Evaluation of Total Shoulder Arthroplasty for Primary Glenohumeral Osteoarthritis: A Prospective Multicenter Study

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Introduction

- TSA – treatment of choice for \( 1^\circ \) DJD

- Few large, prospective multicenter studies

  Torchia ME, et al. JSES 1997
  Norris TR, et al. JSES 2002
  Edwards TB, et al. JSES 2003
  Iannotti JP, et al. JBJS 2003
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Materials and Methods

- Zimmer BF prosthesis
- Inclusion
  - 1° GH DJD
- Exclusion
  - Prior surgery, RCT, AVN, inflammatory arthritis, Fx
- Enrollment
  - 880 patients screened
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Materials and Methods

- 207 pts (213 shoulders) prosp. enrolled 2001-2004
  - 118 Male, 95 Female
  - Age: Avg. 68 (47 – 88)
- 14 centers (21 surgeons)
  - 13 domestic
  - 1 international
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Materials and Methods

- **Follow-up**
  - 3 mo; 6 mo; yearly until 5 yrs post-op

- **Outcome Measures**
  - Exam (ROM)
  - SST, ASES, Constant
  - SF-36, Euroquol
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Intra-op

- Glenoids
  - All poly
  - Cemented
  - 83% pegged

- Humerus
  - 51% cemented
  - 82% offset head
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Statistics

- Missing data imputed using 10 multiple imputations through SPSS software. Linear mixed models (continuous outcomes) or generalized estimating equations (ordinal outcomes)
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Results

- Clinical data for ALL F/U visits (3 mo – 5 yr)
  - Average F/U: 39 months (3.2 yrs)

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>3 mo</th>
<th>6 mo</th>
<th>1 yr</th>
<th>2 yr</th>
<th>3 yr</th>
<th>4 yr</th>
<th>5 yr</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>213</td>
<td>164</td>
<td>157</td>
<td>168</td>
<td>145</td>
<td>118</td>
<td>102</td>
<td>93</td>
</tr>
<tr>
<td>% F/U</td>
<td>77.0%</td>
<td>73.7%</td>
<td>78.9%</td>
<td>68.1%</td>
<td>55.4%</td>
<td>47.9%</td>
<td>43.7%</td>
<td></td>
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</tbody>
</table>
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Results – ROM

- Sig. ↑ in all ROM from baseline at every time point post-op (p<0.001)
- After 6 mo. post-op imp. in ROM plateau
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Results – SST

- Sig. ↑ in avg SST from baseline at every time point post-op (p<0.001)
- After 6 mo. post-op ↑ in avg SST plateau
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Results – Constant

- Sig. ↑ in Constant from baseline at every time point post-op (p<0.001)
- After 2 yrs post-op ↑ in avg Constant plateau
• Sig. ↑ in avg ASES from baseline at every time point post-op (p<0.001)
• After 6 mo. the ↑ in avg ASES plateau
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Results – EuroQol

• Sig. ↑ from baseline at 3 mo, 6 mo, 1 yr, and 2 yr post-op (p<0.025)
  – Majority of improvements by 3 months
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Results – SF-36

- Sig. ↑ in **SF-36 MCS** from baseline at 3 mo/6 mo post-op (p<0.039)
- Sig. ↑ in **SF-36 PCS** from baseline at every point post-op (p<0.008)
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Results – BMI, Age, Gender

- Minor differences between Male and Female (M>F) (ex. SST), however no overall trend
- No differences between older and middle-age pts
- No differences between 3 BMI groups

Average SST

- M>F at 3 mo, 2 yr, 4 yr and 5 yr
- Differences impacted by difference between M/F at baseline
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Results

- 73/78 patients (93.6%) improvements in shoulder pain at 5yr post-op
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Complications

- Of 213 shoulders, 6 (2.8%) subsequent surgery

<table>
<thead>
<tr>
<th>Adverse Event</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>(2) Subscapularis tear</td>
<td>Repair of tendon</td>
</tr>
<tr>
<td>(1) Prosthetic loosening due to poly wear</td>
<td>Conversion to a hemi with bone-grafting of glenoid</td>
</tr>
<tr>
<td>(1) Traumatic event causing fracture</td>
<td>Revision of TSA</td>
</tr>
<tr>
<td>(1) Trauma causing acute rotator cuff inflammation</td>
<td>Pain management (anti-inflammatories) and home exercise program</td>
</tr>
<tr>
<td>(1) Loose K-Wires</td>
<td>Event resolved</td>
</tr>
</tbody>
</table>
• TSA leads to significant improvement in pain relief, shoulder function and subjective global health measures

• Most improvements occurred by 6 months, while many plateau after just 3 months

• Complication and re-op rates very low
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Strengths

• Large cohort with single diagnosis
• Large # of surgeons → generalizability and reproducibility
• Prospective → standardized data acquisition
• Variety of validated outcome scores → quantification of shoulder and overall health improvement
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Limitations

- Patient f/u limited due to large-scale, multicenter nature of study
- Single prosthesis did not allow for comparison between prosthetic designs
Thank You!