similar cartilage regeneration (31.3% to 41.7%). In consistency with previous studies, the integrity of MMPR played a minor role in cartilage regeneration. This leads to the interpretation that healing rate and cartilage regeneration are not correlated with clinical outcome scoring. [Discussion] An HTO could unload the pressure in the medial compartment, thus relieving varus-induced medial knee pain. According to previous studies, HTO alone without MMPR repair achieved favorable outcomes. Lee et al. and Ke et al. also described similar findings in their cohort studies. The beneficial effects of concurrent MMPR repair during HTOs increase the rate of meniscal healing. However, long-term follow-up should still be conducted in order to further investigate whether the repair technique could help provide longer survivorship of the HTOs. [Conclusions] Concurrent MMPR repair during HTOs presented with a better MMPR healing rate but similar cartilage regeneration rate in short-term to mid-term follow-up. However, a better healing rate was not associated with higher clinical scores. For deeper and more extensive conclusions to be drawn, follow-up should be continued long-term.

Category: Knee · Meniscus

Survivorship And Reoperation of 324 Consecutive Isolated or Combined Arthroscopic Meniscal Allograft Transplantation Using Soft-Tissue Fixation

Abstract ID# 21992
All Authors: Alberto Grassi PhD ITALY
Stefano Di Paolo Eng ITALY
Vito Coco MD ITALY
Iacopo Romandini MD ITALY
Giuseppe Filardo MD, PhD, MBA, Prof. ITALY
Gian Andrea Lucidi MD ITALY
Stefano Zaffagnini MD, Prof. ITALY

Summary: The female sex and the need to combine MAT with cartilage procedure or ACL reconstruction could result in an increased rate of clinical failure at a mid-term follow-up.

Data:
Introduction: Meniscus allograft transplantation (MAT) is an effective treatment for relieving symptoms and improving knee functions in patients who experience symptomatic unicompartamental knee pain following a previous meniscectomy. However, in the literature there is a paucity of studies assessing the survival rate and prognostic factors of soft-tissue MAT. The present study aimed to report the survivorship of a large single-center cohort of consecutive patients treated with arthroscopic MAT using soft tissue technique and investigate variables that could potentially influence failures and outcomes. METHODS: 364 consecutive MAT performed in a single Institution between June 2004 and April 2019 were screened and assessed for eligibility. Subjective clinical scores (Lysholm score, Tegner Activity Scale and VAS) were collected pre-operatively and at 2 years, 5 years, 7 years and 10 years follow-up. Two survival analyses were performed using the Kaplan–Meier curves with (SF) surgical failure and (CF) clinical failure as endpoints. In addition, univariate analyses were performed using reoperations, surgical failure and clinical failure as endpoints, and different demographic and surgical characteristics as endpoints. RESULTS: 324 consecutive patients were evaluated at a mean follow-up 5.7 ± 3.0 years. Of them, 189 (58%) underwent an associated surgical procedure. A total of 22 patients (6.8%) were considered Surgical Failures. A significant improvement of all the PROMs was present between the pre-operative status and the last follow-up (p<0.001) with no significant decrease over time. Moreover, 70 (21.6%) patients were considered Clinical Failure: the need for concomitant Cartilage procedures (OR=0.16, p=0.001) or ACL reconstruction (OR=0.40; p=0.059) were predictors of failure. Finally, a lower survival rate was reported in Females (p=0.007) and in patients who required cartilage surgery (p=0.014). In particular, the latter group showed nearly half the survival rate with respect to those with no cartilage procedures at 10-year follow-up (36.4% vs. 71%, p=0.029). DISCUSSION AND CONCLUSION: The female sex and the need to combine MAT with cartilage procedure or ACL reconstruction could result in an increased rate of clinical failure at a mid-term follow-up. The present study results help the surgeon correctly set patients' expectations regarding MAT survival and clinical failures. In particular females and patients with focal cartilage defects have nearly half the survival rate at long-term follow-up.

Category: Knee · Meniscus

Experimental Model of Medial Meniscus Posterior Root Tear Increases the Severity of Cartilage Damage in Rabbits

Abstract ID# 21404
All Authors: Lika Dziadzishvili MD SPAIN
Irene Isabel Lopez-Torres MD, PhD SPAIN
Maria Encarnacion Fernandez-Valle PhD SPAIN
David Moreno Molera . SPAIN
Emilio Calvo MD, PhD, MBA SPAIN

Summary: Experimental model of medial meniscus posterior root tear increases the severity of cartilage damage in rabbits.

Data: Background Magnetic resonance imaging (MRI) is ideally suited for the investigation of joint diseases by virtue of its excellent soft tissue contrast, high spatial resolution, multiplanar capability, ability to allow direct visualization and to quantify cartilage thickness and volume distribution under normal and pathologic conditions. The main objective of this study was to identify and evaluate early osteoarthritic changes using high resolution magnetic resonance imaging after surgical release of medial meniscus posterior root in rabbit knees. Methods Knee osteoarthritis (OA) was experimentally induced by medial meniscus posterior root transection in the right knees of 12 male rabbits. Knees were evaluated with high MRI at baseline, at 8- and 16-weeks post-surgery. Contralateral knees were used as healthy controls. The evaluation of the cartilage thickness was carried out by two independent observers and the measurements were performed on the two femoral condyles and the tibial surface. Results MRI before knee surgery disclosed no cartilage or bone abnormalities in any of the studied animal. The radiological alterations consisted of thinning of cartilage, sclerosis of the subchondral bone. Significant decrease in cartilage thickness was observed after 16-weeks of follow-up (p=0.023). Meniscal extrusion was evident after 8 weeks of post-surgery in all 12 animals after meniscal root release. Conclusions This study develops a novel model of knee OA that can aid in the early diagnosis of cartilage injury. These changes can be a promising therapeutic target, which promotes the interest of this model. Investigation of early osteoarthritic changes may lead to understanding of when and how rapidly knee OA develops after meniscal root injury.

Category: Knee · Meniscus

The Lateral Menisco-Tibial Ligament is a Restrictor of Radial Movement of the Lateral Meniscus, its Injury Increases Meniscal Extrusion and its Repair and the Lateral Apusoludese Technique Restores the Extrusion to its Native Values

Abstract ID# 21853
All Authors: Rodolfo Morales-Avalos MD, PhD. MEXICO
Joan Carles Monllau MD, PhD, Prof. SPAIN
Simone Perelli MD SPAIN
Felix Vilchez-Cavazos MD, PhD MEXICO

Summary: This study determines the role of the lateral menisco-tibial ligament in the phenomenon of meniscal extrusion and analyzes the biomechanical consequences of its repair as well as the capsulodesis technique.

Data: Introduction. Previous studies have hypothesized that the lateral menisco-tibial ligament and the recently described Menisco-Tibio-Popliteus-Fibular Complex act together as a restrictor of the radial mobility of the lateral meniscus. The capsulodesis technique was described in 2017 as a quick and cheap solution to reduce meniscal extrusion after lateral meniscal allograft transplantation with satisfactory results at two and seven years of follow-up. The purpose of this study was to determine the function of the lateral menisco-tibial ligament in terms of radial mobility of the lateral meniscus as well as load distribution on the lateral tibial plateau and to determine if its repair as well as the capsulodesis technique restore this mobility and load to their native values in a biomechanical model using human cadaveric knees. Methods. Eleven human, fresh-frozen cadaveric knees were used for testing in this study. Prior authorization of an ethics committee. A diagnostic arthroscopy, simple radiographs and an MRI were...
performed to include healthy knees without high degrees of joint wear or associated ligamentous injuries. The lateral meniscus was circumferentially implanted with radiopaque spherical markers. They were mounted to a testing apparatus applying muscle and ground-reaction forces. The meniscus was evaluated at 0, 30, 90, and 120 degrees of knee flexion using Roentgen stereophotogrammetric analysis (RSA) and with a second method using two markers put on the posterior cruciate ligament and the lateral meniscus, and the load distribution were assessed using a pressure mapping sensor system after applying a loading force of 200 N to the knee joint. Measurements were recorded for 4 states: the native lateral meniscus, the injury of the lateral meniscus-tibial ligament, the primary repair of the mentioned ligament, the injury of the lateral meniscus-tibial ligament without repair but performing the arthroscopic technique of capsulodesis. Both cyclic loading and load-to-failure testing were performed. The displacement, stiffness, response to cyclic loading, and mode of failure were recorded and analyzed statistically. Results. The maximum values of extrusion occurred at 60 degrees of flexion, during biomechanical testing, the mean absolute meniscal extrusion at baseline was 1.3 ± 0.5 mm. After creation of the meniscotibial ligament lesion, the mean absolute meniscal extrusion was significantly increased (3.7 ± 0.9 mm) (P < 0.001). After repair, the extrusion was reduced to 1.8 ± 0.4 mm and after the capsulodesis the extrusion was reduced to 2.0 ± 0.5 mm. There were no statistically significant differences between the results of these last two groups. The average contact pressure of the tibial cartilage was significantly higher in the injury group than in the intact group or the primary repair and capsulodesis group. Conclusions. This study indicates that the lateral menisco-tibial ligament contributes to meniscal stability restricting the radial mobility of the lateral meniscus as lesions cause the meniscus to extrude and that repair of these ligaments and the capsulodesis technique can significantly reduce extrusion.

Category: Knee · Meniscus

Prospective Long-Term Outcomes of The Medial Collagen Meniscus Implant Versus Partial Medial Meniscectomy: A 20-Year Follow-Up Study

Abstract ID#: 21996
All Authors:
Gian Andrea Lucidi MD ITALY
Piero Agostinone MD ITALY
Alberto Grassi PhD ITALY
Stefano Di Paolo Eng ITALY
Andrea Pierangeli MD ITALY
Giacoimo Dal Fabbro ITALY
Stefano Zaffagnini MD, Prof. ITALY

Summary:
Differently from the 10 years follow-up, the clinical and the radiological outcomes of the medial CMI were not superior compared to the patients who underwent meniscectomy.

Data:
Background: The collagen meniscal implant (CMI) is a biologic scaffold that could be used to replace the meniscus host tissue after partial meniscectomy. The short-term results of this procedure have already been described, however, there is a paucity of comparative long-term studies. Purpose: The aim of the study was to compare the clinical outcomes, failures and osteoarthritic progression of patients who underwent partial medial meniscectomy and partial meniscus scaffold implantation. Study design: Prospective cohort-study; level of evidence, 2.

Methods: Thirty-six nonconsecutive patients with meniscal meniscus injuries underwent partial meniscal CMI (MCMI) implantation or partial medial meniscectomy (PMM) between 1997 and 2000 and were included in a prospective study with an intermediate 10-year follow-up examination. Outcome measures at the last follow-up included the Lysholm score (p = 0.86), KOOS subscales (p = 0.45 – 0.92), Tegner (p = 0.29) and the IKDC (p = 0.70). Moreover, 17 patients underwent Radiographic examination (7 MCMI, 10 MM) and no significant difference was reported with respect of the presence and incidence of Osteoarthritis between the two groups. Conclusion: The CMI implant for partial medial meniscectomy provided good long-term results and a low failure rate. However, differently from the 10 years follow-up, the clinical and the radiological outcomes were not superior compared to the medial meniscectomy group.

Category: Knee · Meniscus

Needle Arthroscopic Repair of Meniscal Tears Under Local Anesthesia: Patient Experience and Outcome Compared to the Traditional Approach

Abstract ID#: 22377
All Authors:
Tobias Stornebrink MD NETHERLANDS
Robbert van Dijk MD NETHERLANDS
Dirk Douven Msc. NETHERLANDS
Gino M. M. J. Kerkhoffs MD, PhD, Prof. NETHERLANDS

Summary:
Needle arthroscopic repair of meniscal tears under local anesthesia is safe and yields clinical outcome equal to more invasive traditional approaches, with less postoperative pain and less time spend on the surgical floor.

Data:
Purpose To compare patient experience and outcome of needle arthroscopic all-inside repair of meniscal tears using only local anesthesia with the traditional arthroscopic approach. Methods This was a pragmatic, prospective and comparative trial including 20 consecutive adult patients that suffered a traumatic meniscal tear in the red or red-white zone – equally divided between an innovation study arm and a control arm. In the innovation arm, procedures were performed using needle arthroscopy under local anesthesia. In the control arm, procedures were performed with traditional arthroscopy and under general or spinal anesthesia. Participants were allocated to a study arm based on shared decision making. The Hospital Anxiety and Depression Scale (HADS, 0–42, lower is better), Numeric Rating Scales (NRS, 0–10) of pain and satisfaction, use of pain medication (in addition to acetaminophen) and a Net Promotor Score (NPS; 0–10) were collected at baseline prior to the procedure, at discharge and at 1-day, 2-days, 7-days, 6-weeks and 3-months post-op. The KOOS domains, EQ5D-Qol and return to work were collected at baseline and 3-months post-op. Pain during the procedure was collected for needle arthroscopy patients, and procedure times for all participants. Occurrence of (serious) adverse events was monitored during the entire study. An a-priori power calculation with the baseline HADS as primary outcome measure indicated that 10 patients should be included in each group in order to detect a five-point difference between both groups. Results 20 patients were included in each group. Mean age was 34 in the needle arthroscopy arm and 37 in the traditional arm (t = 0.55, p = 0.59). Patients in the needle arthroscopy group experienced a lower NRS of pain at discharge compared to the traditional arthroscopy group (2 vs 7, p = 0.048), and less needle arthroscopy group participants used pain medication (in addition to acetaminophen) at discharge (2 vs 8 patients, p = 0.003) and at postoperative day 7 (4 vs 8 patients, p = 0.012). The EQ5D-Qol at 3 months post-op was higher in the needle arthroscopy group (80 vs 70.5, p = 0.041). Median NRS of pain during the needle arthroscopic procedure was 2 (IQR 1–6). At 3-month follow-up, there were no differences in HADS, NRS of pain, NRS of satisfaction, NPR, return to work, the KOOS domains, use of pain medication and ability to walk without supportive devices. Surgical time was longer in the needle arthroscopic group (27 vs 14 minutes, p = 0.003), yet time between arrival in the OR and discharge to the ward was longer in the traditional group (53 vs 92 minutes, p = 0.003). One patient from the traditional group was converted to a meniscectomy 9 months after the index procedure. There were no further complications. Conclusion This study indicates the feasibility of needle arthroscopic repair of meniscal tears under local anesthesia. In well selected and counseled patients, patient experience and outcome – including anxiety, satisfaction, pain and quality of life – is equal to the traditional arthroscopic approach. Postoperative pain and use of pain medication may be less and patients spend less time on the capacity constrained operating floor.

Category: Knee · Meniscus

Arthroscopic Capsulodesis Decreases Meniscal Extrusion At 1 Year Follow Up When Combined With Transtibial Repair of Posterosmedial Root Lesion. A Multicenter Prospective Randomized Study

Abstract ID#: 22575
All Authors: