

# AN AUDIT OF MANDIBULAR FRACTURE TREATMENT METHODS AT MILITARY BASE HOSPITAL YABA, LAGOS, NIGERIA (A 5 – YEAR RETROSPECTIVE STUDY)

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## SUMMARY

In this paper, the methods used in management of mandibular fractures at Military Base Hospital, Yaba (MBHY) from 1990 – 1994 (5 years) have been reviewed retrospectively. Out of the total patients 110, 90% were treated with inter-maxillary fixation (IMF) techniques with or without intra-osseous wires, while only 9.1% (10 patients) were treated with bone plate techniques. This paper advocates the traditional inter-maxillary fixation (IMF) as a first line method of treatment of mandibular fracture, as it is simple to apply, cheap for the patient, and is a well tried and proven treatment technique over the years.

However, in selected cases, especially with displaced, unstable segments posteriorly, the use of bone plate method can provide a precise, rigid fixation and is highly advisable to refer such cases to Consultant Oral and Maxillofacial Surgeons. This is more costly and requires surgical skill and expertise.

**KEYWORD:** Mandibular fractures, Intermaxillary fixation (IMF) Bone Plates Intra-Osseous wires

## INTRODUCTION

The Intermaxillary fixation (IMF) treatment technique has been a traditional method of treatment of mandibular fractures especially in the dentate and partially dentate patients using interdental and eyelet wires, arch bars or direct wiring technique. This is a well-tried and proven technique which should not be discarded in favour of open reduction methods<sup>1</sup>.

However, in some advanced countries, a maxillo-mandibular fixation and immobilization is no longer acceptable in the management of the facial bones fractures. It has been shown by Cawood<sup>2</sup> that miniplate osteosynthesis is superior to IMF in the management of mandibular fracture. However, Williams et al<sup>3</sup> showed that restricted airway, increased vulnerability to sequelae of post-operative haemorrhage, and oedema, vomiting, particularly in neurological patients, are some of the disadvantages to IMF. It should be noted in addition that a patient with IMF is restricted to semisolid diet and stays longer on hospital admission, hence he loses weight and his return to work is delayed, thus manifesting an economic disadvantage.

In an attempt to overcome problems of IMF, various workers have described the use of bone plates<sup>4,5,6</sup> without the use of intermaxillary fixation, a major drawback however is infection, external scars, occlusal derangement and the need for second surgery to remove the plates. A miniplate monocortical system inserted intra-orally obviates these drawbacks as claimed by Michelet<sup>7</sup>. However, Cawood<sup>2</sup>, recommends that miniplates should be applied soon after injury to reduce chances of wound

dehiscence. The cost of materials used for miniplate fixation, and wide range of bulky engineering devices which requires technical skill for its application may be a discouragement to both the patient and surgeon.

In Nigeria, scarcity of bone plates due to economic considerations, too few maxillofacial surgeons, too many patients, are very significant drawbacks to its use. Therefore, most of the patients treated in our hospital were treated with IMF and intra-osseous arch wires in open reduction cases. The IMF method seems a very satisfactory treatment technique supplemented by the functional matrix of the body tissues which tend to reduce the fracture and make it stable. It is also noted that rigid fixation with bone plates and elimination of all movements at fracture sites is not only unnecessary but in some instances undesirable<sup>8</sup>.

The aim of the study is to audit and analyse treatment methods used for mandibular fracture cases in the Nigerian Army Base Hospital Yaba for a period of 5 years, 1990 – 1994.

## MATERIALS AND METHOD

The Nigerian Army Base Hospital Yaba medical records and outpatients register of the Dental department showed 110 patients with mandibular fractures for 5 years period between 1990 – 1994. (Patients with insufficient data were excluded from the study).

The patients were analysed in respect to age, sex, type of fracture, site of fracture (Table 1). Critical appraisal of the techniques used for treatment of fractures were made (Table 2).

## RESULTS

Reduction and immobilization were carried out under

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endotracheal general anaesthesia in 56 patients (51%) for IMF with or without intra-osseous wires. Ten patients (9.1%) had Champy bone plates inserted. This was by extra-oral submandibular approach. The champy plates were applied, screwed down to bone as screw holes had been pre-marked by surgical drill, prior to its application. Reduction of bone fragments were achieved and centric occlusion obtained. The wounds were closed in layers with resorbable sutures. IMF were obtained in each case for 1 week.

**Table 1: Annual Analysis of Mandibular Fracture by Age and Sex**

Year	1990	1991	1992	1993	1994	Total
Age (yrs)	4	6	4	4	2	20
20-40	10	14	16	16	24	80
40-60	2	0	2	4	2	10
Total	16	20	22	24	28	110
Male	12	16	22	24	26	100
Female	4	4	0	0	2	10

In 32 patients (29.1%) reduction and immobilization were achieved under local anaesthetic agents with or without intravenous diazepam while in 12 patients, (11.0%) it was done under ketamine intravenous anaesthesia with diazepam (Table 2). Most of the patients treated were within 20-40 years range and the maximum number of patients were recorded in 1994 (25.4%) while the least was recorded in 1990 (14.4%). Most fractures were recorded in males (90.9%) throughout the 5 years duration; while females were involved in 9.1%.

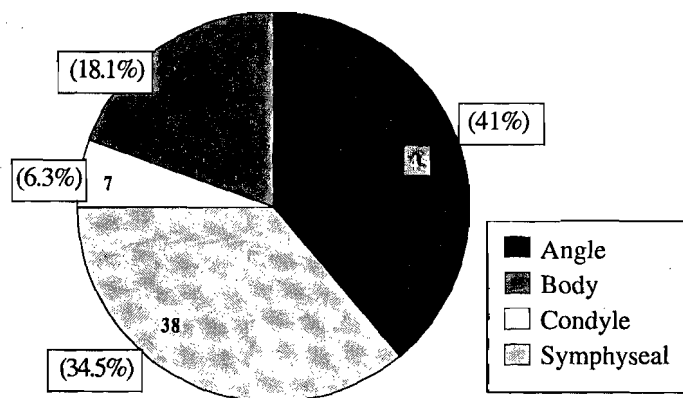
**Table 2: Modalities of Treatment of Mandibular Fractures in MBHY (1990-1994)**

	1990	1991	1992	1993	1994	Total
Mandibular fracture cases	16	20	22	24	28	110
IMF with L.A and diazepam	8	6	6	6	6	32
IMF with Ketamine anaesthesia	0	0	2	4	6	12
IMF (under G.A)	8	10	6	4	2	30
IMF with intra osseous wires (under G.A)	0	4	4	8	10	26
Champy plates	0	0	4	2	4	10

Table II shows the modalities employed for the treatments of mandibular fractures at MBHY during the five year review period. One hundred (91%) of the total 110 patients were treated with IMF with or without intra-osseous wire under endotracheal anaesthesia, ketamine anaesthesia or local anaesthesia with Diazepam. Out of this, only 26 (23.6%) had intra-osseous wires. It was only in 10 (9.1%) that bone plating was used.

Most of the fractures occurred at the angle of the mandible 45(41.0%) and at the body, unilaterally or bilaterally 38(34.5%) while in 20 (18.1%) the fractures were located in the mandibular symphysis. Condylar involvement was recorded in 7(6.3%) of the cases (figure 1).

**Fig. 1: Mandibular Fracture Sites**



Bone plates were inserted at the angle, body and symphysis (Table 3). In the cases treated with IMF and intra-osseous wire, they were complicated by infection in 2 cases (7.6%) and malocclusion in 2 cases (7.6%) (Table 4). In patients treated with bone-plates, one case of infection and another of malocclusion were seen. Only those treated with bone plates and nerve paresis. But some 12.1% patients who had IMF alone still suffered infection and malocclusion more related to cause of fracture rather than treatment methods used.

**Table 3: Sites of Application of Champy Plates and Complications (N = 10)**

Fracture Site	No. of Pts.	*Days before plating	Complications
Angle	4	8*	Infection, Nerve palsy (1 patient)
Symphysis	2	6*	
Body	4	5*	Delayed union due to non-vital tooth in fracture line (1 patient)

\*Days between presentation and insertion of bone plates

**Table 4: Complications Encountered with IMF, Intra-Osseous Wire and Bone Plates (N = 10)**

Complications	Bone plates % (10)	IMF & Intra-Osseous Wire (26)	IMF alone (74)
1. Infection	1(10%)	2(7.6%)	5(6.7%)
2. Nerve palsy	2(20%)	0(0%)	0(0%)
3. Malocclusion	1 (10%)	2(7.6%)	4(5.4%)

## DISCUSSION

The majority of mandibular fractures responded to simple traditional Intermaxillary fixation (IMF) method of treatment (90.9%) in our hospital. This is similar to observations made by Melmed et al<sup>9</sup>. There are few contra-indications to the insertion of IMF and if this is applied under general anaesthesia, excellent results can be achieved. The most important condition to be met is the presence of adequately shaped teeth to which the eyelets, arch bars can be anchored. Little experience is required to insert IMF and it is highly economical when compared to the bone plate techniques. Seventy-four (67%) of total of 110 patients had IMF alone while 26 (23.6%) had IMF and intra-osseous wires.

Champy or other osteosynthetic bone plates require skill for their insertion. This method should be reserved for difficult mandibular fractures with displaced segments and should be referred to experienced surgeons. Accuracy in occlusion, adaptation of plate to bone surface contours are some of the pre-requisites for successful results. In this study, nerve paresis was observed in 2 of the total patients so treated. The removal of plate at second operation is a disadvantage, though local anaesthetic agent is usually sufficient. In Europe and America, plates are not routinely removed but undertaken in events of symptoms, which occur in 5 – 20% of cases<sup>10</sup>. There is no doubt that corrosion products are produced by stainless steel bone plates materials in the tissues but this is biocompatible to some level, beyond which foreign body reaction supervenes which can lead to tissue breakdown and implant failure. In fact, some studies on implants have demonstrated titanium the most biocompatible material in the lymphatics<sup>11</sup>. However, none of our plated cases had breakdown or implant failure.

The major advantages of bone plate are rigidity of fixation, direct healing at fracture site, obviation of post-operative intermaxillary fixation period and early achievement of the use of jaws in speech and feeding. This is also of benefit to the patient both psychologically and socially.

Infection is a risk in bone plating techniques as seen in our study although only 10(9.1%) were so treated. In the cases treated with plates, prophylactic antibiotics were given for 10 days each. It has been advocated that bone plating should be inserted within 12 hours of trauma to avoid infection<sup>6</sup>, however, the maximum length of days before operation undertaken in our cases were 8 days while the minimum days were 5 days and this did not affect the infection as pre-intra-and post-operative antibiotics were

given.

We did not include children or elderly patients in the bone plate cases as in both extremes of life, plating may cause damages to unerupted teeth in children and subperiosteal blood supply in the elderly may be stripped off with periosteum prior to insertion of bone plates which predisposes to bone infection.

In conclusion, maxillo-mandibular immobilization method is becoming an obsolete and unacceptable method of treating mandibular fractures in the developed countries. It is considered a blind procedure with resultant inadequate reduction, fixation of fracture resulting in indirect healing at the fracture site. Other disadvantages include potential embarrassment of the airway, necessity of anaesthetic and nursing staff attendance and the anxiety to see the patient fully recovered when jaws are wired together<sup>2</sup>.

Additionally, the patient who is in a prolonged period of immobilization of jaws, spend much more time out of work, feeds on semi-liquid diet and loses weight. Nevertheless, this method has been satisfactorily used consistently in our hospital in combination with intra-osseous wiring and good results with minimal complications has been achieved.

The bulk of the treated cases in MBHY (90.9%) fell into this category. It is advocated for a nation with depressed economy, there is also little skill required.

When the patient can afford it, bone plating (especially in carefully selected cases) offers an alternative when precision and rigidity is necessary. In such cases, antibiotic cover is mandatory and should be continued post-operatively. Such a case should be fractures with displaced fragments and should be handled by experienced surgeon as early as possible.

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