medial collateral ligament/posteromedial corner, and lateral collateral ligament/posterolateral corner (LCL/PLC). Exclusion criteria included isolated PCL-R, PCL repair and missing surgical data with respect to any variable. Patients were dichotomized into early and delayed surgery groups based on whether time elapsed between injury and surgery was shorter or longer than 12 weeks. Demographics, injury mechanism, and concomitant ligament, meniscus, and cartilage injury data were extracted. Between-group comparisons of categorical variables were conducted with Chi-square or Fisher’s exact tests, and continuous variables were compared with independent samples t-tests. Post-hoc comparisons were adjusted for multiplicity with the Bonferroni-Hochberg procedure. Level of significance was set at p < 0.05. Results: A total of 148 patients were deemed eligible for analysis. There were 57 (38.5%) patients in the early multiligament PCL-R group, and 91 (61.5%) patients in the delayed multiligament PCL-R group. The mean time from injury to surgery was 6 ± 3.1 weeks in the early PCL-R group, compared to 63.7 ± 11.3 weeks in the delayed PCL-R group. While concomitant LCL/PLC reconstruction was performed in 55 (60%) of delayed multiligament PCL-Rs and 23 (40%) of early PCL-Rs (p = 0.02), there was no significant between-group differences in the frequencies of other concomitant ligament surgeries performed. There were no significant differences in the prevalence of meniscal tears between the early (n = 28, 49%) and delayed (n = 36, 40%) multiligament PCL-R groups (p = 0.25). Concomitant meniscus surgery was significantly more prevalent in the early (n = 25, 44%) versus delayed (n = 19, 21%) multiligament PCL-R group (p = 0.003), with a significantly greater proportion of medial meniscus surgeries performed in the early (n = 16, 28%) compared to delayed (n = 13, 14%) PCL-R group (p = 0.05). The prevalence of knee cartilage injury was significantly different between the early (n = 12, 24%) and delayed (n = 41, 46%) multiligament PCL-R groups (p = 0.01), with a more frequent involvement of the lateral (n = 17, 19% vs. n = 3, 5%, respectively; p = 0.04) and medial (n = 31, 34% vs. n = 6, 11%, respectively; p = 0.005) femoral condyles in the delayed compared to the early PCL-R group. Conclusion: Patients undergoing delayed multiligament PCL-R demonstrated a higher rate of cartilage pathology, specifically of the lateral and medial femoral condyles, when compared to patients undergoing early PCL-R. Delayed multiligament PCL-R may lead to increased chondral damage, potentially due to knee instability. Despite similar rates of medial meniscus injury in both groups, medial meniscus surgery is more prevalent in early multiligament PCL-R and suggests that surgical timing may impact the treatability of concomitant meniscus pathology. Additionally, acute management of instability in this population may prevent the development of posterolateral knee instability.

Category: Knee - Ligaments (Not ACL)

Comparison of Three Surgical Techniques of Posterolateral Knee Reconstructions: A Cadaveric Study

Abstract ID# 22755
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Summary:
This study reported that the 2 so-called anatomic reconstruction procedures were significantly more effective than the modified Larson for external rotation control. Consequently, it remains preferable to use anatomic techniques in multiligament injuries involving the PLC.

Data:
Background: While injuries to the posterolateral corner (PLC) of the knee are often overlooked, these lesions required reconstruction in order to restore varus and rotational stability. Among PLC reconstructions techniques (anatomical or not), the modified Larson (LMR), the LaPrade reconstruction (LR) and the “Versailles” reconstruction (VR) procedures are commonly used. Hypothesis: The hypothesis was that anatomical reconstructions (VR and LR procedures) of the PLC provides better restoration and control of external rotational laxity. Patients and Methods: Fifteen fresh-frozen cadaveric knees were tested to compare the 3 procedures. Varus laxity on stress radiographs in full knee extension and external rotational laxity with dial test at 30° of flexion were quantified during 3 phases: intact knee, PLC sectioned and PLC reconstructed. Results: Mean varus values did not differ significantly regardless the technique used in the intact knees (p = .14), after sectioning the PLC (p = .14) or after PLC reconstruction (p = .17). After PLC reconstruction, varus laxity was restored with statistical difference from the intact testing between LMR, VR and LR (respectively, -1.0, -1.3 and -1.5, p = .98).

Mean external rotation laxity in the 3 groups was not significantly different when dial test at 30° of knee flexion was quantified on intact knees (p = .32) or after sectioning the PAPL (p = .15). After PLC reconstruction, the modified Larson technique was found to be significantly less effective to restore rotational stability compared with VR and LR (p = .025). Discussion: The VR provides similar outcomes to the LR for restoring stability in varus and external rotation. This study reported that the 2 so-called anatomic reconstruction procedures (VR and LR) were significantly more effective than the modified Larson for external rotation control. Consequently, it remains preferable to use anatomic techniques in multiligament injuries involving the PLC.

Category: Knee - Ligaments (Not ACL)

“Does Posterior Slope Lead To PCL Injury In Knee? And Effect Of Posterior Slope On The Outcome Following PCL Reconstruction?”

Abstract ID# 22917
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Summary:
DECREASED POSTERIOR Tibial SLOPE IS ASSOCIATED WITH INCREASED RISK FOR PCL INJURIES AND NEGATIVE IMPACT ON CLINICAL OUTCOME AFTER PCL RECONSTRUCTION AND LEADS TO POSTERIOR LAXITY OF KNEE.

Data:
Introduction: Aim of our study is to evaluate the effect of posterior tibial slope on radiological and functional outcome following PCL reconstruction in Isolated PCL injuries. And to evaluate the incidence of variation of PTS angle in patients with isolated PCL injuries and to analyze the effect of Posterior Tibial Slope Angle on radiological and functional Outcome of PCL Reconstruction. Methods: In our retrospective study, we included 171 patients of isolated PCL injuries to evaluate the incidence of variation of PTS angle, among these 60 patients were PCL Tears and 111 patients were PCL Avulsions. These 60 PCL Tears patients who underwent Isolated PCL reconstruction were grouped into Group-A (PTS < 70) and group-B (PTS > 70) based on PTS angle, taking 70 as threshold value. These two groups were compared to evaluate and analyze the effect of PTS angle on radiological outcome at 6-months and 1-year, and functional outcome using IKDC and Tegner Lysholm score, knee Range of motion at 6-months, 1-year, and mean follow-up. Results: In our study we found that, mean PTS angle was 6.640 ± 2.70, 62 % of patients with Isolated PCL injury had PTS of < 70. On comparison between Group-A and group-B population, we found that radiological posterior laxity at 1 year was more in group-A as compared to Group-B which was statistically significant. Functional outcome with IKDC and Tegner Lysholm showed lower scores in group-A as compared to group-B at mean final follow-up and group-A patients had decreased range of movements compared to Group-B at 1 year and mean follow-up, and the difference was statistically significant. Conclusion: Decreased posterior tibial slope is associated with increased risk for PCL injuries. And Decreased PTS has negative impact on clinical outcome after PCL reconstruction and leads to posterior laxity of knee. Key words: PCL, Posterior slope, Posterior cruciate ligament, Knee ligament

Category: Knee - Ligaments (Not ACL)

Clinical and Patient-Reported Outcomes of Acute Percutaneous Repair of Medial Collateral Ligament in the Multiligamentous Injured Knee

Abstract ID# 21391
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Summary:
Acute MCL repair in the setting of multiligamentous knee injuries results in minimal valgus laxity, minimal complications, good subjective outcomes and excellent stability at short-term follow-up.

Data:
Introduction: It is unclear whether to treat grade III superficial medial collateral ligament (sMCL) tears nonoperatively or operatively in the setting of a multi-
ligamentous injured knee (MLIK). Potential disadvantages of delayed treatment of concomitant injuries include longer time to surgery and residual valgus laxity, whereas acute sMCL repair has potential to address these issues. The purpose of this study was to assess short-term outcomes of acute MCL repair. Methods: A retrospective analysis of MLIK patients with grade III sMCL injuries, who underwent acute (<6 weeks) MCL repair, and had at least two-year follow-up, was completed. Physical examination at minimum six months and patient-reported outcome measures (PROMs) at minimum two years were utilized to assess patient status. Continuous variables were reported in median with interquartile range (IQR). Results: Twenty-six patients were included with median follow-up of 4.2 years. Valgus laxity was negative in 22 patients (91.7%), grade one in two (8.3%), and there were no MCL failures. Three patients (11.5%) required reoperation, one (3.8%) for arthrofibrosis, one (3.8%) for MCL hardware removal, and one (3.8%) for unicompartmental knee arthroplasty. ACL failure was seen in four patients (16.0%), and PCL failure in one (10%). PROMs were excellent with median Lysholm 95.0 (IQR 90.0–100.0), modified Cincinnati Score 89.0 (IQR 84.0–96.0), SANE 90.0 (IQR 80.0–95.0), preinjury Tegner 6.0 (IQR 5.0–6.0), Tegner at follow-up 5.0 (IQR 4.5–6.0), IKDC Subjective Score 82.8 (IQR 79.3–89.7), FJS 77.1 (IQR 67.7–91.7), and ACL-RSI 72.7 (IQR 42.5–81.9). Conclusions: In this heterogeneous cohort of MLIK patients, outcomes of acute percutaneous MCL repair were encouraging with excellent stability and PROMs. MCL repair seems to reliably result in valgus stability, without additional risk of arthrofibrosis and need for additional grafts or risk of tunnel convergence and should be considered in the MLIK when possible.

Category: Knee - Ligaments (Not ACL)

Determining of Patient Acceptable Symptom State and Evaluation of Work and Sports Impact After Multiligament Knee Reconstruction

Abstract ID# 22745
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Summary:
This study determined the PASS threshold value for the subjective IKDC and Lysholm as 67.9 and 80. Predictor of achieving PASS was low intensity trauma. Modern surgical techniques after multiligament knee injuries allow return to work without modification in most cases dependent on the work heaviness. Return to low-intensity sports was feasible for patients practicing regular activity before injury.

Data:
Multi-ligament knee injuries have a significant functional impact for the patient. Parameters such as Patient Acceptable Symptom Status (PASS) are new measures to assess patient satisfaction and improve interpretation of patient-reported outcomes measurements (PROMs). In addition to subjective scores, assessment of return to activity is an important issue. The primary purpose of this study was to determine the PASS threshold value for the subjective IKDC and Lysholm scores after multiligament reconstruction with a minimum follow-up of 12 months. The secondary objectives were to determine the predictive factors for achieving this value, to assess impact on professional activity according to heaviness and on return to sport. A retrospective, single-center analysis was conducted on patients treated for knee dislocation (07/2008-12/2019). 42 patients were assessed with a follow up compliance of 85.7%. All patients had knee ligament repair and/or reconstruction with allograft and autograft according to treatment algorithm. Clinical data and postoperative complications were collected at the last follow-up consultation. IKDC subjective knee and Lysholm scores were performed. PASS threshold value was calculated using an anchoring method. Multivariate logistic regressions were conducted to determine predictors of achieving PASS. A self-questionnaire was given to the patient to assess impact on work and sports. Activities were classified according to Tegner scale. With a mean follow-up of 4.8 years, 78.6% of the patients reported satisfactory symptom status. No significant difference was observed between patients who answered "yes" and those who answered "no" to the PASS question showed. Expect for PROMs, IKDC was 75.2 points for patients who answered "yes" to PASS question versus 61.4 for those who answered no (p = 0.003) and a mean Lysholm score of 86.2 points versus 71.6 (p = 0.002). The PASS cutoff for the cohort was defined at 67.9 for the IKDC and 80 for the Lysholm score. A multivariate logistic regression according to the achievement of this threshold value defined that low-intensity trauma was a predictor of achieving this value for the subjective IKDC (Odds Ratio 10.507, 95% CI 1.074 to 102.839, p = 0.043). 34 patients (81%) had returned to work without job modification, 7 (16.7%) patients required job adjustment and 1 (2.4%) patient was classified as invalid. Patients in light work group returned to work significantly more without modification than heavy work group (p = 0.038). Pre-injury, 30 (71.4%) patients were practicing sports. At the last follow-up, 25 (59.5%) patients were involved in sports. 25/30 (83.3%) patients practicing sports had resumed sports but at a lower level before the injury (Tegner: before injury 5.2 vs after reconstruction 4.4; p = 0.014) This study defined the PASS threshold value for the subjective IKDC and Lysholm as 67.9 and 80, with a minimum follow-up of one year. Predictor of achieving PASS for subjective IKDC score was low intensity trauma. Modern surgical techniques after multiligament knee injuries allow return to work without modification in most cases. However, this remains dependent on the work heaviness. Furthermore, return to low-intensity sports was feasible for patients practicing regular activity before injury.

Category: Knee - Ligaments (Not ACL)

Poorer Functional Outcomes in Patients with Multi-Ligamentous Knee Injury with Concomitant Patellar Tendon Ruptures At 5-Years Follow-Up: A Multicenter Study

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Summary:
Using propensity score matching, the purpose of this study was to compare the outcomes of MLKIs with and without patellar tendon ruptures and to investigate the overall predictors of these outcomes.

Data:
Purpose: Multi-ligamentous knee injuries (MLKIs) are high energy injuries that may infrequently present with concomitant patellar tendon rupture. There is limited information in the literature regarding these rare presentations, with even less information regarding clinical outcomes. Using propensity score matching, the purpose of this study was to compare the outcomes of MLKIs with and without patellar tendon ruptures and to investigate the overall predictors of these outcomes. Methods: Twelve patients who underwent surgical repair for combined MLKI and patellar tendon rupture from February 2011 to April 2020 with minimum 1-year follow-up data were identified from two separate institutions. Patients were propensity-score matched with a 1:1 ratio with controls based on age, body mass index (BMI), gender, and time from surgery. Patient-reported outcomes included International Knee Documentation Committee (IKDC) Subjective Knee Form, Lysholm and Tegner scores, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score. Results: Twelve MLKIs with concomitant patellar tendon injuries were identified out of a multicenter cohort of 237 (5%) patients sustaining MLKI and were case matched 1:1 with 12 MLKIs without extensor mechanism injuries. The average follow up was 5.5 ± 2.6 years. There were no differences in Schenck Classification injury pattern. There were significant differences found across IKDC (Patellar Tendon mean: 53.1 ± 24.3, MLKI mean 79.3 ± 19.6, P < 0.001) and Lysholm scores (Patellar Tendon mean: 63.6 ± 22.3, MLKI mean 86.3 ± 10.7, P < 0.001) between the two, illustrating poorer outcomes for patients with concomitant patellar tendon ruptures. Conclusion: In the setting of MLKI, patients who have a concomitant patellar tendon rupture have worse functional outcomes compared to those without. This information will be important for patient counseling and might be considered to be added to Schenck classification, reflecting its prognostic value.

Category: Knee - Ligaments (Not ACL)

Fibular Versus Tibiofibular-Based Reconstruction of The Posterolateral Corner Of The Knee: A Systematic Review and Meta-Analysis

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