Summary: Surgeons should be aware of this phenomenon and aim for a uniform C-arm position for every MPFL reconstruction.

Data: Background: Medial patellofemoral ligament (MPFL) reconstruction is an established procedure in the treatment of patellar instability. However, femoral tunnel misplacement is responsible for 38.2% of cases in revision surgery. Different methods are published for the identification of the femoral MPFL insertion site. In clinical practice, the Schottle technique, using C-arm can be considered the gold standard. Purpose: The purpose of the study was to evaluate the influence of the C-arm position on the radiographic femoral MPFL positioning. Study Design: Descriptive laboratory study. Methods: Ten cadaveric knees were dissected, the femoral MPFL insertion site was identified and marked using 10 mm eyelets. According to possible clinical scenarios, true lateral radiographs in two different C-arm positions (ML5: 25cm from the receptor with X-ray beam from medial to lateral; LM25: 5cm from the receptor with X-ray beam from lateral to medially) were taken. At each radiograph, the eyelet position was recorded as the distance (proximal-distal and anterior-posterior) from the optimal radiographic insertion point according to Schottle et al. Differences were calculated using the Wilcoxon signed-rank test (2-related sample), and a p-value of less than 0.05 was considered significant. Results: The anatomic femoral MPFL insertion in the MLS-position was located a mean of 2.3 ± 2.4 mm (range, 0.2-5.8) proximally and 4.1 ± 6.0 mm (range, -6.2-3.6) anteriorly to the Schottle point. This resulted in an absolute distance of 7.2 ± 3.0 mm (range, 3.6-13.6). In the LM25-position it was located a mean of 0.6 ± 1.8 mm (range, -3.2-5.6) distally, and 2.7 ± 5.7 mm (range, -8.4-9.8) anteriorly, which resulted in an absolute distance of 5.5 ± 3.1 mm (range, 1.1-9.8).

Recurrent instability, return to sport (RTS), and patient reported outcome measures (PROMs) were used as outcomes for this study. Methods: Patients with recurrent patellar instability were prospectively enrolled in an institutional registry beginning March 2014. All patients underwent primary, unilateral, isolated MPFL reconstruction regardless of their bony anatomy. Radiographic measurements including TT-TG, Caton-Deschamps Index (CDI), Patellar Trochlear Index (PTI), Trochlear Depth Index (TDI), Patellar Tendon to Lateral Trochlear Ridge (PT-LTR) and Tibial Tubercle to Lateral Trochlear Ridge (TT-LTR) were obtained at baseline. Recurrent instability, patient outcomes including PROMs, and return to sport (RTS) were obtained annually. Presence of post-operative apprehension, post-operative J-sign, and knee hyperextension were also collected. Independent samples t-tests and chi-square analyses were used to compare continuous and discrete variables, respectively, between groups. Results: 138 patients (72% female; mean age 20.1 ± 6.1 years) underwent isolated MPFL reconstruction between March 2014 and December 2019. Mean Beighton Score was 5.3 ± 3.0 and knee hyperextension was 5.4 deg ± 2.8 deg. Eighty-nine patients (65%) had pre-operative knee hyper-extension. At 2-year follow up, six patients (5%) reported an episode of recurrent instability, nine patients (8%) reported post-operative apprehension, and 44 patients had a post-operative J-sign (37%). No patients with post-operative apprehension reported recurrent instability. By 2-year follow-up, 89% of patients were able to return to sport (RTS). 50% of patients who had pre-operative knee hyper-extension and post-operative apprehension did not RTS (p = 0.034). While not statistically significant, a higher percentage of patients who had recurrent instability or apprehension did not RTS (40%) compared to those who did not (11%). Patients with post-operative J-signs had significantly worse IKDC (P = 0.022), KOOS-PS (P = 0.011), and Kujala (P = 0.035) at 2-years. For patients with recurrent instability or post-operative apprehension, Kujala was statistically significantly lower at 1-year compared to those without (84.9 vs. 91.7, P = 0.019). At 2-year follow-up the difference was still maintained between the two groups (83.6 vs. 91.6). Conclusion: Patients with post-operative J-signs showed worse PROMs at 2-years post-operatively. A higher percentage of patients who had pre-operative knee hyperextension and post-operative apprehension did not RTS. Patients who had post-operative apprehension did not report a recurrent instability event at most recent follow up. These findings support the need to further investigate if post-operative J-sign and apprehension may be important markers of sub-optimal outcomes after isolated MPFL reconstruction for recurrent instability, which in turn, may help identify patients that may benefit from concomitant bony realignment procedures at the time of their index procedure.

Category: Knee - Patellofemoral

Post-Operative Apprehension and J-Sign Predict Poorer Outcomes After Isolated Medial Patellofemoral Ligament Reconstruction for Patellar Instability

Abstract ID# 23354
All Authors:
Elizabeth Rose Dennis MD MS UNITED STATES
Brittany Ammerman MD, MBS UNITED STATES
Joseph T. Nguyen MPH UNITED STATES
William A. Marmor MD UNITED STATES
Simone Gruber MS UNITED STATES
Jacqueline M. Brady MD UNITED STATES
Beth Ellen Shubin Stein MD UNITED STATES

Summary:
In this prospective study for patients undergoing isolated MPFL reconstruction for recurrent patellofemoral instability, patients with post-operative J-signs showed worse PROMs at 2-years, a higher percentage of patients who had pre-operative knee hyperextension and post-operative apprehension did not RTS and patients who had post-operative apprehension did not experience recurrent instability.

Data:
Objectives: A multicenter prospective trial is currently underway to identify which subset of patients with recurrent patellofemoral instability would benefit from a concomitant bony realignment procedure in addition to a medial patellofemoral ligament (MPFL) reconstruction. The aim of this study is to investigate if post-operative apprehension is measure of sub-optimal outcomes to determine if this may be an additional indicator of patients who may need bony realignment in addition to an isolated soft tissue procedure. Post-operative J-sign, a clinical exam finding that may indicate patellar maltracking was also investigated.
academic medical center who were twelve to eighty-five years-old and had undergone MPFL-R over an 8.5-year period. Records were reviewed for demographic, physical exam, radiographic, surgical, and clinical outcomes data. PROs included the Northwick Patellar Instability (NPI) grade, Marx activity rating, and Knee Injury and Osteoarthritis Outcome Score (KOOS). Descriptive statistics, Chi-squared analysis, and linear regressions were performed to assess the effects of BMI as a categorical and continuous variable. Results: A total of 161 MPFL-Rs without TTO were included. Of this cohort, 115 were BMI < 30 and 46 were BMI = 30. Clinical follow up was 66.2 and 54.4 weeks among the non-obese and obese cohorts, respectively (p = 0.07). Functional outcomes (time in brace, time to weight bearing, return to sport) and postop complications (deep vein thrombosis, infection, pain, repeat dislocation/instability) were similar between both cohorts (p > 0.50). When comparing between BMI of 30, PROs were all similar (p > 0.10). Linear regression fit BMI and NPI with r² = 0.0622, p = 0.0137; and BMI and Marx with r² = 0.0525, p = 0.0239. When comparing cohorts with a BMI cutoff of 35, NPI and Marx were significantly worse in the obese cohort (p = 0.0184 and p = 0.0108, respectively). Conclusion: To our knowledge, this is the largest study to date to assess the effects of BMI following MPFL-R. Among our cohort, BMI = 30 was not associated with worsened outcomes, yet BMI = 35 may be associated with worsened PROs. Surgeons may consider MPFL-R and more invasive procedures such as TTO among obese patients without fear of worsened outcomes. Future outcomes studies among morbidly obese patients may be warranted.

Category: Knee - Patellofemoral

Isolated MPFL Reconstruction Results In Similar Postoperative Outcomes as Concomitant MPFL Reconstruction and TTO in the Setting of Elevated TT-TG Distances

Abstract ID# 22659

All Authors: Prushoth Vivekanantha BMSc CANADA
Harjind Kahlion BHSc CANADA
Dan Cohen MD CANADA
Darren L. de SA MBA(c), MD FRCCS CANADA

Summary:
Isolated MPFLR leads to similar anterior knee pain and similar redislocation rates in patients with TT-TG distances greater than 15mm, suggesting this procedure as a possible alternative to MPFLR combined with TTO in this patient population.

Data:
Introduction: To determine the effect of isolated medial patellofemoral ligament reconstruction (MPFLR) versus concomitant MPFLR and tibial-tuberous osteotomy (TTO) on patient-reported functional outcomes, rate of patellar redislocation, and rate of return to sport in skeletally mature patients with recurrent patellar instability and elevated tibial-tuberous trochlear groove (TT-TG) distance. Methods: Three databases MEDLINE, PubMed and EMBASE were searched from inception to July 10th, 2022 for literature outlining the management of patients with TT-TG indices greater than 15mm with either isolated MPFLR or concomitant MPFLR and TTO procedures. The authors adhered to the PRISMA and R-AMSTAR guidelines as well as the Cochrane Handbook for Systematic Reviews of Interventions. Data on functional outcomes via the Kujala anterior knee pain score, redislocation rates, return to sport rates, and complications were recorded. The MINORS score was used for all studies in order to perform a quality assessment of included studies. Results: A total of 31 studies comprising 1405 patients (1452 knees) were included in this review. The mean pooled redislocation rate in 19 studies examining isolated MPFLR procedures comprising 948 patients was 3.1% (95% CI 2.1%-4.4%), I² = 7% as opposed to 3.2% (95% CI 1.9%-5.0%), I² = 0% in 15 studies comprising 486 patients in the concomitant group. The mean Kujala score in 13 studies comprising 848 total patients in the isolated MPFLR group was 85.0 (range 80.9 - 97.5) compared to a score of 83.7 (range 77.2 - 94.0) in 14 studies comprising 459 patients in the concomitant group. The mean pooled return to sport rate in seven studies with 472 total patients in the isolated MPFLR group was 92% (95% CI 78%-86%, I²=16%) compared to a score of 92% (95% CI, 78%-99%, I²=58%) in four studies comprising 54 patients in the concomitant group. There were similar complication rates between both treatment groups, including range of motion deficits, fractures, infections, and graft failures. Conclusion: Isolated MPFLR leads to similar anterior knee pain, similar dislocation rates and lower return to sport rates than concomitant MPFLR and TTO procedures in patients with TT-TG distances greater than 15mm. Information from this review can aid surgeons in their decision to perform a concomitant TTO in patients with recurrent patellar instability and elevated TT-TG distances.

Category: Knee - Patellofemoral

Isolated Medial Patellofemoral Ligament Reconstruction In Patellar Instability: Does The Distance Between Tibial Tuberosity - Trochlear Groove Make A Difference?

Abstract ID# 22338

All Authors:
Diego Edwards MD CHILE
Juan Pablo Casas-Cordero MD CHILE
Daniel Cerda MD CHILE
Julian Alonso de Frutos MD CHILE
Francisco Cornejo MD CHILE
Rafael Calvo Mena MD CHILE
Gerardo Zelaya CHILE

Summary:
Isolated Medial Patellofemoral Ligament Reconstruction in patellar instability presents a functional improvement, with a low rate of complications and failure, regardless of the pre surgical Tibial Tuberosity – Trochlear Groove distance.

Data:
Introduction: Medial patellofemoral ligament reconstruction (MPFLR) is used in most patellar instability surgeries, there is controversy on adding a tibial tuberosity osteotomy (TTO). Objective: To describe the results of isolated MPFLR in Patellar instability according to the Tibial Tuberosity - Trochlear Groove distance (TT-TG) Methods: Retrospective study of patients with patellar instability with a mature skeleton in one center between 2016 and 2021, using isolated MPFLR. Patients with incomplete clinical and/or radiological records and follow-up less than one year were excluded. Pre-surgical demographic and radiological data (TT-TG, Caton-Deschamps (CD) index, patellar tilt, trochlear dysplasia) was recorded. Patients were divided in three groups according to TT-TG distance (Group 1: <17mm, Group 2: 17-19, Group 3: >20mm). A pre and post surgical Kujala score was performed. Local complications, satisfaction, recurrence and/or reintervention were recorded. Pre-surgical variables between groups, intra and inter-group Kujala differences were compared using Bartlett’s test. Consent from the patients and approval from the local ethics committee were obtained. Results: 67 patients met the selection criteria, mean age of 23 years, 70% were women. There were no pre surgical, radiological nor follow-up differences between the groups (average 27 months). Pre and post surgical Kujala score, respectively: Group 1: 37 - 78 Group 2: 37 - 78 Group 3: 39 - 79 All groups had a significant improvement (p < 0.05), there were no significant differences in improvement between groups (p > 0.05). There were three patients with a redislocation episode, all in group 1. One patient had a mobilisation under anesthesia due to an arthrofibrosis (Group 2). 97% of all cases reported being satisfied. Conclusion: Isolated MPFLR in patellar instability presents a functional improvement, with a low rate of complications and failure, regardless of the pre surgical TT-TG.

Category: Knee - Patellofemoral

The Prevalence and Predictors of Articular Cartilage Damage at the Time of Medial Patellofemoral Ligament Reconstruction

Abstract ID# 22350

All Authors:
Robert A Magnusen MD, MPH UNITED STATES
Julie Agel ATC UNITED STATES
Elizabeth A. Arendt MD UNITED STATES
Julian A. Feller FRACS, FAOtarh AUSTRALIA

Summary:
Substantial cartilage injuries are present in 56% of patients who undergo primary isolated MPFL reconstruction, with medial patellar lesions being the most common. Increased age at surgery is associated with an increased risk of substantial cartilage damage.

Data:
Introduction: Recurrent patellar instability is a debilitating condition that is often managed surgically with reconstruction of the medial patellofemoral ligament