

# Hand Surgery

# Hand examination

- Look (expose to elbows)
  - Swollen?
  - Deformity?
  - Painful?
  - Abnormal posture?



- Nothing to see → mass movement
  - Crepitus?
  - Loss of function?
- Nothing to see → quick sensory screen
- Neurovascular status of the hand

# The plan

- **The questions:**
  - What am I looking at?
  - Is it a skin lesion?
  - Is it a nerve injury/lesion?
  - Is it a vascular injury/lesion?
  - Is it a tendon injury/lesion?
  - Is it a bone or joint pathology?
  - Is it congenital?
  - Is it a tumor?
    - How can I now focus my examination?
  - Is it infection?
    - What investigations do I need?

# Fractures of the Metacarpals, phalanges

## Signes

- Swelling
- Deformity
- Pain
- Crepitation
- Loss of function

## Diagnosis

- X-Ray



# Treatment

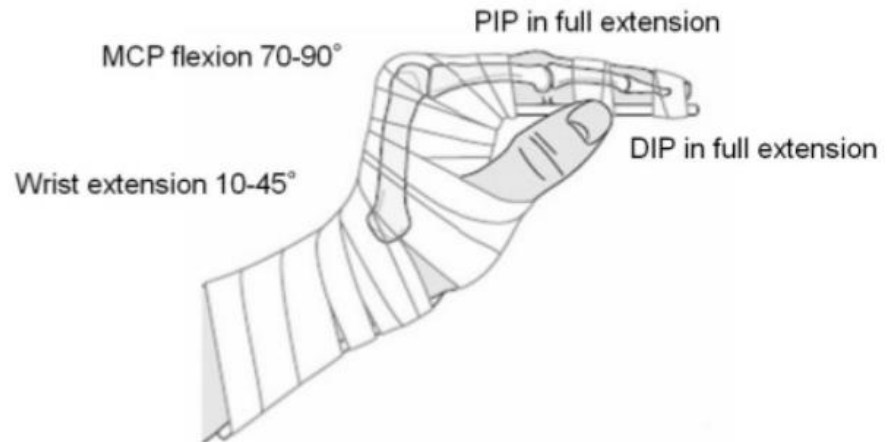
- **NONOPERATIVE**
- Plaster fixation
- **OPERATIVE FIXATION**
- K-wire+plaster fixation
- Screw fixation
- Mini plate
- Fixateur externe

# Treatment



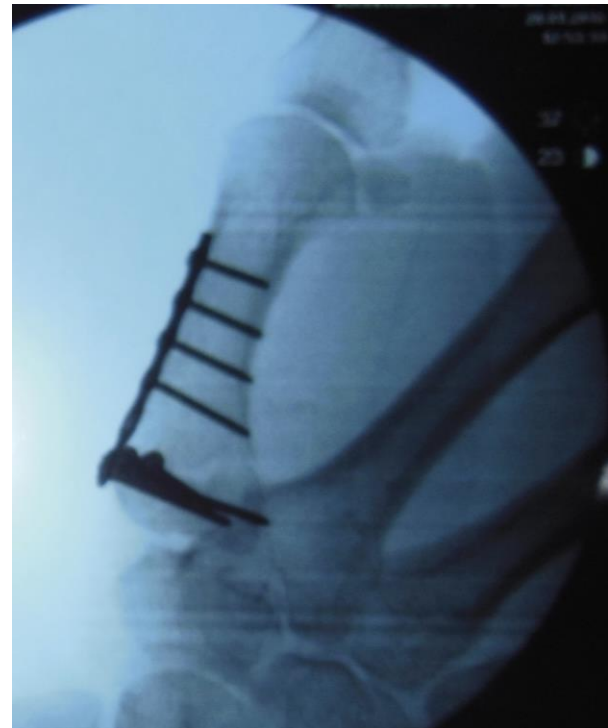
# Position of safe immobilisation (POSI)

- The functional position of the hand
- Radiocarpal: 30° dorsal extension
- MP: 60-90° flexion
- PIP and DIP: 10-15° flexion
  
- Safe/intrinsic plus position (PIP,DIP extended)



# Goals of treatment

- Length
- Alignment
- Rotation
- Restore the articular surface
- Minimise stiffness
- Optimise function
- If possible **AVOID** surgery
- Can I make the patient **WORSE**?





# Indications for surgery

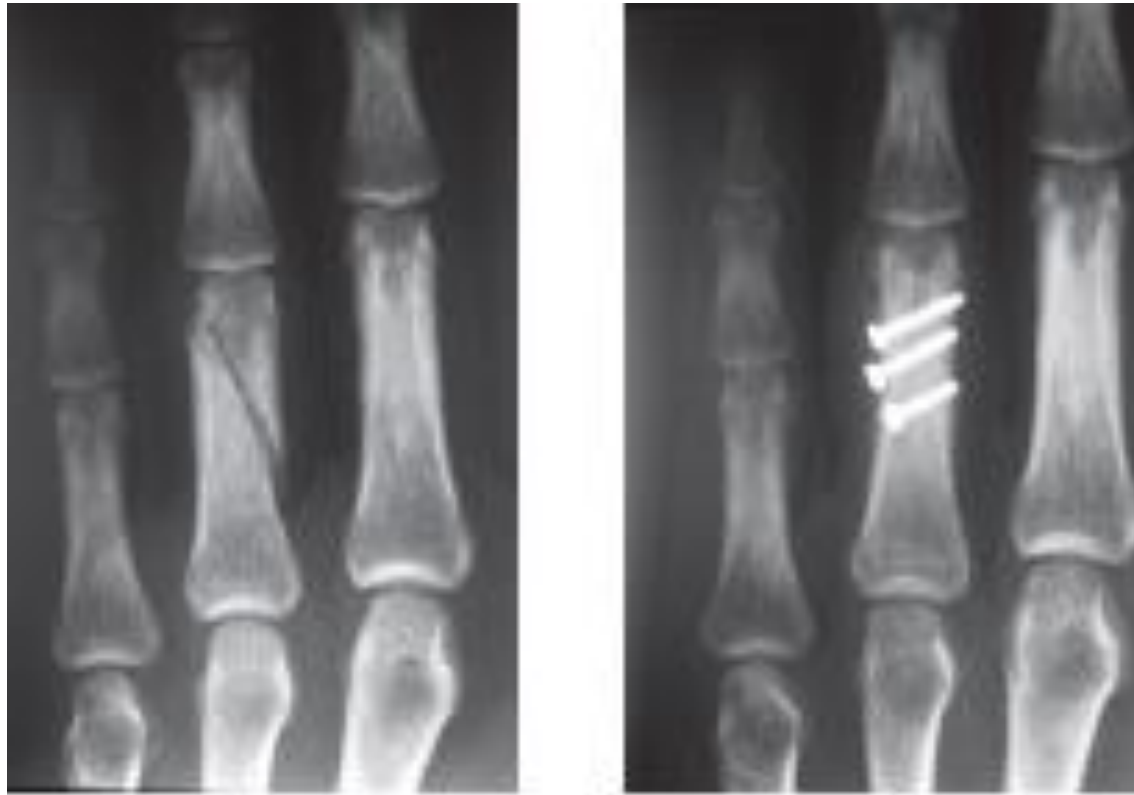
- Open fractures
- Irreducible fractures
- Scissoring
- Polytrauma



# Indications for Operative Fixation of Metacarpal and Phalangeal Fractures

- Irreducible fractures
- Malrotation (spiral and short oblique)
- Intra-articular fractures
- Subcapital fractures (phalangeal)
- Open fractures
- Segmental bone loss
- Polytrauma with hand fractures
- Multiple hand or wrist fractures
- Fractures with soft tissue injury (vessel, tendon, nerve, skin)
- Reconstruction (osteotomy)

# Screw fixation



# Plate fixation



# Metacarpals





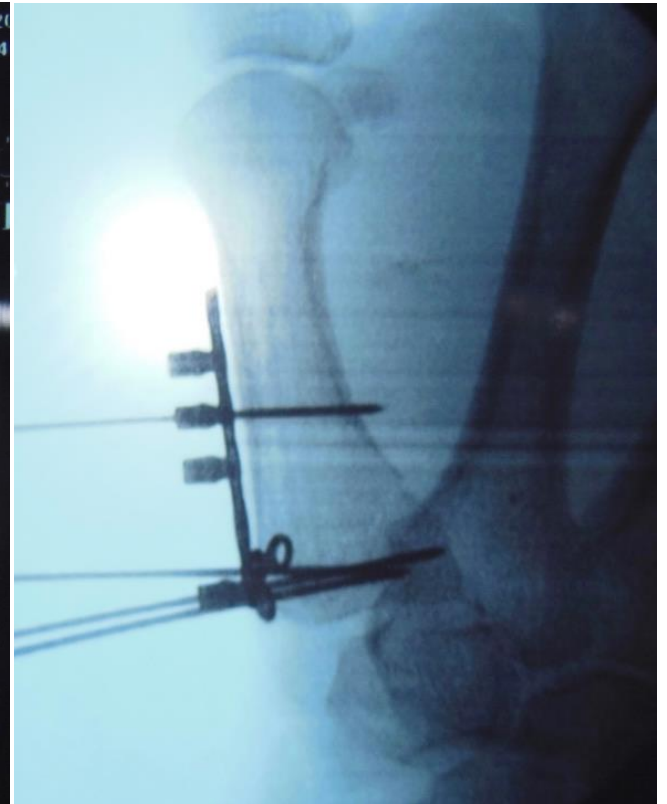
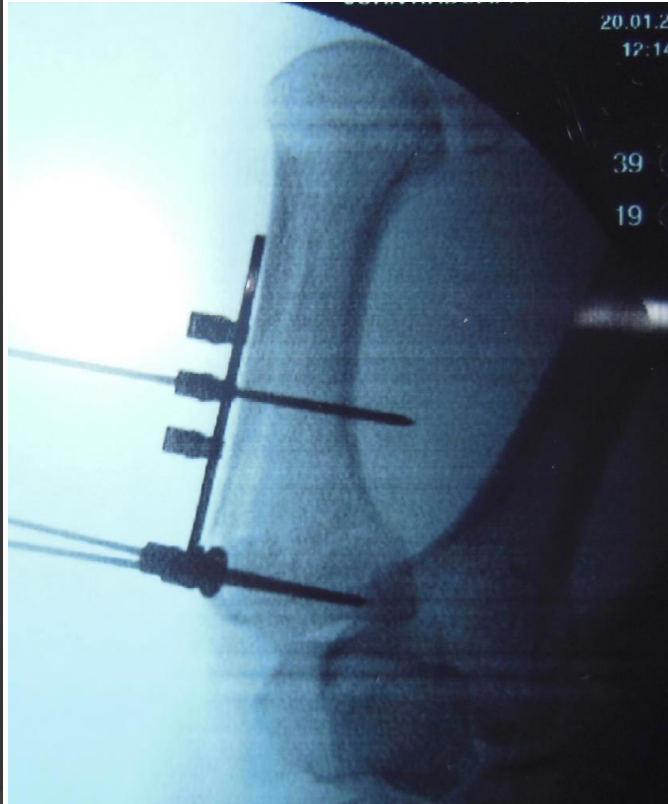
Bennett's Fracture



# Rolando







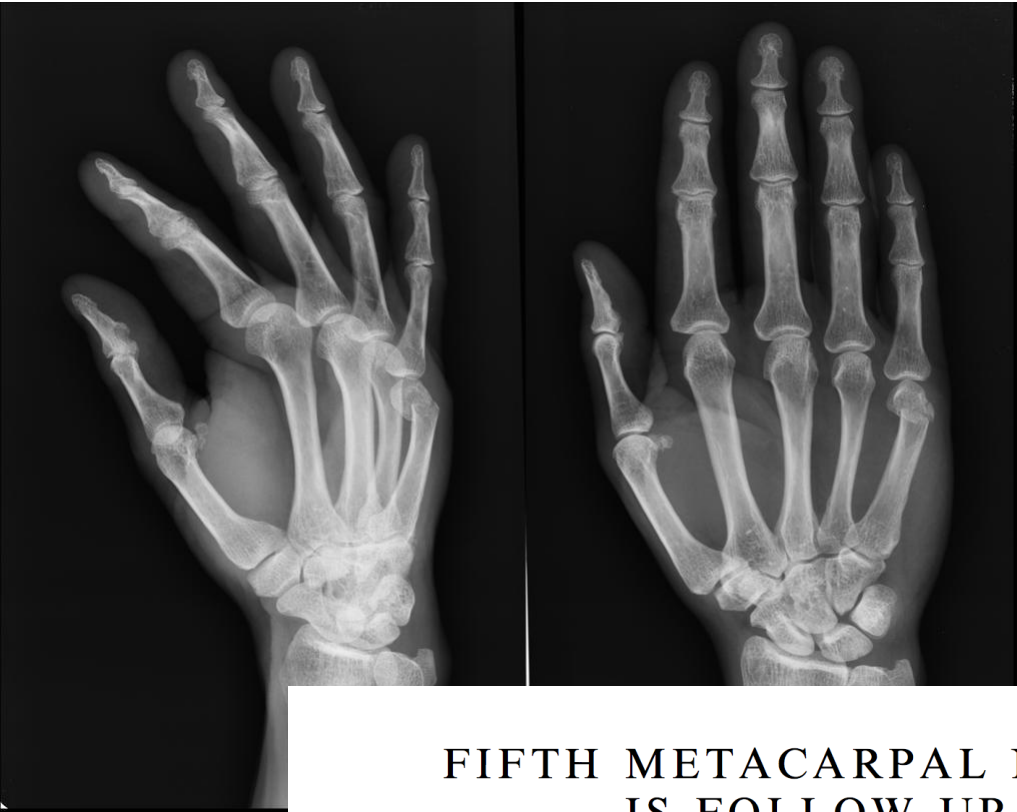
Rolando Fracture

# Boxer's fracture





Boxer's Fracture



## FIFTH METACARPAL NECK FRACTURES: IS FOLLOW-UP REQUIRED?

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**Do not miss this....**

Concentrate on the small stuff



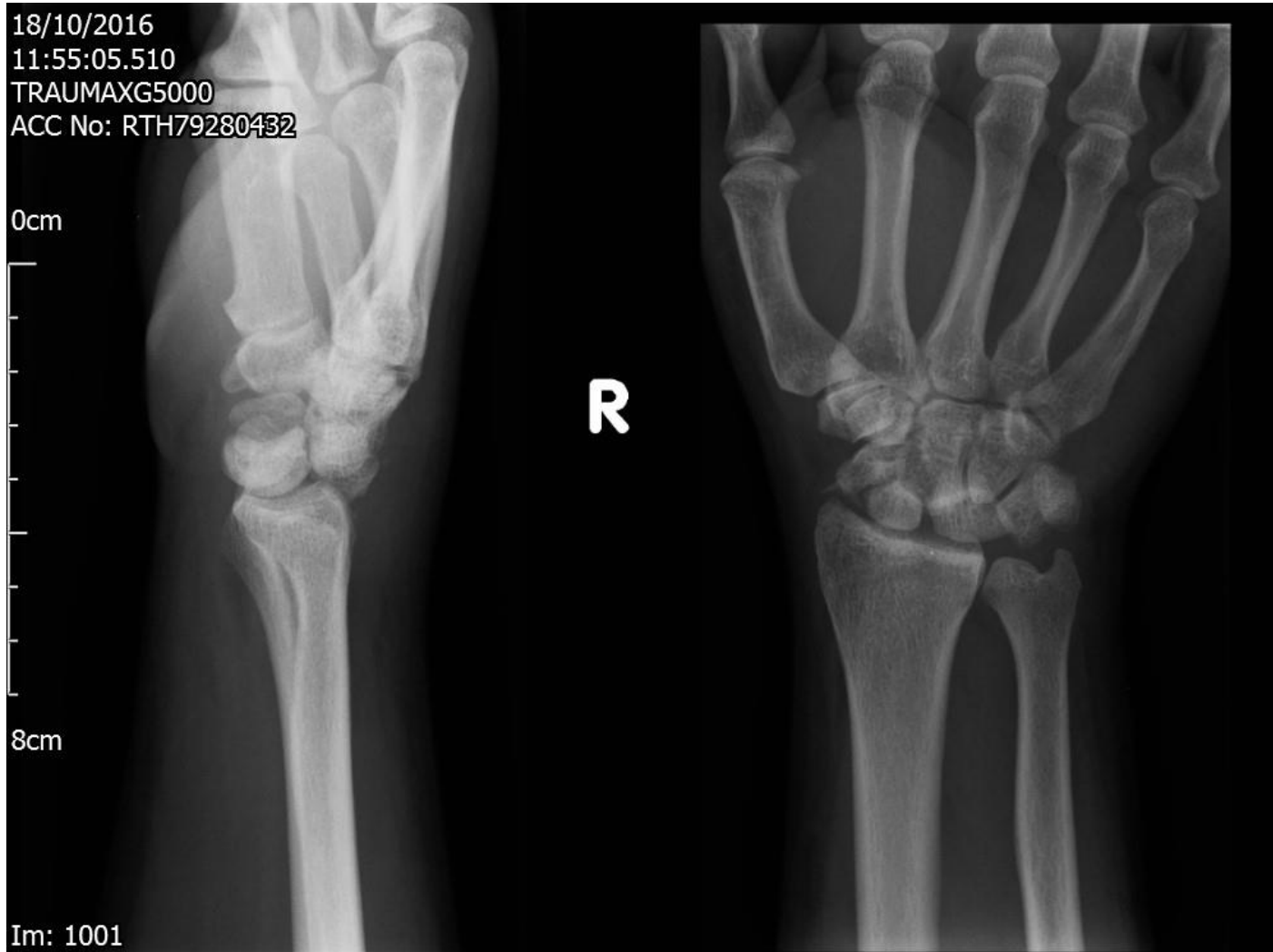
18/10/2016  
11:55:05.510  
TRAUMAXG5000  
ACC No: RTH79280432

0cm

8cm

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**Gilula's Lines**





# Perilunate dislocation

- High-energy trauma
- Palmar/dorsal
- Lunate remain in place



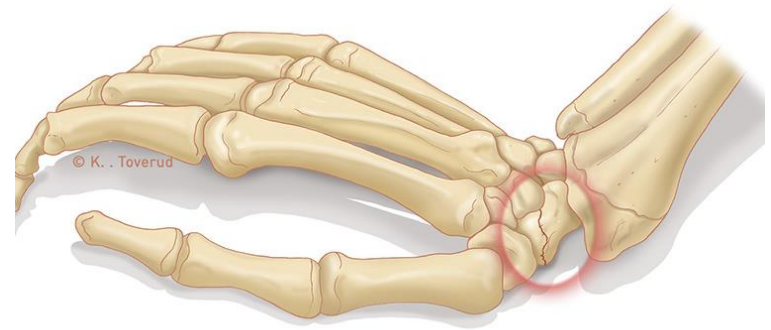
# Management

- Emergency treatment
  - Chinese finger traps
  - Manipulation
- Decompress the median nerve if signs
- Further imaging
- Discuss with hand team
- Reduce the lunate, hold it reduced
- Repair injured structures.



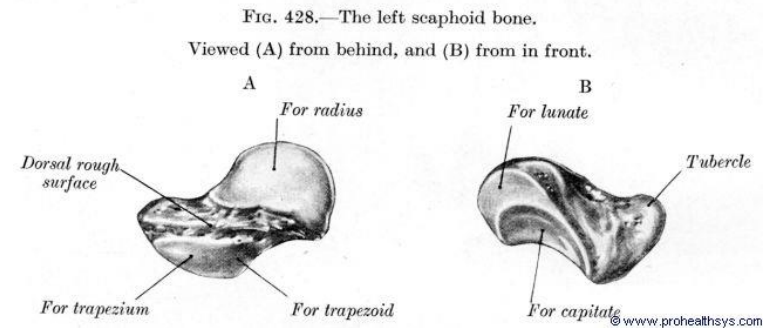
# Scaphoid Fractures

- Commonest carpal fracture
- Low energy - FOOSH
- 80% Males
- Average 25 years
- Incidence 50 per 100,000



# Anatomy

- Boat shaped
- 5 articular surfaces
- 85% surface cartilage
- "Link" between carpal rows
- Five ligaments
  - SL, RSC, STT, SC, DIC



# Vascularity

- Gelberman et al. 1980
- Retrograde supply
- Single interosseous artery
- Dorsal and volar branches
- Volar supplies 20-30%

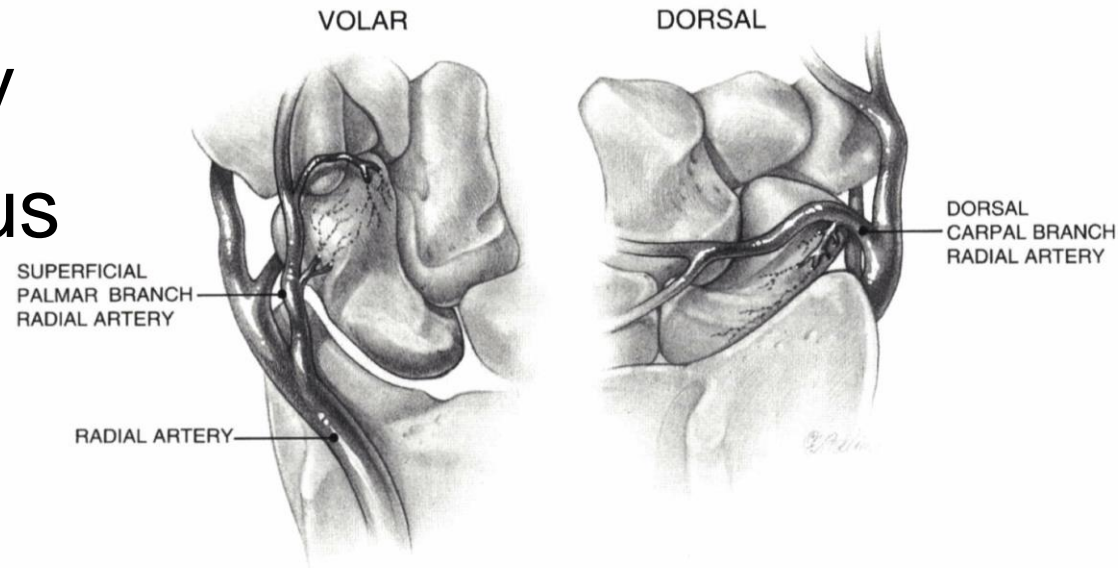
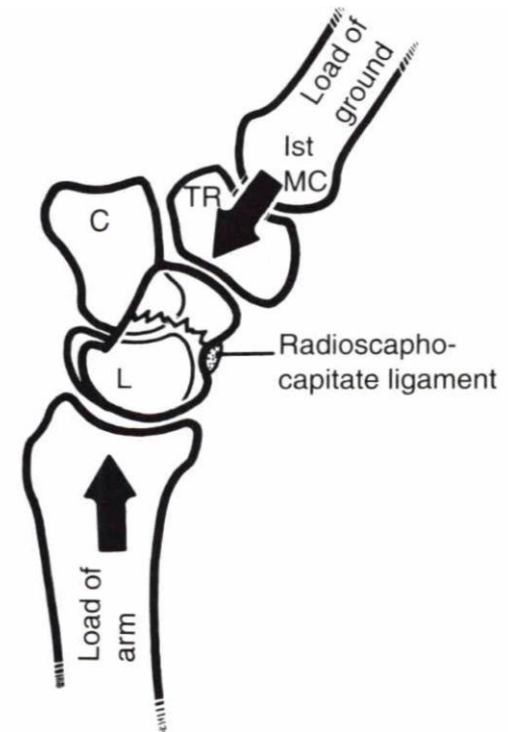


FIGURE 17-4. Schematic representation of the blood supply of the scaphoid.

# Biomechanics of fracture

- Wrist in extension
- Ulnarly deviated
- Mainly a radial sided force
- RSC acts as a fulcrum
- Volar fragmentation
- Humpback deformity

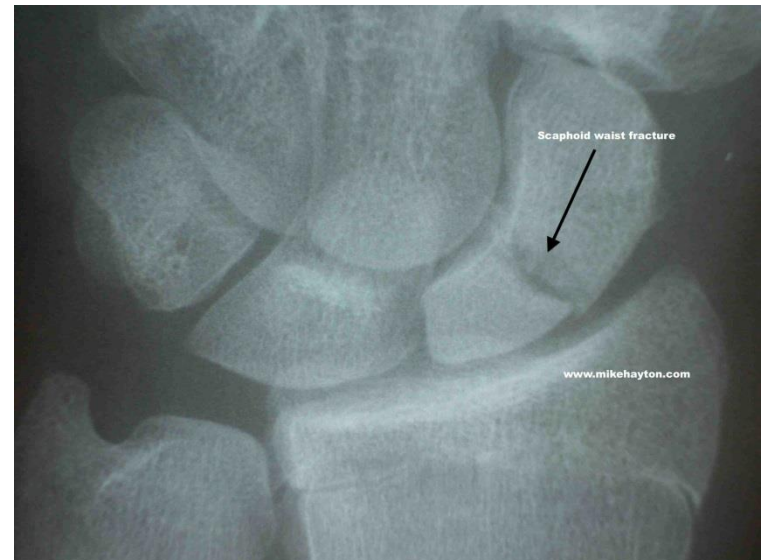


## Symptoms:

- Swelling , pain in the Fossa tabatiere
- Pain during the wrist extension

## Diagnosis

- X-ray
- CT
- MRI





# Clinical tests

**Table I.** Accuracy of clinical tests in diagnosis of scaphoid fractures

<b>Clinical tests</b>	<b>Specificity (%)*</b>	<b>Sensitivity (%)†</b>
Snuff box tenderness <sup>7</sup>	40	90
Effusion (On ultrasound) <sup>8</sup>	91	50
Tenderness over scaphoid tubercle <sup>7</sup>	57	87
Scaphoid compression test <sup>9</sup>	92	94
Combined <sup>10</sup>	74	100

Specificity= Number of true negatives/(Number of true negatives+ Number of false positives)

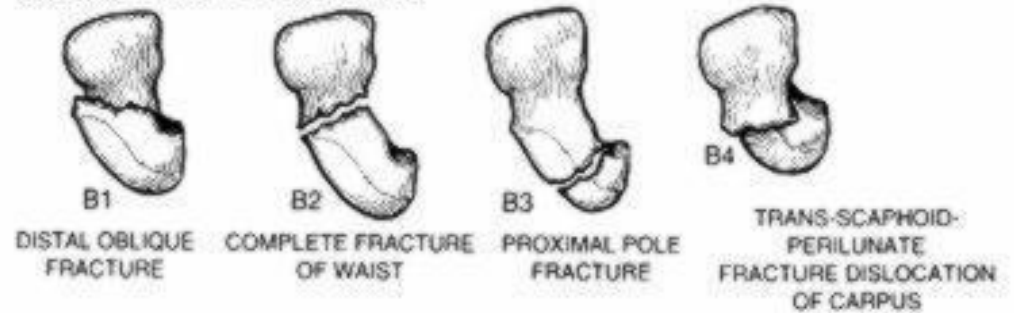
Sensitivity= Number of true positives/(Number of true positives+ Number of false negatives)

# Herbert classification

## TYPE A: STABLE ACUTE FRACTURES



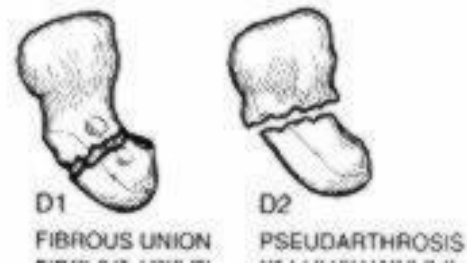
## TYPE B: UNSTABLE ACUTE FRACTURES



## TYPE C: DELAYED UNION



## TYPE D: ESTABLISHED NONUNION



# Non-operative Management

- Only for stable injuries....
  - tubercle
  - distal 1/3
  - incomplete waist
- Undisplaced waist
  - 12/52 below elbow inc. thumb





# Operative Management

- Undisplaced waist
  - Percutaneous
- Displaced waist
  - ORIF
- Proximal pole
  - ORIF



# Complications

- Delayed / nonunion / AVN
- Degenerative change
- Stiffness
- Screw prominence
- Can be as high as 30%



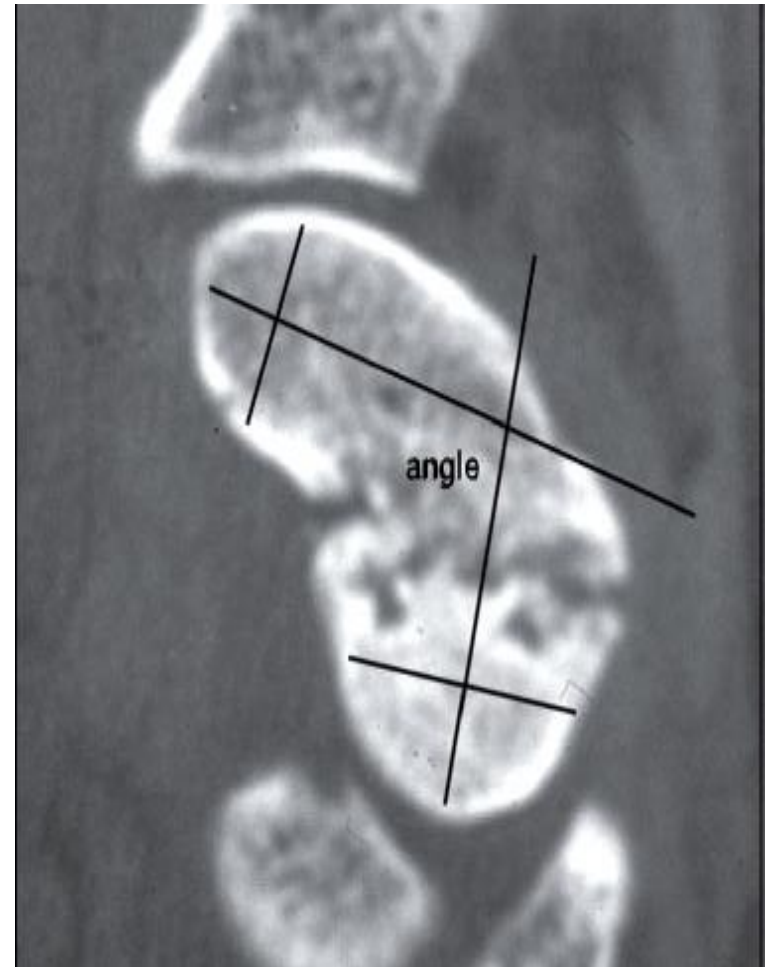
# Scaphoid Nonunion

- Failure of a bone to unite within an expected time frame
- 12 weeks for the scaphoid
- Aim - aligned, united scaphoid
- Will cause arthropathy...
- Will it be symptomatic??



# Assessment - planning

- Is there degeneration?
- Scaphoid alignment
- Bone loss
- Cysts
- Humpback deformity
- AVN



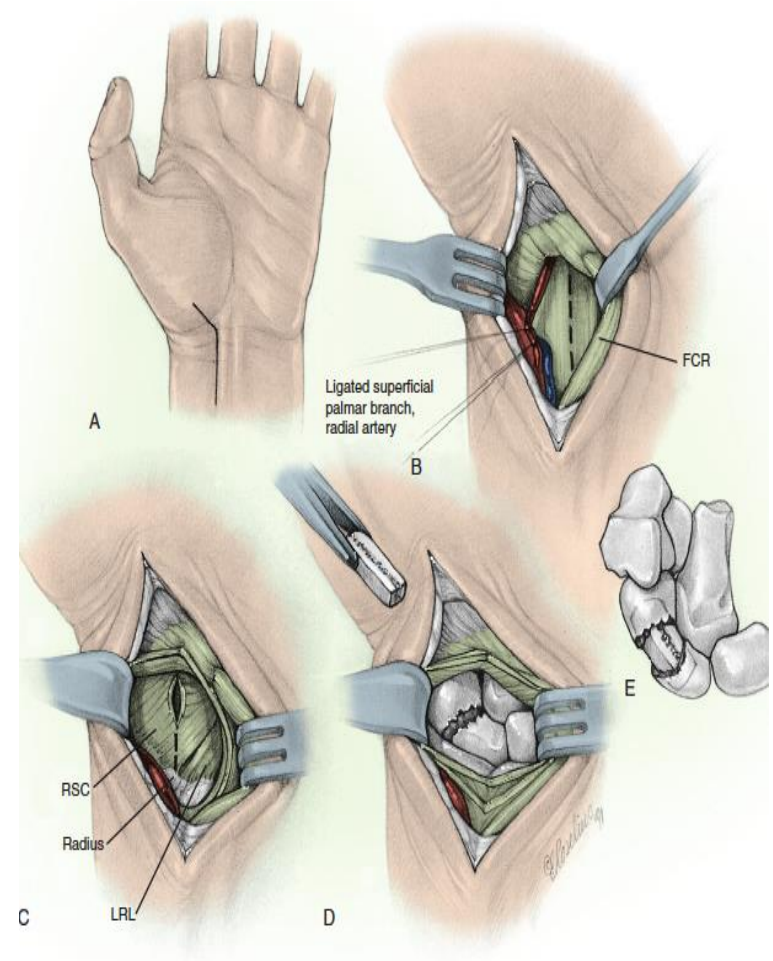


# Algorithm

ALGORITHM FOR SCAPHOID FRACTURE NONUNION MANAGEMENT	
Type of Fracture	Treatment
Delayed union	Percutaneous or open rigid fixation with a headless compression screw
Established nonunion Fibrous nonunion, waist Sclerotic nonunion, waist	Open repair and bone grafting Dorsal for proximal pole fracture Volar for waist fracture
Humpback nonunion, waist	Volar approach and corticocancellous wedge graft
Proximal pole nonunion, nonischemic	Dorsal approach Percutaneous or open bone grafting and fixation with headless screw Lock midcarpal joint with mini-screw, or Sandwich proximal fragment between lunate and scaphoid waist with headless screw
Vascular nonunion, waist or proximal pole	Vascularized bone graft: dorsal or palmar approach

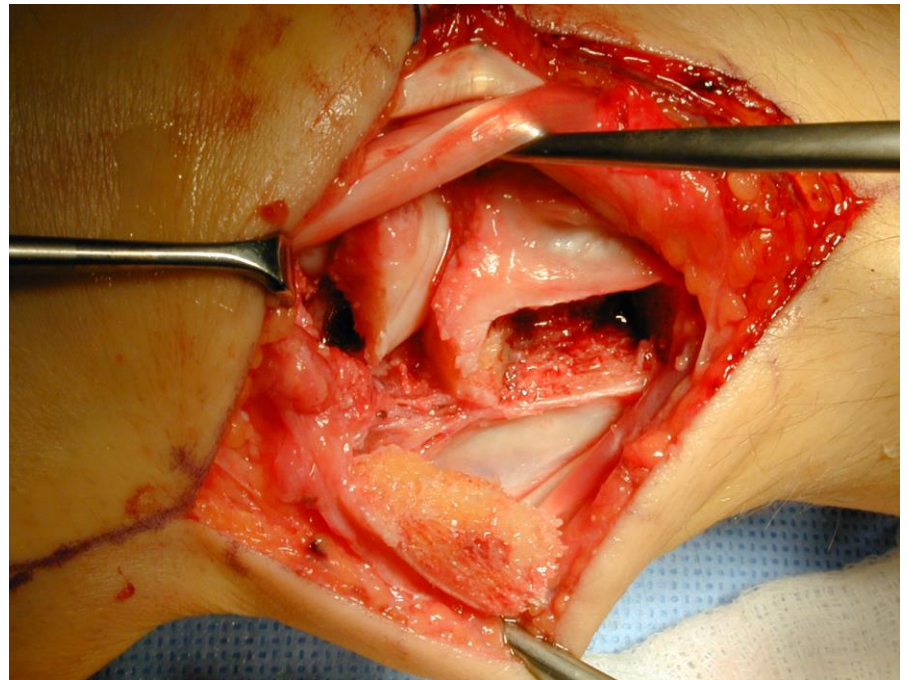
# Operative options

- Fixation
- Non vascularised bone graft
- Matti-Russe or crest



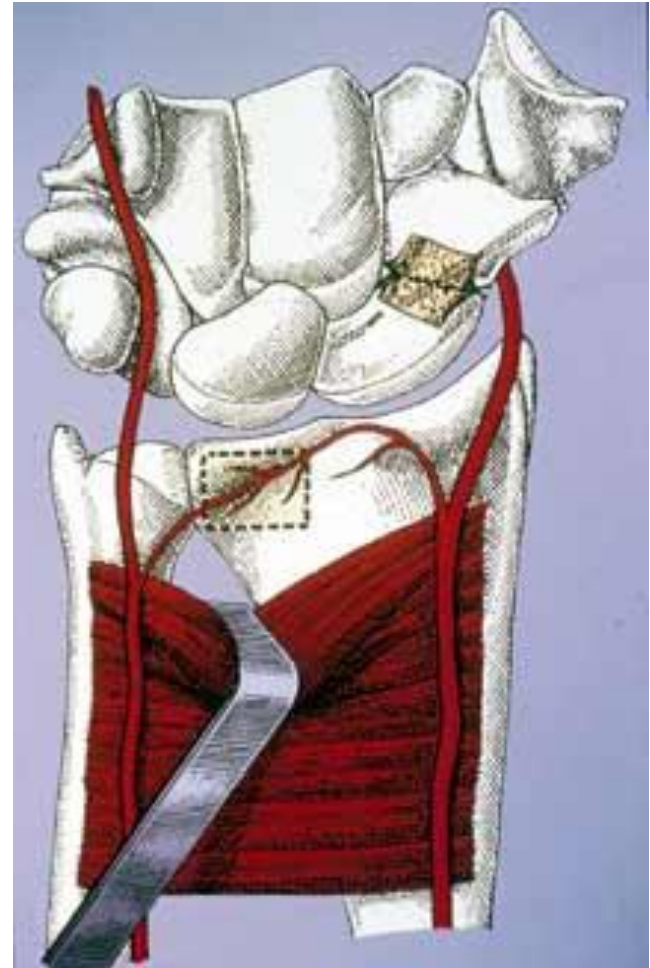
# Operative options

- Fixation
- Non vascularised bone graft
  - Matti-Russe
- Vascularised bone graft
  - PQ - Kuhlmann
  - Zaidenberg
  - Medial femoral condyle



# Treatment of the PSA

- OPERATIVE
- screw
- Bone graft+screw
- Pedicled bone graft



# Prognosis?

- Meta-analysis - nonunion
  - 1600 articles - 48 eligible
  - Screw and graft - 94% union
  - Wire and graft - 77% union
- Meta-analysis - AVN
  - 88% union vascularised
  - 47% union non-vascularised



*Pinder et al, JHS(E) 2015*

# Scaphoid Nonunion Advanced Collapse

- However, do we know how many of the scaphoid nonunions progress to a SNAC wrist?
- And, do we know the percentage of these which develop symptoms?



# SNAC wrist pattern

- I—The interface between the radius scaphoid fossa and the fractured scaphoid distal fragment interface is affected.
- In Stage II, the interface between the fractured scaphoid proximal fragment and capitate is also affected.
- In Stage III, Radius-scaphoid, scaphoid-capitate and lunate-capitate interfaces are affected. In this system, the interface between the fractured scaphoid proximal pole and radius is not included, since it is frequently spared.



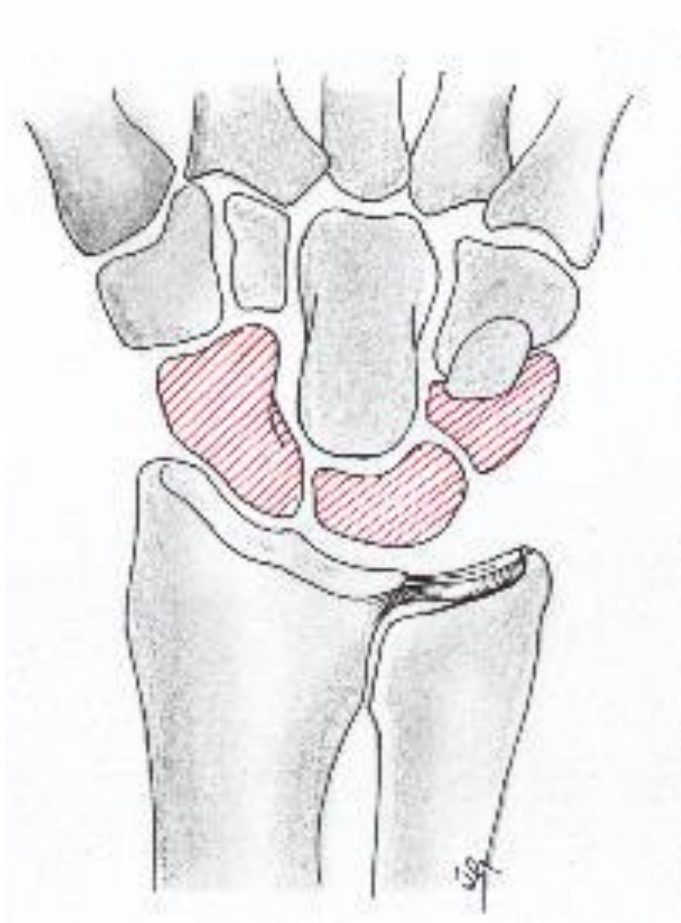


# Styloidectomy

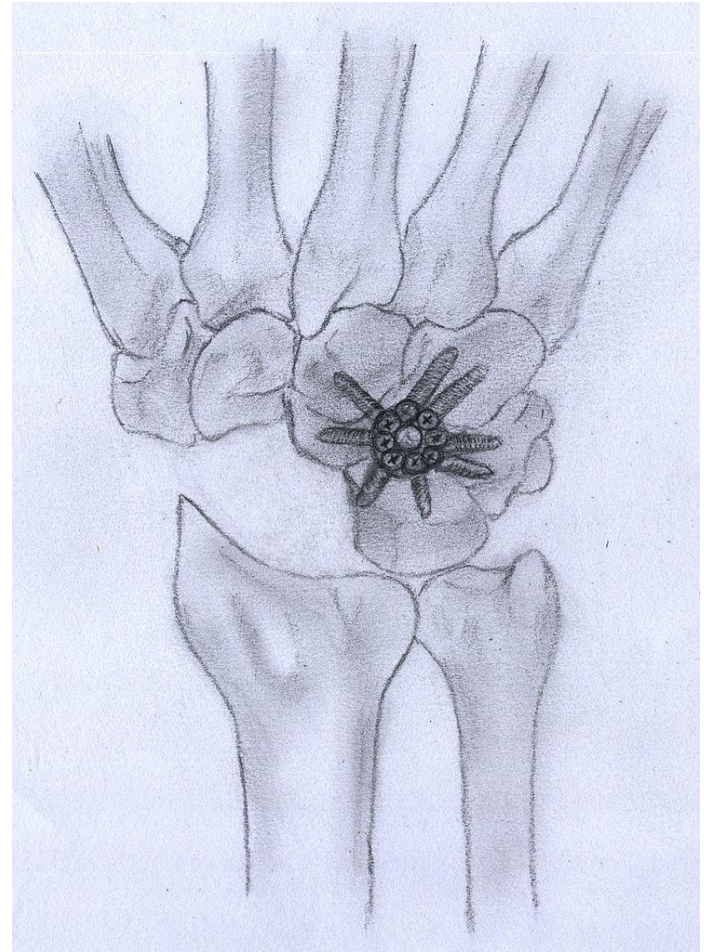




PRC



4CF



# PRC, 4CF



# Total wrist arthrodesis



# Total wrist arthroplasty

