## Critical Glenoid Bone Loss Resulting in Recurrent Shoulder Instability following an Arthroscopic Bankart Repair: Systematic Review and Meta-Analysis

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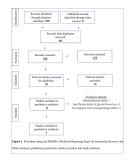
INTRODUCTION: Glenoid bone loss has been reported to occur in as much as 86% of patients with recurrent shoulder instability. Several studies have quantified the amount glenoid bone loss as a risk factor for surgical failure; however, most of these studies have been underpowered with a small sample size. We performed a systematic review and meta-analysis in efforts to quantify the amount of glenoid bone loss associated with recurrent shoulder instability following an arthroscopic Bankart repair. We hypothesized that the percentage of glenoid bone loss associated with recurrent instability after an arthroscopic Bankart repair is lower than the previously proposed critical value of 25%.

A systematic review was performed according to the PRISMA guidelines; two online databases (MEDLINE and Google Scholar) were searched for literature on the measurement and outcomes of anterior glenoid bone loss and its association with glenohumeral instability. Studies were screened independently by two reviewers. For relevant articles, the corresponding author of the publication was contacted to request de-identified raw data from their study. Data collected included patient age at surgery, gender, duration of follow up, percentage glenoid bone loss, failure, SANE, ASES, Rowe and WOSI. Receiver Operator Curve analysis and logistic regression models were performed.

RESULTS: Twelve studies met the selection criteria, 3 biomechanical studies and 9 clinical studies. Five of the clinical studies reported methods of bone loss measurement, quantity of bone loss, failure rates, and patient-reported outcomes. The corresponding authors for these 5 manuscripts were contacted and raw de-identified data was obtained from 3 of the authors, creating a total sample size of 528 patients. In the combined study cohort, recurrent dislocation or subluxation occurred in 23.7% of patients. The ROC analysis demonstrated that 16.0% of glenoid bone loss was predictive of recurrent shoulder dislocation or subluxation (Youden index 0.59, sensitivity 80%, specificity of 79%). There was a significant difference in age between those who failed the arthroscopic Bankart and those who did not (22.9 years vs. 24.3 years; p=0.009). In patients who did not sustain a dislocation or subluxation, the ROC analysis demonstrated that 20.0% of glenoid bone loss was predictive of a Single Assessment Numeric Evaluation (SANE) score less than 85% (Youden index 0.93, sensitivity 93%, specificity 100%).

## DISCUSSION AND CONCLUSION:

This is the first meta-analysis and largest study quantifying critical glenoid bone loss predictive of recurrent instability after an arthroscopic Bankart repair. Patients with 16.0% anterior glenoid bone loss are at significant risk of recurrent instability when treated with an arthroscopic Bankart repair alone.



	PMED	Improd	Year	Service
113,140,13		New Jury Sparts	100	is patients with gleeoid bone loss >20% who underwork arthroscopic Bankert repair with bone graft augment, dislocation rate was only 2.0%. In patients with a presid bone is so x xxxx who underwork arthroscopic Bankert receive without bone craft.
Linnara	139294	Traumated Arthorac	2020	arthrescapic Bankort repair without sone graft ausment, redelocation rate was 45.5%
Litters			Ando	Optimal critical value of glernid Beaument was 17.3%. Patients with more than 17.3% of gleroid bore loss than this had statistically significant werse shoulder.
Shin	28333542	Am J Sports Med	2017	Functional scores and SANE scores.  17-13% of glornel bore loss is determined to be subtributed bone loss. Male patients and patients involved in contact sports were more likely to have
		Orthog Traumatal		worse scores as measured by the
Tamameto	33534030	Surg Res	2019	Patients with any glenoid bane loss had 4 times greate valued manners after activacous, saidtlastics. Glenoid bane loss > 15%, symptoms >5 months, and younger than 20 years of age were risk factors that
Dekker	15552355	Am J Sports Med	2820	increased the risk for recurrent instability.

Riot Author	PMD	toursal	Tear	Semmany Symptomatic recurrent instability occurred in about 30.3% of patients undergoing primary entheraceasic Bankan repair. Scoring yetsens can predict instability were monometer occuracy in powers more more was over points. Patients receive 1 point for ago, 1 point for off- vack lindow, 2 points for instant centerior articular and points.
tion	82926270	Arthrescopy	3850	x150 degrees, and it points fair disensidifibree (ass x19th) competitive supply players with glimobamental instability and gleenid from Instability and glimobamental from Instability and plants of consideration decreases where the consideration for decreases where the consideration and constitution of the
Feni	33506555	Am J Sports Med	2021	repair versus 4% with open Latarjet procedure. In the military population with high levels of mandatary solving, phroob loave has sloven \$3.50 was associated with weese Western Critario Shoulder Instability somes, increasing amounts of sloneid bones loss was arredictive.
Shaha	15883168	Am J Sports Med	2015	of a worse functional outcome. In Su et. al's study, 42% patients who underwest recurrent arthroscopic remision arthroscopy had recurrent instability at 2.8 years after surgery. Presence of an Off-track lesion, age 422 years, and ligamentious
Su	80063594	1815	2018	lasity were independent predictors of recurrence. In Bolleau et als study, presence of gleroid bone loss an infector hypertaxity led to 75% recurrence rate. Patients with three subure anchors or fewer had higher risk for
Belleau	15582355	10.5	2006	recurrent instability.