

Patient Compliance Following Isolated Mandibular Fracture Repair

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ABSTRACT

INTRODUCTION: Compliance with postoperative care in the maxillofacial trauma population is uniformly considered to be poor. The axiom to “treat and street” is not a function of lack of access to postoperative care but rather its anticipated lack of utilization. The goal of this study is to identify factors associated with increased compliance with postoperative management of mandible fractures.

SETTING: A retrospective cohort study from a tertiary care institution.

METHODS: Using Current Procedural Terminology (CPT) codes to identify maxillofacial injuries requiring operative repair, a subset of isolated mandibular fractures was identified. Age, gender, race, insurance type, travel distance to our site of repair, type of fracture, surgical approach, and complications were used as variables in univariate regression modeling to examine factors associated with compliance to postoperative care.

RESULTS: Between 2010 and 2013, 344 isolated mandible fractures were identified. Mean age was 34.6, and 82.6% were male. 83.1% of patients made their first post-operative follow up visit. Demographic data, fracture location, distance to medical center (p=0.75), type of repair, use of drains (p=0.61), or non-absorbable suture (p=0.32) did not appear to be associated with compliance. No association between complications and postoperative compliance were observed (p=0.17). Trends toward improved compliance were observed when evaluating insurance type and use of temporary fixation hardware. The presence of current tobacco use was found to be negatively associated with patient compliance (OR=0.33, p<0.01).

CONCLUSIONS: Postoperative compliance after surgical repair is much better than what is currently represented in the literature. It would appear post operative compliance is dependent on patient related factors more so than what can be modified by the surgeon.

INTRODUCTION

Maxillofacial trauma continues to have a significant impact on the United States Healthcare system. Mandible fractures are the second most common fracture of the maxillofacial skeleton accounting for nearly 70,000 injuries annually within the United States¹. The majority of these eventually require operative intervention to restore form and function of the mandible. Fractures can be repaired using both open and closed techniques dependent on surgeon preference, comminution, or location of the fracture site.

Patient compliance has long been discussed as burden and contributing factor to complications and poor outcomes in trauma patients however little work has been done to assess the role that surgical technique may play in patient compliance during the postoperative time period. The objective of this study was to assess whether a myriad of demographic, patient specific, and surgeon specific factors affect post-operative compliance in isolated mandible fractures.

METHODS AND MATERIALS

Using Current Procedural Terminology (CPT) codes to identify maxillofacial injuries requiring operative repair from January 2010 to December 2013, a subset of patients sustaining isolated mandibular fractures was identified.

Demographic data including age, gender, race, insurance type, smoking status, and travel distance to the University of Kentucky Medical Center was assessed. Fracture specific data including fracture type(s) and fracture complexity was identified. Surgical specific data including surgical approach, use of maxillomandibular fixation following the procedure, use of negative pressure drains, and suture material was collected. Complication data was also reported in instances where the individual required re-operation following his/her fracture reduction as a result of infection, malocclusion, or fracture non-union.

Descriptive statistics were generated for the cohort. Univariate regression modeling was used to examine the association of demographic, fracture specific, and surgical specific data with compliance rates for patient’s making their first post-operative visit. Logistic regression was performed to examine the association of variables with appointment compliance.

RESULTS

344 patients were found to meet inclusion criteria for this study. Of the isolated mandible fractures identified, 202 (58.7%) were found to encompass 2 or more fracture sites (Figure 1). Patient demographic information can be found in Table 1.

Overall, 83.1% (N=286) of patients made their first scheduled follow up. Patients had a median time to follow up of 8 days and were followed for an average of 16 weeks following operative intervention. Of the 17% who failed to make their first scheduled follow up visit, 63.7% (N=37) of these patients did not follow up at all during the time frame of this retrospective analysis.

Univariate regression analysis seen in Table 3 shows that surgical approach, use of drains (p=0.61) or non-absorbable suture (p=0.32), and distance of the medical center from the patient’s home address (p=0.75) did not affect presentation to first post-operative visit.

Complications following mandibular repair occurred in 12.5% (N=43) of patients, largely contributed to post-operative infection (N=32). This was found not to be affected by the type of surgical approach (transcervical (TC) p=0.62, transoral (TO) p=0.62, maxillomandibular fixation (MMF) p=0.58). Patients who failed to make their first scheduled follow up were not found to have an increased likelihood of postoperative complications (p=0.17).

Table 1: Demographic Information

Description	Subset	N (%)	Mean (SD)
Gender	Male	284 (82.6)	
	Female	60 (17.4)	
Race	Caucasion	291 (84.6)	
	African American	37 (10.8)	
	Hispanic	8 (2.3)	
	Other	8 (2.3)	
Age			34.6 (13.46)
Current Smoker		214 (62.2)	
Insurance Type	No Insurance	154 (44.8)	
	Private Insurance	75 (21.8)	
	Automotive	33 (9.6)	
	Medicare	27 (7.9)	
	Medicaid	21 (6.1)	
	Other	9 (2.6)	
Distance to Medical Center (miles)	Made First Post-Op Appt	75 (42.2)	
	No-Show First Post-Op Appt	68 (54.6)	
			65.1 (47.4)
Mechanism of Action	Assault	181 (52.6)	
	Motor Vehicle Collision	63 (18.3)	
	Fall	53 (15.4)	
	Other	21 (6.1)	
	Work Related Injury	11 (3.2)	
	Motorcycle Collision	7 (2.0)	
	ATV Collision	7 (2.0)	
	Pedestrian vs. Car	1 (0.9)	

Table 1 represents demographic information for the cohort. ATV=all terrain vehicle.

Figure 1: Single and Multiple Mandibular Fracture Distribution

Figure 1 looks at the representative fracture distribution within the cohort. 142 fractures were found to be single fractures of the mandible and are represented in yellow. 202 patients had multiple fractures to the mandible represented in blue. The angle was the most common isolated mandible fracture while the parasymphysis and angle were the most likely to be injured together. Labels are placed on all fracture combinations that occurred 10 or more times in this cohort.

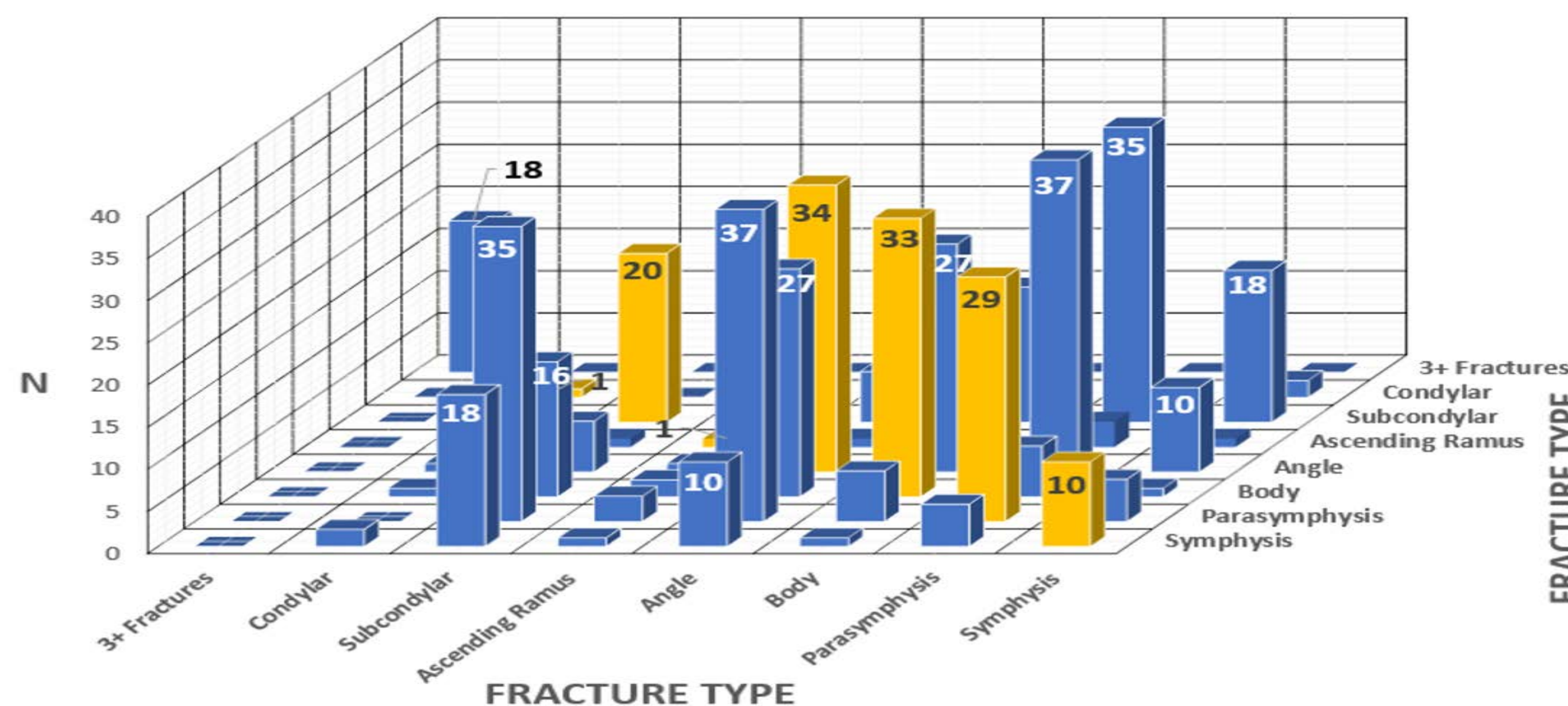


Table 2: Type of Fracture Repair

Repair Type	N (%)
MMF	20 (5.8)
Transcervical ORIF	63 (18.3)
Transoral ORIF	135 (39.2)
Transcervical ORIF + post-op MMF	10 (2.9)
Transoral ORIF + post-op MMF	31 (9.0)
Transcervical and Transoral ORIF	64 (18.6)
Other	21 (6.1)

Table 3: Univariate Regression Analysis

Variable	Subset	OR	95% CI	P Value
External Drain		1.27	0.51–3.19	0.61
	Permanent Suture	1.44	0.71–2.93	0.32
Type of Repair	Closed Reduction	1.0		
	TC ORIF	1.06	0.26–4.36	0.94
	TO ORIF	1.02	0.26–3.82	0.97
	TC + TO ORIF	0.75	0.19–2.98	0.68
	TO + MMF	1.58	0.14–17.56	0.71
	TC + MMF	2.56	0.39–16.88	0.33
	TC + TO + MMF	1.59	0.14–17.56	0.71
Complications		2.37	0.70–7.99	0.17
Age		1.02	0.99–1.04	0.15
Current Smoker		0.33	0.14–0.73	0.006
Gender		0.50	0.19–1.32	0.16
Race	Caucasion	1.0		
	African	0.62	0.25–1.51	0.29
	American			
	Hispanic	1.08	0.13–9.04	0.94
	Other	0.39	0.07–2.06	0.27
Insurance	Auto	1.0		
	Medicare	5.11	0.57–45.62	0.14
	Medicaid	1.33	0.29–6.03	0.71
	Bureau of Prisons	1.56	0.35–6.96	0.56
	Private	3.07	0.86–10.89	0.08
	None	0.89	0.34–2.35	0.81
Distance to Medical Center		1.00	0.99–1.01	0.75

1. Patients undergoing operative repair of isolated mandibular injuries have a much higher compliance to follow up than has been previously discussed in the literature²⁻⁴.
2. While the use of maxillomandibular fixation does seem to trend toward improvement in post-operative follow-up, no form of surgical technique nor appliance used was found to significantly improve the likelihood of patient follow up. Thus, no alteration of practice or operative technique should be made in an attempt to improve compliance.
3. The use of tobacco prior to operative repair was the only variable found to be statistically significant in this analysis. This finding is more worrisome for this patient cohort as smoking history is a well known contributor to increased post operative complications⁵⁻⁷.
4. Patients with private insurance and Medicare were more likely to present for follow-up than those without insurance however this failed to reach statistical significance.
5. Patient compliance to post-operative follow up appears to be more dependent on patient related factors rather than what can be modified by the surgeon. This study does help identify certain demographic information that may help surgeons recognize patients that may be at higher risk for failed post-operative follow up.
6. Further study is needed to assess other factors that impair or promote patient compliance in order to optimize outcomes and expectations following repair of these injuries.

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