Current Practice for Meniscus Repair Rehabilitation Amongst AOSSM Members

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Summary:
Survey study on the current trends for rehabilitation following meniscus repair depending on tear morphology.

Data:
Introduction: Meniscal repair has correspondingly become more popular, with promise of preservation of joint mechanics and hopes of preventing secondary arthritis. However, it is not clear the optimal rehabilitation protocol, with regards to the duration of limitation of range of motion and weight bearing, following repair of various meniscal tear types. It is prudent for orthopaedic surgeons to understand the current contextual landscape of how practitioners recommend rehabilitative patients that undergo meniscal repair. Methods: This is a cross-sectional observational survey study. A de-identified survey was designed using arthroscopic images from six cases of meniscal repair: Radial tear at popliteal hiatus, medial meniscus posterior root repair, lateral meniscus radial tear, lateral meniscus horizontal tear, medial meniscus red-white zone bucket-handle repair, and medial meniscus red-red zone longitudinal peripheral tear. This survey was distributed to American Orthopaedic Society for Sports Medicine (AOSSM) members by e-mail. Questions were designed to elicit, from the surveyed surgeons, their recommendations for duration of limitation of range of motion, weight bearing, and initial hoop stress integrity appears to substantially affect rehabilitation decision-making, with loss of hoop stresses triggering a more conservative approach to rehabilitation, both with regards to permissive return to range of motion and weight bearing.

Medial Meniscus Anatomy Rediscovered

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Summary:
Not previously described ligaments stabilising medial meniscus have been found during cadaveric dissection and then their presence has been confirmed in MRI scans.

Data:
Introduction: A new, not previously described pair of ligaments stabilising the medial meniscus (MM) were found during a cadaveric knees’ dissection. Follow-up studies – anatomical (prospective) and radiological (retrospective) were conducted to further investigate and establish their possible clinical and surgical relevance. METHODS: Anatomical study – while dissecting 18 cadaveric knees a previously not reported ligament was observed posterior to the medial collateral ligament (MCL), running from the femur and attaching adjacent to the posterior horn of medial meniscus (Zone 4), tentatively named a medial meniscus meniscofemoral ligament (MMFL). A second ligament running from the inferior border of MM Zone 4, over semimembranosus tendon with a distal insertion at the tibia where it runs posteriorly to MCL was named a medial meniscus meniscocapsular ligament (MMTL). The ligaments were photographically documented. Further retrospective radiological analysis of 100 knee STMRIs (Coronal PD-dixon sequences) was carried out (44 women, 55 males; mean age 41.9 years). The identification of MMFL & MMTL was made through a consensus between MSK radiologist, anatomist, and orthopaedic surgeon based on defined set of criteria: visible/not visible; normal/abnormal structure; torn. Concomitant pathologies were noted: ACL tear/deficiency; MM lesion (acute tear, degeneration, absence); presence/grade of articular cartilage defects in the medial compartment (MCAC). Statistical analysis was done using a Spearman’s r test. RESULTS: The anatomical dissections so far revealed the ligaments in all specimens. The MRI analysis has confirmed the ligaments’ presence in 95 knees; in 3 cases MMTL and in 4 MMFL were absent. In 21% the ligaments were normal, in 65% degenerated, and in 10% torn. In 77% of knees joint effusion and in 34% an ACL injury were recorded. Statistically significant correlation was found between the degree of soft tissues pathologies and the extent of MMTL and MMFL changes – more severe soft tissue damage correlated with higher degree of the ligaments’ abnormalities. Acute MM tears or degeneration correlated highly with abnormal structural changes of MMTL/ MMFL. CONCLUSIONS: The ligaments disruption resulting in MM injury or degeneration often coincides with acute ACL tears and soft tissues damage within the knee joint. The injury mechanism in which MM is torn seems likely to be a scenario where the ligaments are pulled away from each other during knee movement. Proper stabilisation of the menisci is crucial for the knee biomechanics. Therefore, determining a surgical technique based on the rediscovered medial meniscus anatomy will play a significant role in optimising meniscal meniscus treatment and improving long-term outcomes. Nevertheless, at the current stage further biomechanical studies and technical analysis of
Progression of Osteoarthritis after Conservative Treatment for Medial Meniscus Posterior Root Tear

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Summary:
Insufficient fracture, which is shown not only in MR but also in simple X-ray, is an important risk factor for aggravation of arthritis.

Data:
Background: There are limited data describing the long-term outcome of non-operative treatment of medial meniscal posterior root tear (MMPRT). The purpose of this study was to investigate the natural history of MMPRT and find out a prognostic factor for poor outcome of non-operative treatment. Methods: Patients who were diagnosed as MMPRT and initially treated with non-operative management were retrospectively reviewed. Patients with severe OA(Kellgren-Lawrence(K-L) grade 4) were excluded and 94 patients were enrolled. The mean follow-up period after diagnosis was 45.9 month (from 17.6 to 170.5).

Demographic characteristics and radiographic features including hip-knee-ankle angle (HKAA), medial proximal tibial angle (MPTA), joint line convergence angle (JLCA), joint line width and K-L grade in plain radiographs and meniscus extrusion, bone edema and insufficient fracture in MRI were assessed. Results: At initial assessment, Four (4.3%) patients were K-L grade 0, 17 (18.1%) patients were grade 1, 59 (62.8%) patients were grade 2 and 14 (14.9%) patients were grade 3. During follow-up period, K-L grade of 34 (36%) patients were aggravated and 60 (64%) patients were not. The average of joint width was 3.2mm at initial assessment, 2.9mm at 1 year, 2.9mm at 2 years, 2.9mm at 3 years and 2.7mm at final follow-up. The average of JLCA was 2.49°, 3.13°, 3.23°, 3.28° and 3.37° at initial, 1 year, 2 years, 3 years and final follow-up. Demographic data and radiographic features were compared between two groups; those whose K-L grade were aggravated and those whose K-L grade were weren’t. Only site of knee was different (73% vs. 27%, P=0.033) and other demographic features were not significantly different between two groups. In radiographic features, insufficient fracture was higher in aggravated group (7% vs. 24%, P=0.019 in X-ray and 10% vs. 35%, P=0.003 in MR). Conclusions: K-L grade of most MMPRT patients (64%) didn’t aggravated during follow-up period. Since insufficient fracture was risk factor for aggravation of arthritis, clinician should carefully assess the insufficient fracture and decide to treat.

A Comparison of All-Inside Versus Inside-Out Meniscus Repair in Elite Athletes

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Summary: A study of 170 elite athletes demonstrated that all-inside medial meniscal repairs had a significantly higher failure rate when compared with inside-out medial meniscal repairs and all types of lateral meniscal repairs.

Data:
Introduction The two most common methods of meniscal repair are all-inside (AI) utilising arthroscopically placed suture devices and inside-out (IO) where sutures are passed through the meniscus and the capsule and tied on the external surface of the capsule. Even though few studies exist comparing the results of these two techniques there has been a shift away from the historic gold standard of IO towards more AI repairs. The aim of this study was to compare the failure rate and the time to failure of all-inside and inside-out meniscus repair performed in elite athletes. Methods A retrospective review was performed of all elite athletes who underwent meniscal repair, under the care of the senior author, between 2013 and 2019. All meniscus repairs with a minimum of two-year follow-up were included in the study, including patients who underwent concurrent cruciate ligament reconstruction. If a patient had both medial and lateral menisci repaired during the same surgery, they were tracked separately for failure. Meniscus repairs were classified as AI or IO depending on the type of repair performed. Failure was defined as undergoing a subsequent surgery to address a persistent meniscal tear. The Fisher exact test was used to analyse categorical data while continuous variables were evaluated using analysis of variance (ANOVA) with Bonferroni adjustment for multiple comparisons. Survival analysis or specifically Cox proportional hazards modelling was used to determine if meniscal repair failure rates differed by location and technique of meniscal repair. Results 170 elite athletes (192 repairs) with an average age of 25.1±4.9 years underwent meniscus repair, 55% played football, 37% played rugby and 8% participated in gymnastics, hockey, cricket, or other sports. Concurrent cruciate ligament reconstruction was performed in 59% of patients. 41 (21%) meniscus repairs failed during the study period. Medial meniscus tears repaired with the AI technique failed at a significantly higher rate (58%) than medial meniscus tears repaired with the IO (23%) or lateral meniscus tears repaired with the AI (12%) or IO (14%) technique (p<0.001). Overall, meniscus repair failure in patients with a medial meniscus tear repaired with the AI technique were almost 8 times higher at any point in time as compared to AI repair of the lateral meniscus. At 1 year following repair, 8% of lateral meniscus repairs had failed (regardless of technique), while medial meniscus repairs failed at rate of 16% for IO and 42% for AI. By 2 years, the failure rate of a medial meniscus tear repaired with the AI technique was 53% and at 5 years was 63%. Conclusion All-inside medial meniscal repair led to a higher rate of failure compared to inside-out medial or lateral meniscus repair in elite athletes. Medial meniscus repairs failed at a high rate than lateral meniscal repairs.