A study was performed for monitoring scapular kinematics in patients with rotator cuff tears (RCT) and scheduled for arthroscopic repair. The 3D scapular kinematics was measured by using an acromion marker cluster both on the healthy and pathologic side during arm elevation. Patients with RCT exhibit scapular dyskinesia with decreased humeral elevation and increased scapular internal rotation.

Data:
BACKGROUND Monitoring scapular movements is valuable in managing patients with abnormal scapular motion patterns, such as those suffering from rotator cuff tears (RCT). Measuring scapular kinematics is challenging due to the sliding nature of the scapula over the thorax and the complex variation in its orientation during movements. Among the methods proposed in the literature for monitoring scapular kinematics is the acromion marker cluster (AMC) method. The AMC overcomes the high level of invasiveness of the method using bone pin insertion, considered the gold standard. AIMS To compare the scapular kinematics of the pathologic side of patients with RCT and scheduled for arthroscopic repair vs. the healthy side before surgery. METHODS An L-shaped AMC consisting of three photo-reflective markers was placed on the flat portion of the acromion, with the long side along the scapular spine and the short side pointing anteriorly to the scapular plane. Through a static calibration procedure, a relationship is defined between the anatomical scapular landmarks and the markers on the cluster to follow dynamically scapular kinematics. Enrolled patients were asked to perform bilateral elevations and lowering in the frontal, scapular, and sagittal planes at a self-selected speed. Patients repeated the movements five times in each trial, but only the central three repetitions were selected for subsequent analysis. Kinematic analysis was performed in Visual 3D software after pre-processing markers trajectories acquired with the Qualisys™ stereophotogrammetric system. The following kinematic variables were calculated: humerothoracic elevations, scapular internal-external rotation, medial-lateral rotation, and anterior-posterior tilt at 30°, 45°, 60°, and 90° of humeral elevation. Statistical analysis was executed in SPSS v28. The nonparametric Wilcoxon rank-sum test was applied as a statistical method (p-value < 0.05). RESULTS: In the sagittal plane, the maximum arm elevation was 112.04° (range: 76.42°–143.29°) for the healthy side and 98.56° (range: 20.89°–133.66°) for the pathologic side. In the scapular plane, the maximum mean arm elevation was 93.94° (range: 77.96°–113.20°) for the healthy side and 87.48° (range: 8.92°–114.17°) for the pathologic side. In the frontal plane, the maximum mean arm elevation was 102.14° (range: 89.10°–117.00°) for the healthy side and 86.07° (range: 21.86°–112.61°) for the pathologic side. At the maximum humeral elevation in the sagittal plane, the mean scapular upward rotation, internal rotation, and posterior tilting were 32.58°±8.60°, 13.50°±8.46°, and 10.92°±9.16° for the healthy side, and 32.63°±11.63°, 17.05°±11.01°, and 9.46°±10.23° for the pathologic side. No significant differences were observed in scapular kinematics at 30°, 45°, 60°, and 90° of humeral elevation. DISCUSSION In this study, the 3D scapular kinematics was evaluated between shoulders with RCT and the contralateral healthy shoulders. According to our study, before treatment, comparable or increased scapular motions in the affected shoulders with respect to the contralateral healthy side may result from adaptive movements of the pathologic side to maintain humeral elevation. Patients with RCT exhibit scapular dyskinesia with decreased humeral elevation and increased scapular internal rotation.

Category: Shoulder - Rotator Cuff

Histopathological and Biomechanical Comparison of Patellar Tendon and Tensor Fascia Lata Autografts in Superior Capsular Reconstruction Surgery

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Summary: Based on the histopathological and biomechanical results in our controlled experimental study, it has been shown that the patellar tendon autograft applied in superior capsular reconstruction surgery is as successful as the tensor fascia lata autograft.

Data: Patients with irreparable rotator cuff tears today constitute one of the challenging patient groups encountered in the outpatient clinic for shoulder surgeons. Superior capsular reconstruction (SCR), defined by Mihata in 2012, is a surgical procedure to restore shoulder stability in irreparable rotator cuff tears. According to the common view in the literature, the most important reason for graft rupture, which is the most important complication of SCR surgery, is insufficient integration of the graft to the bone attachment sites. There are studies in the literature on appropriate graft selection. Dermal allografts, synthetic grafts and fascia lata autografts can be used. Patellar tendon graft (PT) is one of the most commonly used grafts in anterior cruciate ligament reconstruction surgery. Our aim of the study is to compare PT autograft and Fascia lata autograft (FL) histopathologically and biomechanically in SCR surgery. Our hypothesis is that PT graft is as effective a graft choice as FL. Our study is the first in the literature to show that the patellar tendon is an option that can be applied in SCR surgery.

Method: Twelve rabbits with irreparable retracted rotator cuff tears in both shoulders and 4 rabbits without surgical intervention were included in the study as a control group. First, a 1 cm rotator cuff defect was created on both shoulders of 12 rabbits. Six weeks after the first surgery, the SCR procedure was applied to the right shoulders of 12 rabbits with TFL taken from the same side and to the left shoulder with PT autograft taken from the same side. No surgical intervention was applied to 4 rabbits in the control group. Following sacrifice after 6 weeks of follow-up, all shoulders were investigated for histopathological (4 control, 4 TFL-4 PT) recovery and tested for biomechanical (4 control, 8 TFL, 8 PT) evaluation. Watkins scoring for macroscopic recovery and H-SCORE scoring for immunohistochemical evaluation were used. Results: In the histopathological evaluation, the PT group showed higher cellularity (p=0.02), vascularity (p=0.01), collagen continuity (p=0.14), and total Watkins score (p=0.001) compared to the TFL group. Immunohistochemical analysis of tissues for CDS1 showed that PT had significantly higher reactivity compared to other groups (P=0.014). Immunohistochemical analysis of tissues for collagen types showed that PT tendons had significantly higher reactivity to collagen type I and type III than other groups (P=0.019 and 0.015). In the biomechanical evaluation, although the mean tensile strength (138.13 ± 19.38) in the PT group was higher than the mean tensile strength (136.56 ± 23.34) in the TFL group, no statistical difference was found (p>0.05). Conclusion: Based on the histopathological and biomechanical results in our controlled experimental study, it has been shown that the PT autograft applied in SCR surgery is as successful as the TFL autograft. The SCR treatment method with PT was described in the literature for the first time in a controlled study.

Category: Shoulder - Rotator Cuff

Impact of Rotator Cuff Tendon Thickness on Functional Outcomes after Arthroscopic Repair - A 2-Year Follow Up Study on Small-Medium Sized Tears in Elderly Patients

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Summary: Arthroscopic cuff repairs result in excellent clinical outcomes for small to medium sized tears in elderly patients aged 65 and above, with clinically important improvements in VAS, CMS, UCLA and OSS scores seen at 1 year post-operatively. Contrary to our hypothesis, tendon thickness did not appear to have any effect on clinical outcomes at 2 years post-operatively.

Data: Introduction Previous studies on rotator cuff tears have examined both clinical and radiographic parameters which may influence post-operative clinical outcomes. While rotator cuff tears are frequently classified by size (small, medium, large or massive) or depth (partial or full-thickness cuff tears), there is currently no literature available examining the objective thickness of the rotator cuff.