



## Fractures of the maxillofacial region in children

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**SUMMARY.** 83 children with maxillofacial fractures have been analyzed according to, aetiology, age, sex, type, and site of fractures. The results showed a high male to female ratio. Mandibular fractures were the commonest, in the condylar region in particular. The commonest causes in descending order were falls, bicycle accidents and at play.

### KEY WORDS:

Fractures – Maxillofacial – Children

### INTRODUCTION

Maxillofacial fractures in children are less common than in adults. A number of factors, including elasticity of the bone in children, the growth process in the young bone (McGuirt and Salisbury, 1987), the presence of developing tooth germs and lack of an adequate number of permanent teeth and the small crown form of the deciduous teeth (Amartunga, 1988), all influence the pattern of fracture, its management and postoperative period of fixation. 83 cases of maxillofacial fractures in children are analyzed according to aetiology, age, sex, type, and site of fracture and treatment methods in three different centres in Ankara, Turkey, during different periods in the last 12 years.

### MATERIAL AND METHODS

The case histories of 83 children with maxillofacial fractures treated in three different centres were analyzed. 24 patients were treated during 1977–1978 by the Department of Otorhinolaryngology of Ankara University, while 29 cases were treated at the Department of Oral and Maxillofacial Surgery of Ankara University, during 1982–1986, and the remaining 30 were patients who received treatment in the Maxillofacial Surgery Department of the State Hospital, Ankara during 1989–1990.

### RESULTS

This report evaluates the experience with 83 children with maxillofacial trauma treated in different periods (Fig. 1). 57 of the patients (68.67%) were male and 26 (31.33%) were female giving a high male-to-female ratio (Fig. 2). However, this ratio revealed a higher predominance of male patients as compared with male predominance in the third group.

The age distribution is noted in Table 1. The mean age in the first group was 6.79, in the second, 7.72 and in the last group, 7.13 years

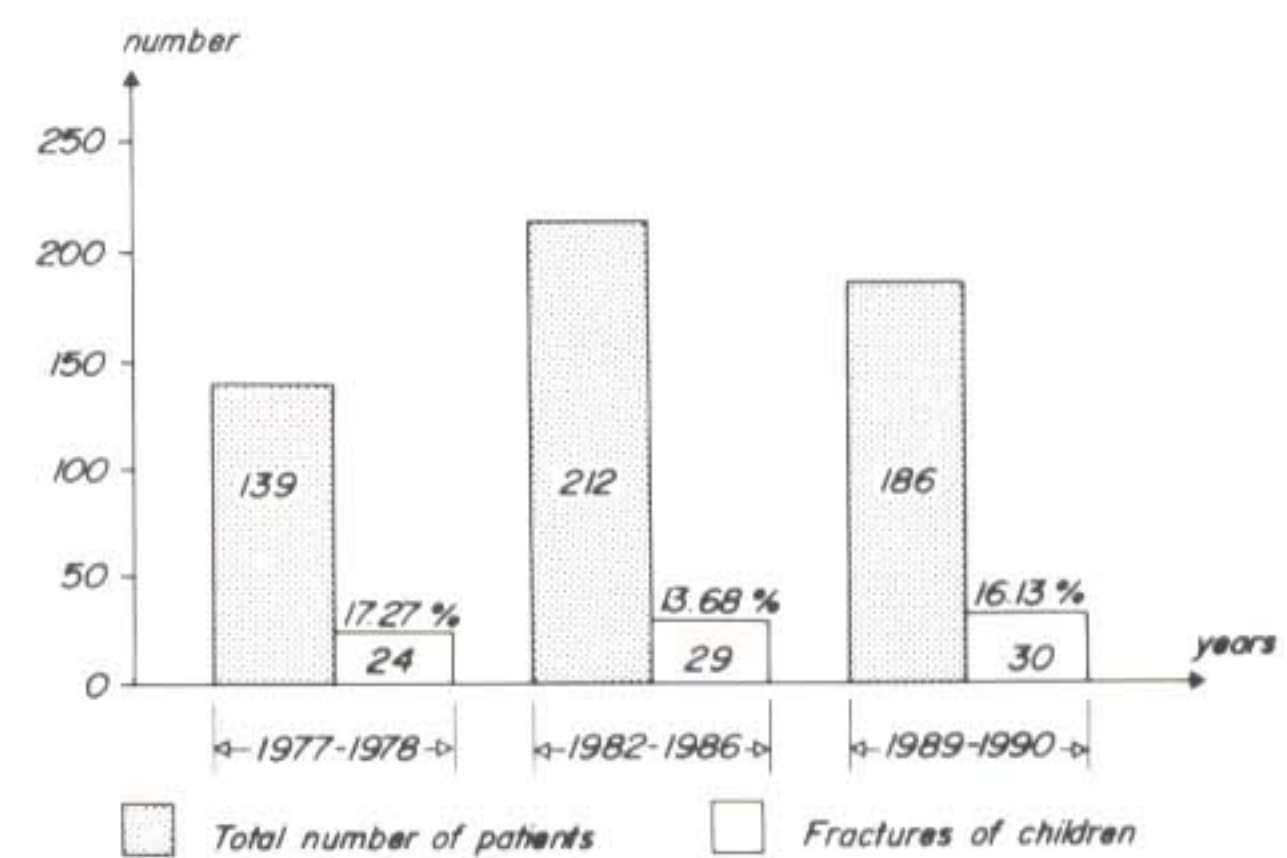


Fig. 1 – Fractures in children out of total number of patients.

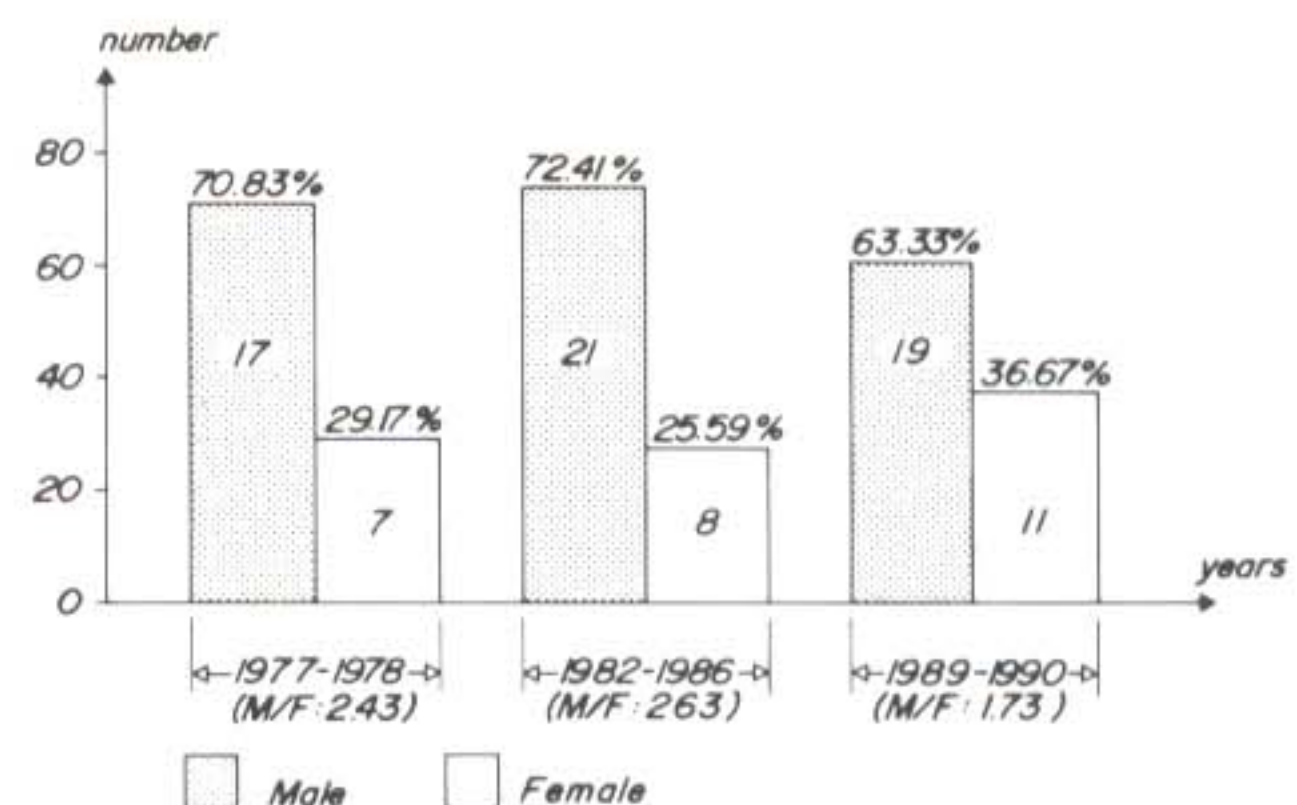


Fig. 2 – Sex distribution (M/F: Male/Female).

Table 1 – Distribution

	N	$\bar{x} \pm S\bar{x}$	Median	Min
1st Group	24	6.79 ± 0.62	6	2
2nd Group	29	7.72 ± 0.58	8	3
3rd Group	30	6.83 ± 0.60	7	1
Total	83	7.13 ± 0.35	7	1



**Table 2** – Site of fractures

	1st Gr.	%	2nd Gr.	%	3rd Gr.	%	Total	%
Maxilla	5	20.83	4	13.79	3	10.00	12	14.46
Mandible	19	79.17	25	86.21	27	90.00	71	85.54
Total	24		29		30		83	

**Table 3** – Anatomical site of mandibular fractures

	1st Gr.	%	2nd Gr.	%	3rd Gr.	%	Total	%
Condyle	5	26.32	8	32.00	7	25.93	20	28.17
Ramus	1	5.26			1	3.70	2	2.82
Angle	2	10.53	1	4.00			3	4.23
Body	4	21.05	6	24.00	7	25.93	17	23.94
Canine	3	15.79	7	28.00	7	25.93	17	23.94
region								
Alveolar	4	21.05	3	12.00	5	18.52	12	16.90
process								
Total	19		25		27		71	

**Table 4** – Anatomical site of maxillary fractures

	1st Gr.	2nd Gr.	3rd Gr.	Total
Alveolar	5	3	3	11
Le Fort		1		1
Total	5	4	3	12

**Table 6** – Treatments used

Treatment	Number of patients	%
Arch bar fixation	43	51.81
Wiring teeth only	32	38.55
Digital pressure + fixation by suture material	5	6.02
Arch bar fixation + head bandage	2	2.41
Intraosseous wiring	1	1.20
Total	83	

Anatomical sites of maxillofacial injuries are depicted in Tables 2, 3 and 4. The most common injuries in the three groups were condyle fractures (28.17%). Mandibular body fractures tended to reveal increasing numbers in all groups (23.94%). The fractures in the canine area were also the second commonest (23.94%). Alveolar fractures were the next common (16.90%). Fractures of the maxilla were less common than the mandibular ones (14.46%).

Falls were found to be the most common cause (45.78%), followed by traffic and bicycle accidents (28.92%). Play accidents were the third most common aetiological factor (20.48%). The remainder were due to horse kicks and dog bites (4.82%) (Table 5).

The majority of the fractures (51.82%) were treated by hand-made arch bar fixation (Table 6). Wiring the teeth alone was used in 38.55% of cases. In the alveolar and green-stick fractures, besides teeth wiring

we used silk sutures to fix the adjacent tooth in some cases after reducing the fragments by digital pressure (6.02%). In the maxillary fractures, arch bar fixation and a head bandage were preferred (2.41%). Only in one case was open reduction and interosseous lower border wiring utilized (1.20%).

## DISCUSSION AND CONCLUSIONS

The results of our study showed that the frequency of maxillofacial fractures in children in our population is not high. *Gussack et al.* (1987) reported a similar

**Table 5** – Aetiology of fractures

	1st Gr.	%	2nd Gr.	%	3rd Gr.	%	Total	%
At home	7	29.17	9	31.03	6	20.00		
Falls							38	45.78
from height	5	20.83	4	13.79	7	23.33		
Traffic and bicycle acc.	6	25.00	8	27.59	10	33.33	24	28.92
Play acc.	4	16.67	7	24.14	6	20.00	17	20.48
Horse kick	2	8.33	1	3.45				
Others							4	4.82
Dog bite					1	3.33		
Total	24						83	



incidence in paediatric patients (14.5%). However, *Bochlogyros* (1985), *Amartunga* (1988), reported fewer fractures in children.

In this study, the peak incidence was in the 6–8 year age-group. This similarity in incidence was found to be unique when compared with the results of *Hagan* and *Huelke* (1961); *Al-Aboosi* and *Perriman* (1976); *Amartunga* (1988).

The sex distribution of maxillofacial trauma at a national level has shown a high male predominance. The reason is that boys are generally more boisterous than girls and spend more time outdoors as *Al-Aboosi* and *Perriman* (1976) stated.

The aetiology of maxillofacial trauma revealed that falls are the main causative factor in adults in the same population, in whom falls were the third aetiological factor (*Borçbakan* et al., 1978; *Güven*, 1988). Under 3 years of age, the most accidents were falls at home. *Nimityongskul* and *Auderson* (1987) reported the falls in detail and classified them as falls out of bed, crib, couch, chair, wagon, rocking horse, and from a height. Traffic and bicycle accidents were found to be the next most common causes in contrast to the studies of *Khosla* and *Boren* (1971); *Lamberg* (1978); *Bochlogyros* (1985); *Amartunga* (1988).

The most common associated injuries in the three groups were to the lips and tongue, while panfacial soft tissue injuries were not remarkable. This differs from the studies of *Needleman* (1986); *Gussack* et al. (1987).

In contrast to the reports of *Danielsen* (1972); *Laskin* (1973); *Needleman* (1986), injuries of the maxillofacial area due to child abuse were not common in our population. This may be a reflection of local traditions.

In our series, isolated dental trauma was not common, as these patients are usually treated by dentists or department of paedodontics in our country.

In general, mandibular fractures are common facial injuries treated by maxillofacial surgeons and they occur twice as frequently as midfacial fractures. There is also a general trend in other reported series and also our findings show a decreased incidence of midface fractures in the paediatric age group (*Oikarinen* and *Malmström*, 1969; *Hall*, 1972; *Reil* and *Kranz*, 1976; *Gussack* et al., 1987). The reason for this may be attributed to the developmental aspects of the facial skeleton. The incidence of midface fractures in children is low but they do occur. The incidence of midface fractures in children exhibits a tendency to an increase in with age.

Condylar fractures were the most common site, as reported by many authors. The results of *Reil* and *Kranz* (1976); *McGuirt* and *Salisbury* (1987); *Amartunga* (1988) confirmed our findings. This differs from the studies of *Oikarinen* and *Malmström* (1969); *Al-Aboosi* and *Perriman* (1976). The high incidence of condyle fractures may be due to the high content of medullary bone with only a thin rim of cortex (*James*, 1985).

Although the reports of *Oikarinen* and *Malmström* (1969); *Al-Aboosi* and *Perriman* (1976) showed the

majority of the fractures seen in their studies to be in the mandibular body, our series revealed body fractures were the second most common site.

In the treatment of fractured jaws in children, two principles must be considered; a short period of fixation and early mobilization and training exercises. Due to the high osteogenic potential and rapid healing of the facial skeleton in children, 2–3 weeks is adequate fixation. In children, postoperative feeding presents problems and the conical shape of the deciduous teeth makes wiring difficult.

The treatment of condylar fractures in children needs particular attention. The management has long been a matter of controversy (*Thoma*, 1954; *Archer*, 1966). Open reduction with intraosseous fixation, immobilization with intermaxillary fixation and non-immobilization and early movement are the alternatives in treatment. Although the principles of fracture treatment are reduction and fixation, the majority prefer conservative fixation, Ivy loop wires, or simple wires placed round the teeth, or head bandages to fix the fragments or teeth temporarily. Only a few cases have been treated surgically. We believe that conservative treatment will avoid external scars, injury to the inferior alveolar nerve and developing permanent tooth follicles. If these methods give less than satisfactory occlusion, orthodontic treatment at a late stage may correct minor discrepancies. The three different series did not show the expected differences in aetiology, sex, type of fractures or treatment although they cover more than 10 years.

#### Acknowledgement

I would like to express my sincere thanks to A. Perriman, BDS, FDS, RCS, Scunthorpe, UK, for his invaluable advice and help in the preparation of this manuscript.

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Paper submitted 9 November 1991  
Accepted 3 February 1992