Current Concepts: Acute Scaphoid Fractures

Jerry I. Huang, M.D.
Program Director, UW Hand Fellowship
University of Washington Medical Ctr
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Scaphoid Fracture

- Most common carpal fracture (60-70%)
- 80% cartilage
- Difficult to define central axis
- Concavity
  - Scaphocapitate
  - Volar surface

Anatomy

Blood Supply Unique

- Dorsal ridge vessels retrograde proximal 70-80%
- Volar branches distal 20-30%

Case 1

- 21 y/o male with injury to right wrist after FOOSH injury
- Snuffbox tenderness
- 2 weeks in thumb spica cast so far

Treatment Guidelines

- Distal pole → 6 to 8 weeks cast immobilization
- Proximal pole → unstable, high risk of AVN → screw fixation
- Waist fracture → cast vs. surgery
- Nonunions → surgery
Injury Radiographs

Treatment Options
- Further imaging? CT Scan?
- Cast immobilization vs. Surgery
- Long arm vs. Short arm
- Dorsal vs. Volar
- Open vs. Percutaneous

Short Arm Thumb Spica Cast
4 Weeks Later

Surgical Options
- Dorsal vs. Volar
- Open vs. Percutaneous
- Return to sports?
- Full weight-bearing?

Advances in Treatment
- Imaging (CT and MRI)
- Surgical approaches
- Arthroscopic assisted fixation
- Headless cannulated screws
- Vascularized bone grafts (Dorsal, volar, and MFC)

CT Scan vs. Radiographs
- Plain radiographs
  - Poor interobserver reliability
    - Trabecular healing
    - Sclerosis at fracture line
    - Avascular necrosis proximal pole
  - Poor reliability for displacement
Acute Waist: Screw vs. Cast

- Faster radiographic union
- Higher union rate??
- Faster return to work, sports, ADLs
- ROM transiently better
- More complications with surgery
- No difference in functional outcome

“Aggressive conservative management”

Consider surgery if no evidence of trabecular healing at 6-8 weeks…

Surgery Considerations

- Nondisplaced or minimally displaced
- Waist or proximal pole
- Fracture comminution
- Bone loss
- Nonunion

Central Placement of the Screw in Simulated Fractures of the Scaphoid Waist

A Biomechanical Study

Central screw 40% stronger

Screw Fixation of Scaphoid Fractures: A Biomechanical Assessment of Screw Length and Screw Augmentation

Seth D. Dobbs, MD, Mandhir M. Parajuli, MD, Joseph F. Slade III, MD
From the Department of Orthopaedics and Rehabilitation, Yale University School of Medicine, New Haven, CT.

Conclusions: “Under physiologically applied loading of cadaveric wrists with unstable scaphoid waist fractures the long screw provided significantly greater stability than the short screw.”
Goals of Surgery

- Central screw placement
- Longest screw
- Dorsal vs. Volar
- Open vs. Percutaneous

Volar or Dorsal?

- Retrospective review 41 pts (JHS 2009)
- 19 volar and 22 dorsal
- Dorsal better central screw placement
- No difference in functional outcome and time to bony union

Volar Screw Placement

- Trapezium

Indications for Percutaneous

- Acute or subacute nondisplaced fx
- Mildly displaced fracture that is easily close reduced
- Delayed union or fibrous nonunion without AVN, without sclerosis, without deformity, and without gap

Percutaneous Screw Fixation for Scaphoid Fracture: A Comparison Between the Dorsal and the Volar Approaches

Jo-Ho Joun, MD, In D. Min, MD, Chung W. Ok, MD, Byung Chul Park, MD, Doong Taek Kim, MD

Percutaneous Fixation of the Scaphoid Through a Dorsal Approach: An Anatomic Study

Dennis C. Almeida, MD, Elizabeth A. Miller, MD, Betsie J. Franco, MD

Is It Safe?
Dorsal Percutaneous PIN Injury ➔ Painful Neuroma?

Surgical Case

Open Approach
- Fracture displacement or comminution
- Nonunion with humpback deformity or requiring bone grafting
- Volar better exposure especially with humpback
- Dorsal proximal pole

Humpback + DISI

K-Wire Joysticks Extend and Supinate
Surgical Case

CT at 3 Months to Confirm Union

Summary

• Understand unique anatomy of the scaphoid
• Surgical treatment: early ROM, faster return to work, sports
• Dorsal vs. volar and open vs. percutaneous fixation
• CT scan to confirm union