External Fixation for Distal Radius Fractures

I (and/or my co-authors) have something to disclose.

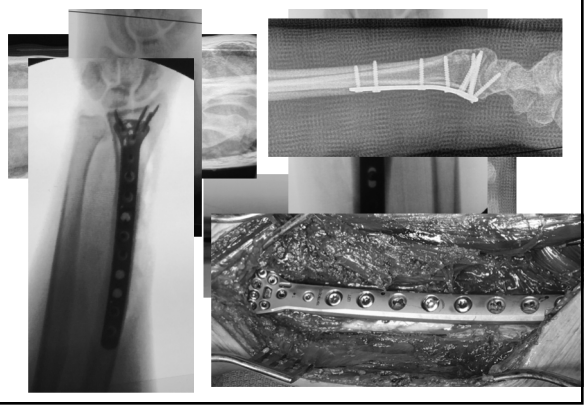
Detailed disclosure information is available via:

"My Academy" app;

Printed Final Program; or

AAOS Orthopaedic Disclosure Program on the AAOS website at http://www.aaos.org/disclosure

I Make Plates and $



I Would Likely Have a Well Done Frame

One Thing

Extension!!!

One Thing


Operative Indications?

- Age
- Initial films
  - Dorsal comminution
  - Intraarticular involvement
- Postreduction films
  - Carpal Alignment
- Loss of reduction

Carpal Malalignment…

THE JOURNAL OF BONE & JOINT SURGERY (BR)

REDISPLACED UNSTABLE FRACTURES OF THE DISTAL RADIUS

A PROSPECTIVE RANDOMISED COMPARISON OF FOUR METHODS OF TREATMENT

M. M. MCQUEEN, C. HAJDUCKA, C. M. COURT-BROWN

From the Royal Infirmary of Edinburgh, Scotland

- Mass grip strength
- Key grip
- Chuck grip

SCIENTIFIC ARTICLE

Predicting Alignment After Closed Reduction and Casting of Distal Radius Fractures

Joey LaMartina, MD, Andrew Jawa, MD, Charlton Stucken, MD, Gabriel Merlin, MD, Paul Tornetta III, MD

Distal Radius Fractures

Lafontaine, et al

1. Age > 60 years
2. Dorsal Angulation > 20°
3. Dorsal Comminution
4. Intra-articular fracture
5. Associated ulnar fracture

≥ 3 criteria = loss of reduction

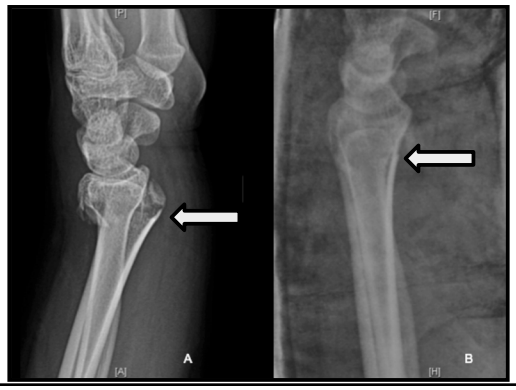
Prediction of Instability in Distal Radial Fractures

By P.J. Mackenney, FRCS, M.M. McQueen, MD, FRCSEd(Orth), and R. Elton, PhD

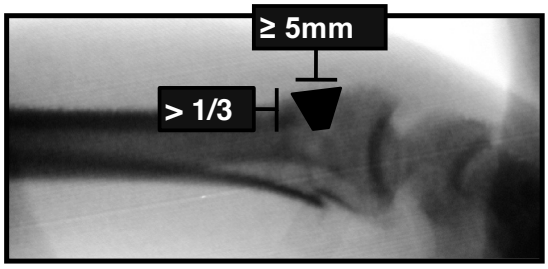
Investigation performed at the Edinburgh Orthopaedic Trauma Unit, The New Royal Infirmary, Edinburgh, Scotland

- Malunion formula risk factors
  - *Age**
  - Comminution
  - Ulnar variance > 3mm
  - Does own shopping

Volar Hook



Dorsal Comminution



Results: At Union

Lafontaine Total	Ulnar Variance	P < .0001
	Radial Height	P < .0001
	Radial Inclination	P < .0001
McQueen Equation	Ulnar Variance	P = .0008
	Radial Height	P < .0001
	Radial Inclination	P < .0001

Loss of Radial Height

Results: Multivariate

	Dorsal Tilt	Ulnar Variance	Radial Height	Radial Inclination
Final Position	Volar Hook Dorsal Comminution	Age of Patient	Age of Patient Intraarticular Fracture	Age of Patient
Δ During Treatment	Volar Hook Dorsal Comminution	Dorsal Comminution	Age of Patient	Age of Patient

Results: Multivariate

	Dorsal Tilt	Ulnar Variance	Radial Height	Radial Inclination
Final Positio	Volar Hook Dorsal Comminution	e of Patient	Age of Patient Intraarticular Fracture	Age of Patient
Δ Durin Treatme	Volar Hook Dorsal Comminution	Dorsal mminution	Age of Patient	Age of Patient

Results

- Carpal alignment
- Predicted by:
  - Volar hook (P = .001)
  - Age of patient (P = .03).

Volar Hook

If Operative…

- CRPP
- Spanning ex fix ± K-wires
- Nonspanning ex fix
- Plating
  - Dorsal
  - Volar (locked)

If Operative…

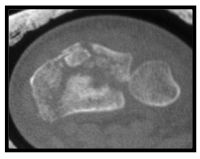
- CRPP
- *Spanning ex fix ± K-wires*
- *Nonspanning ex fix*
- *Plating*
  - Dorsal
  - *Volar (locked)*

Algorithm

- Extraarticular? YES
- Intraarticular?
  - Reduced in cast…YES
  - Translation ok in cast
    - With pins…YES
  - Impacted joint in cast
    - With open reduction + pins..YES
  - Fracture dislocation…NO!

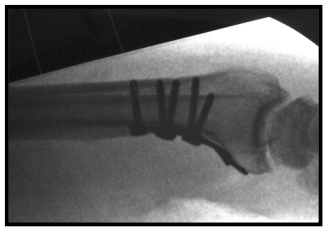
Intraarticular?

- YES!
- Can control fragments with pinning
- Critical
  - K-wires
  - Volar shift maneuver
  - Immobilize in *extension!*



Rim Fractures

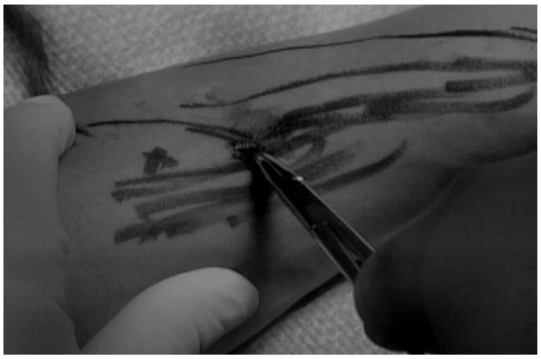

Plate(s)

Tips

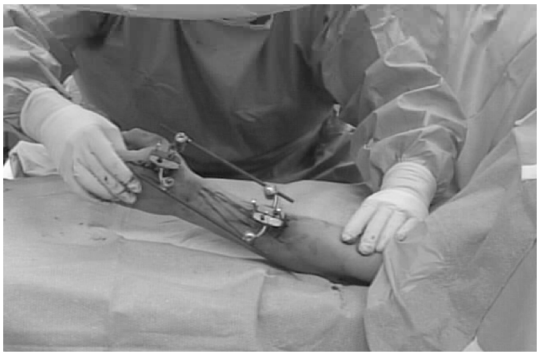
- Distract initially
- Metaphyseal alignment
  - Volar shift
  - Kapandji or other levers
- Joint impaction
  - Perc elevation or open and graft
- Pin (radial and others)
- Neutral frame in *extension*

Percutaneous Cannula

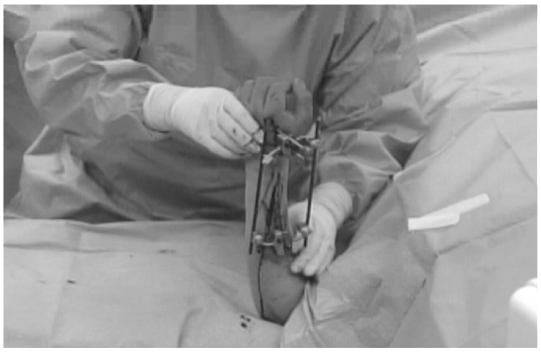


Reduction

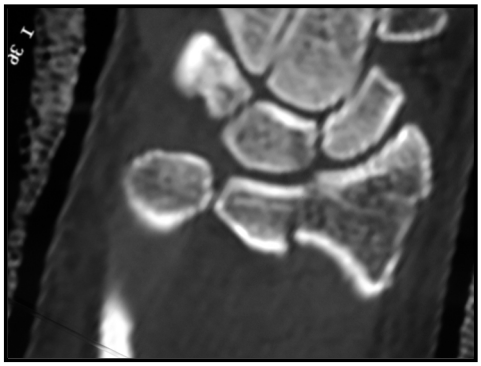
Radiographs



Motion

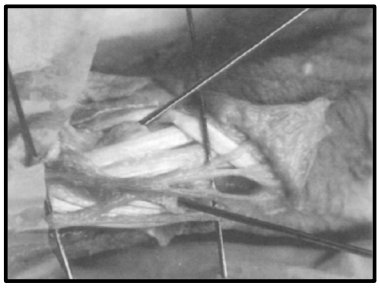


Spanning + K-Wire

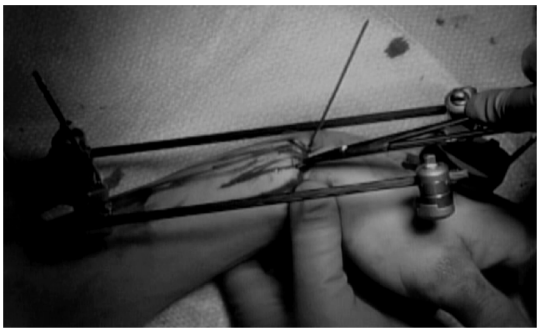


The Risks of Kirschner Wire Placement in the Distal Radius: A Comparison of Techniques

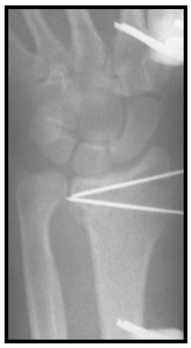
Neal L. Hochwald, MD, Brooklyn, NY,
Richard Levine, MD, Newark, NJ, Paul Tornetta III, MD, Brooklyn, NY



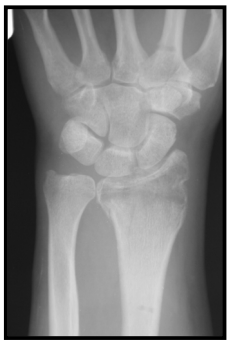
Pinning

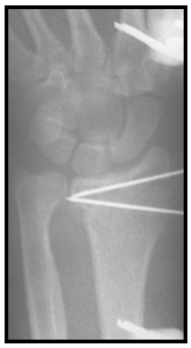


Spanning + K-Wire

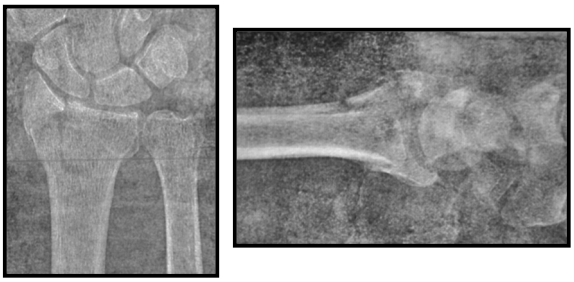


Spanning + K-Wire

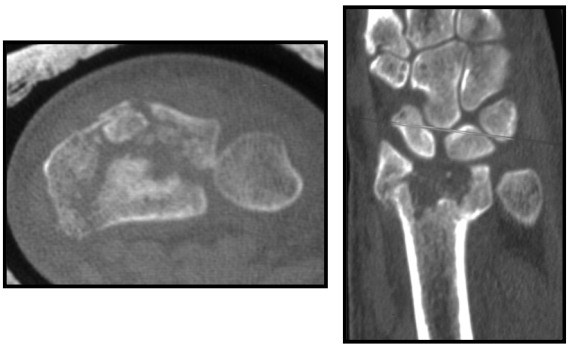




Complex

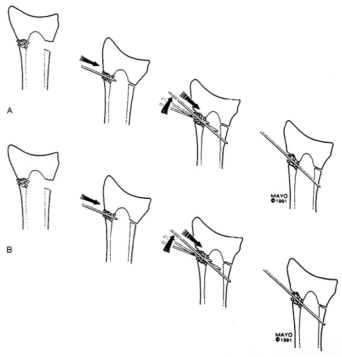


Rarely CT, but …

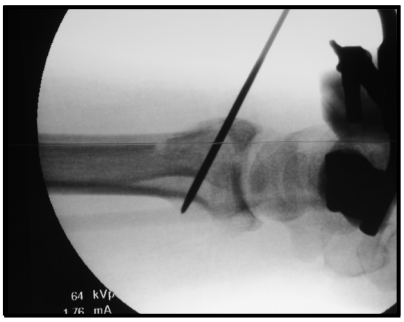


Lateral is Key

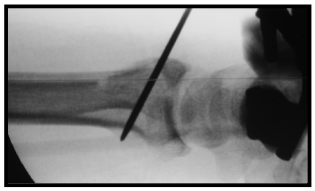
Kapandji Technique



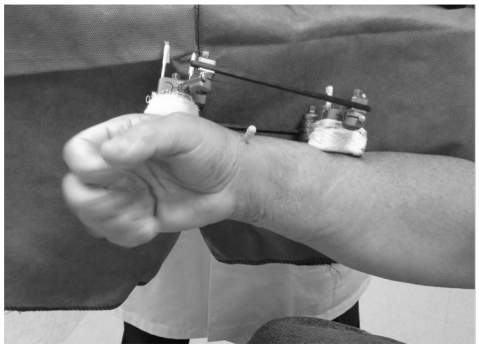
Kapandji Technique



Intraop



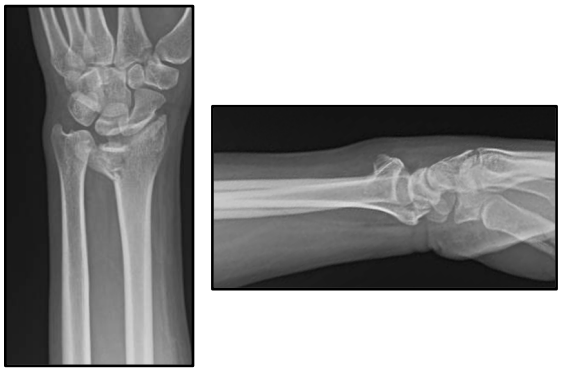
Two Weeks



4 Weeks

Removal in Clinic

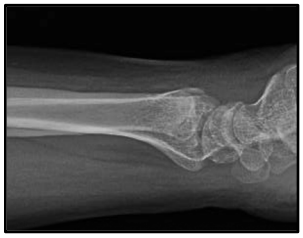
Impaction!



Casted

Ex Fix + OR+ Graft

Healed



Other Options..

THE JOURNAL OF BONE & JOINT SURGERY (BR)

Redisplaced unstable fractures of the distal radius

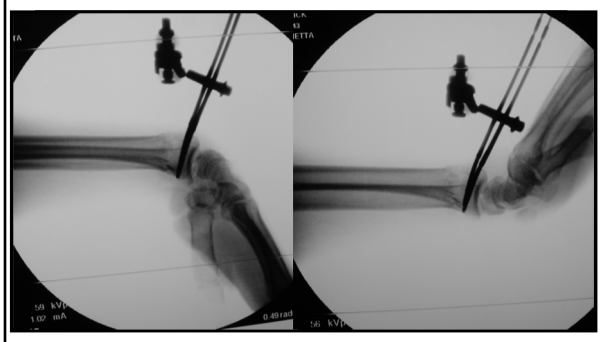
A RANDOMISED, PROSPECTIVE STUDY OF BRIDGING *VERSUS* NON-BRIDGING EXTERNAL FIXATION

M. M. McQueen

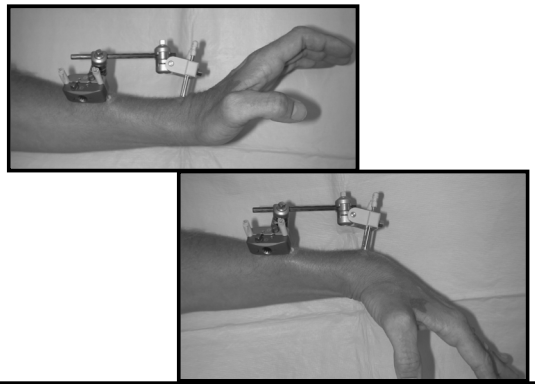
From the Royal Infirmary of Edinburgh, Scotland

	Group I	Group II	p value
Six weeks	3 (±6)	14 (±16)	<0.01
Three months	30 (±16)	54 (±27)	<0.001
Six months	59 (±22)	75 (±21)	<0.001
One year	69 (±21)	87 (±16)	<0.001

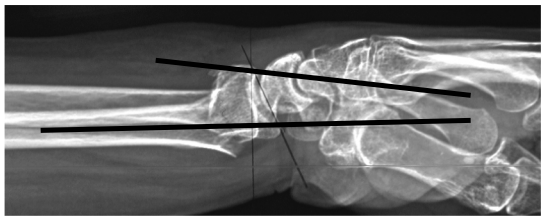
Other Options..



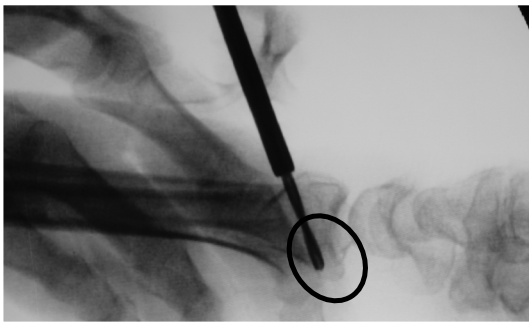
5 Weeks



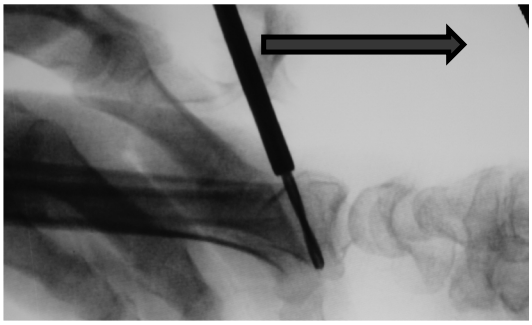
Technique



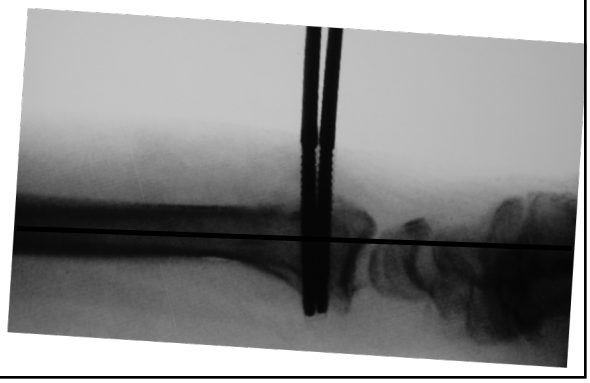
Pins / Reduction



Pins / Reduction



Pins / Reduction

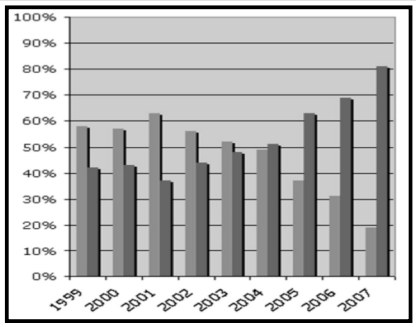


Fractures of the Distal Part of the Radius

The Evolution of Practice Over Time. Where's the Evidence?

By Kenneth J. Koval, MD, John J. Harrast, MS, Jeffrey O. Anglen, MD, and James N. Weinstein, DO, MS

Investigation performed at Dartmouth-Hitchcock Medical Center, Lebanon, New Hampshire

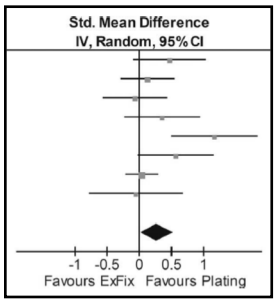


Why Would I Have a Frame??

- **Decreased complications that matter to me**
- **Can effectively treat anything except a fracture dislocation**

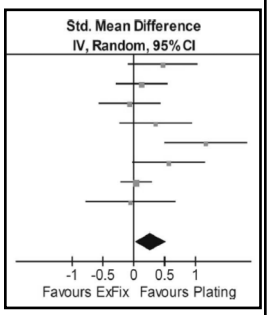
External Fixation Versus Internal Fixation for Unstable Distal Radius Fractures: A Systematic Review and Meta-Analysis of Comparative Clinical Trials

David H. Wei, MD, MS. Rudolf W. Poolman, MD, PhD,† Mohit Bhandari, MD, MSc,‡ Valerie M. Wolfe, MD,* and Melvin P. Rosenwasser, MD**



But…Important?

- **No report of the actual difference**
- **Only statistical**
- **Need the real #'s to decide importance**



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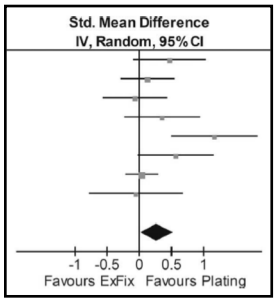
14.8

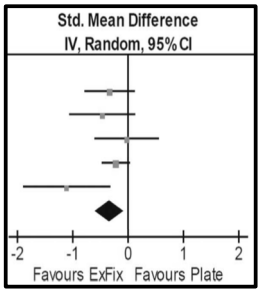


12.1

External Fixation Versus Internal Fixation for Unstable Distal Radius Fractures: A Systematic Review and Meta-Analysis of Comparative Clinical Trials

David H. Wei, MD, MS, Rudolf W. Poolman, MD, PhD,† Mohit Bhandari, MD, MSc,‡ Valerie M. Wolfe, MD,* and Melvin P. Rosenwasser, MD**

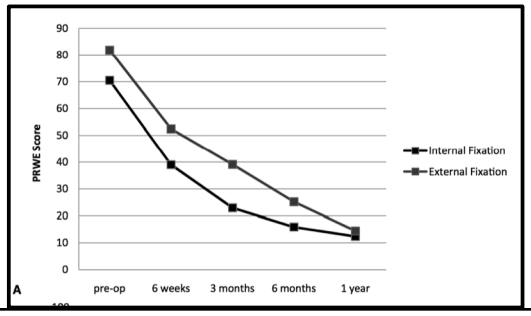
92%



82%

Open Reduction Internal Fixation Versus Percutaneous Pinning With External Fixation of Distal Radius Fractures: A Prospective, Randomized Clinical Trial

Ruby Grewal, MD, MSc, Joy C. MacDermid, MSc, PhD, Graham J. W. King, MD, MSc, Kenneth J. Faber, MD



...And Not Fair Chance!

Treatment of complex fractures of the distal radius: A prospective randomised comparison of external fixation 'versus' locked volar plating

J. Jeudy [a], V. Steiger [b], P. Boyer [a], P. Cronier [b], P. Bizot [b], P. Massin [a,*]

[a] Department of Orthopaedic Surgery, Bichat Claude Bernard Teaching Hospital, Paris Diderot University, 46 rue Henri Huchard, 75877 Paris cedex 18, France
[b] Department of Orthopaedic Surgery, Angers Teaching Hospital, 49833 Angers cedex 09, France

Other Studies

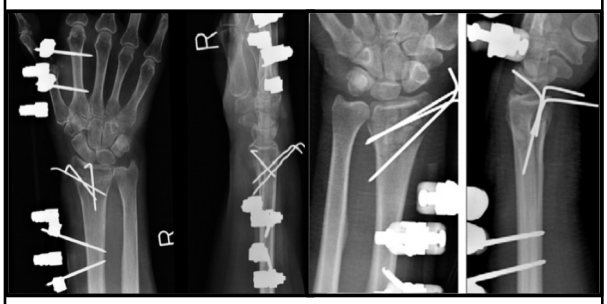


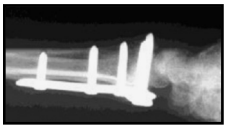
Plate Complications

10% - 30%

Locked volar plating for unstable distal radial fractures: Clinical and radiological outcomes

Dominique Knight, Carol Hajducka, Elizabeth Will, Margaret McQueen *

- 48% Complication rate
- 25% Malunion
- 25% Intraarticular screws
  - From collapse
- 12.5% EPL rupture
- 5% CTS



Complications

- Lack of reduction
  - Neutral volar tilt
- Loss of reduction
  - 1.9°, 10%
- Intraarticular screws
  - Initial 3%
  - Collapse 3% - 5%???

Complications

- Extensor tendons
  - Rupture 2%, Irritation 5%
- Flexor tendons
  - Rupture 3%, Irritation 8%
- Median nerve (CTS)
  - 4%

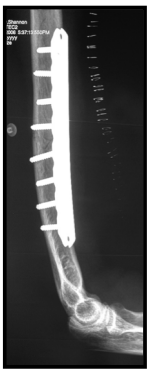
Loooong Screws

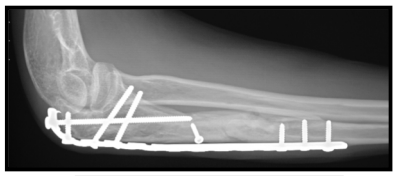
Aurora, et al. JOT '07

Screws in DRUJ

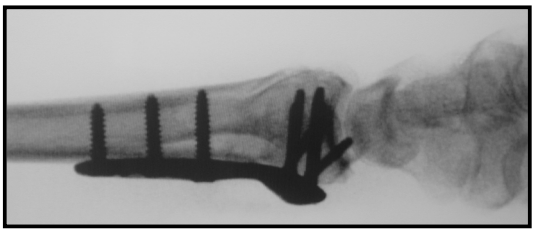
38 year old trauma

Humerus + Elbow





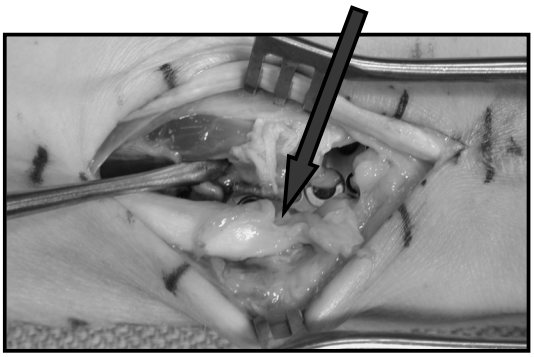
FPL



Healed

FPL Rupture

FPL Rupture



Summary

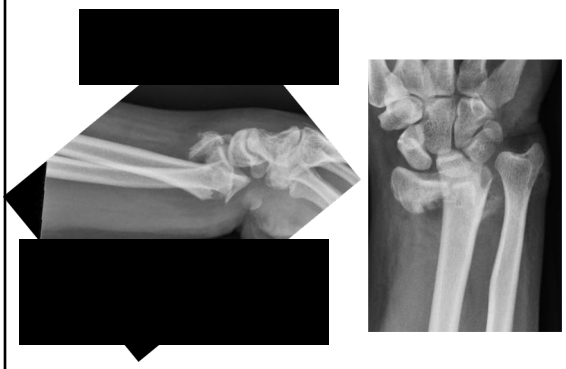
- Operative treatment NOT required for many fractures!
- If operative
  - Do what you are good at
  - Be able to perform all techniques
  - Don't throw away your frames!

Summary

- Operative treatment NOT required for many fractures!
- If operative
  - Do what you are good at
  - Be able to perform all techniques
  - Don't throw away your frames!

Extension!!!

Bilateral Bad Injuries



Bilateral Frames

9 Weeks


Thank You
Boston Medical Center