with complaints of bleeding from the mouth after falling from a tree about 3 hours ago. History of fainting (-), nausea and vomiting (-), history of bleeding from the nose (-), and bleeding from the ear (-). In the general examination, it was found that the patient was fully conscious with the Glasgow Coma Scale (GCS) 15, and vital signs were within normal limits. On extraoral examination, the face was symmetrical, and there was a laceration in the chin area. On intra-oral examination, there was laceration of the lip and gingival area, laceration, and avulsion of the anterior maxillary teeth (Figure 1). In this case, the diagnosis was a dentoalveolar fracture of tooth 52-21 accompanied by avulsion of tooth 52, palatoversion with grade 2 mobility of tooth 11, and intrusion with grade 2 mobility of tooth 21. The treatments performed were repositioning of teeth 11, 21, and simple wiring using wire sizes of 0.4 and composite on teeth 55-65.



**Figure 1:** Extraoral and intraoral clinical features

Suturing was done to close the wound on the gingiva and simple wiring with a composite to fix the loose tooth (teeth 11 and 21) (Figure 2.). After three months, an evaluation was done, and panoramic photos were performed to assess the success rate (Figure 3.)



**Figure 2:** Clinical features of suturing and simple wiring



**Figure 3:** Clinical and panoramic photos of the patient 3 months post-treatment

### 3. Discussion

In this case, a patient aged five-years-old experienced an avulsion of tooth 52 accompanied by palatoversion with grade 2 mobility of tooth 11 and intrusion with grade 2 mobility of tooth 21 due to falling from a tree. WHO classification of trauma resulting in dentoalveolar fracture, namely injury to the tooth and pulp's hard tissue, periodontal tissue, and supporting bone.<sup>1,4</sup> The causes of trauma are divided into two parts, direct and indirect. Direct trauma happened if the impact is directly on the tooth, usually in the anterior region. The clinical examination of dentoalveolar fractures was carried out in two examinations, extra-oral and intra-oral. In the extra-oral examination, it is carried out by

visualization and palpation.

In this case, fixation was performed with wiring and avulsed tooth extraction (tooth 52). Mobile tooth fixation can be done with wiring or orthodontic braces, recommended for 7-14 days if there were no alveolar fractures. If the tooth remains loose, it needs to be fixed longer, and the patient is ordered not to bite on the tooth.<sup>1,6</sup> Adjustment of occlusion and fixation must also be considered because the length of tooth fixation for a healthy alveolar bone is 7-10 days.

In this case, the fixation was carried out with a simple wiring technique using wire no. 0.4 and suturing were performed on the wound in the gum area. This simple wiring technique is used because the process is relatively easy.

Initially, teeth 11 and 21 were repositioned and stabilized with composites and wires for approximately 14 days and then stabilized without endodontic intervention. Size 0.4 gauge wire is used because it is flexible enough and can be used for a long time without adversely affecting the healing of the periodontal ligaments and allows for normal functional tooth movement.<sup>6,7</sup>

The management of this dentoalveolar trauma includes medical treatment in the form of giving antibiotics and analgesics as needed and restoring function and aesthetics as well as possible. The child's psychosocial and mental factors must be considered; for example, the choice of flexible splinting must be comfortable and easy to apply for the child.<sup>1,3,8</sup> In this case, both permanent incisors were maintained in good health and fully erupted.<sup>1,8,9</sup>

#### 4. Conclusion

The handling of dentoalveolar trauma in children is different from adults because dentoalveolar trauma in children requires special attention. The condition of the transitional teeth is a specialty in the dentoalveolar trauma of children so that the choice of the treatment plan and the use of splinting tools need to consider easiness of application, patient comfort, psychosocial and mental factors of the child, and does not interfere with the growth and development of the teeth and jaws.

#### References

- [1] Council on Clinical Affairs (2012). *Guideline on Management of Acute Dental Trauma*. American Academy of Pediatric Dentistry. Clinical Guidelines. p.230-238
- [2] DiAngelis A.J. et al. (2012). *Guidelines for the Management of Traumatic Dental Injuries: 1. Fractures and Luxations of Permanent Teeth*. Dental Traumatology 2012; 28:p2-12
- [3] Malmgren B. et al. (2012). *International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 3. Injuries in the primary dentition*. Dental Traumatology 2012; 28:p174–182
- [4] Andersson L. et al. (2012). *International Association of Dental Traumatology guidelines for the management of traumatic dental injuries: 2. Avulsion of permanent teeth*. Dental Traumatology 2012; 28:p88–96
- [5] Andreasen J.O., Andreasen F.M., Andersson L. (2007). *Textbook and Color Atlas of Traumatic Injuries to the Teeth*. Blackwell Publishing Company. p.217-274;842-850
- [6] Kahler B., et al. (2016). *Splinting of teeth following trauma: a review and a new splinting recommendation*. Australian Dental Journal 2016; 61:(1 Suppl)p.59–73
- [7] Honsik, K.A. Emergency treatment of dentoalveolar trauma. Accessed 25 January 2007: <https://www.physsportsmed.com>.
- [8] Wigen TI, Agnalt R, Jacobsen I (2008) Intrusive luxation of permanent incisors in Norwegians aged 6-17 years: a retrospective study of treatment and outcome. Dent Traumatology 24: 612-618. 45 Tallingaridis G, Malmgren B, Andreasen JO, Malmgren Olle.
- [9] Hermann NV, Lauridsen E, Ahrensburg SS, Gerds TA, Andreasen JO (2012) Periodontal healing complications

following concussion and subluxation injuries in the permanent dentition: a longitudinal cohort study. Dent Traumatology 28: 386-393.