External Fixation for Distal Radius Fractures

Boston Medical Center

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...

- Mass grip strength
- Key grip
- Chuck grip
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

• Malunion formula risk factors
  • Age*
  • Comminution
  • Ulnar variance > 3mm
  • Does own shopping
Study Purpose

- Independently validate:
  - McQueen Malunion Formula
  - Lafontaine’s Criteria
- Evaluate
  - Post-reduction volar cortical alignment ("Volar Hook")
  - Specific definition for dorsal comminution

Volar Hook

Dorsal Comminution

- ≥ 5mm
- > 1/3
Patient Cohort

• 546 Distal radius fractures
  • 271 < 10° angulation or partial articular
  • 74 Unacceptable initial reductions and treated operatively
  • 14 Displaced within 2 weeks and treated operatively
  • 19 Inadequate/incomplete xrays

Patients and Methods

• 168 patients
  • 116 female
  • 52 male

• Average age = 52
• Average f/u = 89.3 days

Results: At Union

<table>
<thead>
<tr>
<th>Lafontaine Total</th>
<th>Ulnar Variance</th>
<th>P &lt; .0001</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Radial Height</td>
<td>P &lt; .0001</td>
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<table>
<thead>
<tr>
<th>McQueen Equation</th>
<th>Ulnar Variance</th>
<th>P = .0008</th>
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Loss of Radial Height

Results: Multivariate

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<td>Final Position</td>
<td>Volar Hook</td>
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<tr>
<td>Δ During Treatment</td>
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</table>
Results

- Carpal alignment

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

Volar Hook

Conclusions

- McQueen and Lafontaine
  - Radial Height, Radial Inclination, Ulnar variance
- Volar Hook = strongest predictor!
  - Δ and final volar tilt
  - Carpal malalignment
If Operative…

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

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

Richard Levine, MD, New York, NY
Paul Torretta III, MD, Brooklyn, NY

Pinning

Spanning + K-Wire
Spanning + K-Wire

Complex

Rarely CT, but …
Lateral is Key

Kapandji Technique

Kapandji Technique
Ex Fix + OR+ Graft

Healed

Other Options..

<table>
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<tr>
<th></th>
<th>Group I</th>
<th>Group II</th>
<th>p value</th>
</tr>
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<tbody>
<tr>
<td>Six weeks</td>
<td>3 (±6)</td>
<td>14 (±16)</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Three months</td>
<td>30 (±16)</td>
<td>54 (±27)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Six months</td>
<td>33 (±23)</td>
<td>55 (±31)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>One year</td>
<td>69 (±21)</td>
<td>87 (±16)</td>
<td>&lt;0.001</td>
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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,*, Ralph W. Zuidema, MD, PhD†, Mohit Bhandari, MD, MS,‡ Valerie M. Wolfs, MD, MS,* and Mehmet F. Resnick, MD*
But...Important?

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

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

- 14.8
- 12.1

- 92%
- 82%
Other Studies
68 year old woman

Carpal Alignment?
6 Months

Motion...

Plate Complications

10% - 30%
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%
Looong Screws

Aurora, et al. JOT '07

Screws in DRUJ

38 year old trauma
Humerus + Elbow

FPL

Healed
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!