ISAKOS

International Society of Arthroscopy, Knee Surgery and Orthopaedic Sports Medicine

9th Biennial ISAKOS Congress • May 12-16, 2013 • Toronto, Canada

Paper #193

Comparison of Glenohumeral Contact Pressures and Contact Area After Glenoid Reconstruction with Latarjet or Distal Tibial Osteochondral Allograft

Nikhil N. Verma, MD, USA
Sanjeev Bhatia, MD, USA
Geoffrey S Van Thiel, MD, MBA, USA
Deepti Gupta, BS, USA
Neil Ghodadra, MD, USA
Bernard R. Bach, Jr, MD, USA
Elizabeth Shewman, MS, USA
Vincent M. Wang, PhD, USA
Brian J. Cole, MD, MBA, USA
Anthony A. Romeo, MD, USA
Matthew T. Provencher, MD, USA

Rush University Medical Center
Chicago, IL, USA

Summary:
Reconstruction of anterior glenoid bone defects with distal tibial allograft may allow for improved joint congruity and lower peak forces within the glenohumeral joint than Latarjet reconstruction at 60 degrees abduction and the ABER position.

Abstract:
Introduction:
Glenoid reconstruction with distal tibial allograft offers the theoretical advantage over Latarjet reconstruction of improved joint congruity and a cartilaginous articulation for the humeral head. The purpose of this study was to investigate changes in the magnitude and location of glenohumeral contact area, contact pressure, and peak forces after (1) creation of 30% anterior glenoid defect, subsequent glenoid bone augmentation with (2) a flush Latarjet coracoid graft or (3) a distal tibia osteochondral allograft. It was hypothesized that thedistal tibial bone graft would best normalize glenohumeral contact area, contact pressures and peak forces.

Methods:
Eight cadaveric shoulder specimens were dissected free of all soft tissues and randomly tested in 3 static positions of humeral abduction--30°, 60°, and 60° abduction with 90° of external rotation (ABER)--with a 440-N compressive load. Glenohumeral contact area, contact pressure, and peak forces were determined sequentially using a digital pressure mapping system (Tekscan, South Boston, MA) for (1) the intact glenoid; (2) the glenoid with a 30% anterior bone defect; followed by (3) the glenoid after reconstruction with a distal tibial allograft or a Latarjet bone block.

Results:
Glenoid reconstruction with distal tibial allografts resulted in significantly higher glenohumeral contact area than reconstruction with Latarjet bone blocks in 60° abduction and the ABER position ($p<0.05$). Distal tibial allograft reconstruction also demonstrated significantly lower peak forces than Latarjet reconstruction in the ABER position ($p<0.05$). In regards to the bone loss model, distal tibial allograft reconstruction exhibited significantly higher contact areas and significantly lower contact pressures and peak forces than the 30% defect model at all abduction positions. Latarjet reconstruction also followed this same pattern but differences in contact area and peak forces between the defect model and Latarjet reconstruction in the ABER position were not statistically significant ($p>0.05$).

Paper #193

Discussion and Conclusions:
Reconstruction of anterior glenoid bone defects with distal tibial allograft may allow for improved joint congruity and lower peak forces within the glenohumeral joint than Latarjet reconstruction at 60 degrees abduction and the ABER position. Although these mechanical properties may translate into clinical differences, further studies are needed to understand their effects.