41% of grade I, 37% grade II, 20% grade III, 2% grade IV, the Howell score of the Ar graft was respectively 61, 26, 13 and 1%. The proportion of the graft in contact with the bone wall of the tibial tunnel was 81 % ± 23, the mean filling of the graft volume inside the tibial tunnel was 80%. No significant correlations were found between tibial tunnel expansion and graft maturation at both locations: SNQ Ti graft (p=0.455), SNQ Ar graft (p=0.455), Howell score Ti (p=0.58) and Ar graft (p=0.47). Graft maturation was correlated with the proportion of graft-to-bone contact and graft occupancy volume (p<0.05). Conclusions At 2 years of ACL reconstruction using a ST4 fixed by ASF, the average tibial tunnel enlargement was 13% and no correlation was found between graft maturation and tibial expansion. Maturation appears to be correlated with graft-bone contact and graft occupancy volume in the tibial tunnel.

Category: Knee - ACL Graft Choice

A Randomised Controlled Trial Comparing Hamstring Tendon Versus Quadriceps Tendon Autograft In Anterior Cruciate Ligament Reconstruction: 2-Year Clinical Results

Abstract ID#: 22064

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Summary:
Quadriiceps autograft tendon shows similar 2 year clinical results, patient reported outcomes and return to sport rates compared with hamstrings autografts used for anterior cruciate ligament reconstruction in the athletic population.

Background:
Numerous graft options are reported when undertaking anterior cruciate ligament reconstruction (ACLR), though a lack of high-quality evidence exists comparing quadriceps (QT) and hamstrings (HT) autografts. Purpose: To investigate patient outcomes in patients undergoing HT versus QT ACLR. Study Design: Randomized controlled clinical trial. Methods: Following recruitment and randomization, 112 patients (HT=55, QT=57) underwent ACLR. Patients were assessed pre- and post-operatively (6 weeks and 3, 6, 12 and 24 months) with a range of patient-reported outcome measures (PROMs), graft laxity (KT-1000), active knee flexion and extension range of motion, peak isokinetic knee extensor and flexor strength and a 6-hop performance battery. Limb Symmetry Indices (LSIs) were calculated for strength and hop measures. Secondary procedures, ACL re-tears and contralateral ACL tears were reported. Results: No group differences (p>0.05) were observed in demographics, injury or surgery history. All PROMs and knee ROM measures significantly improved (p<0.0001) though, apart from the Anterior Cruciate Ligament Return to Sport after Injury (ACL-RSI) score which was significantly better (p<0.05) in the HT group at 3, 6 and 12 months, no other group differences (p>0.05) were observed. No group differences were observed in side-to-side laxity (p>0.407), while there was no significant change in laxity from 6 to 24 months (p>0.105). While the HT group demonstrated significantly greater (p<0.05) quadriceps strength LSIs at 6 and 12 months, the QT group demonstrated significantly greater (p<0.05) hamstring strength LSIs at 12, 6 and 24 months. The HT group demonstrated significantly greater (p<0.05) LSIs for the single horizontal (6 months), lateral (6 and 12 months) and medial (6 months) hop tests for distance. Up until 24-months, 1 patient (QT at 22 months) had suffered a re-tear, with 2 contralateral ACL tears (QT at 19 months, HT at 23 months). Secondary procedures included 5 in the HT group (MUA, notch debridement, meniscal repair) and 6 in the QT group (MUA, notch debridement, meniscal repair, tubular transfer, osteochondral autologous transplantation). Conclusions: The two autograft groups compared well for PROMs (apart from the ACL-RI), knee ROM and laxity. However, greater hamstring strength LSIs were observed for the QT cohort, with greater quadriceps strength (and hop test) LSIs in the HT cohort. Longer-term review will continue to evaluate RTS and later-stage re-injury between the two graft constructs.

Category: Knee - ACL Graft Choice

DOSTAR: Dual or Single Hamstring Tendon for ACL Reconstruction. A Randomised Control Trial.

Abstract ID#: 22101

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Summary:
This study seeks to compare the outcomes between Single Tendon (ST) and Dual Tendon (DT) ACLR, given there is no prospective randomised controlled trial (RCT) in the literature comparing outcomes between these two options.

Data:
Introduction: Hamstring autograft is the most common graft used worldwide for ACL reconstruction (ACLR). Hamstring harvest has been associated with reduced hamstring strength, donor site pain and muscle strains after return to sport. There is conjecture as to the importance of the gracilis tendon in contributing to pain, flexion strength and rotational stability. Traditional hamstring graft requires both tendons to be harvested to achieve a graft of sufficient length and diameter, but newer techniques allow for a shorter, broad single tendon graft. To date there has been no prospective randomised controlled trial evaluating outcomes after single or dual hamstring ACLR. The aim of this study is to compare post-operative clinical outcomes between single (semitendinosus only) versus dual (semitendinosus and gracilis) hamstring tendon grafts. Methods: In this ongoing double blinded prospective randomised controlled trial (RCT) (registered as a clinical trial with the Australia New Zealand Clinical Trials Registry (ACTRN126200009279921)) patients were recruited and randomised a priori into a single tendon (ST) or a dual tendon (DT) group for ACLR. All anaesthetic and surgical techniques were uniform between the groups aside from graft technique and tunnel fixation. Patients were evaluated pre-operatively and at 6 months post-ACLR using patient-reported outcome measures (PROMS) including the IKDC, Lysholm and Modified Cincinnati knee scores, as well as a visual analog scale for pain frequency (VAS-F) and severity (VAS-S). At 6 months post-ACLR, the Graft Morbidity Score (GMS) was completed, while knee laxity (KT-1000), hop performance and peak isokinetic quadricipes and hamstrings strength were assessed. Results: Overall, 71 patients (ST = 34; DT = 37) were assessed at 6 months post-surgery on a per protocol analysis, with a further 13 patients excluded at time of surgery as their selected graft did not meet a minimum 8mm diameter. No significant group differences (P>0.05) were observed in demographics (age, sex, height and body mass) or surgical characteristics (concomitant meniscal repairs and meniscal tears). Graft diameters were significantly smaller in the ST group compared to the DT group (mean difference (MD), -0.67mm; 95% CI, -0.91 to -0.43; P<0.001). A significantly lower GMS was reported in the ST group compared to the DT group (effect size [ES], 0.649; 95% CI, 2.4, 16.2; P=0.01). No significant group difference were observed for other PROMS (P>0.05) or knee laxity (P=0.362). Conclusion ST (versus DT) harvest results in significantly less donor site morbidity and this is the first prospective RCT to determine this. There were no differences between ST and DT hamstring ACLR were observed in PROMs, knee laxity and hamstring strength. Younger female patients tend to have inadequate single tendon size to produce a graft of sufficient diameter, and alternative techniques should be considered. Further endpoints include radiological analysis, longer term donor site morbidity, revision rates and return to sport and will continue to be presented in the future.

Category: Knee - ACL Graft Choice

A Novel Practical Method To Predict Anterior Cruciate Ligament Hamstring Graft Size Using Pre-Operative MRI

Abstract ID#: 21619

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Summary: We have presented a modified, practical method to predict the ACL hamstring graft size with high specificity using pre-operative MRI measurements that does not require any specialized software or methods, and can be reliably done even by junior members of the surgical team. 

Background: Predicting hamstring graft size pre-operatively for the surgical reconstruction of the anterior cruciate ligament (ACL) is important as it may help pre-empt an insufficient diameter in graft size intra-operatively, which may lead to graft failure. While there are multiple published models for the prediction of the hamstring graft pre-operatively using magnetic resonance imaging (MRI) picture archiving and communication systems (PACS), most are not feasible and practical. We aim to ask the following questions: (1) Can an ACL hamstring graft size be practically predicted in a numerically continuous manner, by surgeons or surgical assistants of all levels of training, using the pre-operative MRI from any native MRI PACS system? (2) Using this method of prediction, what is the degree of correlation between the predicted and actual graft size? (3) If we define an adequate actual graft size as more than or equal to 8mm, what is the performance of this method of prediction in terms of specificity, sensitivity and discriminatory ability? 

Methods: A retrospective review of 112 patients who underwent primary ACL reconstruction with quadrupled hamstring semitendinosus-gracilis grafts at a tertiary institution between January 2018 and December 2018 was conducted. Two independent and blinded evaluators with no prior radiology posting experience measured the cross-sectional lengths and breadths of both semitendinosus and gracilis grafts using standard MRI PACS for all included patients. Data of the actual graft sizes used intraoperatively were also extracted. Results: We found that the diameter can be predicted in a numerically continuous manner as the square root of 2 *(AB + CD), where A and B refer to the semitendinosus cross-sectional length and breadth respectively, and C and D refer to the gracilis cross-sectional length and breadth respectively. The Pearson’s correlation coefficient between the predicted and actual graft diameter was 0.661 (p < .001), which shows a moderate positive correlation. Our method yields a high specificity of 92.6% and a moderate sensitivity of 67.2% if we define an adequate actual graft size as more than or equal to 8mm. A logistic regression model was performed (p < .001), with the odds of the actual graft diameter being adequate increases by 12.8 for each additional mm of the predicted graft diameter (95% CI [5.2, 38.2]), and an area under receiver-operating characteristic (ROC) curve plotted with the respective logistic regression models shows good discrimination (AUC = 0.856). Conclusions: We have presented a modified, practical method to predict the ACL hamstring graft size with high specificity using pre-operative MRI measurements that does not require any specialized software or methods, and can be reliably done even by junior members of the surgical team.

Category: Knee - ACL Graft Choice

Analysis of Graft Types used with Internal Brace Augmentation for ACL Reconstruction: A Systematic Review

Abstract ID# 22703
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Summary:
Patients and doctors reported that a Decision Aid for patients with anterior cruciate ligament injuries was very useful in shared decision-making about treatment options. However, the Decision Aid did not significantly alter the proportion of patients selecting non-surgical and surgical treatments or the proportion of patients switching to surgery within the first year. Data: Background Patients with anterior cruciate ligament (ACL) injury are faced with a choice between surgery or non-surgical treatment with intensive rehabilitation. To offer patients a treatment meeting their individual values, lifestyle, and conditions, patients must be involved in the decision-making. Often Decision Aids are used during the process of shared decision-making to help patients to make informed, preference-based decisions in collaboration with health professionals. Studies have indicated that Decision Aids seemed to reduce the number of surgeries in favor of more conservative options. Based on international criteria, current literature, and former patients’ experiences and suggestions, a Decision Aid for patients with ACL injury has been developed. However, the users’ experience and the impact of the Decision Aid on the proportion of patients selecting non-surgical and surgical treatments have not been investigated. Aims: 1. To investigate both patient and doctors’ experiences using the Decision Aid in Shared Decision-making. 2. To investigate whether exposure to the Decision Aid had an impact on the proportion of patients selecting non-surgical and surgical treatments and whether the exposure to the Decision Aid affected the proportion of patients switching from non-surgical to surgery treatment within the first year. Methods: The Decision Aid was evaluated by semi-structured interviews with patients, and a focus group interview with the doctors. In a consecutive case series, proportions of patients selecting non-surgical and surgical treatments were compared before (Period: January 2015 to January 2017) and after patients’ exposure to the Decision Aid (Period: January 2017 to January 2019). Data were collected retrospectively from the health records of patients with ACL injuries, who presented to the Department of Sports Traumatology in a Danish University Hospital. Results: Both patients and doctors...