

# MANDIBULAR FRACTURES IN AN AMERICAN INNER CITY: THE HARLEM HOSPITAL CENTER EXPERIENCE

Stephen C. Hall, MD, and Ferdinand A. Ofodile, MD  
New York, New York

**A retrospective study of 116 patients treated at Harlem Hospital for mandibular fractures between 1984 and 1987 was performed. Men comprised 84% of the population studied. The mechanisms of injury were assault with fists and blunt objects (33%), falls (10%), kicking (3%), penetrating injuries (3%), and vehicular accidents (1%). The body of the mandible (46%) and the angle (22%) were the most common fracture sites. Intermaxillary fixation with arch bars was the most frequent method of treatment (55%), followed by open reduction and internal fixation (33%). The complication rate with open reduction was relatively low (15%) despite the fact that 73% of these patients were heavy drug or alcohol abusers with documented poor oral hygiene. This study further substantiates the findings that in the poor inner cities, blunt trauma from drug-related violence has become the major cause of mandibular fracture. Treatment of these patients should include prophylactic broad-spectrum antibiotics, improved oral hygiene, and supplemental nutrition. (*J Natl Med Assoc.* 1991;83:421-423)**

**Key words** • mandible fracture • intermaxillary fixation  
• teeth

Most studies on facial fractures have come from centers where vehicular accidents were the most common etiological factor.<sup>1-3</sup> In the last 2 decades, however, the preponderance of crime related to drugs has led to a

changing pattern of facial fractures in the inner cities of the United States. As a major urban trauma center, Harlem Hospital Center receives a large amount of facial trauma. This study reviews mandibular fractures treated at Harlem Hospital from 1984 to 1987, in an attempt to identify changing patterns in the etiology and course of mandibular fractures in the poor inner city environment.

## MATERIALS AND METHODS

A retrospective study was performed on 116 patients treated by the plastic and oral surgery departments at Harlem Hospital Center from 1984 to 1987. Ninety-eight patients were men (84%) and 18 women (16%). The average ages were 32 years for men and 29 for women. Sixty-nine percent of these patients were drug abusers, alcoholics, or both. The data analyzed included etiology, location of fractures, associated injuries, mode of treatment, presence of teeth in the fracture line, and complications.

## RESULTS

### Etiology

The most common cause of mandibular fractures was trauma with fists or blunt objects, such as baseball bats. These constituted 83% of the cases (Table 1). Vehicular accidents were responsible for only 1% of cases. Penetrating injuries, such as gunshot wounds, caused 3% of fractures.

### Fracture Site

The body of the mandible was the most common site of fracture (40%), followed by the angle (22%). The condyles were involved in only 12% of cases (Table 2). In 68 of the 116 patients, the fracture was unilateral, and there was no significant difference in involvement of the left or right side. In 39 patients, teeth were in the line of the fracture.

---

From the Plastic Surgery Section, Harlem Hospital Center, New York, New York. Requests for reprints should be addressed to Dr Ferdinand A. Ofodile, Plastic Surgery Section, Harlem Hospital Center, 506 Lenox Ave, New York, NY 10037.

**TABLE 1. ETIOLOGY OF FRACTURES**

<b>Etiology</b>	<b>Patients</b>	<b>%</b>
Fists and blunt objects	96	83
Falls	12	10
Kicks	4	3
Penetrating	3	3
Vehicular accident	1	1
<b>Total</b>	<b>116</b>	<b>100</b>

**TABLE 2. FRACTURE SITE**

	<b>Fractures</b>	<b>%</b>
Body	81	46
Angle	39	22
Condyle	21	12
Parasymphysial	18	10
Symphysis	7	4
Alveolar ridge	5	3
Ramus	5	3
<b>Total</b>	<b>176</b>	<b>100</b>

**TABLE 3. ASSOCIATED INJURIES**

	<b>Number</b>	<b>%</b>
Facial fracture	5	46
Facial nerve injury	1	9
Intracranial injury	1	9
Chest injury	2	9
Abdominal injury	2	18
External injury	1	9
<b>Total</b>	<b>11</b>	<b>100</b>

**Associated Injuries**

Other injuries associated with mandibular fractures included fractures of other facial bones in 46% of the patients (Table 3). Less common were abdominal injuries (18%), chest injuries (9%), and head injuries (9%).

**Treatment**

Treatment was directed toward ensuring healing of the mandible in good occlusion. Closed reduction and intermaxillary fixation using arch bars was the most frequent mode of treatment (55%). Open reduction was necessary in 38% of the cases, and external fixators were used in 8% (Table 4). Twenty-six of 39 patients underwent tooth extraction in the line of the fracture. These were mostly carious teeth or teeth too loose to save—teeth were not routinely extracted unless they were in the line of fracture. Prophylactic broad-

**TABLE 4. TREATMENT**

	<b>Patients</b>	<b>%</b>
IMF alone	66	55
IMF and ORIF	36	33
ORIF alone	5	4
External fixator alone	5	4
External fixator and IMF	2	2
IMF, ORIF, and external fixator	1	1
Steinmann pins	1	1
<b>Total</b>	<b>119</b>	<b>100</b>

Abbreviations: IMF = intramedullary fixation, ORIF = open reduction internal fixation.

**TABLE 5. COMPLICATIONS**

	<b>Patients</b>	<b>%</b>
Tissue infections	10	8.6
Osteomyelitis	4	3.4
Nonunion	5	4.3
Unsuccessful IMF, ORIF needed	3	2.6
<b>Total</b>	<b>22</b>	<b>18.9</b>

Abbreviations: IMF = intramedullary fixation, ORIF = open reduction internal fixation.

spectrum antibiotics were routinely used, as was supplemental nutrition and vitamins in drug addicts and alcoholic patients.

**Complications**

Infection accounted for 63% of the complications in our series, occurring in 12% of the patients (Table 5). Of these, soft tissue infection was found in 8.6% and osteomyelitis in 3.4%. In six patients (6.8%), infection was present at the time of admission. In seven patients (5.2%), the infection developed after admission, with most occurring in drug and alcohol abusers with carious teeth (Table 6). In the patients who were admitted with ongoing infections, the average interval from the time of fracture to the time of admission was 2 weeks (Table 7). The majority were addicts or alcoholics with carious teeth.

Nonunion occurred in 4.3% of patients. Only 2.6% required open reduction after initial attempts at closed reduction and intermaxillary fixation.

**DISCUSSION**

The rising incidence of drug addiction and the violence associated with it has led in recent years to a changing pattern of facial fractures in the inner cities of the United States. Trauma from fists, kicks, and blunt

**TABLE 6. INFECTIONS OCCURRING AFTER ADMISSION**

Patients	Soft Tissue	
	Infections*	Osteomyelitis*
Drug and ETOH abuser	1	2
Nondrug or ETOH abuser	2	1
Carious teeth	3	3
Tooth in line of fracture extracted	1	2
Tooth in line of fracture not extracted	1	0

Abbreviations: ETOH = ethyl alcohol.  
\*n = 3.

objects, such as baseball bats, are now the primary cause of mandibular fractures. Our experience at Harlem Hospital Center parallels those in Detroit<sup>3</sup> and Philadelphia.<sup>4</sup>

The body and angle were the most frequently fractured sites (68%). These findings are similar to the 51% and 72% in the Detroit<sup>3</sup> and Philadelphia<sup>4</sup> studies, respectively.

The prevalence of drug addiction and alcoholism results in an unusually high incidence of carious teeth because of poor oral hygiene. It also results in delay in seeking medical care. Sometimes these patients seek help because of superimposed infection rather than the original fracture. As expected, the complication rate was higher in the addicted patients with poor oral hygiene and carious teeth as well as in those who delayed seeking help (Table 8).

In 13 cases where the tooth in the line of fracture was not extracted, only one complication occurred—an infection at the fracture site. Thoma<sup>5</sup> and Clark<sup>6</sup> propose routine extraction of teeth in the line of fracture. The findings from this study support the findings of Schneider and Stern<sup>7</sup> and de Amaratunga<sup>8</sup> that there is no significantly higher complication rate when a tooth is left in the line of fracture. Extraction should be done when the involved tooth is carious or so loose it cannot be expected to be saved.

The complication rate for open reduction and internal fixation was 15%, which compared favorably with centers reported by Busuito et al (18%)<sup>3</sup> and Olson et al (26.9%).<sup>1</sup> This rate was surprisingly low despite the fact that 73% of these patients were drug and alcohol abusers. The low incidence may be attributed to routine use of prophylactic antibiotics, identification, and extraction of carious teeth around the fracture and

**TABLE 7. INFECTIONS OCCURRING FOLLOWING ADMISSION**

Patients	Soft Tissue	
	Infections*	Osteomyelitis†
ETOH abuser only	1	1
Drug and ETOH abuser	4	0
Nondrug or ETOH abuser	2	0
Carious teeth	7	1
Tooth in line of fracture extracted	6	1
Tooth in line of fracture not extracted	0	0

Abbreviations: ETOH = ethyl alcohol.  
\*n = 7.  
†n = 1.

**TABLE 8. COMPLICATION RATE FOR PATIENTS INITIALLY TREATED WITH OPEN REDUCTION INTERNAL FIXATION**

Patients	Osteo-			%
	myelitis	Nonunion	Total	
33 (drug and/or ETOH abusers)	2	3	5	11
12 (nondrug or ETOH abusers)	1	1	2	4
45 (total)			7	15

Abbreviations: ETOH = ethyl alcohol.

initiation of vigorous oral hygiene and supplemental nutrition.

**Literature Cited**

1. Olson R, Fonseca R, Zetler D, Osbon D. Fractures of the mandible: a review of 580 cases. *J Oral Maxillofac Surg.* 1982;40:23-28.
2. Murray JF, Hall HC. Fractures of the mandible in motor vehicle accidents. *Clin Plast Surg.* 1975;2:131-136.
3. Busuito M, Smith D, Robson M. Mandibular fractures in an urban trauma center. *J Trauma.* 1986;26:826-829.
4. Eid K, Lynch D, Whitaker L. Mandibular fractures: the problem patient. *J Trauma.* 1976;16:658-661.
5. Thoma KH. *Oral Surgery.* 4th ed. St Louis, Mo: CV Mosby; 1966.
6. Clark HB. *Practical Oral Surgery.* 2nd ed. Philadelphia, Pa: Lea & Febiger; 1959.
7. Schneider SS, Stern M. Teeth in the line of mandibular fractures. *Journal of Oral Surgery.* 1971;29:107-109.
8. de Amaratunga NA. The effect of teeth in the line of mandibular fractures on healing. *J Oral Maxillofacial Surg.* 1987;45:312-314.