



The Treatment of Metacarpal Fractures: Conservative Management May Be Better

Chelsea Snider MD; Michael Neumeister MD, FRCSC, FACS
Southern Illinois University School of Medicine

Background

Over 1.5 million hand fractures are treated in the US yearly, 20% of which are metacarpal fractures. The treatment of these fractures is based primarily on surgeon preference and experience. Currently, no best treatment practice is available in the literature.

The treatment options:

- Conservative
 - Non operative
 - Splinting with or without closed reduction
- Operative
 - Closed Reduction with percutaneous fixation
 - Open reduction with percutaneous fixation or plate
 - External fixation

Objectives

- To compare conservative and operative management of metacarpal fractures
- To ultimately develop evidence-based recommendations for best practice in the treatment of metacarpal fractures based on
 - Patient-Centered Outcomes
 - Functional Outcomes
 - Radiographic Outcomes

Table 1. Demographics

	Base	Shaft	Neck	Head
Number Participation	24	37	12	4
Conservative	19	30	8	3
Operative	5	7	4	1
Sex				
Female	9	8	3	0
Conservative	8	7	2	0
Operative	1	1	1	0
Male	15	29	9	4
Conservative	11	23	6	3
Operative	4	6	3	1
Average Age				
Conservative	44	32	32	35
Operative	25	37	36	54
Average Length of Follow up				
Conservative	11	9.7	2.1	7.7
Operative	27	61	9.5	16

Methods and Materials

Patients who were treated for metacarpal fractures at Southern Illinois University School of Medicine in the last 5 years were eligible to participate in any or all of the following:

- 1) Patient Questionnaire: Days off work, Out of Pocket Cost, Pain and Stiffness
- 2) Hand Therapy Follow-up: Measurement of range of motion at MCP and grip strength
- 3) Follow-up Radiograph: Evaluate healing, i.e. nonunion, malunion
- 4) Chart Review: Review clinic notes for documented complications, secondary interventions, stiffness, range of motion

Patients were reimbursed for travel expenses.

Table 2. Outcomes

	Conservative	Operative	P Value
Patient-Centered Outcomes	42	14	
Days off Work	36	213	0.0088
Out of Pocket Cost	\$1,037	\$2,380	0.0011
Stiffness	11.9%	42.8%	0.0078
Pain	16.7%	50.0%	0.0090
Functional Outcomes	25	0	
Mean Extension of MCP	-0.4°	-	-
Mean Flexion of MCP	79.04°	-	-
Grip Strength	83.58	-	-
Radiographic Outcomes	30	2	
Malunion	23.0%	0.0%	0.4396
Nonunion	10.0%	0.0%	0.6385
Angulation >10 degrees	43.0%	0.0%	0.2270
Clinic Notes	60	17	
Complications	3.33%	35.29%	0.0011
Secondary Interventions	1.67%	35.29%	0.0016
Decreased Range of Motion	5.00%	35.29%	0.0028

Results

From 2006 to 2011, 902 patients were treated for metacarpal fractures at Southern Illinois University School of Medicine. Sixty-four patients participated in the clinical follow-up portion of the study, totaling 77 metacarpal fractures.

Patient-Centered Outcomes:

- 56 responses, 42 patients treated conservatively and 14 treated operatively
- Conservative management group had less out of pocket cost and fewer days off work
- Increased stiffness and pain in the operative group

Functional Outcomes:

- 25 patients returned for follow-up exam with hand therapist, all treated conservatively
- Patients treated conservatively re-gained normal ROM and grip strength

Radiographic Outcomes:

- 32 patients returned for radiographic follow-up, 30 treated conservatively and 2 treated operatively
- Patients treated conservatively showed increased nonunion, malunion and angulation >10 degrees radiographically

Chart Review:

- 77 fractures, 60 treated conservatively and 17 treated operatively
- Fewer complications and secondary interventions in the conservatively treated group
- Patient's treated operatively had higher rates of decreased range of motion

Discussion

Treatment of metacarpal fractures is currently based on low-level evidence. This clinical follow-up study adds to the literature to support the notion that conservative management is a suitable option for stable metacarpal fractures. There have been other studies that support conservative management for metacarpal fractures.

Al-Qattan et al. reported 54 metacarpal fractures treated with immediate mobilization in a palmar wrist splint. Outcomes demonstrated 100% bony union, recovery of extension lag, and grip strength equal to 94% of the contralateral hand.

McKerrell et al. treated 40 patients with closed metacarpal neck fractures: 25 treated conservatively and 15 managed operatively. Patients treated conservatively took less time off work and both groups regained full range of motion and normal grip strength.

Canon et al. treated 22 patients with metacarpal fractures conservatively. Sixteen patients demonstrated >1 mm step-off malunion on radiograph; however, there was no correlation between radiographic outcomes and symptoms or malrotation.

Despite radiographic evidence of malunion, nonunion or persistent bony angulation, functional and patient-centered outcomes continue to support conservative management as a suitable option for stable metacarpal fractures.

Conclusion

Conservative management with closed reduction, splinting, and early range of motion is a suitable option for treatment of all types of stable metacarpal fractures, and may lead to decreased morbidity while preserving function and facilitating a quick return to work.

Radiographic images do not necessarily correlate to functional outcomes or patient satisfaction.

Scissoring on initial assessment or significantly unstable fractures still lend themselves to operative intervention.



Figure 1. At the time of injury



Figure 2. 18 months after closed reduction and splinting

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