Effect of Glenohumeral Abduction on Supraspinatus Repair Tension

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INTRODUCTION

Rotator cuff tears are common, rotator cuff repair aim to re-attach the torn tendon back to the humeral head thus restoring shoulder function and reduce pain. However the re-tear rate post rotator cuff repair is reported to be 11 - 94%[1-3]. Some surgeons insist the use of slings and abduction pillows (small or large) post-operatively to unload or protect the repair while others do not.

Aims:

1) determine what position the shoulder is placed in when wearing a sling with large abduction pillow, a sling with small abduction pillow, sling with no pillow and

2) in a cadaver rotator cuff repair model, evaluate the tension on the supraspinatus tendon at each of these shoulder positions, with the ultimate aim to,

3) determine which type of sling places the repaired rotator cuff in the best position to heal without re-tearing.

METHODS

A pilot x-ray study was performed on three healthy subjects using a x-ray fluoroscopy InSight (Hologic, Inc. Bedford, MA, USA) in true anterior-posterior (AP) view, to determine what position the shoulder is placed in when wearing a sling only (Donjoy Ultrasling II (DJO, Normanhurst, NSW, Australia)), sling with small abduction pillow (Donjoy Ultrasling II (DJO)) and sling with large abduction pillow (ProCare Shoulder Abduction Kit (DJO)).

RESULTS AND DISCUSSION

The sling with no abduction pillow placed the glenohumeral joint (GH) in 4° ± 1° (mean angle ± SEM) of abduction and 29° ± 4° internal rotation, a sling with small abduction placed the GH joint in 13° ± 2° abduction and 20° ± 1° internal rotation and a sling with large abduction pillow placed the GH joint in 25° ± 3° abduction and 11° ± 0° internal rotation.

Placing the human cadaveric shoulders in the position of a sling with small abduction pillow caused a reduction in tension on the supraspinatus of 27% anteriorly (p<0.05) and 55% posteriorly (p<0.006) compared to placing the shoulder in the position of a sling with no abduction pillow.
Placing the shoulder in the position of a sling with large abduction pillow caused a further reduction in tension on the supraspinatus of 42% anteriorly (p<0.0005) and 56% posteriorly (p<0.0001) compared to the small abduction pillow.

When the humerus was internally rotated from neutral to 30°, tension in the posterior suture was four times higher compared to tension in the anterior suture(P<0.0001).

**CONCLUSIONS**

Angles of abduction clinically produced by commonly used slings and abduction pillows are lower than originally suggested in the literature. Abduction of the glenohumeral joint following rotator cuff repair at angles consistent with wearing small and large abduction pillows reduced tension on the supraspinatus by approximately 27% to 56%.

**REFERENCES**

