Corrective Osteotomy of Distal Radius

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INDICATION

Young, symptomatic patient. •
15 DEG. Dorsal tilt •
5 mm shorthening •
Marked radial inclination •
TIMING OF SURGERY

as soon as possible, provided there is:

- absence of trophic changes
- acceptable bone quality
- adequate wrist function
NASCENT MALUNION

- immature callus
- established deformity (5 – 8 weeks post-fracture)

MATURE MALUNION

- remodelled callus
- 4 to 6 months or more post-fracture
ADVANTAGES OF EARLY CORRECTION

• easiness of radial and DRUJ re-alignment
• less soft tissue contractures and DRUJ dysfunction
• no need of structural corticocancellous bone graft
• considerably decrease of total disability
• early return to work

corrective osteotomy of malunited Colles fractures through a dorsal approach

preoperative planning is based on the radiographic measurements of the opposite wrist:

- ulnar inclination
- ulnar variance
- volar tilt

(for rotational deformity: comparative CT-scans)

FINITE CENTER OF ROTATION
2.4 distal radius locking plates
correction of malunited Colles' fractures through a volar approach:

- Open wedge osteotomy, interpositional bone graft and volar plate fixation (U. Lanz, J.Orbay)

- Close wedge osteotomy, Darrach procedure and K-wire fixation (Posner, Garcia-Elias)

- Close wedge osteotomy and ulnar shortening

- Close wedge osteotomy and ulnar head prosthesis (D.L.Fernandez)
CORRECTION IN SAGITTAL PLANE
CORRECTION INFRONTAL PLANE
<table>
<thead>
<tr>
<th>hole</th>
<th>screw length in mm</th>
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</thead>
<tbody>
<tr>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>10, 14°, 18°, 22°</td>
</tr>
<tr>
<td>4</td>
<td>7°, 11°, 14°, 17°, 20°, 23°</td>
</tr>
<tr>
<td>5</td>
<td>6°, 8°, 11°, 14°, 16°, 18°, 21°</td>
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</tbody>
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SCREW LENGTH ≈ ANGLE
surgical technique
intrarticular malunion results after failure to recognize potentially unstable articular disruption, or insufficient reduction and fixation during surgical treatment.
INTRA-ARTICULAR OSTEOTOMIES

The indication of osteotomy for an intra-articular malunion depends on:

1) the fracture pattern
2) the extent of cartilage damage
3) the chronology
4) presence of fixed carpal malalignment
5) the soft tissue condition
CONTRAINDICATIONS

1) severe cartilage damage
2) radiographic degenerative changes
3) chronic synovitis
4) significant soft tissue and capsular contractures (post RSD)
5) complex fracture pattern and fixed carpal malalignment
TREATMENT RECOMMENDATIONS

- simple intra-articular disruption
- as soon as possible
- minimal cartilage damage (chondromalacia)
- adequate pre-operative function
- compliant, cooperative patient

otherwise a limited carpal fusion (RSL or RL) is preferable
INTRAARTICULAR MALUNION
CONCLUSIONS

- Malunion remains the most common complication of closed reduction and plaster immobilisation of unstable extra-articular fractures.

- Intra-articular malunion results after failure to recognize potentially unstable articular disruption, or insufficient reduction and fixation during surgical treatment.

- If symptomatic extra-articular malunion occurs, radial osteotomy offers better function, improves the external appearance and normalizes carpal kinematics.
Intra-articular malunion deserves early correction in order to restore the functional – anatomic integrity of the joint before the onset of symptoms and cartilage damage.

Our experience has shown that with:

- careful patient selection
- correct indication and
- refinements of surgical technique

Over 80% of excellent and good results can be expected.
Complications and failures are commonly caused either by technical errors, or by improper patient selection with:

- degenerative changes
- trophic disturbances
- partial joint stiffness
- severe osteoporosis
- fixed type of DISI malalignment

and failure to assess and simultaneously treat associated disorders of the distal radioulnar joint.
CONCLUSIONS

• osteotomies reliably improve function and relieve pain

• preoperative planning and meticulous operative technique are fundamental

• novel techniques may reduce morbidity, improve precision of correction and end result