A Short Period of Maxillomandibular Fixation for Treatment of Fractures of the Mandibular Tooth-Bearing Area

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Purpose: This study was aimed to determine whether a short period of maxillomandibular fixation (MMF) followed by an arch bar splint wired to the lower jaw is a suitable alternative to conventional MMF for treatment of fractures of the mandibular tooth-bearing area.

Patients and Methods: Thirty patients with mandibular fractures associated with no other facial fractures were selected. They were randomly assigned into 2 groups for treatment with conventional MMF (group A) and MMF for a short period of 2 weeks followed by an arch bar splint wired to the lower jaw (group B). Complications were recorded and post-treatment maximum interincisal mouth opening was measured at 1 week and 3 and 6 months. Age and gender-matched control groups were randomly selected. Groups were then compared for significant differences. A value of $P < .05$ was considered significant.

Results: The 2 patient groups were not significantly different in relation to site and cause of fracture ($P = .995$ and $P = .682$, respectively), the mean time from injury to MMF ($P = .234$), and the mean time required for fracture healing ($P = .315$). Delayed union and nonunion were not encountered, and there were no significant differences in relation to postoperative infection ($P = 1$) and malocclusion ($P = .598$). When compared with group A patients, group B patients had an early significantly greater degree in mouth opening ($P = .001$); at no time was there a significant difference in the degree of mouth opening between group B patients and the control group (1 week, $P = .079$; 3 months, $P = .166$; 6 months, $P = .378$).

Conclusion: In selected cases, a short period of MMF followed by an arch bar splint wired to the lower jaw is a suitable alternative to conventional MMF for treatment of fractures of the mandibular tooth-bearing area. The method is effective and significantly reduces the potential adverse effects of long-term MMF.

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Based on the statement that a simpler method should be chosen whenever it is as effective as a more invasive one,[1] maxillomandibular fixation (MMF) remains the mainstay of mandible fracture stabilization.[2] Traditionally, the length of MMF used for immobilization of adult mandibular fractures has been 6 weeks.[3] However, prolonged MMF has been criticized for pain, poor oral hygiene, phonetic disturbance, loss of effective work time, weight loss, reduced masticatory efficiency, and reduced mouth opening.[4-6] As a result, there has been a search for ways to reduce the period of MMF.[7] In this regard, immobilization for a short period of 2 weeks followed by splinting the lower jaw with an arch bar or acrylic splint, or a period of soft diet, have been suggested as options available to the surgeon.[8] Research studies in this direction have seldom been undertaken. Therefore, the aim of this study was to determine whether a short period of MMF followed by an arch bar splint wired to the lower jaw is a suitable alternative to conventional MMF for treatment of fractures of the mandibular tooth-bearing area.

Patients and Methods

Thirty patients with mandibular fractures associated with no other facial injuries who attended the Oral Surgery Department, Faculty of Dentistry, Mansoura University, Mansoura, Egypt, were selected for this study. The selection was based on the following

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Table 1. SUMMARY OF RESULTS AND STATISTICAL ANALYSIS

Variables	Group A (n = 15)	Group B (n = 15)	Chi-Square Analysis		
			X^2	df	P^*
Site (number) of fractures					
Body	5 (5)	6 (6)	0.424	5	.995
Body and angle†	3 (6)	3 (6)			
Bilateral body	1 (2)	1 (2)			
Body and symphysis	2 (4)	1 (2)			
Symphysis	3 (3)	3 (3)			
Symphysis and angle†	1 (2)	1 (2)			
Cause of fracture					
Altercations	8	9	1.503	3	.682
Falls	5	4			
Motor	2	1			
Butted by an ox	0	1			
Complications					
Infection	1	2	0.370	1	1.0
Malocclusion	1	3	1.154	1	.598

*A value of $P < .05$ was considered significant.
†Fracture line involving the angle mesial to a functional third molar.

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criteria: 1) patient of either gender, aged 20 years or more, nonsmoker, nonalcoholic, and nonsubstance or intravenous drug abuser; 2) fracture involving the body or symphysis of the mandible with sufficient occluding teeth present on either side of the fracture or fracture involving the mandibular angle mesial to a functional third molar not indicated for removal; 3) fragments distracted with mobility at the superior and inferior parts of the fracture; 4) no infection at the fracture site; and 5) no systemic problems.

Patients were treated as outpatients with closed reduction and MMF using arch bars and tie wires. They were randomly assigned into 2 groups for treatment with the conventional 6 weeks of MMF (group A), and MMF for a short period of 2 weeks followed by an arch bar splint wired to the lower jaw (group B). In both groups, the end period of primary treatment was determined to be 6 weeks. Patients in group B were prescribed a soft diet for 2 weeks following release of MMF; they were also advised to refrain from strenuous physical activity during this period.[9]

Teeth in the fracture line involving the body or symphysis were removed when indicated, and an antibiotic was given preoperatively and for 3 days postoperatively. Patients were seen weekly during the treatment period. Fracture union was tested by manipulation for mobility at the fracture site starting at 4 weeks after fixation and continuing at weekly intervals for 6 weeks. This entailed removing the intermaxillary wires every time the test was performed in group A patients. Each patient was also asked to open the mouth against force applied at the point of the chin by the operator's hand.[10] If mobility or pain was produced at the fracture site, union was considered to be inadequate. Intermaxillary wires were replaced and the arch bar splint was maintained to the end period of treatment if union was not satisfactory. Follow-up examinations were performed within 1 week after the end period of treatment, and successive visits were made at 1, 2, 3, and 6 months. Complications in terms of infection, malocclusion (any deviation from the patient's normal arch relationship), delayed union (mobility at the fracture site after 6 weeks of treatment), and nonunion (presence of mobility after 6 months of treatment) were recorded. Post-treatment maximum interincisal mouth opening was also recorded at 1 week and 3 and 6 months. An age and gender-matched control group with no past history of facial trauma was randomly selected. The groups were then compared for significant differences using an independent samples t test for parametric data and a chi-square analysis for nonparametric data. A value of $P < .05$ was considered statistically significant.

Results

Over the course of 2 years, 43 mandibular fractures were treated in 30 patients who had no other facial fractures. Patients were 27 males and 3 females ranging in age from 20 to 52 years with an average age of 35.7 years. Twenty-two fractures in 15 group A patients were treated with conventional MMF and 21 fractures in 15 group B patients were treated with MMF for a short period followed by splinting the lower jaw with an arch bar (Table 1). The 2 patient groups were not significantly different in relation to