



Clinical Outcomes of Limited Open Intramedullary Headless Screw Fixation (IMHS) of Metacarpal Fractures - 91 Consecutive Patients

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Introduction

Metacarpal and phalanx fractures account for 41% of all fractures in the hand and forearm.[1] Multiple approaches have been described for the treatment of displaced and unstable fractures,[2-4].

Displaced metacarpal and phalangeal fractures with clinical deformity are commonly treated operatively with reduction and stabilization. Techniques include percutaneous and limited open antegrade (i.e. bouquet pinning)[4-6], retrograde (i.e. longitudinal intramedullary fixation)[7], plate fixation[6, 8-10], or transmetacarpal Kirschner wire pinning.[11-13] More recently, authors have described the use of limited open retrograde intramedullary headless screw for the fixation of metacarpal neck and shaft fractures.[13-17]

There is no consensus on ideal fixation technique for metacarpal neck or proximal phalanx fractures.[2, 3, 7, 8, 18] Here we present the largest series to date (n=91) of consecutive patients treated with IMHS fixation with analysis of the clinical and radiographic outcomes.

Methods

Following IRB approval, a retrospective review was conducted to identify all consecutive patients who underwent IMHS fixation for metacarpal neck or shaft fractures. A database was created to record: gender, age, handedness, fracture location, dorsal/volar angulation, sagittal plane deformity, radiographic characteristics (fracture union, metacarpophalangeal joint narrowing, arthrosis, and chondrolysis), post-operative active digital range of motion, return to full daily activities, and complications.

Results

- 91 consecutive patients
- Metacarpal neck (56) and shaft (35) [all closed fractures]
- Demographics: 12F and 79M,
- Mean age 28 years,
- 81 RHD, 78/91 (86%) dominant hand
- Majority of cases small finger metacarpal injuries: 50 neck fractures and 29 shaft fractures (87%)
- Mean time to return to full daily active life (RTW): 11 weeks (range 2- 62 wks)
- 91 patients (100%) full active MCP joint extension. 88 patients (97%) full composite flexion
- Mean time to radiographic union was 6 weeks (range 2-12)
- Complications: 3 (3%) < 65° of MCP flexion (mean 57°), 3 (3%) refracture due to repeat trauma after union, 1 (1%) reoperation for non-union, 1 (1%) asymptomatic radiographic arthritis

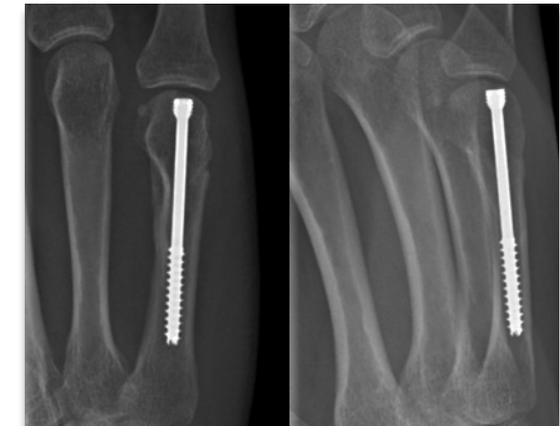


Figure 1: Radiograph demonstrating IMHS fixation of metacarpal fracture.

Conclusions

Advantages to this technique include: early mobilization; avoidance of K-wire associated complications; reduced soft tissue dissection; elimination of secondary surgeries for removal of hardware and tenolysis.

Although this procedure requires an articular starting point, current 3DCT and clinical evidence does not demonstrate any significant morbidity.[17] Long term prospective studies are needed to directly compare the utility and outcomes of this procedure versus more commonly used surgical solutions.

Table 1: Metacarpal Neck and shaft fractures angulation distribution

	Thumb	Index	Middle	Ring	Small	Total
Neck Fractures (n)	0	2	2	2	50	56
Mean angulation in degrees (range)	N/A	40 (15 - 65)	5 (0 - 10)	49 (45 - 53)	45 (0-90)	44 (0-90)
Shaft fractures (n)	1	1	0	4	29	35
Mean angulation in degrees (range)	50	12	N/A	37(30-45)	44(0-70)	42 (0-70)