Abstracts

Preoperative Lateral Tibial Plateau Translation on MRI is Associated with Measured Laxity at One Year Following ACLR

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Summary:
Lateral tibial plateau translation on MRI is associated with measured laxity at one year following ACLR.

Data:
Introduction: Preoperative lateral tibial plateau translation (ATT) as measured on MRI has been shown to be predictive of anterior cruciate ligament (ACL) rupture and is correlated with high grade rotatory laxity in ACL deficient knees. Postoperative laxity following ACL reconstruction (ACLR) has also been shown to predict re-rupture and return to sports rates, and can be assessed objectively using the GNRB® arthrometer. To date, the relationship between ATT and postoperative laxity has not been established, and this study therefore investigated the relationship between laxity as measured on GNRB® and ATT at one year post ACLR. Methods: A retrospective analysis was conducted of 172 patients who had undergone both high resolution standardised protocol 3T MRI scan and completed GNRB® laxity testing at one year following ACLR. The measured variables were ATT in millimetres (mm) on MRI, and maximum anterior displacement of the tibia (TD, also in mm) at 200N of force using the GNRB® machine. Analysis was carried out with SPSS version 28 with descriptive statistics to calculate means, standard deviations (SD) and range. Independent samples t-test was used to compare means between two cohorts of ATT determined by the post hoc cut off, and linear regression to investigate correlation between ATT and TD. Significance was set at p<.05. Results: Mean ATT was 3.9mm (SD 2.4, range 0 – 12), and mean TD was 8.5mm (SD 2.2, range 4 – 15). To allow comparison between two cohorts of ATT, a cut off was set at 4mm which was in keeping with both median and mean values for our cohort and available literature on ATT. There was a significant difference (p<0.001) when comparing TD between the cohort with ATT less than 4mm and those greater or equal to 4mm (n=85 vs n=87, mean TD 7.9mm vs 9.1mm respectively). ATT and TD were found to be weakly correlated (r = 0.4, p<0.01). Discussion and Conclusion: ATT of greater than 4mm measured on MRI scan at 1 year post ACLR was predictive of increased laxity. Our findings support the use of this measure as a generalisable and easily accessible tool to identify patients with residual laxity post ACLR who may be at increased risk of re-rupture and poorer outcomes. This is the first study to investigate ATT as a surrogate measure of objective laxity following ACLR.

Category: Knee - Other

Does The Soaking Of Hamstrings Tendon Autograft With Vancomycin Reduce The Contamination During Harvesting and Manipulation? A Prospective Randomized Clinical Trial

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Summary:
We propose soaking the graft in vancomycin in order to prevent the patients from septic arthritis after ACL reconstruction.

Data:
Purpose: Septic arthritis after ACL reconstruction is a devastating complication. In recent years, graft soaking with Vancomycin has been proposed as a solution to eliminate this complication. The purpose of the present study is to access how the vancomycin solution protects the hamstring autograft during harvesting and preparation. Material and Methods: The study material consisted of 40 patients operated on for ACL reconstruction with a hamstring tendon autograft. In 20 patients the graft was soaked in vancomycin (Group A) while in 20 (Group B) the graft was not soaked in vancomycin. We used strict criteria for this study; all patients were operated from the same surgeon, with the same technique, the same way of tendon harvesting and preparation. Only patient with isolated ACL reconstruction were included in this study. In all the patients we calculated the time of graft harvesting, and the total time of surgery. In all patients we used the same antibiotic for infection prevention (1 dose prior and two doses after the operation). After fixation of the graft to the tibia with an interference screw and a staple, the rest of the tissue was sent for culture. All the cultures were incubated in 37°C with 5% CO2 in agar plates for 5 days and inspected daily for microbial growth. Any bacterial growth and the number of colony forming were reported. Results: There was no statistical difference in harvesting time and total operation time between the 2 groups. On the other hand 11 patients (60%) in group B were positive while no patient in Group A was positive. This difference was statistically significant (p<0.01). All cultures were positive for the same microorganism, coagulase-negative staphylococcus (CNS). Thus soaking the graft with vancomycin protects the infection during harvesting and preparation of the graft. Conclusions: In this series hamstring tendons autograft harvesting and preparation leads to bacterial contamination in 60% of the cases. On the other hand there is no contamination after soaking the graft with vancomycin. On the basis of this study we propose soaking the graft in vancomycin in order to prevent the patients from septic arthritis after ACL reconstruction.

Category: Knee - Other

Rates of Septic Arthritis after ACL Reconstruction: A Large Single System Analysis

Abstract ID# 23255
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Summary:
In a large cohort of 6,741 patients, ACL reconstruction with quadriceps tendon yielded a significantly lower rate of septic arthritis than hamstring tendon (0.10% vs 0.72%, respectively, providing useful information for patients and surgeons when counseling on infection risk during ACL reconstruction.

Data:
Introduction: Septic arthritis is a rare but catastrophic complication after anterior cruciate ligament reconstruction (ACLR). Although the infection rates for bone-patella tendon-bone autograft (BTB), hamstring tendon autograft (HT) and allograft have been reported previously, there is limited data available for large cohorts of quadriceps tendon autograft (QT). The aim of this study is to compare rates of septic arthritis after primary and revision ACLR with QT, BTB, HT, and allograft. Methods: All ACLR cases performed by 10 high-volume sports medicine fellowship-trained ACL surgeons between January 2000 and January 2022 were retrospectively analyzed. Minimum follow-up was 90 days after ACLR, and all multi-ligament reconstructions were excluded. Demographic information,
surgical variables, infection characteristics and incidence of ACL graft retention were collected for all included patients. Post-operative septic arthritis was defined by at least 1 of the following criteria: purulent drainage from a deep incision, knee joint aspiration suggestive of a bacterial infection, culture-positive aspiration, or positive physical examination findings consistent with septic arthritis. The Mann-Whitney U test was used for group comparisons for nonparametric values or where normality assumption was violated. Depending on the sample, the chi-square test or Fisher exact test (n < 5) was used to analyze discrete variables. Results: 6,741 patients were included in this study. The most commonly used graft was allograft (n = 2,510, 37.2%), followed by HT (n = 1,784, 26.5%), BTB (n = 1,488, 22.1%), and QT (n = 959, 14.2%) autografts. The overall post-operative infection rate was 0.34% (n = 23). Infection rates based on graft type were 0.72% for HT autograft, 0.23% for allograft, 0.20% for BTB autograft, and 0.10% for QT autograft. A statistically significant difference in infection rate was observed between QT and HT autografts (p < 0.05), but not between QT and BTB autografts or QT and allograft (p > 0.05 for both). All grafts were retained during irrigation and debridement treatment. The mean time from the index surgery to the onset of symptoms was 29 days (min: 5, max: 69). Staphylococcus aureus (n = 2) and Enterococcus faecalis (n = 2) were the most common bacterial pathogens in culture-positive septic arthritis cases (n = 10, 43.4% of all infection patients). Conclusion: Septic arthritis was detected at an overall rate of 0.34% after ACLR, with the highest rate being observed after the use of HT autograft (0.73%). QT autograft (0.1%) was found to have the lowest infection rate of all graft types, and was significantly lower than HT autograft. Surgeons can utilize this information when counseling patients on the risks of graft options for ACLR and determining ideal graft choice.

Category: Knee - Other

Anterolateral and Direct Lateral Tunnel: Two Safe Zones for Femoral Tunnel Drilling in All-Epiphyseal Anterior Cruciate Ligament Reconstruction – A Digital Three-Dimensional MRI Simulation Model Study

Abstract ID# 22935

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Summary: Anterior Cruciate Ligament (ACL) all-epiphyseal technique aims to avoid the distal femoral physis, nevertheless other adjacent structures could be at risk. This 3D MRI model study identified two safe zones for the femoral tunnel drilling during this technique in patients with open growth plates. The anterolateral (AL) direction showed a larger safe area and longer drilling length. Data: Purpose Damage to the distal femoral physis (DFP) should be minimized during Anterior Cruciate Ligament (ACL) reconstructions in patients with open growth plates. All-epiphyseal technique aims to avoid the DFP, nevertheless, other adjacent structures such as the articular surface, the lateral collateral ligament (LCL), the anterolateral ligament (ALL), and the popliteus tendon (PT) could be at risk. Current knowledge about safe zones and ideal tunnel orientation is limited. The objective of this study was to investigate the safe zones for femoral tunnel drilling in all-epiphyseal ACL reconstructions and its relation with at-risk structures. Methods Eighty magnetic resonance images (MRI) from patients aged 10 to 17 were obtained and randomly sampled from the institutional database, with a homogeneous distribution of age and sex. A de novo software was developed to obtain three-dimensional (3D) models of the distal femur and DFP. In each model, the femoral footprints of the ACL, LCL, ALL, and PT were identified, as established in cadaveric and imaging studies by previous authors. Drillings were simulated using 7-, and 8-mm drills, starting from the ACL femoral insertion at every possible angle within a 90° cone. Safe zones were defined as the direction in which neither the DFP, LCL, ALL, PT nor articular surface were violated. The segmentation, measurement, and statistical analysis were developed in MATLAB software. Statistical analysis was conducted using Student’s t-test, one-way ANOVA, and simple linear regression. Statistical significance p < 0.05. Results A total of 52 knees with open DFP were obtained, median age 13 (IQR 10-17), 59.6% men. Two safe zones were found: an Anterolateral (AL) and a Direct Lateral (DL) direction. For both 7- and 8-mm tunnels, the AL orientation had a larger safe area and a longer drilling length than the DL (p < 0.01). The mean safe area of the AL direction for the 7- and 8-mm tunnels were 408 y 384 mm2 respectively (p < 0.05). The mean safe area of the DL orientation for the 7- and 8-mm tunnels were 236 y 219 mm2 respectively (p < 0.05). The mean length for the AL direction was 34.2 mm and for the DL was 27.4 mm (p < 0.05). There were no statistical differences between sex or age. Conclusions This 3D MRI simulation model study identified two safe zones for the femoral tunnel drilling during the all-epiphyseal ACL reconstruction technique in patients with open growth plates. The AL direction showed a larger safe area and longer tunnel length. Category: Knee - Other

BMAC Augmentation of Allograft Anterior Cruciate Ligament Reconstruction Improves Patient Reported Outcomes in the Presence of Intra-Articular Pathology

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Summary: Amongst patients with concurrent meniscus and/or cartilage lesions, patients with BMAC had an 8-point higher mean IKDC score than controls at 9 months postoperatively; however, there was no difference in mean IKDC score between BMAC and control groups if no concurrent pathology was present. Data: Background: A randomized control trial demonstrated evidence of earlier graft remodeling and improved 9-month International Knee Documentation Committee (IKDC) scores when anterior cruciate ligament reconstruction (ACL/R) with bone-tendon-bone allograft was augmented with an intra-graft injection of bone marrow aspirate concentrate (BMAC). While these results are promising, the mechanism by which BMAC may affect patient reported outcome measures (PROMs) following ACLR is unclear. Methods: This was a sub-analysis of patients enrolled to date in an IRB-approved, double-blinded, randomized control trial comparing patients undergoing ACLR with BTB allograft ± BMAC. Only patients who had completed at least 9 months follow-up were included. Patients were stratified by 1) treatment arm (BMAC versus control) and 2) presence of concurrent meniscus or cartilage pathology, as noted on diagnostic arthroscopy. The primary outcome was the Tegner activity scale and International Knee Documentation Committee (IKDC) at 9 months. A secondary sub-analysis assessed differences in MRI characteristics (signal intensity ratio [SIR]) across the control groups if no concurrent meniscus pathology was present. Results: There were no statistical differences between sex or age. Statistical analysis assessed differences in MRI characteristics (signal intensity ratio [SIR]) across the control groups if no concurrent meniscus pathology was present. There were no statistical differences between sex or age. Statistical analysis assessed differences in MRI characteristics (signal intensity ratio [SIR]) across the control groups if no concurrent meniscus pathology was present.