Arthroscopic Treatment for Shoulder Instability with Posterior Glenoid Bone Loss Using Allograft

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Posterior Shoulder Instability

Increasingly recognized as a cause of significant shoulder pain and dysfunction.

Patients with posterior shoulder instability only make up 10% of all shoulder instability cases.\(^1\text{-}^5\)

Most patients (>90%) present with pain while only 15% present with instability.

Most observed in contact and overhead athletes, weightlifters, and military personnel.\(^1\text{-}^5\text{,}^7\)

Associated lesions include posterior labral tears, reverse Hill-Sachs lesions, and posterior glenoid bone loss.\(^1\text{-}^5\text{,}^7\text{-}^{13}\)
Glenoid bone reconstruction includes autograft iliac crest grafting, allograft augmentation, and glenoid or humeral osteotomies.  
1,9,11,13,17-19

Defects that are larger than 20% of the posterior glenoid width implicate a boney augmentation procedure as isolated Bankart repair may result in an unstable shoulder.  
1,5,8,9,11,16
Arthroscopic Boney Augmentation

- Arthroscopic boney augmentation using distal tibia allograft allows for reconstruction of the posterior bone loss
  - Can treat other pathologies \(^1,^{13,15,17,18}\)
  - Arthroscopic treatment offers improved cosmetic results and post-operative advantages including less pain, earlier mobility and faster rehabilitation and return to sports
Purpose

To evaluate the safety profile as well as the clinical and radiological outcomes of patients treated with arthroscopic posterior glenoid reconstruction using distal tibia allograft.
Methods

• Retrospective review of prospectively collected data from 2016-2017
• Inclusion – Posterior dislocation with bone loss treated with distal tibia allograft with screw fixation and posterior Bankart repair
• Exclusion – Rotator cuff tear, multidirectional instability, isolated posterior Bankart repair

• Primary Objective – PROs and radiographic outcome
  • Collected WOSI preoperatively and post-operatively at 6 weeks, 3 months, 6 months, 1 years, 2 years
  • All patients had a *minimum* one-year follow-up
• Imaging – X-rays, CT
  • Taken pre-operatively and at one year
  • Evaluated graft healing, graft position, and screw angle

• Secondary Objective – Safety Profile
  • Any complication – nerve injury, admission to hospital, bleeding, infection, implant failure (intra-operative or post-operative), revision surgery or re-dislocation
Demographics

<table>
<thead>
<tr>
<th></th>
<th>Posterior Glenoid Patients</th>
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<tbody>
<tr>
<td><strong>N</strong></td>
<td>9</td>
</tr>
<tr>
<td>% Male (N)</td>
<td>77.8% (7)</td>
</tr>
<tr>
<td>Age at surgery (years)</td>
<td>33.26 ± 9.94</td>
</tr>
<tr>
<td>% Right (N)</td>
<td>44.4% (4)</td>
</tr>
<tr>
<td>Glenoid AP (mm)</td>
<td>20.90 ± 1.96 (19.7%)</td>
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<tr>
<td>Average Follow-up (years)</td>
<td>3.45 ± 0.33</td>
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Results – Clinical and Radiographic Outcomes

- All patients had good graft union despite seven patients showing some graft resorption
  - Resorption: Grade 0 = 2 patients, Grade 1 = 6 patients, Grade 2 = 1 patient

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Value</th>
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<tr>
<td>WOSI Follow-up (months)</td>
<td>12.75 ± 12.45</td>
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<tr>
<td>Pre-operative WOSI</td>
<td>72.6 ± 15.0</td>
</tr>
<tr>
<td>Post-operative WOSI (at two years)</td>
<td>17.9 ± 19.2</td>
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<tr>
<td>Screw alpha angle (deg)</td>
<td>15.8 ± 4.6</td>
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<tr>
<td>Post-operative Glenoid AP (mm)</td>
<td>30.7 ± 3.2</td>
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<tr>
<td>Graft positioning (N)</td>
<td></td>
</tr>
<tr>
<td>Medial</td>
<td>2</td>
</tr>
<tr>
<td>Lateral</td>
<td>0</td>
</tr>
<tr>
<td>Flush</td>
<td>7</td>
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ΔWOSI = 52.0 ± 21.7 (p = <0.0001)
Results – Safety Profile

- No intra-operative complications, neurovascular injuries, adverse events, or major bleeding
- All subjects had a stable shoulder at latest follow-up, no subluxations and no positive apprehension tests
- No arthropathy
- No hardware failures
Discussion

Posterior glenoid bone augmentation using distal tibia allograft shows good healing and graft positioning with favourable patient outcomes.

There is a lack of high-quality evidence regarding this surgical technique, however a systematic review shows that it may be a reliable option for improving patient outcome.

Our favourable outcomes are comparable to those of others published in 2013\textsuperscript{15} and 2017\textsuperscript{20} that show low recurrence rates and good graft union, although their studies utilized iliac crest autograft.
Summary

• This is the first case series reporting the clinical and radiological outcomes on the arthroscopic treatment of posterior shoulder instability with bone loss via distal tibia allograft

• This technique is shown to have:
  • A good safety profile
  • Favourable clinical outcomes
  • Favourable radiological outcomes

• Further investigation with longer follow up is needed to evaluate the longevity of these positive health outcomes


