Maxillofacial Fractures Related to Work Accidents

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Summary

Work-related maxillofacial fractures were studied retrospectively over a six-year period. There were 98 cases accounting for 4.5% of all facial bone fractures treated in our hospital between 1981 and 1986. Of the patients, 89.8% were male. The mean age of the injured was 36.4 years. The incidence of work-related maxillofacial fractures was 0.37 per 1000 workers. Most of the injuries (66%) occurred in factories and construction work. Such work was associated with an to 15 times higher risk of maxillofacial fracture than service and office work. Of the fractures, 20.4% were sustained on the way to or coming from work. At the place of work, the commonest causes of injury were blows from objects or falls from a height (70%). On the way to or coming from work, the aetiological factor was most often a traffic accident. Assault and battery had caused facial bone fractures in 11.2% of cases. Fifty-five patients with midface and 45 patients with mandibular fractures were found, of these, 8 patients had bimaxillary fractures. In 6 cases, only dentoalveolar fractures were found. Of the patients, 55.1% were treated operatively. Sixty-six patients were hospitalized, the mean length of hospital stay being 3.2 days (range 1–12 days).

Key words

Maxillofacial injuries – Trauma – Fractures – Work-related injuries

Introduction

Numerous reports on the aetiology of facial bone fractures have been published. The commonest causes are traffic accidents, assault and battery and work accidents (Oftkartin and Malmström, 1969; Van Hoof et al., 1977; Lamberg, 1978; Zachariades et al., 1983). Incidence varies according to geographical area and the socio-economic status of the population concerned (Larsen and Nielsen, 1976; Olson et al., 1982; Voss, 1982; Ellis et al., 1985a; Abitose, 1986).

In many studies, work-related facial injuries are presented as an entity. However, when preventive measures are being planned, knowledge of how injuries arise is important. This retrospective study analyzed the incidence, causes and treatment of maxillofacial trauma caused by work accidents.

Patients and Methods

Case histories of patients treated in the Department of Maxillofacial Surgery, Helsinki University Central Hospital, over the period 1981–1986 were reviewed. All patients suffering from a maxillofacial fracture caused by a work-related accident were included. The patient-related factors analyzed were age, sex and occupation. To allow comparison with data on the population of the area in general, the patients were also divided into groups by age (10 years or under, 20 to 24 years, 25 to 34 years, 35 to 44 years, 45 to 54 years, and 55 to 59 years, 60 years or over). Occupations were classified as service and office workers (1), transportation (2), farm and forestry workers (3), factory workers (4), and construction workers (5). The nature of the work was recorded in detail. Time of accident, causes and the fracture sites were recorded. Data on treatment and complications was collected. Numerical data is given as mean ± standard deviation of the mean.

Results

During the six-year period 1981–1986, 2,200 patients with maxillofacial fractures were treated in the Department of Maxillofacial surgery, Helsinki University Central Hospital. In 98 cases (4.5%) the injury had been caused by a work-related accident. The 98 cases also include injuries sustained on the way to or coming from work. Demographic data is shown in Fig. 1. The mean age of the patients was 36.4 years.

On average, there were 16 work-related maxillofacial fractures a year.

Occupation

The incidence of maxillofacial injuries in Helsinki was 0.37 per 1000 workers. It was highest among factory workers (1.01:1000) and construction workers (1.17:1000). Maxillofacial injuries in these groups accounted for 66% of all cases. Among service and office workers the incidence was 0.12:1000. Most maxillofacial injuries suffered by the latter group occurred on the way to or from work (Table 1).

<table>
<thead>
<tr>
<th>Occupation</th>
<th>At work</th>
<th>On way to / coming from work</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Service and office work</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>2. Transportation</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>3. Farming</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>4. Factory work</td>
<td>21</td>
<td>7</td>
</tr>
<tr>
<td>5. Construction</td>
<td>21</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>78 (80%)</td>
<td>20 (20%)</td>
</tr>
</tbody>
</table>
Among factory workers, facial bone fractures were more often sustained in maintenance work than in production.

**Causes of injury**

A blow from an object was the commonest cause of a work-related accident, accounting for 37.8% of all cases (Fig. 2a–e). Among construction workers, the percentage was 29.7 and among factory workers it was 48.6. All of these injuries were sustained at the place of work.

Falling from a height was a cause of maxillofacial injury in 17 of the 98 cases. All such injuries occurred at the place of work. In 12 of the 17 accidents, the fall had been between 2 and 4 metres. In 7 cases, the patient had fallen from a stepladder.

Of the maxillofacial injuries, 27.6% had resulted from a traffic accident. Most injuries in this category (63%) had been sustained on the way to or coming from work.

Assault and battery was the commonest cause among service and office workers (7/11 cases), and accounted for 11.2% of all cases. Three of the victims had been hit by a guest in a restaurant and two sustained their injuries while on guard in a public place.

**Injuries**

The sites of the fractures of the facial bones are shown in Fig. 3. Eight patients had bimaxillary fractures. Twenty-five patients also had injuries additional to the maxillofacial ones. Nine such patients with other injuries had fallen from a height. In nine cases, the patient had been involved in a traffic accident. A blow from an object caused other injuries in seven cases.

![Fig. 1](image1) Number of patients with work-related maxillofacial fractures in the various age groups.

![Fig. 2a](image2) A 23-year-old male construction worker hit in the face by a cement mixer. Orthopantomogram shows compound fracture of the left angle and ramus.

![Fig. 2b](image3) Osteosynthesis with wires and IMF.
Fractures of the skull or brain contusions occurred in seven cases. Injuries of the upper extremities accounted for 37.9% of the additional injuries. Contusion of the thorax and fractures of the ribs were recorded in five cases. There were six cases of injured hip or/and lower extremity.

**Treatment**
The mandibular fractures were treated conservatively, with intermaxillary fixation (IMF) only, in 34 of 45 cases. However, all but eight patients with a midface fracture underwent operation. Sixty-six patients were admitted to hospital and the length of hospital stay was 3.2 days (range 1–12 days). Hospitalization for over seven days was necessary on seven occasions. Complications were noted in 11.2% of cases. Hyposensitivity of the skin was found in six of these patients. Occlusal disturbances occurred in three cases. Unsightly scarring was found in one case and a mandibular pseudoarthrosis in another.

**Discussion**
In the study reported here, maxillofacial fractures related to work accidents were found to have occurred on average in 16 patients a year, and accounted for 4.5% of all fractures treated in our department during the study period. Fifty-one per cent of cases were treated operatively. Few complications were noted.

There are numerous reports on maxillofacial trauma (Larsen and Nielsen, 1976; Van Hoof et al., 1977; Lambek,
Fig. 3 Distribution of fractures of maxillofacial skeleton. Absolute number of fractures are for the left side and percentages of total number of fractures on the right side. Half of the patients had a fracture in two or more different sites. Number 15 refers to all levels of Le Fort fractures.

Lamberg, 1978). The decline may be attributable to improved working conditions.

In our study, injuries were most often seen in patients of 20 to 29 years of age (32%). The finding is consistent with findings in other studies (Oikarinen and Malmström, 1969; Ellis et al., 1985 a and b). This age group is, in general, the most susceptible to fracture of the facial bones (Oikarinen and Lindqvist, 1975; Olson et al., 1982; Voss, 1982; Bochlogyro, 1985; Abiose, 1986; Lindqvist et al., 1986). Data from the Helsinki population register show that 10% of all workers were 20 to 24 years of age; the age groups 25 to 34 years and 35 to 44 years each accounted for 29% of workers. Nineteen per cent of the workers were 45 to 54 years old (unpublished information, Helsinki population register). These figures are almost identical to the percentage of patients in the different age groups in this study. Thus, age does not seem to be predictive of work-related maxillofacial injuries.

In 1985, 66% of all workers belonged to the service and office worker group. The corresponding percentages for industry, construction, farming and transportation were 16, 6, 0.2 and 9 (unpublished information, Helsinki population register). Our results indicate that factory and construction work involves a risk of maxillofacial injury 8 to 15 times higher than service and office work. In factory and construction work, falls from a height or blows from objects are the commonest causes of maxillofacial injury. In most cases, the injured person was male, as has been found by other investigators (Larsen and Nielsen, 1976; Voss, 1982; Ellis et al., 1985 a and b; Abiose, 1986). Low numbers of women would be expected, since there is a predominance of men in the occupation groups at greatest risk of work-related facial bone fractures (unpublished information, Helsinki population register). In some other studies, the substantial differences between the sexes in relation to incidence of work-related accidents may also be attributed to the fact that only small numbers of women were employed away from their homes.

Work-related facial bone fractures mostly occurred in isolation, as a result of a direct blow to the face. This was also noted by Ellis et al. (1985 a and b). The incidence of concomitant cranial bone fractures was low in our study, presumably because of the shock-absorbing effect of the facial bone structure and the wearing of safety helmets. The type of maxillofacial fractures has varied from study to study (Van Hoof et al., 1977; Andersson et al., 1984; Abiose, 1986). In the present study, no specific type of fracture characteristic of work-related injuries could be demonstrated.

The finding that work-related facial bone fractures are commoner in some types of work than others should affect safety regulations. In estimating costs of safety measures, an important factor to consider is the severity of the injuries: 67% of the patients we studied were admitted to hospital, and in half of all cases operative treatment was necessary.

Conclusions

Construction and factory work is associated with the highest risk of work-related maxillofacial fractures. Injuries are most often caused by falls from a height or blows from objects.
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References


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