Original Article The Eurasian Journal of Medicine EAJM 2012; 44: 141-3

Maxillofacial Fracture Experiences: A Review of 152 Cases

Maksillofasyal Travma Deneyimlerimiz: 152 Olgu Derlemesi

Osman Enver Aydin[1], Onder Tan[1], Said Algan[1], Selma Denktas Kuduban[1], Ensar Zafer Barin[1], Hakan Cinal[1], Murat Sarici[2], Umit Avsar[3]

[1]Department of Plastic Reconstructive and Aesthetic Surgery, Faculty of Medicine, Ataturk University, Erzurum, Turkey

[2]Department of Plastic and Reconstructive Surgery, Bitlis State Hospital, Bitlis, Turkey

[3]Department of Family Medicine, Faculty of Medicine, Ataturk University, Erzurum, Turkey

Abstract

Objective: The fractures of facial structures lead to great morbidity. Cross-sectional studies are needed to evaluate the current state of maxillofacial traumas. Thus, this study aims to evaluate these experiences and to compare these results with the current literature.

Materials and Methods: The medical records of the maxillofacial fracture cases hospitalized between January 2004 and November 2011 were examined. The age, sex, etiology, fracture localization and treatment method for each case were documented. The affected facial bones were grouped as mandible, maxilla, zygoma, naso-orbitoethmoid complex (NOEC) and blow-out. Nasal fractures were excluded. The cases were assigned to 3 groups with respect to age (below 16, above 65 and between 17 and 64). The chi Square test was used to assess the significance of the difference in mandibular fracture rates in the pediatric population compared to others.

Results: The total number of cases was 152. The total number of fractures was 185. Of the 152 cases, 117 were male and 35 were female. The average age was 31.4 (±18.3), ranging between 2 and 81. Thirty-one cases were 16 years old or less. Nine cases were 65 years old or more. Mandibular and zygomatic fractures were the most prevalent fractures in the adult group. Mandibular fractures were significantly more common in the pediatric age group compared to rest of the population (X^2, $p<0.05$). Traffic accidents were the most common etiological factor, with a 55.3% ratio. Open reduction and internal fixation was the most frequently conducted treatment modality in all age groups.

Conclusion: Retrospective studies are important for the projection of future prospects. In summary, our results indicate that pediatric fractures are mostly in the lower face and usually affect the condylar region, which is consistent with the literature.

Key Words: Lower face, Mandible, Maxillofacial fractures

Özet

Amaç: Yüz kemiği kırıkları büyük morbidite nedenidir. Maksillofasyal travmalarda güncel durumun değerlendirilmesi ve buna yönelik değerlendirmeler için kesitsel çalışmalar gereklidir. Bu nedenle bu çalışmada, deneyimlerin değerlendirilmesi ve mevcut literatürle karşılaştırılması amaçlanmıştır.

Gereç ve Yöntem: Ocak 2004-Kasım 2011 arasında kliniğimizde yatırılarak izlenen hastaların tıbbi kayıtları geriye dönük olarak incelenmiştir. Yaş, cinsiyet, etiyoloji, kırık yeri ve tedavi yöntemi her hasta için belirlenmiştir. Kırık yerleşimleri, mandibula, maksilla, zigoma, nazo-orbitoetmoid kompleks ve blow-out kırıkları şeklinde sınıflandırıldı. Burun kırıkları dahil edilmedi. Seri, yaşa göre 3 gruba bölündü. Pediatrik grup 16 yaş altı, erişkin grup 17-64 arası ve geriatrik grup 65 yaş ve üzeri şeklinde sınıflandırıldı. Pediatrik grup ve pediatrik olmayan gruplar arasında mandibula kırıkları açısından fark olup olmadığı Chi Kare testi ile değerlendirildi.

Bulgular: Toplam 152 hasta incelendi. Toplam kırık sayısı 185 olarak saptandı. Hastaların 117'si erkek 35'i kadındı. Yaş ortalaması 31.4 (±18.3) ve yaş aralığı 2 ve 81 arasındaydı. Otuz bir olgu pediatrik, 9 olgu geriatrik gruptaydı. Mandibula kırıkları pediatrik grupta diğer yaşlara göre anlamlı düzeyde daha fazla görülmekteydi (X^2, $p<0.05$). Trafik kazaları %55.3 oranla en önemli etiyolojik faktor olarak saptanmıştır. Açık redüksiyon ve internal tespit is en sık uygulanan tedavi yöntemi olmuştur.

Sonuç: Retrospektif çalışmalar geleceğin projeksiyonu için önemlidir. Sonuçlarımız, literatürle uyumlu şekilde, alt yüz kırıklarının pediatrik yaş grubunda daha fazla görüldüğünü ortaya koymuştur.

Anahtar Kelimeler: Alt yüz, Mandibula, Maksillofasyal kırıklar

Introduction

Fractures of the facial structures lead to great morbidity. Recovering form and function is the main issue at stake for maxillofacial fractures. Age, location, alignment, etiology of the fracture and concomitant injuries and systemic diseases determine the management strategy, as well as social, economic, cultural and environmental factors [1-3].

Fracture pattern varies with age, which also complicates the treatment and outcomes. Deciduous dentition limits the area appropriate for screw placement. Additionally, pediatric fractures usually implicate the condylar region, which bears a growth plate. A lesion of this growth plate leads to mandibular hypoplasia and temporomandibular joint ankylosis [3].

In this context, the writers aim to evaluate their experience and compare the results with the current literature.

Received: December 10, 2011 / **Accepted:** August 30, 2012

Correspondence to: Osman Enver Aydin, Department of Plastic Reconstructive and Aesthetic Surgery, Faculty of Medicine, Ataturk University, Erzurum, Turkey
Phone: +90 442 236 70 21 Fax: +90 442 236 12 01 e-mail: enveraydin@yahoo.com

doi:10.5152/eajm.2012.33

Materials and Methods

The medical records of maxillofacial fracture cases hospitalized in the authors' institution between November 2004 and November 2011 were examined. The age, sex, etiology, fracture localization and treatment method for each case were documented. The affected facial structures were grouped as mandible, maxilla, zygoma, naso-orbitoethmoid complex (NOEC) and blow-out. The etiology was classified as traffic accident, fall, violence, gunshot wound or other (sports injury, animal kick, blast, earthquake). Nasal fractures were excluded.

The cases were sorted into 3 groups with respect to age (below 16, above 65 and between 17 and 64). A chi square test was used to test the significance of the difference in the pediatric mandibular fracture rate compared to other rates.

Results

Cases

The total number of cases was 152. The total number of fractures was 185. Of the 152 cases, 117 were male and 35 were female. The average age was 31.4 (±18.3), ranging between two and 81. Thirty-one cases were 16 years old or less. Nine cases were 65 years old or more (Table 1).

Location

Of the 152 cases, 90 (59.2%) had mandibular, 55 (36.2%) had zygomatic, 30 (19.7%) had maxillary, five (3.3%) had blow-out and five (3.3%) had NOEC fractures (Table 2). In the pediatric age group, mandibular fractures were most common (77.4%). Mandibular fractures were significantly more common in the pediatric age group than in the rest of the population (X^2, $p<0.05$) (Figure 1).

Table 1. Demographics of the cases

		n	%
Sex	Male	117	77.0
	Female	35	23.0
	Total	152	100
Age		31.4 (±18.3)	
Age groups	0-16	31	20.4
	17-64	112	73.7
	65-	9	5.9
Total		152	100

Table 2. Locations and numbers of the fractures

	n	%
Mandible	90	59.2
Zygoma	55	36.2
Maxilla	30	19.7
Blow-out	5	3.3
NOEC	5	3.3
Total	185	100

Etiology

Traffic accidents were the most common cause, with 84 (55.3%) incidents. Twenty-seven (17.8%) cases had fall as the etiology. Twenty-seven cases (17.8%) were due to violence. Eight cases (5.3%) had gunshot wounds. One sports injury, three animal kicks, one earthquake and one blast injury were among the rarely observed etiologies (Table 3). Etiologies varied within age groups. Traffic accidents were the most common etiology in both pediatric and the adult groups. There was no statistical significance in the difference in etiology among the age groups (Figure 2).

Treatment

One hundred thirty-two (86.8%) cases were treated with only open reduction and internal fixation (ORIF). Twelve (7.6%) cases were treated with intermaxillary fixation (IMF); 5 (1.9%) blow-out fractures were treated using porous polyethylene; and 7 (6.5%) cases were managed with conservative methods

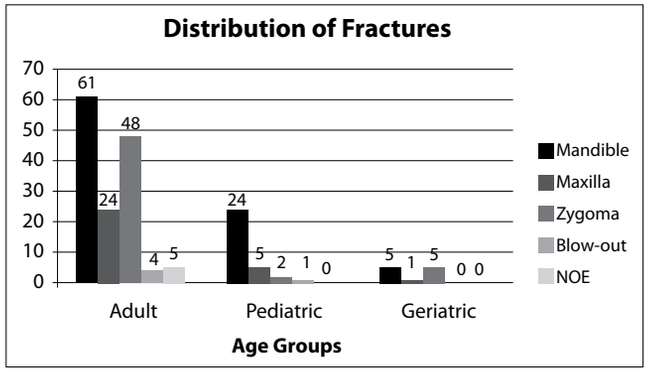

Figure 1. *Fracture locations are shown with respect to age groups. The percentage rate of mandibular fractures was significantly higher in the pediatric group compared to the other age groups (X^2 test, $p<0.05$).*

Table 3. Etiologies of the fractures

	n	%
Traffic Accident	84	55.3
Fall	27	17.8
Violence	27	17.8
Gun-shot	8	5.3
Other (Sports injury, Animal kick, Crush injury, Blast)	6	3.8
Total	152	100

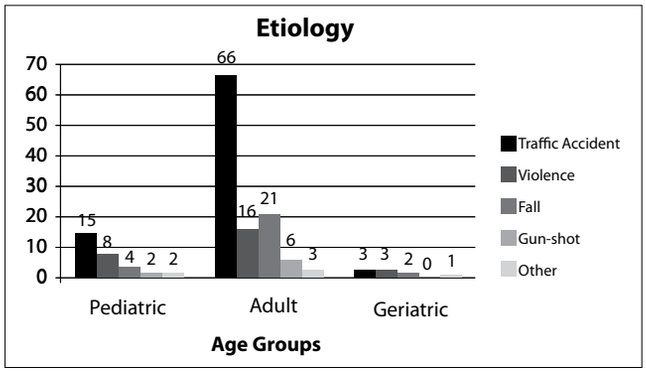

Figure 2. *Etiologies are shown with respect to age groups. The "Other" label includes sports injuries, animal kicks, crush injuries and bomb blasts.*

(Table 4). In the pediatric group, 24 (77.4%) were treated with ORIF, and only 4 cases were treated with IMF.

Discussion

Trauma is an eternal healthcare problem for humans. Maxillofacial trauma is a major component of whole trauma and causes severe mortality and morbidity. Facial disfigurement, functional jaw problems, visual, olfactory or hearing loss and facial paralysis lead to a great social and economic burden. Although efficient and algorithmic treatment is crucial for good results, the evaluation of the patient data to determine preventive measures is also imperative.

The male-to-female ratio was 3:1. This ratio is consistent with previous reports [1, 2, 4]. This result does not take into account the socioeconomic status of the society. We may speculate that the main reason for male predominance is that men are less obedient to rules, have a greater tendency toward violence and are more mobile than women.

Mandibular fractures were prominent in the pediatric age group. Seventy percent of pediatric facial fractures were observed in the mandible. With these injuries come treatment problems concerning pediatric mandibular and alveolar fractures relevant to permanent teeth [3]. The geriatric age group included too few cases to make any assumption or evaluation.

Consistent with previous studies from various countries, traffic accidents comprised the major etiological factor, with falls being second in rank [2, 5]. Violence was the third factor in our research. In this study, sports injuries accounted for 0.9% of the overall etiological factors. This low rate of sports injury is far below the sports injury rate of developed countries, which was reported to be 15.1% [1].

Table 4. Treatment interventions

	n
ORIF	127
ORIF+IMF	5
IMF	7
Conservative	10
Porous Polyethylene	5
Other (Gillies Steel wire)	2
Total	156

Mandibular, maxillary and zygomatic fractures were mostly treated with ORIF. ORIF is the standard management modality for facial fractures. Isolated zygomatic arch fractures were treated with the Gillies Method. Blow-out fractures were treated using high-density porous polyethylene and bone grafts harvested from the iliac bone.

A large number of maxillofacial trauma cases are treated in plastic surgery clinics. Retrospective studies are important to the projection of future prospects. In summary, our results indicate that pediatric fractures are mostly located in the lower face and usually affect the condylar region, which is consistent with the literature.

Conflict of interest statement: The authors declare that they have no conflict of interest to the publication of this article.

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