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# Outcomes Following Thermal, Open, and Arthroscopic Glenohumeral Capsulorrhaphy for Recurrent Anterior Instability

NATA RESEARCH & EDUCATION FOUNDATION

## GRANT INFORMATION SUMMARY

### PRACTICAL SIGNIFICANCE

Arthroscopic repair of anterior shoulder instability resulted in rotator cuff strength, functional ability, and patient satisfaction outcomes superior to those of open and thermal repair when evaluated nearly 3 years post-surgery.

### STUDY BACKGROUND

Identification of the optimal treatment for anterior glenohumeral instability (AGHI) remains a challenge, with surgical repair having limited success, particularly among young athletes. While various clinical studies have advocated open, thermal, or arthroscopic glenohumeral capsulorrhaphy for recurrent AGHI, no single study has directly compared the postoperative outcomes of all three procedures.

### OBJECTIVE

To compare glenohumeral joint position sense, rotator cuff strength, functional ability, and level of satisfaction among patients undergoing thermal, open, and arthroscopic capsulorrhaphy to healthy, age-matched controls. A second objective was to examine the extent to which clinical measures of objective and subjective function predict surgical success.

### DESIGN AND SETTING

A retrospective, case-control study was conducted at the Sports Medicine Laboratory at Oregon State University. We utilized a repeated measures ANOVA design to compare the 4 independent group variables (Open, Thermal, Arthroscopic, and Control). The dependent measures used to measure outcome were passive joint position sense (JPS) and isokinetic strength testing of both limbs. A stepwise multiple regression analysis was conducted to predict shoulder function rated with Shoulder Rating Questionnaire (SRQ) and with American Shoulder and Elbow Surgeons (ASES) evaluation form.

### SUBJECTS

Seventy-three adults (44 men, 29 women; mean age  $23.7 \pm 6.8$  years) were categorized to 1 of 4 groups: Open ( $n = 21$ ), Thermal ( $n = 16$ ), Arthroscopic ( $n = 14$ ), and Controls ( $n = 22$ ). The involved and contralateral shoulders of surgical subjects were tested at  $32.1 \pm 24.8$  months postsurgery (range, 6 to 96 months).

### MEASUREMENTS

JPS quantified via passive reproduction of 60% and 90% of maximum passive external rotation (ERmax), as well as concentric internal (IR) and external rotation (ER) peak torque, were evaluated

at 90, 180 and 270o/sec with an isokinetic dynamometer. Objective postoperative function was quantified with the ASES, while functional status and patient satisfaction were assessed with the SRQ.

## RESULTS

Patients' surgical limb JPS was similar to their uninjured shoulders across all groups. The Open group demonstrated significantly better ( $P < .05$ ) involved-limb JPS acuity ( $4.2^\circ + 1.9Y$ ) than the Arthroscopic ( $6.8^\circ + 3.2Y$ ) and Control groups ( $6.6^\circ + 3.5Y$ ) (Figure 1). However, Open patients had 31% less IR strength than Controls and 33% less than Arthroscopic patients (Figure 2), with IR peak torques significantly less in their surgical versus uninvolved shoulders ( $P < .002$ ). Patients' level of pain and ASES scores were significant predictors of functional SRQ outcomes ( $R = .81$ ,  $P < .003$ ). Recurrent instability, defined as self reported sense of subluxation occurred in 14% of arthroscopic, 24% of open, and 25% of thermal capsulorrhaphy patients.

## CONCLUSIONS

Patients undergoing arthroscopic capsulorrhaphy had the lowest recurrence of AGHI. Significant internal rotation concentric strength deficits were demonstrated in patients undergoing open and thermal capsulorrhaphy. Objective clinical outcomes and level of pain were strong predictors of patient function and satisfaction after anterior glenohumeral capsulorrhaphy.

**Supporting and advancing the athletic training profession through research and education.**

## Publication and Presentation List:

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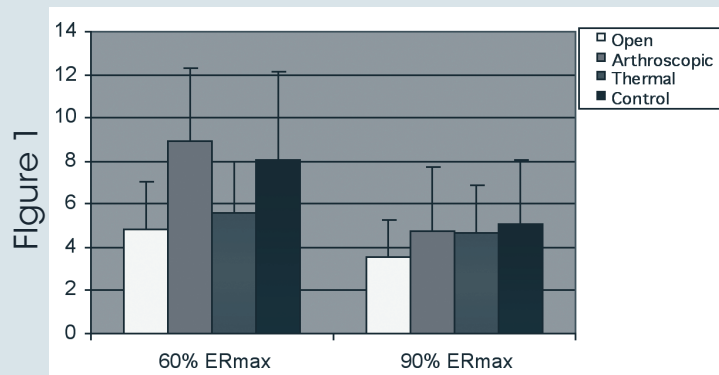


Figure 1. Joint position sense absolute error (mean + SD) at 60% and 90% of passive ERmax.

\* Open group had significantly less absolute error than Arthroscopic and Controls ( $P < .01$ ).

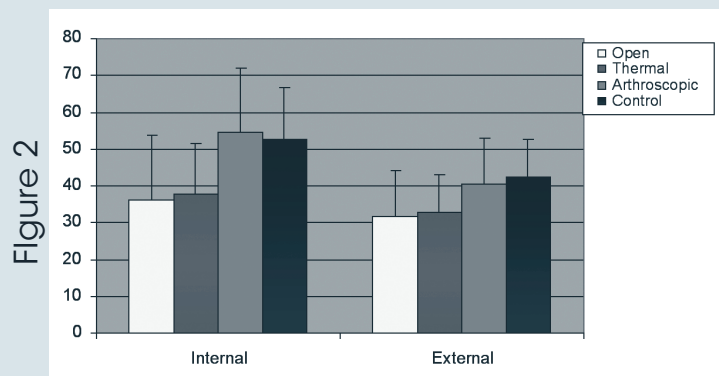


Figure 2. Mean concentric internal and external rotation strength across testing velocities, expressed in Nm of peak torque as a percentage of the subject's body mass (kg).

\* Open group had significantly less torque than Arthroscopic and Controls ( $P < .01$ ).

\*\* Open significantly less torque than Controls ( $P < .02$ ).



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Jeff Sullivan recently finished his doctoral degree in sports medicine at Oregon State University. He is currently an associate professor at Point Loma Nazarene University in San Diego, CA. In his ninth year as a certified athletic trainer, Jeff teaches in the athletic training education program and is an assistant athletic trainer.