Damage. The cartilage damage group demonstrated significant cartilage damage, with trochlear damage less common (19 patients). Sixty-nine (56%) were noted to have substantial patellofemoral articular cartilage injury. Patient and injury factors were compared based on the International Cartilage Restoration Society (ICRS) grade 2 or greater in the patellofemoral joint were defined. Location on the patella was recorded. Patients with articular cartilage damage of the patellar articular cartilage injury (72 grade 2, 27 grade 3, 12 grade 4). Most of these patients (106) had patellar cartilage damage, with trochlear damage less common (19 patients). Sixty-nine of the 106 patients with patellar cartilage damage (65%) had medial patellar damage. The cartilage damage group demonstrated significantly increased age at surgery (p = 0.022) and trends toward higher BMI (p = 0.059), lower Beighton score (0.059), more severe trochlear dysplasia (p = 0.16), higher patellotrochlear index (p = 0.20), and a higher incidence of contact injury (p = 0.16). Logistic regression demonstrated that increased age at surgery (OR = 1.079, p = 0.010) was the only significant predictor of substantial cartilage injury. Each one year increase in patient age was associated with a 7.9% increase in the odds of having substantial cartilage injury. Conclusion: 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.

Category: Knee - Patellofemoral

Pediatric Patients with First-Time Patella Dislocation: A Prospective Cohort Comparing Non-Operative and Operative Treatment

Abstract ID# 22727
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Summary: Even though conservative management demonstrates good outcome in first time patella dislocations in pediatric patients, surgical management can be an effective treatment when risk factors for instability are present. Data: Purpose To compare outcomes of non-operative versus operative management in pediatric patients after first-time patellofemoral dislocation. Methods All consecutive skeletally immature patients that sustained a first-time patellofemoral dislocation were included in this prospective study. Patients were divided in two cohorts depending on management. Non-operative management consisted of bracing and physical therapy. Operative management consisted of double bundle medial patellofemoral ligament / medial quadriceps tendon femoral ligament (MPFL/MQFLL) reconstruction using the pediatric Schottle point at the femoral side, and one bony and one soft tissue attachment at the patella side. The primary outcome measured was failure (defined as any subsequent dislocation or subluxation event). Minimum follow up time was 2 years. Other outcomes recorded were demographic data, risk factors for patellofemoral instability, functional outcomes (Kujala and physical activity level, return to sports and complications. A correlation analysis attempted to identify potential association of failure with risk factors. SPSS was used for statistical analysis with statistical significance set at p < 0.05. Results Eighty-two consecutive patients were included in the analysis with 53 patients in the non-operative management cohort and 29 patients in the operative management cohort that met the inclusion/exclusion criteria. Mean age was 12.1 ± 2.3 and female to male ratio was 55/27. Failure rate was 55% in the conservative group and 24% in the surgical group (p = 0.01). Kujala and IKDC scores were significantly higher at the operative group versus the non-operative group (91.0 ± 9.1 vs 83.5 ± 10.6, p = 0.001 and 88.0 ± 10.9 vs 78.4 ± 12.1, p = 0.0007, respectively). Activity level was also higher at the operative group (6.0 ± 1.8 vs 4.2 ± 1.6, p = 0.0001). There were 7 complications recorded in the operative group (24%). From the different risk factors analyzed, trochlear dysplasia, patella alta, pre-injury activity level, and flexibility were associated with higher risk of recurrence. Conclusions Non-operative management in skeletally immature patients with first-time patellofemoral dislocation remains a reasonable and safe option but appears to be associated with high failure rate. Operative management is an effective alternative, especially when risk factors are present, that demonstrates lower failure rate, higher functional outcome and higher activity level, but with an increased risk of complications in this cohort.

Category: Knee - Patellofemoral

The Epidemiology of Surgical Procedures for Recurrent Patellar Instability in the Jupiter Cohort

Abstract ID# 22826
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Summary: This study describes the frequency of different surgical procedures used in the JUPITER Cohort. Data: Background: The JUPITER prospective study represents a cohort of patients from busy patellofemoral surgeons at 11 centers. Understanding what procedures are performed in a large cohort such as JUPITER will give an overview of the most common ways being used to address patellofemoral instability. Methods: The JUPITER prospective cohort currently includes 1437 patients. All surgical procedures are documented in the database. The database was queried to evaluate the different surgical procedures included to help stabilize the patella. The percent of patients undergoing each procedure is reported. Results: MPFL reconstruction was performed on 1129 (79%) patients. Lateral release was performed on 234 (16%) patients. Lateral retinacular lengthening was performed on 102 (7%) patients. There were several variations of the tubercle osteotomy performed: anteromedialization 160 (11%), direct medial 86 (6%), Maquet 6 (<1%), distalization 53 (4%). Less common procedures included trochleoplasty which was performed on 30 (2%) patients. Distal femoral osteotomy, primarily lateral opening wedge, was performed on 18 (1%) patients. Femoral derotation osteotomy was performed on 10 (<1%) patients and bilateral derotation osteotomy was performed on 6 (1%) patients. Quadricepsplasty was performed on 12 (<1%) patients. Conclusion: There are many procedures available in the armamentarium of a patellofemoral surgeon. In the JUPITER cohort, the majority of patients underwent MPFL reconstruction. A lateral retinacular procedure was included in roughly a quarter of the patients. Tibial tubercle osteotomy was part of treatment for roughly 20% of patients. Other procedures were much less frequent.

Category: Knee - Patellofemoral

Change in Tibial Tubercle-Trochlear Groove Distance During Adolescent Growth

Abstract ID# 23047
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Summary: The Epidemiology of Surgical Procedures for Recurrent Patellar Instability in the Jupiter Cohort
Abstracts

Summary: Our study indicate that on an individual basis, the Tibial Tubercle-Trochlear groove distance in patients suffering from recurrent lateral patellar dislocation may both decrease and increase during the growth spurt.

Data: Background: Increased Tibial Tubercle-Trochlear Groove Distance (TT-TG) is a risk factor for recurrent lateral patella dislocations (RLPD). Population studies have demonstrated that the TT-TG increases gradually during growth until skeletal maturity in healthy subjects, but the change in TT-TG distance on an individual basis during adolescence in patients with RLPD has previously not been investigated. The purpose of this study was to measure the TT-TG distance in mature and skeletally immature RLPD patients over a three-year period.

Method: 13 patients with open physis (mean age 13 years) and 12 adult patients (mean age 25 years) with RLPD were recruited from a prospective randomized control trial. The TT-TG distance was measured on MRI at baseline and three years later. The change in TT-TG distance and Insall-Salvati ratio (ISR) was compared between the two groups. Results: The change in TT-TG distance from baseline to the three-year follow up was greater in the patients with open physis (2.9 mm, 95% Confidence Interval (CI) 2.1 – 3.7) compared to the skeletally mature patients (1.3 mm, 95% CI 0.6 – 2.0, p=0.004). Furthermore, the change in TT-TG distance in the patients with open physis could both increase and decrease. The change in ISR was also greater in the patients with open physis (0.09 (95% CI 0.04 – 0.14) vs 0.03 (95% CI 0.016 – 0.049, p=0.029). Conclusion: Our study indicate that on an individual basis, the TT-TG distance in patients suffering from RLPD may both decrease and increase during the growth spurt. This contradicts the current concept that the TT-TG distance increases gradually during growth. This is important information to consider when treating adolescents with RLPD, particularly when bony correction surgery is contemplated.

Category: Knee - Patellofemoral

Outcomes of Isolated Medial Patellofemoral Ligament Reconstruction for Patellar Instability In Ehlers-Danlos Syndrome

Abstract ID# 23213

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Summary: Retrospective outcomes review of 31 patients (47 knees) diagnosed with Ehlers-Danlos hyper mobility syndrome who underwent MPFL reconstruction.

Data: Background: Ehlers-Danlos Syndrome (EDS) patients with patellar instability constitute a tough subset of patients to treat and pose significant challenges in Orthopaedic management. There is reluctance to manage EDS patients due to the high failure rate of surgery, out of proportion pain, numerous and vague symptoms and unsolvable problems. The outcomes of isolated Medial Patellofemoral Ligament Reconstruction (MPFL-R) for patellar instability in EDS patients are not known. Purpose: To analyze mid-term clinical outcomes of isolated MPFL-R in EDS patients. Study Design: Retrospective chart review and prospective collection of patient-reported outcomes (PROs) Methods: In a retrospective review, 47 knees in 31 patients with EDS that underwent isolated MPFL-R for recurrent patellar instability, with minimum 2 year follow-up, were identified. Clinical outcomes, including postoperative complications, were noted. Failure was defined as the need for revision surgery for recurrent instability. Postoperative PROs (Pedi-IKDC, Kujala, HSS Pedi-FABS, BPII 2.0, and KOOS) were collected in a prospective fashion. Results: Mean age of the cohort was 14.9 years. 27/31 (87.1%) were females. 16/31 (51.6%) had bilateral knee involvement. All patients were diagnosed with EDS by Genetics Division. 26 patients had Beighton score of 9/9. At mean follow-up of 7.2 years, 9/47 (19.1%) knees had failed MPFL-R and required revision stabilization. Another 9/47 (19.1%) required other subsequent surgeries. 7/31 knees (22.6%) with autograft failed compared to 2/16 (12.5%) with allograft (p=0.69). For autograft, 6 failures occurred with gracilis (17 knees), one with quadriceps tendon (1 knee) and none with semitendinosus (13 knees). 4/16 (25%) patients with bilateral knee involvement had recurrent instability compared to 2/15 (13.3%) with unilateral involvement (p=0.69). Patients who required revision surgery were significantly younger (p<0.05) compared to those who didn’t require revision (12.8 vs 15.4 years). There was significantly (p<0.05) increased failure rate if patients were able to touch the palm to the floor with knees extended. At mean follow-up of 5.2 years, the postoperative PROs were inferior to those reported in non-EDS population. Mean scores of PROs: Pedi-IKDC 96.2 (+/-19.8), Kujala 75.7 (+/-20.1), HSS Pedi-FABS 5.9 (+/-6.7), BAFF PFI 58.8 (+/-25.1), KOOS pain 76.1 (+/-22.5), KOOS symptoms 71.2 (+/-19.4), KOOS ADL 82.3 (+/-21.0), KOOS Function 64.7 (+/-29.4); best possible score for each PRO measure is 100, except HSS Pedi-FABS (best is 30). Despite repeated surgery or ongoing symptoms, all but 1 patient were satisfied with index surgery. Conclusion: Isolated MPFL-R restored patellar stability in EDS patients with 19.1% failure rate at midterm follow-up. Failure was more likely in younger patients, bilateral involvement and in those who can touch the palm to the floor with knees extended. Allograft had less failure rate than autograft. Postoperative PROs were inferior compared to non-EDS population. Patients should be adequately counselled about potential risks and complications prior to surgery.

Category: Knee - Patellofemoral

Sulcus-Deepening Trochleoplasty With A Dedicated Cutting Guide For Patellar Instability With High-Grade Trochlear Dysplasia. Analysis Of Cartilage And Functional Outcome At More Than 2 Years

Abstract ID# 23560

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Summary: Deepening trochleoplasty using a thick osteochondral flap technique with a dedicated cutting guide was not associated with increased risk of secondary OA and functional outcome deterioration at more than 2 years.

Data: Background: Recurrent patellar dislocations and trochlear dysplasia are strongly associated with cartilage lesions and onset of early patellofemoral osteoarthritis (PF OA). Trochleoplasty is widely used to address trochlear dysplasia and was reported as a successful method to control patellar instability. However, the procedure is technically demanding and might accelerate progression of OA by failure to restore joint congruency and chondrolysis. We hypothesized that trochleoplasty with preservation of subchondral bone integrity by keeping thick osteochondral flaps and using a dedicated cutting guide will result in the absence of secondary PF OA and preservation of functional outcome. Purpose: The primary aim of the study is to assess patello femoral cartilage more than 2 years after sulcus-deepening trochleoplasty by MRI. Secondary objective is to analyze the evolution of patient-reported outcome scores between 1-year postop and time to follow up. Study design: prospective cohort study; level of evidence, 2. Methods: between 2015 and 2020, deepening trochleoplasty with a thick flap was performed in 36 consecutive patients with high grade trochlea dysplasia (75% Dejour type B, 25% Dejour type D). Sex ratio 0.8, age 23.9±7.3 years, BMI 23.2±4.6 Kg/m2. Trochleoplasty was undertaken using a saw blade guided by K-wires positioned with a dedicated guide. It was combined with medial patello femoral ligament reconstruction in all cases, tibial tuberosity osteotomy in 69 % (25/36), and lateral patellar retinaculum Z-lengthening in 91% (33/36). The most common postoperative adverse event was arthrofibrosis (14% (5/36)). Follow-up of 3.9 years (min 2 years; max 7 years). A radiologist independently measured cartilage thickness on MRI at baseline to time point in four focal regions of the patello femoral joint. Marked points included the medial and lateral facet of the patella as well as the medial and lateral part of the trochlea. Each baseline-time point segmentation pair was compared and no statistically significant difference was observed. No significant difference was observed for KOOS subscales , Kujala anterior knee pain scale and Lysholm scores when comparing 1 year postop to time to follow up values. Conclusion: Deepening trochleoplasty using a thick osteochondral flap technique with a dedicated cutting guide is not associated with increased risk of secondary OA and functional outcome deterioration at more than 2 years.