Paper 20

Abstract Title:
Tape versus Suture - A Biomechanical and Clinical Analysis in Arthroscopic Rotator Cuff Repair of Large Tears

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Objectives: Clinical studies have shown that repairs of larger rotator cuff tears are less likely to re-tear than repairs of smaller and partial thickness tears. Clinical studies have also shown that rotator cuff repair with an arthroscopic tension band technique have a lower re-tear rate at six months and two years post-surgery compared to simple suture-anchor technique, probably due to higher compression at the tendon-bone interface (footprint). Advances in suture anchor systems have allowed a wider tape to be used for rotator cuff repairs. Therefore the aims of this study were 1) to determine if there is any biomechanical and/or clinical benefits of using fibertape versus #2 suture in arthroscopic repair of large full thickness rotator cuff tears.

Methods: Rotator cuff tears of the infraspinatus tendon were created in 16 ovine shoulders. The tendons were re-attached to the footprint using a tension band repair technique with two different types of sutures: 1) #2 suture (Fiberwire, Arthrex) or 2) tape (FiberTape, Arthrex) with an inverted mattress single row configuration using the same knotless anchor (Swivel-lock, Arthrex) system. Following repair, footprint contact pressure was measured with 10, 20, 30 N applied to the repaired tendon and at -10deg, 0deg, 10deg of abduction. Repair strength was determined by a pull-to-failure test. A retrospective analysis of prospectively assessed consecutive patients who underwent arthroscopic rotator cuff repair with full thickness tears larger than 1.5cm x 1cm by a single surgeon. There were 50 patients in the tape repair group and 100 patients in the suture repair group. Patients ranked pain and functional scores, shoulder strength and range of motion were recorded pre and post-operatively at one, six, 12 and six months. Ultrasound was used to evaluate the repair integrity at six months post-surgery.

Results: Rotator cuff repair using tape had higher footprint contact pressure (0.33MPa ± 0.03MPa vs 0.11MPa ± 0.3MPa, p<0.0001, mean ± SEM) compared to repair with #2 sutures at 0° abduction with a 30 N load applied across the repaired tendon. Ultimate failure load of tape repair was higher than suture repair (217 ± 28 N vs 144 ± 14 N, p < 0.05). Clinical data showed both group reported significantly lower frequency and magnitude of pain during overhead activity and sleep at six months compared to pre-surgery levels (p<0.001). At six months post-surgery the suture repair group had better internal rotation (+3 vertebral levels) and external rotation (+18deg) compared to the tape repair group (p<0.001). Both groups had similar shoulder strength at six months. The re-tear rate was similar between the tape group (16%) (8/ 50) and the suture group (17%) (17/100).

Conclusion: The biomechanical study showed that rotator cuff tears repaired with inverted mattress knotless single row constructs with tape increased the tendon-bone footprint compression three fold...
and the construct strength 1.5 fold compared to repairs performed with suture. The biomechanical advantages of tape did not, however, translate to clinical benefits with both constructs resulting in relatively good healing rates in patients with large cuff tears. Patients repaired with tape, however, were stiffer in internal and external shoulder rotation at six months.