

improvement of the initial reconstruction to preserve the medial meniscus at the time of the first surgery.

**Conclusion:** High BMI, early graft failure, severe medial meniscus injury is a cause of inferior outcome of the clinical results of re-ACL reconstruction using ART-BTB technique.

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#### B0778

##### Clinical comparison of physeal sparing double bundle anterior cruciate ligament reconstruction and delayed reconstruction in patients with open physes

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**Background:** Tears of anterior cruciate ligament (ACL) were considered a rare injury in children and adolescents, but a number of recent studies suggest that their incidence is increasing. Treatment strategies for ACL tears in patients with open physes have evolved, however, there are still no clear management guidelines. It used to be thought that surgery should be delayed until skeletal maturity to prevent violation of the physes and consequent disturbance of growth. It is now generally accepted that operative intervention gives a better functional outcome. The purpose of this study is to compare the outcomes of physeal sparing ACL reconstruction and delayed reconstruction in patients with open physes.

**Material & Method:** We evaluated 12 patients (7 men and 5 women), who were treated for ACL tears either by physeal sparing reconstruction (PS group, n=6) or delayed reconstruction (D group, n=6) between 2009 and 2014. The mean age at the time of injury was 12.1 years for the PS group and 13.7 years for the D group. The physeal sparing reconstruction we performed was as follows. An incision was made to the distal portion of lateral femur and epiphyseal line was identified. Thereafter, the femoral double round tunnels were created distal to epiphyseal line by using outside-in guide. The tibial double round sockets were drilled by using retrodrill system. The results of both groups were compared postoperative Tegner activity score, Lysholm score, International Knee Documentation Committee (IKDC) grade and physical examination findings (Lachman test, Pivot shift test). Statistical analysis was performed using SPSS software (IBM-SPSS, New York, USA). A nominal p value of <0.05 was considered to indicate statistical significance.

**Results:** The average postoperative Tegner and Lysholm score was 6.8, 98.7 in PS group and 7.0, 99.0 in D group, respectively. There was no significant difference in both score (p=0.87, p=0.75). One patient in both groups was IKDC grade B, but all other patients were grade A. The results of the Lachman test were all normal, and the results of the pivot shift test were glide for one patient in both group and normal for all other patients. At the time of operation, two patients in D group were noted meniscus tear, which were not found at the time of injury. No patient had a re-rupture or a discrepancy in the length of the lower extremities measured clinically.

**Discussion:** ACL reconstruction in patients with open physes is a controversial topic. This is the first report of the physeal sparing and anatomic double bundle reconstruction for skeletally immature patients. Our ACL reconstruction technique yields satisfactory clinical results. In this study, two patients were noted meniscus tear in D group, therefore conservative treatment of ACL injuries often leads to poor and unacceptable results.

**Conclusion:** This case series indicates good results of double bundle ACL reconstruction with use of physeal sparing technique in patients with open physes.

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#### B0780

##### Arthroscopic treatment of multidirectional shoulder instability with capsular narrowing and shortening of the anterior, inferior and posterior ligaments: Minimum 2-year follow-up

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**Background:** Shoulder stabilization for symptomatic multi-directional instability can be performed with open or arthroscopic surgery, but arthroscopy has become the preferred method. There are differences in different arthroscopic capsule narrowing techniques. The aim of this study was to present the clinical outcomes of arthroscopic all round capsular narrowing applied along the axes of the glenohumeral ligaments (GHL) in 2-4-year follow-up period.

**Materials:** The study included 75 patients who underwent surgery because of symptomatic multi-directional shoulder instability. The diagnosis was made on the basis of patient history, physical examination and arthroscopic findings. Functional outcomes of the all patients were evaluated with the American Shoulder and Elbow Surgeons (ASES) score, Rowe instability score and visual analog pain scale. Stability, strength, degree of pain and range of motion were also evaluated with patient-reported scales.

**Methods:** The technique applied was arthroscopic shortening of the inferior capsule then the inferior GHL anterior and posterior sections, the medial GHL, and superior GHL. In each case, 3 absorbable screws were used. An arm sling was applied for 3 weeks postoperatively. After 3 weeks, ROM exercises were started without forcing internal and external rotation. At the end of one week, all ROM exercises and strengthening exercises were started. Sporting activities were permitted after 16 weeks.

**Results:** In the follow-up period of 2-4 years, all postoperative functional scores were rated good to excellent except three cases. There were 2 (2.66%) cases of recurrent dislocation and 1(1.33%) case of symptomatic instability. In the cases of recurrent dislocation, revision was applied with the Latarjet procedure. There were no differences in range of motion compared with the opposite extremity in 72 (96%) cases.

**Discussion and Conclusion:** The good results obtained with open capsule narrowing have been obtained in recent years with arthroscopic techniques in multi-directional shoulder instability. The results of this study demonstrated that in multi-directional instability, capsular narrowing applied with the arthroscopic technique in the form of all round shortening along the axes of the glenohumeral ligaments is an effective technique which is compatible with the biomechanics of the glenohumeral joint and provides good results in terms of pain relief and clinical stability at a minimum 2-year follow-up.

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#### B0784

##### Preoperative evaluation of spinoglenoid ganglion cyst with MRI, EMG and isokinetic muscle test – Does size matter?

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**Background:** There are few studies correlating the size of ganglion cyst at the spinoglenoid notch with electrophysiological alterations, muscle power or pain severity.

**Materials and Methods:** Between June 2010 and November 2014, 30 patients (24 males and 6 females) who diagnosed with a ganglion cyst at the spinoglenoid notch on MRI were evaluated by EMG/NCV test and isokinetic muscle test. Maximum cyst diameter was measured on MRI and used for comparison. Pain severity was estimated by visual analogue scale (VAS). And, pooled sensitivity and specificity analysis was conducted, with an assessment of the summary receiver operating characteristic (ROC) curve.

**Results:** EMG/NCV test were examined in 27 out of 30 patients. Eight out of 27 patients were diagnosed with suprascapular neuropathy. The overall mean cyst size was 2.1cm. The cyst size of EMG positive group was 2.7cm, and size of EMG negative group was 1.8cm. When the size of ganglion cysts was increased 1cm, probability of an abnormal EMG/NCV test were increased 4.32 times (odds ratio: 4.32, p = 0.023). Area under the ROC curve (AUC) was 0.822, and set point 2.2cm had most sensitivity (87.5%), specificity (73.7%), positive likelihood ratio (3.3). However, there was no significant difference in the peak torque deficit on external rotation (mean: 30.2 (> 2.2 cm) vs. 20.7 (< 2.2 cm); p = 0.156) and abduction (mean: 28.6 (> 2.2 cm) vs. 18.4 (< 2.2 cm), respectively; p = 0.28) according to the size of ganglion cyst. The mean pain VAS of all 30 patients was 6.22 (range: 3–9), and there was no statistical difference in pain VAS according to the cyst size (mean: 6.06 (> 2.2 cm) vs. 6.50 (< 2.2 cm), respectively; p = 0.841). Twenty eight out of 30 patients had a labral lesion associated with spinoglenoid notch cyst on MRI. We performed SLAP repair in 19 cases, biceps tenodesis in 6 cases, biceps tenotomy in 3 cases, and cyst decompression only in 2 cases.

**Discussion:** Large spinoglenoid notch cysts may compress the suprascapular nerve. Tung et al [1] reported that average maximum diameter of cysts associated with muscle denervation was 3.1cm. However, this study diagnosed muscle denervation on MRI, not the EMG/NCV study. The strengths of this study were as follows; 1) The current study used needle EMG for the diagnosis of suprascapular neuropathy. 2) This is the first study regarding the correlation with cyst size and suprascapular neuropathy. 3) All patients in the present study have taken EMG/NCV test, isokinetic muscle performance test and MRI evaluation. The limitation of study was 1) small number for subgroup analysis, 2) postoperative external rotation power and EMG follow up were not analyzed.

**Conclusion:** The current data suggested that cyst size reflect the compressive suprascapular neuropathy. Therefore, the decompression surgery would be justified in patients with cyst size greater than 2.2 cm.

##### References:

[1] Tung GA, Entzian D, Stern JB, Green A. MR imaging and MR arthrography of paragonoid labral cysts. *AJR. Am. J. Roentgenol.* 2000;174(6):1707-15. doi:10.2214/ajr.174.6.1741707. <http://dx.doi.org/10.1016/j.asmart.2016.07.180>

#### B0788

##### Safe needle insertion points of FAST-FIX 360

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**Background:** FAST-FIX (FF) 360 is an implant developed with consideration for mechanical performance, safety and handiness among a number of implants. However, it has a demerit of a needle of the implant inserting blindly over the meniscus, and consequently, the installation site of the implant cannot be confirmed. Therefore, it is important to understand the anatomy around the insertion site and meniscus to prevent such a shortcoming.