Distal Radius Fractures - Volar Plating for All

Frontiers in Upper Extremity Surgery 2017

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Disclosure

Skeletal Dynamics - Consultant

• 85% Dorsal

• 15% Volar
1970 - AO

- Anatomical Reduction
- Stable Fixation
- Early Function

Dorsal Plate Fixation

- Limited Motion
- Plate Removal

Extensor Tendon Disturbance
1994 - Distal fragment does not toggle
- Provides stable distal fixation in comminuted or osteoporotic bone

1995 - Distal Radius Locking Plate Fixation
“π - Plate”

Extensor Tendon Ruptures
- Plate redesign

The Dogma

Dorsal Fracture – Dorsal Plate

Palmar Fracture – Palmar Plate
The volar approach seldom presents flexor tendon problems.
A new method of treatment
Volar management of
the dorsal fracture

1997

Ineffective for Dorsal Fractures
First Plate Designed for Volar Fixation of Dorsal Fractures

1998
H-Plate

2002
4-6 weeks post-op

1998 - 2013
Volar Plate Evolution

Strongest Possible Interface
Plate acts as template and drill guide

Subchondral Support Scaffold

Ligament Contribution to Patterns of Articular Fractures of the Distal Radius

Daniel G. Mandziak, MBBS, Adam C. Watts, MBBS, Gregory I. Bain, PhD, MBBS

Journal of Hand Surgery. 2011.07.014
Load Transmission Through the Wrist in the Extended Position
Masataka Majima, MD, Emiko Horii, MD, Hiroshi Matsuki, MD, Hitoshi Hirata, MD, Eiichi Genda, MD
(J Hand Surg 2008;33A:182 – 188.)

Fracture fixation methods
• Pins/wires
Fracture fixation methods

- Pins/plates

Fracture fixation methods

- Plates and extenders
Scaphoid Fossa Fixation

Lunate Fossa Fixation
Plate extenders
Plate extenders

Radiographic Evaluation of Dorsal Screw Penetration After Volar Fixed-Angle Plating of the Distal Radius: A Cadaveric Study

Steven D. Maschke & Peter J. Evans & David Schub & Richard Drake & Jeffrey N. Lawton

Hand. 2007 Sep; 2(3): 144-150
Extended Tangential View
“Carpal shoot through”

Extended Tangential View

Flexor Tendon Injury
Most Frequently Ruptured Tendons

#1

#2
Volar Radial Tubercle
Volar Rim Lunate Fossa

Inter Fossa Sulcus

Tendon Center to Bone ~ 4.5mm
Plate to Tendon Surface ~ 0mm
“The Critical Line”

168 DRFs treated with volar plating

• Grade 0  0 Ruptures
• Grade 1  1 Rupture
• Grade 2  2 Ruptures

Volar Locking Plate Implant Prominence and Flexor Tendon Rupture

By Maximillian Soong, MD, Brandon E. Earp, MD, Gavin Bishop, MD, Albert Leung, BS, and Philip Blazar, MD

Investigation performed at the Department of Orthopaedic Surgery, Lahey Clinic, Burlington, and the Department of Orthopaedic Surgery, Brigham and Women’s Hospital, Boston, Massachusetts
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<thead>
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<th>Group 1 (Acu-Loc)</th>
<th>Group 2 (DVR)</th>
<th>P Value</th>
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<tr>
<td>No. of patients</td>
<td>72</td>
<td>93</td>
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<tr>
<td>No. of prominent plates, volar</td>
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<tr>
<td>Grade 0</td>
<td>19%</td>
<td>49%</td>
<td>&lt;0.0001†</td>
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<tr>
<td>Grade 1</td>
<td>18%</td>
<td>51%</td>
<td>&lt;0.0001†</td>
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<tr>
<td>Grade 2</td>
<td>63%</td>
<td>0%</td>
<td>&lt;0.0001†</td>
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No. of cases with flexor tendon rupture(s)

4%   4%   4%   4%   4% | 0%  0% | 0.08 |
• Randomized: VLP vs Casting.

• “Simple volar approach” @ 1-2 weeks

• Operative group did better first 6 months.

• At one year both groups were almost equal.

• 36% vs 14% complication rate

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<th>Non Operative</th>
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<tr>
<td>Total</td>
<td>13</td>
<td>5</td>
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<tr>
<td>Flexor</td>
<td>4 (plate prom)</td>
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<tr>
<td>Extensor</td>
<td>6 (long screws)</td>
<td>0</td>
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<tr>
<td>CTS</td>
<td>1</td>
<td>0</td>
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<tr>
<td>CRPS</td>
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Complication rate and patient satisfaction after volar plating of distal radius fractures

J. L. Orbay, F. Rubio, E. J. Balaguer, L. Vernon

Unpublished data

- 808 consecutive patients
- 443 evaluated thus far (54.8%)
- 9.2% overall complication rate
- 4.3% required a second operation
- <0.5% infection rate

- Overall satisfaction 91.4%
- 90.1% would have the same procedure again
- 92.6% would recommend their surgeon
Volar Approach for Dorsal Fracture Not Trivial

Anatomical Plates Require Anatomical Reduction
Using the Extended FCR Approach

- Release the radial septum
- Pronate the proximal fragment
- Intrafocal Exposure
Dorsal rim fracture
Volar rim fracture
Prevent Collapse and Salvage Failures of the Volar Rim of the Distal Radius

J. L. Orbay, F. Rubio, L. Vernon

21 patients
- 17 had volar marginal fixation at primary surgery
- 4 had volar marginal fixation as a revision
- No failures in primary VMF fixation group
- 2/4 had failure after revision
- 91% successful overall VMF fixation
- failure associated with revision fixation

- For failed VMF fixation, opening wedge osteotomy
- Correct volar tilt to 5 degrees dorsal
- Restores supination loss seen after failed VMF fixation
A combination
Is there any role for a dorsal approach?
Thank You!