

# Treatment of Metacarpal Fractures

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## Disclosures

- ▶ Consultant for Arthrex, Inc
- ▶ Speaker's Bureau Endo Pharmaceuticals

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## Introduction

- ▶ Majority of hand fractures are closed, simple, and stable
- ▶ Function follows form → tolerance for some deformity
  - ▶ Minimal splinting + early mobilization
  - ▶ Closed reduction + immobilization
  - ▶ Closed reduction + pinning (CRPP)

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## Surgical Indications

- ▶ Failure to achieve closed reduction (*irreducible*)
- ▶ Failure to maintain closed reduction (*unstable*)
- ▶ Displaced intra-articular fractures
- ▶ Multiple unstable (comminuted) fractures
- ▶ Open fractures
- ▶ Segmental bone loss

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## Metacarpal Fractures Classification

- ▶ Fracture Pattern:
  - ▶ Transverse
  - ▶ Oblique
  - ▶ Spiral
- Fracture Locations:
  - Head
  - Neck
  - Shaft
  - Base

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## Metacarpal Head Fracture

- ▶ Rare
- ▶ Direct blow or axial load
- ▶ Often severely comminuted
- ▶ ORIF with goal of anatomic articular reduction
- ▶ Headless Screws
- ▶ Rarely MCP arthroplasty vs. fusion (Poorly tolerated)



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### Metacarpal Neck Fracture

- ▶ Boxer's Fracture: fighting
- ▶ Direct impact
- ▶ Axial loading
- ▶ Apex dorsal angulation
- ▶ Pull of flexors and interossei muscles



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### Metacarpal Neck Fracture

- ▶ Acceptable Angulation:
  - ▶ 2nd/3rd: <10-15°
  - ▶ 4th: < 30°
  - ▶ 5th: < 50-70°
- ▶ Malunion:
  - ▶ Digital pseudoclawing



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### Metacarpal Shaft

- ▶ Most shaft fractures treatment: Immobilization
- ▶ Intermetacarpal ligaments prevent shortening of more than 3-4 mm
- ▶ Surgical indications:
  - ▶ Comminution
  - ▶ Malrotation
  - ▶ Shortening
  - ▶ Angulation



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### Metacarpal/Phalangeal Fractures

- ▶ **Surgical Fixation:**
  - ▶ Closed reduction + cast immobilization in anatomical position x 4-6 weeks
  - ▶ Pins
  - ▶ Headless screws
  - ▶ Multiple small plate options
    - ▶ Including fracture specific plating



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### 2.4/2.0 mm Plating for Metacarpals

- ▶ 2.4/2.0 mm Plates
  - ▶ Multiple plate designs and lengths
  - ▶ Key is the plate is low profile and does not irritate tendon



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### 2.4/2.0 mm Plating for Metacarpals



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# Headless Screws



**Clinical Outcomes of Limited-Open Retrograde Intramedullary Headless Screw Fixation of Metacarpal Fractures**  
David S. Bachmann, MD, James Papp, MD, Nancy Feinberg, PhD, BS, Thomas J. Anderson, MD, Scott W. Wolfe, MD

**Retrograde Headless Intramedullary Screw Fixation for Displaced Fifth Metacarpal Neck and Shaft Fractures: Short Term Results**  
Michael F. Green, James S. Yee, Richard W. Williams, Richard J. Garcia

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# Headless Screw Fixation for Hand fractures

- ▶ Benefits
  - ▶ Simple technique
  - ▶ No hardware prominence
  - ▶ Stable fixation for transverse fractures
  - ▶ Can use 4.0mm for 5<sup>th</sup> metacarpal (50 mm)
- ▶ Limitations
  - ▶ Screw length limitations
  - ▶ Not for long oblique fractures
  - ▶ Cartilage defect




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**Retrograde Headless Intramedullary Screw Fixation for Displaced Fifth Metacarpal Neck and Shaft Fractures: Short Term Results**  
Michael F. Green, James S. Yee, Richard W. Williams, Richard J. Garcia

Retrospectively reviewed nine patients treated with retrograde intramedullary screw fixation of fifth meta- carpal neck and shaft fractures between 2011 and 2013.

Outcomes:  
0° extension and 90° flexion.  
DASH 47 → 0.7  
The mean postoperative grip strength was measured of the injured hand (40 kg) and un-injured hand (41 kg).




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### Use of Headless Screws:

- ▶ Intramedullary
- ▶ Stable
- ▶ Early motion well tolerated
- ▶ Limited surgical approach minimizes operative scarring
- ▶ My current treatment of choice for axially stable fractures in skeletally mature patients

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### Thank You!

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