Summary:
Fibular-based techniques have similar outcomes to tibiofibular-based techniques for posterolateral corner injuries. The fibular-based technique seems to be the more viable treatment option in view of being less technically demanding and invasive and requiring fewer grafts with a quicker operative time.

Data:
Background: Anatomical reconstruction is the gold standard treatment for posterolateral corner (PLC) injuries of the knee. They are classified into either fibular- or tibiofibular-based reconstructions based upon distal constructs. Despite comparable outcomes in biomechanical studies, clinical results comparing these constructs remain elusive with no consensus reached regarding the best treatment option. Purpose: To perform a systematic review and meta-analysis to compare if one construct is superior to the other in both clinical outcomes and restoration of stability. Study Design: Meta-Analysis Methods: The Cochrane Controlled Register of Trials, PubMed, Medline and Embase were used to perform a systematic review and meta-analysis using the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) criteria with the aim of bias assessment was performed using the Risk of Bias In Non-randomized Studies–of Interventions and the Cochrane Collaboration tools. Results: The initial search identified a total of 524 studies, 22 of which met inclusion criteria and were included in the study. There were 332 patients (60% male, 40% female), 159 (47.4%) underwent MCL reconstruction with autograft and 173 (52.5%) with allograft. 31.2% of patients undergoing MCL reconstruction with allograft had concomitant anterior cruciate ligament (ACL) reconstruction, as compared to 0 patients undergoing MCL reconstruction with autograft and ACL reconstruction. The most common autografts used were semitendinosus (82, 96.4%) and bone-patellar tendon-bone (3, 3.5%). The most common allografts were the Achilles tendon (124, 48.4%), semitendinosus (29.4%), and tibialis anterior (22.1%). Patient reported outcomes such as pain and functionality show strong improvement after MCL reconstruction and indicate greater long-term success compared to MCL repair, regardless of the use of autograft or allograft. Pain (measured by Lysholm scores) improved on average from 54.4 to 89.6 and post-operative functionality (measured by International Knee Documentation Committee (IKDC) scores) improved on average from 53.1 to 88.3 in patients with MCL reconstruction. There was no significant difference in post-operative Lysholm and IKDC scores between MCL reconstruction with autograft or allograft. Two of the 22 studies included data on 63 MCL repair patients, all of which experienced statistically significant lower Lysholm and IKDC scores than their reconstruction counterparts. Radiographic analysis demonstrated that 16 (10.1%) patients who underwent MCL reconstructions using autograft had post-operative valgus instability, whereas about 5 (2.8%) patients who underwent MCL reconstructions using allograft led to the same outcomes. Graft survivorship was slightly higher in MCL reconstruction using autograft when compared to autograft, but this was not statistically significant. Additionally, compared to MCL-only reconstruction, 82 patients underwent MCL reconstruction and primary or revision ACL reconstruction. 36 (43.9%) of these patients presented with knee extension deficits and failure of valgus stress tests, most of them undergoing MCL reconstruction and revision ACL reconstruction. Conclusions: MCL reconstruction with either autograft or allograft leads to similar clinical outcomes. Graft failure and post-operative functional limitations occurred more frequently in patients who underwent MCL reconstruction with autograft. MCL reconstruction combined with primary or revision ACL reconstruction results in a higher rate of valgus stress and flexion deficits. Allograft may be the preferred option for MCL reconstruction owing to lower failure rate.

Category: Knee - Ligaments (Not ACL)

What Is the Meaning of Popliteal Hiatus Widening on Magnetic Resonance Imaging?

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All Authors:
Sang Hak Lee MD, PhD KOREA, REPUBLIC OF
Tae Wook Kim MD KOREA, REPUBLIC OF
Bo Seung Bae MD KOREA, REPUBLIC OF
Tae Young Ko MD KOREA, REPUBLIC OF

Summary:
Patients with unstable tear on discoid lateral meniscus and lateral meniscus demonstrated large hiatus width that should carefully be evaluated in meniscus repair around the popliteal hiatus.

Data:
Introduction: Previous studies have shown that the widening of the popliteal hiatus of the lateral meniscus (LM) on magnetic resonance imaging (MRI) led to recurrent subluxation of LM. Discoid lateral meniscus (DLM) has a high rate of peripheral rim instability, high predisposition to tear, and common mechanical symptoms. However, MRI studies evaluating the popliteal hiatus of DLM and LM have rarely been reported. This study aimed to evaluate the association between popliteal hiatus width on MRI, torn DLM, and LM tears. Materials and Methods: We included 193 lateral meniscal disorder knees (mean age, 34.6 ± 14.2 years) treated with arthroscopic meniscus repair or partial meniscectomy by senior surgeon from January 2011 to August 2020. The inclusion criteria were as follows: 1) torn DLM 2) LM tear, and 3) a stable knee. In addition, 50 subjects with normal knees were enrolled as controls. All patients were divided into four
groups of lateral meniscal disorders: 1) torn DLM (Group A; N=52; mean age, 29.6 ± 15.6 years), 2) lateral meniscal tear without subluxation (Group B; N=114; mean age, 38.6 ± 12.6 years), 3) lateral meniscal tear with subluxation (Group C; N=27; mean age, 27.6 ± 12.8 years), 4) normal meniscus (Group D: N=50; mean age, 24.0 ± 13.7 years). The popliteal hiatus width and the ratio between the popliteal hiatus and the lateral tibial plateau were measured on both the coronal and sagittal planes on preoperative MRI for all groups. The comparisons of preoperative popliteal hiatus width on MRI were performed among the repair group around the popliteal hiatus (N=69), the repair group but not around the popliteal hiatus (N=33), and partial meniscectomy group (N=91).

Results: The coronal and sagittal popliteal hiatus widths from group A (coronal: 3.8mm ± 3.8, sagittal: 2.6mm ± 2.0), group B (coronal: 1.9mm ± 1.5, sagittal: 1.8mm ± 1.4), and group C (coronal: 2.0mm ± 1.5, sagittal:1.8mm ± 1.3) were significantly different compared with those of group D (coronal:1.1mm ± 0.9 , sagittal: 1.0mm ± 1.2) (P<0.05). Significant differences in the coronal and sagittal widths of the popliteal hiatus were observed between group A and B along with group A and C (P<0.05), while there were no differences between groups B and C. Considering popliteal hiatus width of >5mm as positive, the group A patients showed the highest incidence of positive findings (26.9%), while only 5.3%, 3.7%, and 0% of patients were found to be positive in group B, C, and D, respectively. Furthermore, the coronal and sagittal popliteal hiatus widths on preoperative MRI in patients who underwent arthroscopic meniscus repair around the popliteal hiatus (coronal: 3.2mm ± 3.5, sagittal: 2.4mm ± 1.8) were significantly larger than those in patients who underwent partial meniscectomy (coronal: 2.0mm ± 1.4, sagittal:1.9mm ± 1.5) and arthroscopic meniscus repair not around the popliteal hiatus (coronal: 1.8mm ± 1.8, sagittal: 1.6mm ± 1.3). Conclusion: Patients with unstable tears on the DLM and LM showed a large popliteal hiatus width that should be carefully evaluated for meniscus repair around the popliteal hiatus.

Category: Knee - Ligaments (Not ACL)

Clinical Outcomes after Multi-Ligamentous Knee Injuries in Patients Over 40-Years-Old at Average 4-Years Follow-Up

Abstract ID# 23427
All Authors:
Zachary J Li BA UNITED STATES
Michael J Aala MD UNITED STATES
Joshua S Green MA UNITED STATES
Isabel Chalem BS UNITED STATES
Jairo Triana BS UNITED STATES
Naina Rao BS UNITED STATES
Michael Buldo-Licciardi BS UNITED STATES
Andrew J Hughes FRCS UNITED STATES
Kirk Anthony Campbell MD UNITED STATES
Michael J. Medvecky MD UNITED STATES

Summary:
The purpose of this study is to investigate outcomes following surgical treatment of multi-ligamentous knee injuries in patients who were at least 40-years-old at the time of injury, using descriptive statistics and multiple regression to identify predisposing factors to patient-reported outcomes.

Data:

Purpose: Multi-ligamentous knee injuries (MLKIs) are typically caused by high-energy mechanisms that warrant complex clinical decision-making and operative management to achieve optimal outcomes for patients. There is limited literature regarding these rare presentations, with even less information examining the clinical outcomes with respect to the age at which the injury was sustained. The purpose of this study is to investigate clinical outcomes following surgical treatment of MLKIs in patients who were at least 40-years-old at the time of their injury. Methods: The study design was a multi-center retrospective cohort study. Forty-four patients who underwent surgical repair for MLKI from May 2013 to August 2021 and were at least 40-years-old at the time of their injury were identified from two separate institutions. Patients-reported outcomes assessed included International Knee Documentation Committee Subjective Knee (IKDC) Subjective Knee Form, the Lysholm Knee Score, the Tegner Activity Scale (TAS), return-to-sport and return-to-work surveys, and Visual Analogue Scale (VAS) for pain and satisfaction. A multiple regression model was used to quantify the impact of various factors related to the initial injury, including age, sex, BMI, time of follow-up, history of dislocation with injury, and mechanism of injury on the assessed outcome measures. Results: The mean age of the cohort was 48.1 ± 7.0 years old. The mean overall follow-up was 60.8 months ± 36.3 (range 12-167). This cohort reported the following: mean IKDC of 63.4 ± 23.5, mean Lysholm score of 72.6 ± 23.6, and mean Tegner scores of 6.3 ± 2.2 before injury and 4.0 ± 2.0 at the time surveyed. These scores align similarly to the literature, indicating mediocre daily functional status. There were 18 patients that reported engagement in sports, with only 5 returning at a mean of 55.5 ± 26.2 weeks. The multiple linear regression model found dislocation to have a coefficient of -22.17 in relation to IKDC (p = 0.009), indicating that prior dislocation would predict a significant functional detriment as measured by the IKDC. A similar regression model with the Lysholm score as the outcome variable found disloca
tion to have a coefficient of -19.18 (p=0.053), approaching significance. None of the other included variables were found to be significantly predictive of poorer outcome measures (p > 0.05), including age. Conclusions: These results demonstrate that age may not be a significant factor to consider with respect to operative management in patients over 40 years old. Instead, dislocation status was found to be a much more significant predictor of clinical outcomes following operative management of MLKIs. Further research should be directed toward understanding which predisposing factors affect the long-term outcomes of MLKI injuries, given the often random nature of their presentation.

Category: Knee - Ligaments (Not ACL)

Partial Superficial MCL Combined With Complete Deep MCL Injury Results In Increased Anteromedial Laxity And Increased Forces On The ACL – A Cadaveric Biomechanical Study

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All Authors:
Thiago Vivaquiao MD, MSc CANADA
Callahan Doughty MSc CANADA
Samira Vakili PhD Candidate CANADA
Ryan M. Degen MD, FRSC CANADA
Ryan Willing PhD CANADA
Alan Getgood MD, FRCS(T&ThOrth), DipSEM CANADA

Summary:
In this in vitro biomechanical study, the sMCL was the primary restraint of valgus laxity, with the dMCL being the primary restraint of external rotation in extension. Both the dMCL and sMCL were co-primary restraints of anteromedial rotation. The addition of a partial sMCL injury resulted in increased valgus laxity, AMR and increases in ACL forces.

Data:
Introduction: Recent studies have highlighted the importance of the deep and superficial MCL (dMCL and sMCL respectively) in controlling anteromedial rotation (AMR). Conflicting data exists as to which of these structures is most important, and no data exists that determines the impact of a combined dMCL and partial sMCL (parsMCL) injury. The purpose of this study was therefore to evaluate knee kinematics and in situ ligament forces during simulated clinical laxity tests following sMCL and dMCL sectioning in ACL intact and deficient knees. We hypothesized that the dMCL has a role in controlling AMR, with the sMCL having a greater role in controlling valgus rotation (VR). Furthermore, a combined dMCL and parsMCL injury would result in increased AMR and increased ACL graft forces. Methods: Testing was performed on 16 cadaveric knee specimens. Three distinct cutting protocols were used. 1 (n=8) - ACL/ dMCL/parsMCL/sMCL; 2 (n=4) - ACL/sMCL/dMCL; 3 (n=4) - dMCL/parsMCL/ sMCL/ACL. The responses of each specimen to VR (8 Nm), external rotation (ER), (4 Nm) and AMR (combined anterior-directed force (89 N) and external torque (4 Nm)) tests at 0°, 30°, 60°, and 90° of flexion were recorded while intact and after each cutting stage. Joint kinematics were re-applied, allowing for in situ ligament forces to be measured. Sample sizes were determined to detect differences of 1° or 5% between states with 80% power and 95% confidence. Results: In ACL deficient knees, an isolated dMCL resulted in a small increase in VR (1.5°). The addition of parsMCL caused a significant increase in VR (2.1° ±0.4°, p = 0.006). When the ACL was intact, parsMCL injury caused a small increase in VR (1.4° ±1.7°, p = 0.047) and 90° (1.5° ±1.3°, p = 0.016). ParsMCL injury created a larger statistically significant increase in ER at 30°, 60°, and 90° of flexion. With the ACL intact, dMCL transection caused a small increase in ER at 60° (0.3° ±0.2°, p = 0.012), with no significant effect from parsMCL. In ACL