significant differences with lower scores for the WC group (61.9 ± 18.5 vs 66.5 ± 16.3 p = 0.01). However, the WC group has a significantly inferior complete retear rate at week 12 (1.7% vs 5.8%) and at week 26 (1.7% vs 7.8% p < 0.05). No differences in retear rate were found at week 6. Conclusion: These results demonstrate that WC patients are on average 6 years younger than non-WC patients, suggesting that manual labour is a substantial contributing factor to RCTs. WC patients have lower outcomes, at week 12 and at week 26 compared with non-WC patients. However, paradoxically, our study showed that WC patients have better healing with inferior retear rates and therefore, it is speculated, that a better long-term prognosis. Better healing may be in part because they are reluctant to push their rehabilitation due to greater pain, and their younger age. Short-term clinical outcomes of WC patients have worse results than those who don’t have a WC claim. This result is helpful in the counseling of these patients and the formation of rehabilitation plans.

Category: Shoulder - Rotator Cuff

Severe Attrition and Poor Satisfaction in Patients Undergoing Tele-Rehabilitation Versus Standard In-Office Rehabilitation After Arthroscopic Rotator Cuff Repair and ACL Reconstructions: Randomized Controlled Trials that Required Cessation

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Summary:
Though overall satisfaction with both modalities was high, patients preferred in-person rehabilitation to telehabilitation after undergoing ACLR and ARCR as evidenced by nearly ubiquitous crossover from telehabilitation to in-person rehabilitation in both studies.

Data:
BACKGROUND: The use of telehabilitation after sports medicine procedures such as arthroscopic rotator cuff repair (ARCR) and anterior cruciate ligament reconstruction (ACLR) has rapidly increased in recent years; however, functional outcomes and patient satisfaction after telehabilitation compared to in-person rehabilitation remain unclear. We hypothesized that functional outcomes and patient satisfaction would not differ significantly between the rehabilitation modalities. METHODS: Two separate randomized-controlled trials were conducted involving patients scheduled to undergo ARCR or ACLR by one of six fellowship-trained sports medicine surgeons between October 2020 and November 2021. Initially 60 patients were included in each arm of the trial. Patients were randomized to receive telehabilitation or in-person rehabilitation for their post-operative course. International Knee Documentation Committee Subjective Knee Form (IKDC) scores (for ACLR), the American Shoulder & Elbow Surgeons (ASES) score (for ARCR), and satisfaction metrics were collected at timepoints of baseline and at each post-operative visit. Baseline characteristics and outcomes between the in-person and telehabilitation arms of each cohort were compared using Mann-Whitney U-test for continuous variables and Fisher’s exact test for categorical variables. P-values less than 0.05 were considered significant. RESULTS: In total, 16 ACLR patients were enrolled, of whom 10 (62.5%) were assigned to in-person rehabilitation and 6 (37.5%) to telehabilitation. Additionally, 32 ARCR patients were enrolled of whom 20 (62.5%) were assigned to in-person rehabilitation and 12 (37.5%) were assigned to telehabilitation. In both trials combined, of the 30 patients initially assigned to in-person rehabilitation, 24 (80%) completed the final follow-up survey and none reported crossover to telehabilitation. Of the 18 patients initially assigned to telehabilitation, 12 (67%) completed the final follow-up survey. Of these 12 patients, 11 (92%) reported crossover; 9 patients completed in-person rehabilitation and 2 patients completed hybrid in-person and tele-rehabilitation. CONCLUSIONS: Though overall satisfaction with both modalities was high, patients preferred in-person rehabilitation to telehabilitation after undergoing ACLR and ARCR as evidenced by nearly ubiquitous crossover from telehabilitation to in-person rehabilitation in both studies. However, a hybrid model combining in-person and tele-visits may be acceptable to most patients. This study provides evidence that patients exhibit a strong preference for in-person rehabilitation programs versus telehabilitation programs after ACLR and ARCR procedures. However, feedback from patients suggests that most would be amenable to a hybrid model combining both modalities, although further exploration is needed.

Category: Shoulder - Rotator Cuff

Improving Tendon-To-Bone Healing by Tendon Inversion: Using a Rat Biceps Tenodesis Model

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Summary:
This animal study observes the effect of ‘inverse tubularization’ on tendon-to-bone healing in a rat biceps tenodesis model, demonstrating improved healing in the experimental group via 1) an increased pull-out strength with biomechanical testing and 2) increased direct fascicular healing to bone on histology.

Data:
Introduction: Tendon-to-bone repair (surgical tenodesis) is an imperfect science. Bone tunnel tenodesis is at risk for graft pull-out, re-rupture, and tunnel widening. In this study, we hypothesized that inside-out tendon inversion, whereby the epitendon is longitudinally incised and inverted, may improve bone tunnel healing by obviating epitenodous lubrication interference at the tendon-bone interface. Tendon inversion also permits exposure of intra-tendinous fascicles to the healing interface, which may improve healing strength by enabling direct fascicular healing against the bone tunnel walls. Methods: 40 adult Sprague-Dawley rats underwent suprachondral long head of biceps (LHB) tenodesis of the shoulder. 20 underwent tendon inversion (inversion group) and 20 did not (control group). The tendon is fixed by suspension fixation in a bicortical bone tunnel using a 1.6mm microvascular clip. All animals were permitted ad lib cage activity until 8-week sacrifice. 14 animals from each group underwent biomechanical testing, and 6 underwent paraffin embedding for histology and immunohistochemistry. Biomechanics: All specimens were frozen in -80C for one freeze-thaw cycle prior to specimen preparation for biomechanical testing. Musculature was removed from an otherwise intact humerus except for the tenodesed LHB. The humerus was potted in 1 inch copper tubing with Bondo. Specimens were kept moist at all times using 1x phosphate buffered saline. The tendon was mounted in a 320-grit sandpaper sandwich with Kraay Glue. The specimens were mounted in an Instron 8872 materials testing system (Instron, Norwood, MA) with a 50N load cell for pull-tofailure testing. All specimens were preloaded to 1N prior to initiation of testing. Peak failure forces are recorded and averaged. Failure mode was recorded. Results: All 40 animals successfully underwent surgery. There were no surgical complications. For biomechanical testing, it was apparent on specimen preparation that two tendon inversion specimens had an early tendon failure leading to a popeye deformity. One control group specimen had uncharacteristic adhesion formation to the pectoralis insertion which interfered with failure testing. These three specimens were excluded from analysis. Biomechanics: The inversion group demonstrated a failure force of 10.97±2.90 N, versus control at 8.61±1.76N (p=0.0247). Interestingly, by failure mode, there were 5 tendon pullouts in the inversion group, versus 2 tendon pullouts in the control group, as opposed to surface or subsurface failures, though this difference was not statistically significant by Chi-square testing (p=0.14). Histology and immunohistochemistry: H&E histology demonstrated evidence of direct intra-tendinous fascicular healing against the bone tunnel walls, with evidence of formation of Sharpey fibers, mechanically oriented fibril insertion into bone, andPossible layered transitional tissues reminiscent of native entheses. Conclusions: Using a rat biceps tenodesis model, we have demonstrated that longitudinal, inside-out tendon inversion (inverse tubularization) may improve tendon-to-bone healing in a bone tunnel. This work may inform future improvements in surgical techniques for tendon-to-bone fixation.