> Am J Sports Med. 2005 Nov;33(11):1667-71. doi: 10.1177/0363546505278252.
Epub 2005 Aug 10.

Tendon-bone interface motion in transosseous suture and suture anchor rotator cuff repair techniques

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PMID: 16093532 DOI: 10.1177/0363546505278252

Abstract

Background: Although many studies involving rotator cuff repair fixation have focused on ultimate fixation strength and ability to restore the tendon's native footprint, no studies have characterized the stability of the repair with regard to motion between the tendon and repair site footprint.

Hypothesis: Suture anchor fixation for rotator cuff repair has greater interface motion between tendon and bone than does transosseous suture fixation.

Study design: Controlled laboratory study.

Methods: Twelve fresh-frozen human cadaveric shoulders were tested in a custom device to position the shoulder in internal and external rotations with simulated supraspinatus muscle loading. Tendon motion relative to the insertional footprint on the greater tuberosity was determined optically using a digital camera rigidly connected to the humerus, with the humerus positioned at 60 degrees of internal rotation and 60 degrees of external rotation. Testing was performed for the intact tendon, a complete supraspinatus tear, a suture anchor repair, and a transosseous tunnel repair.

Results: Difference in tendon-bone interface motion when compared with the intact tendon was 7.14 +/- 3.72 mm for the torn rotator cuff condition, 2.35 +/- 1.26 mm for the suture anchor repair, and 0.02 +/- 1.18 mm for the transosseous suture repair. The transosseous suture repair demonstrated significantly less motion when compared with the torn rotator cuff and suture anchor repair conditions ($P < .05$).

Conclusion: Transosseous suture repair compared with suture anchor repair demonstrated superior tendon fixation with reduced motion at the tendon-to-tuberosity interface.

Clinical relevance: Development of new fixation techniques for arthroscopic and open rotator cuff repairs should attempt to minimize interface motion of the tendon relative to the tuberosity.