

# PRIMARY BIOMECHANICAL STABILITY OF PATCH AUGMENTED DOUBLE-ROW ROTATOR CUFF REPAIR

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## Introduction

Primary stability is considered to be of major importance in rotator cuff repair. The strength of rotator cuff repair can be increased by augmentation with a collagen patch [Barber, 2008 and Santoni, 2010]. However, the influence of the applied patch fixation technique has so far been sparsely investigated. Therefore, the biomechanical properties of three different, arthroscopically manageable, techniques of patch augmentation were tested and compared to a non-augmented double-row repair.

## Methods

40 cadaver sheep shoulders underwent dissection of the infraspinatus-tendon from its insertion and were randomized into 4 groups (n=10/group). In all groups, the tendon was reinserted using the SpeedBridge™-technique. Group 1 served as the control group (no patch). Groups 2-4 were augmented using a xenologous dermis patch (DX Reinforcement Matrix). In group 2 the patch was “integrated” between the tendon and the double-row sutures. In group 3 the patch was stretched like a „cover“ over the rotator cuff by stitching it to the tendon medial of the medial row and tensioning it over the major tubercle with two extra anchors. In group 4 a „hybrid“ fixation was performed by using a medial row anchor suture for medial fixation and lateral fixation equal to group 3.

Using an Instron Structural Testing Setup (Figure 1), the tendons were preconditioned, cyclically loaded from 10 to 30N and load to failure was determined by incrementally increasing the load.



Figure 1: Setup in the Instron testing machine

## Results

The statistical analysis (Kruskal–Wallis/pairwise Wilcoxon-Tests) showed clear differences between the groups. Augmentation increased the load to failure significantly from 140.2N (SD 41.4; control group) to 225.8N (SD46.9; +61%) in group 3 „cover“ and 211.4N (SD 62.4; +50.7%) in group 4 „hybrid“ (p<0.05). No significant difference was found between the control group and group 2 with 101.6N (SD 32.4) as well as between group 3 and 4 (p>0.05).

## Conclusion

Patch augmentation of double-row SpeedBridge™ repair increases significantly the load to failure when the patch is fixed in the „cover“ or the „hybrid“ technique. The patch between the tendon and the fixation alone („integrated“) doesn't increase the strength of the repair. Surgeons have to consider not only patch choice, but patch augmentation technique as well, to ensure best possible primary stability.

## References

Barber *et al*, Arthroscopy, 24(1):20–24, 2008.  
Santoni *et al*, J Sports Med, 38(4), 2010.