THE EFFECT OF SCAPULAR SPINE AUTOGRRAFT ON BONY STABILITY OF THE SHOULDER IN CASES OF AN ANTERIOR GLENOID DEFECT: A CADAVERIC STUDY

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Disclosure

The authors have no financial conflicts to disclose
Shoulder instability: common and debilitating

Bony augmentation often beneficial (Zimmermann, JBJS 2017, Bessiere, OTSR 2013)
- Bony wear in recurrent instability
- Non healed glenoid fractures
- Multidirectional instability
- Revision cases

Multiple bone block options:
- Coracoid (Latarjet, Bristow)
  - Imperfect joint surface congruity
  - Unavailable for posterior / revision cases
- Iliac crest autograft
  - Second prep / positioning / surgical site
  - Iliac pain
- Allograft
  - Resorption
  - Communicable disease
  - Cost/availability
Scapular spine autograft is an attractive alternative

- Ease of surgical approach
- Local accessibility to implantation site
- Lack of endangered structures
- Appropriate morphology, tricortical

Feasibility established in spine literature (cadaver study)
- Tubbs, JNS 2007

Purpose:

- Can scapular spine autograft work in a cadaveric model?

Hypothesis
- Tri-cortical scapular spine autograft can restore the joint reaction forces of the glenohumeral joint in resisting anterior shoulder dislocation
5 matched pairs of fresh-frozen cadaver shoulders

- Skin, subcutaneous tissues, and muscle were removed

- Rotator cuff musculature and shoulder capsule intact

- Humerus was translated 1cm anteriorly on the glenoid under 25N of axial compression force
  - Customized testing device
Peak reaction force of the glenohumeral joint was then measured under three conditions:
- Intact glenoid
- After a bone defect measuring 25% of the maximal width of the glenoid was made in the anterior-inferior glenoid
- After size-matched glenoid augmentation with a scapular spine tri-cortical autograft

For augmentation, superior surface of the scapular spine flare was approximated to the glenoid surface

Primary outcome was change in peak joint reaction forces between the defect state and the augmented state
Results

- Significant decrease in peak reaction force after the glenoid defect was created as compared to the intact state (p=0.00001)
  - All specimens

- Increase in peak joint reaction force in the augmented state as compared to the defect state (p=0.00001)

- Augmented state restored 81% of the peak reaction force of the glenohumeral joint compared to the intact state, a non-significant (p=0.068)

Figure 1. Augmentation procedure: (a) glenoid after creation of a defect, (b) example of bone graft harvested from superior scapular spine, (c) after augmenting joint with scapular spine autograft.
Results

- Scapular spine autograft completely filled the glenoid defect
- Radius of curvature of the superior surface of the scapular spine closely matched the radius of curvature of the glenoid

Figure 1. Augmentation procedure: (a) glenoid after creation of a defect, (b) example of bone graft harvested from superior scapular spine, (c) after augmenting joint with scapular spine autograft.
Conclusions

- Scapular spine autograft can restore most of the peak reaction force in the glenohumeral joint with glenoid bone loss

- Scapular spine may be a local alternative for bony augmentation of glenoid defects in shoulder instability
References


