

Posterior Glenoid Osteotomy with Capsulolabral Repair Improves Resistance Forces in a Critical Glenoid Bone Loss Model

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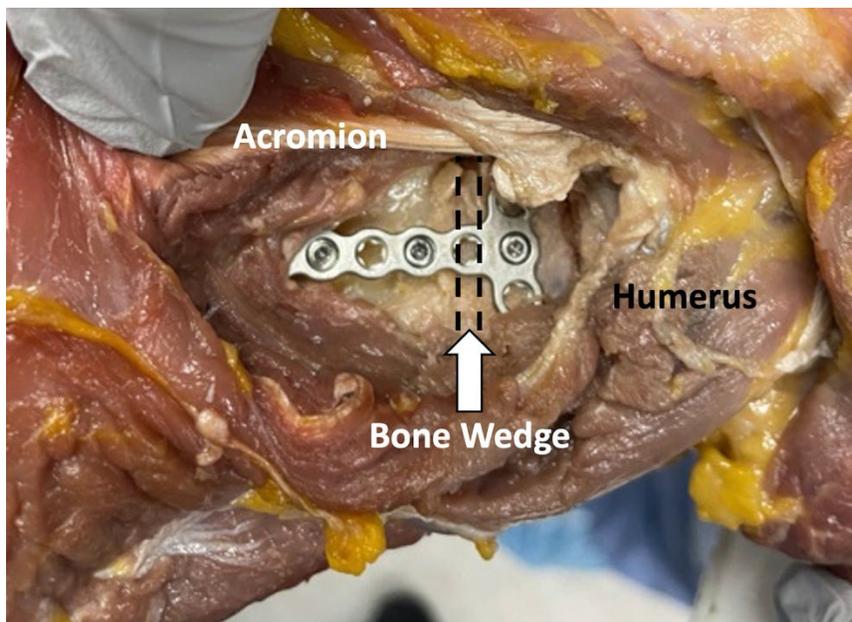
Abstract

Introduction: Bone loss in posterior shoulder instability is an increasingly recognized clinical phenomenon. There is no widespread consensus on the surgical treatment of posterior shoulder instability with critical posterior glenoid bone loss. Our hypothesis was that opening posterior glenoid wedge osteotomy with soft tissue repair will improve the resistance forces of instability when compared to soft tissue repair alone in the setting of 20% critical bone loss.

Methods: Native glenoid retroversion was measured on 9 shoulders using computerized tomography (CT) scans. The humerus was potted in 90 degrees of forward flexion and 30 degrees of internal rotation relative to the scapula and a posterior dislocation was performed in order to create a posterior capsulolabral injury model. The specimens were each taken through a fixed sequence of testing: (1) posteroinferior capsulolabral tear, (2) no glenoid bone loss with posteroinferior capsulolabral repair, (3) 20% posterior glenoid bone loss with posteroinferior capsulolabral repair, (4) and 20% glenoid bone loss with posterior glenoid opening wedge osteotomy and posteroinferior capsulolabral repair. Bone loss was created using a sagittal saw. The resultant peak forces with 1 centimeter of posterior translation were measured. A one-way repeated-measures analysis of variance (RM-ANOVA) was used to compare mean force values.

Results: Following the initial dislocation event, all shoulders had a resultant posterior capsulolabral injury. The resulting labral injury was extended from 6 to 9 o'clock in all specimen to homogenize the extent of injury. Repairing the capsulolabral complex in the 20% posterior glenoid bone loss group did not result in a statistically significant increase in resistance force compared to the labral deficient group, (34.1N vs. 22.2N, $p = 0.068$). When 20% posterior bone loss was created, the posterior glenoid osteotomy with capsulolabral repair was significantly stronger (43.8N) than the posterior repair alone both with (34.1N) and without (31.8N) bone loss, $p = 0.008$ and $p = 0.045$, respectively.

Conclusion: In the setting of critical posterior glenoid bone loss, an opening wedge posterior glenoid osteotomy with capsulolabral repair significantly improved resistance to posterior humeral translation compared to capsulolabral repair alone.



PEAK RESISTANCE FORCE

