



Effects of Substance Abuse on the Healing of Mandible Fractures

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Abstract

Objectives: Facial fractures account for over 400,000 emergency room visits and nearly \$1 billion in yearly health care costs. Mandible fractures contribute to a significant portion of the cost of care for these facial fractures. Substance use, involving tobacco, alcohol, and illicit drugs have both a physiological and psychological influence over the healing process. Knowledge of the factors that influence outcomes after surgical repair can influence management of the patient and help reduce the burden of these injuries.

Study Design: Retrospective cohort study

Methods: Records of patients presenting for management of isolated mandible fractures from 2013 to 2014 were examined for a minimum of 6 months following surgery. The data was analyzed to determine the correlation between non-tobacco substance use and outcomes after mandible fracture fixation. The measure outcomes included major complications, defined as infected/exposed hardware and nonunion. Appropriate statistical testing was used for data analysis.

Results: 152 patients met criteria for isolated mandible fractures during the study period. 45 patients used no substances, 47 used tobacco alone, and 60 used drugs/alcohol and/or tobacco. Our cohorts were similar in many criteria examined including average age, gender ratio, number and severity of fractures, and method of fracture fixation. There was a 3-fold increase in the rate of major complications, 9% to 27%, if the patient was a known drug/alcohol user, irrespective of his or her tobacco use status.

Conclusion: Substance abuse is a behavior that is associated with many poor outcomes, including an increase in major complications following the fixation of mandible fractures. There is a significantly increased risk of infection and required re-operation among substance abusers. Efforts should be made to identify modifiable factors prior to surgery to improve the outcome of fractures in this population.

Methods

➤ Retrospective review of mandible fracture repairs at Temple University Hospital from 2013 to 2014

- Inclusion Criteria
 - Isolated mandible fractures
 - At least 6 months of post-op follow-up
 - Patients aged 16 years or older
 - Patients underwent surgical repair of fracture(s)

- Exclusion Criteria
 - Presence of other facial fractures
 - Patients with concomitant life-threatening injuries
 - Patients with less than 6 months of follow-up

➤ A paired t-test was used to determine the association between varied forms of substance abuse and major complications following surgical repair

Results

Patient Demographics	All Patients	No Substance Use	Tobacco Use Only	Drugs/Alcohol +/- Tobacco
Patients	152	45	47	60
Male	131 (86%)	39 (87%)	38 (81%)	54 (90%)
Female	21 (14%)	6 (13%)	9 (19%)	6 (10%)
Age Range	16 - 60	16 - 60	18 - 57	18 - 56
Mean Age	31.1	29.4	30.4	32.9
Total Fractures (Fx)	256	74	81	101
Mean Fx per Patient	1.68	1.64	1.72	1.68
Open Fractures	22 (14%)	6 (13%)	5 (11%)	11 (18%)
Comminuted Fx	35 (23%)	9 (20%)	8 (17%)	18 (30%)

Table 1: Patient Demographics. Mandible fracture (Fx) cohorts were similar in male:female ratio, age, mean number of fractures, and rates of open and comminuted fractures.

Surgical Techniques	All Patients	No Substance Use	Tobacco Use Only	Drugs/Alcohol +/- Tobacco
Extraoral Approach	42 (28%)	9 (20%)	15 (32%)	18 (30%)
Patients treated as Inpatient Admits	100 (66%)	31 (69%)	29 (62%)	40 (67%)
No Repair – Soft Diet	5 (3%)	0 (0%)	3 (6%)	2 (3%)
MMF only	53 (35%)	20 (44%)	16 (34%)	17 (28%)
ORIF only	16 (11%)	1 (2%)	6 (13%)	9 (15%)
ORIF/MMF	74 (49%)	22 (49%)	20 (43%)	32 (53%)
Exfix only	2 (1%)	1 (2%)	1 (2%)	0 (0%)
Exfix/MMF	2 (1%)	1 (2%)	1 (2%)	0 (0%)

Table 2: Surgical Techniques. The techniques employed for fracture fixation included mandibulomaxillary fixation (MMF), open reduction internal fixation (ORIF), and external fixation (Exfix) as well as a combination of the methods. Extraoral approach includes any percutaneous incision.

Complication Rates	All Patients	No Substance Use	Tobacco Use Only	Drugs/Alcohol +/- Tobacco
All Complications	54 (36%)	16 (36%)	14 (30%)	24 (40%)
Major Complications	24 (16%)	3 (7%)	4 (9%)	16 (27%)
Infection	17 (11%)	3 (7%)	3 (6%)	12 (20%)
Re-operation	9 (6%)	2 (4%)	2 (4%)	6 (10%)
Malunion	7 (5%)	0 (0%)	1 (2%)	6 (10%)

Table 3: Complication Rates. Major complications have been defined as post-operative infection, exposed hardware, or nonunion. Minor complications included chronic pain, paresthesia, and trismus.

Abbreviations: fracture (Fx), mandibulomaxillary fixation (MMF), open reduction internal fixation (ORIF), external fixation (Exfix)

Results Continued

Mandible Fracture Repairs

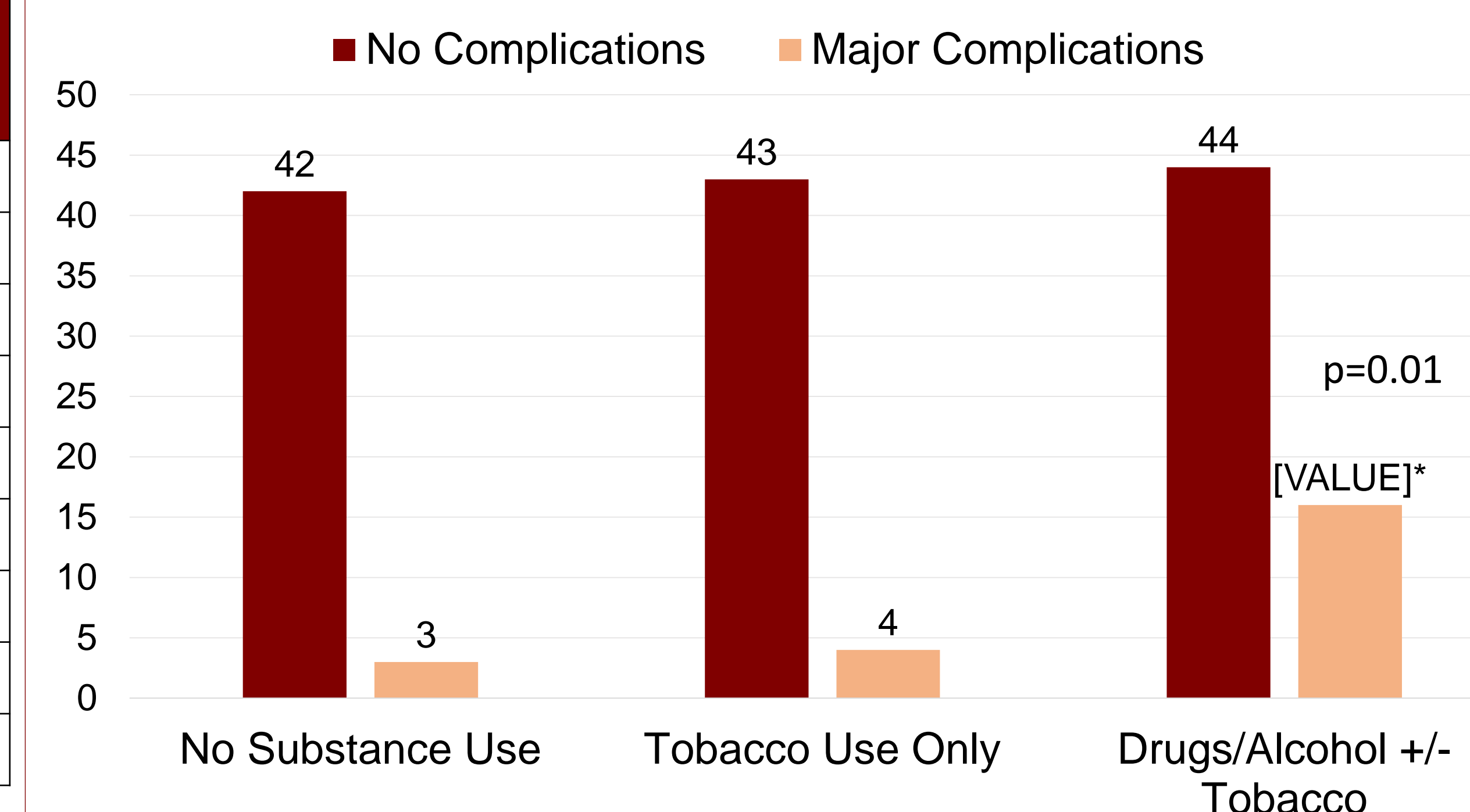


Figure 1: Mandible Fracture Repairs. The occurrence of major complications following surgical repair based on substance abuse status. Major complications have been defined as post-operative infection, exposed hardware, or nonunion. There is an increase in the rate of complications in patients with a history of non-tobacco substance abuse (p=0.01).

- 152 patients met study criteria
- 30% of patients did not use any substances, 31% used tobacco only, and 39% used drugs/alcohol
- 86% of the patient cohort was male and the mean age of all patients was 31 years old
- Patients averaged 1.68 mandible fractures
- The two most common surgical techniques utilized for surgical repair were MMF and MMF paired with ORIF
- The average rate of major complications in all patients is 16%
- However, within each subset of patients, the rate of major complications is 7%, 9%, and 27% for non-substance users, only tobacco users, and drug/alcohol users respectively.
- There is a statistically significant increase (p=0.01) in the rate of major complications for patients with non-tobacco substance abuse undergoing fixation of isolated mandible fractures

Conclusions

Drug and alcohol use, irrespective of tobacco use, increases the risk for major complications following surgical repair of mandible fractures. These major complications, such as infection and malunion, can then necessitate reoperation, further increasing the risk for poor healing. Risk factors, such as substance abuse, should be evaluated prior to surgery to identify those patients who have an increased risk for post-operative complications.