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Case Report

Emergency Treatment of Dentoalveolar Fracture in Children with the Ernst Wiring: A Case Report

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Abstract

Introduction: Dentoalveolar fracture is damage or interruption of hard tissue continuity in the tooth structure and alveolar bone caused by trauma. Dentoalveolar fractures in children require special considerations in treatment so as not to interfere with the growth of bones and teeth. The purpose of this case report is to describe the emergency treatment of dentoalveolar fracture using ersnt wiring in a 4-year-old boy**.**

Case report: The patient came to the emergency room at Hasan Sadikin Hospital Bandung complaining of bleeding from the mouth due to a fall with his chin hitting the floor about 4 hours before. The results of the extraoral clinical examination found lacerations on the chin with irregular edges, and the base of the muscle and intra-oral found puncture wounds on the lower lip and lacerations in the gum area, teeth 52-62, enamel fractures on teeth 71 accompanied by tooth mobility 71-81. The patient was diagnosed with a dentoalveolar fracture of teeth 71-81, Vulnus punctured region of the lower lip, and Vulnus lacerated area of chin and gums. The treatment for this case was wound debridement, suturing, and Ernst wiring on teeth 71-81.

Conclusion: Emergency treatment of dentoalveolar fractures in children with primary teeth using Ernst wiring is excellent, easy, and fast to do and can prevent complications in both soft tissue and alveolar bone and teeth.

Key Words: Dentoalveolar Fracture, Primary Teeth, Ernst Wiring, Emergency

Introduction

Children and young adults are a particular group in oral and maxillofacial trauma due to significant differences in facial bones compared to adults. Fractures of facial bones are rare in young children because of the sizeable cranium-facial ratio. Cranial protrusions tend to absorb blunt trauma, resulting in more skull fractures than facial bone fractures. Trauma to the face can cause dentoalveolar fractures. Causes of dentoalveolar fractures vary by age, sex, and demographics. Falls are a common cause of fractures in primary teeth as well as young permanent teeth. Teenagers and adults usually experience dentoalveolar fractures due to motor vehicle accidents, which are more common in

men than women. This statement is reinforced by the results of the 2018 Basic Health Research (Riskesdas) study; the percentage of injuries due to accidents was 2.9% for men and 1.6% for women. Injuries to the mouth, teeth, and face can also result from sports and child abuse.[1,2]

The incidence of dentoalveolar fractures is relatively high. Research conducted at the Rural Dental College and Hospital India, the dentoalveolar fracture is the most extensive fracture, with a percentage (of 70%) of all fractures in the maxilla and (10%) of all incidents in mandibular fractures. A meta-analysis study stated that the prevalence of dentoalveolar fractures was higher in males. Many dentoalveolar fractures in Indonesia are of productive age (18-40 years), with an incidence percentage of 61.54%. The city of Bandung has a high number of productive ages, namely 1,756,396 per the year 2021; the frequency of cases of dentoalveolar trauma tends to increase due to the increasing involvement of young patients in accidents.[2] Medical emergencies on children are urgent conditions that require immediate treatment in children to reduce the risk of death.[1]

Clinical signs of dentoalveolar fractures include mobility and shifting of several teeth in one segment, lacerations to the gingiva and vermilion of the lips, injuries to the gingiva and an overlying hematoma, tenderness over the fracture line and swelling or injury to the chin.[3,4,5] Management of emergency cases of dentoalveolar fractures in patients must be carried out immediately and quickly. In the choice of treatment method, treatment of dentoalveolar fractures in the form of tooth extraction, wound irrigation and suturing of the wound using local anesthesia as well as antibiotic and anti-pain medication. [6,7]

Management of fractures in primary and mixed dentition presents several difficulties. First, there are permanent teeth that have not erupted until the age of 6 years or more, so ORIF (Open reduction internal fixation) can cause trauma to the tooth germs and can only be done mono-cortically, namely on the inferior border of the mandible. Second, it is challenging to do IMF (Intermaxillary fixation) on teeth that have not erupted or partially erupted. Dentoalveolar fracture treatment reduces or returns the fracture segment to its original position and fixation until bone healing occurs. The bone reduction can be accomplished gradually by guiding elastic, orthodontic techniques and digitally pressing the bone or tooth segments against the alveolar bone and teeth. Fixation can be done with dental wiring, arch bars, and composite resin. The circum mandibular wiring technique is minimally invasive, with good stabilization compared to the ORIF method.[7,8] The purpose of this case report is to report the emergency treatment of a dentoalveolar fracture in a 4-year-old child patient using Ernst wiring.

Case Report:

A 4-year-old male patient came to the emergency room at Hasan Sadikin Hospital Bandung complaining of bleeding from the mouth. About 4 hours earlier, the patient fell with his chin hitting the floor while playing on the steps of his house. Then the patient was taken to a private hospital in the Cikutra area, and the wound was cleaned. History of fainting (-), history of bleeding from the oral cavity (+), bleeding from the nose (-) and bleeding from the ear (-). Extraoral examination revealed a 4x3x0.5 cm laceration on the chin with irregular edges and a muscle base (figure 1).

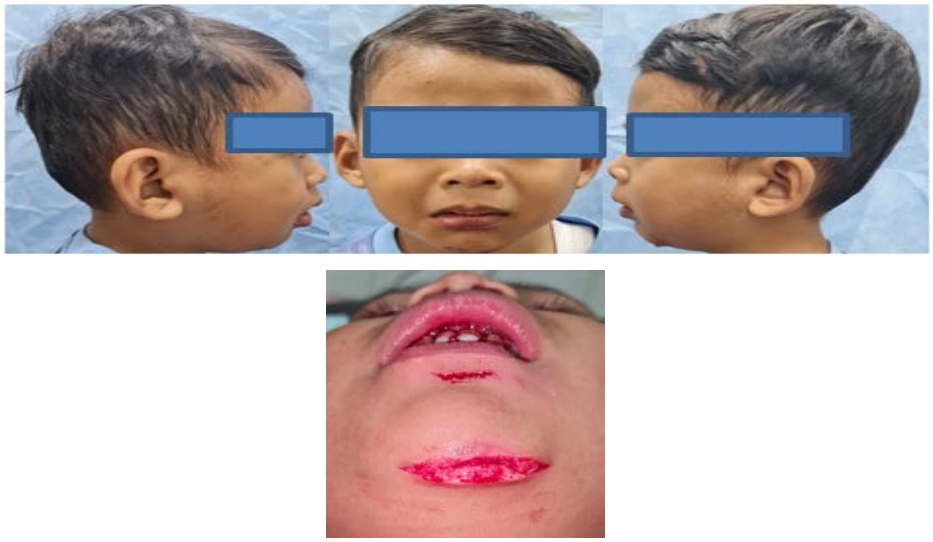

Figure 1: Extra oral visible injuries to the lips and chin

Intra-oral examination found an enamel fracture on tooth 71 accompanied by unsteadiness, a puncture wound on the lower lip, and a torn wound in the gum area of teeth 52-62 and 71-81 (figure 2). On a panoramic X-ray, a radiolucent image is seen in the dentoalveolar bone of the lower jaw (figure 3).

Figure 2: Intraoral puncture wound on the lower lip and torn wound in the gum area

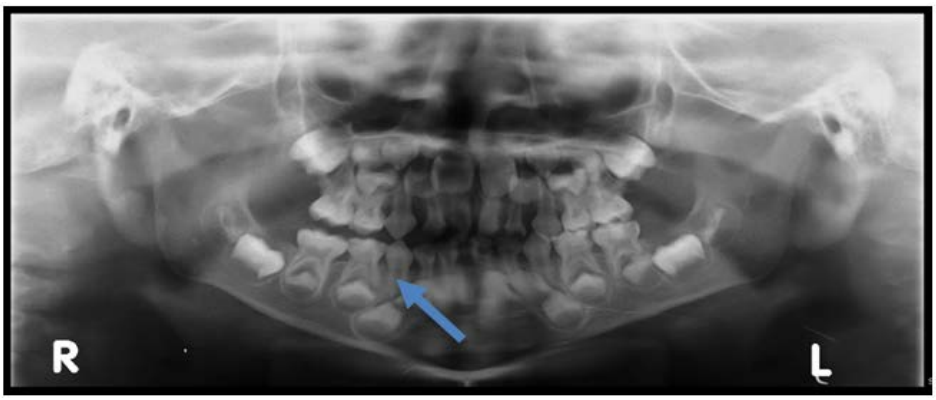

Figure 3: Panoramic X-ray, radiolucent view of the lower jaw dentoalveolar bone.

The patient was diagnosed with a dentoalveolar fracture of tooth 71, Vulnus puncture region of the lower lip, and Vulnus lacerated area of chin and gums of teeth 52-62, 71-81. Treatment of this case was wound debridement, suturing, and Ernst wiring on teeth 71-81 (figures 4 & 5). Postoperative medication was given in the form of amoxicillin syrup and paracetamol syrup. Aloclair mouthwash and Ikamycetin to treat intraoral and extraoral scars. The patient signs informed consent for treatment actions and publication of scientific activities.

Figure 4: Extra oral patient after treatment

Figure 5: Intra oral patient after treatment

On the seventh day of control, the wound looked dry and closed both in the extra-oral and intra-oral areas. The mobility of tooth 71 has begun to decrease, the Ernst wiring looks good in its position, and intra-oral and extra-oral aff hecting was carried out (Figure 6)

Figure 6: Control on the 7th day

Discussion:

Dentoalveolar fractures are defined as damage or break in the continuity of hard tissue in the tooth structure and alveolar bone caused by trauma or fractures, which include avulsions, subluxations, or tooth fractures associated with alveolar bone fractures. Dentoalveolar fractures can occur without or be accompanied by fractures of other body parts, usually resulting from minor

accidents such as falling, hitting while playing, playing sports, or iatrogenic. Clinical signs of dentoalveolar fractures include oscillation and displacement of several teeth in one segment, lacerations of the gingiva and vermilion of the lips, injuries to the gingiva and overlying hematoma, tenderness over the fracture line, and swelling or injury to the chin. Careful clinical examination and radiographic examination are necessary to establish the diagnosis.3,6

Treatment of dentoalveolar fractures includes reduction of the fracture segment and fixation until bone healing occurs. Fracture segment reduction can be done by closed reduction or open reduction. Closed reduction of the fracture segment is performed by digitally pressing it into its anatomical position. Open reduction is performed when there are bone fragments or segment edges that make repositioning difficult,7 In the above case, closed reduction was performed because there was no displacement of the distant fracture segment and no bone fragments or granulation tissue to prevent repositioning. Reduction is carried out simply by emphasizing the fracture segment to obtain an anatomical position. 1

Several methods for fixing bone segments include permanent wiring, interdental wiring, arch bars, and acrylic splints. Splinting is not needed in children's dentoalveolar fractures, which do not cause displacement of bone or tooth segments due to children's rapid bone healing process. Treatment with a soft diet for two weeks with routine periodontal examinations is sufficient. Splinting of multiple teeth mesial and distal to the fracture segment is necessary if there is minimal displacement of the fracture segment. 6,7 In this case, Ernst wiring was used to fixation the fracture segments. Other methods cannot be used because the teeth have not all erupted yet and the shape of the crowns of the primary teeth makes it impossible to fix them using an arch bar. This method was chosen because it reduces the use of IMF, avoids ankylosis and growth disorders, is easy to use, atraumatic, and does not damage teeth and tooth germs. Ernst wiring provides not only support from the surrounding teeth but also support from the bone.6

Possible complications arising from untreated dentoalveolar fractures include pulpal necrosis, external root resorption, tooth loss, and other disorders related to the patient's quality of life and psychology. The psychological aspect here is related to mental health. A patient's self-esteem is related to aesthetic aspects that are disturbed due to physical disabilities or disabilities caused by dentoalveolar fractures. In addition, dentoalveolar fractures can cause several side effects, especially for children. This fracture will later be related to craniofacial development. Maxillofacial trauma can also affect dentoalveolar fractures, which can cause loose or loose teeth, and soft tissue damage such as contusions, lacerations, abrasions, avulsions, and edema. There will increase significantly if adequate treatment is not carried out immediately and there is no follow-up.1,9

Dentoalveolar fractures due to trauma have serious risks for the human body, such as airway obstruction due to foreign bodies and tooth fragments which can cause disruption and even death if not treated immediately. Other complications that can occur are shocked due to heavy bleeding, infection, and impaired aesthetic function. Delayed treatment and inappropriate equipment, materials, and techniques usually cause failure to treat dentoalveolar fractures. *Dentoalveolar fracture treatment* is a complex procedure requiring a dentist's accurate knowledge, diagnosis, and treatment plan to prevent complications associated with tooth eruption, occlusion, facial development, alveolar growth, or even death. 1,9,10

Conclusion:

Treatment of dentoalveolar fractures in primary teething children using Ernst wiring is excellent, easy, and fast to do. It can prevent complications in both soft tissue and alveolar bone and teeth.

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