Distal Ulnar Fractures:
When Should We Fix Them?

^
If Ever

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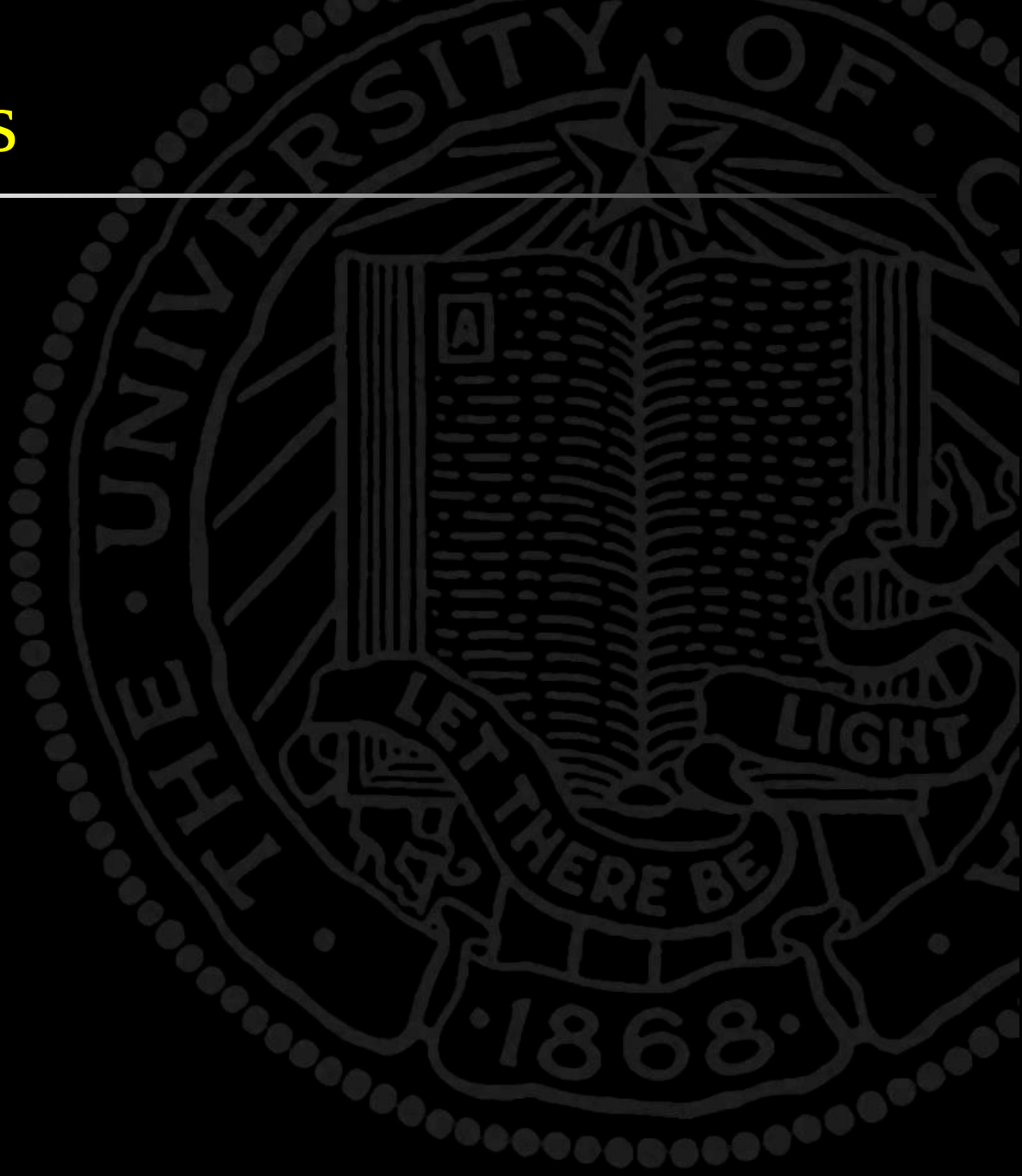
Disclosures

- **None**

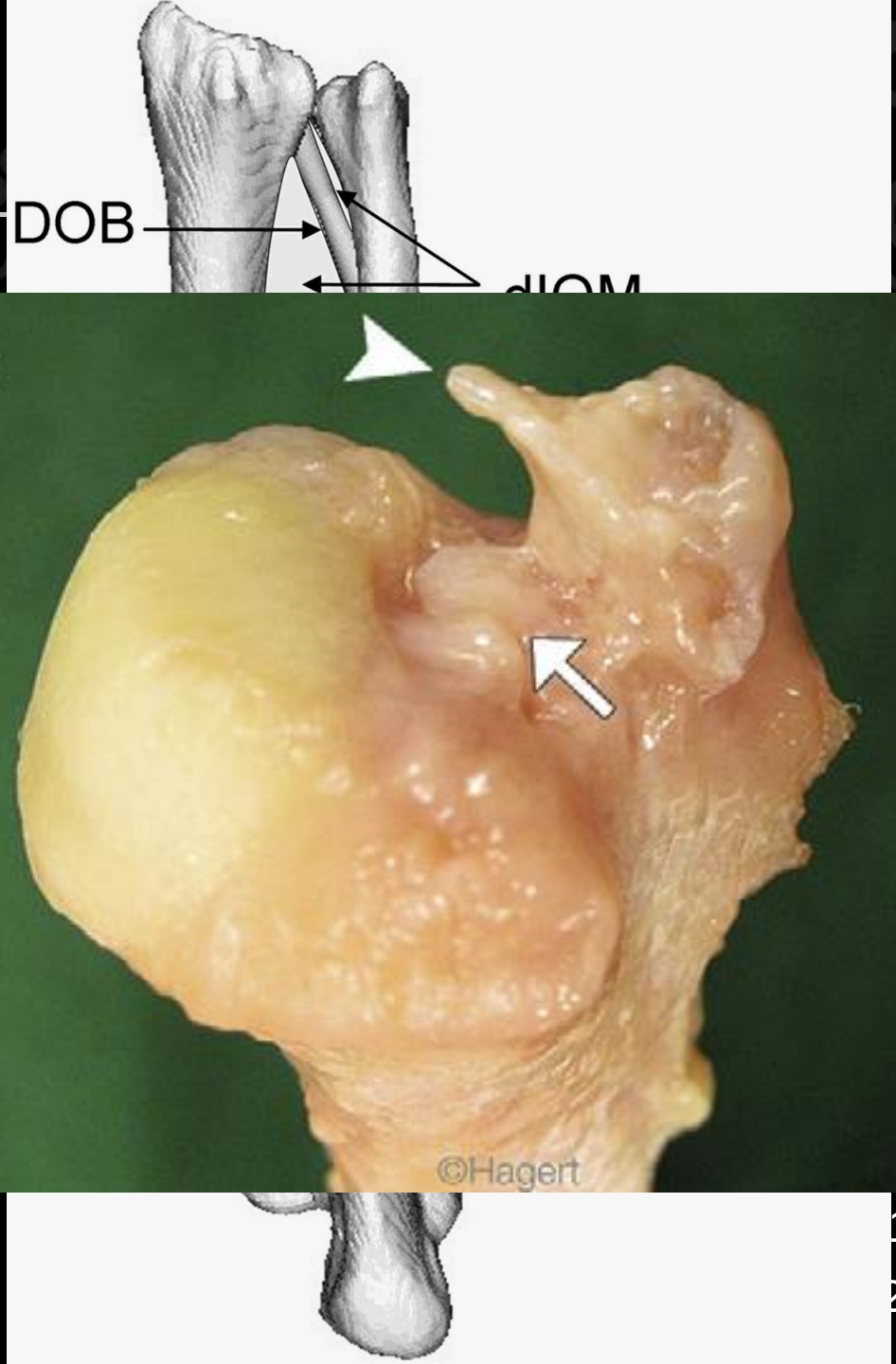


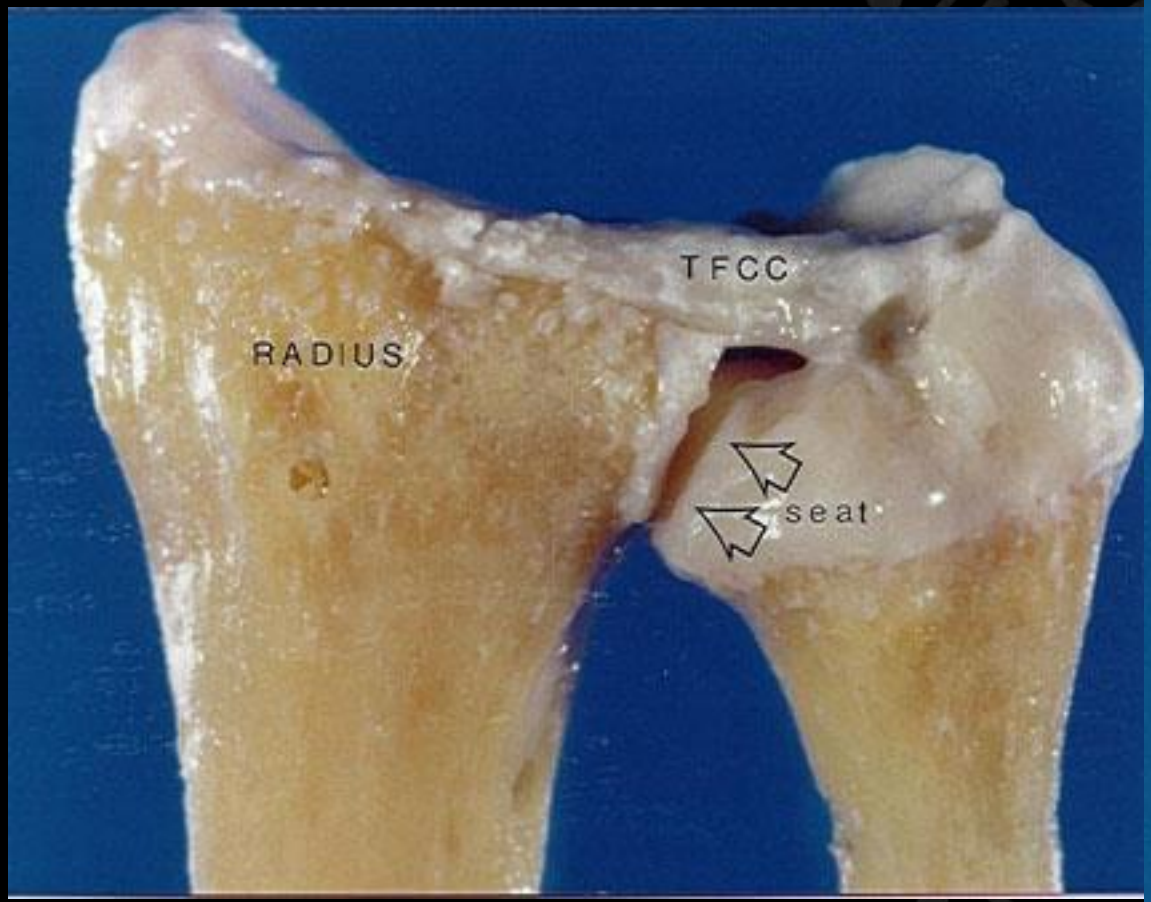
Overview

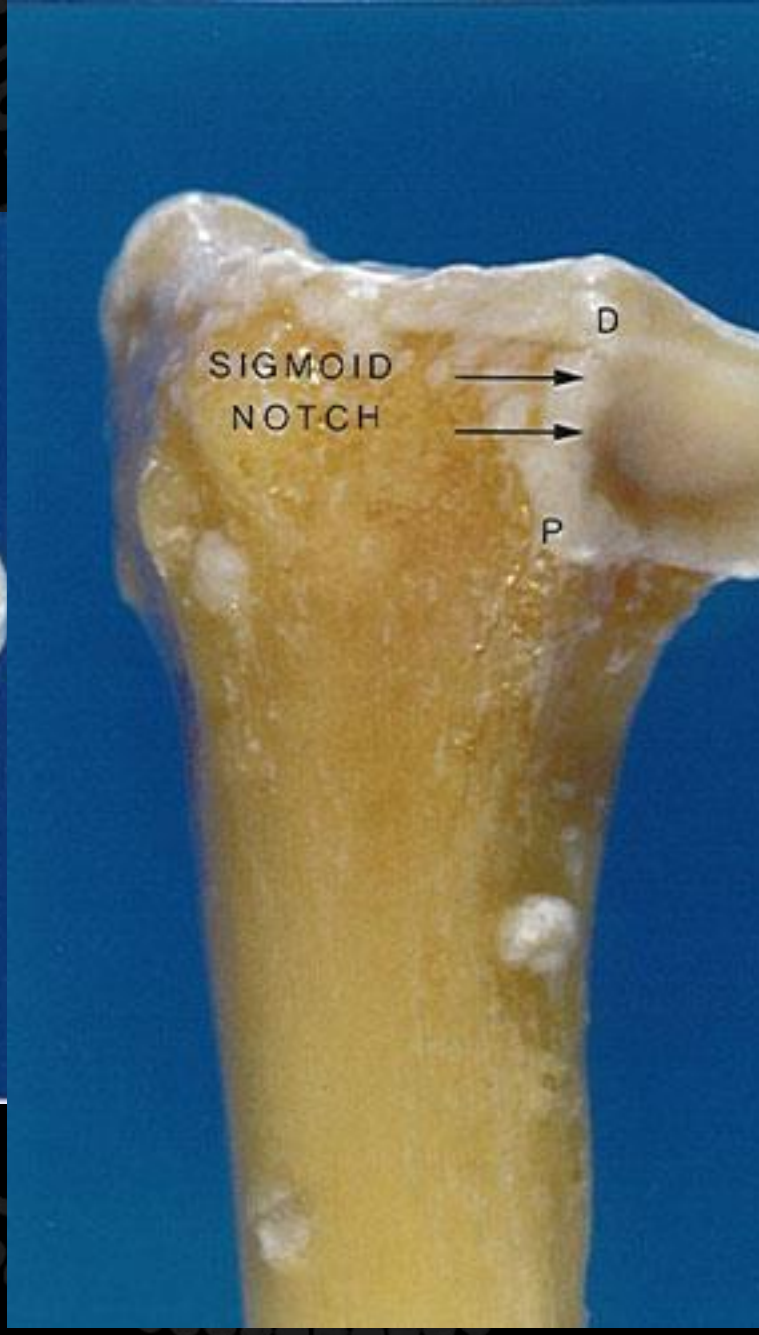
- **Anatomy**
- **Types of distal ulna fracture**
- **Treatment Options**
- **Surgical Approach**

Anatomy

- IOM
- DRUJ
- TFCC
- Ulnar head
  - Dome
  - Styloid



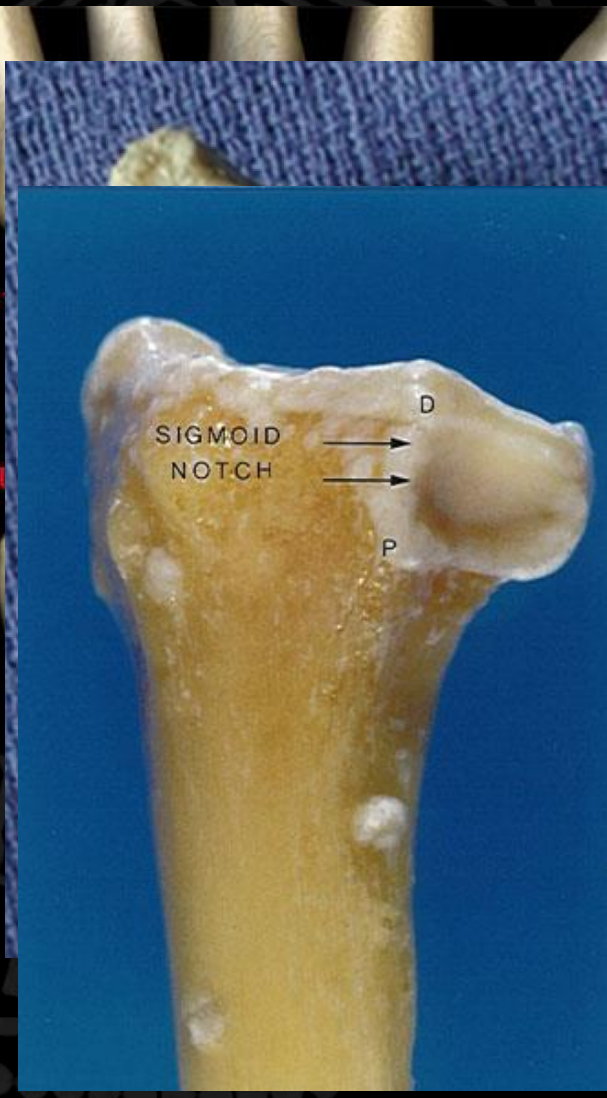




Green's Hand Surgery, 1999

Why is the ulnar side of radius so key?

- **Short radiolunate ligament**
- **Volar lunate facet convex and extends more distally**
- **Volar aspect of lunate fossa bears more load than the scaphoid fossa**
- **Sigmoid notch**



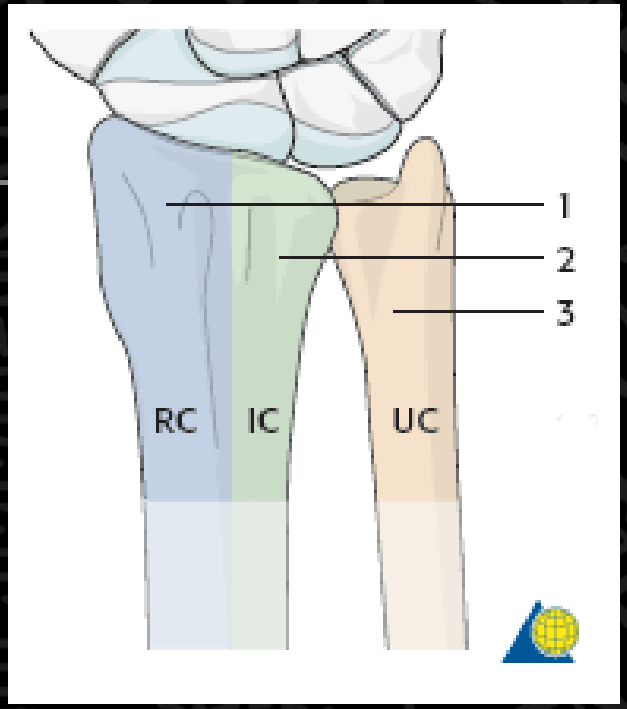
Landsmeer, 1990

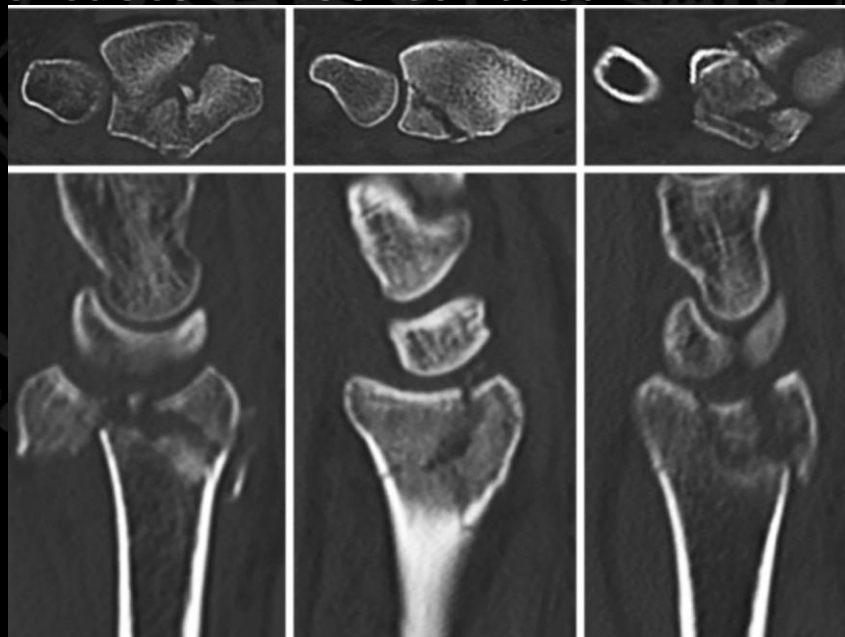
Ulnar-sided injuries of the wrist

- **Sigmoid notch (Distal radius)**
- **Ulnar styloid and TFCC**
- **Ulnar head and neck**

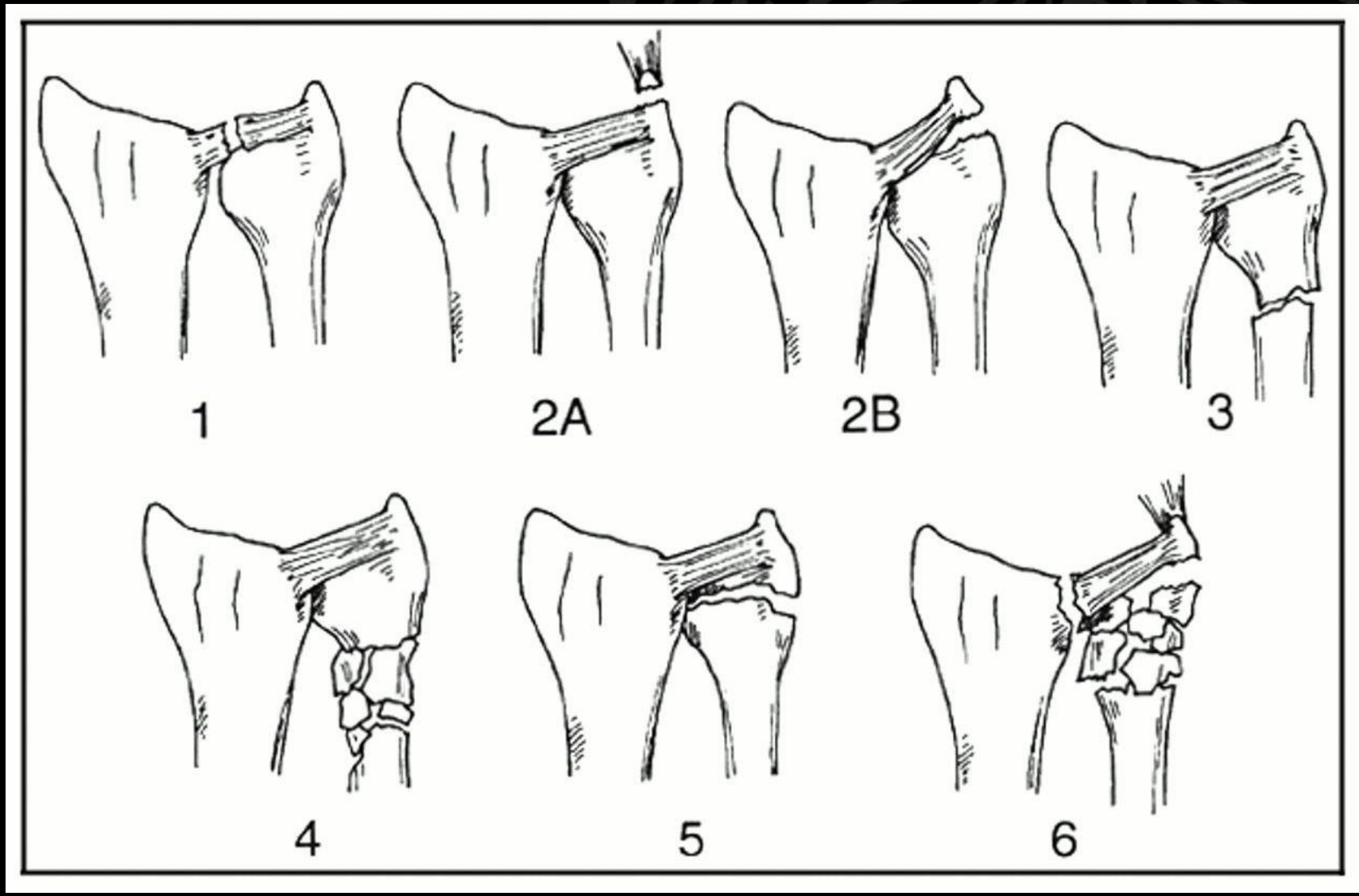
Sigmoid Notch

- **Intermediate column of the wrist**
- **Foundation of the DRUJ**
- **Extraarticular Fractures**
  - **Dorsal angulation >30˚ → increases DRUJ contact forces → OA**
- **Intraarticular fractures**
  - **Volar and dorsal lunate facet**





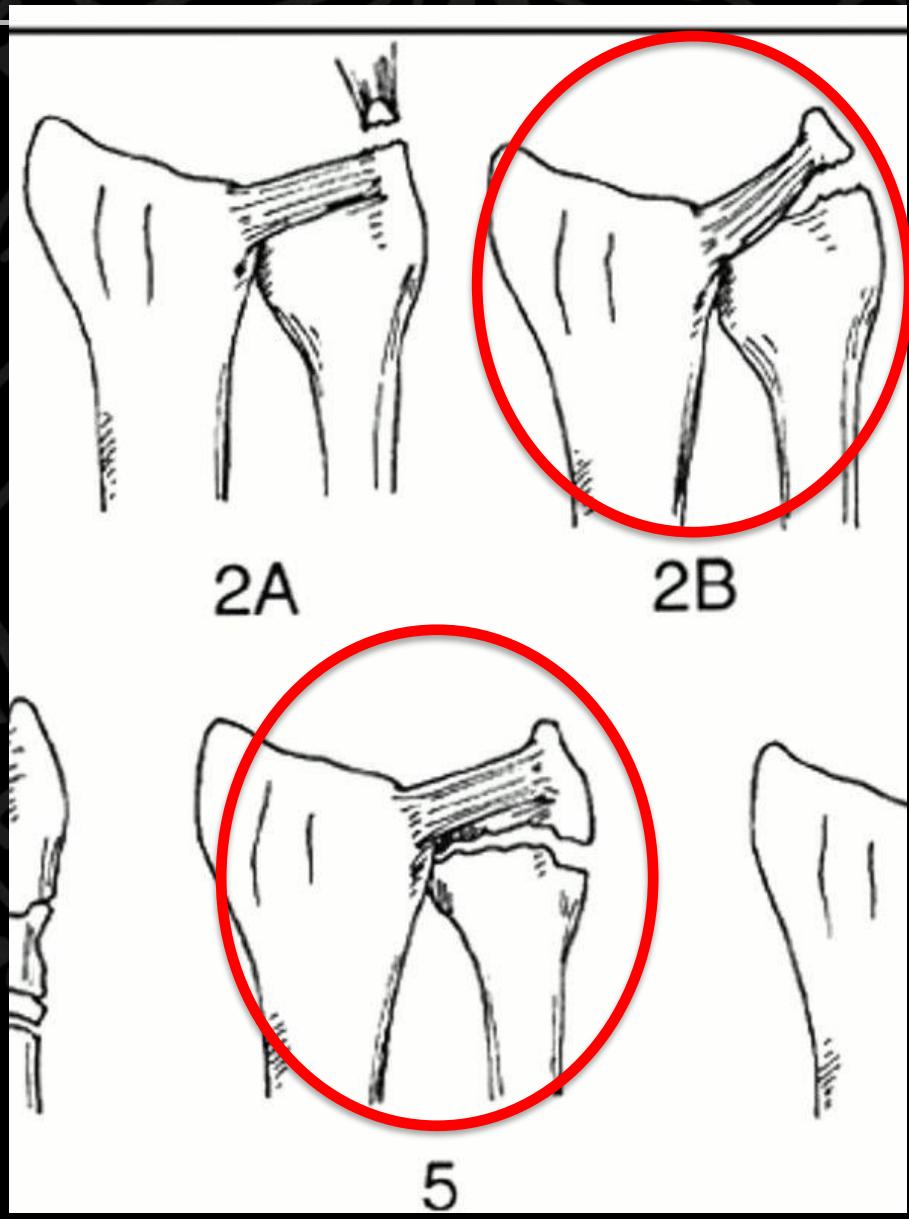
AO: Ulnar styloid and Distal ulna



Trumble, 1998

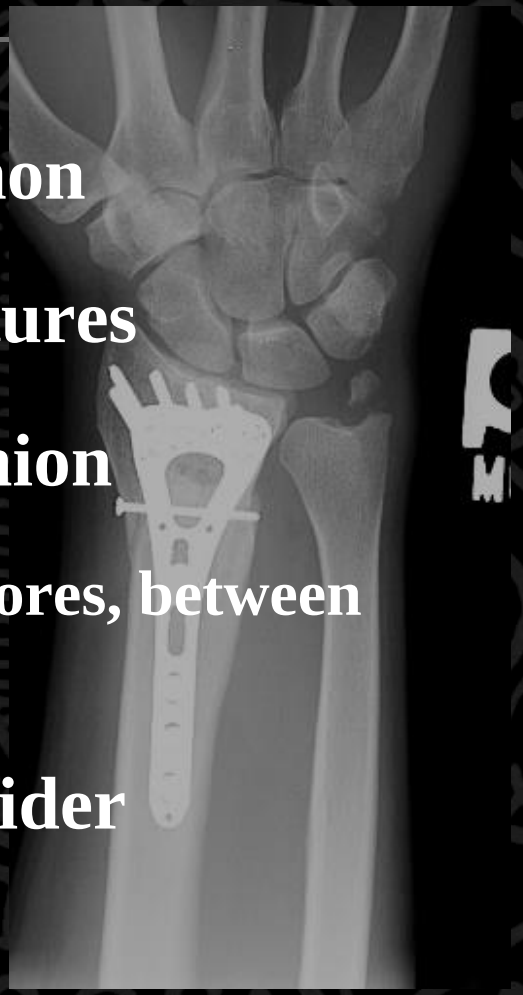
Ulnar styloid fractures

- **4 main types**
  - **Basal oblique is the one to worry about**



Ulnar styloid fractures

- **Isolated styloid fractures are uncommon**
- **~60% of DRF have ulnar styloid fractures**
- **~60% of ulnar styloids go on to nonunion**
  - **No difference in motion, function/pain scores, between those with union and nonunion**
- **If >2mm displaced or large base, consider fixation?**



Sammer, 2010
Ring, 2010
Souer, 2009
Blazar, 2002

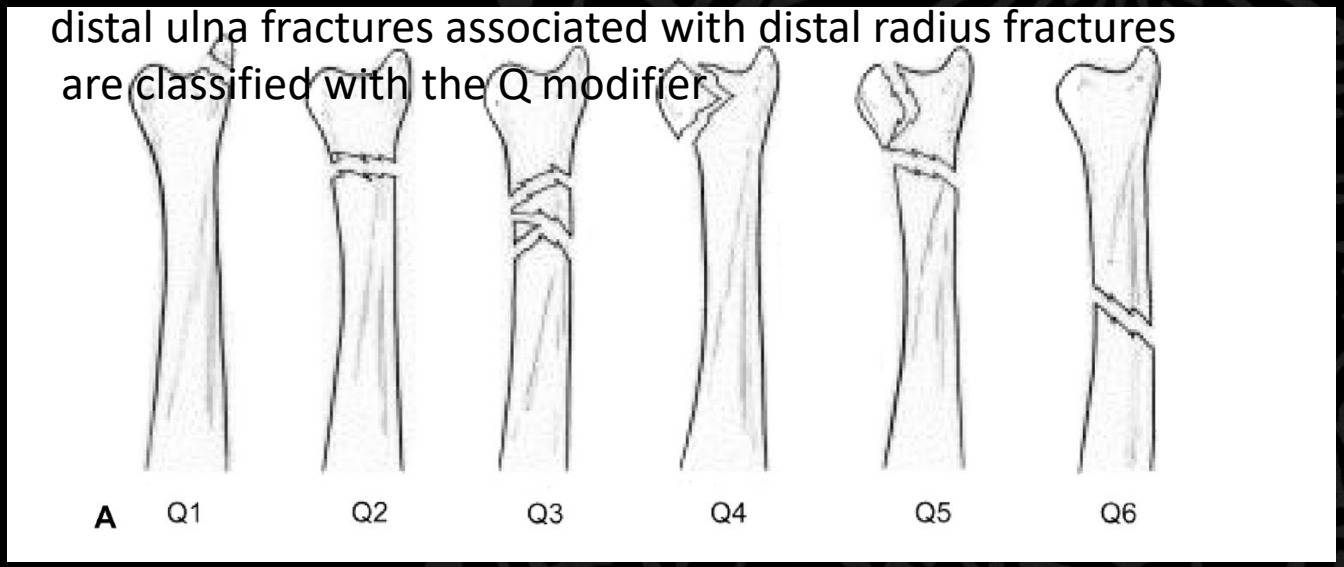
Ulnar styloid and distal radius fractures

- **Most DRUJ are stable after DRF fixation**
- **And if they aren't?**
  - **Check your DRF reduction…..**
  - **ORIF of styloid (Kwires/fiberwire, tension band)**
- **Symptomatic nonunions?**
  - **Diagnostic wrist A/S, excision styloid, poss TFCC repair**

Sammer, 2010
Ruch, 2012
Ruch, 2010

Classification Systems of Distal Ulna Fractures (a/w DRF)

AO



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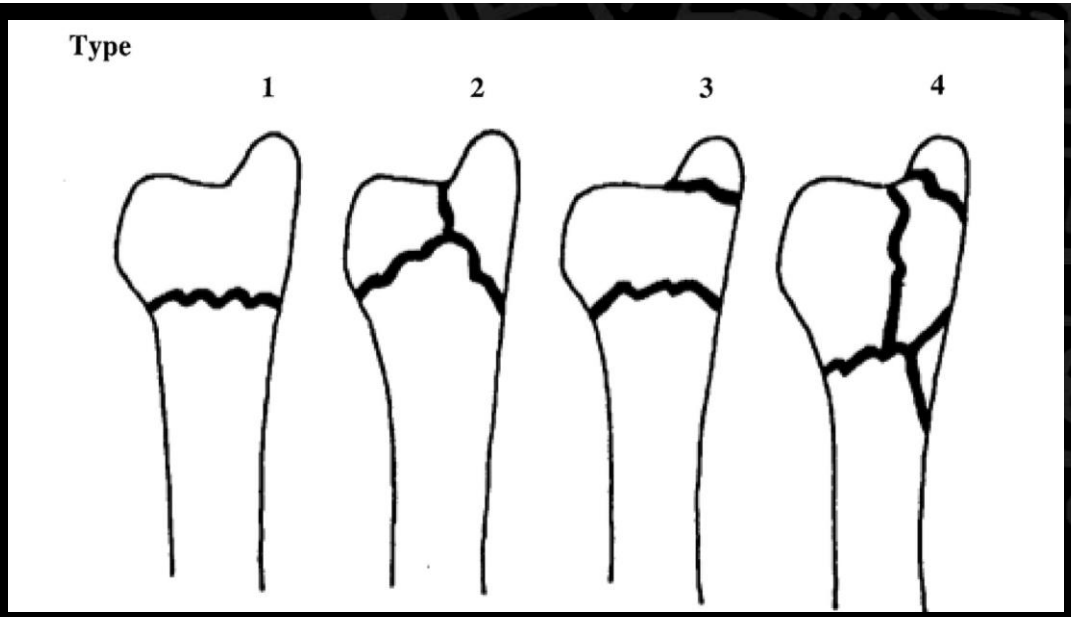
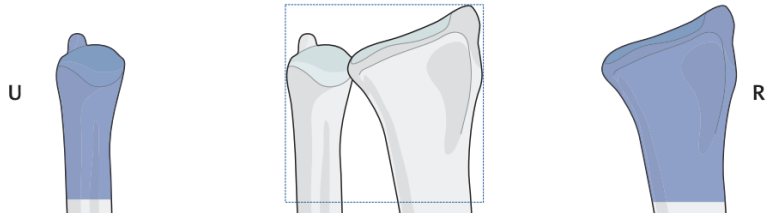


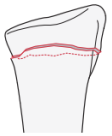
2R3/2U3

Location: Radius/Ulna, **distal end segment** 2R3/2U3

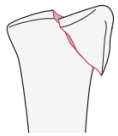


Types:

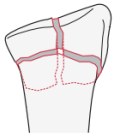
Radius, distal end segment, **extraarticular fracture** 2R3A



Radius, distal end segment, **partial articular fracture** 2R3B



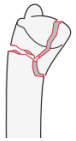
Radius, distal end segment, **complete articular fracture** 2R3C



Ulna, distal end segment, **extraarticular fracture** 2U3A

Ulna, distal end segment, **partial articular fracture** 2U3B

Ulna, distal end segment, **complete articular fracture** 2U3C



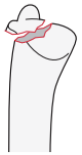
2U3A

Type: Ulna, distal end segment, **extraarticular fracture** 2U3A

Group: Ulna, distal end segment, **extraarticular, styloid process fracture** 2U3A1

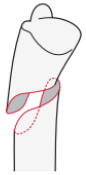
Subgroups:
Tip of styloid fracture 2U3A1.1

Base of styloid fracture 2U3A1.2

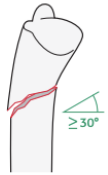


Group: Ulna, distal end segment, extraarticular, **simple fracture** 2U3A2

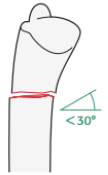
Subgroups:
Spiral fracture 2U3A2.1



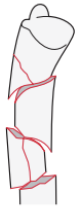
Oblique fracture (≥30°) 2U3A2.2



Transverse fracture (<30°) 2U3A2.3



Group: Ulna, distal end segment, extraarticular, **multifragmentary fracture** 2U3A3



Ulnar head and neck fractures

- **Why are they so difficult?**
  - **Comminution**
  - **Osteopenia**
  - **Hardware impingement**
  - **Thin skin**
  - **Triangular cross-sectional shape of bone**

OCT - 1 2003

K032705
page 1 of 3

Summary of Safety and Effectiveness for the Distal Radius Fracture Repair System

submitted by

Hand Innovations, Inc.
8905 SW 87 Avenue
Miami, FL 33176-2227
Phone: 1 (800)-800-8188

Contact Person: Al Weisenborn
Device Trade Name: Distal Radius Fracture Repair System
Common Name: Distal Volar Radius Plate, Dorsal Nail Plate and Jig Set
Classification Name: Plate Fixation Bone per 21 CFR § 888.3030

Where are we today?

- **14 intraarticular distal ulna fx (IADUF) in setting of distal radius in elderly (ave age 74)**
- **All DRF treated with volar plate, all ulna nonoperative (noted to be stable intraaop), early wrist motion (2 weeks)**
- **All fractures went on to union at 12 weeks**
  - **11 excellent, 3 good**
  - **No druj instability**
  - **1 case of DRUJ widening on Xray**

Namba, JHS E 2009

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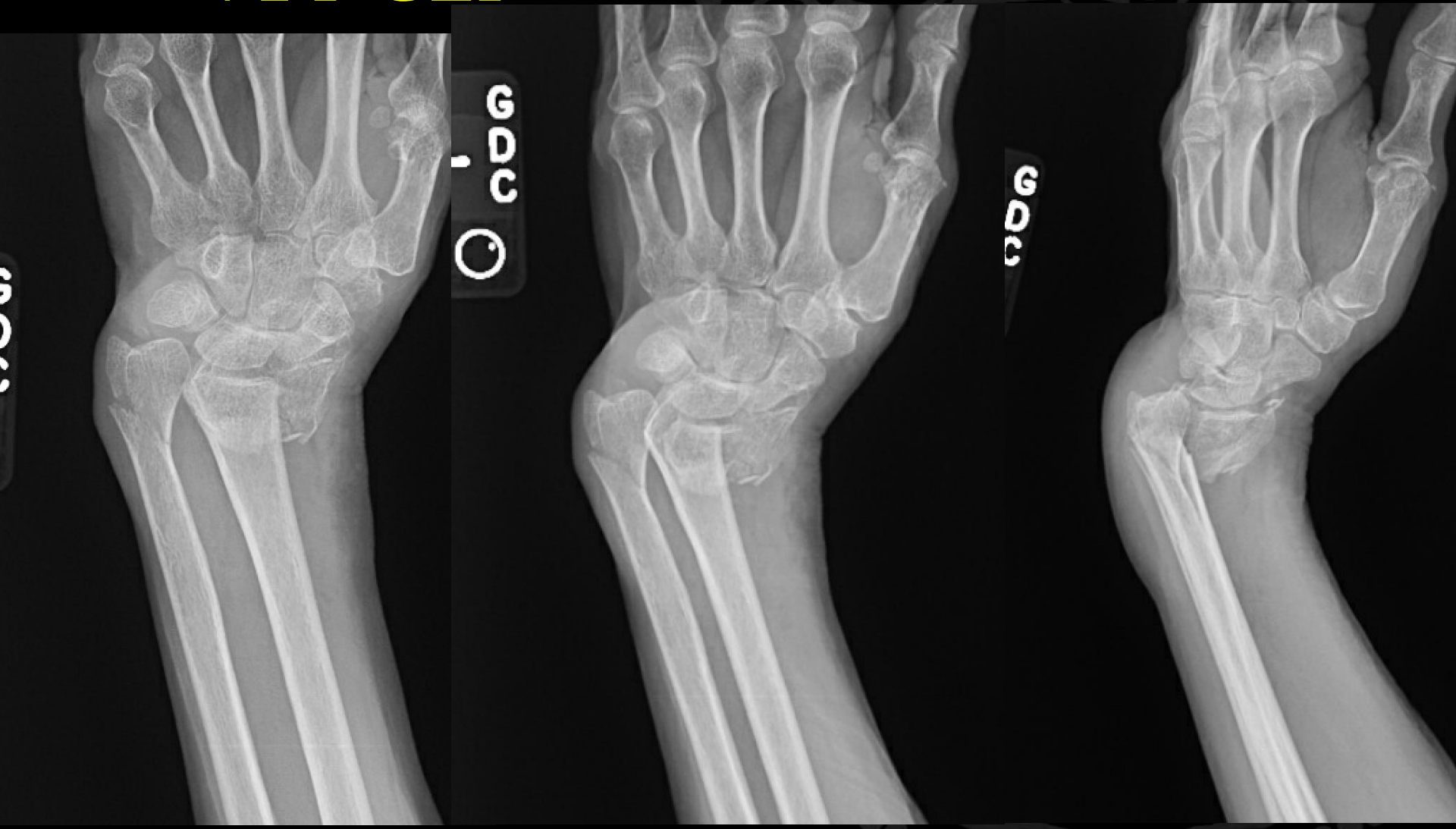
Namba, JHS E 2009

71 F GLF



Images courtesy of L. Shapiro MD


L
SML

57F MVC


R


R

73F GLF

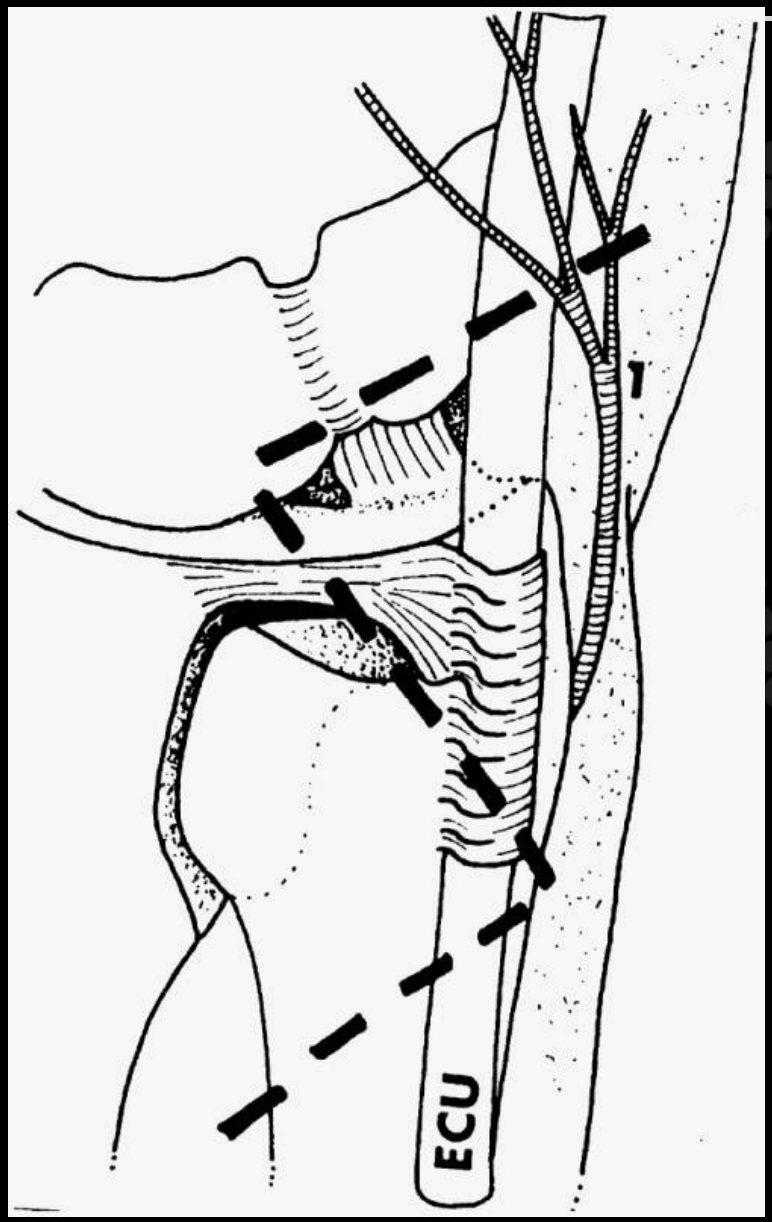
Distal ulna shaft fractures

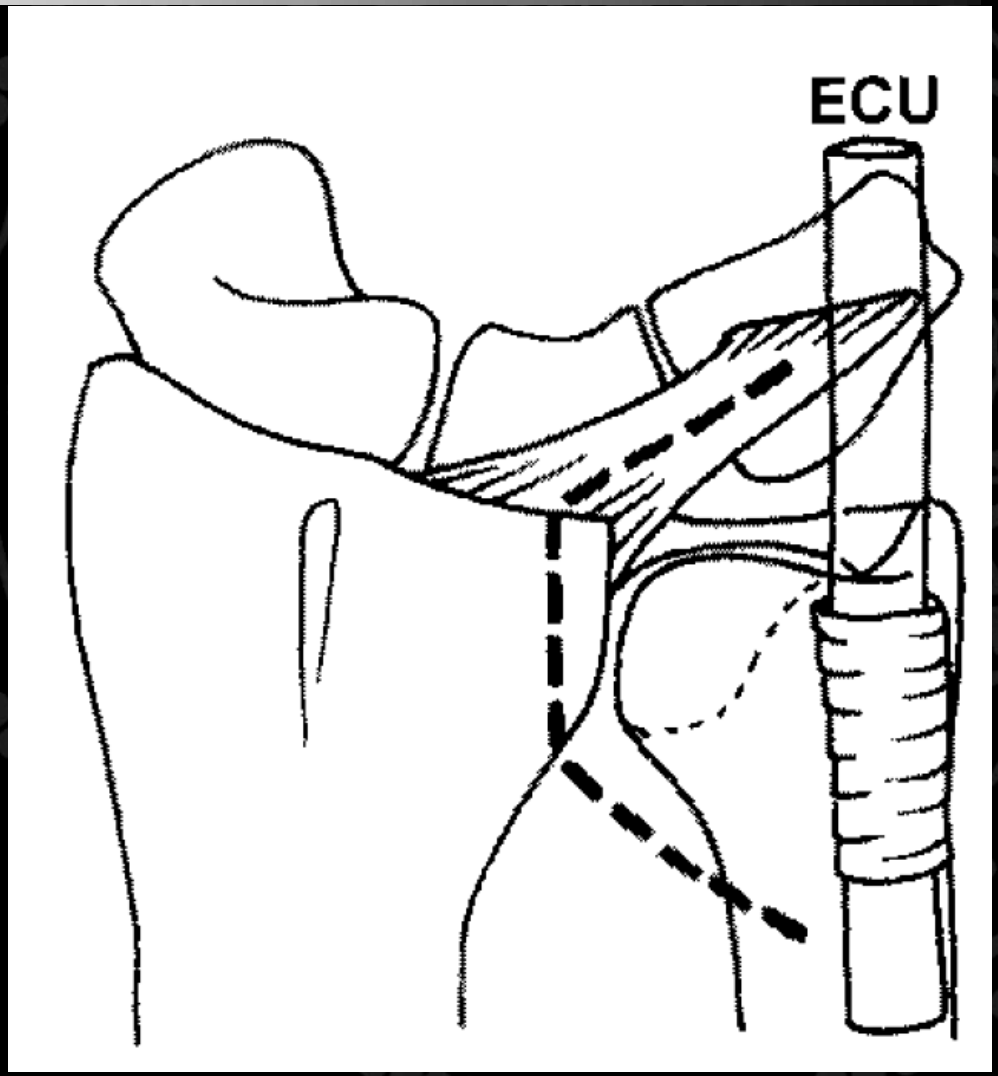
- **<50% displacement→ CAST**
- **>50% displacement or >10˚ angulation→ fix**

Surgical approach: :distal ulna

- **Volar, lateral, dorsal**
- **Complications:**
  - **Volar: beware NV bundle (ulnar artery and nerve)**
  - **Lateral/Dorsal: dorsal sensory branch of ulnar nerve (1-4 cm proximal to ulnar styloid)**

Dorsal Approach

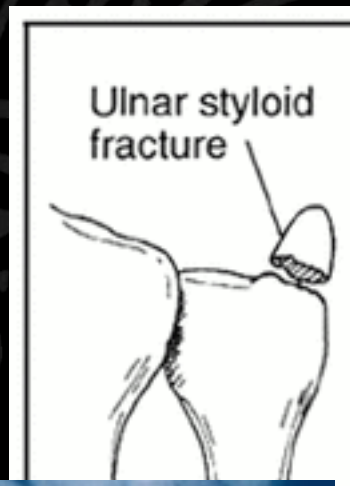


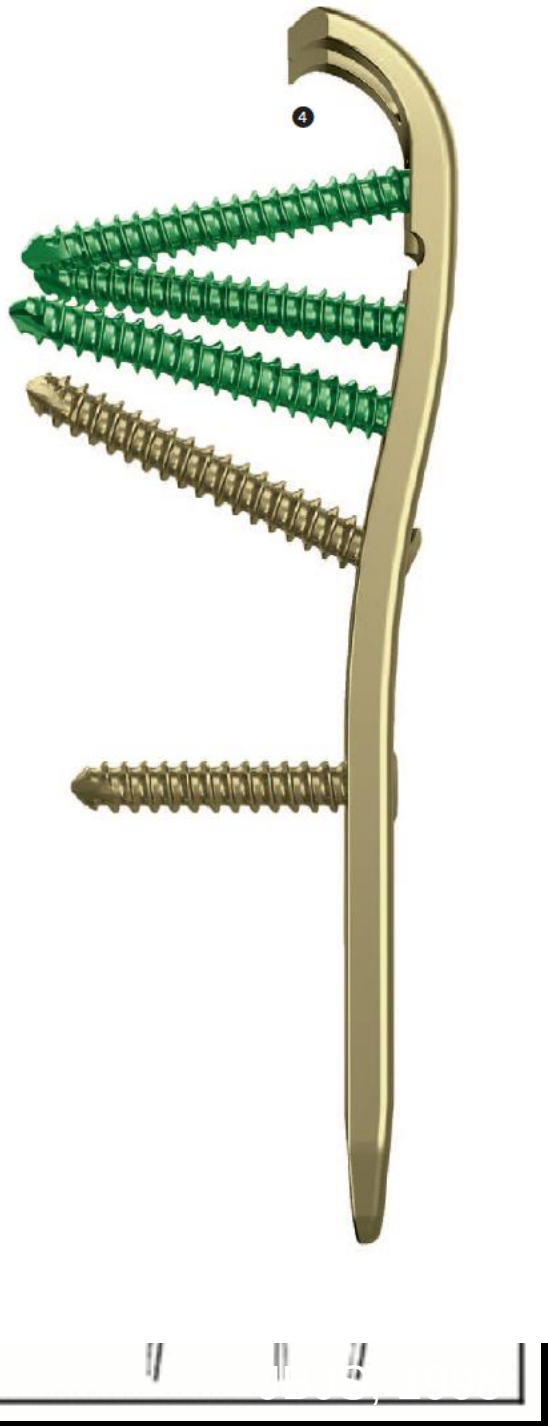


Garcia-Elias, 2003

Methods of fixation

- Kwires
- Tension band
- IO wiring
- Plate-screw constructs
- Blade plates





What about severely comminuted bone?

- **Leave it**
- **Fix it**
- **Take ulnar head out**
- **Ulnar head arthroplasty**

Poster 96

Distal Radius and Distal Metaphyseal Ulna Fracture in Patients Older than 65 years-old: Comparative Study between Internal Fixation of the Ulna and Darrach's Procedure

Level 3 Evidence

Table 2. Objective and Subjective Results

Variable	ORIF group	Darrach group	p
Range of Motion – *mean (95% CI)*			
Flexion	51,8 (46 – 57)	56,5 (42 – 71)	0.45*
Extension	62 (55 – 69)	59,8 (47 – 73)	0.52*
Radial deviation	18,1 (12 – 24)	16,5 (11 – 22)	0.57*
Ulnar deviation	32,8 (29 – 37)	33,6 (25 – 42)	0.59*
Pronation	76,4 (69 – 84)	83 (79 – 87)	0.16*
Supination	79,9 (74 – 86)	86,4 (84 – 89)	*0.04**
Grip strength [kg] – *mean (95% CI)*	14,7 (11 – 18)	11,6 (8 – 15)	0.06*
Pain (VAS 0 to 10) – *mean (95% CI)*	0,2 (-0.1 – 0.6)	1,3 (-0.5 – 3)	0.11*
DASH questionnaire – *mean (95% CI)*	9 (3 – 15)	25 (5 – 45)	0.14*
Complications – *n (%)*	6 (60)	1 (9)	*0.02*[α]

Boretto, 2015

Salvage operations

- **Ulnar head replacement**
- **Darrach**
- **Sauve-Kapandji**
- **DRUJ prosthesis**

Conclusions

- **The majority of ulnar fractures do not need to be fixed**
  - **Goal is anatomic fixation of radius**
  - **Check DRUJ stability after ORIF DRF**
  - **Think twice about basal oblique styloid fractures and the VERY displaced fracture**
- **Comminuted IADUF?**
  - **>65– darrach or leave it alone**
  - **Young? Fix it**

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Thank you!

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