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Outcomes of Distal Tibia Allograft Reconstruction for Recurrent Anterior Shoulder Instability

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Summary:
Patients undergoing distal tibia allograft reconstruction for recurrent anterior shoulder instability have excellent clinical outcomes with minimal graft resorption at a mean 45 months after surgery.

Abstract:
INTRODUCTION
A variety of bone augmentation procedures have been described for reconstruction of significant glenoid bone defects in the setting of recurrent anterior glenohumeral instability. Fresh distal tibia allograft (DTA) offers an anatomic reconstruction resulting in a cartilaginous, congruent articulation with the humeral head, however, little is known regarding clinical and radiographic outcomes. The purpose of this study was to assess the clinical and radiographic outcomes of patients with recurrent anterior shoulder instability treated with fresh DTA glenoid reconstruction.

METHODS
Consecutive patients over a three-year period with a minimum 15% glenoid bone loss in the setting of recurrent anterior instability underwent glenoid bone reconstruction using a fresh DTA were reviewed. Patients were excluded for hyperlaxity or neurologic injury. Patients were evaluated with clinical outcomes (ASES, SANE, WOSI) assessments at a minimum of two years as well as computed tomography (CT) at a minimum of six months postoperatively. All CT scans were graded for: 1) overall healing of the graft to the native glenoid; 2) angle of the bone graft relative to the native glenoid (allograft angle); and 3) amount of allograft lysis. Statistical analysis was performed with paired T-tests, with $P<0.05$ considered significant.

RESULTS
A total of 20 patients (average age 30.7 ± 5.4 years) with an average follow-up of 45 months (range, 30-66) were included. For all patients, there were statistically significant improvements in pre-operative to post-operative ASES (63 to 91, $P<0.01$), SANE (50 to 90.5, $P<0.01$), and WOSI (46% to 11%, $P<0.01$) outcomes assessments. Analysis of CT data (Figure 1) demonstrated 85% (range, 60-100%) overall healing of the graft to the native glenoid, an average allograft angle of 14.9 degrees (range, 6.6-29.3 degrees), and an average allograft lysis of 2% (range, 0-25%). Grafts with lesser allograft angles (8.8-13.4 degrees) were found to be better opposed to the anterior glenoid, demonstrating superior healing and graft incorporation. One patient (5%) sustained a superficial Propionibacterium Acnes infection and underwent allograft removal followed by revision DTA reconstruction. There were no cases of recurrent instability.

CONCLUSIONS
At an average follow-up of nearly 4 years, fresh DTA reconstruction for recurrent anterior shoulder instability results

in a clinically stable joint with excellent clinical outcomes and minimal graft reabsorption. Optimal allograft placement resulted in superior bony incorporation with the native glenoid. Longer-term studies are needed to determine if the results of fresh DTA reconstruction for recurrent glenohumeral instability are maintained over time.