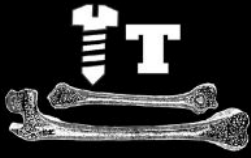


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Scaphoid Fractures w/ Dr. Roberts

Epidemiology

- Male, foosh (hyperextension past 95 degrees), young.
- Volar cortex usually fails in tension.
- Dorsal in compression.

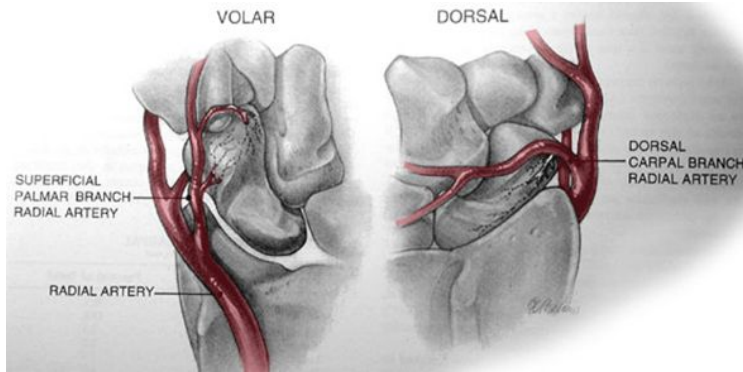
Anatomy

- Oblique orientation (volar/radial) that links proximal and distal carpal rows
- 80% covered by articular cartilage
- Proximal pole, waist (MC), distal pole, tubercle
- Unstable fx- Hump Back deformity
 - Distal frag flexed- trapezium and trapezoid attachments.
 - Prox fragment extends- lunate/ triquetrum attachments



Blood Supply

- 70-80% of intraosseus vascularity- dorsal scaphoid branches of radial artery
- Enter scaphoid waist in retrograde direction- provides single dominant intraosseus vessel to prox pole of scaphoid
- Minor volar contribution from radial artery or its superficial palmar branch
- Anterior interosseus a. Provides collateral circulation.
- Proximal pole is prone to AVN.



Classification

- Most common- Herbert/Modified Herbert > Russe

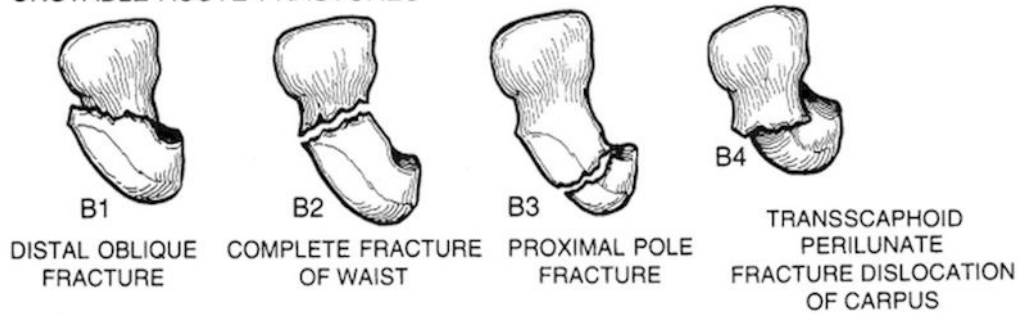
TYPE A:

STABLE ACUTE FRACTURES



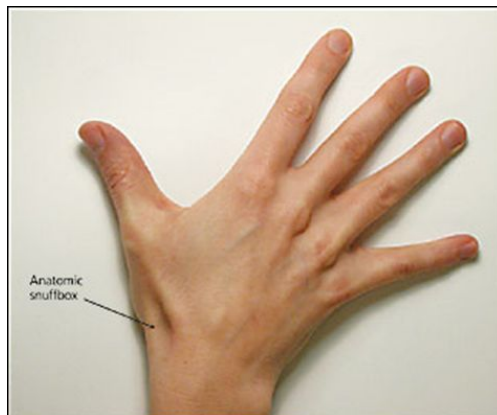
TYPE B:

UNSTABLE ACUTE FRACTURES



Diagnosis

- PE: ecchymosis, decreased motion, TTP in snuffbox + tubercle
- Low specificity



Imaging

- PA, lateral, oblique, scaphoid view (supinated PA w/ ulnar deviation)



-
- 20% w/ negative films will have a fx > splint + repeat films in 2 weeks
- MRI/ CT (MRI more sensitive + specific + allows assessment of osseous blood supply + soft tissue changes)



-
- CT in long axis of scaphoid helpful

Tx

- Early diagnosis is key. Do better if tx w/i 4 weeks from injury
- Distal pole- can heal with 6 weeks
- Proximal pole can take up to 6mo of immobilization

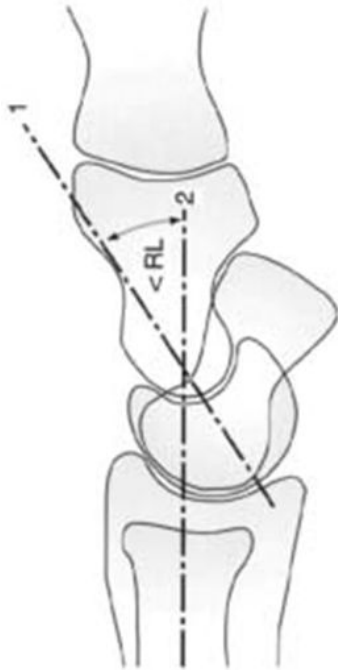
Non op

- Nondisplaced scaphoid waist/ distal pole fx- cast 8-12 wk
- Below elbow cast w/ or w/o thumb immobilization

- all achieve union. No differences.
- 90-95% heal by 3 mo with cast immobilization
- Risks- disuse osteopenia, stiffness, muscle atrophy

Operative tx

- Displaced fx- gap of 1mm, scapholunate angle >60deg, radiolunate angle >15



-
- Displaced fx + proximal pole fx
- Casting v fixation for acute fx
 - Some studies show inc fracture union, but not statistically significant.
 - Same at 2 years
 - In athletic population- quicker return to work, earlier return to wrist ROM and grip strength beginning 8 weeks post op

Operative technique

- Volar v dorsal for acute fx
 - No diff in terms of fx union and functional outcomes. Some proponents of dorsal due to blood supply
 - Proximal pole easier visualized w/ dorsal antegrade approach.
 - Distal pole- amenable to volar retrograde approach
 - Waist fx- volar or dorsal, pending fx pattern n surgeon preference + need for bone grafting

Perc + mini open approach

- Perc best suited for- nondisplaced fx, can also perc w/ joystick manipulation and K wires
- Early studies- union rate of 70-89%

- Recent studies- up to 100%
- Transverse waist fx- dorsal perc technique allows placement parallel to long axis of scaphoid and perp to fx line

Open approach

- Fx w/ volar collapse (humpback deformity)- easily corrected w/ volar
 - Dorsal approach- can make iatrogenic humpback deformity worse by flexing wrist during screw placement.
 - Avoid EPL
 - Volar approach- can injure ligaments and lead to carpal instability
 - Also difficult to go parallel. So guidewire and drill have to be placed through the edge of trapezium.
 - No inc incidence of symptomatic scaphotrapezial OA in short and medium term

Arthroscopy assisted techniques

Nonunion

- 4-50%, failure of fx to heal within 6months
- PE- cont snuffbox TTP and dec wrist extension.
- Xray- wide sclerotic fx cleft, possible cyst formation

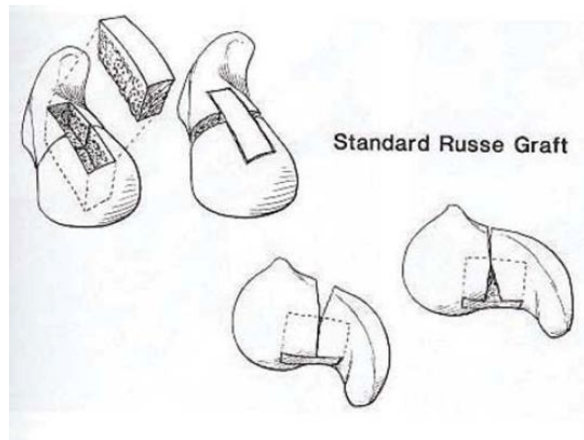


- Unstable nonunions- loss of normal length and shape of scaphoid, often w/ DISI pattern
 - Leads to SNAC
- Tx: ORIF w/ bone grafting.restore length, alignment, and height
 - Intramedullary screw fixation. 1v2

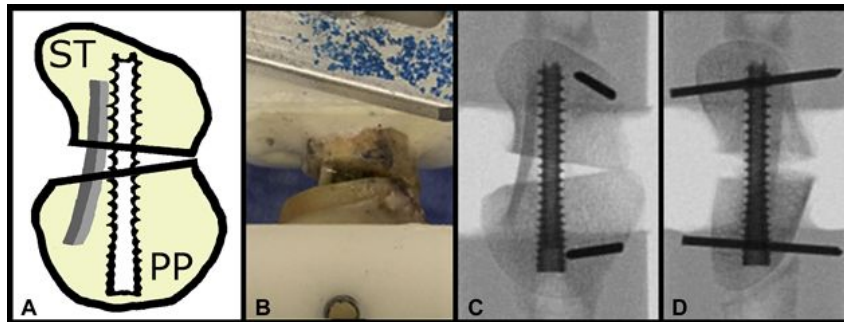
Nonvascularized bone grafts

- Matti- original technique
 - iliac crest corticocancellous bone strut as inlay through dorsal approach
- Russe

- modified technique of volar approach to correct volar collapse-



- Fisk fernandez
 - triangular/ trapezoidal corticocancellous wedge from iliac crest or distal radius as intercalary structural graft
- Hybrid Russe procedure-
 - corticocancellous volar strut from volar distal radius w/ cancellous autograft and headless compression screw fixation to correct scaphoid waist fx nonunion w/ humpback
 - Studies show 100% union at 3.6 mo post op up to 2yrs



- Non vascularized osteochondral rib autograft- Unsalvageable proximal pole fx
 - young active patients who salvage is not ideal
 - Scapholunate ligament not reconstructed, but “overstuffing the joint” prevents carpal collapse

Vascularized bone grafting

- May be useful in the setting of AVN
- Grafting dorsoradial aspect to distal radius- supplied by 1,2 intercompartmental supraretinacular artery
 - Varying results
 - No difference compared to non vascularized iliac crest bone grafting
- Dorsal Distal radius graft
- Volar DT graft based on volar carpal artery
- Medial condyle of femur based on descending genicular artery
 - Possible significant higher union rate, shorter time to union than 1,2 intercompartmental supraretinacular artery

Post-op protocol

- Painless ROM, 6 wk

Sources:

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