

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 group provided good functional and radiologic outcomes without significant differences. Also the second-look 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 tibial tunnel widening and the progression of osteoarthritis 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, Lysholm 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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#### B0648

##### Partial-thickness rotator cuff tears in university baseball players

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**Background:** Rotator cuff tears are common shoulder injuries in baseball players. In some severe tears (i.e. through more than 50% of the cuff's thickness), conservative treatment does not work well, and surgical treatment is sometimes chosen in an effort to ensure return to play. In contrast, some partial thickness rotator cuff tears do not cause shoulder symptoms, even during throwing motion. Here, we assessed the rates and characteristics of symptomatic and asymptomatic partial thickness rotator cuff tears in baseball players.

**Materials and Methods:** We studied 57 university baseball players (age:  $19.7 \pm 0.8$  years; baseball career:  $11.5 \pm 1.7$  years; position: 25 pitchers and 32 position players). All subjects completed questionnaires about current and past shoulder pain; their rotator cuff tendons were then ultrasonographically examined.

**Results:** Twenty-two (39%) players were diagnosed with rotator cuff tears using ultrasonography. All tears were articular sided and of partial thickness. Eleven tears were in the supraspinatus, 5 in the infraspinatus, and 6 in both the supraspinatus and the infraspinatus. Tear depth was  $3.6 \pm 1.5$  mm in the supraspinatus and  $2.8 \pm 1.4$  mm in the infraspinatus. Only 23% of rotator cuff tears (5/22 tears) were accompanied by shoulder pain; the remaining 77% (17/22 tears) were asymptomatic. Six of the players with tears had had shoulder pain when throwing at high school or junior high school, although they had no pain at the time of our investigation. Five of the 25 pitchers (20%) and 17 of the 32 position players (53%) had rotator cuff tears.

**Conclusions:** Ultrasonographic examination showed that 30% of these university baseball players had asymptomatic articular-sided partial-thickness rotator cuff tears. The tear extended for less than 50% of the medial-to-lateral dimension of the rotator cuff's footprint on the greater tuberosity; this suggests that most of these were tears of the superior capsule but not the rotator cuff tendons, because the superior capsule is attached in the articular half of the greater tuberosity. Furthermore, 77% of tears were asymptomatic. Therefore, most so-called articular-sided partial-thickness rotator cuff tears may not be pathological tendon tear but instead adaptive changes in response to acquired laxity without any symptom.

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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 rotary 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 PCL 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  $58 \pm 1$  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 favourite 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 experiment 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 requirements of individual anatomic precise reconstruction can not be met with traditional single positioning method. 3D printing technology may can 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