

30°. However, most load was transferred through the big AM-bundle while the PL-bundle shared significant load only at 30°, with only minimal contribution from the IM-bundle at all flexion degrees.

Conclusions The precise knowledge of the ACL anatomy in the goat knee is necessary when a goat model is planned. Though anatomically discernible, the IM-bundle plays only an inferior role in ATT and might be neglected as a separate bundle during reconstruction. The goat ACL shows some differences to the human ACL, whereas the main functions of the ACL bundles are similar.

Functional evaluation and RM of shoulder rotator cuff: heritability estimates in monozygotic and dizygotic twin pairs

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Purpose The aim of our study is to establish if the shoulder’s functionality and the morphology of the coraco-acromial arch are genetically determined parameters.

Material and methods In the Italian Twin Registry, we identified 50 twin pairs with average age similar to that of patients with rotator cuff tear. We examined 29 twin pairs, 15 MZ (10 males; 5 females) mean aged 63 years (range 53–72) and 14 DZ (4 males; 8 females; 2 opposite sex) mean aged 63 years (range 60–66), without disease of the shoulder. All subjects underwent in order to: functional and subjective evaluation of the right shoulder (Constant Score; Simple Shoulder Test) and MR. On the MR images, we measured: acromio-humeral distance, angle of glenoid retroversion, area of the supraspinatus muscle; and we evaluated: degree of acromio-clavicular arthropathy, rotator cuff condition and Goutallier’s stage.

Results Data were analysed with the “twin design”. Correlations of the three morphometric parameters were greater in MZ compared to DZ. The correlation of the acromio-humeral distance has been the highest (0.95 MZ; 0.23 DZ). Similar results have been obtained for the CS (MZ = 0.7; DZ = 0.5) and SST (MZ = 0.8; DZ = 0.6). From these correlations derived heritability estimates of 32% and 34% for the CS and the SST, respectively. Higher values of heritability included: glenoid retroversion (56%) and acromio-humeral distance (91%). The correlation of the variable (degeneration/tear of the infraspinatus tendon) resulted greater in MZ (0.91) compared to DZ (0.44).

Conclusions This study is the first that uses the “twin design”. Results suggest that the variability inside each twin pair for the morphology of the coraco-acromial arch and the degeneration/tear of the infraspinatus tendon depend more from genetic than environmental factors.

Level of evidence Level IV, prognostic case series.

TRUFIT system™ for osteochondral lesion of the knee

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Objective The TRUFIT system™ (Smith&Nephew) is a bone graft substitute made of sour poly glycolide (50%), calcium sulfate (40%) and PGA fibers (10%). Aim of the study was to evaluate its clinical effectiveness.

Material and methods Twelve patients were treated for osteochondral lesion of the femoral condyle of the knee. Six cases were women,

the average age was 46 years, seven cases were left side. Indication for surgery was osteochondritis dissecans of the lateral femoral condyle in 6 cases, post traumatic chondral lesion (4° Outerbridge) of the medial femoral condyle in 6 cases. Chondral lesions were from 10 to 12 mm². Nine cases were implanted an 11 mm scaffold and, in 3 cases a 9 mm.

Results The average time for surgery was 45 minutes. Continuous passive motion of the knee was started the first postoperative day, full weight bearing was allowed 6 weeks after surgery. At seven, 5, 3, and 2 months, respectively, of follow-up the knees joint were pain free, full range of motion, and all patients were back to their ordinary lifestyle.

Conclusions The TRUFIT system™ showed to be a reliable treatment for osteochondral lesion smaller than 12 mm.

SESSION 29

Arthroscopic treatment of acute acromio-clavicular joint dislocation with double flip button: two- to four-year follow-up

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Introduction The ideal treatment for acromio-clavicular (AC) joint dislocation is controversial, both in terms of indications and surgical technique. The present study evaluates the clinical and radiological outcomes at a minimum follow-up of two years in a group of patients with acute AC dislocation, arthroscopically repaired with two flip buttons and braided polyethylene sutures.

Material and methods We treated 16 patients affected by acute AC joint dislocation, types III-V according to Rockwood. The bony tunnels in the clavicle and coracoid will host the coraco-clavicular retention system, which consists of two flip buttons (inferior and superior) fixed at the coracoid base and at the superior aspect of the clavicle, respectively, with polyethylene sutures looped around the internal eyelets. The mean follow-up was 31 months (range 24–48 months). At final follow-up patients were assessed using Constant score. AC joint comparative X-ray evaluations were also obtained at rest and under stress.

Results The mean Constant score at final follow-up was 96.8 points (range 82–100), with full recovery of shoulder range of motion in all patients. All patients returned to all daily activities at mean 3.2 months post-operatively (range 3–4 months). At final follow-up, 12 shoulders (75%) maintained a complete reduction and four shoulders (25%) showed a partial loss of reduction, with a mean coraco-clavicular distance of 150% (range 136–172%) compared to the uninjured shoulder. Nevertheless, the functional outcomes of all these four patients were excellent, with a mean Constant score of 99 (range 97–100) and complete range of motion. Concomitant lesions observed at arthroscopy included three (18.75%) type 2 SLAP lesions and one (6.25%) Bankart lesion.

Discussion The clinical results of the presented arthroscopic technique at an average follow-up of two years were excellent in terms of mean Constant score. From a radiological point of view one-fourth of

the patients presented with a partial loss of reduction. It was associated to the migration of the superior flip button into the clavicle secondary to the penetration of the superior cortex that never progressed beyond the upper third of the collarbone. Nevertheless, all of these patients reported excellent functional outcome and were satisfied with the procedure despite a slight prominence of the lateral profile of the clavicle.

Conclusions The presented technique proved to be safe and minimally invasive, delivering good clinical and aesthetic results while allowing the treatment of associated gleno-humeral lesions. Data will be presented.

Quantification of glenoid erosion in shoulder hemiarthroplasty: radiographic analysis and clinical considerations

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Radiographic analysis is essential to depict complications of shoulder prostheses [1]. Aim of the current study is to quantify glenoid erosion and verify its correlation with Constant–Murley score in patients who underwent shoulder hemiarthroplasty for displaced proximal humerus fractures. We selected 21 patients according to the following radiographic criteria: (a) type A₁ glenoid morphology as described by Walch [2]; (b) acromio-humeral interval lower than 7 mm. Investigation included measurement of coraco-glenoid angle (CGA) in true AP view and gleno-humeral line space (GHL) in axillary view [3]. We identified group I and II. Group I included 11 patients, 5 males and 6 females, mean age 65.3 years (range 58–71), dominant arm in 6 cases; the mean radiographic follow-up was performed at 4.1 years (range 3.8–4.4). The group II (control group) included 10 patients, 5 males and 5 females, mean age 62.5 years (range 56–69), dominant arm 4 cases; the mean radiographic follow-up was performed at 4 months (range 3.8–5.1). The mean values of CGA were 3.9 ± 1.49 in the group I and 0.4 ± 0.2 in the group II. We recorded GHL values of 1.94 ± 1.45 in the group I and 3.9 ± 0.7 in the group II. In the patients of group I with CGA equal or greater than 4.9 ± 0.9 and GHL equal or lower than 1.4 ± 0.3 the mean Constant score was lower (40.4 ± 7.6 , $p < 0.05$) than Total Constant score (62.3 ± 6.9). In conclusion we can assert the strong correlation between the severity of glenoid erosion and worsening quality of life in patients with shoulder hemiarthroplasty. When the pain is persistent with poor range of motion, the conversion in total arthroplasty or in reverse prostheses should be considered.

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Ulnar nerve regeneration in an elderly patient assessed by roof-opening of a degradable nerve-guide

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Introduction The rate of unsuccessful recovery from peripheral nerve gap-lesions in the elderly is high. Artificial nerve guides showed to perform at least as good as autografts in nerve gap-injuries bringing the significant advantage of avoiding donor site sacrifice and morbidity.

Methods We report a 70-year-old patient who suffered from a chainsaw lesion which resulted in transection-avulsion of the ulnar nerve at the wrist with a gap of about 8 mm. A cross-linked collagen nerve-guide was implanted.

Results After 8 months the Tinel's sign already reached the distal palmar crevice and motor and sensory recovery was nearly complete. Revision took place a month later; the guide was evidenced by a spongy structure wrapped around the nerve and, despite its structural alteration, it had maintained its full integrity and shape. The nerve was affected by a mild stenosis.

Conclusions This study reports that the use of a degradable nerve guide and its removal after a clinical recovery both proved beneficial in treating a nerve-gap lesion in an elderly patient.

SESSION 30

S3 Hand-Innovation plates in the treatment of proximal humeral fractures: our experience and case review

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Introduction The aim of this study was to estimate the outcome after internal fixation of displaced proximal humerus fractures with the Hand-Innovation[®] system plate.

Material and methods Forty-six patients (34 females, 12 males) with a mean age of 70.3 years (range 41–88) at the moment of the evaluation, and with displaced fractures of the proximal humerus divided into two-, three- and four-part (Neer classification) were examined clinically and radiologically. The minimum follow-up was 6 months and allowed a good consolidation of the fracture; the mean follow-up was 20.8 post-operative months. Functional results were analysed with two scores: the Constant one and the Dash one (Disabilities of the Arm, Shoulder and Hand score).

Results The mean Constant score was 69.9 (range 47.0–87.0), while the mean Dash score was 16.3 (range 0.8–60.3). One implant was removed because of re-fracture after a trauma: in this case the implant was substituted by Hand Innovation long plate. Overall only two plates were removed: one was that just described above, the second was because of intolerance to the implant.

Conclusions These results demonstrate the high stability of the Hand-Innovation[®] system plate that allowed early mobilization of the shoulder. This fixation system seems to be an excellent alternative treatment of displaced proximal humerus fractures.