

Material and Methods: One hundred seven patients who received ACL reconstruction and underwent postoperative MRI and second-look arthroscopy, were followed up for a minimum 2 years retrospectively. Severity of infrapatellar fat pad (IPFP) fibrosis was evaluated by MRI at an average of 26 months after ACL reconstruction. Cartilage degeneration was evaluated by second look arthroscopy at 29 months.

Results: Twenty-five patients (24.0%) showed cartilage degeneration of PFJ in second look arthroscopy. Patients were divided into 3 groups according to severity of IPFP fibrosis tissue i.e., Group A: focal and incomplete band fibrosis, n=69, Group B: complete band fibrosis, n=31, and Group C: diffuse and infiltrated fibrosis, n=7. Cartilage degeneration of PFJ was significantly worsened with more fibrosis formation of IPFP ($p<0.001$). Other factors for instabilities, BMI, age, concomitant meniscal procedure, time from injury to reconstruction and clinical scores were not correlated with cartilage degeneration of PFJ. The multivariate logistic regression analysis of degeneration of PFJ after ACL reconstruction identified more severe fibrosis tissue formation of IPFP and initial cartilage defect as significant predictors.

Conclusions: More extensive fibrosis tissue of IPFP and initial cartilage defect cause further degenerative change of PFJ. Age, BMI, concomitant meniscal procedure, time from injury to reconstruction, clinical scores and instability did not affect cartilage degeneration of PFJ in the short term follow-up period.

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B0250

Modified posterior portals for hindfoot arthroscopy

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Purpose: The purpose of this study was to determine the course and safe distances achieved with our modified coaxial portals for hindfoot arthroscopy and to report the clinical results.

Methods: Thirty embalmed cadaveric and ten fresh-frozen ankle specimens were used for anatomic measurements and trial operations. The posteromedial portal via the posterior tibial tendon sheath was first established. The posterolateral portal was subsequently created immediately behind the posterior border of the lateral malleolus and anterior to the peroneal tendons using an inside-out technique. The coaxial portals were finally finished with cannulas left in place. A clinical study was conducted with posterior ankle arthroscopy performed on 18 ankles in 15 patients. All patients were evaluated for any complications with an average follow-up of 38 months.

Results: The posterior tibial nerve, posterior tibial artery and peroneal artery were located at a mean distance of 8.7mm, 10.1mm and 12.9mm respectively from the near edge of the kirschner wire used as a reference to the coaxial portals. The sural nerve and lesser saphenous vein were at a larger distances of 27.6 mm and 28.3 mm, respectively. The mean West Point Score at the time of the latest follow-up was 91.5 points (range, 76–100). There were 9 excellent results, 3 good results and 1 fair result. No patient showed any complication related to the modified coaxial portals.

Conclusions: The modified coaxial portals appeared to have a safe distance from the neurovascular structures in our anatomic study. Clinically, this technique is safe, effective, and reproducible.

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B0266

Arthroscopic incomplete repair of irreparable rotator cuff tears: Pre-operative factors and outcomes

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Background: For massive and irreparable rotator cuff tear (RCT), reverse total shoulder arthroplasty (RTSA) was developed and getting more popular. However, incomplete repair was still considered due to the improvement of clinical outcomes without the possible complications of RTSA. In this study, we evaluate the image and functional outcomes of patients treated with incomplete repair, as well as the pre-operative factors that may be related to the more improvement from the surgery.

Material: We reviewed patients who underwent incomplete rotator cuff repair from December 2012 to April 2015 due to irreparable RCT. The incomplete repair was defined as a residual defect of the tendon-footprint junction after repair. There were 37 patients met this criteria. The mean patient age was 60.3 years, 19 were male, 18 were female, 29 had a right shoulder RCT and eight had a left shoulder RCT. The surgical procedure included repairing the less retracted anterior and posterior margins. In addition, aggressive tendon adhesion release, interval slide or margin convergence was performed depending on the intraoperative situation. All surgeries were performed by the same surgeon.

Method: Patient characteristics collected before surgery included age, sex, presence or absence of diabetes, smoking status, presence or absence of night pain, duration of symptoms, the Visual Analogue Scale of pain (VAS) score, acromio-humeral distance (AHD), and American Shoulder and Elbow Surgeons (ASES) score. Duration of symptoms was categorized as 0–6 months, 7–12 months, and >12 months. MRI and X-ray were checked approximately 6 months after the surgery to evaluate the healing status and AHD, respectively. The failure of repair was defined as a progression of tear. Functional outcome was evaluated using the ASES score at least 8 months after surgery. The degree of functional improvement was defined as the difference between ASES scores before and after surgery (d-ASES).

Results: The mean follow-up period was 29.3 months (range, 8–80 months). The VAS score improved significantly from 5.22 to 1.51 ($P < 0.01$). The ASES score improved significantly from 46.0 to 78.6 ($P < 0.01$). The incidences of night pain significantly improved from 70.3% to 8.1% ($P < 0.01$).

Only lower ASES score, higher VAS score and night pain before surgery were related to the higher d-ASES score. There were no factors related to failure of repair, identified based on an MRI at a mean follow-up time of 6.4 months. AHD improved from 8.3 mm to 8.8 mm, but this was not significant (P value = 0.327). There was no correlation between the preoperative ASES score and AHD or the postoperative ASES score and AHD. The rate of failure-repair was 21.6%. The failure of repair detected based on the MRI was not related to a lower postoperative ASES score.

Discussion: Many reports showed a functional improvement after incomplete repair for irreparable RCT [1,2]. A previous report defined an ASES score > 80 as an excellent result for massive RCT[3]. In our study, the mean postoperative ASES score reached 78.6, implying that our result was satisfactory for the irreparable tears. There was no correlation between the postoperative ASES score and failure of repair. Failure of repair on MRI did not indicate poor function. Controversy still exists as to the effect of AHD on functional outcome. In our study, AHD increased by approximately 0.5 mm after surgery, although this was not a significant result. This AHD increase may have been because of the repair of the rotator cuff or the performance of acromioplasty. Our study showed no correlation between the preoperative AHD and the final functional outcome.

Previous studies showed that a higher fatty infiltration of supraspinatus muscle had a negative effect on healing [4]. However, in our study, some patients were diagnosed via sonography rather than an MRI and we were unable to evaluate this factor.

The ASES questionnaire is known to be a highly reproducible and valid method for evaluating subjective shoulder function. We evaluated the effect of surgery based on the differences in the preoperative ASES score and postoperative ASES score, defining d-ASES score. We also evaluated those factors that may affect the d-ASES score. Only night pain, higher VAS score and lower ASES score had a positive effect on the d-ASES score. Other factors, such as age, sex, presence or absence of diabetes and smoking status, were not related to the d-ASES score. This may mean that patients with a poorer preoperative function and more pain will experience a better postoperative improvement.

Conclusion: Arthroscopic incomplete repair of the irreparable rotator cuff tear is an effective treatment to improve the shoulder function and decrease the pain. Patients with lower functional score, higher VAS score or night pain before surgery get more benefit on functional improvement from the surgery. Thus, we suggest incomplete repair for irreparable tears even in poor preoperative functional score. The incomplete repair should be tried before the reverse total shoulder arthroplasty.

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B0271

CT value and tunnel enlargement of rounded rectangular femoral bone tunnel for anterior cruciate ligament reconstruction

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Background: We developed a novel technique for anatomical single-bundle anterior cruciate ligament (ACL) reconstruction: creation of a rounded rectangular femoral bone tunnel. The purpose of this study was to compare the computed tomography (CT) value and tunnel enlargement ratio of the femoral bone tunnel with those of rounded tunnel ACL reconstruction.

Material: We included 39 knees that underwent rounded tunnel ACL reconstruction and 42 that underwent rounded rectangular ACL reconstruction. To evaluate the CT value, we compared the CT images approximately 1 week after surgery. Making a parallel slice toward the opening of bone tunnels to a depth of 3 mm, we evaluated the CT value of eight directions in the bone tunnel wall. To evaluate tunnel enlargement, we compared CT images approximately 1 week after surgery with images taken 3 months after surgery. Using a parallel slice toward the opening of the bone tunnel, we measured the bone tunnel area and calculated the tunnel enlargement ratio. The level of significance was $P<0.05$, and the t-test was used for statistical analyses.

Results: The CT value was significantly high for the rounded rectangular tunnel in comparison with the rounded tunnel in almost all directions ($P<0.05$). The rounded rectangular tunnel area enlargement ratio was significantly lower (rounded: $110 \pm 38\%$ vs rounded rectangular: $73 \pm 37\%$, $p=0.001$).

Discussion: A femoral bone tunnel created for ACL reconstruction may enlarge over time through mechanical and biological factors induced by the reconstructed ligament. Bone tunnel