Results: The mean side-to-side difference in the ratio of ATS to the femur was as follows: Group 1, 2.37%; Group 2, 3.59%; Group 3, 5.95%; and Group 4, 8.45%. Groups 3 and 4 showed significantly higher values than those of Groups 1 and 2. There was a positive correlation between the ratio of ATS and the time from injury to surgery ($r = 0.52$). The ratio of medial meniscus injury was significantly higher in Group 4 ($r = 29.0$); Group 2, 23.9%; Group 3, 29.6%; and Group 4, 52.6%). The ratio of ATS in patients who had a medial meniscus injury was significantly higher than that in the patients without medial meniscus injury (5.54% vs 4.11%; $p < 0.001$). There was no correlation between the ratio of ATS and the tibial posterior slope ($r = 0.07$).

Conclusions: ATS in maximum extension increases with time in ACL-deficient knees. In addition, medial meniscus injuries exacerbated ATS associated with ACL deficiency and medial meniscal injuries significantly increased 12 months after the ACL injury. Therefore, it is suggested that ACL reconstruction should be performed within 6 months after an injury if surgeons desire to avoid the abnormal subfibular relationship in the sagittal plane at the time of the surgery or at least within 12 months to avoid a complication of medial meniscal injuries.

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B0663

Graft diameter matters in hamstring ACL reconstruction

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Introduction: Recently techniques have been developed to increase graft diameter in hamstring ACL reconstruction with the hope to decrease graft failure. To date there is limited evidence to show that a smaller graft diameter results in a higher ACL failure rate.

Method: The factors for failure in 1480 consecutive single surgeon hamstring ACL reconstructions were evaluated prospectively. Patients were followed for 2-15 years. A multivariate analysis was performed which looked at graft size, age, sex, time to surgery, meniscal integrity, meniscal repair and ACL graft placement to determine whether graft diameter matters in determining the failure of hamstring ACL reconstruction.

Results: Graft diameters ranged from 6-10mm. The mean graft diameter for all patients was 7.75mm. 83 ACL reconstructions failed. The mean size of graft failures was 7.55mm. ACL reconstructions that failed had a significantly smaller hamstring graft diameter (p = 0.001). The Hazard Ratio for a smaller diameter graft is 0.517 ($p < 0.0001$)

For every 1mm decrease in graft diameter there is a 48.3% higher chance of failure.

ATS in maximum extension increases with time in ACL-deficient knees. In addition, medial meniscus injuries exacerbated ATS associated with ACL deficiency and medial meniscal injuries significantly increased 12 months after the ACL injury. Therefore, it is suggested that ACL reconstruction should be performed within 6 months after an injury if surgeons desire to avoid the abnormal subfibular relationship in the sagittal plane at the time of the surgery or at least within 12 months to avoid a complication of medial meniscal injuries.

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B0668

Arthroscopic wire fixation of avulsion fractures of the posterior cruciate ligament from the tibia

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Background: Avulsion fractures of the posterior cruciate ligament (PCL) from the tibia need surgical intervention. Open reduction and internal fixation with cannulated screw has extensive soft tissue damage and difficulties in screw removal. Arthroscopically assisted fixation techniques from literature were variable and the results were not consistent. This study is to retrospectively evaluate the clinical results of arthroscopically assisted reduction and wire loop fixation of avulsion fractures of the PCL from the tibia.

Material and method: June 2009 to March 2015, 15 patients with PCL tibia insertion avulsion fracture underwent arthroscopic reduction and modified figure eight wire loop fixation. The mean age was 30.8 years. The mean period between the injury and operation was 9.5 days. Surgical technique: Anatomical reduction, suture in position with knee in 90 degree of flexion. Arthrosectomy of anterolateral and anteromedial portals, a posteromedial portal was established routinely. After resection of posterior septum, two parallel 2.5 mm tubal tunnel were created by using the posterior cruciate ligament tibial tunnel drill guide. The locations of tunnels were separated and inferior to the fracture fragment. A 1.6mm wire was passed in front of the ligament-bone junction of PCL avulsion fragment, the two ends of wire crossed the surface of the avulsion fragment, then passed into tibia tunnels respectively, tightened the wire in the anterior cortex of tibia. Muscles excise and range of movement training started immediately after surgery, however, the full weight bearing only allowed after 6-weeks. The post-operation stress x-ray, posterior drawer test and IKDC Score were used to evaluate objective and subjective improvements.

Results: No surgical complications were noticed. 13 patients underwent review, the mean follow-up period was 22.3 months. No objective PCL laxity was noticed from the post-operation x-ray, posterior drawer test and IKDC Score were used to evaluate objective and subjective improvements.

Patients that had wire removal. All patients rated themselves returned to pre-injury functional level.

Discussion: Although several techniques had been used to treat the avulsion fracture of PCL from the tibia, such as screw, sutures, wires, however, for the small and comminuted PCL bony fragments remained difficult in fixation. Our technique adopts the figure eight wire loop in which the small and comminute PCL avulsion fragments can be pressed down and hold in place by the loop. The wire loop was sitting in front of the PCL ligament and bony fragment junction. The stiffness property of wire can sustain the tension as long as the wire was tightened. The clinical follow up showed no loosening of fixation and no cutting out of wire through the bony fragments.

Conclusion: Arthroscopically assisted wire loop fixation of avulsion fractures of PCL from the tibia can achieve satisfactory clinical results during the long-term follow-up in terms of the range of motion and knee stability.

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B0672

Results of arthroscopic fixation of osteochondritis dissecans lesions of the knee with cylindrical autogenous osteochondral plugs (case series)

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Purpose: Surgical techniques that have been described for the operative fixation of an unstable osteochondritis dissecans (OCD) lesion in the knee are various and with different outcomes and none of them were totally successful. We report the results of a new fixation technique for unstable OCD lesions using arthroscopic autogenous osteochondral grafting (mosaicplasty).


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B0664

Anteromedial opening wedge HTO for the PCL deficient varus arthritic knee a prospective ten – Fifteen year study

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Introduction: Treatment of the young patient with medial compartment arthritis and a PCL deficient knee is a complex problem. This study evaluates the efficacy and survival of the anteromedial opening wedge osteotomy for PCL deficient knees with medial and patellofemoral compartment degenerative changes.

Methods: Twenty two patients have undergone an anteromedial opening wedge high tibial osteotomy for the PCL deficient varus knee. Patients were evaluated prospectively pre-operatively and at one, five and fifteen years post surgery by visual analogue pain scores and patellofemoral pain scores, subjective IKDC, WOMAC and SF-36. Radiographic evaluation to determine correction in the coronal plane and the degree of slope increase was performed at one-year post surgery. Patients have been followed from 8-15 years – mean 12 years.

Results: All patients reported and improvement in PCL instability. There was a significant improvement in visual analogue pain and patellofemoral pain scores, subjective IKDC, WOMAC and SF-36 and overall knee function at one five, ten and fifteen years. Two patients have been converted to a TKA at 9 & 11 years. The survival at 10 years is 95%.

Conclusion: This technique shows encouraging mid to long term results for a complex problem with a 95% ten year survival and a significant and sustainable improvement in pain scores, WOMAC, IKDC & SF-36.

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The OCD lesions were assessed arthroscopically and then fixed in situ by using one or multiple osteochondral dowel grafts harvested from the non weight-bearing region of femoral condyle. And all the patients were followed at least for 24 months.

**Results**

Preoperative International Knee Documentation Committee scores assessed 4 patients as nearly normal, 10 as abnormal, and 2 as severely abnormal. After the 24-month follow-up, 15 knees were scored as normal and 1 patients as abnormal. All the patients had CT-scan after 6 months post operative and all of them had bony union. All the patients were symptom free at the last follow up.

**Conclusions**

Autogenous osteochondral grafting of unstable OCD lesions in the knee is a reliable technique for fixation of these lesions and in addition to have biologic enhancement of union with out any foreign body in the joint.

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**B0676**

The study of Interleukin-8 on anterior cruciate ligament reconstruction with remnant preservation

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**Objective**

Preservation of Remnent Attachment Improves Graft Healing in a Rabbit Model of Anterior Cruciate Ligament Reconstruction. The aim of this study was to investigate the role of interleukin 8 between remnant preserved versus conventional anterior cruciate ligament reconstruction especially during the early stage.

**Methods**

40 cases of ACL reconstruction was studied. Group I was 20 cases of remnant preserving and group II was 20 cases of ACL reconstruction without remnant preservation. We collect the joint fluid from the patients every 3 months and Interleukin-8 was measured using Multiplex assay. Stability is measured by stress radiogram using Telos device at 30 flexion at post operative 3.6.12 Month. ACL signal intensity on MRI after mean period 13 months (10-13 months) of operation was measured.

**Results**

At 3 months, IL 8 was elevated in 55 % in group I & 25% in group II anterior displacement measured by stress radiogram using Telos was 0.46mm ± 0.19 in group I and 3.39mm ± 0.28 in group II at post-operative 3 Month, 1.15mm ± 0.25 in group I, 2.96mm ± 0.28 in group II at post-operative 6 month, 2.96mm ± 0.28 in group I, 2.87mm ± 0.34 in group II at post-operative 12 month, mechanical stability was better in group I than group II with statistical significance.

There was increased signal on F-up MRI in group II than group I with statistical significance.

**Conclusions**

The remnant preservation ACL reconstruction may be beneficial for ligamentization of the graft tendon during the first 3 months and for mechanical stability.

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**B0680**

Curative effect comparison of two kinds of grafts suture for massive rotator cuff tear

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**Background**

Since Mihaata reported that the grafts (tendons, fascia lata or artificial materials) were applied to treat massive rotator cuff tears (MRCT) by arthroscopic superior capsule reconstruction (ASCR), clinical results showed the recovery of the glenohumeral joint stability, especially pain relief were significantly improved. The literature reported that the grafts were used to repair rotator cuff tears, which were attached laterally to the greater tuberosity, but medially to the proximal rotator cuff residual (conventional patch graft) or glenoid superior tubercle (Mihaata)

**Material**

From January 2012 to December 2015, 25 patients with MRCT underwent ASCR, who had grade 2 of rotator cuff, severe retraction to glenoid or severe muscle atrophy of 25 cases,11 were male and 14 were female, aged 48-77, the mean age was 53 years.

**Method**

Group A: the grafts of 9 patients were sutured medially to proximal rotator cuff residual and laterally to the greater tuberosity. Group B: the grafts of 16 patients were attached medially to the glenoid superior tubercle and laterally to the greater tuberosity (ASCR), if rotator cuff residual sliding was enough, that can further overlapping suture with graft. The visual analouge scale (VAS) score, the ROM, the supraspinatus muscle strength, Constant-Murley score, American Shoulder and Elbow Surgeons (ASES) score, and magnetic resonance imaging (MRI) were used to evaluate the effectiveness.

**Results**

25 patients were followed up 12-36 months (mean,18 months). At 12 months after operation, compared to the grafts attached medially to the glenoid superior tubercle and proximal rotator cuff residual, pain relief and shoulder joint activities recovery were without significant difference. But for patients of grafts attached medially to the glenoid superior tubercle, the supraspinatus muscle strength post-operative recovered better and faster, the supraspinatus muscle strength postoperative 3 month of 1 case in group A recovered to normal, the supraspinatus muscle strength postoperative 1 year of 1 partly sutured patients in group B was weakness. The operation in group B was complex and needed suture anchors. We suggest that using the method of Mihaata for patients with MRCT that cannot reset, which the grafts were attached medially to the glenoid superior tubercle (ASCR). Patients with MRCT that can partly reset need patch graft, the grafts can simply be sutured medi ally to proximal rotator cuff residual.

**Conclusion**

Compared to grafts attached medially to the glenoid superior tubercle and proximal rotator cuff residual, the supraspinatus muscle strength postoperative of group B recovered better and faster.

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**B0686**

A clinical-friendly motion capture system to evaluate knee instability in ACL-deficient patients

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**Background**

Knee instability related to ACL-deficiency (ACLD) is an important criterion for diagnosis and decision of return-to-sports (RTS). Currently, the assessments rely on subjective physical examinations, while objective measurements with conventional motion capture system (MCS) is not readily available in most sports clinics. OptiKnee is a compact MCS that enables collection of knee kinematic data. In this study, we use OptiKnee to compare knee kinematics in ACLD patients with healthy controls.

**Materials and Methods**

Ten unilateral ACLD patients and 10 healthy controls were recruited. Demographic data and IKDC scores were collected. All participants performed a standardized single-logged hop landing (SLHL) task on both legs. At least 5 trials were collected for each leg. Knee kinematics was obtained and changes at 250 ms after landing were examined. Comparisons were made between the injured and contralateral sides in ACLD subjects, and their side-to-side difference (SSD) were compared to the controls.

**Results**

ACLD limbs demonstrated a decrease in maximum knee flexion and an increase in internal rotation and adduction after landing in SLHL as compared to the contralateral limb; while no significant difference was detected between both limbs in the controls. Significant SSD in knee flexion and internal rotation was detected between ACLD patients and controls.

**Discussion and conclusion**

Our results demonstrated that OptiKnee was able to detect kinematic changes related to knee instability in ACLD patients. This clinical-friendly system may enable objective quantitative assessment of knee function and provide evidence for decision of RTS.

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**B0701**

The diagnosis and treatment of the medial rotatory with button locked irreducible knee dislocation

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**Background**

The medial rotatory with button locked irreducible knee dislocation (MRBLKD) is often irreducible with closed means as the medial femoral condyle button holes through the medial joint capsule, forcing the medial collateral ligament or other medial structures to invaginate into the joint. This type KD is the medial femoral condyle anterolateral rotatory ligament in relation to tibia, the LCL and PLC is the center axis and the lateral condyle and tibia did not dislocation. These type of dislocation was described as posterolateral type in Kennedy’s classification, and not mentioned in Schenck’s classification. Delay in diagnosis or missed diagnosis can result in skin and locked tissue necrosis.

**Methods**

Over a 5-year period, we treated 22 patients with medial rotatory with button locked irreducible knee dislocations. The Ligamentous injury patterns, locked tissue, methods of reduction, and surgery strategies were defined and concluded. These patients were contacted, and valgus stress, ROM, prospectively measured clinical outcomes scores (Lysholm) were obtained.

**Results**

The most frequently locked medial structures included medial collateral ligament, medial capsule, muscle of vastus medialis, and MPFL the methods of reduction included open reduction, reduction under the arthroscopy assist, reduction with limited open. The surgery strategies consisted releasing the locked, reducing joint, and repair/reconstructing PCL and medial structures. The medial structures were repair atatomic site. All the patients’ valgus and varus stress testing was normal and PFT was less than 60mm. IKDC Score was B and the mean Lysholm score was 90.12. No patient need further operation expect one patient received skin transplanted.

**Conclusion**

The medial rotatory with button locked irreducible knee dislocation is a special knee dislocation, the MRBLKD is emphasize the injured structures at the medial, the situation of locked and irreduction of KD. Prompt open reduction or reduction under the arthroscopy assist, reduction of medial and lateral condyle.

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