UCSF Trauma Conference 2021

Complex Distal Radius Fractures Selecting a Succcessful Approach

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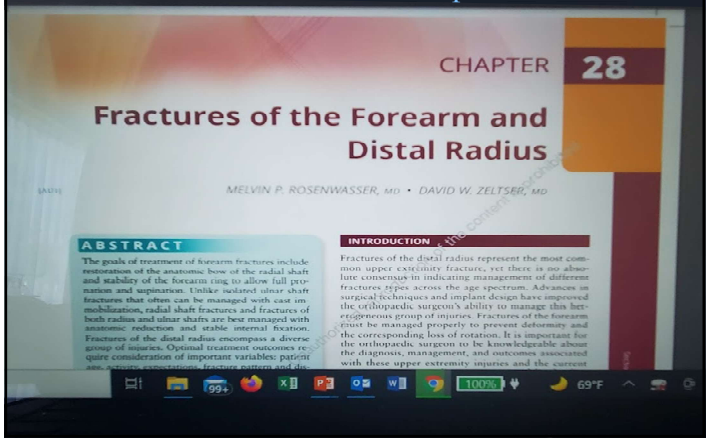
2021 OKU 6 Trauma
Distal Radius Chapter


CHAPTER 28

Fractures of the Forearm and Distal Radius

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ABSTRACT

The goals of treatment of forearm fractures include restoration of the anatomic bow of the radial shaft and stability of the forearm ring to allow full pronation and supination. Unlike isolated ulnar shaft fractures that often can be managed with cast immobilization, radial shaft fractures and fractures of both radius and ulnar shafts are best managed with anatomic reduction and stable internal fixation. Fractures of the distal radius encompass a diverse group of injuries. Optimal treatment outcomes require consideration of important variables: patient

INTRODUCTION

Fractures of the distal radius represent the most common upper extremity fracture, yet there is no absolute consensus in indicating management of different fractures types across the age spectrum. Advances in surgical techniques and implant design have improved the orthopaedic surgeon's ability to manage this heterogeneous group of injuries. Fractures of the forearm must be managed properly to prevent deformity and the corresponding loss of rotation. It is important for the orthopaedic surgeon to be knowledgeable about the diagnosis, management, and outcomes associated with these upper extremity injuries and the current

DRF's
Common and Operated Frequently

Everybody knows the FCR splitting approach

It works for all extra-articular fractures

It doesn't for more complex intra-articular fractures in all cases

If you are going to tackle the more difficult comminuted and displaced fractures

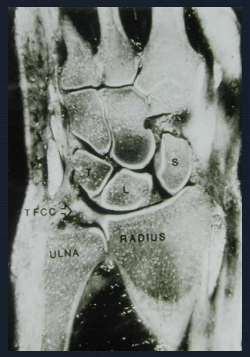
You need more arrows in the quiver

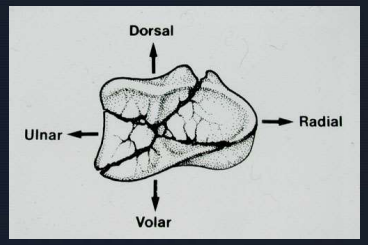
Dorsal, radial column, and midline approaches need to be mastered

Have surgical access to all columns
To be able to fix all Fx types

- **Radial Column**
  - Lateral side of radius including the radial styloid and scaphoid fossa
- **Intermediate Column**
  - Ulnar side of radius, including the lunate fossa and sigmoid notch
- **Ulnar Column**
  - Ulnar head, including the triangular fibrocartilage complex (TFCC) and the ulnar part of the distal radioulnar joint (DRUJ)

Lunate facet reduction critical for carpal stability and restoration of supination





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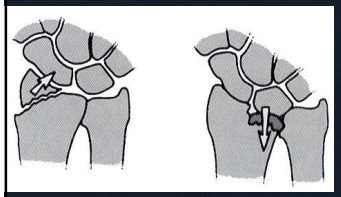
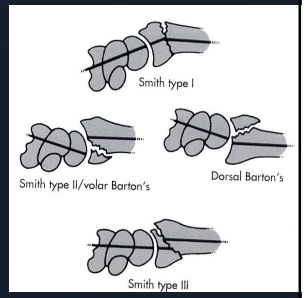
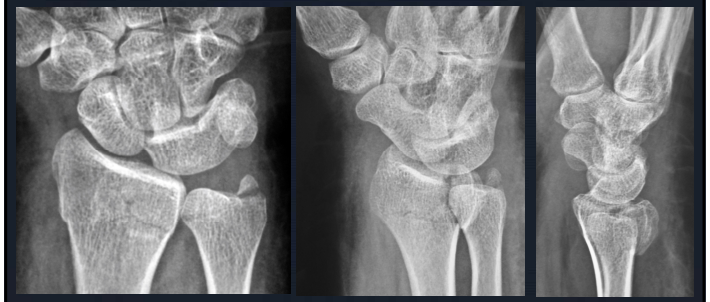
These Fracture variations need more direct approaches to capture the displaced facet

Chauffeur's ***Die-punch***





Case: 50 y/o F s/p fall
Displaced dorsal lunate facet
Do you want to approach this via FCR split?



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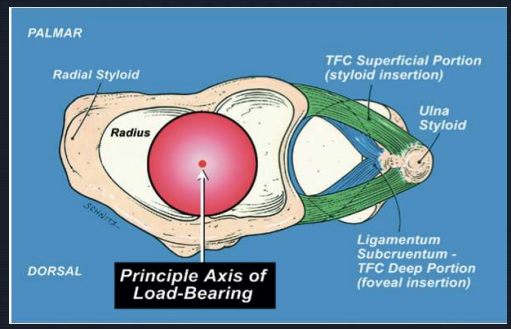
If the lunate facet is stable post ORIF The DRUJ will most likely be stable



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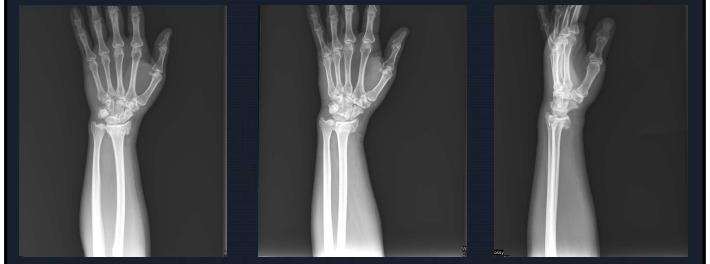
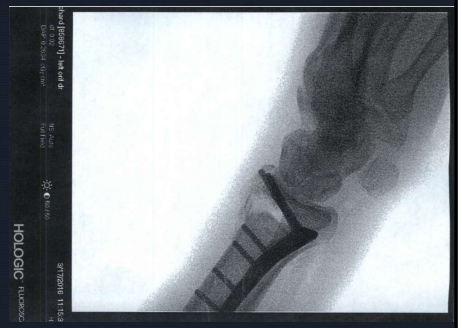
59 y/o RHD M: injury films @ 2 days post fall

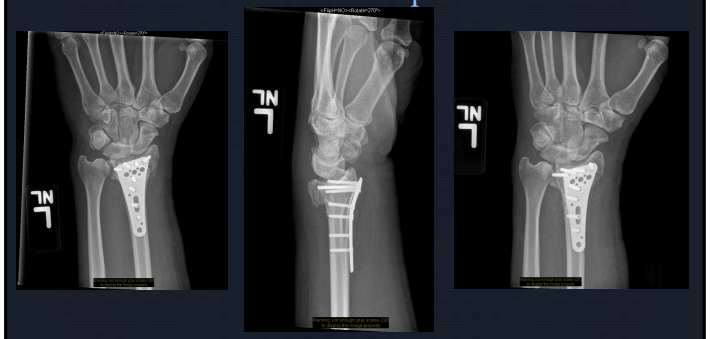


Intra-Op film: 5 days post injury

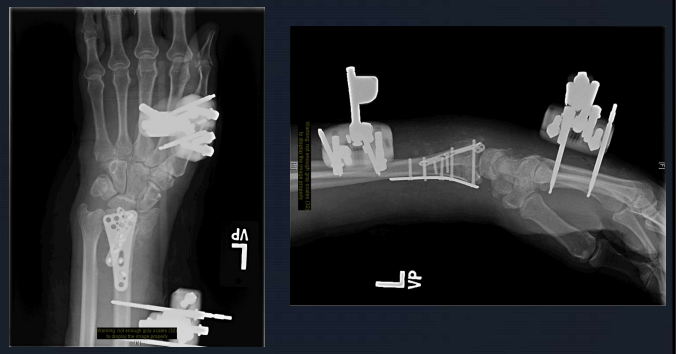
- Volar Locking plate
- FCR split
- Reduction looks good
- Splinted and seen 2 weeks later



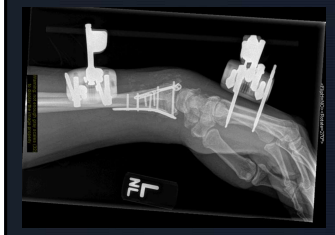
Volar Locking Plates alone may not be sufficient to control osteopenic dorsal rim

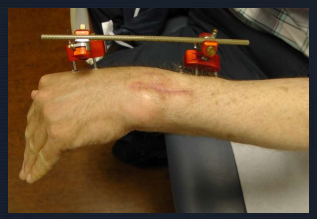


Revised with addition of dorsal facet plate in combination with volar locking plate, neutralized with spanning external fixator



@ 1 month stable alignment: fixator removed





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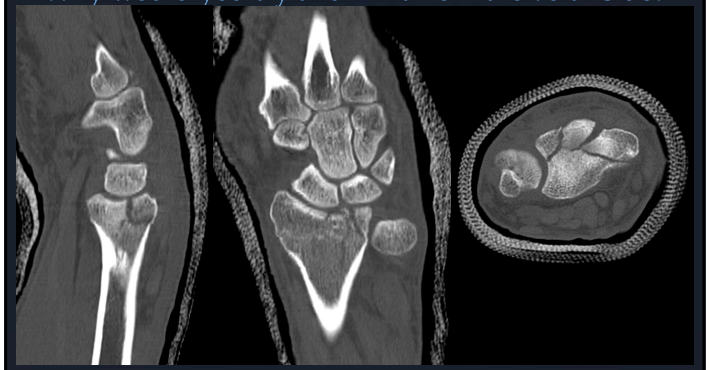
This fx is a dorsal die punch
Why would you try and fix it from the volar side?



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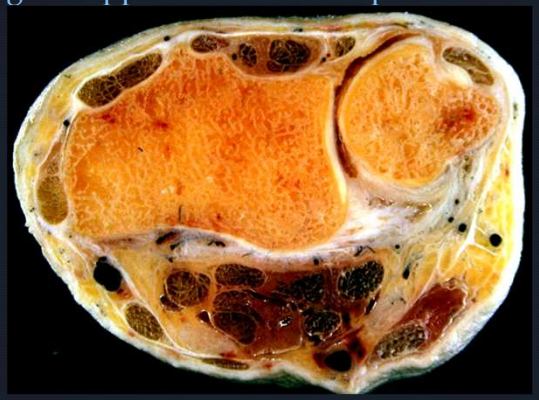
Surgical Approaches must respect anatomy



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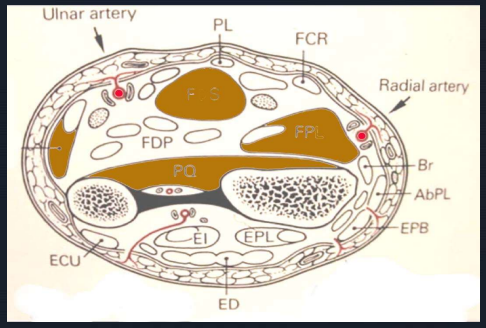
Workhorse FCR splitting approach
Palmar cutaneous nerve in FCR-PL interval



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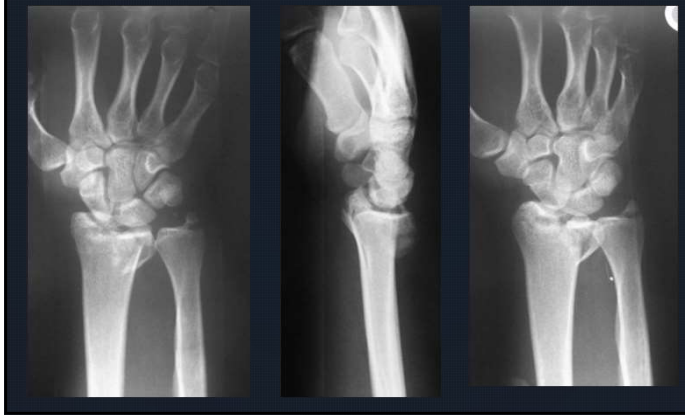
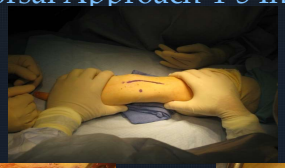
23 y/o M s/p MC accident
Radial Column + Dorsal Facet Fxs
Is this a Volar Plate case?

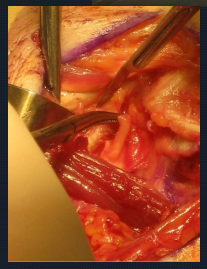


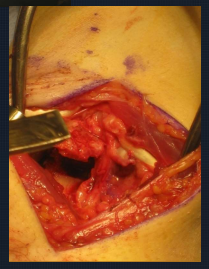
Surgical Planning

- **Dorsal Facet approached dorsally in the 4-5 interval**
- **Radial column approached through 1st DC**
- **Each allows direct access for buttressing the unstable fracture fragments**
- **Metaphyseal void can be addressed with void filler allograft**
- **This fracture would be very difficult to fix using the standard FCR incision and a VLP**

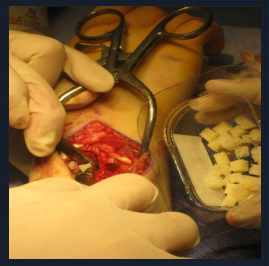
Dorsal Approach 4-5 Interval

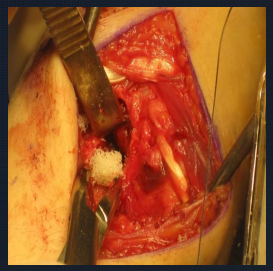




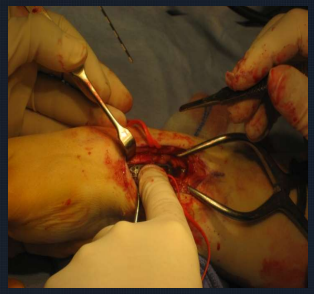
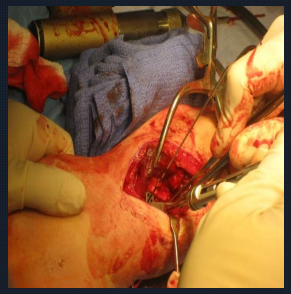


Reduction of lunate facet
allograft cancellous croutons into void

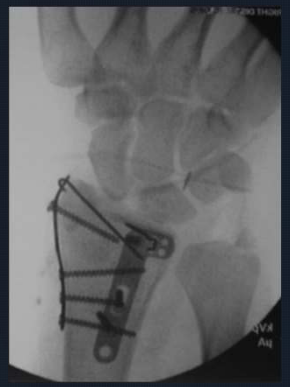
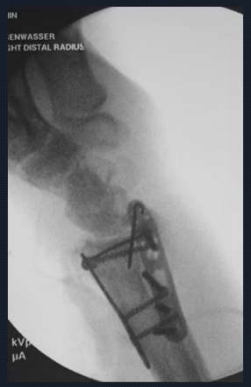




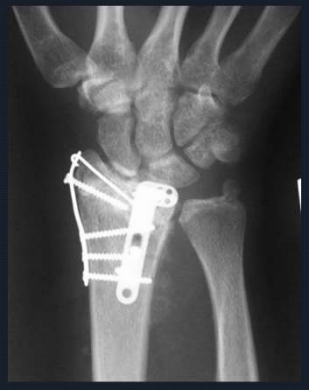
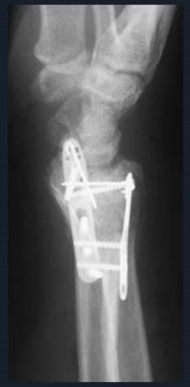
1st DC incision- tendons retracted dorsally
Isolate RSN and protect with loops
Radial column buttress plate

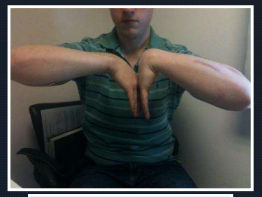
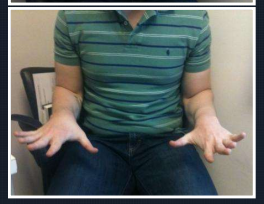
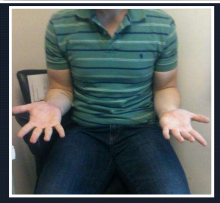
Dorsal and Radial Column plating

@ 2 mos healed and No Subsidence

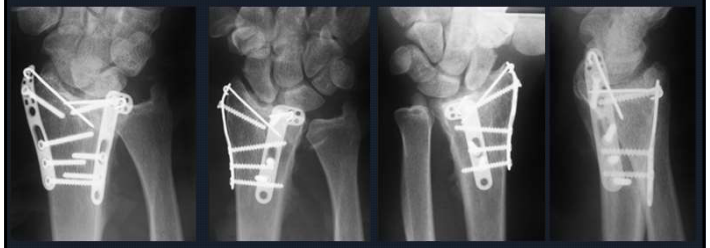



@ 2 Months- Near full motion

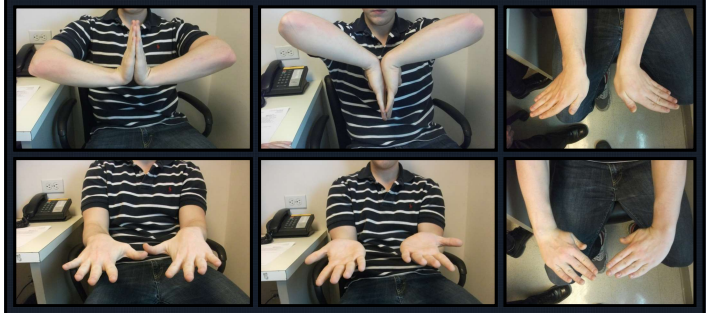





@2 Months
Strength correlates with union

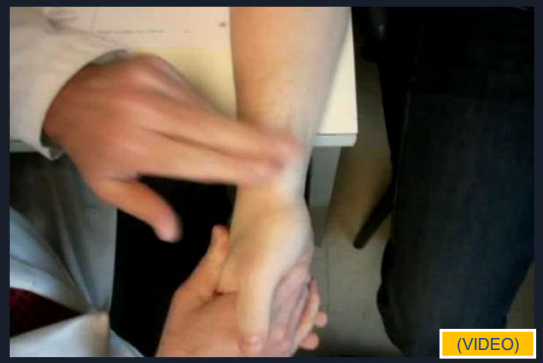
@ 1 Year - No HWR migration or Pain



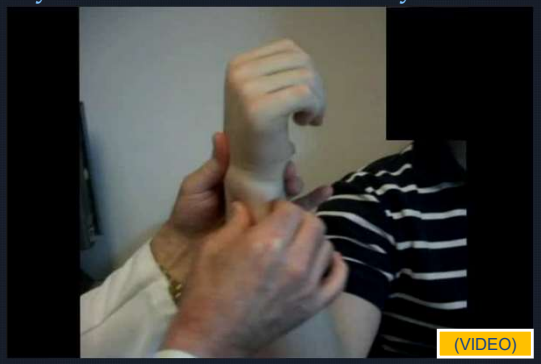
@1 Year
No Pain or complaints



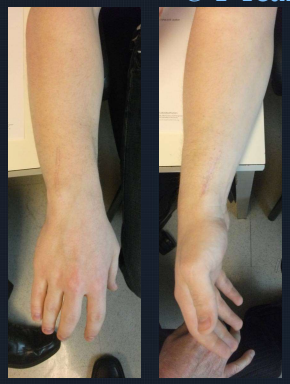
@ 1 yr- No Radial Nerve symptoms
No Hardware Pain



@1 Year
Always shuck to test the stability of the DRUJ



@ 1 Year Outcome



- DASH = 0.8
- VAS (rest) = 0.0
- VAS (active) = 0.1

- Grip: 64kg/60kg
- K Pinch: 11kg/10kg

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Standard X-ray indices may not be enough in determining closed vs open RX

- **Radial length**
- **Radial inclination**
- **Articular step-off**
- **Articular tilt**
- **DRUJ Congruence**

When I need to ensure no loss of supination,

I get a CT in axial plane

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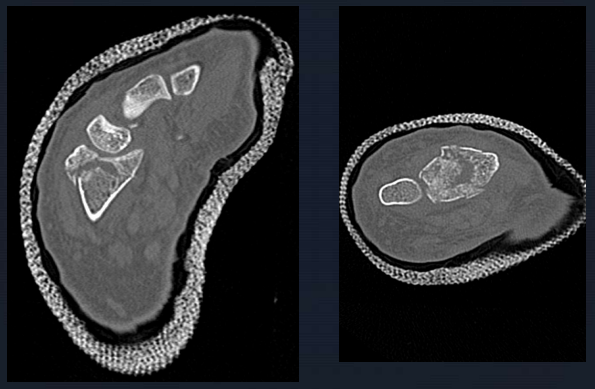
CT @ 2 weeks – incongruent joint
ORIF indicated



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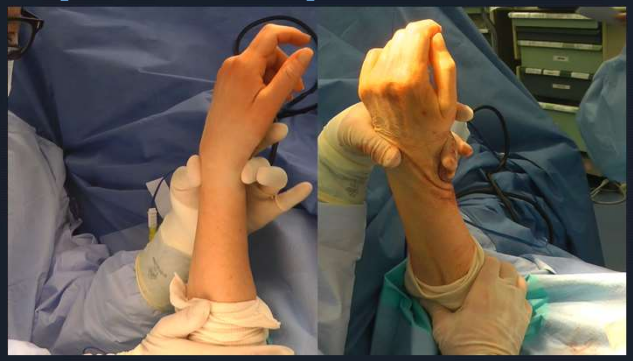
Supination Blocked pre op evaluation
Supination restored post ORIF Lunate facet



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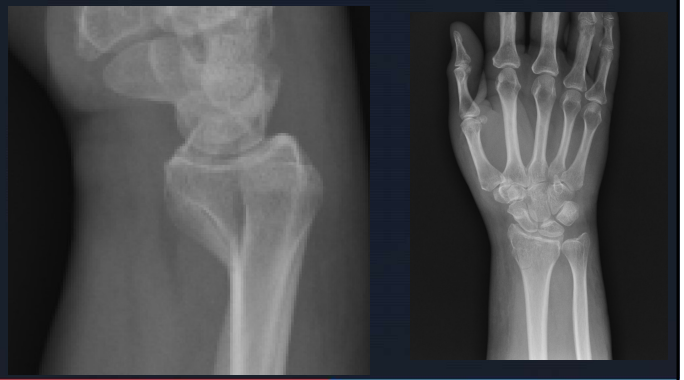
Volar Barton's Fx
Must capture volar lunate facet



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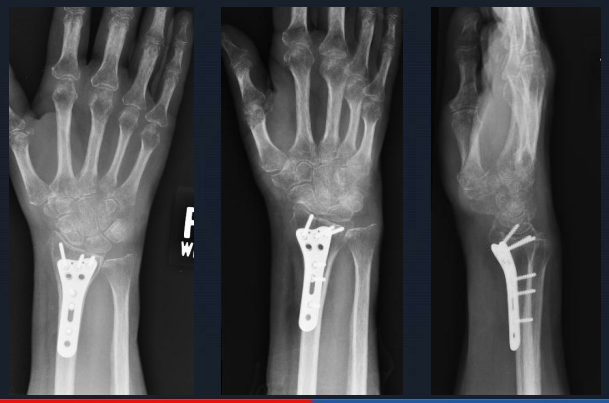
Medialize plate to capture lunate facet



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Case: Volar Barton's Fx
54 y/o Physician fell while rollerblading

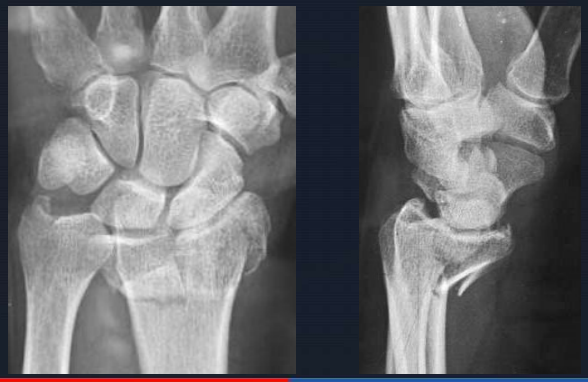

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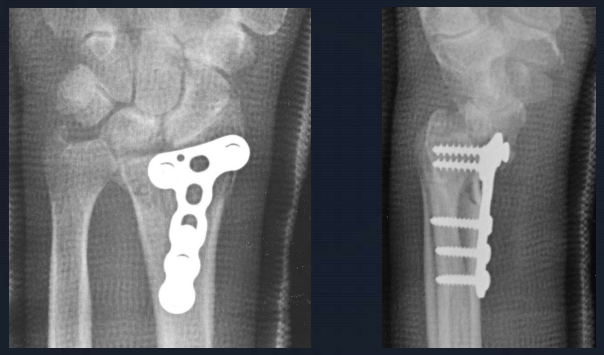
Plate Not Medial Enough
Lunate Facet Escape



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How do you see better with standard FCR splitting approach?

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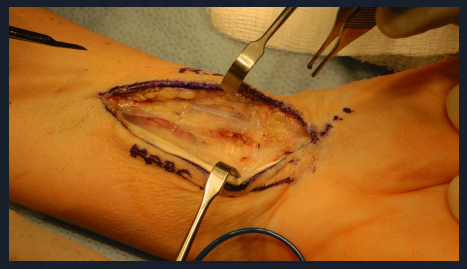
Extend incision distally- Release FCR tunnel
This allows better FCR retraction



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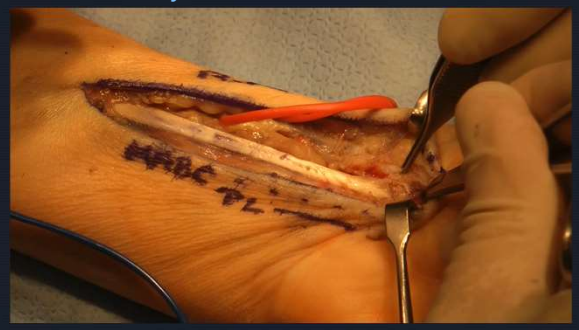
Release the fibro-osseous FCR tunnel
Markedly increases FCR retraction



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Pearl

- Take down of pronator quadratus should be performed with 1/3 of the adjacent and contiguous brachioradialis tendon
- This will make a secure repair over the plate achievable
- Covering the distal radial part of the VLP will help protect the FPL tendon from irritation and possible late rupture

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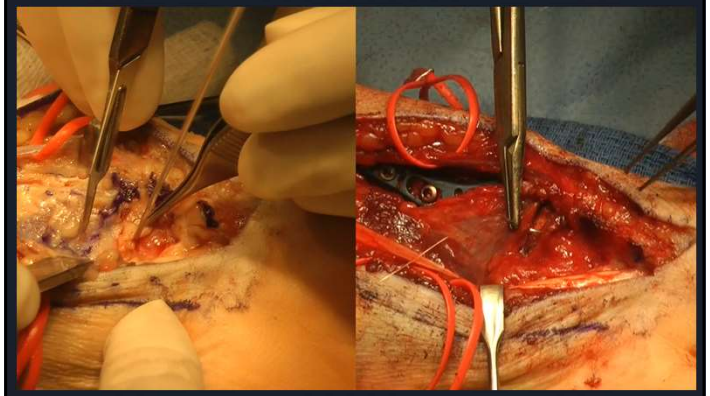
Elevation of Flap - Closing Flap



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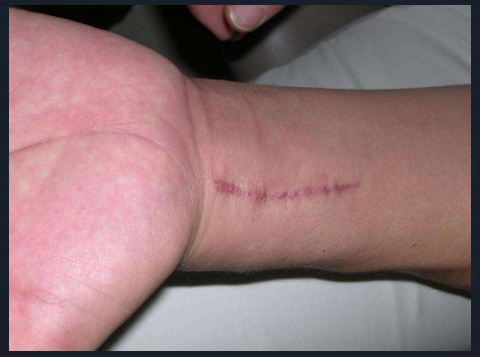
To make it easier to get to volar lunate facet Consider midline approach just ulnar to PL



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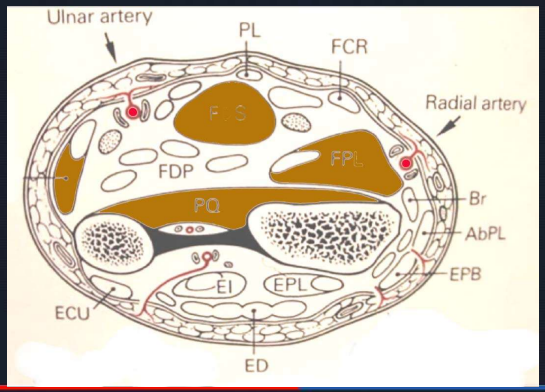
Volar Ulnar Approach to Lunate Facet



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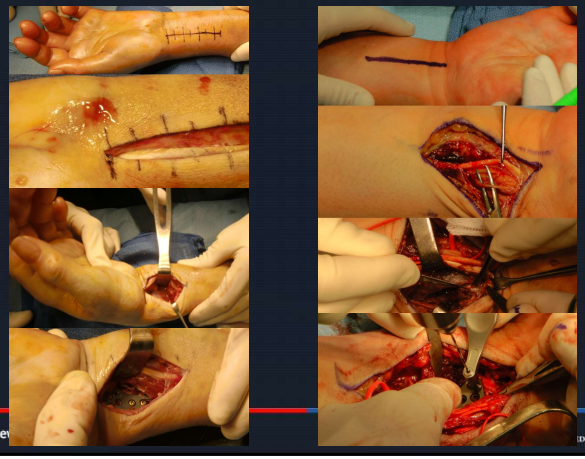
FCR vs Volar Ulnar Approach

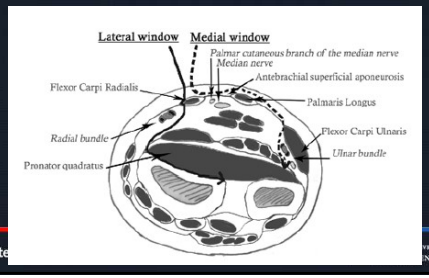


TECHNIQUE

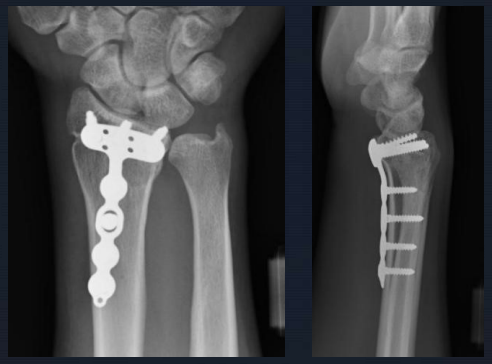
A New Single Volar Approach for Epiphyseal Ulnar and Radial-sided Comminutive Fracture of the Distal Radius: The Mediolateral Windows Approach

Olivier Mares, MD,† Marc Andre Graves, MD,‡ Christophe Bosch, MD,*† Michel Chammas, MD, PhD,*† and Cyril Lazerges, MD†*

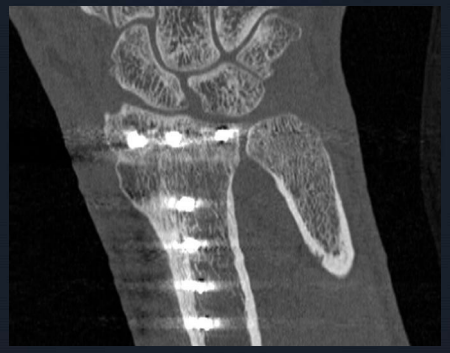
Techniques in Hand & Upper Extremity Surgery • Volume 16, Number 1, March 2012



Direct medial facet exposure through FDS-FCU interval allows extreme medialization of plate



This plate placement is difficult through standard FCR split



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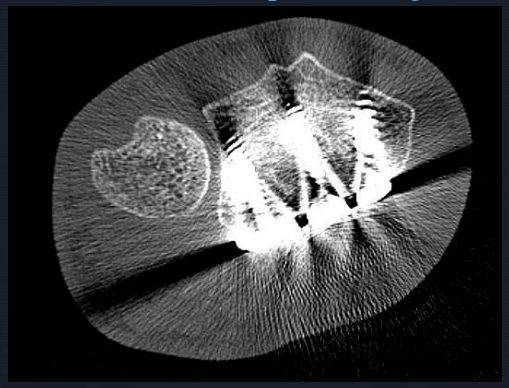
Axial CT medial screw capture of sigmoid notch



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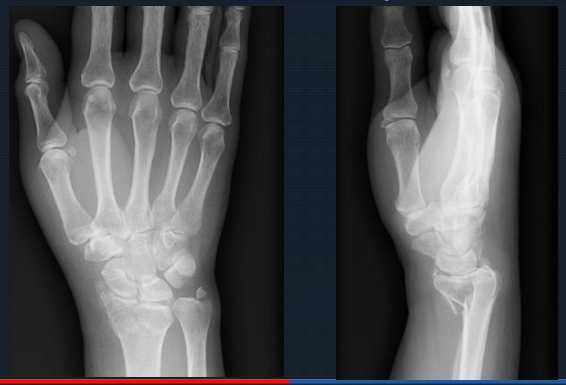
Case: 63 y/o RHD F, fall- volar Barton's
What about ulnar styloid?



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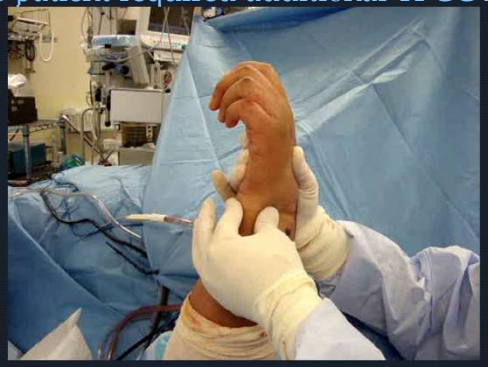
Always Test DRUJ stability after radius ORIF
This patient required additional TFCC repair



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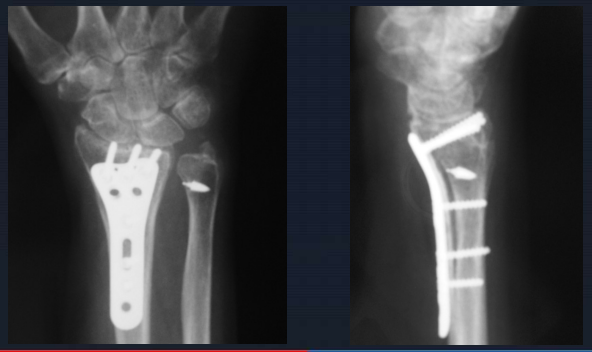
Repair TFCC attachment with
suture looped around TFCC secured with anchor



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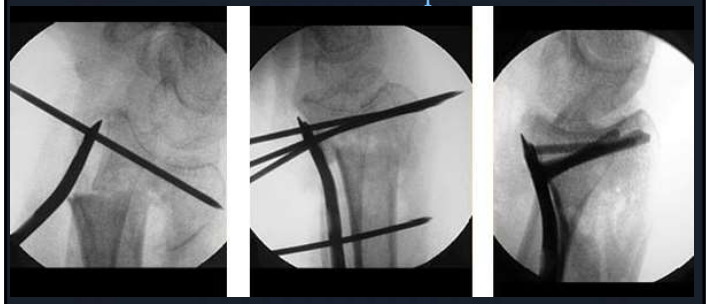
1-2 weeks post injury Reduction aided by Liftoff Technique



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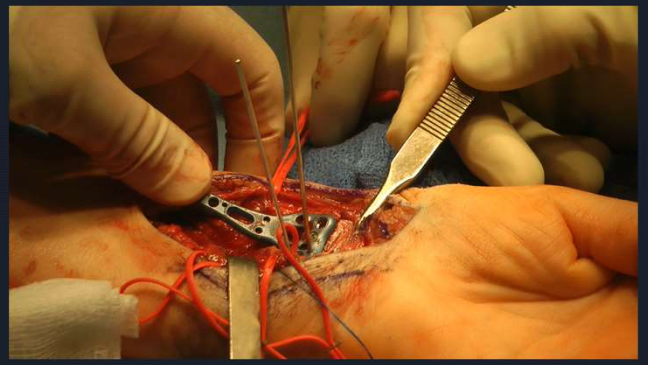
Lift-off Technique



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Thank You

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My Preferred Approach to the Dorsal Lunate Facet

Dorsal Approach to the Wrist for Lunate Fossa Fractures and DRUJ Pathology

- Incision along ulnar border of distal radius
- Divide retinaculum between EDM and EDC
- Subperiosteal elevation under EDC for lunate fossa fractures
- Create window between EDM and ECU for DRUJ pathology

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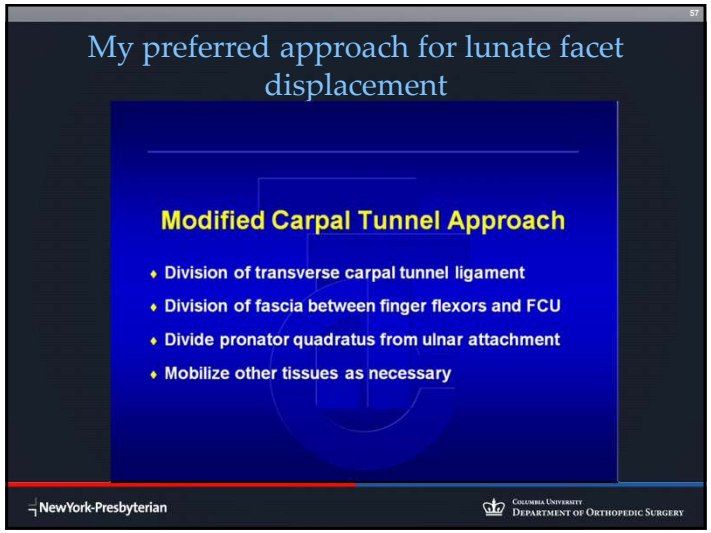
57
My preferred approach for lunate facet displacement
Modified Carpal Tunnel Approach
Division of transverse carpal tunnel ligament
Division of fascia between finger flexors and FCU
Divide pronator quadratus from ulnar attachment
Mobilize other tissues as necessary
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