SPORTS INJURIES IN HAND

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EPIDEMIOLOGY

Incidence of hand, finger and wrist injuries in sports :

3% – 9 %

RADIAL-SIDED WRIST PAIN

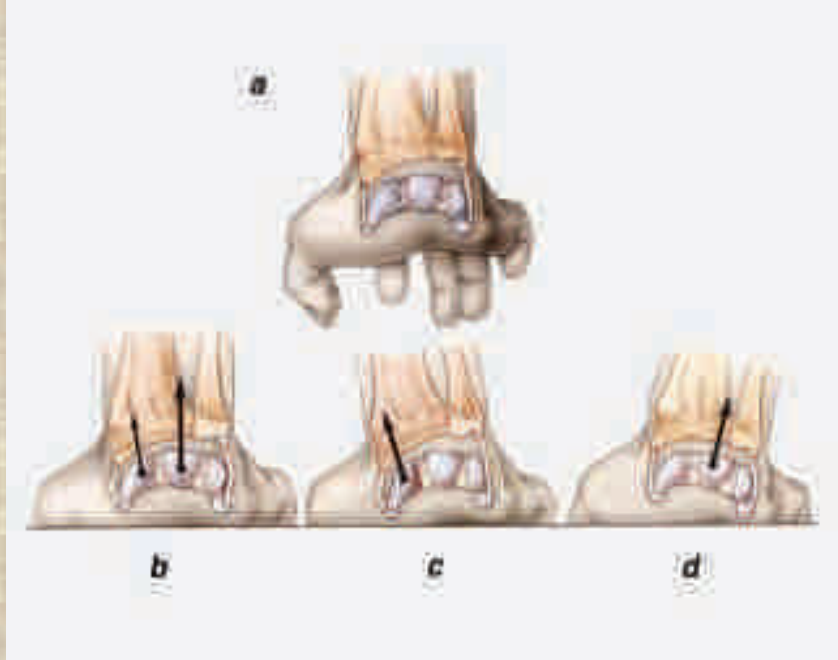
1) Distal Radius Fractures
2) Scaphoid Fractures
3) Rotatory Subluxation of the scaphoid
4) Kienbock Disease
5) De Quervain Tenosynovitis
6) Intersection Syndrome
7) Wartenberg Syndrome

RADIAL-SIDED WRIST PAIN

1) Distal Radius Fractures

RADIAL-SIDED WRIST PAIN

1) Distal Radius Fractures



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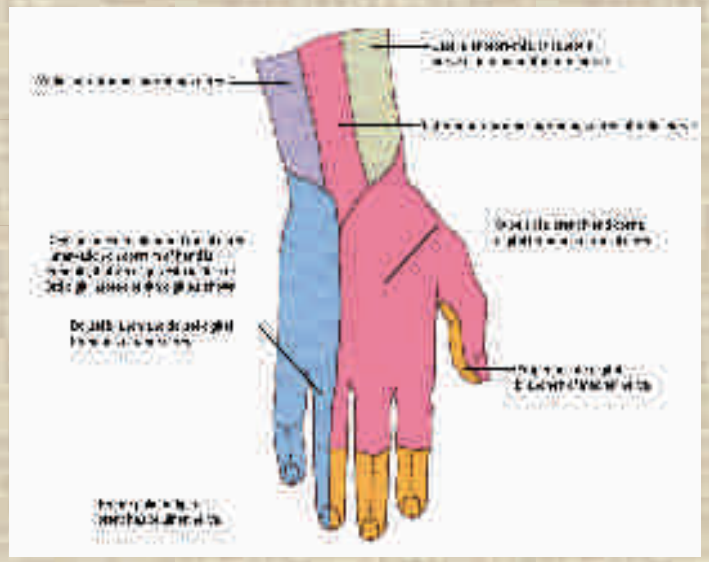

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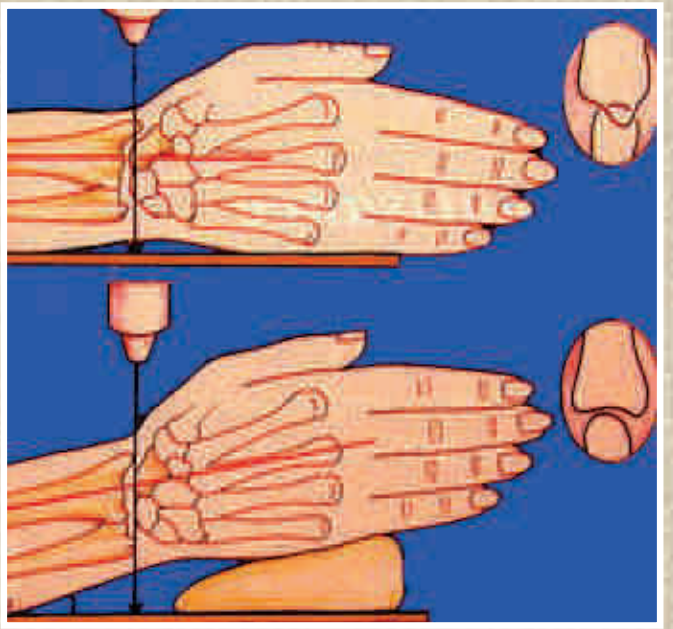

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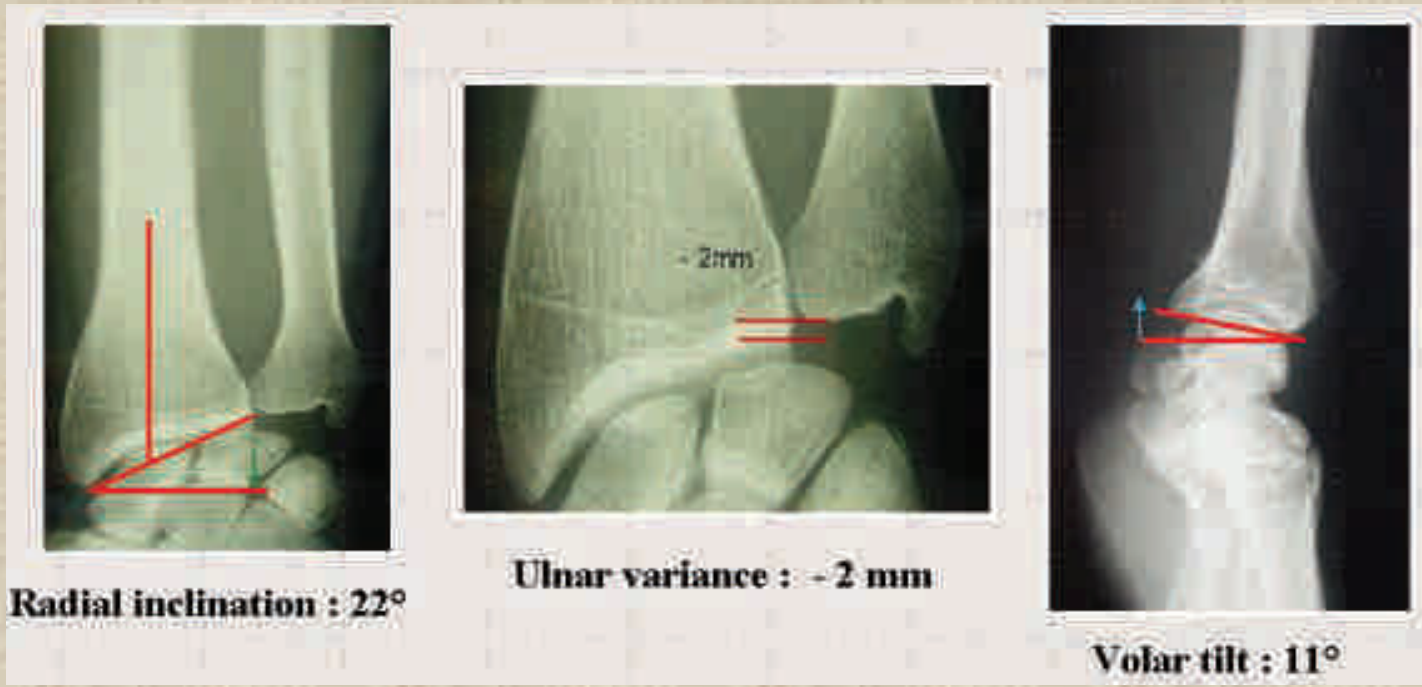

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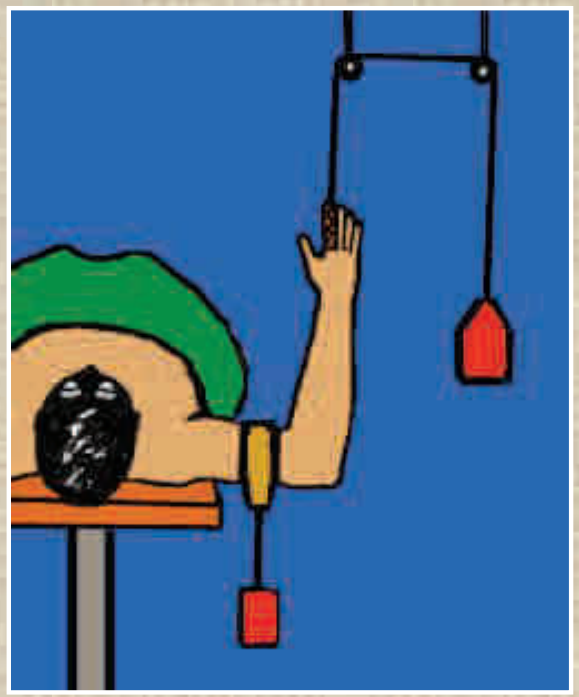

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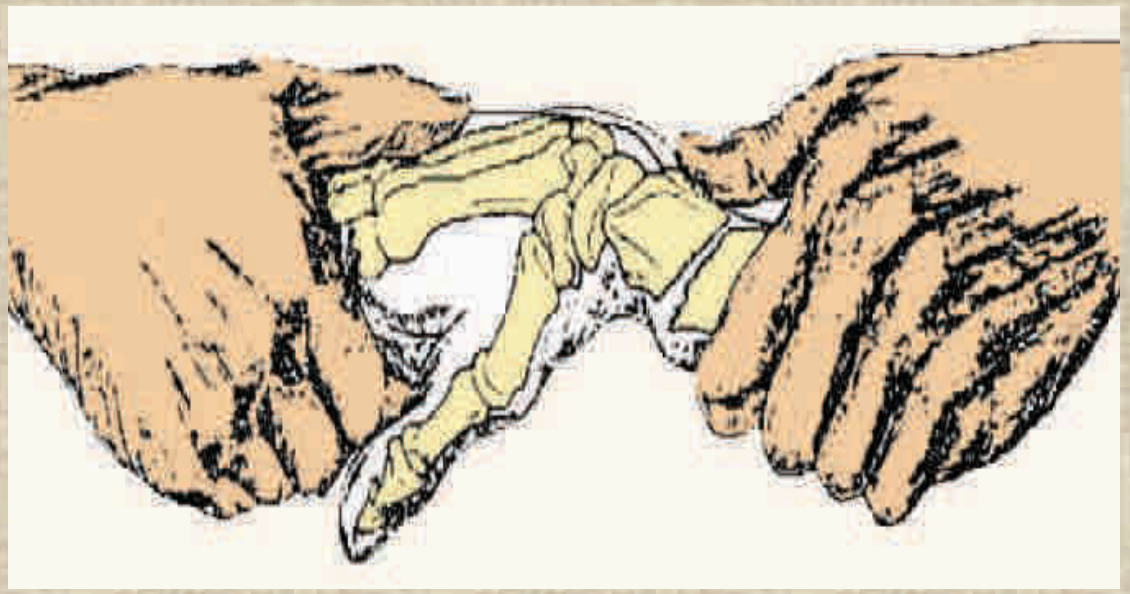

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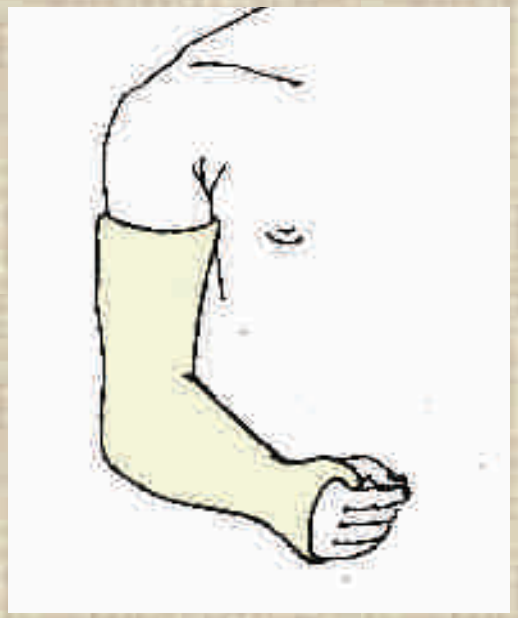

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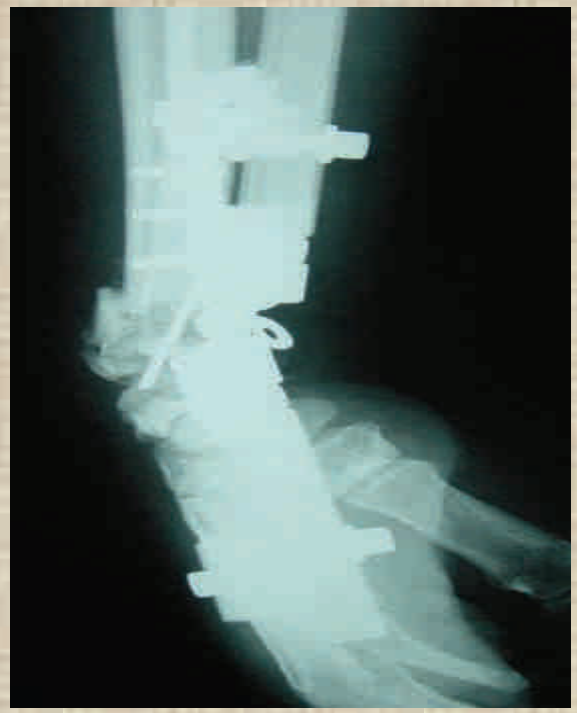

RADIAL-SIDED WRIST PAIN

2) Scaphoid Fractures

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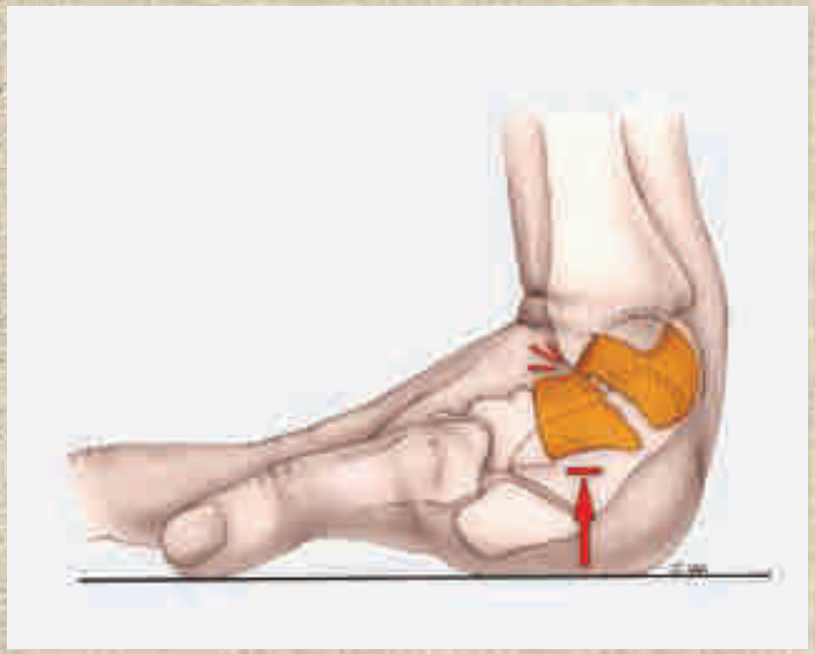
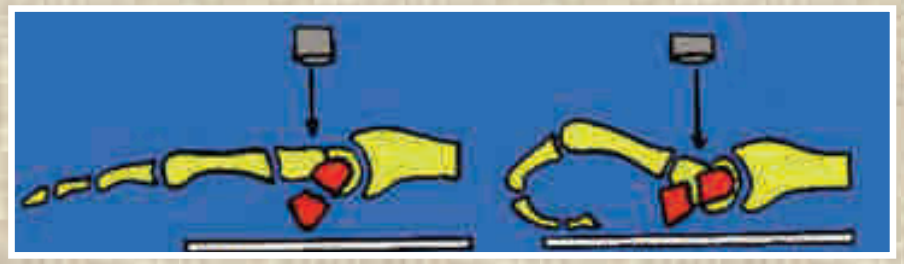
2) Scaphoid Fractures



- **70% of all carpal fractures**
- **Most frequent wrist fracture in the athlete**
- **Hockey, football, boxing, basketball**

RADIAL-SIDED WRIST PAIN

2) Scaphoid Fractures



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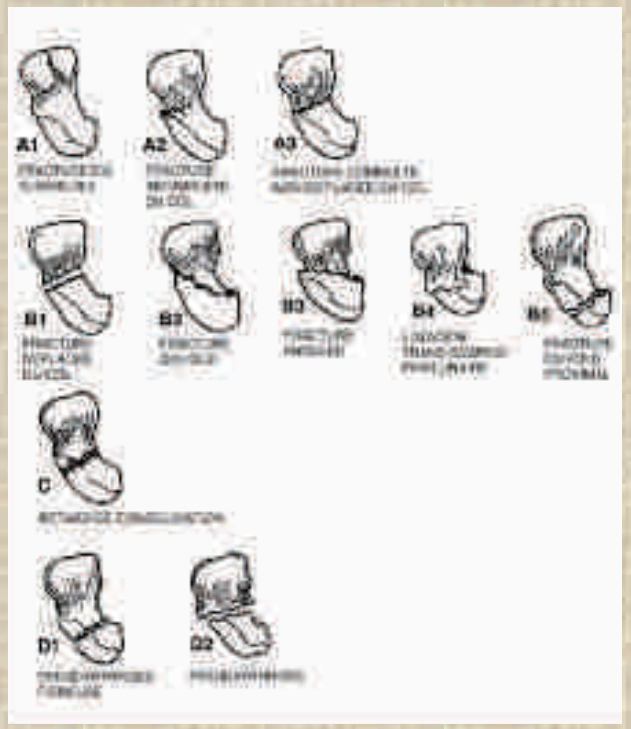
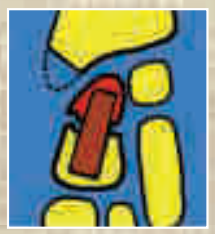




RADIAL-SIDED WRIST PAIN

2) Scaphoid Fractures

Non-union

RADIAL-SIDED WRIST PAIN

3) Rotatory Subluxation of the scaphoid

Pathomechanics :

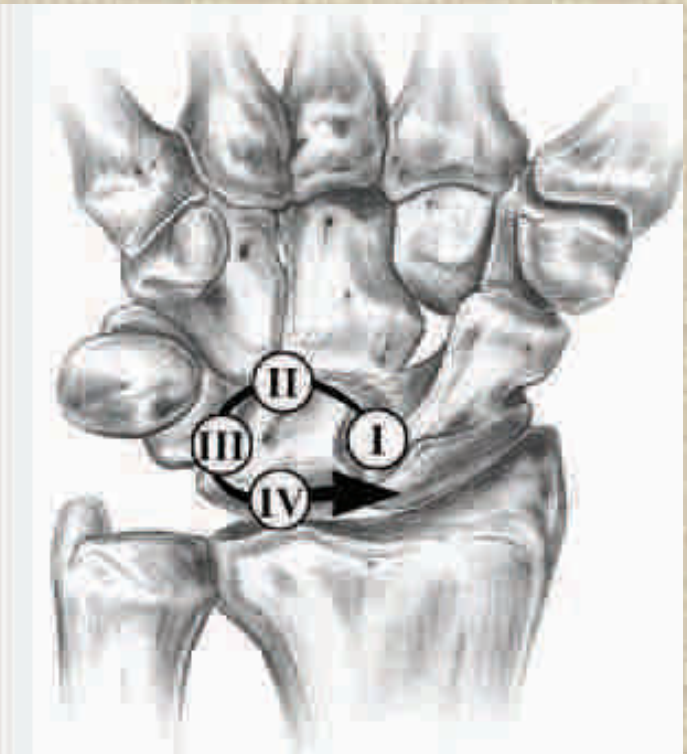
- Wrist hyperextension

- Ulnar deviation

- Intracarpal supination

RADIAL-SIDED WRIST PAIN

3) Rotatory Subluxation of the scaphoid



Mayfield's stages of progressive perilunate instability

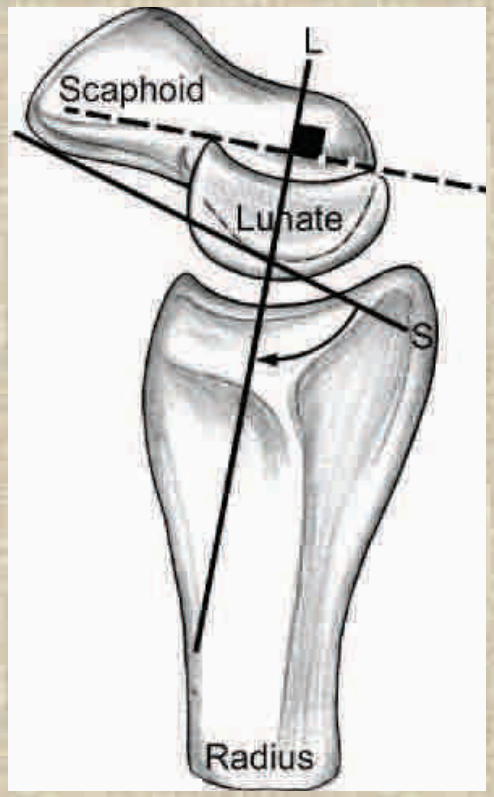
RADIAL-SIDED WRIST PAIN

3) Rotatory Subluxation of the scaphoid

Watson's maneuver :
Pressure applied over scaphoid tubercle
while moving the wrist from an ulnar to radial direction.
A positive test elicits pain and a palpable clunk or snapping

RADIAL-SIDED WRIST PAIN

3) Rotatory Subluxation of the scaphoid



Measurement of the scapholunate angle
(30 – 60 ° = normal)

RADIAL-SIDED WRIST PAIN

3) Rotatory Subluxation of the scaphoid

Treatment options :

- Acute injuries (< 3 weeks) → open reduction + repair of the ligament

- Subacute (between 3 weeks and 3 months) → controversial

- Chronic → Ligamentoplasty, full or partial wrist fusion or proximal row carpectomy

RADIAL-SIDED WRIST PAIN

3) Rotatory Subluxation of the scaphoid ?

RADIAL-SIDED WRIST PAIN

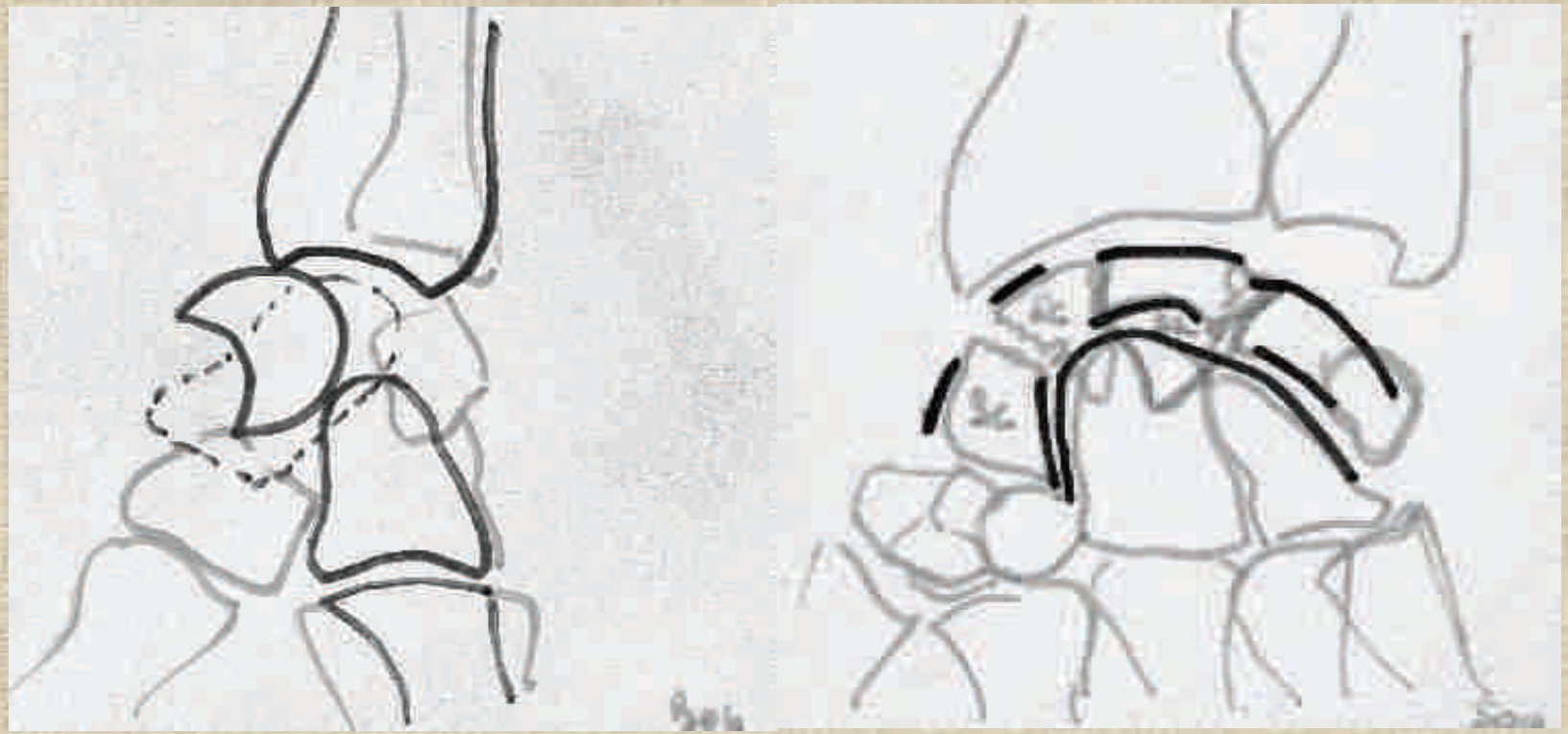
3) Perilunate dislocation

RADIAL-SIDED WRIST PAIN

3) Trans scapho perilunate fracture dislocation

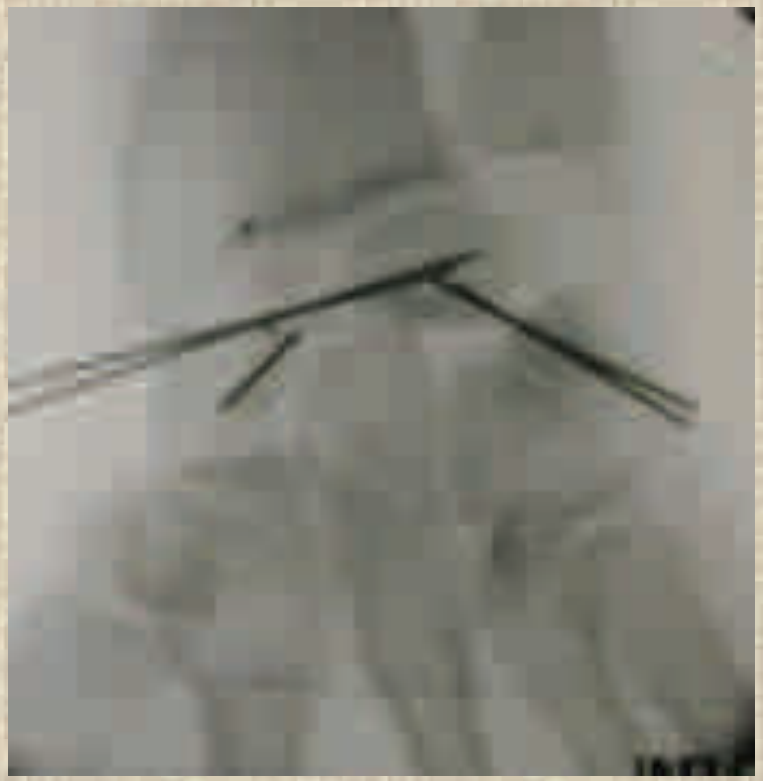
RADIAL-SIDED WRIST PAIN

3) Trans scapho perilunate fracture dislocation



RADIAL-SIDED WRIST PAIN

3) Trans scapho perilunate fracture dislocation



RADIAL-SIDED WRIST PAIN

4) Kienbock Disease

- **Avascular necrosis of the lunate**
- **Etiology (controversial) : trauma, poor blood supply**
- **Active individual between 20 and 25 years**
- **Examination : swelling, tenderness, ↓ ROM, ↓ strength**

RADIAL-SIDED WRIST PAIN

4) Kienbock Disease

TABLE 1. STAGING OF KIENBÖCK'S DISEASE

Stage 0*	Normal x-ray with abnormal magnetic resonance imaging
Stage I	Lunate fracture without density or shape change
Stage II	Increased lunate density without significant change in lunate size or shape and relationship of the bones is not changed. Significant fracture lines may be noted.
Stage IIIa	Lunate collapse without carpal collapse
Stage IIIb	Static carpal collapse
Stage IV	Extensive osteoarthritic changes

* Amadio PC, Hanssen AD, Earnest TH. The genesis of Kienböck's disease: evaluation of a case by magnetic resonance imaging. J Hand Surg [Am]. 1987;12 (6):1044-1045.

RADIAL-SIDED WRIST PAIN

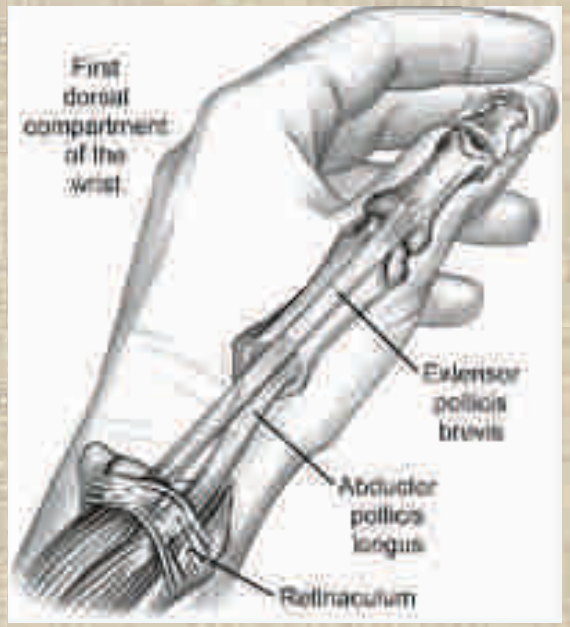
4) Kienbock Disease

Treatment :

- **Ulna minus → radial shortening procedure**
- **Ulna positive / neutral wrist → revascularization, STT fusion, capitate shortening**
- **Arthritic changes / carpal collapse → PRC or radiocarpal fusion**

RADIAL-SIDED WRIST PAIN

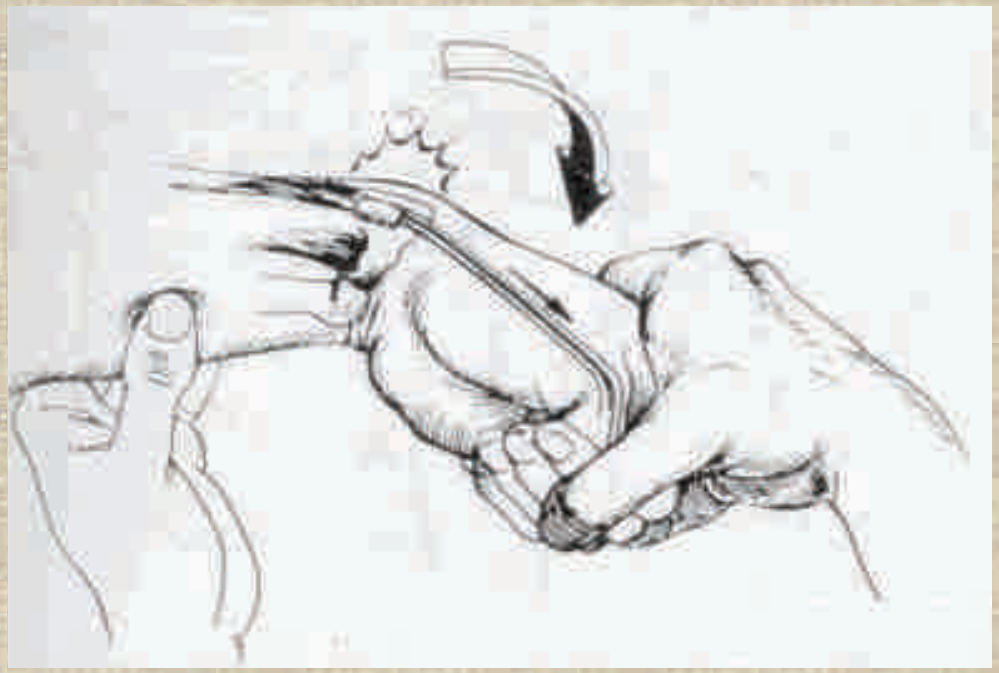
5) De Quervain Tenosynovitis



- **Most common form of tenosynovitis reported in the athlete**
- **Most often racquet sport**
- **Repetitive ulnar deviation**

RADIAL-SIDED WRIST PAIN

5) De Quervain Tenosynovitis



Finkelstein test

RADIAL-SIDED WRIST PAIN

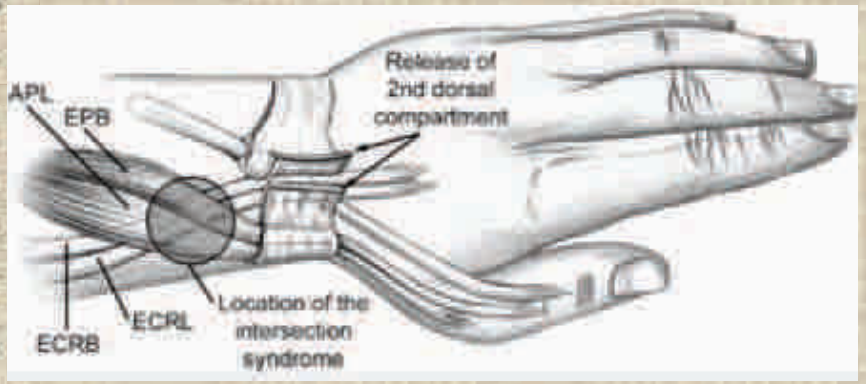
5) De Quervain Tenosynovitis

Treatment :

- **Splinting and steroid injection (80% successful)**
- **Operative decompression**

RADIAL-SIDED WRIST PAIN

6) Intersection Syndrome



- **Repetitive wrist flexion and extension against resistance**
- **Rowing, weight lifting, gymnastics**

RADIAL-SIDED WRIST PAIN

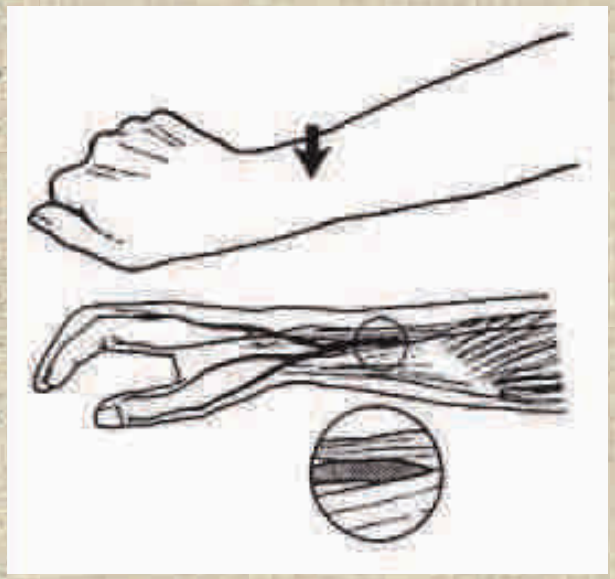
6) Intersection Syndrome

Treatment :

- **Nonoperative treatment is usually successful**
- **Splinting, NSAID and steroid injection**
- **Surgical exploration and debridement**

RADIAL-SIDED WRIST PAIN

7) Wartenberg Syndrome



- **Pain, numbness and tingling (dorsoradial aspect of the hand and thumb)**
- **↑ symptoms during wrist flexion and ulnar deviation**

RADIAL-SIDED WRIST PAIN

7) Wartenberg Syndrome

Treatment :

- **Nonoperative management : rest, ice, splinting**
- **Surgical decompression of the nerve**
- **Early motion to prevent adhesions**

ULNAR WRIST PAIN

1) TFCC Tears
2) Ulnar impaction Syndrome
3) Hamate Fractures
4) Lunotriquetral Instability
5) Extensor carpi ulnaris (ECU) tendonitis
6) Pisotriquetral arthrosis

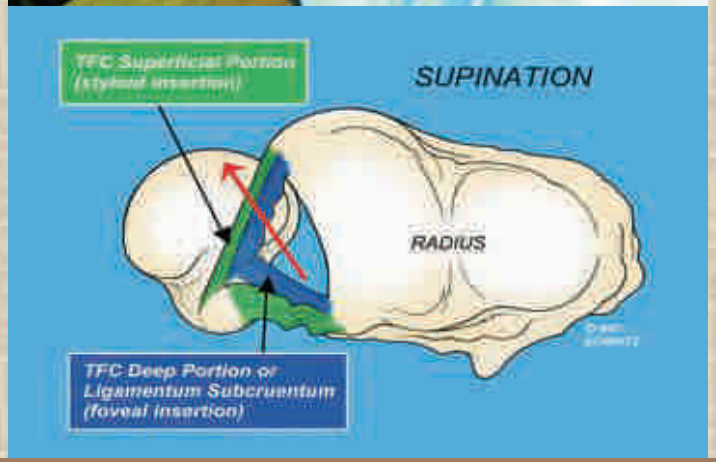
ULNAR WRIST PAIN

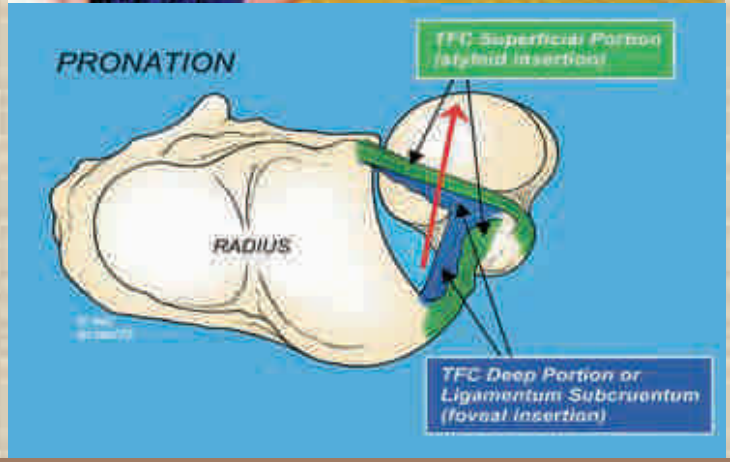
1) TFCC Tears

- **Fall on an outstretched, pronated hand**
- **Popping with forearm rotation**

ULNAR WRIST PAIN

1) TFCC Tears





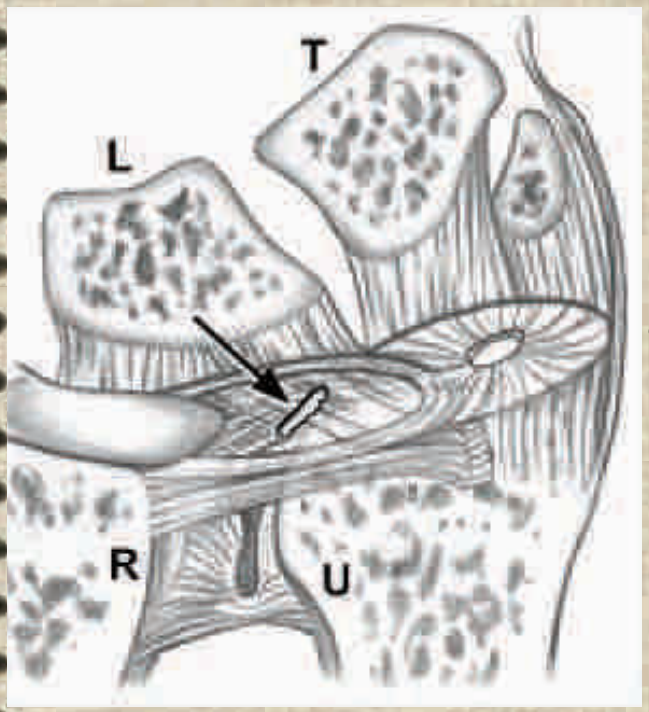
ULNAR WRIST PAIN

1) TFCC Tears

- **PA and lateral view (ulnar variance)**
- **MRI with arthrography**
- **Arthroscopy**

ULNAR WRIST PAIN

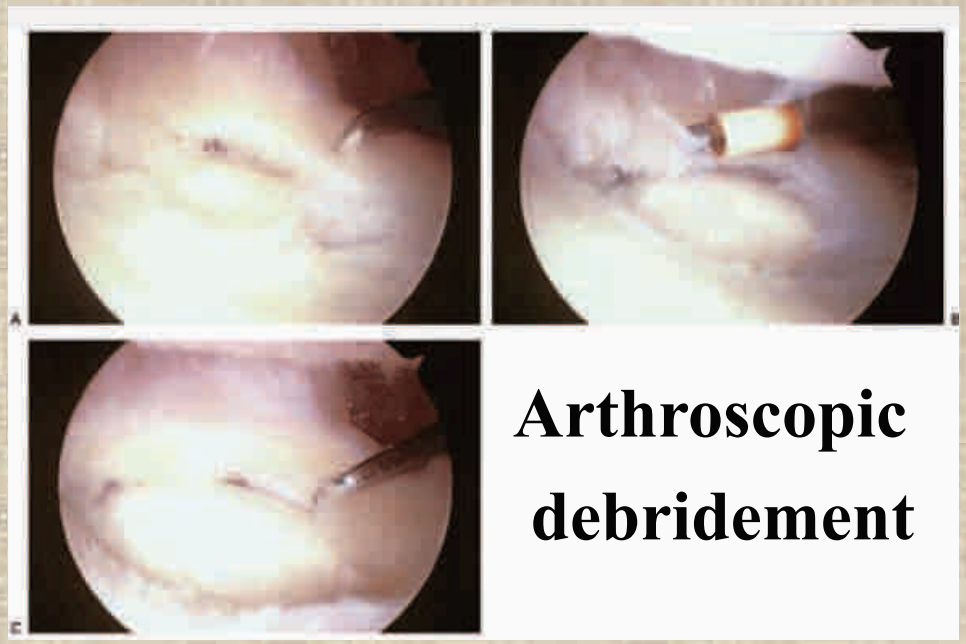
1) TFCC Tears



- **Most common of the traumatic tears in athletes are central tears (Palmer 1A)**

ULNAR WRIST PAIN

1) TFCC Tears

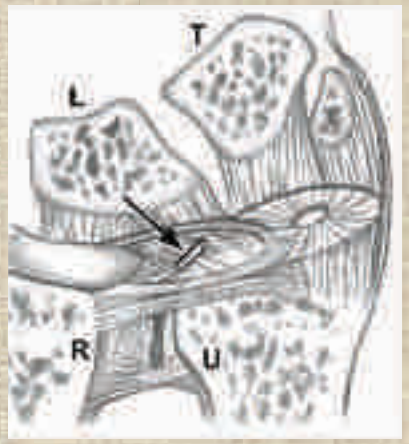


Arthroscopic debridement

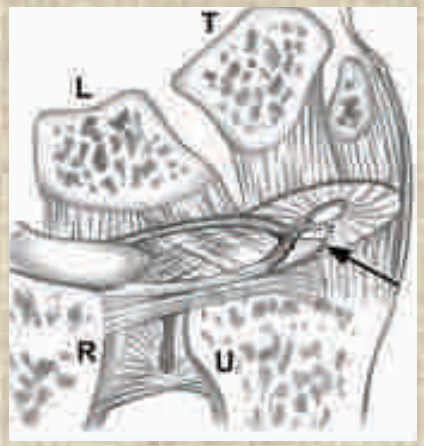
ULNAR WRIST PAIN

1) TFCC Tears

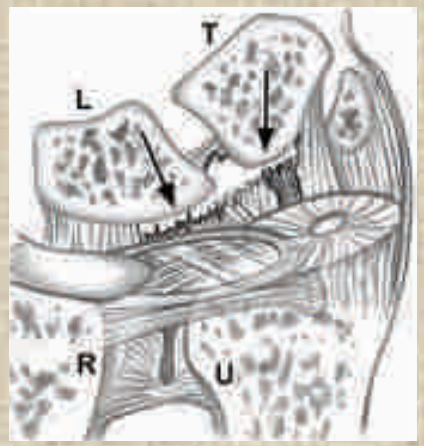
Palmer class	Treatment
1A	Arthroscopic debridement
1B	Arthroscopic repair
1C	Open repair
1D	Arthroscopic repair



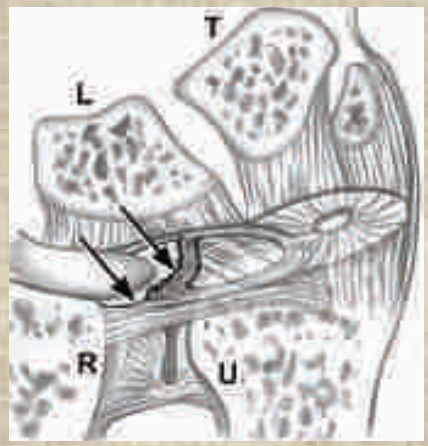
1A



1B

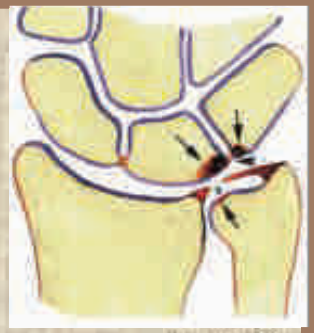


1C



1D

ULNAR WRIST PAIN



2) Ulnar impaction Syndrome

Fraying of the articular disc but no perforation → 2A | Conservative care

2A + chondromalacia of the ulnar head, lunate, and triquetrum → 2B | Conservative care/open wafer procedure

2B + perforation of the TFC in the center of the disc → 2C | Arthroscopic wafer procedure

2C + lunotriquetral tear → 2D

Stable LT joint	Arthroscopic wafer procedure
Mild LT instability	Ulnar shortening
LT instability, dorsal intercalated segmental instability deformity	Ulnar shortening/intercarpal fusion

2D + degenerative arthritis of the ulnocarpal joint and distal radioulnar joint → 2E | Ulnar resection, Sauve-Kapandji

LT, lunotriquetral

ULNAR WRIST PAIN

2) Ulnar impaction Syndrome

Arthroscopic wafer procedure

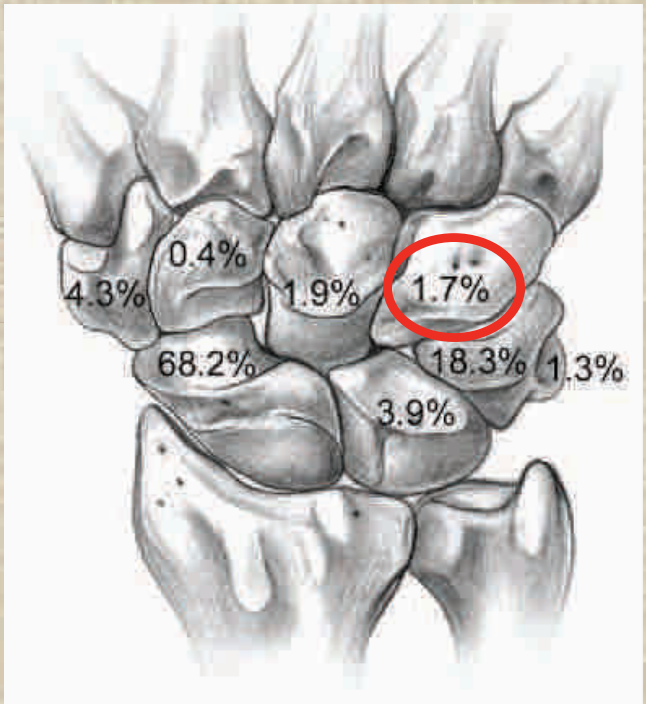
ULNAR WRIST PAIN

2) Ulnar impaction Syndrome

ulnar-shortening procedure

ULNAR WRIST PAIN

3) Hamate Fractures



Small proportion of all carpal fractures

ULNAR WRIST PAIN

3) Hamate Fractures

<u>Distribution :</u>

Golf 33 %

Baseball 9.5 %

Tennis 4.8 %

Weightlifting 4.8 %

Diving 4.8 %

ULNAR WRIST PAIN

3) Hamate Fractures

- **Pain in the hypothenar eminence aggravated by grasp**
- **Loss of grip strength**
- **Dorsal wrist pain**
- **Ulnar nerve paresthesias**
- **Rx : PA, lateral, carpal tunnel view**
- **Ct scan**

ULNAR WRIST PAIN

3) Hamate Fractures

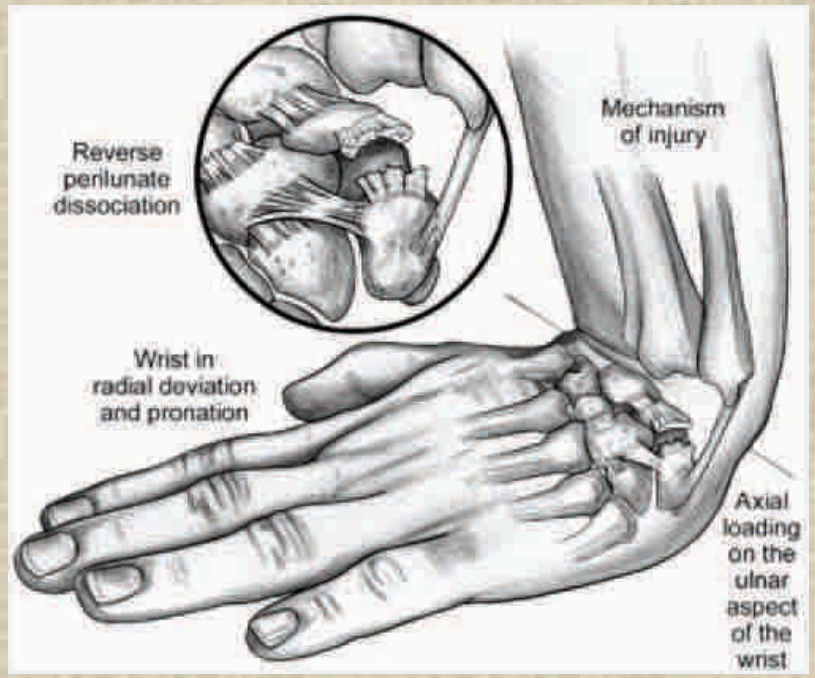
Treatment :

If nondisplaced and without neurologic symptoms : cast immobilization
(Back to sporting activities : fracture union)

Otherwise : Excision of the hook of the hamate
(Back to sporting activities : 3 weeks)

ULNAR WRIST PAIN

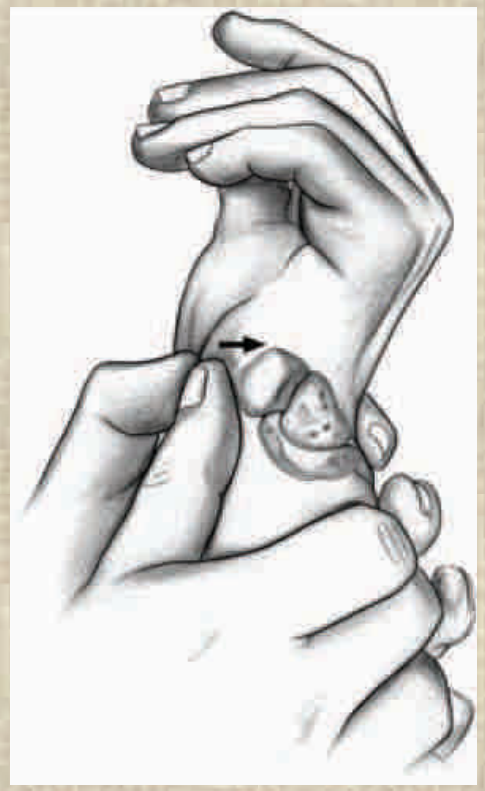
4) Lunotriquetral Instability



ULNAR WRIST PAIN

4) Lunotriquetral Instability

Ballottement test



Kleinman's shear test

Lateral compression test

ULNAR WRIST PAIN

4) Lunotriquetral Instability

ULNAR WRIST PAIN

4) Lunotriquetral Instability

Treatment :

- **Immobilization (long arm immobilization 4 weeks + short arm cast for an additional 4 weeks)**
- **Debridement**
- **Ligament reconstruction**
- **Ulnar shortening**
- **Lunotriquetral fusion**

ULNAR WRIST PAIN

5) Extensor carpi ulnaris (ECU) tendonitis

- **Frequently follows a twisting sprain of the wrist**
- **May be difficult to differentiate due to traumatic disruption of the TFCC ligament**
- **Paresthesia can be frequently found**
- **Ultrasound examination**
- **MRI in doubtful cases**

ULNAR WRIST PAIN

5) Extensor carpi ulnaris (ECU) tendonitis

- **Conservative treatment consist of ice application, wrist extension splinting and antiinflammatory medication**
- **Steroid injection rarely gives complete relief of symptoms**
- **Surgical treatment : The pathologic tendon sheath must be totally removed**

ULNAR WRIST PAIN

6) Pisotriquetral arthrosis

- **Racquet-type sports**
- **Tenderness of the palmar ulnar side of the wrist**
- **Oblique view, CT scan**
- **Treatment : rest, steroid injections, pisiform excision**

METACARPAL FRACTURES

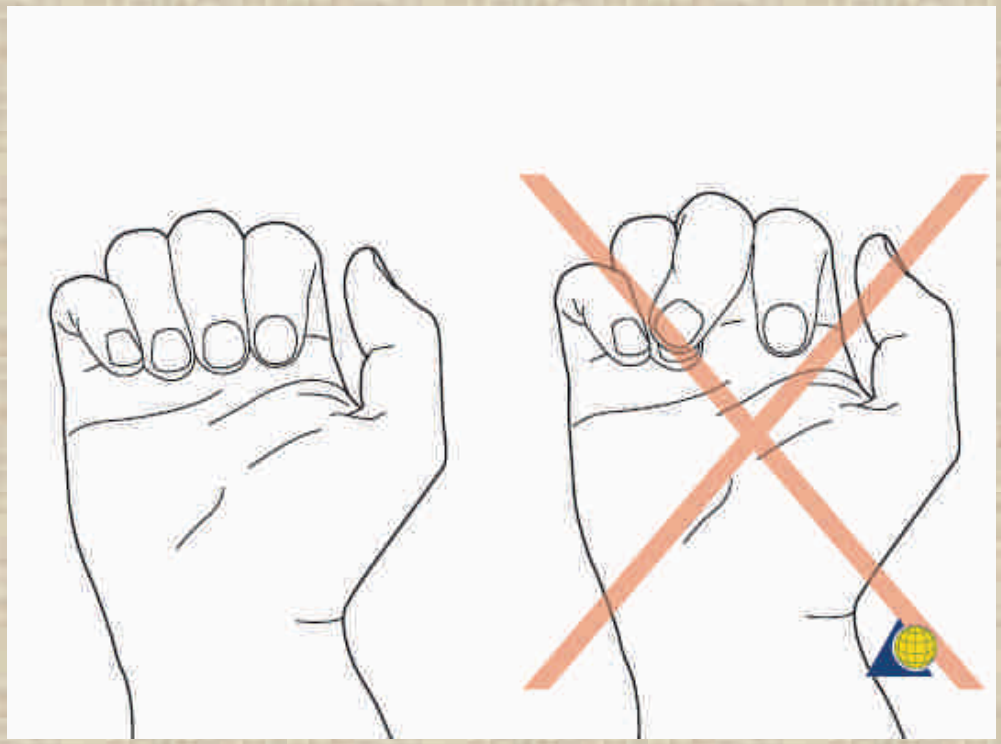
Many different types

<u>Goals :</u>

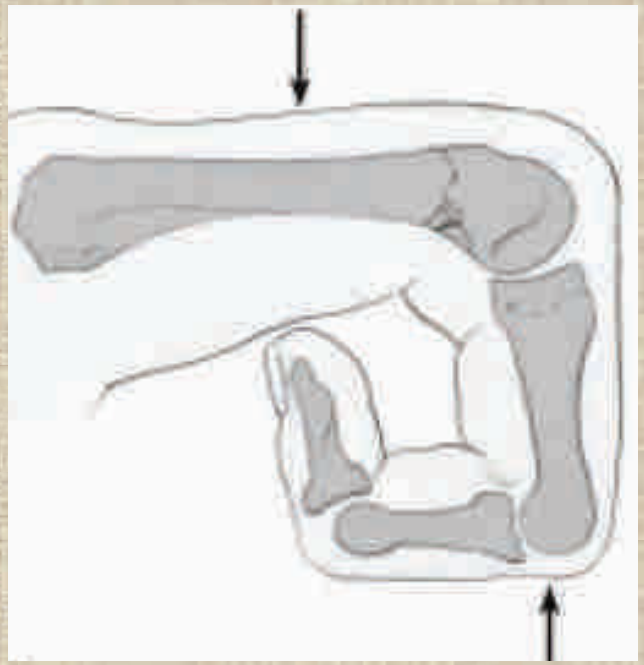
Restoration of articular incongruity, length, rotation, prevention of joint stiffness

PA, lateral, oblique views

METACARPAL FRACTURES



METACARPAL FRACTURES



Jahss maneuver

METACARPAL FRACTURES

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CARPOMETACARPAL JOINT DISLOCATIONS

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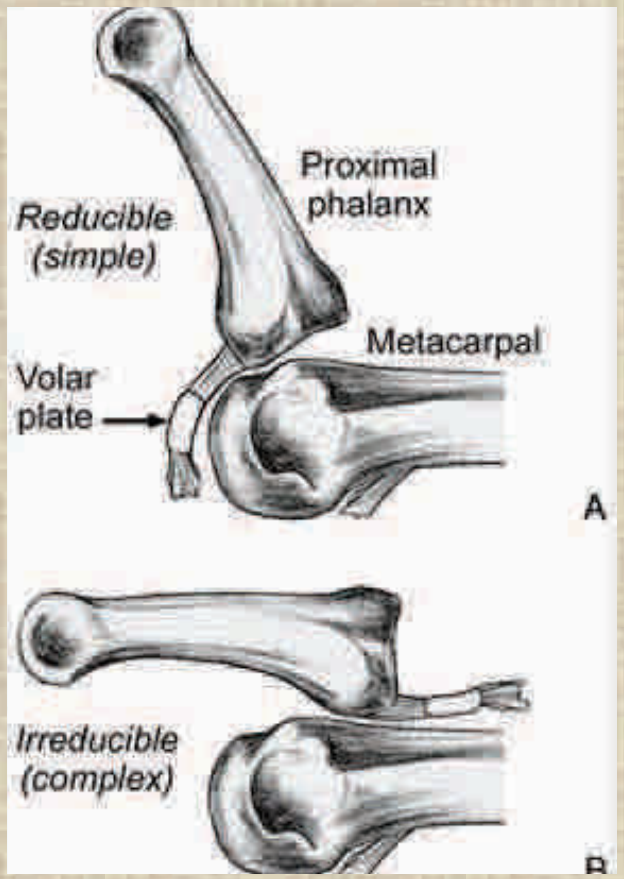
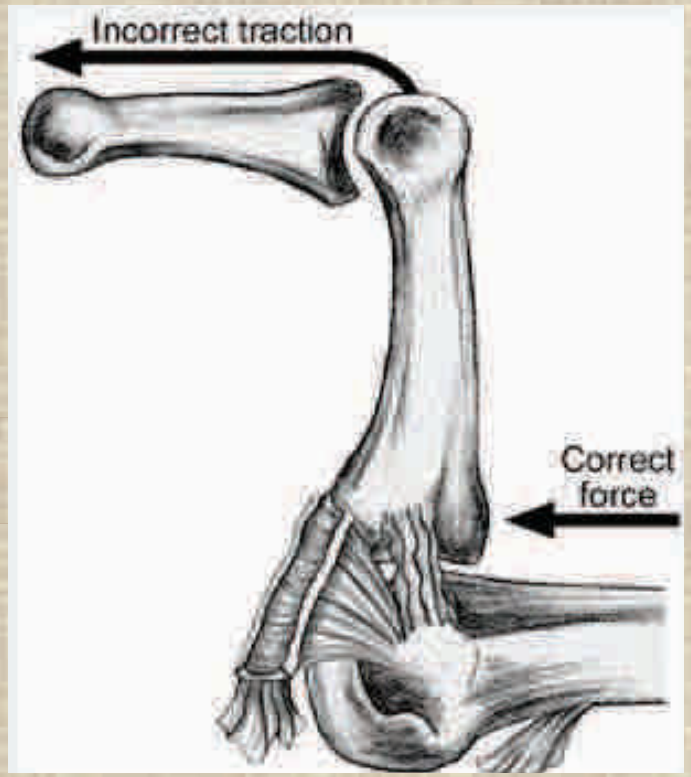
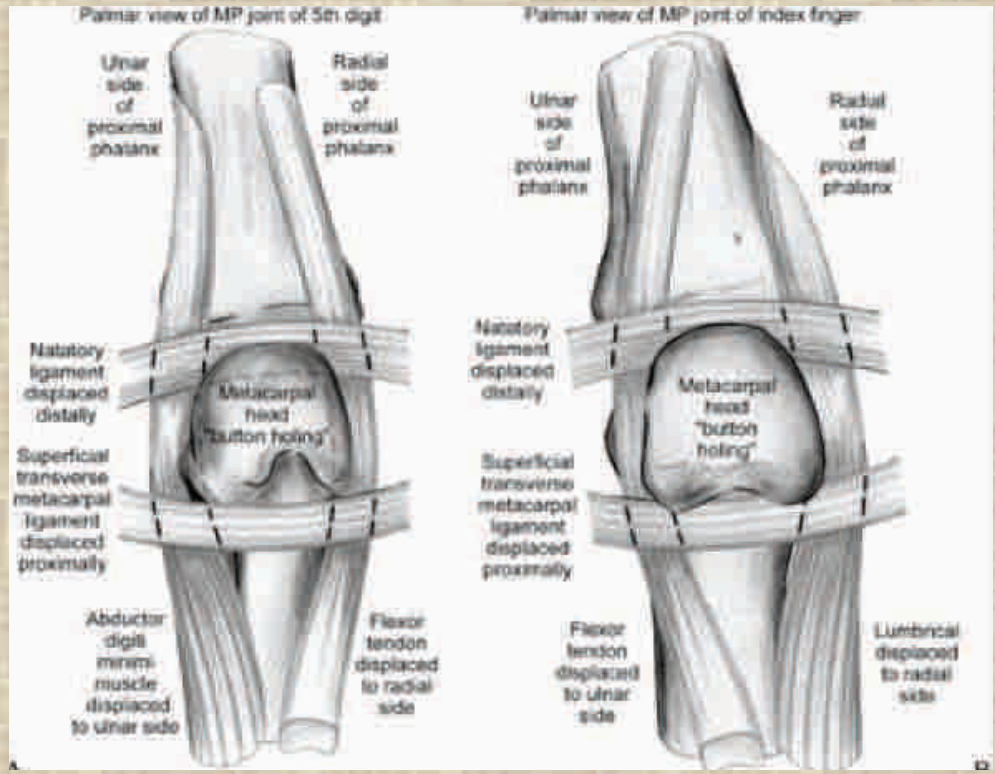
METACARPOPHALANGEAL JOINT DISLOCATIONS

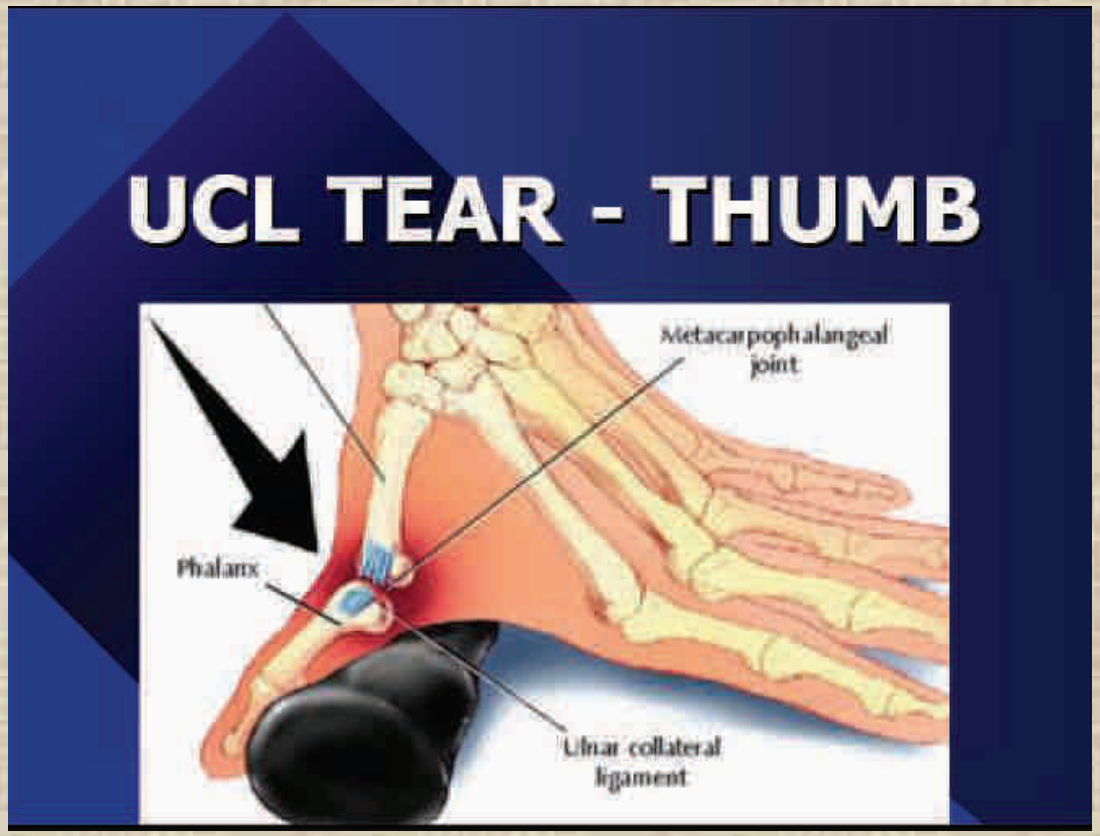


METACARPOPHALANGEAL JOINT DISLOCATIONS





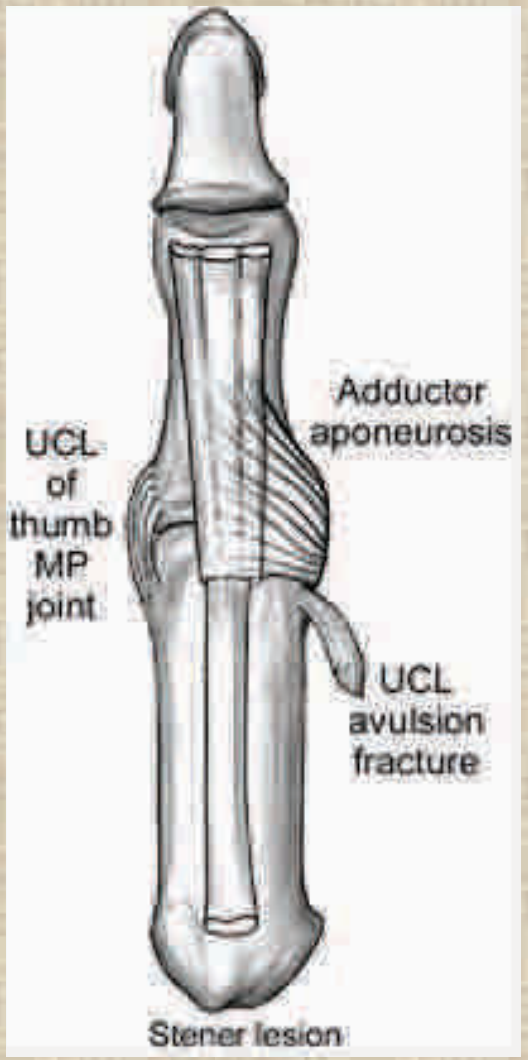
METACARPOPHALANGEAL JOINT OF THE THUMB



Skiers, ball-handling athletes

METACARPOPHALANGEAL JOINT OF THE THUMB

METACARPOPHALANGEAL JOINT OF THE THUMB

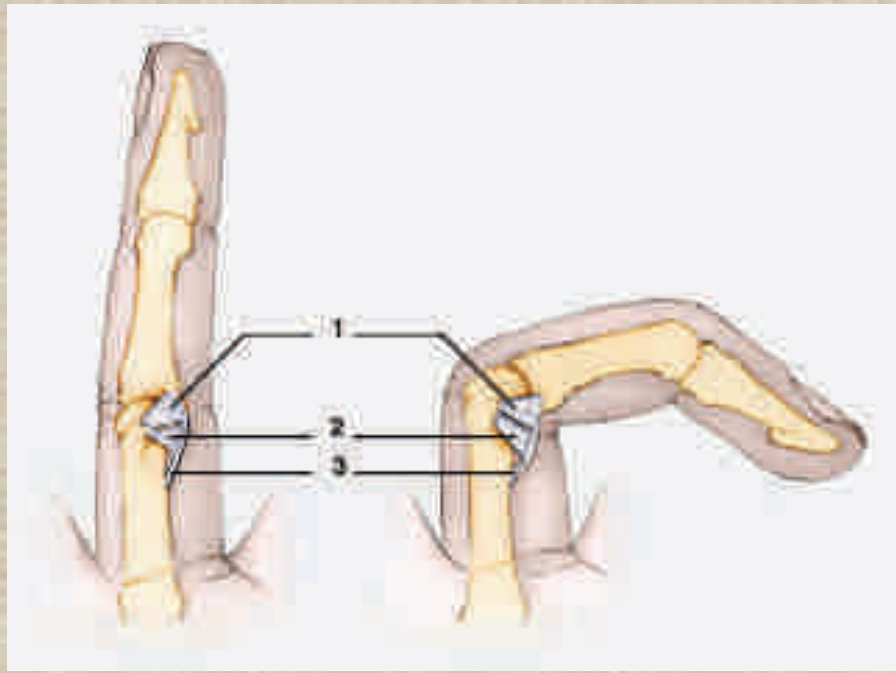


METACARPOPHALANGEAL JOINT OF THE THUMB

METACARPOPHALANGEAL JOINT OF THE THUMB

1 month

PROXIMAL INTERPHALANGEAL JOINT INJURIES



Football, Wrestling, Baseball

> 20° = complete ligamentous tear

PROXIMAL INTERPHALANGEAL JOINT INJURIES

PROXIMAL INTERPHALANGEAL JOINT INJURIES

Beasley

Syndactily

PROXIMAL INTERPHALANGEAL JOINT INJURIES

Dorsal and axial load : ball handling sports

PROXIMAL INTERPHALANGEAL JOINT INJURIES

PROXIMAL INTERPHALANGEAL JOINT INJURIES

Limited extension during 3 weeks

DISTAL INTERPHALANGEAL JOINT INJURIES

Hyperextension force on a flexed DIP joint

DISTAL INTERPHALANGEAL JOINT INJURIES

Rugby Finger or Jersey Finger

DISTAL INTERPHALANGEAL JOINT INJURIES

DISTAL INTERPHALANGEAL JOINT INJURIES

DISTAL INTERPHALANGEAL JOINT INJURIES

Hyperflexion force on an extended DIP joint

DISTAL INTERPHALANGEAL JOINT INJURIES

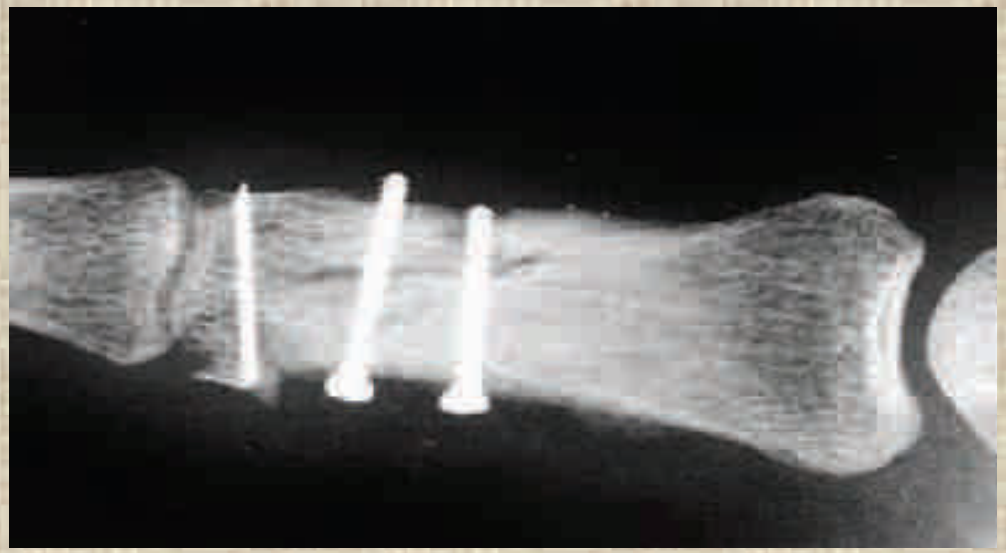
Mallet Finger

DISTAL INTERPHALANGEAL JOINT INJURIES

PHALANGEAL FRACTURES

PHALANGEAL FRACTURES

PHALANGEAL FRACTURES



NERVE COMPRESSION SYNDROME

Carpal tunnel Syndrome

Repetitive grasping activities

NERVE COMPRESSION SYNDROME

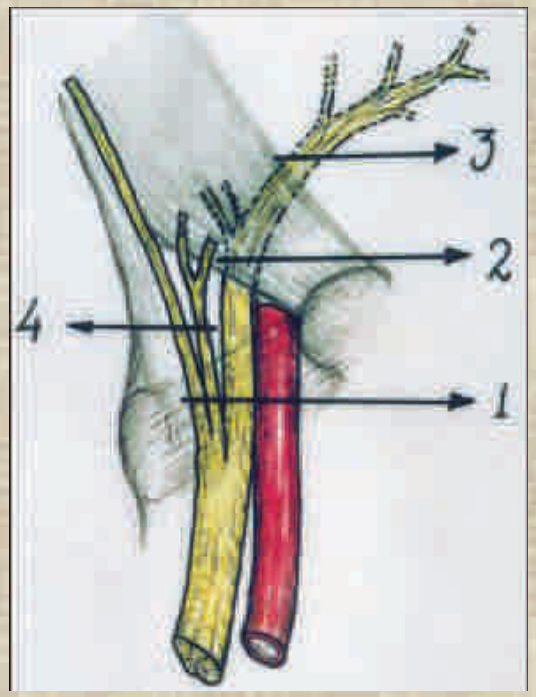
Carpal tunnel Syndrome

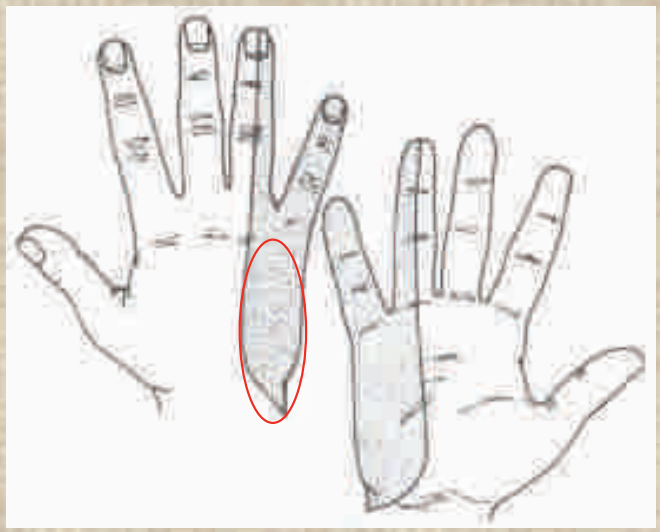
Tinel's sign

Phalen's test

NERVE COMPRESSION SYNDROME

Ulnar nerve Compression : Wrist





- **Cyclist's palsy : Gloves, handlebars, vibration, prolonged grasping**
- **Racquet-type sports**

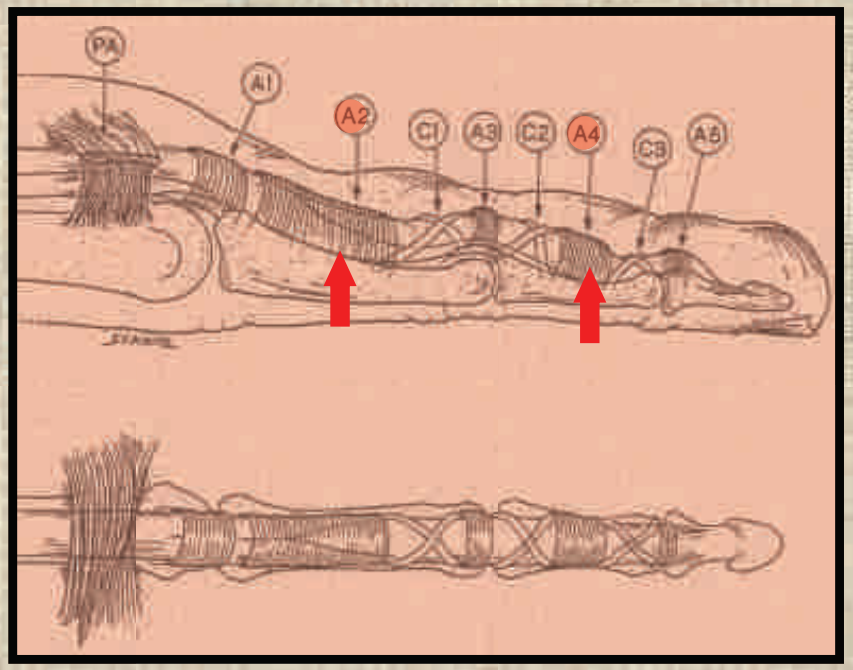
PULLEY

Climbing



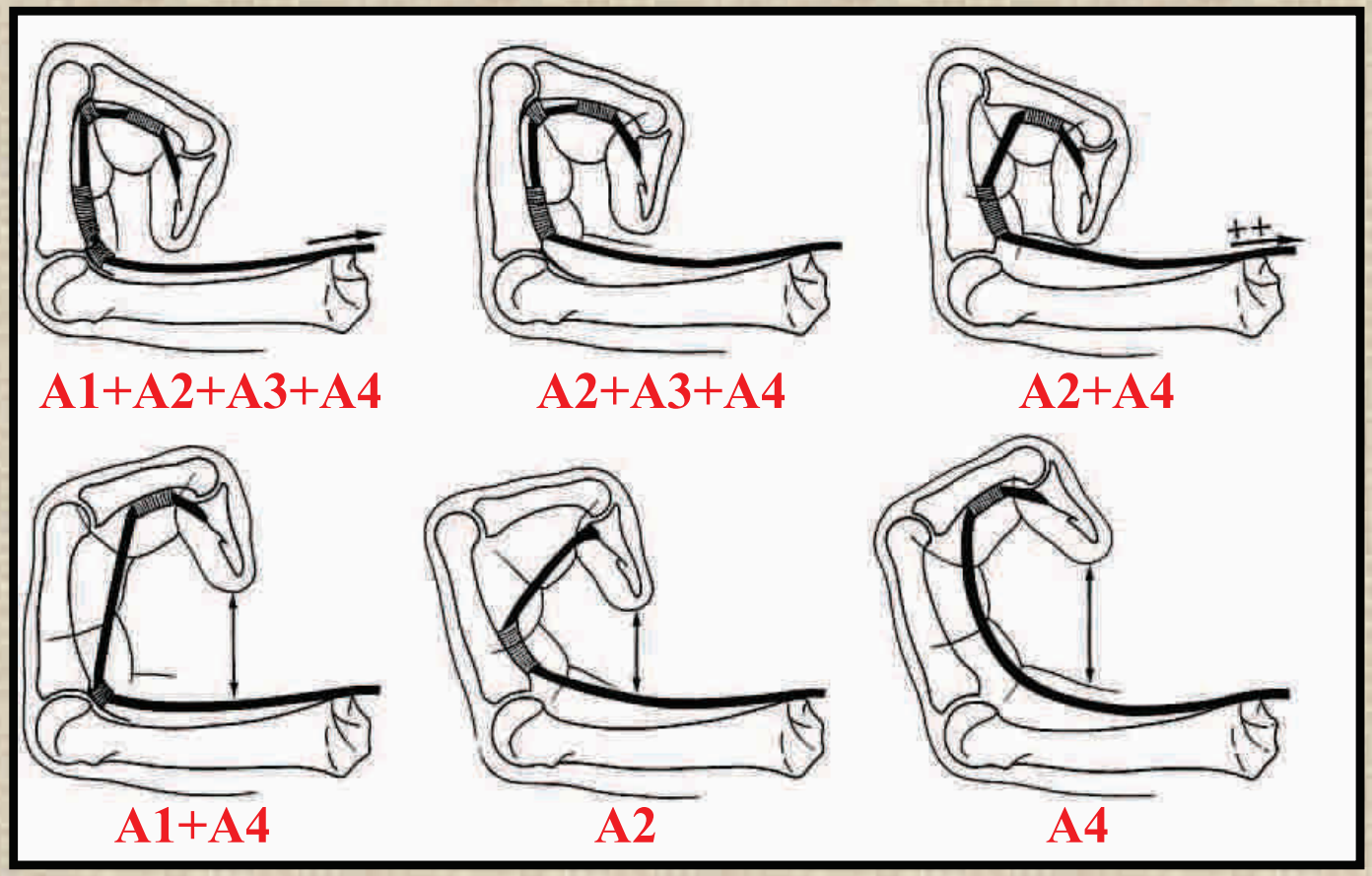
PULLEY

Climbing



PULLEY

Climbing



PULLEY

Climbing

PULLEY

Climbing

MRI

PULLEY

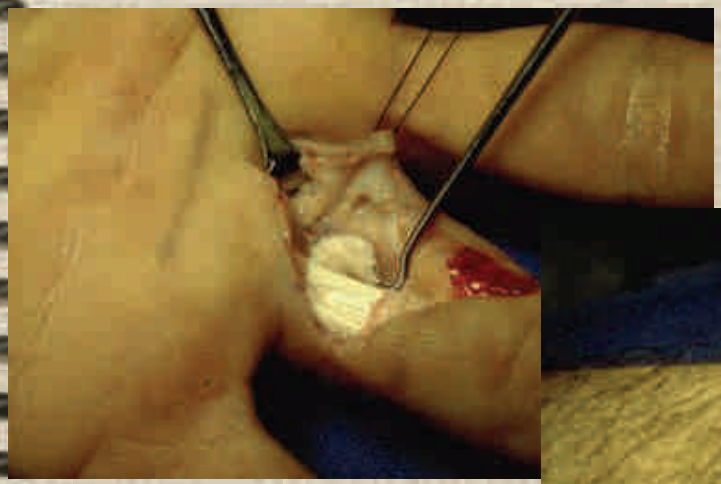
Climbing

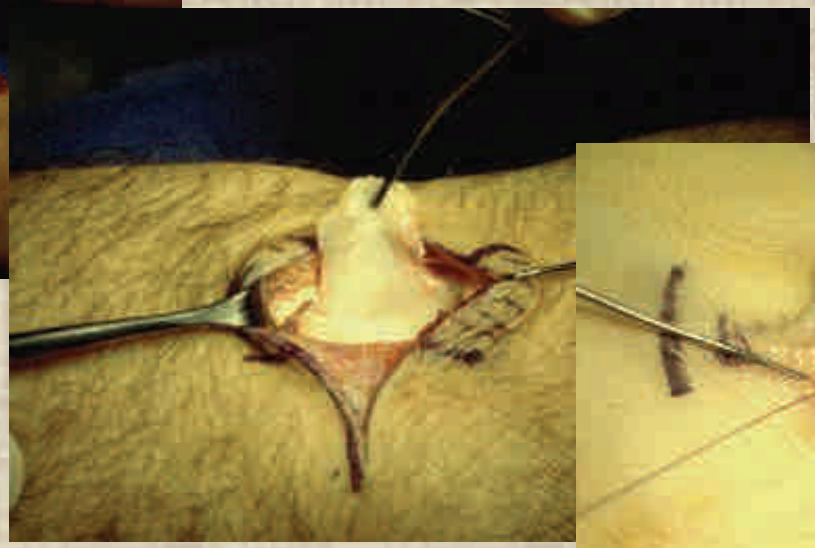
Conservative treatment

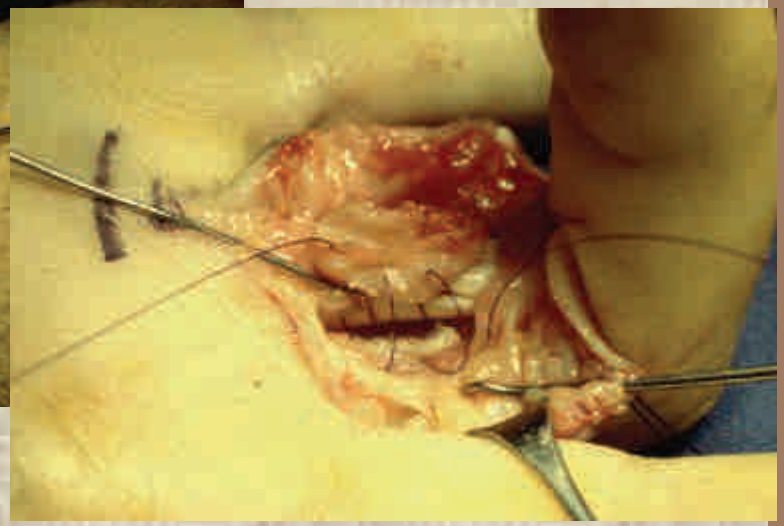
- **Rest 6 weeks**
- **Protection**

PULLEY

Surgical treatment







Thank you for your attention

Reference : **SPORTS INJURIES**

Freddie H. FU, David A. STONE

Lippincot Williams & Wilkins