



IMF Screws: A Favorable Alternative to Arch Bars



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Background

Current literature offers little insight into best practices for maxillomandibular fixation (MMF) of mandible fractures. Existing studies comparing Erich arch bars (EABs) to intermaxillary fixation (IMF) screws are limited by small sample sizes and constrained sets of variables that are often subjective.¹⁻⁴

Objective: To compare the outcomes of Erich arch bars versus IMF screws for closed reduction of mandible fractures.

Methods

Part I. A retrospective chart review was conducted on patients with permanent dentition who underwent primary treatment of mandible fractures via MMF with arch bars or IMF screws at a single institution between 2009 and 2025.

Part II. Phone interviews were conducted to identify long-term postoperative occlusion (CUH IRB#23-050).

Exclusion: Concurrent Le Fort or maxillary fractures influencing occlusion, internal fixation, other MMF techniques

Outcomes: Patient demographics, Mandible Injury Severity Score,⁵ treatment course, complications

Statistical Analysis: Student's t-test, Fisher's exact test, Propensity score matching ($\alpha=0.05$)

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Table 1. Patient factors and surgical management. Data as N (%) or mean $\pm$ SD.

	Total cohort, N=233	Arch Bars, N=161	IMF Screws, N=72	P value
Tobacco use	136 (59.7)	87 (55.4)	49 (69.0)	0.059
Recreational drug use and/or alcohol abuse	87 (37.8)	55 (34.6)	32 (45.1)	0.14
Insecure housing (vs. secure or incarcerated)	17 (7.3)	9 (5.6)	8 (11.1)	0.12
Mandible Injury Severity Score	12.1 $\pm$ 3.2	12.3 $\pm$ 3.0	11.8 $\pm$ 3.4	0.40
Surgical time for MMF placement (min)	71 $\pm$ 47	81 $\pm$ 34	48 $\pm$ 64	<0.0001
Bridle wire included	49 (21.3)	36 (22.6)	13 (18.3)	0.49
Lost to follow-up prior to hardware removal	50 (21.5)	34 (21.1)	16 (22.2)	0.86

Table 2. Outcomes of Erich arch bars versus IMF screws among patients who were followed to hardware removal. ED, emergency department. Data as N (%) or mean $\pm$ SD.

	Total cohort, N=183	Arch Bars, N=127	IMF Screws, N=56	P value
Duration in MMF (days)	33.7 $\pm$ 16.5	35.2 $\pm$ 20.1	30.9 $\pm$ 16.5	0.22
Duration with hardware (days)	95.1 $\pm$ 173.0	98.0 $\pm$ 189.3	88.6 $\pm$ 130.3	0.74
Length of follow-up (days)	138.7 $\pm$ 357.5	158.1 $\pm$ 419.0	94.7 $\pm$ 133.4	0.27
MMF final release				0.56
By surgeon	105 (79.6)	69 (82.1)	36 (75.0)	
By patient	23 (17.4)	12 (14.3)	11 (22.9)	
By ED physician	1 (0.76)	1 (1.2)	0 (0.0)	
Fell out	3 (2.3)	2 (2.4)	1 (2.1)	
Removal of hardware				<0.001
In operating room	143 (78.6)	113 (89.7)	30 (53.6)	
In clinic	37 (20.3)	11 (8.7)	26 (46.4)	
By patient	2 (1.1)	2 (1.6)	0 (0.0)	
Mucosal injury/overgrowth	27 (15.0)	17 (13.5)	10 (18.5)	0.38
Return to ED for pain	43 (23.8)	28 (22.2)	15 (27.3)	0.46
Premature wire loss	34 (24.8)	23 (25.6)	11 (23.4)	0.84
Hardware loosening	20 (13.8)	11 (11.5)	9 (18.4)	0.31
Infection	11 (6.1)	8 (6.4)	3 (5.5)	1.0
Postoperative malocclusion	19 (10.4)	13 (10.3)	6 (10.7)	1.0
Exchange for other fixation type	10 (5.5)	6 (4.7)	4 (7.1)	0.50

Results

Of 233 patients, 69% received arch bars and 31% received IMF screws by 21 surgeons (**Table 1**). Groups were comparable with respect to male predominance (87.1% overall, $p=0.7$), race ($p=0.2$), BMI (0.6), tobacco use, drug use, housing security, preoperative malocclusion (78.3%, $p=0.9$), fracture frequency ($p=0.2$), and fracture location in the setting of one ($p=0.8$) and two fractures ($p=0.4$).

Operative procedure time was shorter to place IMF screws than arch bars ($p<0.0001$). IMF screws were more likely to be removed in clinic rather than the operating room ($p<0.001$) (**Table 2**). Arch bars and IMF screws had similar complication rates. Propensity score-matching for patient age, hypertension, tobacco use, drug use, number of fractures, MISS, and time to surgery since injury did not result in a significant difference in any complication rates.

Arch bar and IMF screw complication rates remained comparable within subgroups of patients with tobacco use, drug use, or housing insecurity. These subgroups did not have poorer follow-up rates.

When called, 80 patients (34.3%) answered, of which 34 (42.5%) agreed to participate: 23 with arch bars (14.3% of cohort) and 11 with IMF screws (15.3% of cohort). Similar proportions reported a current occlusion that differs from pre-injury occlusion at 7.8 ± 2.8 years and 4.9 ± 4.3 years postoperatively, respectively (56.5% vs. 54.6%, $p=0.91$).

Conclusion

IMF screws are a favorable alternative to arch bars for treatment of mandible fractures, owed to a shorter surgical time, ease of awake removal, and equivalent complication rates, even within high-risk subgroups and at long-term follow-up. To the authors' knowledge, this is the largest and most granular study to compare these modalities.