Levels of Synovial Fluid Cytokines Predict Midterm Patient Reported Outcomes Following Arthroscopic Partial Meniscectomy

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Summary:
Biomarker analysis was performed on patients undergoing arthroscopic partial meniscectomy and used to explore the relationship between them and improvement in Lysholm score, VAS score, and KOOS-PS.

Data:
Purpose: To identify synovial fluid biomarkers associated with midterm post-operative outcomes in patients undergoing arthroscopic partial meniscectomy (APM). Methods: Subjects were prospectively enrolled in a cohort of patients who had synovial fluid aspirated from their knee on the day of surgery prior to undergoing APM. Biomarker analysis was performed. Preoperative patient-reported outcome (PRO) scores including VAS pain, Lysholm and Tegner activity score were collected preoperatively. At a minimum of 2 years of follow-up post-operative outcomes were collected. Using previously described values, patients who met the minimal clinically important difference (MCID) for Lysholm score were identified and groups were compared using parametric and non-parametric tests. Using preoperative and postoperative outcome scores, generalized linear models were used to explore the relationship between biomarkers and improvement in Lysholm Score, improvement in visual analog scale (VAS) pain score, and postoperative KOOS-PS.

Additionally, higher levels of IL-1RA at the time of surgery were associated with greater improvement in midterm Lysholm score.

Category: Knee - Meniscus

Load Distribution in Knee Articular Cartilage Compare Between the Suture Anchor and Transtibial Pullout Technique for Posterior Medial Meniscus Root Tear: A Cadaveric Study

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Summary: The study compared the load distribution on the articular cartilage after medial meniscus root repair with transtibial pull out vs. suture anchor techniques.

Data:
Introduction: Posterior medial meniscus root tear can lead to early osteoarthritis (OA). Repairing the torn meniscus yields a better outcome and prevents further OA change. This study compares the load distribution to the medial tibial articular cartilage in difference knee flexion angle after refixing posterior medial meniscus root tears (PMMRT) between the suture anchor and transtibial pullout techniques. Methods: Twelve human cadaveric knees were used and divided into 3 groups (4 knees in each group): (1) Intact meniscus (IM), (2) Fixation with suture anchor technique (SA) and (3) Fixation with transtibial pullout technique (TP). An axial compression load up to 1500 N by Instron E 10000 was applied at two knee flexion angles (0° and 60°) in each group. Tekscan 4000 pressure sensor was used to record peak contact pressure and contact area for each testing condition. Results: The peak contact pressure and the contact area between the three conditions were not significantly different at 0° and 60° knee flexion angles. The peak contact pressure and contact area were 373.48 ± 2642.3 kPa, 288.2 ± 115.0 mm2, 4510 ± 2930.5 kPa, 204.4 ± 36.8 mm2 and 5288.8 ± 2607.7 kPa, 219.2 ± 84.7 mm2 in IM, SA and TP, respectively. Conclusion: Both suture anchor and transtibial pullout refixation of PMMRT can restore peak contact pressure and contact area similar to the intact meniscus.

Category: Knee - Meniscus

The Effect of Saucerization on Knee Joint Morphology Associated with a Complete Discoid Lateral Meniscus

Abstract ID# 22018
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Summary: Saucerization for discoid lateral meniscus (DLM) can have the effect of preventing progression to the bone morphology characteristic of DLM.

Data:
Purpose: To determine the effect of saucerization of knee joint morphology associated with a complete discoid lateral meniscus (DLM). Methods: This retrospective study included cases performed saucerization between December 2007 and June 2022. All cases were divided by age group; under 12 (U12) and over 13 (O13). The following morphological parameters using magnetic resonance (MR) images were evaluated preoperatively and postoperatively in each group: anterior obliquity of the lateral tibial plateau (AOLTP), posterior obliquity of the lateral tibial plateau (POLTP) and the lowest point of the lateral femoral condyle (PLFPC). Results: A total of 77 cases were evaluated. 31 cases were in the U12 pre OP group and 46 in the O13 pre OP group. With minimal follow-up of 2 years, 27 cases in the U12 group and 36 in the O13 group were included. The mean age was 10 years in the U12 group and 19 years in the O13 group. The mean follow-up period was 4.6 years in the U12 group and 3.2 years in the O13 group. Preoperative case in the O13 group were matched with the age at the final follow-up of cases in the U12 group, resulting in 32 cases in the match group. The AOLTP was no significant difference between the U12 group and the match
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Evaluating the Clinical Presentation of Meniscal Root Tears

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Summary:
The study demonstrates that many patients with repairable meniscal root tears do not present with classic symptoms or signs of meniscal root tears.

Data:
Objectives: The posterior root of the medial meniscus plays an important role in cartilage preservation by dissipating forces through hoop stresses, while preventing extrusion of the meniscus. Root tears are clinically significant because the joint reactive forces experienced by the articular cartilage increase substantially with extrusion related to a root tear. Unfortunately, root tears can be difficult to diagnose. Traditional mechanical symptoms of meniscal pathology may not be present. Therefore, obtaining a thorough patient history can provide valuable information that can assist with the diagnosis. The purpose of this study is to analyze the presenting symptoms and clinical exam findings of patients undergoing meniscal root repair to aid physicians in diagnosing this injury. Methods: All patients undergoing arthroscopic meniscal repair from 1/1/2016–9/1/2021 were retrospectively identified at our institution using CPT codes, and patients who had definitive documentation of an isolated meniscal root repair within the operative report were included in the study. Patients under the age of 40 years were excluded. Physician clinical notes were reviewed, recording detailed information regarding the presenting symptoms and physical exam findings. Pre-operative radiographs were graded using the Kellgren-Lawrence (KL) scale for osteoarthritis. When available, pre-operative MRIs were evaluated. Root tears were graded using the radiographic criteria of Chung et al. and articular cartilage injury was graded using a validated system, AMADEUS (mean total Area Measurement And DEpth & Underlying Structures, a scale from 0 to 100; 100 = no injury). Results: There were 221 patients who met the inclusion criteria. Of the 221 patients, 65.6% of patients reported that their pain began following an acute injury, with only 39.3% of patients reporting a “pop.” Only 7.7% reported an injury while walking downstairs, and 76.4% of patients were able to bear weight after the injury. On physical exam, effusion was present in 71% of knees. A McMurray test was positive in 95.5% of knees, and 49.5% of knees had positive Lachman test and 29.7% were positive Pivot Shift test. Radiographic studies were available for review. There was a full tear in 53.3% and partial thickness tear in 35.6% of patients. Regarding the location of the tears, 44.1% of tears occurred at the midsubstance of the root, with 28.0% occurring at the enthesis and 28.0% occurring at the root-posterior horn junction. The mean AMADEUS score was 94.4 ± 11.4. Conclusion: The study demonstrates that many patients with repairable meniscal root tears do not present with classic symptoms or signs of meniscal root tears. Only 40% of patients reported feeling a “pop” and most patients were able to bear weight following the initial injury. There was an effusion and a positive McMurray test in the vast majority of meniscal root tears. The locations of the root tears were variable, but in our cohort over half of patients had a full thickness tear. A low index of suspicion is necessary to appropriately diagnose and ultimately treat repairable meniscal root tears.

Category: Knee - Meniscus

Arthroscopic Partial Meniscectomy in NCAA Division in Football Players: Return to Sport Rates and Player Performance

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Summary:
This presentation seeks to report the outcomes of routine arthroscopic meniscectomy in National Collegiate Athletic Association (NCAA) Division I Football players.

Data:
Purpose: To report the outcomes of routine arthroscopic meniscectomy in National Collegiate Athletic Association (NCAA) Division I Football players. Methods: NCAA Division I football players at a single institution who underwent arthroscopic meniscectomy with or without chondroplasty over 5 years were included. Players who had incomplete data, previous knee surgery, ligamentous injury and/or microfractures were excluded. Variables collected for each player included: player position, age, timing of surgery (in season versus off-season), intra-operative findings, procedures performed, RTP time, and number of games played in the season the player returned to football activity. Player positions were grouped as non-skill positions (offensive and defensive line, tight end, punter) and skill positions (running back, wide receiver, defensive back, linebacker, quarterback) based on a previous analysis. Results: Thirty-six athletes (38 knees) who underwent arthroscopic partial meniscectomy (31 lateral, 7 medial) were analyzed. The mean athlete age was 20 ± 2.4 (range: 18-22) years. Half (19/38 players, 50%) of players were non-skill players and 50% (19/38 players) were skill players. The mean RTP time was 71 ± 39 days. The mean RTP time in athletes who underwent in-season surgery was significantly shorter than the RTP in athletes who had off-season surgery (58 ± 41 days vs. 85 ± 33 days, p = 0.05). The mean RTP in 29 athletes (31 knees) with lateral meniscectomy was similar to the 7 athletes (7 knees) who had medial meniscectomy (70 ± 38 days vs. 77 ± 56 days, p = 0.6803). The mean RTP time was similar between football players who underwent isolated lateral meniscectomy and those who had lateral meniscectomy with chondroplasty (61 ± 36 days vs. 75 ± 41 days, p = 0.32). Athletes played an average of 7.7 ± 4.9 games the season they returned; position category and anatomical compartment of the knee lesion had no bearing on number of games played (p=0.1864 and p=0.425). Conclusions: NCAA Division I football players who underwent arthroscopic partial meniscectomy RTS at approximately 2.5 months postoperatively. Athletes who underwent off-season lateral meniscectomy surgery had longer RTP time compared to those who underwent surgery in-season. We found no difference in the RTP rate following arthroscopic partial meniscectomy between skill-position players (linebacker, running back, defensive back, wide receiver, quarterback) and non-skill position players (defensive lineman, offensive lineman, tight end, punter) who competed in the NCAA Division I category (mean RTP of 73 days vs. 70 days, p=0.82). RTP time and performance after surgery did not differ based on anatomical location of the lesions, or chondroplasty at the time of meniscectomy. Level of evidence: Level IV, retrospective case series.

Category: Knee - Meniscus

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