Primary Hemi-Arthroplasty for
Irreparable Distal Radius Fracture
in the Independent Elderly

Guillaume Herzberg, Marion Burnier, LYON
✓ Introduction
✓ Patient’s Selection
✓ Surgical Technique
✓ Current Experience
✓ Discussion
Immediate Post op
Immediate Post op + 6 Weeks
Volar Plating For Unstable Intra-articular DRF In Elderly

2011 Arora, J Bone Joint Surg Am, Level I Study,

> 36% Complications
Irreparable Upper Limb Fractures in the Elderly
Irreparable Upper Limb Fractures in the Elderly

Roux, 2009
1. AO « C » DRF
2. High Extra-Articular Displacement
3. High Intra-Articular Displacement
4. Distal Fracture Line
5. Circumferential Comminution
6. Impaction - Separation
✓ Introduction

✓ Patient’s Selection: PAF

✓ Surgical Technique

✓ Current Experience

✓ Discussion
### Patient Accident Fracture

**PAF Daily Screening**

#### Patient Information

- **Age:** __
- **Sex:** M F
- **General Health:**
  - 1 Dependent
  - 2 Diseases
  - 3 Normal
- **Functional Needs:**
  - 1 Minimum
  - 2 Intermediate
  - 3 Maximum

#### Accident Energy

- 1 Low
- 2 Medium
- 3 High
- Polytrauma
- Poly-Injured

#### RADIUS

- **AO Classification:**
  - Complete A
  - C Partial B
- **PA X-Ray:**
  - Radial Inclination
  - Ulnar Variance
  - Diaphyseal Extension
  - Medial Translation of Radial Diaphysis
- **Lat. X-Ray:**
  - Tilt
  - Translation
  - Compression
  - Dorsal Volar
  - Circumferential
  - Fracture Line Distal to Watershed Line
  - Sagittal Articular Widening

#### PA / Lat. X-Rays

- **Radius Distal Surface:**
  - Step-Off
  - Gap
  - DRUJ Intra-DSS

#### ULNA

- **Neck Fracture**
- **Head Fracture**
- **Displaced Ulnar Styloid Base Fracture**
- **Possible TFCC Rupture**
- **DRUJ Subluxation**
- **DRUJ Dislocation**

#### CARPUS

- **Scaphoid fracture**
- **Possible SL Dissociation**
- **Possible LT Dissociation**
- **Volar Dorsal Radio-carpal Subluxation**

#### CT Scan

- **Radius Distal Surface**
  - Step-Off
  - Gap
  - DRUJ Intra-DSS
- **Radial Sigmoid notch**
  - Step-Off
  - Gap
  - DRUJ Intra-DSS

#### Arthroscopy

- **Loose Bodies**
- **TFCC Rupture**
- **SL Dissociation**
- **LT Dissociation**

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**TREATMENT**
Patient 2-2  Energy 1  Fracture “Irreparable”

Impaction-Separation

Circumferential Comminution
Distal Fracture Line
<table>
<thead>
<tr>
<th>AO « A »</th>
<th>1 - 1</th>
<th>2 - 2</th>
<th>3 - 3</th>
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<tbody>
<tr>
<td></td>
<td>Dependent</td>
<td>Comorbidities</td>
<td>Normal</td>
</tr>
<tr>
<td>n=1582</td>
<td></td>
<td>Independent</td>
<td></td>
</tr>
<tr>
<td>85 Y.</td>
<td>77 Y.</td>
<td>45 Y.</td>
<td></td>
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<tr>
<td>95% Females</td>
<td>85% Females</td>
<td>61% Females</td>
<td></td>
</tr>
<tr>
<td>AO « C »</td>
<td></td>
<td></td>
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<tr>
<td>82 Y.</td>
<td>75 Y.</td>
<td>45 Y.</td>
<td></td>
</tr>
<tr>
<td>95% Females</td>
<td>84% Females</td>
<td>47% Females</td>
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</tr>
<tr>
<td>AO « B »</td>
<td></td>
<td></td>
<td>32 Y.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>88% Males</td>
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</tbody>
</table>

4% « 2-2 » Patients with « Irreparable » DRF

PAF 2009-2018 (n=1582)
✓ Introduction
✓ Patient’s Selection
✓ Surgical Technique
✓ Current Experience
✓ Discussion
« Remotion » Stryker (Ex SBI)
« Remotion » Stryker (Ex SBI)

« Cobra » Groupe Lepine

Conflict of Interests
Lyon Hospital, University, GH
✓ Preoperative Planification

- Restore Radial Height
- Save Sigmoid Notch if Possible
Key Point

Resection

Ulnar Head Preserved
Key Point

Resection

Ulnar Head Resection
Post-operative Care

| Long-arm Cast | 3W | Short-arm Splint + Self-rehabilitation | 6W | Physiotherapy |

(Ulnar Head Resection / Sigmoid Notch Healing)
Introduction

Patient’s Selection

Surgical Technique

Current Experience

Discussion
Results 17 Wrists, Average 3 years F-Up

Complications

- 1 Revision for Stiffness & Radial Deviation Tendency (Arthrolysis and Tendon Transfer, ECRL to ECRB)
- 1 Implant Change (Too Small Size)
- 3 Temporary CRPS

No Dislocation / Loosening / Infection

- No Implant Removal
Pain Flex-Ext.
Function Flex-Ext.
Flex-Ext. Arc
Grip Strength
Pron-Sup. Strength
Pron-Sup. Arc
Function Pron-Sup.
Pain Pron-Sup.
Prono-Supination
Flexion-Extension
VAS Pain Pron-Sup.
VAS Function Pron-Sup.
Pron-Sup. Arc
Prono-Sup. Strength
VAS Pain Flex-Ext.
VAS Function Flex-Ext.
Flex-Ext. Arc
Grip Strength
Subj. Wrist Value
Lyon Wrist Clinical Score
Conversion of Scores into a Radar

### Lyon Wrist Clinical Evaluation Form (Full*)

<table>
<thead>
<tr>
<th>Affected Side / Dominance</th>
<th>Subjective Wrist Value % = 30</th>
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<tbody>
<tr>
<td>5</td>
<td>0-25%</td>
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<td>5</td>
<td>0-25%</td>
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<tr>
<td>2.5</td>
<td>severe</td>
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<td>7.5</td>
<td>145</td>
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<tr>
<td>5</td>
<td>Grip Strength %</td>
</tr>
<tr>
<td>5</td>
<td>Pron-Sup. Strength %</td>
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<tr>
<td>10</td>
<td>Pron-Sup. Arc</td>
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<td>15</td>
<td>Function Pron-Sup. (20=Normal)</td>
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<tr>
<td>10</td>
<td>Pain Pron-Sup. (20=no Pain)</td>
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### Lyon Wrist Score (Full*)

<table>
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<th>Score</th>
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<td>69</td>
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*including pronosupination strength

Subjective if Post-operative: Much Worse / Worse / Unchanged / Better / Much Better
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<th>Affected Side / Dominance</th>
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<tr>
<td></td>
<td>0</td>
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<tr>
<td>Subjective Wrist Value</td>
<td>5</td>
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<tr>
<td>Pain Flex-Ext. (20°=no Pain)</td>
<td>10</td>
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<tr>
<td>Function Flex-Ext. (20°=Normal)</td>
<td>5</td>
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<tr>
<td>Flex-Ext. Arc</td>
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<tr>
<td>Grip Strength %</td>
<td>62</td>
</tr>
<tr>
<td>Pron-Sup. Strength %</td>
<td>55</td>
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<tr>
<td>Pron-Sup. Arc</td>
<td>160</td>
</tr>
<tr>
<td>Function Pron-Sup. (20°=Normal)</td>
<td>15</td>
</tr>
<tr>
<td>Pain Pron-Sup. (20°=no Pain)</td>
<td>15</td>
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- Pronation (normal 75°)
- Supination (normal 81°)
- Flexion (normal 75°)
- Extension (normal 74°)
- Radial Deviation (normal 21°)
- Ulnar Deviation (normal 35°)

| Grip Strength kg **       | 24 | 39 |
| Pronation Strength kg *** | 50 | 60 |
| Supination Strength kg **** | 60 | 140 |
| Pronation + Supination Strength kg | 110 | 200 |

### Lyon Wrist Score (Full*)

- 69

*including pronosupination strength

Subjective if Post-operative: Much Worse / Worse / Unchanged / Better / Much Better

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**Conversion of Scores into a Radar**

- Subjective Wrist Value
- Pain Flex-Ext. (20°=no Pain)
- Pain Pron-Sup. (20°=no Pain)
- Function Flex-Ext. (20°=Normal)
- Function Pron-Sup. (20°=Normal)
- Grip Strength %
- Pron-Sup. Arc
- Flex-Ext. Arc
- Grip Strength %
Mean Clinical Results
VAS 1/10, QD 25%, PRWE 22

Subjective Wrist Value

VAS Pain with Pron-Sup. (20=no Pain)
VAS Pain with Flex-Ext (20=no Pain)
VAS Function with Pron-Sup. (20=Normal)
VAS Function with Flex-Ext. (20=Normal)

Pron-Sup. Arc
72° + 75° = 147°

Grip Strength % 72%

Flex-Ext. Arc
25° + 36° = 61°

Mean Active Wrist Extension 36°
Radiological Results

Acute Stage

Same Patient, 2 Years F-Up
Clinical Cases

71 year-old Lady, Retired Teacher,

Independent at Home, Hiking Hypertension, Treated Breast Cancer

Just Fell from Stair on RT Dominant Hand Closed Injury
71 Year-old Active Lady
F-Up 2 Years.  QD: 16  PRWE: 18  VAS Pain 2/10

LWS 0  Poor  50  Fair  70  Good  90  Exc.  100

75
Subjective Wrist Value

VAS Pain with Flex-Ext (20= no Pain)
VAS Function with Flex-Ext. (20= Normal)

Flex-Ext. Arc
75° + 50° = 125°

Grip Strength %
100%

Pron-Sup. Arc
70° + 70° = 140°

VAS Pain with Pron-Sup. (20= no Pain)
VAS Function with Pron-Sup. (20= Normal)

LWS
0 Poor 50 Fair 70 Good 90 Exc. 100

F-Up 2 Years. QD: 16 PRWE: 18 VAS Pain 2/10

QD: 16
PRWE: 18
VAS Pain 2/10
Painful Malunions
- Painful Malunions
Day 60 post-injury
Primary: Avg. LWS= 75%

Subjective Wrist Value (20= Normal)

VAS Pain with Pron-Sup. (20=no Pain)

VAS Function Loss with Pron-Sup.

Pron-Sup. Arc

Grip Strength %

Secondary: Avg. LWS= 59%

Subjective Wrist Value (20= Normal)

VAS Pain with Pron-Sup. (20=no Pain)

VAS Function Loss with Pron-Sup.

Pron-Sup. Arc

Grip Strength %
✓ Introduction
✓ Patient’s Selection
✓ Surgical Technique
✓ Current Experience
✓ Discussion
Irreparable Osteoporotic DRF In Independent Elderly
Classic Treatment Options:

- Cast > Severe Malunions
- Percut Pinning > Secondary Displacements
- External Fixator > Cumbersome in Elderly
- ORIF Volar Plate > Unreliable (Arora, Gabl)

« Irreparable Osteoporotic DRF In Independent Elderly »
Classic Treatment Options:

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2 New Options Emerging:

- Distraction Plating
- Hemiarthroplasty
Distraction Plating for the Treatment of Highly Comminuted Distal Radius Fractures in Elderly Patients

2012

Marc J. Richard, MD, Leonid I. Katolik, MD, Douglas P. Hanel, MD, Daniel A. Wartinbee, MD, David S. Ruch, MD

33 Patients >60, Mean 70 years, Very Good Results

Wrist Immobilization: Mean 4 Months (min 2, max 9 months)
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Need for Plate Removal
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Need for Plate Removal

Potential for Skin Complications in Elderly
Primary Wrist Hemiarthroplasty For Acute Irreparable DRF in Elderly

<table>
<thead>
<tr>
<th>Year</th>
<th>Source</th>
<th>n</th>
<th>VAS Pain /100</th>
<th>Wrist Fex. Ext. Arc</th>
<th>Grip Strength % Contralat.</th>
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<tbody>
<tr>
<td>2014</td>
<td>Vergnenegre</td>
<td>8</td>
<td>23</td>
<td>89°</td>
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Primary Wrist Hemiarthroplasty
For Acute Irreparable DRF in Elderly

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5-Year Periods
<table>
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Hemiarthroplasty

Radioscapholunate Fusion
Summary
75 Year-Old Lady, Active & Independent at Home
DRF Classified as P.A.F. 2-2, Irreparable (6 Criteria)

=Not Amenable to Reliable Volar Plating*

Arora & al 2011 JBJSA 93A; 2146-53
Herzberg 2015 J Wrist Surg 4; 156-63
Herzberg 2017 OTSR 103; 915-18

1. AO « C », Osteoporotic DRF
2. High Extra-Articular Displacement
3. High Intra-Articular Displacement
4. Distal Fracture Line
5. Circumferential Comminution
6. Impaction - Separation
P.A.F. Classification of DRF*

Homogeneous, Patient Based DRF Groups

Logical Workups

Logical Treatment Options

Herzberg & al 2010 Chir Main 29; 231-5
2012 J Wrist Surg 1; 81-82
Reconstruct DRUJ if Salvageable Sigmoid Notch

Restore Radial Height
Preliminary Results

Mean Active Wrist Extension 35°

Avg. Lyon Wrist Score = 75%

Herzberg & al 2017 OTSR 103; 915-18
Conclusions

- Old Concept for Hip, Knee, Shoulder, Elbow Fractures
- New Concept for Acute Irreparable Distal Radius Fractures
LYON WRIST 2020

LYON, France

October 15 - 16, 2020

Save the Date!

LYON WRIST 2020
International Advanced Wrist Course 2020

alcoms69.fr

Groupe Lepine Hemiarthroplasty Workshop

Fractures
Arthroscopy
Arthroplasty