REHABILITATION OF CONSERVATIVELY MANAGED PROXIMAL HUMERUS FRACTURES - A SYSTEMATIC REVIEW OF THE LITERATURE


*Anuj Punnoose Msc MCSP
Physiotherapy Lead and Clinical Specialist
Trauma and Orthopaedic Unit
Cambridge University Hospitals NHS Foundation Trust
U.K

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CONFLICT OF INTEREST

None to declare
BACKGROUND

• Over 300,000 patients present with fragility fractures to UK hospitals every year (NICE, 2012)

• Among these injuries, proximal humerus fractures are considered the third commonest.

• Management of these fractures can depend on a multitude of factors like patient’s level of independence, bone quality, and surgical risk factors.

• A large multi-centre randomised control study published recently reported of no improved outcomes of surgical intervention over conservative care (A. Rangan et al, 2015)

• Rehabilitation protocols for conservatively managed fractures are largely based on anecdotal evidence and does not often inform clinicians on how best to manage these fractures (Hodgson, 2006)
AIM OF THE REVIEW

- Determine the optimum rehabilitation approach for conservatively managed proximal humerus fractures.
ELIGIBILITY CRITERIA

• All randomised control studies which included conservative management as one of the treatment arms were included
• Adults human beings who have been reported with a proximal humerus fracture

EXCLUSION CRITERIA

• All Non-english publications
• Animal Studies
• Studies which included participants with a peri-prosthetic fracture
SEARCH STRATEGY

• Database Search (1 Jan 2000- 17 May 2017)
  • MEDLINE and CINAHL databases
  • Search terms (fracture* adj3 humer* adj3 (proximal or "surgical neck" or head)).mp. or ((exp Humeral Fractures/ or exp Shoulder Fractures/) and (proximal or "surgical neck" or head).mp.).
RESULTS

1 study was a 2 yr extension
METHODOLOGICAL QUALITY OF THE STUDIES

On the PEDro Scale

Ranged from 6-8/10 (Moderate)
<table>
<thead>
<tr>
<th>Author</th>
<th>PEDro Score</th>
<th>No. of participants</th>
<th>Fracture Classification</th>
<th>Immobilisation</th>
<th>Treatment Group (A) Early mobilisation</th>
<th>Treatment Group (B) Delayed mobilisation</th>
<th>Outcomes Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lefevre-Colau, et al. 2007</td>
<td>8/10</td>
<td>37 = early mobilisation (A) 37 = delayed mobilisation (B) 37 = early mobilisation (A) 37 = delayed mobilisation (B)</td>
<td>Neer 1, 2 and 3 part fractures</td>
<td>A = mobilised within 72 hours. Sling worn between physio sessions until 4-6 weeks as pain required. B = 3 weeks of immobilisation then sling worn between physiotherapy for a further 1-3 weeks depending on pain.</td>
<td>0-3 weeks: Mobilisation within 72 hrs of injury. 5 x 2hr/week physiotherapy sessions – icing, cervical massage and gradual introduction of passive and pendulum movements.</td>
<td>&gt;3 weeks: 4 x 2hour/week for 4 weeks. Passive mobilisation performed by the physiotherapist in all planes of movement. &gt;6 weeks: bi-weekly sessions. &gt;6 weeks: Weekly sessions including AROM exercises. &gt;3 months: bimonthly sessions including strengthening exercises Daily HEP encouraged after 4-6 weeks. Total = 32 treatment sessions</td>
<td>• Constant Score (primary outcome at 3 months, secondary outcomes at 6 weeks and 6 months) • AROM • PROM • Change of pain intensity (follow up at 6 weeks, 3 and 6 months)</td>
</tr>
<tr>
<td>Hodgson et al 2003</td>
<td>7/10</td>
<td>44 = early mobilisation (A) 42 = delayed mobilisation (B) 44 = early mobilisation (A) 42 = delayed mobilisation (B)</td>
<td>Neer 2 part fractures</td>
<td>Collar and Cuff A = 1 week immobilisation B = 3 weeks immobilisation</td>
<td>Home ex Programme Week 1: Pendulum exercises Week 2-4: Assisted flexion and light functional exercises.</td>
<td>Same treatment as group A however started at week 3. Total = 33 treatment sessions</td>
<td>Constant Score (primary outcome at 16 weeks, secondary at 8 and 52 weeks) SF-36 health survey 8, 16 and 52 weeks</td>
</tr>
</tbody>
</table>
HODGSON, 2003

- 86 PARTICIPANTS (Mob within 1 week vs after 3 weeks)
- Collar and cuff used for support
- Home ex programme

Study Results

- The early mobilisation group had significantly better health-related quality-of-life scores at 16 weeks in two dimensions of the SF36 (role limitation physical CI (3.4 to 40.9) p=0.02 and pain CI (3.2 to 21.2) p=<0.01.
- Shoulder function measured by Constant Score was significantly better at 8 and 16 weeks in the earlier group CI (0.68 to 0.25), p=0.001
- Between group differences were not significant at 1 year follow-up in both these outcome measures, although, the earlier mob group had better function and less pain at that point
LEFEVRE-COLAU, 2007

- 74 participants (Mob within 3 days vs after 3 weeks)
- Sling for support
- Physiotherapy offered face to face (5x 2 hr sessions/week)

Study Results

- Shoulder function measured by Constant score was significantly better at 6 weeks and 3 months. CI (2.0 to 18.1, \( p=0.02 \)) and (1.9 to 17.8, \( p=0.02 \)) respectively.
- Change in pain intensity was significantly higher at 3 months in the earlier group CI 0.52 to 30.8, \( p=0.04 \)
- Between group differences were not significant in both these outcome measures at 6 months follow-up

10 participants withdrew from the study due to difficulties of getting to the hospital
## CONSERVATIVE VS SURGICAL

<table>
<thead>
<tr>
<th>Author</th>
<th>PEDro Score</th>
<th>No. of participants</th>
<th>Fracture Classification</th>
<th>Immobilisation</th>
<th>Surg. Intervention (A)</th>
<th>Control (B)</th>
<th>Outcomes Measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>P. Olerud et al 2011</td>
<td>8/10</td>
<td>27 = operative (A) - Hemi arthroplasty (1 patient had locking plates) 28 = conservative (B)</td>
<td>Neer 4 part fractures</td>
<td>A = 6 weeks in a sling then as necessary but mobilised day 1 post-op</td>
<td>Day 1 post-op: Pendulum and passive elevation/abduction to 90° started  &gt;6 weeks: free active ROM &gt;3 month: strengthening exercises</td>
<td>Pendulum and passive elevation/abduction to 90° at 2 weeks.  &gt;4 weeks: free active ROM</td>
<td>EQ-5D  Constant Score  DASH  Follow-up: 4, 12 and 24 months</td>
</tr>
<tr>
<td>A. Rangan et al 2015</td>
<td>7/10</td>
<td>125 = surgical (A) - Locking plate (82.6%), hemi (n10), IM nail (n4), other (n5) 125 = conservative (B)</td>
<td>Neer 1, 2, 3 and 4 part fractures</td>
<td>A = As per hosp guidelines  B = sling for as long as deemed necessary (suggested 3 weeks)</td>
<td>As per hospital guidelines</td>
<td>Pendulum ex and active assisted ex commenced at 3 weeks  Active ex and capsular stretches from 6 weeks</td>
<td>Oxford Shoulder Score  SF-12 health survey  EuroQoL 5D  3, 6, 12 and 24 months</td>
</tr>
<tr>
<td>T. Fjalestad et al 2012</td>
<td>6/10</td>
<td>25 = surgical With angular plate (A) 25 = conservative (B)</td>
<td>Neer 3 and 4 part fractures</td>
<td>A = Velpeau bandage until day 3 post-op  B = 2 weeks immobilisation</td>
<td>Day 3: pendulum and passive exercises  Week 3: active exercises  Week 6: strengthening exercises Continued physiotherapy and HEP for 6 months</td>
<td>Week 2: pendulum and passive exercises  Week 5: active exercises  Week 6: strengthening exercises Continued physiotherapy and HEP for 6 months</td>
<td>Constant Score  Modified ASES self-assessment form  Radiographic evaluation  EMG of deltoid muscle  Clinical follow up: 2, 8, 12, 26 and 52 weeks</td>
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<tr>
<td>T. Fjalestad and M. O.</td>
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<td>Same as above at 2 years</td>
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</tbody>
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## ADVERSE EFFECTS

<table>
<thead>
<tr>
<th>Author</th>
<th>Adverse Effects</th>
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<tbody>
<tr>
<td>M. M. Lefevre-Colau, et al. 2007</td>
<td>1 participant in each group received a steroidal subacromial injection for impingement syndrome</td>
</tr>
<tr>
<td>S. A. Hodgson et al 2003</td>
<td>1 participant in delayed mobilisation developed adhesive capsulitis at 52 weeks.</td>
</tr>
<tr>
<td>P. Olerud et al 2011</td>
<td>3 in the operative group and 1 in the conservative group and had to undergo further surgery</td>
</tr>
<tr>
<td>A.Rangan et al (2015)</td>
<td>30/125 in the surgical group and 23/125 in the conservative group reported of adverse events.</td>
</tr>
<tr>
<td>T. Fjalestad et al 2012</td>
<td>10 in surgical group and 3 in conservative group had adverse events.</td>
</tr>
<tr>
<td>T. Fjalestad and M. O. Hole 2014</td>
<td>Same as above. 1 additional patient in the conservative group had died by the 2 year follow-up</td>
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</tbody>
</table>
KEY FINDINGS

• Immobilisation period: Ranged from 3 days to 3 weeks
• Type of Sling: No particular recommendation. Collar and cuff, slings, velpaeu bandage etc were used in studies.
• Commencement of Passive/ Active ex:
  • Passive movements were permitted early (within 1 week) in all studies except in ProFHER study
  • Active movements were not commenced before 4 weeks in any of the studies.
CONCLUSION

• Current evidence on rehabilitation for conservatively managed proximal humerus fractures is not robust enough to recommend a particular approach that could improve long term outcomes.

• However, studies who had compared early mobilisation to delayed mobilisation reported better function and lower pain levels in the earlier stages (upto 6 months) which may have a positive impact on quality of life as well as health and social care needs.

• Studies also reported of minimal or no adverse effects in the early treatment group.
RECOMMENDATIONS

• Further studies are required to investigate various exercise regimes (passive and active) and also varying duration of immobilisation

• Due to variations in clinical practice and preferences, expert opinion and deriving a consensus statement (Delphi) would assist in developing an optimum rehabilitation regime for these patients.
THANK YOU
anuj.punnoose@addenbrookes.nhs.uk
REFERENCES


