Distal Radius Fractures Update 2019

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Midlands    Mercy CB
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The most common fracture seen in the ER.

~ 3% of all adult upper extremity injuries and ~ 20% to 35% of pediatric fractures.

Bimodal distribution:

One peak in the 5- to 24-year-old, predominantly male population—athletic and high-energy injuries. May be physeal or metaphyseal.

A second peak in the elderly, predominantly female population—lower-energy or “fragility” fractures.


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Pediatric Physeal Fractures

(Depending upon the Orthopedist On Call, some will be referred to a Pedi Ortho specialist.)
Goals of Pediatric Fracture Management

Because the distal radial physis contributes ~70 to 80% of the longitudinal growth of the radius and 40% of the upper extremity, distal radial fractures have tremendous inherent remodeling potential.

In patients younger than 10 to 12 years, 20 to 30 degrees of angulation in the sagittal (lateral) plane and 50 to 100% translation MAY remodel with continued skeletal growth.

Angulation of more than 10 degrees in the AP plane may NOT remodel with continued skeletal growth.

(Depending upon the Orthopedist On Call, some will be referred to a Pedi Ortho specialist.)


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Torus (Buckle) Fractures

Greenstick Fractures

( Depending upon the Orthopedist On Call, some will be referred to a Pedi Ortho specialist.)
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Pediatric Metaphyseal Fractures

(Depending upon the Orthopedist On Call, some will be referred to a Pedi Ortho specialist.)

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Adult (skeletally mature) Fractures

*Within a year of physeal closure.*

Females > 15
Males > 16
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Normal Adult Anatomy

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Normal Adult Anatomy
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Goals of Adult Fracture Management at Time of Healing

Age < 50

- Ulnar Inclination: Anatomic 20-25°
- Dorsal Tilt: Anatomic 0° to 10° palmar
- Ulnar length: Neutral
- Articular stepoff: < 1 mm

Age > 50

- Ulnar Inclination: >15°
- Dorsal Tilt: < 10° dorsal
- Ulnar length: < 2 mm ulnar plus
- Articular stepoff: < 2 mm

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Nondisplaced fractures.

- No immediate circular casting. Always use molded ace-wrapped splints for first 7-10 days until swelling goes up then down, then apply cast or order fracture brace from OT
- Immobilize until ~6 wks after injury.
- Educate patient about compartment syndrome.
- Dr. Clough’s preference is no NSAIDs.
- If intra-articular, confirm articular congruity with CT.
- NOT an emergency requiring Orthopedic F/U in only 1-3 days, should be seen 7-10 days after injury!
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Nondisplaced fractures.

- Sugar tong splint applied on date of injury for 7-10 days.

- Recheck x-rays every week for 3-4 weeks (some will displace).
- Allow wrist motion when callus formation appears on x-rays in 4-6 wks.
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Nondisplaced fractures.
Day of injury vs 10 wks later

Displaced, then Reduced Fractures.

“This multicenter randomized trial showed that adequately reduced extra-articular distal radial fractures demonstrated better functional outcomes after 12 months when treated with open reduction and volar plate fixation compared with nonoperative treatment.

In addition, 42% of patients initially managed nonoperatively underwent a subsequent surgical procedure for fracture redisplacement or symptomatic malunion. Moreover, subgroup analyses showed that patients who required a subsequent surgical procedure had worse functional outcomes up to 12 months compared with patients primarily treated operatively.”


http://dx.doi.org/10.2106/JBJS.18.00693
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Displaced, then Reduced Fractures.

- High risk of displacement, even when anatomically reduced and splinted and compliant with restrictions.
- Follow-up x-rays every 7-10 days.
- Displacement or instability may require surgical intervention.

Dr. Clough’s preferences for closed, displaced fractures:

- Reduce in ER only if cutaneous, vascular or neurologic compromise.
- ORIF 5-18 days after injury with goals of:
  - Adequate time for preop medical clearance.
  - Reversal of anticoagulants & Lovenox bridge therapy permitting regional block vs. general anesthesia.
  - Reduced swelling and soft tissue complications.

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Displaced, then Reduced Fractures.

Treatment options when displacement requires surgical intervention:

- Open fractures or polytrauma may require immediate surgery.
- Closed reduction & pinning, usually in pediatric populations
- Fixed angle volar plate fixation (85% in many studies)
- Periarticular fractures require different techniques:
  - External Fixation
  - Fragment-specific plates
  - Bridge plating.
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Displaced Fractures.
Plate fixation.

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Displaced Fractures.
External fixation.
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Displaced Fractures.

Fragment-specific plating requires additional incisions, less secure fixation, later active motion & have more difficulty regaining range of motion.

Green’s Operative Hand Surgery, 2017
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Displaced Fractures.

Bridge Plating

- Indications are polytrauma, periarticular fractures, compromised patient health
- Internal version of external fixation
- Shorter OR time than ORIF, same as external fixation
- Two smaller incisions, same as external fixation
- Easier wound treatment than external fixation
- Less risk of infection than external fixation
- Allows custom molded braces or casts, but no weight bearing
- Requires return to OR for removal when fracture heals, unlike external fixation which is removed in office
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Regardless of treatment, distal radial fractures have significant risks and a long recovery period.

Wrist motion starts 4-8 wks after injury or surgery.
Lifting starts 2-3 months later.
Weight bearing starts 2-4 months later.
Return to maximum strength 9-12 months later.
Return to maximum motion (< 100%) 18-24 months later.
Risk of carpal tunnel syndrome is 20-40% in 1-2 years.
RSD risk up to 20%, Vit. C may not be effective prophylactic treatment.
Risk of tendonitis or tendon rupture is 1-2%.
Barometric &/or cold exposure symptoms common up to 2 years later.

Highlights of Literature Review
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System Financial Opportunities

“Patients with nonsurgically managed distal radius fractures generated an average per patient revenue of $806 when their treatment (by a Resident) was attested by an ED attending, compared with an average per patient revenue of $770 when their treatment was not documented by an ED attending. “

“The reimbursement level for Physician Assistant billing in this scenario typically is 80% of what an attending Orthopaedic Physician would bill. “

“Surgically treated patients generated 4.1 times the revenue (from physician charges alone) than did nonsurgically treated patients.”

Business Modeling of Orthopaedic Trauma in the Emergency Department
An Untapped Revenue Stream. Jacobs, RC et al.
JAAOS July 1, 2019 - Volume 27 - Issue 13 - p e612–e621
doi: 10.5435/JAAOS-D-17-00742

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Social Deprivation

INTRODUCTION:
Social deprivation is associated with many adult fractures including distal radius fractures (DRF) but the mechanisms for this are unclear. The aim of this study was to identify if social deprivation was associated with falls risk, mechanism of injury or osteoporosis in patients with a fragility fracture of the distal radius.

METHOD:
Details of all patients aged 50 years and over presenting with a radiographically confirmed fracture of the distal radius over a one year period, were prospectively recorded. Patients were sent a questionnaire pack including questions regarding place and mechanism of injury, comorbidity assessment, falls risk assessment tool and FRAX assessment of bone health and fracture risk.
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**Social Deprivation**

**RESULTS:**
333 out of 521 eligible patients completed the questionnaire (279 female; 54 male, response rate = 64%). There was no difference between characteristics of responders and non-responders (p = 0.58). **DRF rate was higher in socially deprived quintiles (p = 0.040).** Less falls occurred in the home in socially deprived patients (Q1/2: 35%; Q3-5: 48%, p = 0.037) with more falls outdoors (Q1/2: 39%; Q3-5: 24%, p = 0.001). There was no difference in height from which falls took place with most occurring from standing height (Q1/2: 81%; Q3-5: 86%, p = 0.336). Linear regression analysis found no relationship between social deprivation rank and FRAX scores (major fracture risk: p = 0.274, hip fracture risk: p = 0.283) but demonstrated a significant relationship between social deprivation and increased number of falls risk factors (p = 0.002). **Mean number of falls risk factors was higher in the two most socially deprived quintiles (Q1/2: 3.62; Q3-5: 2.79, p = 0.028).**

**CONCLUSION:**
We have identified increased falls risk as an important reason for DRF in socially deprived patients. Knowing which patients are at highest risk allows interventions to be efficiently targeted. **We would recommend resources should be targeted towards patients from socially deprived areas and focused on specific falls prevention strategies.**


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**Patient-Centric Outcomes: Return to Yoga**

**BACKGROUND:**
Yoga is a popular activity involving extreme wrist positioning and extension loading. Our purpose was to quantify the prevalence of preoperative yoga participation and characterize subsequent ability to return to yoga in patients undergoing volar locked plating of distal radius fractures.

**METHODS:**
We retrospectively reviewed all cases of distal radius open reduction internal fixation between August 2015 and March 2017. Patients were included if they were treated with volar locked plating and if they participated in yoga on a regular basis preoperatively. Patients were contacted at a minimum of 1 year postoperatively and surveyed about yoga participation.
Patient-Centric Outcomes: Return to Yoga

RESULTS:
A total of 149 patients who underwent distal radius volar plating were surveyed. Thirty-one patients (32 procedures, 20.8% of surveyed patients) participated in yoga on a regular basis preoperatively. Overall, 90.3% returned to yoga in some capacity. Mean times to return to yoga in any capacity, with weight-bearing, and in a "steady state" were 5.7, 7.4, and 10.0 months, respectively. Of patients who resumed yoga, 65.5% returned to the same or better level of yoga. Satisfaction with participation in yoga was 8.9 (out of 10).

CONCLUSIONS:
We found a relatively high yoga participation rate in patients undergoing distal radius fracture fixation, suggesting the need to be able to effectively counsel these patients. Our results demonstrate a high rate of return to yoga, although approximately one-third of patients experienced a decreased level of participation. Surgeons can use this information to set appropriate expectations.

Return to Yoga Rates Are High After Volar Plating of Distal Radius Fractures.

QUESTIONS?
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Thank You
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