A comparison of the outcomes of partial- versus full-thickness rotator cuff tear repair in humans

INTRODUCTION:
Symptomatic partial thickness rotator cuff tears are common and are usually repaired if the tear involves 50% or more of the tendon thickness. The outcomes from repair of partial thickness rotator cuff tears are, however, for the most part, unknown. Our impression was that they heal in a more aggressive fashion than full thickness tears following repair - with more stiffness but fewer re-tears. The aim of this study was to test this hypothesis.

METHODS:
Of 435 consecutive arthroscopic rotator cuff repairs, 150 met the inclusion criteria for this study. One hundred had a full thickness tear measuring less than 4 cm² (full thickness group) and 50 had a partial thickness tear (partial thickness group). All tears were repaired using a knotless single row "tension band" arthroscopic repair (OPUS Magnum-2, Arthrocare Corporation). American Shoulder and Elbow Surgeons (ASES) scores and standardized patient- and examiner-determined outcomes were obtained pre-operatively and at 6, 12 and 24 weeks, and 2 years post surgery. Rotator cuff integrity was determined at 6 months and 2 years post surgery by ultrasound.

Outcome scores were analyzed using paired and un-paired Student's t-tests. Differences in re-tear and stiffness rates were analyzed using Chi-square and Fisher Exact tests. The study was approved by the local institutional review board.

RESULTS:
The ASES score, patient determined overall shoulder function and pain scores were superior to pre-operative scores at 6 months (p<0.001) and at 24 months (p<0.001) in both groups with no significant differences between the groups (figure 1). Examiner determined post-operative stiffness at 6 weeks was common in both groups (50% in partial thickness, 47% in full thickness group) but decreased to 21% and 19% (p<0.01) at 3 months and 15% and 14% at 6 months (figure 2). Patient determined shoulder stiffness showed a similar increase at 6 weeks and subsequent decrease in the following months with no significant differences between the two groups (figure 2).

The ultrasound determined re-tear rate was small (2% in the partial thickness group and 5% in the full thickness group; p=0.6) at 6 months increasing to 11% and 22% (p=0.3) at 24 months (figure 4). The re-tear rate increased significantly from 6 months to 24 months in the full thickness group (p=0.05, figure 4). Revision surgery for a re-tear was required in 5 patients (3 in full thickness group and 2 in partial thickness group).

DISCUSSION:
To our knowledge this is the first study to compare the clinical outcomes and re-tear rates of repair of partial thickness rotator cuff tears with repair of similar sized full thickness tears. Arthroscopic repair of partial thickness rotator cuff tears was associated with excellent medium term clinical outcomes with low re-tear rates. The data did not support our hypothesis: the outcomes of repairs of partial thickness tears were similar to the outcomes of repairs of full thickness tears measuring less than 4 cm² with no significant differences in re-tear rate or post-operative stiffness rate between the two groups. Interestingly, there was a deterioration in cuff integrity between 6 months and 24 months in the full thickness repair group.

Figure 1. Shoulder Function following arthroscopic repair of full thickness vs partial thickness rotator cuff tears (mean and SEM, n=100 and n=50 respectively). The ASES score was superior to pre-operative scores at 6 months (p<0.001) and at 24 months (p<0.001) in both groups with no significant differences between the groups.

Figure 2. Examiner determined shoulder stiffness following repair of full or partial thickness rotator cuff tears. Shoulder stiffness was defined as forward flexion<110° or external rotation<25° or internal rotation>31. No significant differences between the groups.

Figure 3. Patient determined shoulder stiffness following repair of full or partial thickness rotator cuff tears (mean and SEM). No significant differences between the groups.

Figure 4. Rotator cuff integrity following arthroscopic repair of full thickness vs partial thickness rotator cuff tears determined at 6 months and 24 months post-surgery by ultrasound (n=91 and n=49 respectively at 6 months; n=54 and n=28 respectively at 24 months). No significant differences between the groups. Significant increase in re-tear rate from 6 months to 24 months in the full thickness group (**p<0.05)