


FLORIDA ORTHOPAEDIC INSTITUTE

USF HEALTH

Fractures of the Distal Radius: Volar, Dorsal, or Both?

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DISCLOSURES

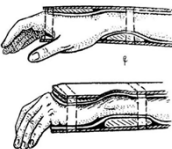
- Hassan R. Mir, MD, MBA, FACS
 - Paid Consultant for a Company or Supplier
 - Smith & Nephew
 - Zimmer Biomet
 - Triage Medical
 - Stock or Stock Options
 - Core Orthopaedics
 - OrthoGrid Systems
 - Research Support from a Company or Supplier
 - AO Trauma North America
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Special Thanks to Dr. Frank Avilucea
for Select Slides/Images




Evolution of Distal Radius Fracture Treatment


[Chung Hand Clinics 2012]



Casting - Cotton-Loder Position




Pins & Plaster



External Fixation


Evolution of Distal Radius Fracture Treatment



PI

Dorsal Plating

Non-Locked
Plating



AOT

Volar Plating

Operative Treatment of DRFx Volar Locked Plating ~ 20 years



[Orbay - Tech Hand Upper Ext Surg 2001]

Fixed Angle Volar Plates

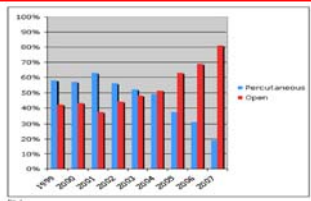
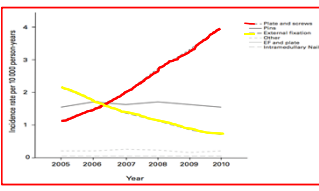


Fig. 1 Bar graph showing the percentage of open treatment for distal radius fractures for each year from 1998 through 2007.

[Koval JBJS 2008]



[Meistrand-Navarro JBJS Br 2014]

AAOS Clinical Practice Guideline Summary	
Treatment of Distal Radius Fractures	
<i>J Am Acad Orthop Surg</i> 2010;18: 180-189	
Abstract	
<p>The clinical practice guideline is based on a systematic review of published studies on the treatment of distal radius fractures in adults. None of the 29 recommendations made by the work group was graded as strong; most are graded as inconclusive or consensus; seven are graded as weak. The remaining five moderate-strength recommendations include surgical fixation, rather than cast fixation, for fractures with postreduction radial shortening >3 mm, dorsal tilt >10°, or intra-articular displacement or step-off >2 mm; use of rigid immobilization rather than removable splints for nonsurgical treatment; making a postreduction true lateral radiograph of the carpus to assess dorsal radial ulnar joint alignment; beginning early wrist motion following stable fixation; and recommending adjuvant treatment with vitamin C to prevent disproportionate pain.</p>	

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What We Do Know...

Surgical Fixation of Fractures with:

- Post-Reduction Radial Shortening of >3mm
- Dorsal Tilt >10 Degrees
- Intra-Articular Displacement or Step-off >2mm

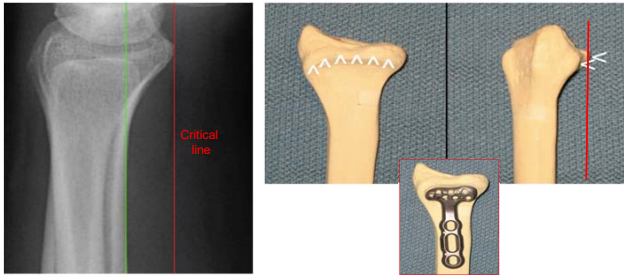
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Treatment of Distal Radius Fractures	

Volar Locking Plate Complications

- Tendon Related
 - Flexor Tendon Rupture
 - Extensor Tendon Rupture
- Osseous Complications
- Nerve Injury
- CRPS

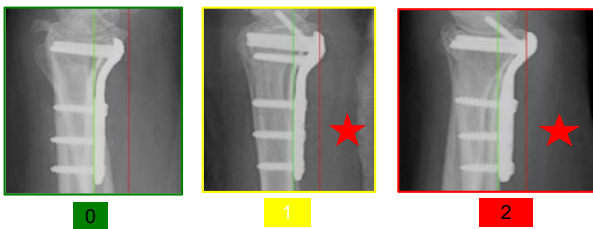
Volar Plate Prominence

Soong JBJS 2011



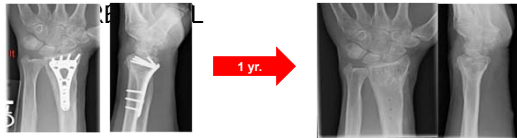
Volar Plate Prominence

4% Flexor tendon rupture
3% flexor tendon "irritation"
Soong JBJS 2011

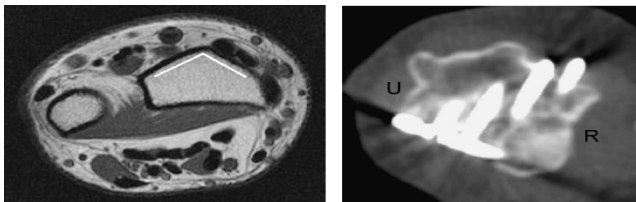


Fracture Dictates Plate Placement

- 1. EDUCATE THE PATIENT
- 2. CLOSE FOLLOW UP IF PLATE IS GRADE 1 OR 2
- 3. DISCUSS POSSIBLE PLATE



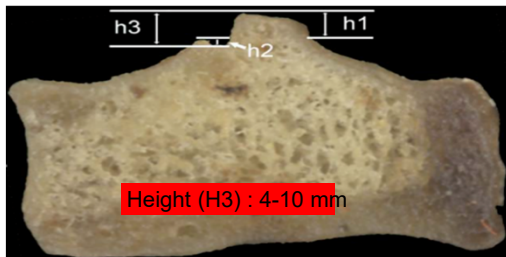
Extensor Tendon Complications

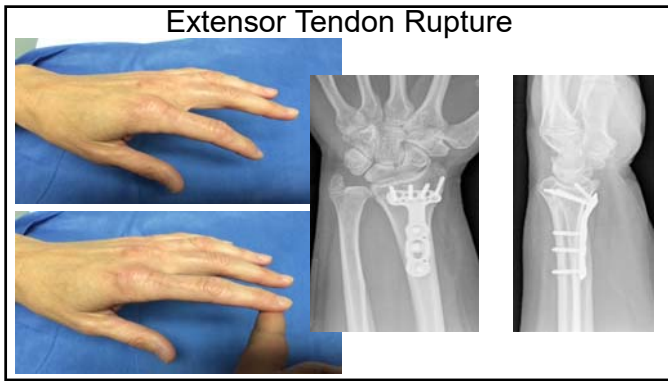


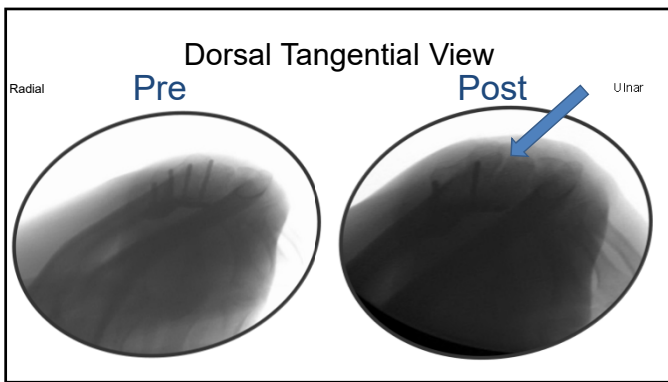
Shape of Radius →
Difficult to Determine Screw Prominence

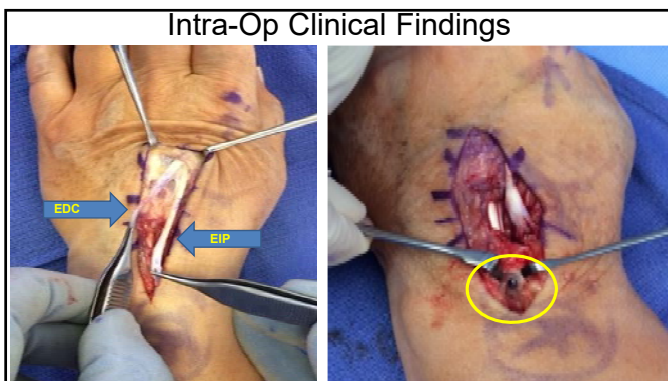
Anatomy Lister's Tubercle

[Clement JHS 2008]









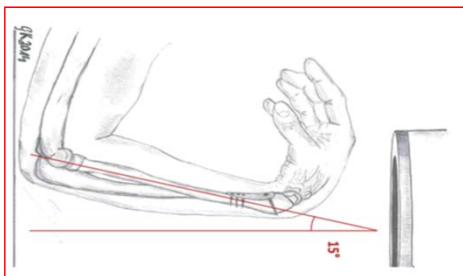
**AVOIDING
Extensor Tendon Complications**

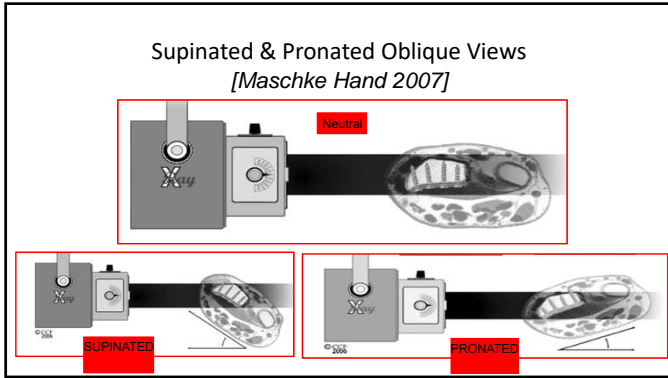
- Dorsal Tangential View [Babst JHS 2014]
- Supinated & Pronated Oblique Views [Maschke Hand 2007]
- Know standard screw lengths
- Locked unicortical distal screws \geq 75% length [Calfee JHS 2012]
- Unicortical Drilling [Al-Rashad JBJS Br 2006]

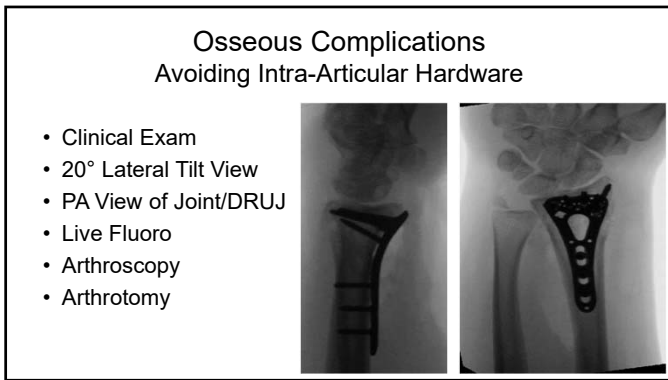
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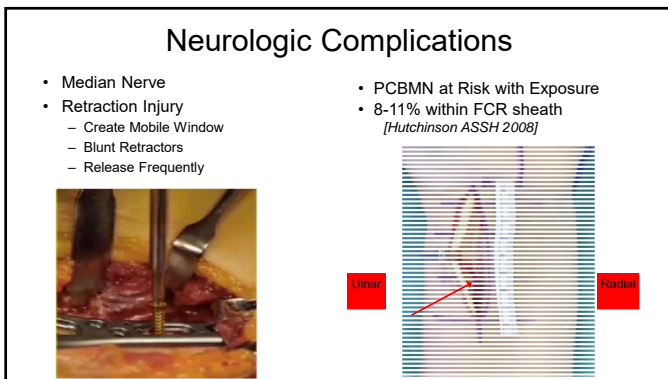


**Dorsal Tangential View
[Babst JHS 2014]**









Acute Carpal Tunnel Syndrome

[Dyer JHS 2008]

- Occurrence 5.4% of DRFx
- #1 Risk: Fracture Translation
- Numbness from Swelling/Splint
- Pre-existing CTS
- Release – Avoid CRPS



CRPS

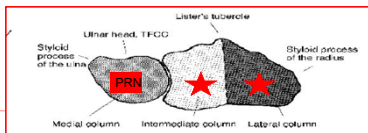
It sees you more than you see it.

- 10-37% of DRFx
- Female, Older Age
- Intra-Articular Fractures
- TYPE 2 – Associated with CTS
– CTR if Symptomatic
- Vitamin C – No Benefit [Evaniew JOT 2015]



Fracture Considerations

- Anatomic Reduction and Rigid Fixation
– Lateral & Intermediate Columns
- Medial Column (Ulna) Stabilized as Necessary
- Allows for Early Mobilization



Fracture Pattern → Determines Fixation

LIMITATIONS TO STANDARD VOLAR PLATING

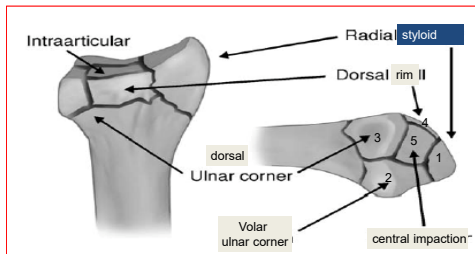


Helpful Tools:
 Dorsal Plating
 Distal Volar plates
 Fragment Specific Fixation
 Dorsal Bridge Plating
 External Fixation



“Critical” Fragments

[Wolfe - Oper Tech Sports Med 2010]



Radiographic Evaluation

[Medhoff - Hand Clinics 2005]



BEWARE with
Standard Volar Locked Plating

- Volar Ulnar Corner Fragment*
- Dorsal Ulnar Corner Fragment
- Unstable Radial Styloid Fragment
- Dorsal Shear Fracture (Barton's)
- Marginal Articular Fractures

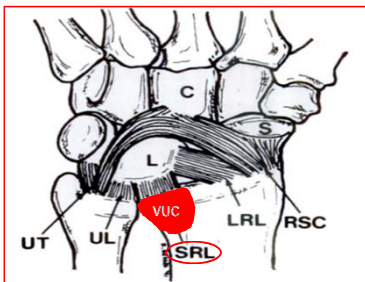


New Technologies

- Variable Angle Locking Plates
 - Distal Screws have +/- 15° spread with Locking Capability
- Better Contour
- Lower Profile
- Fragment Specific



Anatomy → Volar Ulnar Corner



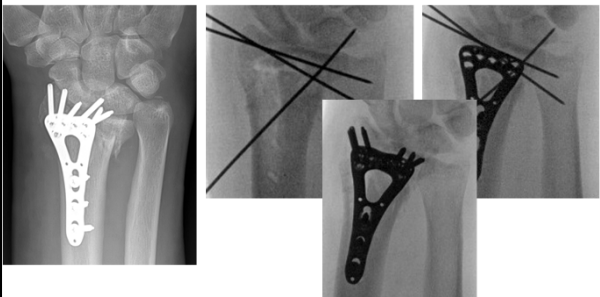
Short Radio-lunate Ligament
 ↓
 ATTACHES TO VOLAR ULNAR CORNER
 ↓
 Carpus Follows this fragment

Volar Ulnar Corner

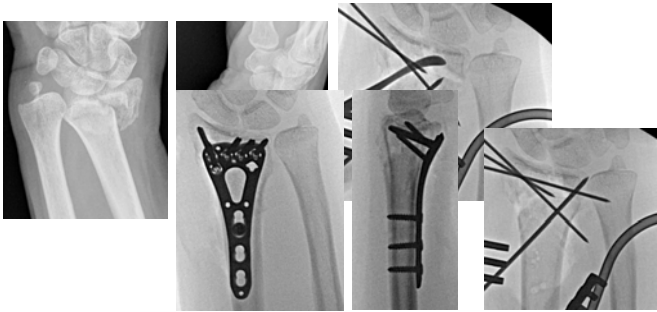
[Harness, Jupiter, Orbay et al - JBJS 2004]



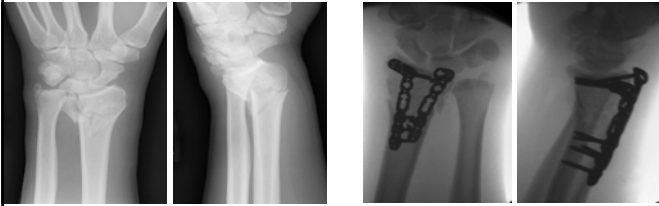
Volar Ulnar Corner Fragment



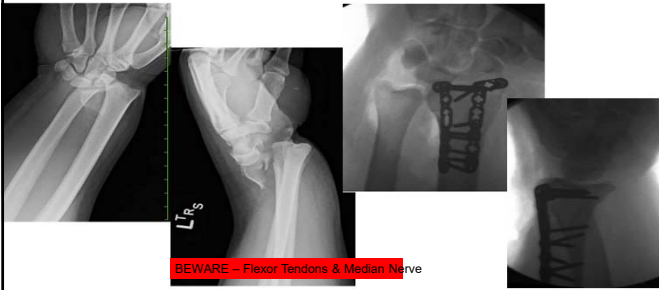
Dorsal Ulnar Corner



Dorsal Ulnar Corner



Dorsal Shear Fracture



Unstable Radial Styloid



Evaluate for Associated Injuries

Marginal Articular Fractures



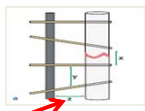
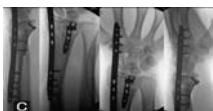
Marginal Articular Fractures



Dorsal Bridge Plate

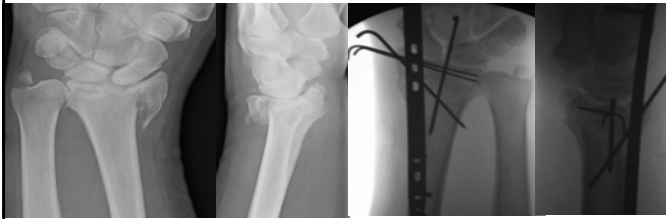
[Burke & Singer 1998, Hanel JBJS 2005, CORR 2006]

- Internal External Fixator
- Comminution + Metadiaphyseal Extension
- High Energy Polytrauma
- Early Weight Bearing
- Elderly [Ruch JHS 2012]

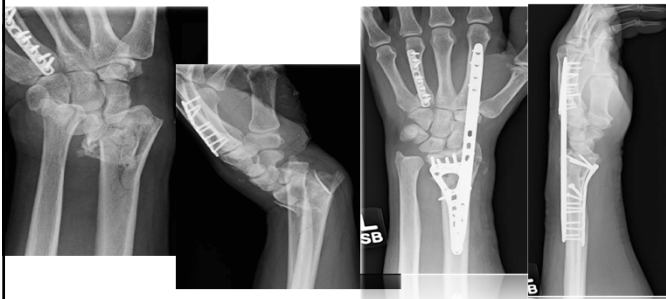


Zero bone-to-bar distance

Marginal Articular Fractures



Marginal Articular Fracture + Metadiaphyseal Extension + Polytrauma



DBP → Outcomes at 1 year

[Hanel JHS 2015]

