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 (Anamurunga, 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.](image1)

![Fig. 2 - Sex distribution (M/F: Male/Female).](image2)

<table>
<thead>
<tr>
<th>Table 1 - Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>1st Group</td>
</tr>
<tr>
<td>2nd Group</td>
</tr>
<tr>
<td>3rd Group</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
### Table 2 - Site of fractures

<table>
<thead>
<tr>
<th></th>
<th>1st Gr.</th>
<th>%</th>
<th>2nd Gr.</th>
<th>%</th>
<th>3rd Gr.</th>
<th>%</th>
<th>Total</th>
<th>%</th>
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<tbody>
<tr>
<td>Maxilla</td>
<td>5</td>
<td>20.83</td>
<td>4</td>
<td>13.79</td>
<td>3</td>
<td>10.00</td>
<td>12</td>
<td>14.46</td>
</tr>
<tr>
<td>Mandible</td>
<td>19</td>
<td>79.17</td>
<td>25</td>
<td>86.21</td>
<td>27</td>
<td>90.00</td>
<td>71</td>
<td>85.54</td>
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<tr>
<td>Total</td>
<td>24</td>
<td></td>
<td>29</td>
<td></td>
<td>30</td>
<td></td>
<td></td>
<td>83</td>
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</tbody>
</table>

### Table 3 - Anatomical site of mandibular fractures

<table>
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<th></th>
<th>1st Gr.</th>
<th>%</th>
<th>2nd Gr.</th>
<th>%</th>
<th>3rd Gr.</th>
<th>%</th>
<th>Total</th>
<th>%</th>
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</thead>
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<tr>
<td>Condyle</td>
<td>5</td>
<td>26.32</td>
<td>8</td>
<td>32.00</td>
<td>7</td>
<td>25.93</td>
<td>20</td>
<td>28.17</td>
</tr>
<tr>
<td>Ramus</td>
<td>1</td>
<td>5.26</td>
<td></td>
<td></td>
<td>1</td>
<td>3.70</td>
<td>2</td>
<td>2.82</td>
</tr>
<tr>
<td>Angle</td>
<td>2</td>
<td>10.53</td>
<td>1</td>
<td>4.00</td>
<td>3</td>
<td>3.02</td>
<td>3</td>
<td>2.33</td>
</tr>
<tr>
<td>Body</td>
<td>4</td>
<td>21.05</td>
<td>6</td>
<td>24.00</td>
<td>7</td>
<td>25.93</td>
<td>17</td>
<td>23.94</td>
</tr>
<tr>
<td>Canine</td>
<td>3</td>
<td>15.79</td>
<td>7</td>
<td>28.00</td>
<td>7</td>
<td>25.93</td>
<td>17</td>
<td>23.94</td>
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<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Alveolar process</td>
<td>4</td>
<td>21.05</td>
<td>3</td>
<td>12.00</td>
<td>5</td>
<td>18.52</td>
<td>12</td>
<td>16.90</td>
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<tr>
<td>Total</td>
<td>19</td>
<td></td>
<td>25</td>
<td></td>
<td></td>
<td>27</td>
<td>71</td>
<td></td>
</tr>
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### Table 4 - Anatomical site of maxillary fractures

<table>
<thead>
<tr>
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<th>2nd Gr.</th>
<th>3rd Gr.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alveolar</td>
<td>5</td>
<td>3</td>
<td>3</td>
<td>11</td>
</tr>
<tr>
<td>Le Fort</td>
<td>1</td>
<td>1</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>4</td>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>

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. Guusseck et al. (1987) reported a similar
incidence in paediatric patients (14.5%). However, 
Bochlogrinos (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 Hogan and 
Huelke (1961); Al-Abouisi 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-Abouisi 
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 (Borchukan et al., 1978; Göven, 1988). Under 3 
years of age, the most accidents were falls at home. 
Nimmitt-Yongskal and Anderson (1987) reported the falls 
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); 
Bochlogrinos (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 Needelman (1986); Gussack et al. 

In contrast to the reports of Danielsen (1972); 
Laskin (1973); Needelman (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 paedodentics 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 
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 
midfacial fractures in children exhibits a tendency to an 
increase in age with fractures.

Condylar fractures were the most common site, as 
reported by many authors. The results of Reil and 
Kranz (1976); McGuirt and Salsbury (1987); 
Amartunga (1988) confirmed our findings. This differs 
from the studies of Oikarinen and Malmström (1969); 
Al-Abouisi and Perriman (1976). The high incidence of 
condylar 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-Abouisi 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 
alternatives 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- 
imobilization 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.

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