DAYTON OHIO

Disclosure

- Upex , stock
- Skeletal dynamics (Elbow)

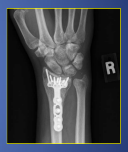
Questions

- Fix all radius fractures volarly ?
- Plate fixation ?
- Remove plate ?
- Dorsal ?
- Nothing ?

Orthopedic Surgery

2018 – Opinions

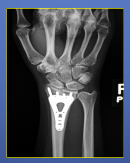
- Most operative radius fracture can be treated Volarly.
  - QUESTIONs
    - What is perfect plate position?
    - If malunion occurs after ORIF ..
      - Remove plate ??
      - Leave – what is the complication rate ??
    - Did dorsal plating get a bad "street cred"

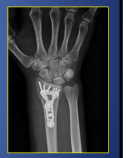


Orthopedic Surgery

Distal Radius Fractures: "Volar Plating?"

Brent Bamberger, DO
Ryan Tarr, DO – PGY4





RATIONALE FOR TREATMENT

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Closed Treatment –
No metal objects

Acceptable Reduction

- <15⁰ dorsal and <20⁰ palmar tilt
- >15⁰ radial inclination
- < 5mm radial shortening
- Ulnar variance negative or neutral
- Articular gap <2mm
- Articular step <1mm

OK

Peter Charles Rhee, DO, MS
Robert J. Medoff, MD
Alexander Y. Shin, MD
JAAOS, 2017

Orthopedic Surgery

"Successful surgical management of complex DRFs requires versatility in surgical approaches and techniques in addition to familiarity with a variety of fixation methods"

Additional fixation may be required for fractures ?

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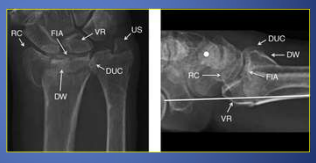
- Small volar rim fragments,
- Radial column comminution,
- DUC fragments



Rhee ,et al 2017 JAAOS

Or a different index technique??

History

- Casting – cotton loder
- Pins – Diego fernandez, Kapanji
- External fixator /plating
- Spanning plates – Ed Burke (Detroit)
- π plates
- mid 1990 – Fracture specific
- 2000 – volar plating

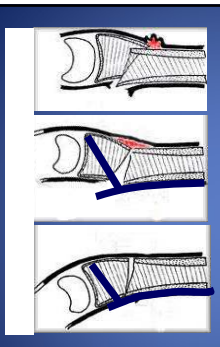
TECHNIQUE

The Extended Flexor Carpi Radialis Approach: A New Perspective for the Distal Radius Fracture

JORGE L. ORBAY, M.D. ALEJANDRO BADIA, M.D. IGOR R. INDRIAGO, M.D. Miami Hand Center, Miami, FL, U.S.A.
ANTHONY INFANTE, D.O.
Florida Orthopaedic Institute, Tampa, FL, U.S.A.
ROGER K. KHOURI, M.D. EDUARDO GONZALEZ, M.D. Miami Hand Center, Miami, FL, U.S.A.
DIEGO L. FERNANDEZ, M.D.
Lindenhof Hospital, Berne, Switzerland

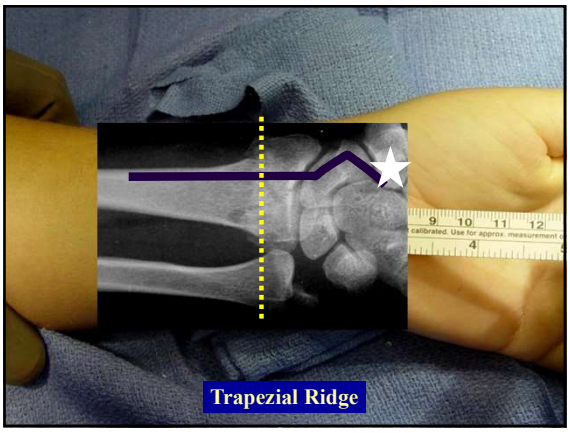
NOT Volar
Bartons !!!

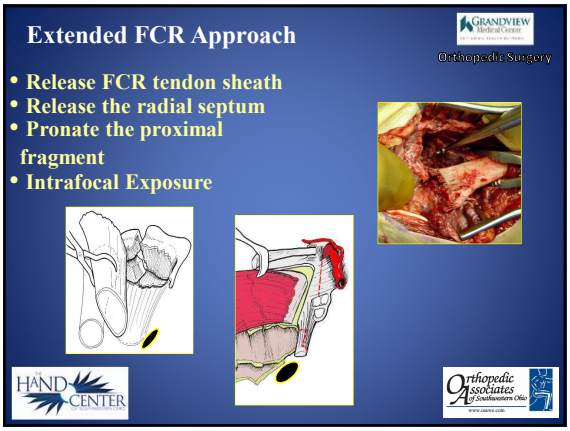
Techniques in Hand and
Upper Extremity Surgery
5(4):204–211, 2001 © 2001

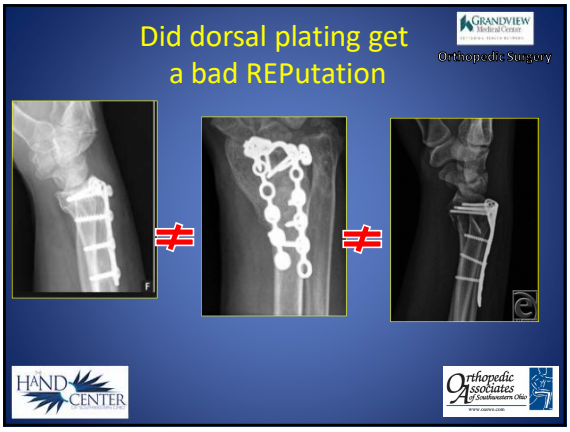


Standard Fixation Technique

Removing dorsal hematoma allows reduction


Trapezial Ridge


Extended FCR Approach
GRANDVIEW Medical Center
Orthopedic Surgery
• Release FCR tendon sheath
• Release the radial septum
• Pronate the proximal fragment
• Intrafocal Exposure
HAND CENTER
Orthopedic Associates of Southwestern Ohio


Did dorsal plating get a bad REPutation
GRANDVIEW Medical Center
Orthopedic Surgery
HAND CENTER
Orthopedic Associates of Southwestern Ohio

Orthopedic Surgery

Volar Plating Not Perfect

Orthopedic Surgery

2017


Contents lists available at ScienceDirect

Injury

journal homepage: www.elsevier.com/locate/injury

Review

Complications of volar locking plating of distal radius fractures in 576 patients with 3.2 years follow-up

Rikke Thorninger[a,*], Mette Lund Madsen[a], Daniel Wæver[a,b], Lars Carl Borris[b], Jan Hendrik Duedal Rölfing[a]

3.2 years

- 576 patients reviewed retrospectively for rate of complications
- 84 complications notes, for overall rate of 14.7%
  - 5 flexor tendon ruptures (FPL from poor plate position)
    - Post op day 272, 294, 509, 544 and 1392
  - 12 extensor tendon ruptures (EPL from prominent screw)
  - Another 10 had symptoms of tenosynovitis
- Reoperation rate was 10.4% (60 of 576 wrists)
  - 41 plates were removed, 7.1%
- Almost a quarter of intraarticular fractures had a complication

Which has more complications?

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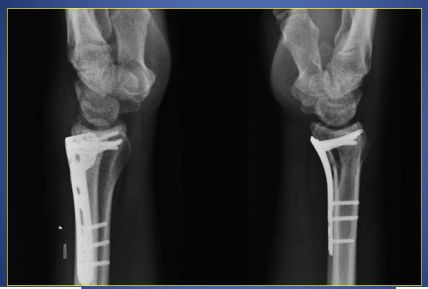


2016

Dorsal or Volar Plate Fixation of the Distal Radius: Does the Complication Rate Help Us to Choose?

D.J.C. Disseldorp, MD[1] P.F.W. Hannemann, MD, PhD[1] M. Poeze, MD, PhD[1] P.R.G. Brink, MD, PhD[1]

Orthopedic Surgery

- 214 patients with displaced distal radius fractures were retrospectively reviewed at 2 YEAR FOLLOW UP
  - 123 dorsal plate, 91 volar plate
- Overall risk for complications was 15.4% in the dorsal group and 14.3% in the volar group
  - 22 complications in the dorsal group, 14 in the volar group
- A total of 19 patients had implant removal due to complications (p = 0.81)
  - 11 patients in the dorsal group and 8 patients in the volar group (p = 0.97).
- 3 tendon ruptures in dorsal group, 1 tendon rupture in volar group
  - 6 patients reported tendonitis, 5 in the dorsal group
- The dorsal plate was removed 4 times due to hardware failure
- Rate of neurologic issue was higher with volar plating
- **No statistically significant difference**

Orthopedic Surgery

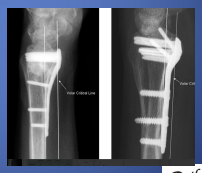
J Hand Surg Am. 2013 Jun;38(6):1091-6. doi: 10.1016/j.jhsa.2013.03.011. Epub 2013 May 4.

Volar plate position and flexor tendon rupture following distal radius fracture fixation.

Kitay A[1], Swanstrom M, Schreiber JJ, Carlson MG, Nguyen JT, Weiland AJ, Daluiski A.

Results: Increase rate of Rupture in higher Soong Grades

- Conclusion: To decrease rupture risk, we recommend considering elective hardware removal after union in SYMPTOMATIC PATIENTS with plate prominence greater than 2.0 mm volar to the critical line or plate position within 3.0 mm of the volar rim.



Effects of Volar Tilt, Wrist Extension, and Plate Position on Contact Between Flexor Pollicis Longus Tendon and Volar Plate

Caroline N. Wolfe Wurtzel, MD, Geoffrey T. Burns, MS, Andy F. Zhu, MD, Kagan Ozer, MD

December 2017 42, Issue 12, Pages 996–1001

Orthopedic Surgery

Wrist ROM with maximum degree of extension before flexor pollicis longus (FPL)/plate contact.

Green depicts no contact

Red depicts contact

.

degree of extension needed for the contact

Negative numbers represent extension of the distal fragment

	Volar Tilt on the Lateral Plane							
Soong Grade	Native ≈ +11°	+5°	0°	−5°	−10°	−15°	−20°
0	80°	67°	55°	52°	40°	28°	20°
1	70°	61°	55°	45°	35°	20°	16°
2	58°	46°	44°	38°	26°	8°	8°

FPL Rupture Experience

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Time to Rupture	Prodromal Symptoms	Plate system	Soong class	angulation
4 years	3 weeks	UPEX	0.5	-5
10 years	2 weeks	stryker	0	5
12 years	none	trimed	0	5

Delayed Rupture of Flexor Pollicis Longus after Volar Plating for a Distal Radius Fracture

Chul-Hyun Cho, MD, Kyung-Jae Lee, MD, Kwang-Soon Song, MD, Ki-Cheor Bae, MD

Orthopedic Surgery

Author	Age (yr)	Timing of rupture after surgery (mo)	Cause of rupture	Treatment for rupture
Bell et al.,[4] 1998	72	10	Steroid therapy	Primary repair
	69	9	Steroid therapy	Tendon graft
	65	4	Steroid therapy	Tendon graft
	60	7	Prominent distal edge of the plate (20% rupture)	Debridement
Cross and Schmidt,[5] 2008	57	8	Prominent distal edge of the plate (partial rupture)	Debridement
	51	6	Improper plate position (distal to transverse ridge)	Primary repair
Duncan and Weiland,[6] 2007	70	9	Prominent distal edge of the plate	Tendon transfer
Klug et al.,[7] 2007	59	13	Prominent distal edge of the plate	Tendon graft
Nunley and Rowan,[8] 1999	72	4	Improper plate position	Tendon transfer
Koo and Ho,[9] 2006	63	68	Prominent distal edge of the plate	Tendon graft

Clinics in Orthopedic Surgery 2012;4:325-328

Complications of Low-Profile Dorsal Versus Volar Locking Plates in the Distal Radius: A Comparative Study

Yangyang R. Yu, BA, Melvin C. Makhni, BS, Shervin Tabrizi, BA, Tamara D. Rozental, MD, George Mundanthanam, MD, Charles S. Day, MD, MBA

J Hand Surg 2011;36A:1135–1141

Orthopedic Surgery

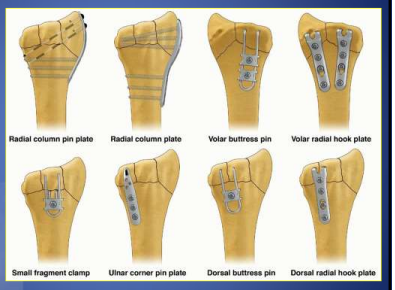
Although we found no overall significant differ- ence in complication rates between the two low-profile plating methods, the volar approach was associated with a significantly higher incidence of neuropathy.

Contrary to previous studies on traditional thicker dorsal plates, low-profile dorsal plating did not result in significantly more tendon irritations or ruptures.

Removal of Plates

- Median nerve injury VOLAR
  - Nerve tethered radially by PCB
  - Study (in progress)
- Superficial Radial Nerve DORSAL
- Fracture of Radius (same as dorsal)
- Tendon Injuries (same as dorsal)
  - Volar morbidity

Fragment specific options



Complex Distal Radius Fractures: An Anatomic Algorithm for Surgical Management

Peter Charles Rhee, DO, MS
Robert J. Medoff, MD
Alexander Y. Shin, MD

AAOS 2017

Most distal radius fractures result from low-energy mechanisms and can be successfully treated nonsurgically Variety of surgical techniques if indicated.

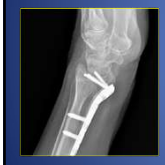
Effective restoration of the bony architecture requires intimate knowledge of the anatomy of the distal radius, a thorough understanding of the goals of treatment,

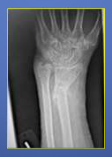
versatility in surgical approaches, and familiarity with multiple fixation options.

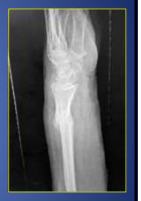
4 and ¼ years post ORIF distal radius Ruptured FPL

Fall after after tendon repair and volar plate Removal

Thought process!







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The Hand Center

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Distal Radial Fracture Treatment ,QUESTIONS??

- MOST fractures , can be fixed with VOLAR Plate
- Not every Fx needs a volar plate
- Must have anatomic volar tilt with a plate
- FPL ruptures occur with out symptoms (timing)
- Timing for plate removal???
- Should remove??
- Rethink fragment specific and dorsal plating

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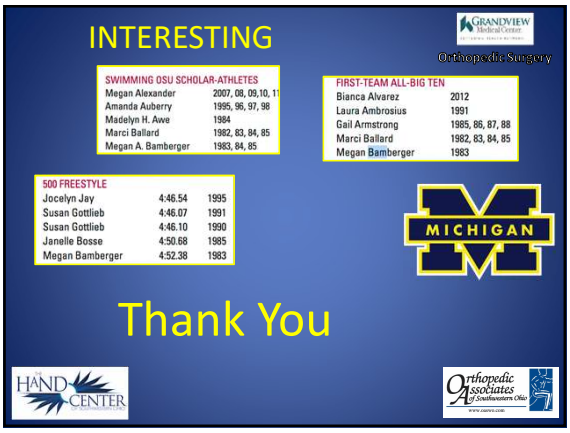
INTERESTING
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Orthopedic Surgery
SWIMMING OSU SCHOLAR-ATHLETES
Megan Alexander 2007, 08, 09,10, 11
Amanda Auberry 1995, 96, 97, 98
Madelyn H. Awe 1984
Marci Ballard 1982, 83, 84, 85
Megan A. Bamberger 1983, 84, 85
FIRST-TEAM ALL-BIG TEN
Bianca Alvarez 2012
Laura Ambrosius 1991
Gail Armstrong 1985, 86, 87, 88
Marci Ballard 1982, 83, 84, 85
Megan Bamberger 1983
500 FREESTYLE
Jocelyn Jay 4:46.54 1995
Susan Gottlieb 4:46.07 1991
Susan Gottlieb 4:46.10 1990
Janelle Bosse 4:50.68 1985
Megan Bamberger 4:52.38 1983
MICHIGAN
Thank You
HAND CENTER
Orthopedic Associates of Southeastern Ohio