Category: Knee - ACL

Prevalence and Severity Of Anterior Knee Symptoms after ACL Reconstruction Using BTB Autograft vs BTB Allograft

Abstract ID# 22130
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Summary:
While BTB autograft is a commonly cited risk for anterior knee pain after ACL reconstruction compared to allograft, our study found that graft option did not significantly influence Kujala score or specific limitations related to anterior knee pain at 1 year after surgery. Data:
Background: Anterior cruciate ligament (ACL) reconstruction is one of the most commonly performed procedures in sports medicine, yet continued controversy exists with regard to optimal graft options. Patellar tendon (BTB) autograft has been associated with increased risk for anterior knee pain, however the severity of symptoms and limitation in function associated with this have not been quantified.

Therefore our aim was to quantify the presence and severity of anterior knee symptoms, comparing knees undergoing BTB autograft vs BTB allograft, and identify risk factors for increased symptoms. Methods: Patients who underwent ACL reconstruction with BTB autograft or BTB allograft by a single surgeon were prospectively enrolled and assessed at 1 year followup using the Kujala score, a validated measurement of patellofemoral symptoms. Kujala scores reported at 1 year were compared between groups using the Mann Whitney U test. Frequency of those reporting limitations in function specific to the anterior knee (pain with stairs, squatting, and prolonged sitting with the knees flexed), were reported and compared using two proportion z-test. Stepwise multiple regression analysis was performed to assess the role of risk factors identified at the time of surgery (graft type, age, BMI, and Outerbridge score of the patella and trochlea) on Kujala scores at 1 year followup. Results: 154 (86F, 68M) were included in this study (mean age: 33.4 +/- 13.4). 91 patients underwent BTB autograft, while 63 patients underwent BTB allograft. At 1 year followup, patients with autograft BTB had a higher Kujala score (94.4 +/- 6.5 vs 90.1 +/- 11.5, p = 0.039). 13.2% of autograft patients and 19.0% of allograft patients reported at least some difficulty with stairs at 1 year (p = 0.324), whereas 16.4% and 25.4% reported some difficulty with squatting (p = 0.175). 23.1% of patients with autograft and 17.4% of allograft patients reported pain with prolonged sitting (p = 0.398). Stepwise multiple regression analysis demonstrated an independent negative relationship on Kujala score with older age at the time of surgery and increased Outerbridge score on the trochlea. Conclusion: While BTB autograft is a commonly cited risk for anterior knee pain after ACL reconstruction, our study found that graft option did not significantly influence Kujala score or specific limitations related to anterior knee pain at 1 year after surgery. However, older age and greater severity of chondral defects on the trochlea at the time of surgery were found to increase the severity of anterior knee symptoms. Further study is needed to better understand the morbidity related to graft options and identify those at risk in patients undergoing ACL reconstruction.

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Mid-Term Follow-up of the STABILITY Study Multicenter RCT Comparing Anterior Cruciate Ligament Reconstruction With and Without Lateral Extra-Articular Tenodesis in Individuals at High Risk of Graft Failure

Abstract ID# 22196
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Summary:
Preliminary results of the STABILITY long-term follow-up suggest differences in graft failure rates persist longer than two years postoperative in favour of the added LET, with no negative influence on patient-reported outcome measures, or range of motion. Data:
Background: Studies have shown high ACL re-tear rates in patients returning to pivoting sports after ACL reconstruction (ACLR). The STABILITY study was a prospective, multicenter randomized clinical trial (RCT) comparing hamstring tendon (HT) autograft ACLR with or without a lateral extra-articular tenodesis (LET) that showed a significant reduction in graft failure rates with the addition of LET at two years postoperatively. Objective: The purpose of this study was to conduct a mid-term follow-up (three, five and seven years postoperative) of patients involved in the STABILITY study at the Fowler Kennedy Sport Medicine Clinic (FKSMC) in London, Ontario, to determine if differences between the surgical groups persisted beyond two years. Methods: Of the 196 participants at the FKSMC, 82 (42%) participated in this mid-term follow-up. Patients completed patient-reported outcome measures (PROMs) including the ACL Quality of Life Questionnaire (ACL-QOL), Knee Injury and Osteoarthritis Outcome Score (KOOS), International Knee Documentation Committee Subjective Knee Form (IKDC), and Marx Activity Rating Scale (MARS). Adverse events and range of motion (ROM) measurements were recorded, and objective knee function was assessed by a surgeon. The primary composite outcome of clinical failure (asymmetric pivot shift and/or graft failure) was determined by the pivot shift test, presented as a relative risk reduction (RRR) and risk difference (RD). An analysis of covariance (ANCOVA) was conducted for PROMs and ROM, with days from surgery to follow-up and baseline values serving as covariates. We reported descriptive information and proportions of adverse events. Results: There was no significant difference in the incidence of clinical failure between the ACLR only and ACLR + LET groups (RRR 0.25, 95% CI: -0.10 to 0.49, p = 0.14 and RD 16%, 95% CI: 7% to 40%). There was a significant difference in incidence of graft failure favouring the ACLR + LET group (RRR 0.88, 95% CI: 0.08 to 0.98, p = 0.04 and RD 18%, 95% CI: 3% to 34%). There was no statistically significant difference between groups for scores on the ACL-QOL (Adjusted Mean Difference (AMD) = -2.2, 95% CI: -5.9 to 10.3, p = 0.34), KOOS (AMD = 3.2, 95% CI: -1.6 to 7.9, p = 0.08), IKDC (AMD = -3.2, 95% CI: -2.4 to 8.7, p = 0.09), or MARS (AMD = -1.0, 95% CI: -3.1 to 1.2, p = 0.37). There were no significant differences between groups in side-to-side limb differences in extension and flexion. At least one adverse event (infection, stiffness, meniscal injury, graft failure, etc.) from the time of surgery to most recent follow-up was experienced by 47 of 82 (57%) patients. Conclusion: While there was no statistically significant difference between groups in terms of ACLR clinical failure, the ACLR alone group experienced significantly more graft failures than the ACLR + LET group. Preliminary results of the STABILITY long-term follow-up suggest differences in graft failure rates persist longer than two years postoperative in favour of the added LET, with no negative influence on PROMS or ROM.

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Risk Factors for Reoperation for Arthrofibrosis Following Anterior Cruciate Ligament Reconstruction: Results from the New Zealand ACL Registry

Abstract ID# 22474
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Summary:
Female sex, a history of previous knee surgery and a translateral femoral tunnel drilling technique are associated with a higher risk of arthrofibrosis following primary ACL reconstruction. Data:
Introduction: Arthrofibrosis is a less common complication following anterior cruciate ligament (ACL) reconstruction. It is unclear what factors increase the risk of arthrofibrosis, however there are concerns that undergoing early surgery may be associated with arthrofibrosis. The aim of this study was to identify the patient and surgical risk factors for arthrofibrosis following primary ACL reconstruction. Methods: Prospective data recorded by the New Zealand ACL Registry was analyzed and cross referenced with data from the Accident Compensation Corporation (ACC), which is the New Zealand Government’s sole funder of ACL reconstructions and any subsequent surgery. Primary ACL reconstructions performed between April 2014 and December 2019 were analyzed, allowing for a minimum follow-up of two years. Patient and surgical data
including age, sex, time from injury-to-surgery, a history of previous knee surgery, graft type, concomitant meniscal injury and femoral tunnel drilling technique were analyzed as recorded in the New Zealand ACL Registry. The ACC database was used to identify patients who underwent a subsequent reoperation with review of operation notes to identify those who had a reoperation for “arthrofibrosis” or “stiffness”. The rates of arthrofibrosis were calculated for each patient and surgical factor and compared via Chi-Square test. A multivariate Cox regression survival analysis was performed to identify the risk factors for reoperation for arthrofibrosis. Hazard ratios (HR) with 95% confidence intervals (CI) were computed. Results: Of 9617 primary ACL reconstructions analyzed, 215 patients underwent a subsequent reoperation for arthrofibrosis (2.2%). A higher risk of arthrofibrosis was observed in female patients (adjusted HR = 1.67, 95% CI 1.22 – 2.27, p = 0.001), patients with a history of previous knee surgery (adjusted HR = 1.97, 95% CI 1.11 – 3.50, p = 0.021) and when a transtibial femoral tunnel drilling technique was used (adjusted HR = 1.55, 95% CI 1.06 – 2.28, p = 0.024). Patients who underwent early ACL reconstruction within 6 weeks of their injury did not have a higher risk of arthrofibrosis when compared to patients who underwent surgery more than 6 weeks after their injury (3.5% versus 2.1%, adjusted HR = 1.56, 95% CI 0.97 – 2.50, p = 0.07). Age, graft type and concomitant meniscal injury did not influence the rate of arthrofibrosis. Discussion and Conclusion: Female sex, a history of previous knee surgery and a transtibial femoral tunnel drilling technique are risk factors for arthrofibrosis after primary ACL reconstruction. Undergoing early ACL reconstruction within 6 weeks of ACL rupture does not increase the risk of arthrofibrosis.

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The Impact of Posterior Tibial Slope on Meniscal Injury in Acute ACL Ruptures: A Large, Retrospective Registry Study

Abstract ID# 22759

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Summary:
This large registry study illustrates that increased lateral posterior tibial slope is associated with higher rates of meniscal injury in acute ACL ruptures.

Data:
Background: Increased posterior tibial slope has previously been associated with an elevated risk of anterior cruciate ligament (ACL) rupture. Recent studies have suggested there may be a relationship between posterior slope and meniscal tears in ACL ruptures, however, these studies have either included chronic ACL injuries, revision ACL reconstructions or an overall low number of study participants. The goal of this study is to leverage a large ACL registry to assess the impact of posterior tibial slope on meniscal tears in acute ACL ruptures. Methods: Our institution’s ACL Registry was consulted to identify all patients between the age of 18 and 45 who underwent primary ACL reconstruction between January 2019 and July 2022 for acute, noncontact ACL rupture, de

Conclusions: Increased lateral posterior tibial slope is associated with a higher rate of meniscal injury in acute ACL ruptures. This knowledge adds to the growing literature surrounding the impact of posterior tibial slope on ACL and meniscal injuries.

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Combined Anterior Cruciate and Anterolateral Ligament Reconstruction Decreases Passive Anterior Tibial Subluxation and Provides Better Rotational Stability Compared to Isolated Anterior Cruciate Ligament Reconstruction: A Propensity Score-Matched Analysis

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Summary:
Combined ACL and ALLR significantly reduces PATS and improves rotational stability compared to isolated ACLR, despite similar functional scales between patients in the two groups. Our findings are expected to aid clinical decision-making regarding ALLR as a treatment option in patients undergoing ACLR to improve knee stability.

Data:
Background: Passive anterior tibial subluxation (PATS) is encountered in patients with anterior cruciate ligament (ACL) injuries. Rotational instability of the knee following ACL reconstruction (ACLR) remains a concern post-surgery. An anatomic approach to the anterolateral ligament (ALL) has, therefore, garnered increased interest in orthopaedic sports medicine because of its potential role in knee stability. Purpose/Hypothesis: To compare the extent of PATS on magnetic resonance imaging and clinical outcomes between ACL + ALL reconstruction (ALLR) versus isolated ACLR. We hypothesized that patients who underwent combined procedures would show reduced PATS and superior knee stability compared to patients who underwent ACLR. Methods: We enrolled 252 patients who underwent primary ACLR between March 2014 and February 2020 at our center, with a minimum follow-up of 2 years (48.4 ± 16.6 months). Patients who underwent combined procedures (ACL + ALLR) were matched in a 1:1 propensity ratio to patients who underwent ACLR only. Anterior tibial subluxation was measured using magnetic resonance imaging (MRI). We evaluated PATS, knee stability (side-to-side laxity difference, pivot-shift test), and mobility after the procedure and documented complications. Thirty-four patients underwent second-look arthroscopy for evaluation of the graft status, with results compared between the groups. Results: Thirty-five matched pairs were included, with no significant differences in preoperative PATS values of the medial and lateral compartments between the groups (ACL + ALLR vs isolated ACLR: lateral compartmental, 5.6 ± 2.2 vs 5.8 ± 2.2 mm; medial compartment, 2.7 ± 1.5 vs 3.3 ± 1.5 mm; P > .05). However, postoperative average PATS values of the ACL + ALLR group showed significant improvement than in the isolated ACLR group (ACL + ALLR vs isolated ACLR: lateral compartmental, 0.5 ± 1.5 vs 2.1 ± 2.0 mm; medial compartment, -0.2 ± 1.3 vs 0.5 ± 1.3 mm; P < .05). The ACL + ALLR group showed significantly better knee stability results in pivot-shift grade (P = .037), although there were no significant differences between groups regarding clinically important measures, complications, and second-look arthroscopic findings (all P > .05). Conclusion: Patients who underwent combined ACL + ALLR demonstrated significantly reduced anterior tibial subluxation and better rotational stability than patients who underwent isolated ACLR, despite similar functional scores between the 2 groups, suggesting that ALLR could be a safe and effective procedure that leads to better outcomes with respect to knee stability.

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Increased Knee Valgus and Hip Adduction Moments After Hamstring Autograft Compared to Quadriceps Autograft in Adolescents 6 Months After Anterior Cruciate Ligament Reconstruction

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