there was no significant difference in graft tear and synovial coverage. Radiologic findings comparing instability showed no significant difference.

Conclusions: Even though adjustable-loop system’s intended flexibility has possibility of loop lengthening and subsequent graft displacement, compared with fixed-loop system, both groups provide further stability function without significant differences. Also the second-loop arthroscopy revealed no difference in graft tear and synovial coverage between fixed-loop and adjustable-loop device.

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B0638
Comparison of clinical outcomes and second-look arthroscopic findings after ACL reconstruction using a hamstring autograft or a tibialis allograft
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Background: The purpose of this prospective randomized clinical study was to compare the clinical and radiological outcomes, including tendon widening and the progression of osteoarthrosis after ACL reconstruction using a hamstring autograft or a tibialis allograft. In addition, we compared the graft tear, and synovial coverage of grafts in patients that underwent the second-look arthroscopy.

Material and Method: Among 184 patients with an ACL injury underwent ACL reconstruction, 68 patients of autograft group and 64 patients of tibialis allograft group were included for this study after minimum of 2-year follow-up. The Lachman and pivot-shift tests, Tegner activity score, Lysolm knee score, and IKDC score were compared between the two groups. The quadriceps and hamstring isokinetic strengths using dynamometer were also compared. Degree of OA was determined using the Kellgren-Lawrence grading system on the weight-bearing radiographs. 51 patients (26 patients in autograft group and 25 in the tibialis allograft group) underwent the second-look arthroscopy, in which we compared the apparent tear of graft and synovial coverage of grafts.

Results: At the final follow-up, there were no statistical significances in the two groups in Lachman and pivot-shift tests (n.s.). The Tegner activity, Lysholm knee score, and IKDC scores were similar in the two groups. Moreover, no significant differences were observed in the muscle powers (n.s.). Some patients showed the progression of OA (5 in autograft and 4 in allograft groups) without intergroup difference (n.s.). Regarding the findings of second-look arthroscopy, although there was no significant difference in graft tear, synovial coverage was better in autograft group than in allograft group.

Conclusions: Even though hamstring autografts and tibialis allografts provided good functional outcomes without significant differences, the second-look arthroscopy revealed that hamstring autografts produced better synovial coverage than tibialis allograft.

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B0649
Arthroscopic-assisted posterolateral corner reconstruction of the knee: Our technique, classification, surgical algorithm, and midterm results
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Arthroscopic-Assisted methods allow more definite assessment of anatomic landmarks, less limitation of range of motions, and less risk of arthrofibrosis, thus they favourably provide the most visualization with the least site morbidity. The aim of this study is to introduce a new arthroscopic method to reconstruct the Popliteus tendon. The minimally invasive technique introduced is performed through the postero-patellar corner (PLC) of the knee to reconstruct the posterolateral rotatory instability (PLRI) of the knee.

39 patients (8 females, 31 males) with PLC injury and normal knee alignment have undergone arthroscopic Popliteus tendon reconstruction. Among them 27 patients had combined ACL and PLC injuries and 9 had been involved in PLC and PLRI. In 3 of them, injuries involved ACL, PCL and PLC. Physical examinations, imaging and arthroscopic evaluations were performed to evaluate instability stages. In the case of grade I instability, when the Popliteus tendon had not been injured, they were treated by modified Larson Technique, using Semitendinosus Autograft. If injury was evaluated as grade II, involving the Popliteus tendon component, arthroscopic reconstruction of the Popliteus tendon was the preferred technique. In the event of grade III, the arthroscopic Popliteus tendon reconstruction and the modified Larson Technique were applied concurrently.

All patients were followed up for 58 ± 1 months postoperatively. Varus and external rotation instabilities were restored with arthroscopic PLC reconstruction. All patients had gained near normal knee stability and significant improvements in the level of pain and performing activities of daily living. In cases of varus the external rotation and the reverse pivot shift were improved substantially. There were no cases of arthrofibrosis and/or limitations in the knee motions. In this study, the novel arthroscopic procedure for reconstruction of the PLC has been accompanied with less morbidity and preserving the native intact structures. The probability of a neurovascular injury has been minimized and there was no case of infection or arthrofibrosis in short term and long term follow-ups. Our findings proved that the combination of Popliteus tendon reconstruction and the modified Larson Technique has favourable results in grade III instabilities. We have shown in a relatively large number of patients and long term multi-phase follow ups that functional static and dynamic stability have been achieved in almost all cases tracking by IKDC scores in multi-stage assessments.

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B0651
The experimental research of anatomic anterior cruciate ligament reconstruction assisting by 3D printing technology
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Background: Due to the individual differences of diameter and print of ligament, the requirement of individual anatomic precise reconstruction can not be meted with traditional single positioning method. 3D printing technology may help with this problem.

Method: The body knees are scanned with thin layer CT aimed to gain the data of bones which is used to establish knee joint model by computer software. The site and direction of the bone tunnels of femur and tibia is designed and calibrated on the knee joint model. The knee resin mold and ACL navigation template is replicated with the help of 3D printing, the accuracy of which is validated on the body knees.

Results: The internal opening of femoral and tibial bone tunnel is located in the central point of original ligament footprint area, and the site and direction is same as preoperative design.

Discussion: Anatomic single bundle ACL reconstruction assisting by 3D printing can greatly improve the accuracy of positioning and short the time of operation by means of careful preoperative design and preview.

Conclusion: This method of positioning is accurate, reliable and repeatability, which is expected to improve the success rate of ACL reconstruction and is feasible for further clinical research.

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B0652
Patient-reported outcomes following surgical treatment for multiligament knee injuries
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Background: Surgical treatment has been recommended for multiligament knee injuries. However, the most effective treatment or timing for multiligament knee injuries remains variable and controversial. The purpose of this study was to evaluate the patient-reported outcomes following surgical treatment for multiligament knee injuries using the Knee Injury and Osteoarthritis Outcome Score (KOOS). Patient: From January 2004 to February 2014, 40 patients with multiligament knee injury underwent surgical treatment in our institution. Twenty-four patients (16 males and 8 females) with

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Conclusion: We successfully developed a method to evaluate intraoperative GTM and quantify the tunnel on MSCT. Further investigation will focus on clinical outcomes correlation with GTM and tunnel placement.

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B0656
Association between pre-operative MRI of the supraspinatus muscle and reparability of rotator cuff tears
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Background: There are few reports of the assessment of the association of the occupation ratio (a marker of supraspinatus muscle atrophy), with reparability into account. To determine the correlation between supraspinatus muscle occupation ratio and reparability of the rotator cuff muscles, (especially the supraspinatus), to determine the correlation between each occupation ratio for 1-muscle (Only SST), 2-muscles (SST + Infraspinatus [IST] or SST + Subscapularis [SBC]), and 3-muscles (SST + IST + SBC) injury of rotator cuff tear.

Material and Methods: We evaluated 170 patients (average age, 62.3 years (range, 40-83 years) who had only arthroscopic type II, III rotator cuff repair. Patients were divided into two groups; 96 patients had undergone a type II repair, 74 patients had undergone a type III repair. Also patients were separated into four groups: i) isolated supraspinatus tears, ii) supraspinatus and infraspinatus tears, iii) supraspinatus and subscapularis tears, iv) tears in all 3 muscles. Muscle atrophy of the supraspinatus was evaluated using occupation ratio on the most lateral T1-weighted sagittal oblique view. Occupation ratio is supraspinatus muscle in supraspinatus fossa was evaluated visually. The area was measured by 2 independent observers using Centric-Radiology RA1000 software (GE Healthcare., Barrington, IL, USA).

Results: On MRI, the supraspinatus muscle occupation ratio was significantly different between the completely repaired (Type II) and incompletely repaired (Type III) groups. As expected, the mean occupation ratio for completely repaired group (42.39 +/- 10.1) was higher than incompletely repaired group (36.64 +/- 6.94), with statistical significance. The cutoff value from complete repair (Type II) to incomplete repair (Type III) was 41 for supraspinatus muscle occupation ratio. As expected, the supraspinatus muscle occupation ratio was significantly smaller as the tear increases (P < 0.001).

Discussion: Our study shows that supraspinatus reparability (mobility to the greater tuberosity) can give some idea through the preoperative MRI sagittal-oblique view. Among the several MRI parameters mentioned in previous studies, our study shows that the pre-operative MRI supraspinatus occupation ratio is associated with reparability of rotator cuff tears, especially the supraspinatus. The supraspinatus occupation ratio cut off value between complete coverage versus incomplete coverage was 41. Several previous literature mentioned reparability of rotator cuff tears using supraspinatus occupation ratio, which is one of the pre-operative MRI factors. Our study shows that the supraspinatus muscle volume or atrophy measured via the occupation ratio can be effective in determining the supraspinatus-infraspinatus reparability. The supraspinatus occupation ratio < 41 suggested a high possibility in incomplete repair. Also we gave a schematic drawing showing the mean data of atrophy to have some estimation of the atrophy and cutoff value 41. It was surprising that even with mild atrophy surrounding the supraspinatus was about 60% atrophy. For other analysis, 2-muscle tear groups showed that the mean occupation ratio of SSP + SBC muscles tear group value higher than occupation ratio of SSP + ISP muscles tear group. It indicates that the degree of atrophy is less severe in supraspinatus muscle when accompanied with anterior tear than posterior tear. This is somewhat obvious since the supraspinatus is separated by rotator interval with subscapularis tendon tear but posterosuperior tear is continuum with infraspinatus.

Conclusion: The occupation ratio of supraspinatus muscle less than 41 can be the cutoff value between coverage of greater tuberosity versus incomplete coverage. And there was a significant correlation between tendons (muscle) tear involvement and supraspinatus muscle atrophy ratio. Only SSP tear group had the least degree of muscle atrophy.

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B0659
Clinical and radiologic outcomes of arthroscopic “Hybrid” repair in large to massive rotator cuff tear
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Background: In some large to massive rotator cuff tears, the double row repair can be difficult or even impossible especially for the supraspinatus tendon. In such circumstances, partial repair or incomplete repair is an option. Incomplete repair (Type III) can be achieved by our concept of “hybrid” repair in this kind of tears. The basic principle behind “hybrid” repair is double row in infraspinatus tendon, single row in supraspinatus tendon, medialization of supraspinatus tendon footprint, and TOE augmentation. This definition is different from previous literature referring to...