Scaphoid Fractures

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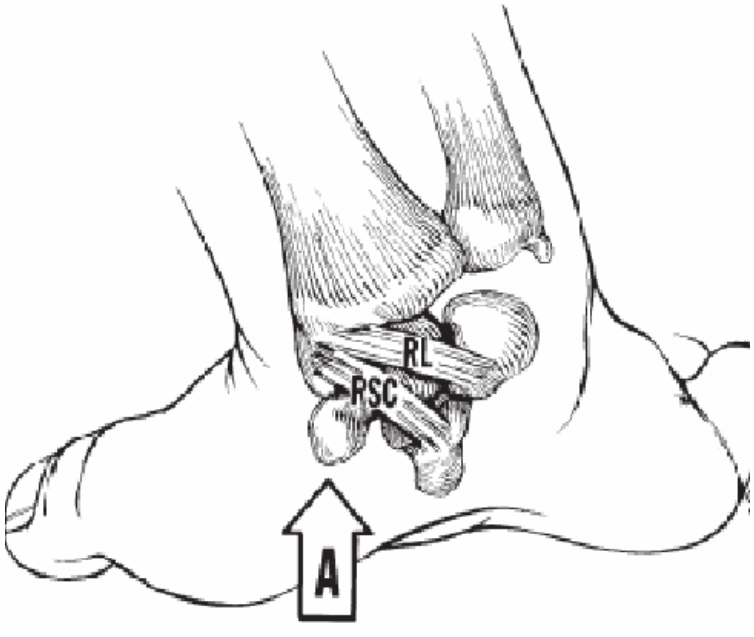
Scaphoid fractures



- 2nd commonest fracture of upper extremity
- Only distal Radius fractures more frequent
- 60-80% of all Carpal fractures

The Scaphoid

- 5 articulating surfaces
- Radius, Lunate, Capitate, Trapezium, Trapezoid
- Almost entirely covered in articular cartilage
- Flexes in Radial deviation
- Extends in Ulnar deviation
- Fracture under compression/ torsion

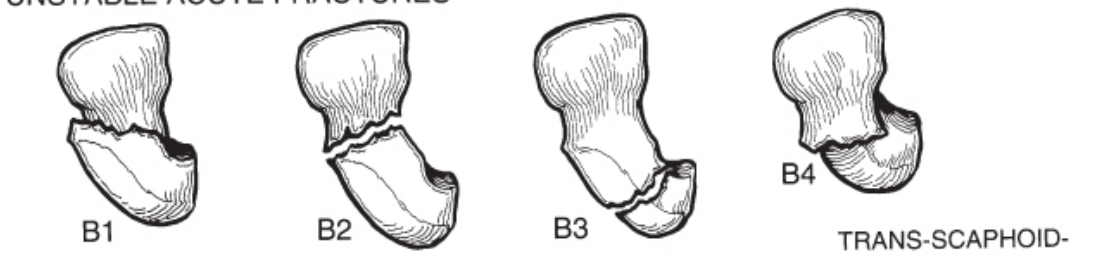
Diagnosis

- Plain X-rays have limitations
- Bone scan 100% sensitive 93% specific
- MRI reports vary but some suggest 100%
- Radiation/cost implications?
- Duration in cast awaiting confirmation?

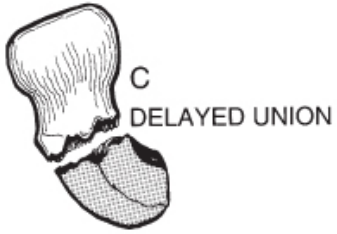
Herbert and Russe classification

TYPE A:
STABLE ACUTE FRACTURES

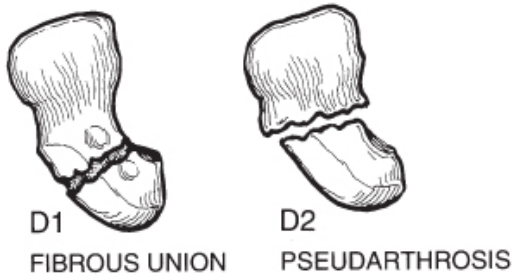
TYPE B:
UNSTABLE ACUTE FRACTURES



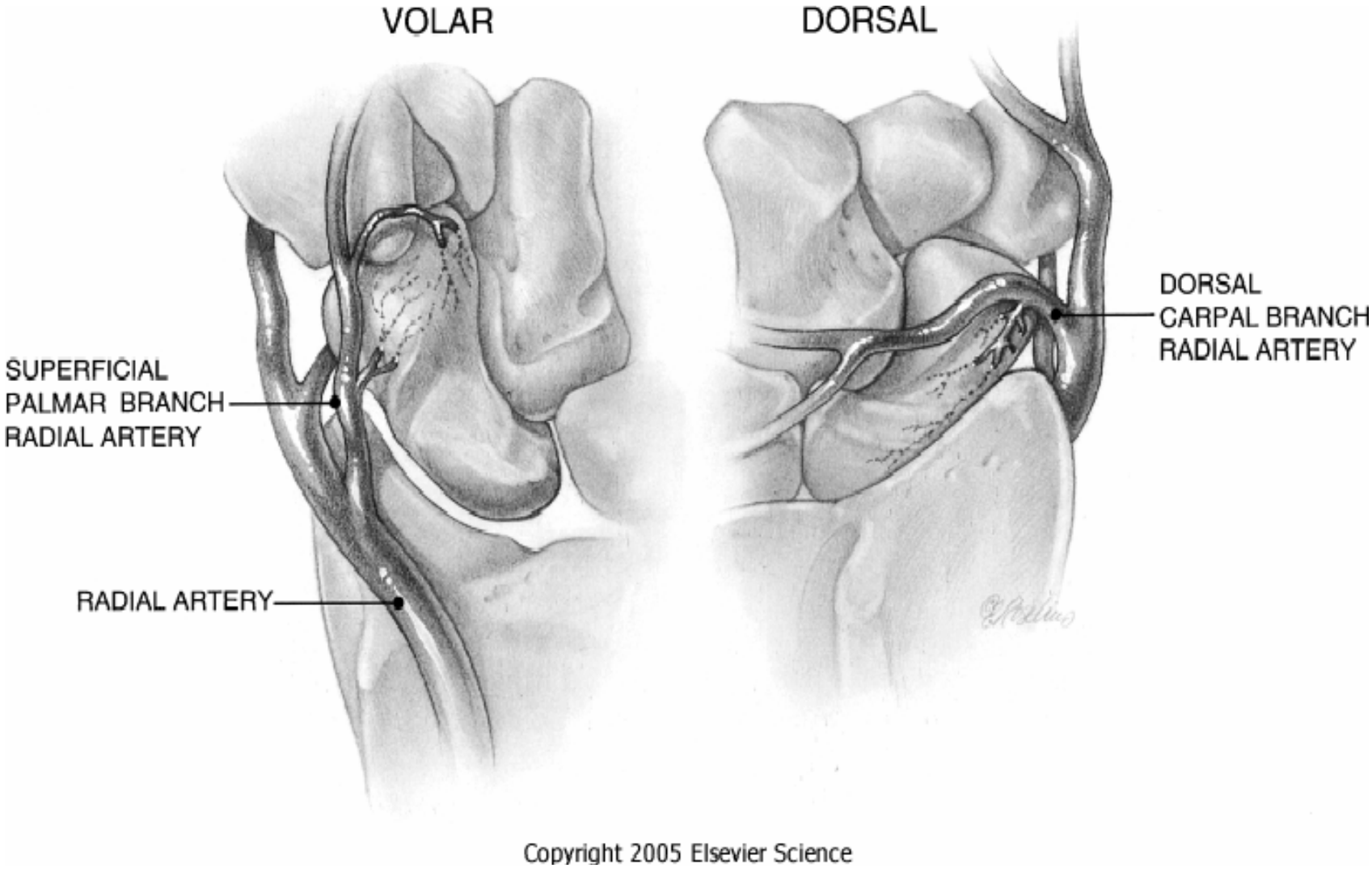
TYPE C:
DELAYED UNION



TYPE D:
ESTABLISHED NONUNION



Blood supply to the Scaphoid

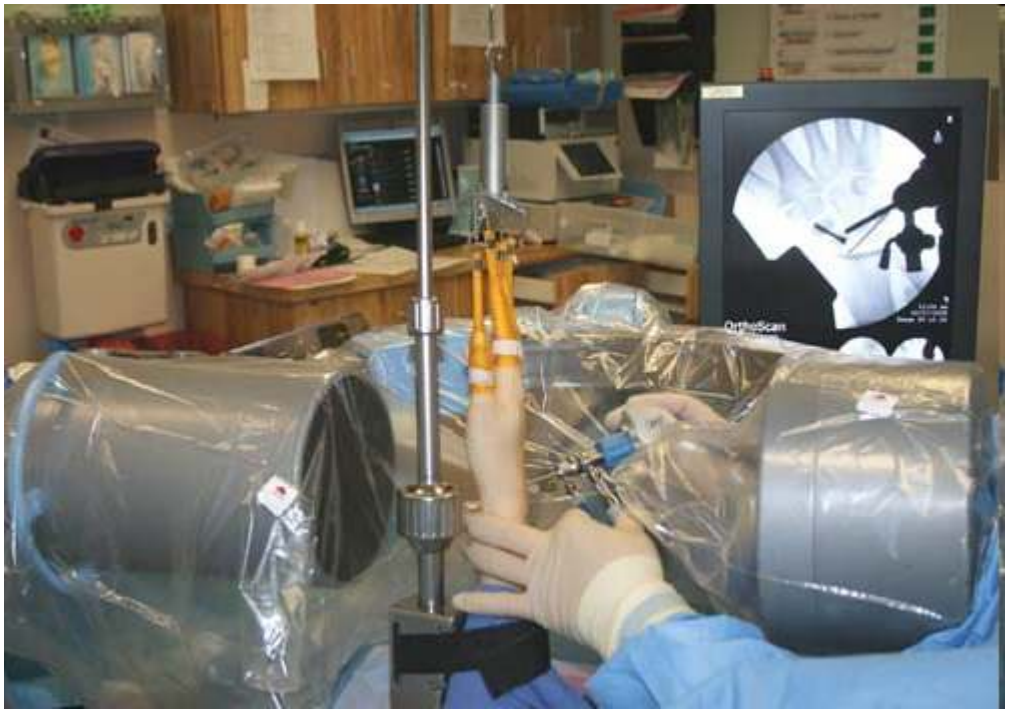


Surgical approaches

- Percutaneous → volar
  → dorsal
- Volar – FCR bed
- Dorsal – Mini-capsulotomy

Percutaneous

Volar Percutaneous

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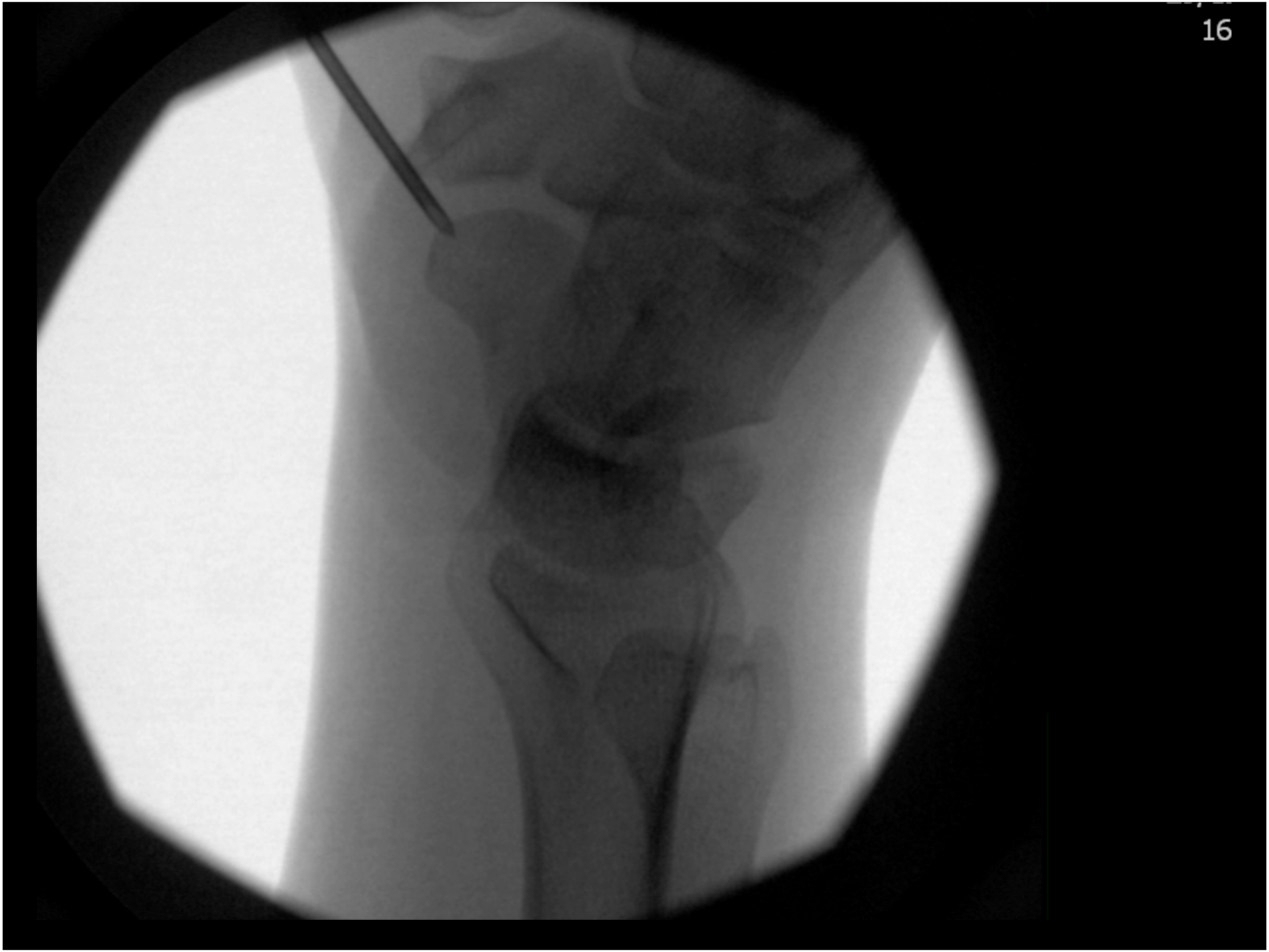
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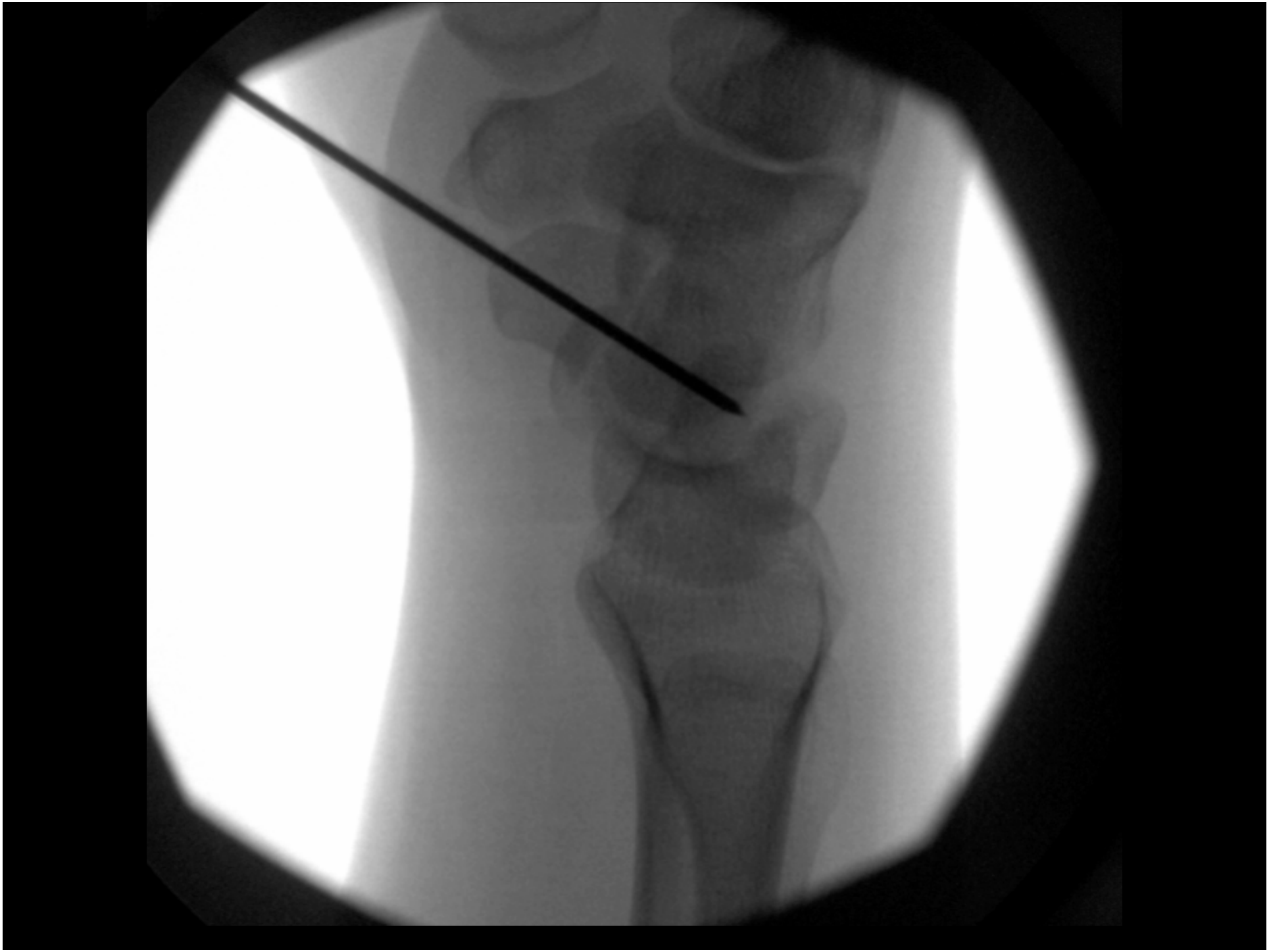
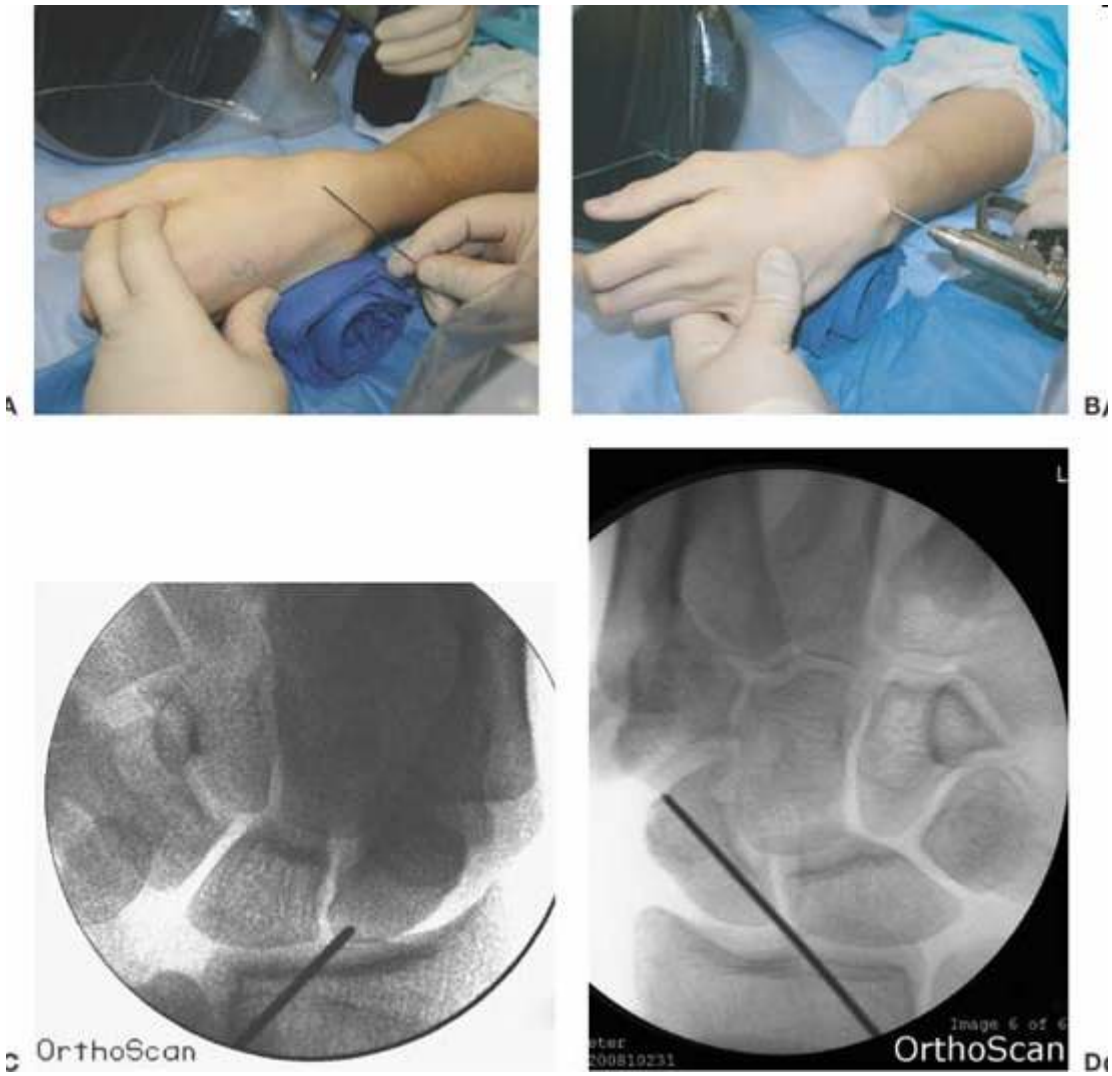
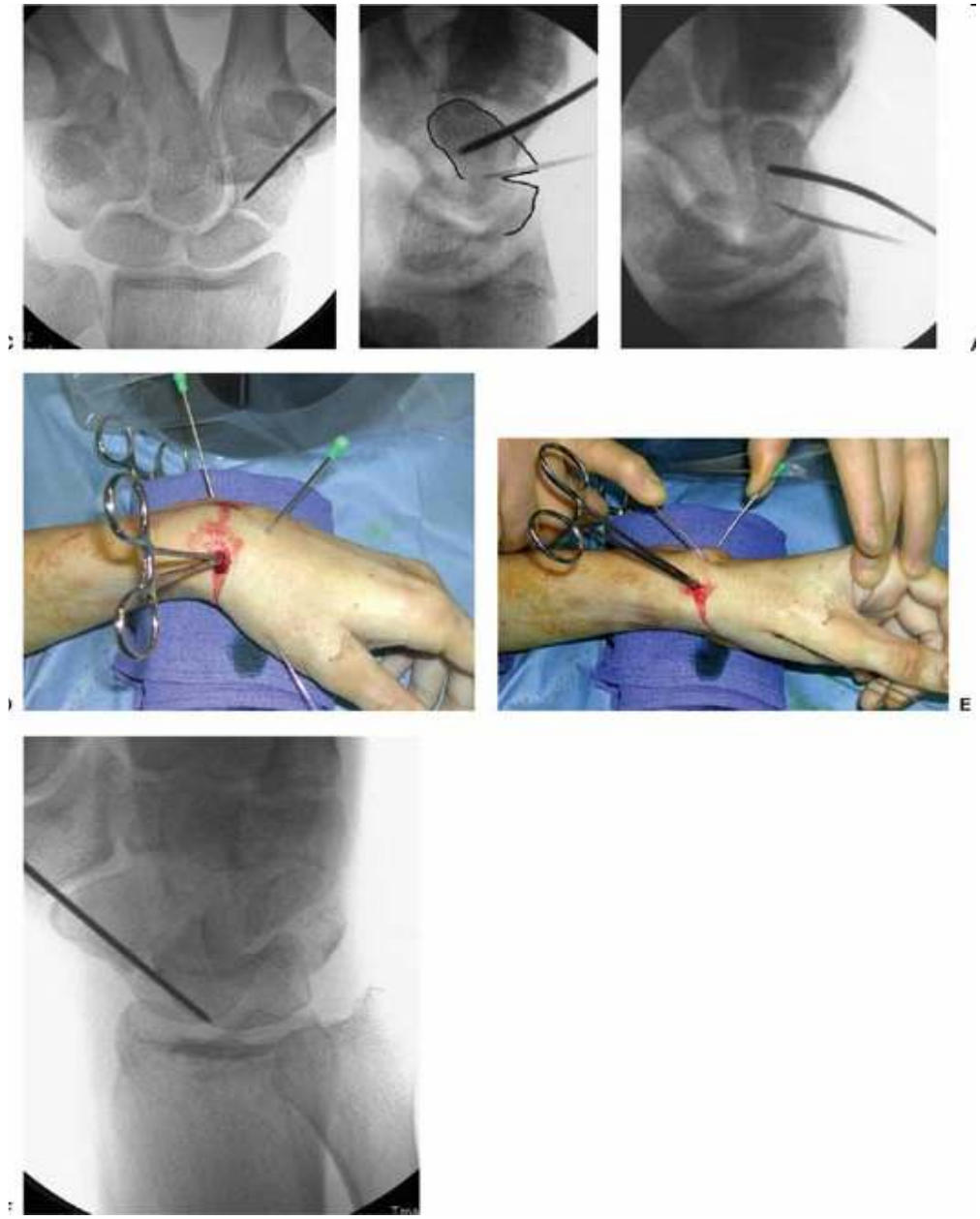


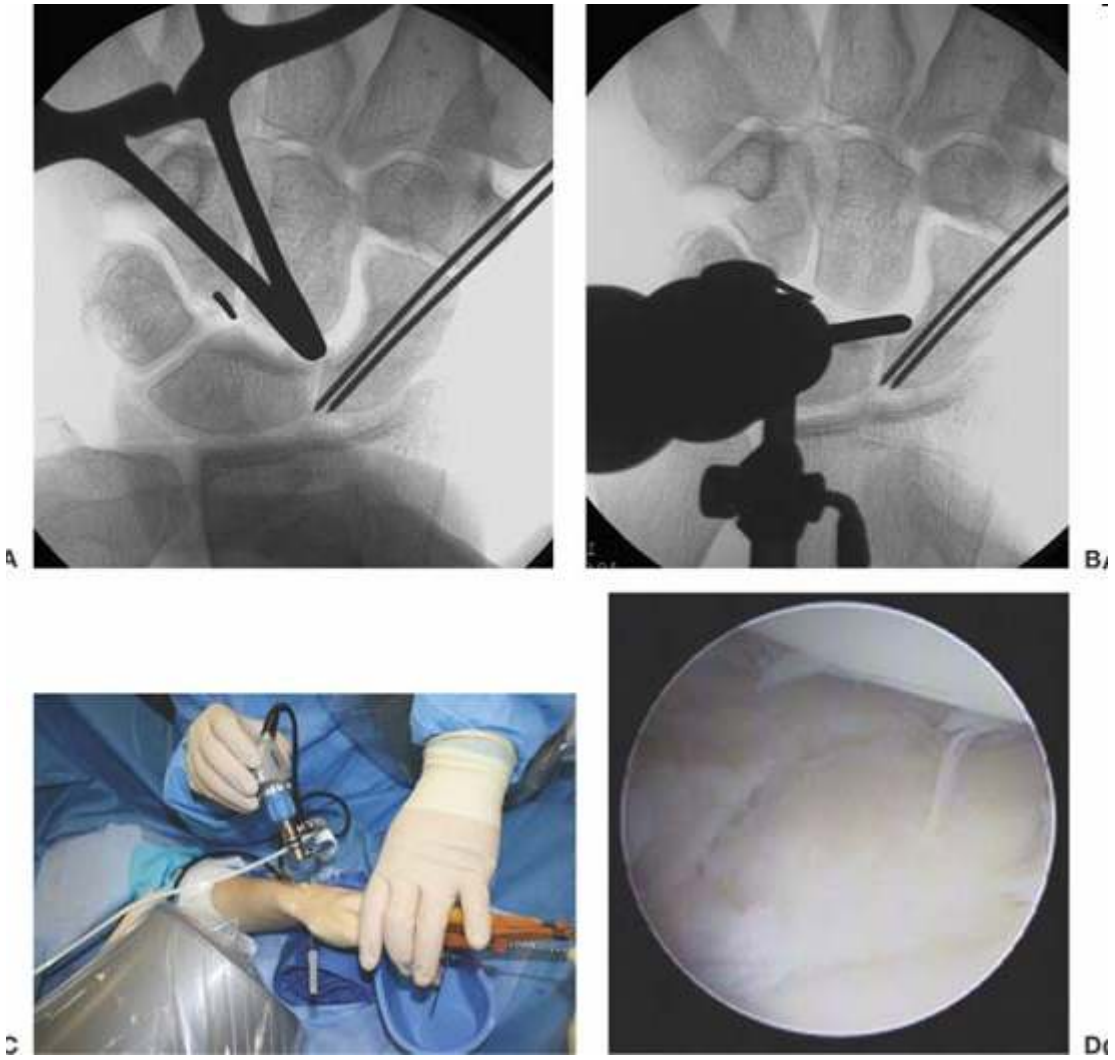
Dorsal Percutaneous



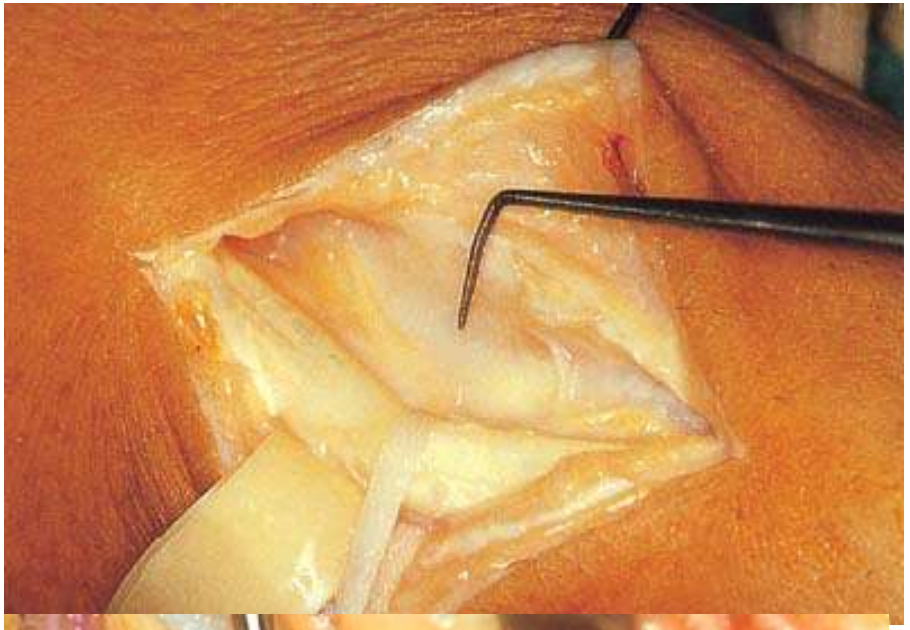
Displaced Fractures Percutaneous technique

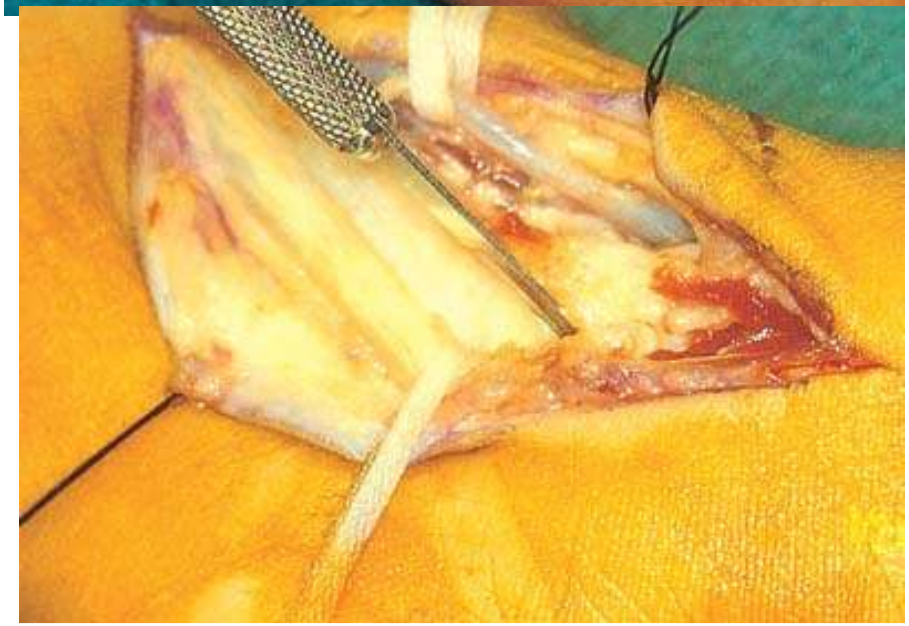


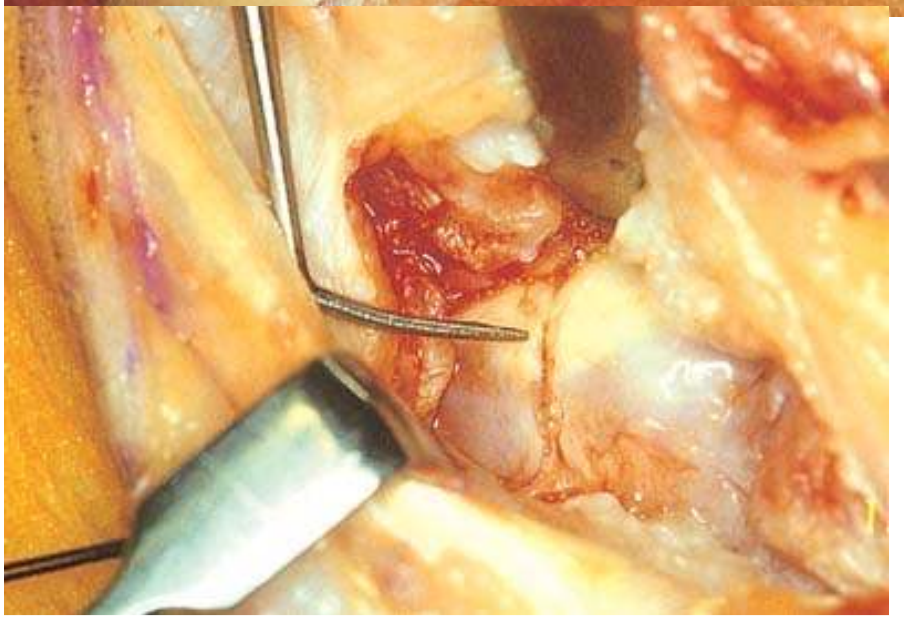
Arthroscopically assisted



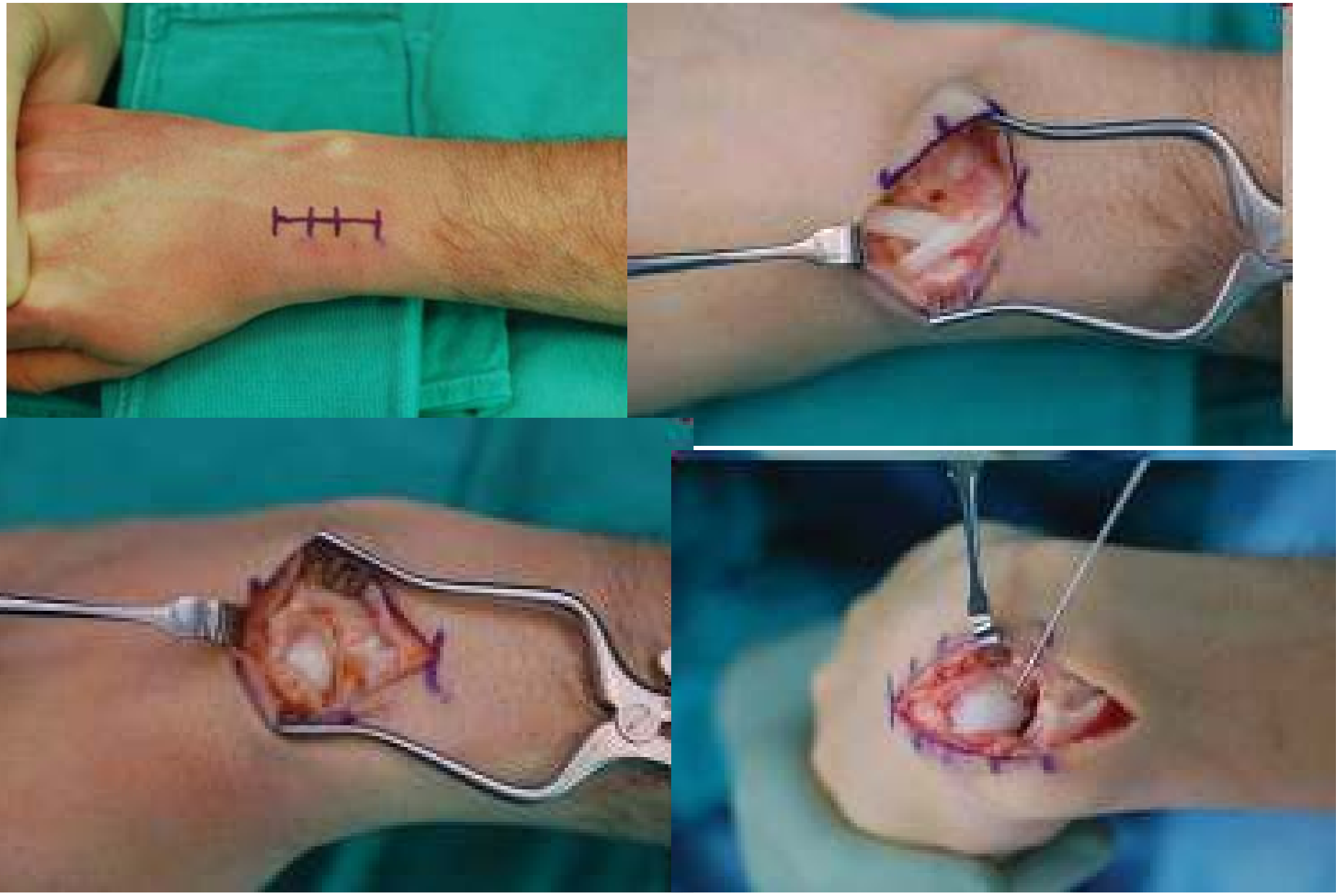
Volar







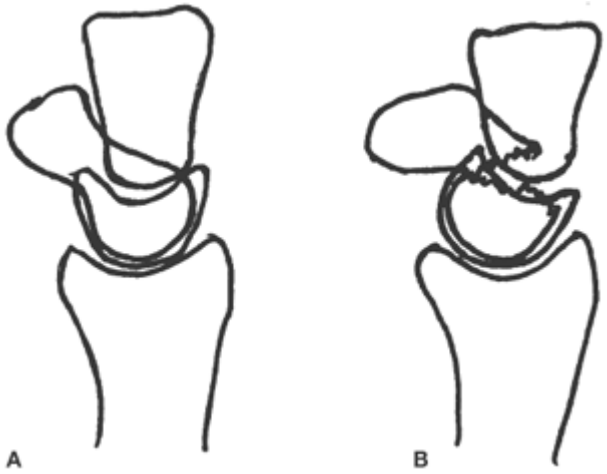
Dorsal



Non-Union Surgery

- Volar Wedge Graft
- (Cortico)cancellous graft
- Vascular pedicle graft
- Dorsal inlay graft
- Percutaneous grafting
- Consider supplementary temporary stabilisation

Volar – opening wedge graft



Dorsal Inlay Graft

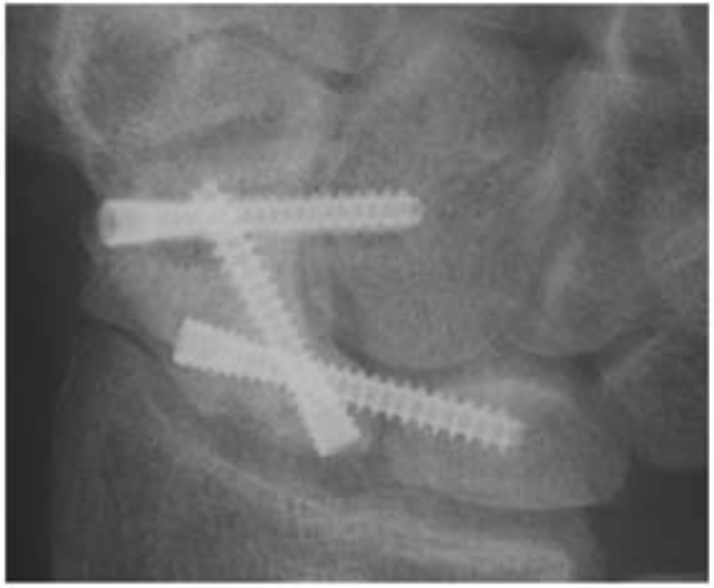
- In a proximal pole fracture non-union, a dorsal inlay graft is most appropriate.
- Remove fibrous tissue from the non-union site with curettes.
- With a high-speed burr, prepare a slot that spans the fracture site to receive the bone graft

Cancellous Graft

- Dorsal approach provides a well-visualized reduction and alignment attainment.
- Leave exposed cancellous bone between the proximal and distal poles.
- Operate early rather than late, although malunions greater than 5 years can heal with grafting 60% of the time.
- Avoid compression screws in cases where cortical contact is contraindicated because of shortening.
- Do not use high-speed drills or burrs in forming cavities.


A

D



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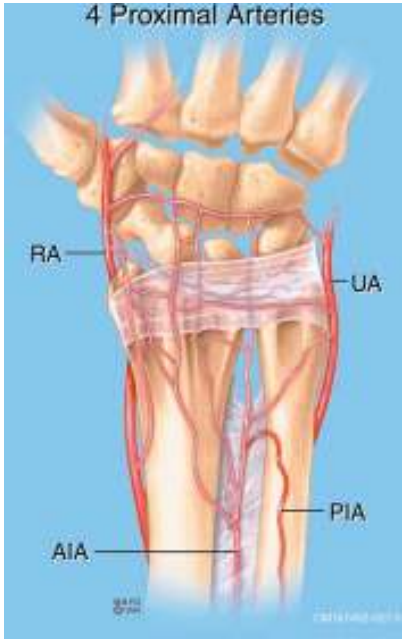
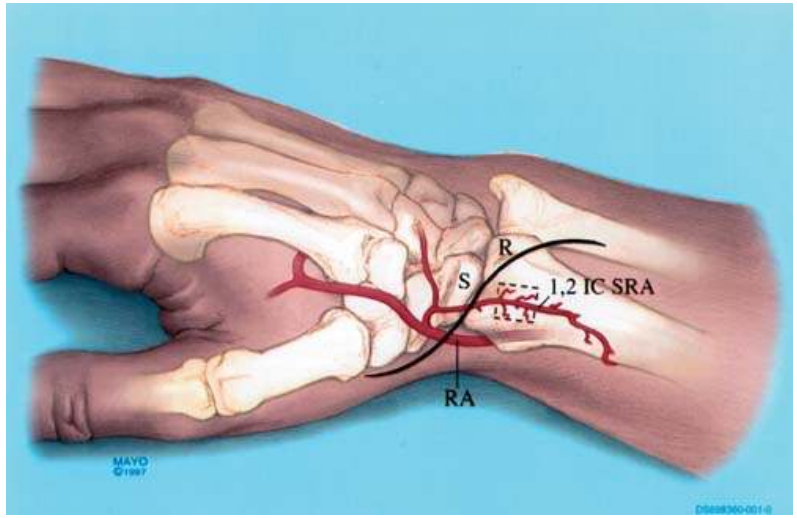
Supplementary Fixation Combinations

Vascularised Pedicle Graft

- Pedicled bone grafts based on the 1,2 ICSRA are useful for most scaphoid nonunions.
- Single dorsal approach for both graft harvest and exposure of the scaphoid.
- Elevate so vessels not empty
- Protect Superficial Radial nerve
- Open the first and second dorsal extensor compartments to either side of the bone graft site, creating a cuff of retinaculum that includes the 1,2 ICSRA.
- Center the graft approximately 1.5 cm proximal to the radiocarpal joint to include the nutrient vessels.
- Before elevating the bone graft, make a transverse dorsal–radial capsulotomy to expose the scaphoid nonunion site





Biomechanical considerations

- Scaphoid waist fractures
  - Central axis placement to allow **longest screw**
- Biomechanical strength are equal - Dorsal or volar screw implantation
- Proximal pole scaphoid fractures
  - Dorsal screw best compression
  - Need a minimum of **four threads** across fracture site
  - Pull-out strength drops with decreasing number of threads
- Strength is equal to number of threads
- Large core diameter screw increases strength
- Use monobloc screws
- Scaphoid is long lever arm
  - Fixation must balance these forces
  - Unstable fixation requires addition construct to transfer forces away from the fracture site
  - Locking mid-carpal joint with miniscrew or 0.062-inch Kirschner-wire between distal pole and capitate
- Stabilize the proximal pole with wires or screw between the proximal pole and lunate

Absolute Indications for Fixation

- Displaced fractures
- Lateral intrascaphoid angle more than 35 degrees
- Bone loss or comminution
- Perilunate fracture
- Dorsal intercalated segmental instability (DISI) alignment
- Proximal pole fractures
- Fractures with delayed presentation (>4 weeks)

Relative Indications

- Stable, nondisplaced scaphoid fractures in patients desiring an early return to work or hobby
- Combined injuries of the scaphoid, including the distal radius or other carpal bones

Contraindication for Fixation

- Degenerative change Radiocarpal joint
- Degenerative change Midcarpal joint
- Salvage resection/partial fusion indicated in these cases

Summary

- Complex range of considerations in planning management
- Significant non-union rate
- Attention to detail and solid fixation at first surgery gives highest success rate of union
- Salvage procedures complex and experience required – consider early referral

Concluding statements

- Do not sit and wait
- If you cannot decide what to do refer on to someone who does
- Age is not a reason to not operate
- Other factors are more important
- Know the approaches for the exam
- Know about shift in current opinion