Which way do you skin your cat?

Controversies in the management of dorsally angulated extra-articular fractures of the distal radius

Mike Kent
Ben Bolland
QAH
Abraham Colles

-the casted wrist “will at some remote period again enjoy perfect freedom in all of its motions and be completely exempt from pain”.

-Management changed dramatically in the last two decades

CAST Vs FIXATION

1950 -1985 450 articles 60 IF
Last 15 yrs 2000 articles 400 IF

-Research conflicting
Research conflicting – why?

Spectrum

1. Age
   - Males <50 yrs
   - Traumatic
   - Females >40 yrs
   - Insufficiency

2. Functional demands

3. Fracture patterns

HETEROGENOUS POPULATION

MULTIPLE INJURY SUBSETS

JBJS Am 2007 89 2051-62
Old (quantitative parameters)

- Radial length < 2 mm
- Palmar tilt < 10-12°
- Radial inclination < 15°

Used in outcome scores

Gartland & Werley 1951
New (MOI, carpal kinematics, DRUJ)

LC – osseous buttress for the carpus
IC – 1° load transmission
MC – Axis for rotation, 2° load

1. Carpal alignment
2. Intercarpal ligament injury
3. DRUJ instability

? Do these parameters apply to all patients, types of injury?

ORIF

1 Catalano LW et al. JBJS Am. 1997
2 Geissler WB et al. JBJS Am. 1996
3 Lindau t et al CORR 2000.
Goals of treatment

• PAIN FREE

• GOOD FUNCTION

• (REDUCE $2^\text{o}$ OA RATE)
Options

Closed Reduction and Cast Immobilisation (CRCI)
Closed Reduction and Percutaneous Pin (CRPP)
Closed Reduction and External Fixation (CREF)
Open Reduction and Internal Fixation (ORIF)

Dorsal plate, Volar Plate – locked/unlocked
45 F Non dominant hand, cashier

Day 0

Post MUA

Day 7

Day 14

Op day 15

70F Non dominant hand, fit & independent
Patient:  
  Age  
  Job  
  ??Hand Dominance  
  Medical Comorbidities

Mechanism:  
  High Vs Low energy

Fracture:  
  Displacement  
  Angulation, length, inclination  
  Dorsal comminution  
  Bone quality

** CRCI redisplacement  
  initial displacement of #  
  age  
  metaphyseal comminution  
  failed initial CRCI
<table>
<thead>
<tr>
<th>Treatment</th>
<th>Pro</th>
<th>Con</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRCI</td>
<td>Cheap, Quick, Non-invasive, No GA</td>
<td>Displacement</td>
</tr>
<tr>
<td>CRPP</td>
<td>Cheap, quick</td>
<td>Infection Displacement (less)??</td>
</tr>
<tr>
<td>CREF</td>
<td>Less displacement, No open procedure</td>
<td>Infection, Stiffness Patient factors</td>
</tr>
<tr>
<td>ORIF</td>
<td>Anatomical reduction, Less loosening (locked)</td>
<td>Expensive Tendon problems CTS Removal Periprosthetic fracture</td>
</tr>
</tbody>
</table>
Evidence CRCI vs CRPP

**Stoffelen et al J Hand Surg Br 1999**
- PRCT 98 pts, 48 – CRPP, 50 CRCI
- Cooney score - good/excellent in 74% CRPP, 75% CRCI
- No sig difference in functional outcome/degree of displacement at 12/12

**Azzopardi et al JBJS 2005**
- PRCT 57 pts, aged 60+
- CRPP marginally better X-rays (inclination, length, inclination)
- No significant difference functionally

**Broos et al ActaOrthopBelg 2001 (review)**
- Similar functional results for CRCI & CRPP
- Percutaneous pins better in younger pts
Wright et al J Hand Surg Am 2005

11 ExFix, 21 ORIF
No significant difference in DASH/PRWE score at 47 months
ORIF – earlier motion
Evidence ORIF vs CRPP

Rozental et al JBJS Am 2009

PRCT 45pts; ORIF volar plate n=23, CRPP n=22. Some CRPP pts augmented with ExFix

Greater ROM, strength patient satisfaction in ORIF gp at 6 and 9 wks Early better DASH score in ORIF, no significant difference at 1 year Cx: 8 pts, 6 CRPP, 2 ORIF.
Gehrmann et al J Hand Surg Am 2008

41 studies, age ≥ 65yrs No significant difference
Suggests stratifying pts into high Vs low demand group
Low demand pts outcomes good despite deformity
Higher demand may benefit from # stabilisation with locking plate

Cochrane 2007

Multiple RCTs but most flawed → little robust data
Major finding – CRPP reduced re-displacement, ?improved function
Closed reduction is the key preliminary procedure
Cost

Shyamalan et al Injury 2009

Limited evidence CRPP vs ORIF
Retrospective 20 pts
CRPP – ave age 34, 56 mins, hardware £3, total £662
ORIF – ave age 54, 121 mins, hardware £787, total £2212
Lots of papers, not much robust evidence
Huge variation in local and national treatment

**CRCI** - stable # pattern

**CRCP** - ??
Young: +ve ??same outcome as ORIF - ve: potential displace
Old: +ve comorbidity; - ve all RF for redisplacement.

**ORIF** - Young: Unstable, high energy, high demand
Old: ? high demand
Conclusion

How to skin your cat...
Younger cats probably deserve a trendy expensive hairstyle

Older cats who’ve used up their 9 lives can get by with a quick trim and tidy up!