

Case Report

Pre-School Child Injuries Including Mandibular Fractures

Masakazu Hamada*^{1,2}, Yoshiyuki Ota¹, Soichi Iwai¹, Hidetaka Shimizu¹, Yoshiaki Yura¹

¹Department of Oral and Maxillofacial Surgery, Osaka University Graduate School of Dentistry, 1-8 Yamadaoka, Suita, Osaka 565-0871, Japan

²Department of Dentistry and Oral Surgery, Toyonaka Municipal Hospital, 4-14-1 Shibaharachou, Toyonaka, Osaka 560-8565, Japan

*Corresponding author: Dr. Masakazu Hamada, Department of Oral and Maxillofacial Surgery, Osaka University Graduate School of Dentistry, 1-8 Yamadaoka, Suita, Osaka 565-0871, Japan, Tel: +81 06 6879 2941; Fax: +81 06 6879 2170; E-mail: hmdmskz@dent.osaka-u.ac.jp

Received: 10-01-2014

Accepted: 10-20-2014

Published: 12-05-2014

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Abstract

The authors examined 159 pediatric patients under 6 years old with traumatic injury in the oral and maxillofacial region treated at the Department of Oral and Maxillofacial Surgery II, Osaka University Graduate School of Dentistry, Japan, between 2009 and 2013. The ratio of boys to girls was 3:2. Out of 159 cases, soft-tissue injury was the most common (71.4%), followed by dental and/or dentoalveolar injury (20.1%), and soft-tissue injury and dental and/or dentoalveolar injury (8.2%). Mandibular fracture accounted for 1.3% of all cases. Falling was the most common cause. Most injuries were confined to dentoalveolar bone. Conservative treatment was useful for greenstick fracture of the mandible.

Keywords: Oral and Maxillofacial Injury; Mandibular Fracture; Pediatric Patients

Introduction

Millions of children are injured in Japan. According to the statistics of injury and disease of the school administration in Japan, the rate of facial injuries is approximately 50% of the total in kindergartens and nursery centers. In association with growth, such as in primary school and junior high school, the rate of facial injury decreases. Fractures of the maxillofacial skeleton are infrequent in infancy. Because the anatomical characteristics of children, such as tooth buds, eruption of deciduous and permanent teeth, and bone elasticity, differ from those of adults, special attention must be paid to the management of pediatric maxillofacial injuries[1-6].

In this report, we focus on injuries in pre-school patients under 6 years old, and age, sex, type of injuries, and etiology are examined. Treatment for 2 cases with mandibular fracture is also described.

Material and Methods

This study was based on the registration data of new

patients, and 159 pediatric patients younger than 6 years with oral and maxillofacial injury treated in the Department of Oral and Maxillofacial Surgery II, Osaka University Graduate School of Dentistry, Japan, between 2009 and 2013 were studied. The records and radiographs of the patients were reviewed and analyzed according to age, sex, cause of injury, and injury pattern. Injuries were divided into 4 patterns: soft-tissue injury, dental and/or dentoalveolar injury, soft-tissue injury and dental and/or dentoalveolar injury, and maxillofacial fracture.

Results

The ratio of boys to girls was 3:2. The patients most frequently affected were 1 year old, and the incidence gradually decreased with age. The number of injuries at 5 years old was about one-third of that at 1 year old. Consistent with the differences between the sexes, the incidence was higher in boys than in girls(Figure 1). The most common injury pattern was soft-tissue injury (71.4%), followed by dental and/or dentoalveolar injury (20.1%), soft-tissue injury and dental and/or dentoalveolar injury (8.2%), and mandibular fracture (1.3%) (Fig-

ure 2). Out of 45 dental and/or dentoalveolar injury cases, involvement of the mandible and maxilla occurred in 73.3% (33 patients) and 26.7% (12 patients), respectively. The most common cause of injury was falls at 78.0% (124 patients), followed by collisions at 13.8% (22 patients), traffic accidents at 3.8% (6 patients), and others at 4.4% (7 patients)(Table 1). Two girls, 2 years and 6 months old and 3 years and 9 months old, suffered injuries to the mandible and received conservative treatment.

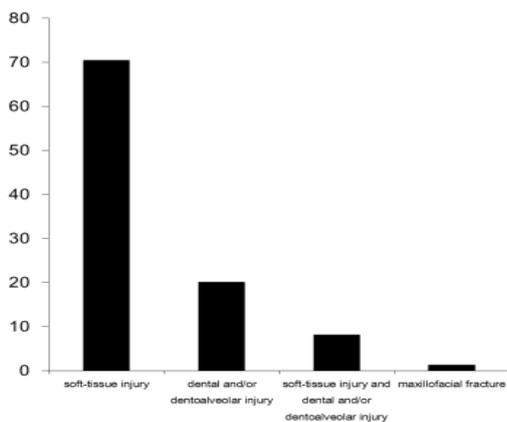


Figure 1. Distribution of age and sex in 159 pediatric patients with traumatic injuries.

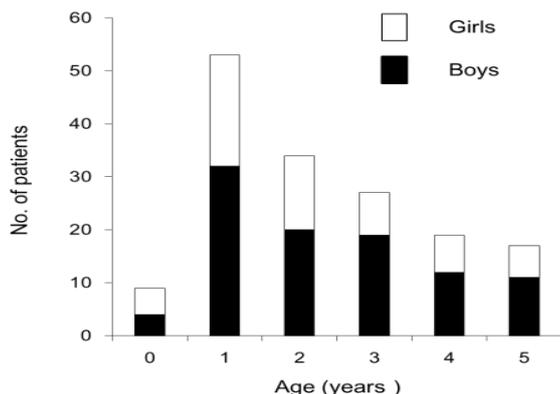


Figure 2. Bar chart shows sites of injury according to the year from 2009 to 2013.

Table 1

Cause of Injury	No. of patients
Fall	124
Collision	22
Traffic Accident	6
Others	7
Total	159

Case reports

Case 1

A 2-year and 6-month old girl suffered injury to her mandible upon falling from the arms of her grandfather. She was taken to an emergency outpatient service. The next day, she was taken to a nearby dental clinic and referred to our hospital the same day. Oral examination revealed

disruption of the mandibular arch between right deciduous lateral and central incisors (Figure 3(a-c)). Mandibular fracture in the symphyseal region but not luxation and fracture of teeth was demonstrated by X-ray examination (Figure 3(d)). With a diagnosis of mandibular fracture, an impression was taken for a plaster model (Figure 3(e)). Her mother was a dental hygienist and stated that the occlusion of the patient was normal. Because the bone fragment was stable, our treatment plan was observation with baby food. The treatment course was uneventful (Figure 3(f))

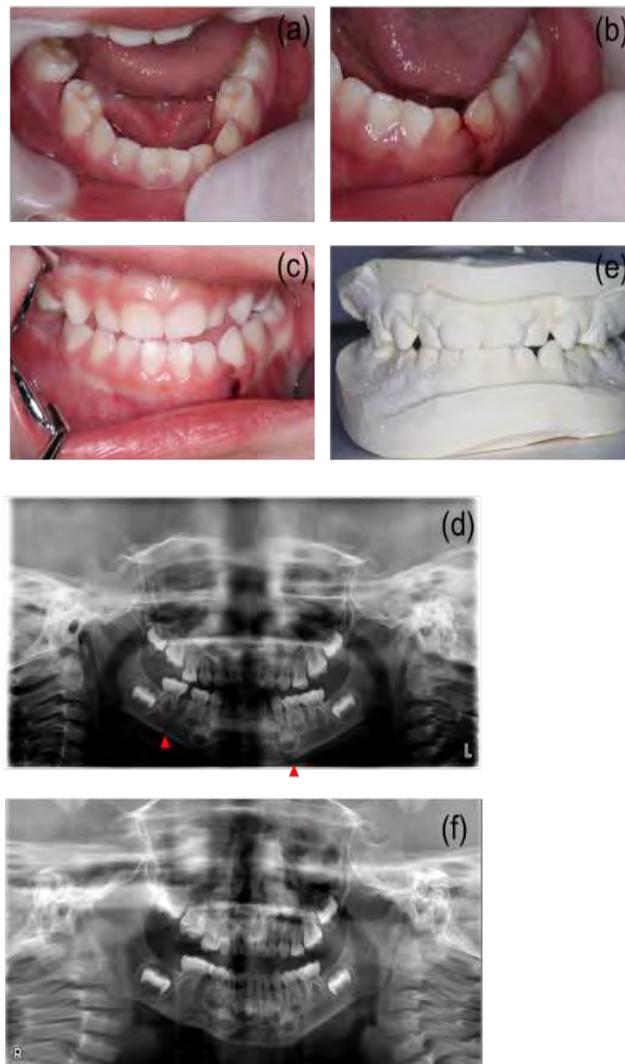


Figure 3. Case 1.(a-c) Intraoral finding (2 years and 6 months old). Disruption of the mandibular arch was observed between right deciduous lateral and central incisors. (d) X-ray findings at first visit (2 years and 6 months old). A dislocated fracture was observed in the symphyseal region of the mandible. Arrowhead indicates the fracture line.(e) Normal occlusion was observed in her plaster mode. (f) X-ray findings (2 years and 8 months old). Fracture lines were not observed.

Case 2

A 3-year and 9-month old girl was hit by a car and suffered injury to her mandible. She was taken to a dental emergen-

cy outpatient service and referred to our hospital 3 days later. Her left deciduous canine was extracted at the dental emergency outpatient service (Figure 4(a)). On X-ray examination, mandibular fracture between the left deciduous canine and deciduous lateral incisor was observed (Figure 4(b)). With a diagnosis of mandibular fracture, an impression was taken for a plaster model. Although slight malocclusion was observed, we fixed a 0.5mm-thick occlusal splint (Erkodur, Erkodent) to the mandible and kept her dental arch stable for 2 weeks. The treatment course was uneventful (Figure 4(c)).

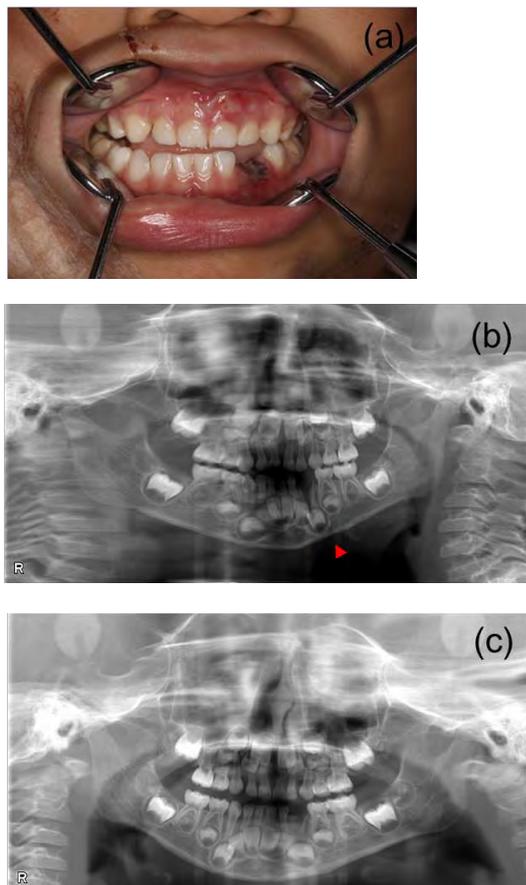


Figure 4. Case 2. (a) Intraoral findings. The left deciduous canine was extracted. Malocclusion was observed. (b) X-ray findings at first visit (3 years and 9 months old). A dislocated fracture was observed in the symphyseal region of the mandible. Arrowhead indicates the fracture line. (c) X-ray findings (4 years old). Fracture lines were not observed.

Discussion

Many investigations of pediatric oral and maxillofacial injury have been performed to clarify the unique etiological and clinical features, and these efforts have continued in recent years [1-6]. It was also reported that pediatric injury occurred frequently at 1 year old [1,6]. We similarly found that injury occurred most frequently at 1 year old during the first 5 years. The incidence of injury gradually decreases with age. The reason for this is that babies start to stand up and walk at

1 year old. The ratio of boys to girls was 3:2 in this study and the trend from 1 to 5 years old was as similar to that in previous study. This is due to the high activity of boys older than 1 year. The incidence of maxillofacial fractures in children is confirmed generally to be low. Indeed, in the present study an infant patients under 6 years old, the rate of maxillofacial fractures was only 1.3%. Most oral and maxillofacial injuries were soft-tissue injuries, followed by dental and/or dentoalveolar injury, and soft-tissue injury and dental and/or dentoalveolar injury. Fractures of the maxillofacial skeleton are infrequent in infancy.

It should be stated that most injuries were caused by falls and collisions. In doors, falls and collisions occurred at the edge of beds, and desks and chairs on the floor, which may result in lip injuries and fracture of the anterior teeth. Children like to put objects, such as toothbrushes, cylindrical toys, and chopsticks, in their mouth. Injuries due to these objects, at soft tissue other than the lips, including the palatal mucosa, buccal mucosa, and pharynx occur when children put these objects in their mouth [6,7]. Wounds in the oral cavity must be examined carefully. In the case of mandibular fracture, young children cannot express their complaints clearly and are often uncooperative. Therefore, they are more difficult to examine and diagnose accurately [1,8]. It is difficult for parents to check infant occlusion in the waking hours. Fortunately, in case1, the patient's mother was a dental hygienist, so she had knowledge of occlusion. Using a plaster model, she checked not only the occlusion but also the mandibular and maxillary arches. This was useful in our treatment plan.

It has been shown that conservative management has many advantages, including a decreased immobilization time, decreased muscular atrophy, better oral hygiene, and a decreased risk of ankylosis [4]. This is especially true of condylar fractures and nondisplaced or greenstick fractures of the body and ramus in which normal occlusion is present following injury [4,9]. In the second case of mandibular fracture, panoramic radiograph and plaster model were available. They were useful to plan the strategy for treatment.

In conclusion, we investigated the frequency of pediatric patients, younger than 6 years, with oral and maxillofacial injuries and successfully treated 2 cases of mandibular fractures in infancy conservatively. Conservative treatment was useful for greenstick fracture of the mandible. The development of maxillofacial growth and tooth buds on the fracture line is not predictable. Therefore, we should monitor this by regular follow-up.

Conflict of interest

The authors declare no conflicts of interest.

References

1. Yamamoto K, Matsusue Y, Horita S, Murakami K, Sugiura T et al. Maxillofacial fractures in children. *J Craniofac Surg.* 2013, 24(1): 153-157.
2. Yamamoto K, Matsusue Y, Murakami K, Horita S, Matsubara Y et al. Fate of developing tooth buds located in relation to mandibular fractures in three infancy cases. *Dent Traumatol.* 2010, 26(4): 353-356.
3. Iida S, Matsuya T. Paediatric maxillofacial fractures: Their aetiological characters and fracture patterns. *J Craniomaxillofac Surg.* 2002, 30(4): 237-241.
4. Smartt JM, Jr, Low DW, Bartlett SP. The pediatric mandible: Ii. Management of traumatic injury or fracture. *Plast Reconstr Surg.* 2005, 116(2): 28e-41e.
5. Haug RH, Foss J. Maxillofacial injuries in the pediatric patient. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 2000, 90(2): 126-134.
6. Matsusue Y, Yamamoto K, Horita S, Inagake K, Kirita T. Impalement injuries of the oral cavity in children. *J Oral Maxillofac Surg.* 2011, 69(6): e147-e151.
7. Younessi OJ, Alcaino EA. Impalement injuries of the oral cavity in children: A case report and survey of the literature. *Int J Paediatr Dent.* 2007, 17(1): 66-71.
8. Eskitascioglu T, Ozyazgan I, Coruh A, Gunay GK, Yuksel E. Retrospective analysis of two hundred thirty-five pediatric mandibular fracture cases. *Ann Plast Surg.* 2009, 63(5): 522-530.
9. Bartlett SP, DeLozier JB, 3rd. Controversies in the management of pediatric facial fractures. *Clin Plast Surg.* 1992, 19(1): 245-258.