Distal Radius Fractures
Volar Plating

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Outcomes and Fixation Type

SUMMARY

• Most studies find equivalent results at 1-2 years regardless of fixation choice
  – Internal fixation will generally provide earlier return to function in first 6-12 weeks compared to pin fixation or wrist spanning fixation

• No type of hardware is superior – use what you need to restore the skeletal anatomy
Why the Popularity

- Provides stability in osteoporotic bone by buttressing the subchondral bone
- Simple surgical approach
- Reduction usually easiest on non-comminuted volar surface
- Useful in variety of fractures
  - Metaphyseal
  - Volar shearing
  - Intra-articular if reducible

Orbay, JHS 2004
Orbay, CORR 2006
Volar Plate Complications

• Review by Soong JHS 2011 demonstrated rare complications
  – 47 complications in 594 patients (7.9%)
    • 14 tendon irritation (1 FPL rupture)
    • 8 intra-articular screws
    • 7 loss of fixation
    • 5 DRUJ related revisions
  – Similar to 5.9% complication rate at 5 years in 303 patients
    • Tarallo JOT 2013
Case 1

44 yo RHD female with left distal radius fracture treated with ORIF at another hospital 1 year prior
Case

Obviated by having the first screw in the distal “T” portion of the plate non-locking
Case

- Now presents with inability to flex index DIJ
Remaining FDS index, FPL 60%
Index FDP Distally
Volar Plate Complications

- Flexor tendon complications
  - Watershed line 2mm proximal to ulnar side joint line and 10-15mm proximal to radial side joint line

Ruptures noted in cases where the plate was placed volar to the “critical line” and at/or distal to the volar rim

Soong JBJS 2011
Critical line

Volar rim

Grade 0  Grade 1  Grade 2
Avoiding Flexor Tendon Complications

• Position plates proximal to watershed line and tightly applied to bone
• Remove hardware if signs of tendon irritation to prevent rupture
• No clear evidence of benefit to repairing pronator quadratus
Case 2

- 71 year old female 5 months after volar plating with inability to extend thumb IP joint
  - Told to continue therapy
Case

- Hardware immortalizes mistakes
Case

- Distal screws removed and EIP to EPL transfer
Volar Plate Complications

• Extensor Tendon Complications
  – EPL, EDC, ECRB/ECRL
  – Possibly related to vascular compromise with fracture, drill penetration, screw prominence
Extensor Complications

• Dorsal anatomy creates difficulty determining screw length accurately
  – Convex surface
  – Lister’s tubercle “hides” depressed 3rd compartment
    • 7mm (4-10)

Clement  JHS 2008
Avoiding Extensor Complications

Unicortical drilling for extra-articular fractures

“…penetrating the third extensor compartment by drilling may harm the EPL tendon.”

Al-Rashid JBJS-B, 2006

Screws at least 75% length to dorsal cortex do not sacrifice construct strength

Wall, JHS 2012
Osseous Complications

- Strength of support decreases as screws increasingly proximal to subchondral bone
- Recognizing loss of lunate facet
  - Lateral xray: volar subluxation of carpus
  - PA xray: apparent shortening of radius

I don’t have an answer for tiny lunate facet
When I Put the Volar Plate Away
Case

- 67 year old physician who fell on outstretched wrist

Dorsal approach to reduce articular surface
Case

- 50 year old female fell while dancing to “Shout”

Dorsal fixation and treatment of SL rupture
Not the Typical Fracture But...
Case

- 54 yo female with MCA at 40 mph
- Injured dominant wrist
- Perfect health.
- Brother-in-law is a hand surgeon
Case

- Long volar plates available but dorsally only long implants are spanning
Case

- 26 year old who fell off pull-up bar doing cross-fit

I don’t de-rotate that piece well dorsally or correct with spanning plate
Case

- Required articular reduction
  - BR release
  - Compress styloid against lunate facet
  - Push up impacted surface through fracture
Final Technical Points

• Adjuncts include:
  – Small dorsal incision to fine tune articular reduction then place distal screws in plate
  – May go bicortical +/- dorsal incision to capture dorsal lunate facet
  – May add radial styloid plate through volar incision if needed for ulnar translation of radius shaft
  – Some lunate facet fragments get a volar plate over the critical line with plan to remove after healing

Volar plates can be “fracture specific” fixation
Thank You