



Gunshot Wounds To The Hand: Using Nerve And Tendon Involvement As A Predictor For Poor Long-term Outcomes

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INTRODUCTION

- There are a wide range of studies on GSWs to the trunk which have led to significant advancements in management leading to improved outcomes, particularly in mortality reduction and infection prevention/control.
- Ballistic injuries involving the upper extremity have not been thoroughly investigated, especially long-term functional outcomes.
- Goal:** We aim to evaluate the injury patterns and functional outcomes in patients who sustained gunshot injuries to the hand to potentially guide future protocols for management.

METHODS

IRB approved retrospective review

633

- All GSW encounters seen at VMC
- Between January 2016 – December 2017

135

- Any Upper extremity involvement

32

- Hand involvement only

- Demographics
- Mechanisms of Injuries
- Injury characteristics
- Surgical interventions
- Long term outcomes
- Follow up rates

Results

Table 2. Ballistic Location and Injury Characteristics

Ballistics Location	Fracture				No Fracture				RR	P-value
	Tendon or Nerve Injury		No associated injury		Tendon or Nerve Injury		No associated injury			
	N	Proportion	N	Proportion	N	Proportion	N	Proportion		
Hand	15	77.8%	2	22.2%	1	16.7%	5	83.3%	4.67	0.0977
Finger	10	60%	2	40%	0	0%	5	100%	7	0.1637
Finger & hand	7	71.4%	2	28.6%	0	0%	0	0%	1.38	0.7567
All patients	32	71.4%	6	28.6%	1	9.1%	10	90.9%	7.86	0.0324

Table 4. Predictive Value in Nerve/Tendon Involvement and Fractures with Outcomes.

Adverse Outcomes	N	Poor Outcome	Good Outcome	p-value
Nerve/Tendon Involvement	16	7	9	0.0143
No Nerve/Tendon Involvement	16	1	15	
Fracture	21	7	14	0.1325
No Fracture	11	1	10	

- Majority of patients were Male (93.8%) with accidental gunshot wounds (52.8%) and an average of 2 ballistic wounds.
- 15 patients had gunshots to the hand, 10 to the fingers, and 7 involving both structures.
- The presence of fractures was associated with a 7.9-fold increase in tendon and nerve injuries ($p = 0.032$).
- Patients who sustained tendon/nerve injuries had significantly higher rates of permanent disability ($p = 0.014$).

Table 3. Follow-up and Treatment.

Follow-up timeframe	
None	72.22%
0-2 weeks	19.44%
2-4 weeks	16.66%
4-12 weeks	13.89%
12-24 weeks	8.33%
24-36 weeks	5.56%
Treatment Method	
ORIF	10
ORIF + Tendon Repair	5
CRPP	2
Observation	9
Amputation	1
I&D	7
I&D + Tendon Repair	2

- 72.22% of patients did not attend their scheduled appointments after being discharged.
- Only 9 of the patients were treated non-operatively with observation and serial follow-up appointments.
- 15 of the patients had management that included ORIF, with 5 of these ORIF procedures also involving a tendon repair procedure.
- 2 of the patients had management that included closed reduction and external fixation.

- Poor outcomes* were defined as all patients who had permanent nerve damage, weakness, decreased range of motion, or pain present at their last follow-up appointment.
- Good outcomes* were defined as patients who either made a full recovery, had very minimal symptoms, or had improving range of motion, pain, and weakness at each follow-up visit.

Conclusion

- Limitations: The size of our patient population and the number of patients lost to follow up.
- Ballistic injuries to the hand are frequently associated with fractures, neurovascular, and tendon injuries.
- The presence of a fracture is associated with a higher incidence of nerve and tendon injuries.
- Involvement of these structures is linked to an increased risk of long-term disability.