4Arthroscopy | JSES KSSTA Arthroscopy 4B journals

Issue 88.3, Arthroscopy, 12-2021

Website www.4b.4abstracts.nl

Part of www.4abstracts.com

4B Arthroscopy founders: D.P. ter Meulen, B. Lubberts

Contact 4@erasmusmc.nl

Manual The titles in the contents are hyperlinks. Use these hyperlinks and the back button underneath every abstract to navigate more easily through the document. All abstracts have a hyperlink to the website of the article. Use this hyperlink to view the article in full-text. Articles can only be accessed in full-text through a personal account or the account of an institution.

Content
December 2021

Upper extremity

Arthroscopy
Volume 37, issue 12

- Patients With Preoperative Clinical Depression Symptomology Experience Significant Improvements in Postoperative Pain, Function, and Depressive Symptoms Following Rotator Cuff Repair
- Anchor Arthropathy of the Shoulder Joint After Instability Repair: Outcomes Improve With Revision Surgery

Journal of Shoulder and Elbow Surgery (JSES)
Volume 30, issue 12

- Periarticular liposomal bupivacaine mixture injection vs. single-shot interscalene block for postoperative pain in arthroscopic rotator cuff repair: a prospective randomized controlled trial.
- Outcomes of posterior labral repair with or without concomitant high-grade glenohumeral chondral pathology: a retrospective cohort with minimum 2-year follow-up.
- Variability of glenoid labral tear patterns: a study of 280 sequential surgical cases.
- Long-term outcomes after arthroscopic transosseous-equivalent repair: clinical and magnetic resonance imaging results of rotator cuff tears at a minimum follow-up of 10 years.
- Posterior glenoid bone block transfer for posterior shoulder instability: a systematic review.
- The Bristow-Latarjet procedure for revision of failed arthroscopic Bankart: a retrospective case series of 59 consecutive patients.
- Inter-rater agreement of rotator cuff tendon and muscle magnetic resonance imaging parameters evaluated preoperatively and during the first postoperative year following rotator cuff repair.
- The fate of sutures post rotator cuff repair.

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA)
Volume 29, Issue 12

- Osteolysis does not affect the outcome of rotator cuff repair: a systematic review and meta-analysis.
- Clinical differences between patients with early and late revision surgery for symptomatic failed arthroscopic rotator cuff repair.
- Supraspinatus repair and biceps tenodesis in competitive CrossFit athletes allow for a 100% of return to sport.
- Bilateral coracohumeral distance discrepancy is associated with subscapularis tear in rotator cuff rupture patients.
- Elite professional goalkeepers report high rate of sport resumption after shoulder surgery.
- Critical shoulder angle does not influence retear rate after arthroscopic rotator cuff repair.
- Arthroscopic rotator cuff repair without antibiotic prophylaxis does not increase the infection rate.
- Improvement in scapular dyskinesis after rotator cuff repair and subacromial decompression.
- Rotator cuff repair in HIV-positive patients ages 65 and older: only slight increase in risk of general postoperative surgical complications.
- Modified double-pulley suture-bridge techniques with or without medial knot tying show comparable clinical and radiological outcomes in arthroscopic rotator cuff repair.

BACK

- Age, participation in competitive sports, bony lesions, ALPSA lesions, > 1 preoperative dislocations, surgical delay and ISIS score > 3 are risk factors for recurrence following arthroscopic Bankart repair: a systematic review and meta-analysis of 4584 shoulders.
- Arthroscopic repair of inferior glenoid labrum tears (Down Under lesions) produces similar outcomes to other glenoid tears.
- Dexmedetomidine combined with suprascapular nerve block and axillary nerve block has a synergistic effect on relieving postoperative pain after arthroscopic rotator cuff repair.
- A high rate of children and adolescents return to sport after surgical treatment of osteochondritis dissecans of the elbow: a systematic review and meta-analysis.

American Journal of Sports Medicine (AJSM)
Volume 49, Issue 14

- Minimum 10-Year Clinical Outcomes After Arthroscopic 270° Labral Repair in Traumatic Shoulder Instability Involving Anterior, Inferior, and Posterior Labral Injury
- Arthroscopic Revision Rotator Cuff Repair: The Role of Previously Neglected Subscapularis Tears
- Biceps Tenodesis as an Attractive Alternative to Superior Labral Anterior-Posterior (SLAP) Repair for Type II SLAP Lesions in Active-Duty Military Patients Younger Than 35 Years

Lower extremity

Arthroscopy
Volume 37, Issue 12

- Repeat Revision Hip Arthroscopy Outcomes Match That of Initial Revision But Not That of Primary Surgery for Femoroacetabular Impingement Syndrome
- Hip Arthroscopy Volume and Reoperations in a Large Cross-Sectional Population: High Rate of Subsequent Revision Hip Arthroscopy in Young Patients and Total Hip Arthroplasty in Older Patients
- Improved Functional Outcome Scores Associated with Greater Reduction in Cam Height Using the Femoroacetabular Impingement Resection Arc During Hip Arthroscopy
- Establishing the Minimal Clinically Important Difference and Patient-Acceptable Symptomatic State After Arthroscopic Meniscal Repair and Associated Variables for Achievement

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA)
Volume 29, Issue 12

- Mild to moderate osteoarthritis is not considered a contraindication to arthroscopic treatment of symptomatic femoroacetabular impingement: results of an international survey.
- Preoperative varus alignment and postoperative meniscus extrusion are the main long-term predictive factors of clinical failure of meniscal root repair.
- Anatomical knee variables result in worse outcomes of lateral meniscal allograft transplantation with discoid lateral menisci than with nondiscoid lateral menisci.
- Age, time from injury to surgery and quadriceps strength affect the risk of revision surgery after primary ACL reconstruction.
- Elevated BMI increases concurrent pathology and operative time in adolescent ACL reconstruction.
- Preoperative pain sensitivity questionnaire helps customize pain management after arthroscopic partial meniscectomy.
- Medial meniscus posterior root repair reduces the extruded meniscus volume during knee flexion with favorable clinical outcome.

BACK

- Matrix-induced chondrogenesis is a valid and safe cartilage repair option for small- to medium-sized cartilage defects of the knee: a systematic review.
- No decrease in incidence of arthroscopic meniscectomy in a Canadian province.
- Anatomic all-epiphyseal ACL reconstruction with “inside-out” femoral tunnel placement in immature patients yields high return to sport rates and functional outcome scores a minimum of 24 months after reconstruction.
- Non-anatomic repair of medial meniscus posterior root tears to the posterior capsule provided favourable outcomes in middle-aged and older patients.
- Satisfactory clinical results and low failure rate of medial collagen meniscus implant (CMI) at a minimum 20 years of follow-up.
- Same knee, different goals: patients and surgeons have different priorities related to ACL reconstruction.

American Journal of Sports Medicine (AJSM)
Volume 47, Issue

- Early Operative Versus Delayed Operative Versus Nonoperative Treatment of Pediatric and Adolescent Anterior Cruciate Ligament Injuries: A Systematic Review and Meta-analysis
- Tranexamic Acid in Anterior Cruciate Ligament Reconstruction: A Systematic Review and Meta-analysis
- Can We Eliminate Opioids After Anterior Cruciate Ligament Reconstruction? A Prospective, Randomized Controlled Trial
- Graft Survivorship After Anterior Cruciate Ligament Reconstruction Based on Tibial Slope
- Differences in Baseline Characteristics and Outcome Among Responders, Late Responders, and Never-Responders After Anterior Cruciate Ligament Reconstruction
- Femoral and Tibial Bony Risk Factors for Anterior Cruciate Ligament Injuries Are Present in More Than 50% of Healthy Individuals
- The Reliability of 3-T Magnetic Resonance Imaging to Identify Arthroscopic Features of Meniscal Tears and Its Utility to Predict Meniscal Tear Reparability
- One Bony Morphology, Two Pathologic Entities: Sex-Based Differences in Patients With Borderline Hip Dysplasia Undergoing Hip Arthroscopy
- Equality in Hip Arthroscopy Outcomes Can Be Achieved Regardless of Patient Socioeconomic Status
- Labral Tear Management in Patients Aged 40 Years and Older Undergoing Primary Hip Arthroscopy: A Propensity-Matched Case-Control Study With Minimum 2-Year Follow-up
- Fascia Iliaca Block for Postoperative Pain Control After Hip Arthroscopy: A Systematic Review of Randomized Controlled Trials

Miscellaneous

-

BACK

Upper extremity

Arthroscopy, Volume 37, Issue 12, P3434-3441

Patients With Preoperative Clinical Depression Symptomology Experience Significant Improvements in Postoperative Pain, Function, and Depressive Symptoms Following Rotator Cuff Repair

Hessburg, L. T., Ziedas, A. C., Cross, A. G., Elhage, K., Guo, E. W., Yedulla, N., … Makhni, E. C.

DOI: https://doi.org/10.1016/j.arthro.2021.05.020

Purpose
To determine the impact of clinical depression on outcomes after rotator cuff repair (RCR), as measured by Patient-Reported Outcomes Measurement Information System (PROMIS) Computer Adaptive Test (CAT) health domains.

Methods
RCR patients were given PROMIS CAT assessments for physical function (PROMIS UE), pain interference (PROMIS PI), and depression (PROMIS D) during preoperative and postoperative clinic visits. PROMIS D scores ≥55 correlate with mild clinical depression; thus patients with PROMIS D scores ≥ 55 were placed in the clinical depression (CD) group, whereas patients with scores <55 were placed in the “no clinical depression” (NCD) group. Categorical variables were compared at preoperative and postoperative (6 months and ≥1 year) timepoints using $\chi 2$ tests. Continuous variables were compared using Student’s t-tests.

Results
Of the 340 RCR patients included in this study, 65 (19.1%) were found to have mild clinical depression preoperatively, with that number being reduced to 23 (6.8%) at 6 months and 19 (5.6%) at ≥1 year after surgery. Compared with preoperative PROMIS scores, CD patients had significant postoperative improvements at 6 months and ≥1 year in mean PROMIS UE (26.7 vs 35.5 vs 38.9; $P < .001$) and PROMIS PI (67.6 vs 56.7 vs 56.4; $P < .001$). NCD patients had similar postoperative improvements at 6 months and ≥1 year in mean PROMIS UE (30.8 vs 38.6 vs 46.9; $P < .001$) and PROMIS PI (61.7 vs 53.0 vs 47.6; $P < .001$). The improvement in PROMIS scores was similar for the CD and NCD groups in both PROMIS UE (12.2 vs 16.1, respectively) and PROMIS PI (−11.2 vs −14.1, respectively).

Conclusion
Despite starting with worse PROMIS UE and PROMIS PI scores, patients undergoing RCR with symptoms of CD experienced significant improvement in function, pain, and depressive symptoms. Preoperative depression should not be a contraindication to arthroscopic RCR in patients who are otherwise appropriate operative candidates.

Level of Evidence
Level III, retrospective comparative trial.

BACK

Anchor Arthropathy of the Shoulder Joint After Instability Repair: Outcomes Improve With Revision Surgery

Ruzbarsky JJ, Waltz RA, Peebles AM, Wong JE, Golijanin P, Arner JW, Peebles LA, Godin JA, Millett PJ, Provencher MT.

https://doi.org/10.1016/j.arthro.2021.05.024

Purpose
To report clinical and patient-reported outcome measures (PROMs) in patients undergoing revision surgery after diagnosis of anchor-induced arthropathy.

Methods

Patients who underwent revision arthroscopic shoulder surgery and were diagnosed with post-instability glenohumeral arthropathy performed from January 2006 to May 2018 were included in the current study. Patients were excluded if they underwent prior open shoulder procedures, if glenoid bone loss was present, or if prerevision imaging and records were incomplete or not available. Data included initial diagnosis and index procedure performed, presenting arthropathy symptoms including duration, exam findings before revision surgery, and surgical intervention. PROMs were prospectively collected before surgery and at minimum 2-year follow-up.

Results
Fourteen patients were included with a mean (± standard deviation) age at presentation of 35.2 ± 12.1 years (range 16 to 59). The follow-up rate was 86%, with a mean follow-up of 3.8 years (range 1.1 to 10.6). Mean time to development of arthropathy symptoms was 48.2 months (range <1 month to 13.8 years), all presenting with pain and decreased range of motion on exam. At time of revision surgery, all patients underwent either open or arthroscopic removal of previous implants, including anchors and suture material. Six patients underwent additional revision stabilization procedures, 1 underwent total shoulder arthroplasty, and 7 underwent arthroscopic intraarticular debridement, capsular release, and chondroplasty with or without microfracture. Pain significantly improved in 79% of patients ($P = .05$). Significant improvements in all PROMs were observed, including 12-item Short Form (43.8 to 54.8, $P < .01$); Disabilities of the Arm, Shoulder, and Hand, shortened version (31.8 to 8.4, $P < .01$); Single Assessment Numeric Evaluation (47.0 to 84.5, $P < .05$); and American Shoulder and Elbow Surgeons (61.6 to 92.1, $P < .01$). Average external rotation significantly improved, from 31° ± 22° to 52° ± 24° ($P = .02$).

Conclusion
Rapid intervention after diagnosis, through either revision arthroscopic or open debridement and stabilization, can lead to significant improvement in range of motion, pain, and overall patient function and satisfaction.

Level of Evidence
IV, retrospective case series.

BACK

Journal of Shoulder and Elbow Surgery (JSES), Volume 30, Issue 12, P2691 - 2697

Periarticular liposomal bupivacaine mixture injection vs. single-shot interscalene block for postoperative pain in arthroscopic rotator cuff repair: a prospective randomized controlled trial. Hillesheim, R.A., Kumar, P., Brolin T.J., et al.

DOI: https://doi.org/10.1016/j.jse.2021.08.012

Background
The pain control efficacy, postoperative opioid requirements, and costs among patients undergoing major shoulder surgery using different perioperative analgesia modalities have been topics of active debate. Several studies have compared periarticular injection (PAI) to interscalene block (ISB) in shoulder arthroplasty, but there is a paucity of data comparing them in arthroscopic rotator cuff repair.

Methods
Patients aged 18-80 years with full-thickness rotator cuff tears and undergoing primary arthroscopic rotator cuff repair at 2 different shoulder centers were screened and subsequently randomized to receive either periarticular injection (PAI) of liposomal bupivacaine mixed with 0.25% bupivacaine (n = 41) or single-shot interscalene nerve block (ISB) (n = 36). Visual analog scale (VAS) pain scores, oral morphine equivalent (OME) use, Single Assessment Numerical Evaluation (SANE) scores, and costs were collected. Differences with P <.05 were considered statistically significant.

Results
Day of surgery VAS score and OME usage were significantly reduced with ISB vs. PAI (0.69 vs. 4.65, P < .001, and 18.66 vs. 34.39, P < .001, respectively). There were no significant differences between groups regarding VAS score on postoperative days (PODs) 1-3; however, OME usage on PODs 1 (50.5 vs. 38.8, P = .03) and 2 (48.1 vs. 37.8, P = .04) was significantly more in the ISB group. At POD 3, VAS score (4.13 vs. 3.97, P = .60) and OME use (28.60 vs. 31.16, P = .51) were similar. At 6 and 12 weeks, there were also no significant differences between groups regarding VAS and OME use. There was no difference in SANE score at 12 weeks following surgery between groups and no difference between average 12-week cumulative OME use between groups. The average charge for the PAI was $455, and the average charge for ISB was $745.

Conclusion
Both ISB and PAI provide acceptable pain control following arthroscopic rotator cuff repair. Patients have less pain on the day of surgery with ISB, but rebound pain is significant after the block wears off, resulting in substantially increased opioid use in the first 2 PODs. However, cumulative opioid use between groups was similar. There were also no significant differences at the end of the 12-week episode of care in any of the other variables studied. The charge per patient for PAI is approximately $300 less than ISB. Thus, PAI may offer surgeons and patients an effective postoperative analgesic modality as an alternative to ISB.

Level of evidence
Level I, Randomized Controlled Trial

BACK

Outcomes of posterior labral repair with or without concomitant high-grade glenohumeral chondral pathology: a retrospective cohort with minimum 2-year follow-up. Young, B.L., Corpus, K.T., Scarola, G., et al.

DOI: https://doi.org/10.1016/j.jse.2021.04.030

Background
The purpose of this study was to compare outcomes of patients who underwent posterior labral repair with and without concomitant glenohumeral chondral pathology.

Methods
A retrospective review was performed on patients aged ≥18 years who underwent primary posterior labral repair over 5 years. Charts were reviewed to determine the presence and location of high-grade (Outerbridge grade III or IV) pathology. Quick Disabilities of the Arm, Shoulder, and Hand questionnaire (QuickDASH), Western Ontario Stability Index (WOSI), visual analog scale (VAS), and Simple Shoulder Test (SST) scores were collected at median 71.5-month follow-up and compared between patients with and without concomitant chondral pathology during the index procedure.

Results
Of 100 patients who underwent primary posterior labral repair, 43% had glenoid and/or humeral-sided high-grade chondral pathology. Patients with chondral pathology were older than those without ($P < .001$). A higher proportion of patients with chondral pathology underwent concomitant biceps tenodesis (19.3% vs. 37.2%, $P = .046$). The type of anchor (all-suture or solid body, $P = .010$) used was different between patients with and without chondral pathology at time of posterior labrum repair. There was no difference in reoperation rates at final follow-up between patients with and without chondral damage at time of index procedure ($P = .200$). All outcome scores were similar between all comer patients with and without chondral pathology. Isolated glenoid pathology was significantly associated with lower QuickDASH ($P = .018$), higher SST ($P = .013$), lower VAS ($P = .016$), and lower WOSI scores ($P = .046$) compared to patients with bipolar lesions. After stratifying by age, there was an association between chondral pathology and lower VAS and WOSI scores in patients aged <35 years, and there was an association between chondral pathology and lower SST scores in patients aged ≥35 years.

Conclusion
Based on median QuickDASH, SST, WOSI, and VAS scores, subjective and functional outcomes after primary arthroscopic posterior labral repair were not negatively influenced by the presence of concomitant chondral damage at the time of surgery for patients aged <35 years at minimum 2-year follow-up. Although our primary outcome score, the QuickDASH, was not significantly associated with the presence of chondral damage in patients aged >35 years, SST scores were negatively influenced by concomitant chondral damage in this older cohort, but this may not be adequately powered. It appeared that patients with chondral damage localized to the glenoid tended to have better outcomes scores that those with bipolar damage.

Level of Evidence
Level III, Retrospective Case-Control Design

BACK

Variability of glenoid labral tear patterns: a study of 280 sequential surgical cases.
Alexeev M., Kercher J.S., Levina Y., et al.

DOI: https://doi.org/10.1016/j.jse.2021.05.004

Background
Glenoid labrum tears are a common cause of shoulder pain and instability and tear patterns have historically been ascribed into categorical descriptions such as anterior, posterior, and superior labral tears (SLAP [superior labrum anterior and posterior]) with multiple subtypes. Although often quoted as representing no more than 10% of instabilities, posterior shoulder instability may be more common than previously recognized. The purpose of this study was to review observed labral tear patterns and compare incidence and morphologies to historical descriptions.

Methods
All patients undergoing arthroscopic or open labral repair (Current Procedural Terminology codes 29806, 29807, 23455, 23460, 23462, 23465) by 2 fellowship-trained shoulder surgeons from July 2012 to May 2019 were retrospectively reviewed. Labral tears were categorized into 3 groups: exclusively anterior to the midline of the glenoid, exclusively posterior, and those crossing the midline of the glenoid. Chief complaint, mechanism of injury, hand dominance, preoperative MRI interpretation by surgeon, and independent radiologist were analyzed for each tear type.

Results
During the 7-year period, 280 patients underwent arthroscopic or open labral repair. Sixty percent of tears were traumatic, with dislocation being the most common traumatic mechanism at 31.4%. Ten distinct tear patterns were identified: 3 types of 90° tears (anteroinferior, posteroinferior, and posterosuperior), 4 types of 180° tears (anterior, posterior, inferior, and SLAP), 2 types of 270° tears (anteroinferior and anterosuperior), and 360° labral tears. A total of 134 tears (47.9%) were classified as posterior, and 72 tears (25.7%) were anterior. Seventy-four tears (26.4%) were combined anterior-posterior tears. Labral tears involving some portion of the posterior labrum constituted 74% of tears. A significant association between tear location and primary complaint ($P < .001$) was noted. Patients with anterior tears complained of only instability in 62.5% of cases, and only pain in 22%. Patients with posterior labral tears complained primarily of pain in 68% of cases, and instability in 21%. There was an accurate preoperative diagnosis given by both radiologists and surgeons on 30% ($n = 63$) of the tears.

Conclusion
There is a wide variety of labral tear patterns identified at the time of surgery, and the incidence of posterior labral tears is higher than previously described. Isolated Bankart lesions are relatively rare and are often associated with more extensive labral lesions. Patients with posterior labral pathology more often complain of pain rather than instability, whereas patients with anterior labral tears more often complain of instability.

Level of Evidence
Level III, Cross-Sectional Design

BACK

Long-term outcomes after arthroscopic transosseous-equivalent repair: clinical and magnetic resonance imaging results of rotator cuff tears at a minimum follow-up of 10 years.

Buyukdogan, K., Aslan, L., Koyuncu, Ö, et al.

DOI: https://doi.org/10.1016/j.jse.2021.04.034

Purpose
The objective of this study was to evaluate the long-term functional outcomes and structural integrity of medium to massive rotator cuff tears at 10-12 years of follow-up after arthroscopic transosseous-equivalent (TOE) repair.

Methods
This was a retrospective study of a consecutive series of patients who underwent primary arthroscopic TOE repair of medium- to massive-sized degenerative rotator cuff tears performed by a single surgeon between January 2007 and August 2009. Patients were examined at a minimum follow-up of 10 years, and magnetic resonance imaging (MRI) was performed to assess tendon integrity. The Constant score (CS), American Shoulder and Elbow Surgeons score, and pain level documented using a visual analog scale were compared between intact repairs and recurrent defects. Univariate analysis was performed to identify factors related to recurrent defects.

Results
A total of 102 patients met the inclusion criteria, and 79 shoulders in 76 patients (74.5% of eligible patients) with a mean age at surgery of 55 ± 8 years (range, 40-72 years) were available for clinical evaluation at a mean follow-up time of 10.9 years (range, 10-12 years). The mean anteroposterior tear size was 3.1 ± 1.1 cm, and there were 41 medium (52%), 26 large (33%), and 12 massive (15%) tears. MRI was performed in 72 shoulders in 69 patients (91% of available shoulders) and revealed that 13 shoulders had recurrent defects (Sugaya stages 4 and 5). During the follow-up period, 3 patients underwent revision surgery, and the overall recurrent defect rate was 21.3%. A clinically meaningful improvement was observed in all outcome measures at the final follow-up regardless of tendon integrity. Patients with intact repairs showed superior outcomes compared with those with recurrent defects; however, only the overall CS met the threshold for clinical relevance. A significant linear correlation was observed between the Sugaya classification and all outcome scores except the CS pain subscale; however, the strength of correlation was weak. The presence of diabetes (odds ratio [OR], 8.6; 95% confidence interval [CI], 2.25-33.2; P = .002), tear size (OR, 2.08; 95% CI, 1.16-3.46; P = .012), and tear retraction (OR, 4.07; 95% CI, 1.11-14.83; P = .033) were associated with recurrent defects in the univariate analysis.

Conclusion
Arthroscopic TOE repair of rotator cuff tears provided improved clinical outcomes with a recurrent defect rate of 21.3% at 10-12 years after surgery. Future research focusing on tendon healing is needed as repair integrity on MRI correlates with clinical outcomes.

Level of evidence
Level IV, Case Series

BACK

Posterior glenoid bone block transfer for posterior shoulder instability: a systematic review.

Mojica, E.S., Schwartz, L.B., Hurley, E.T., et al.

DOI: https://doi.org/10.1016/j.jse.2021.06.013

Background
The purpose of this study is to systematically review the literature and evaluate patient-reported outcomes and complication/revision rates of bone block augmentation in the treatment of posterior shoulder instability (PSI).

Methods
PubMed was searched according to PRIMSA guidelines to find clinical studies evaluating patient-reported outcomes, revision, and complication rates in posterior bone block for PSI. A literature search of MEDLINE, EMBASE, and the Cochrane Library was performed based on the PRISMA guidelines. Clinical studies reporting on the complications following posterior bone block were included.

Results
Overall, 11 studies (level of evidence [LOE] III: 2, LOE IV: 9) met inclusion criteria, with 225 shoulders. Recurrent instability after the posterior bone block was found to be 9.8%. The overall complication rate was 13.8%, with 0.89% having graft complications, 11.1% having hardware complications, 0.4% having wound complications, 0.4% having nerve complications, and 0.89% having other complications. Residual pain was found in 11.6% of shoulders operated on. Patient-reported outcomes were evaluated most commonly by Rowe (81.4%), Constant (84.6%), and Walch-Duplay scores (81.6%).

Conclusion
There is a moderate rate of recurrence following posterior bone block for PSI. However, the patient-reported outcomes are high despite there being commonly reported persistent shoulder pain postoperatively.

Level of evidence
Level IV, Systematic Review

BACK

The Bristow-Latarjet procedure for revision of failed arthroscopic Bankart: a retrospective case series of 59 consecutive patients. Clowez, G., Gendre, P., Boileau, P.

DOI: https://doi.org/10.1016/j.jse.2021.05.007

Background
Recurrence of anterior instability after arthroscopic Bankart prevents return to sports and remains a surgical challenge. We aim to assess clinical and radiologic outcomes after coracoid bone-block performed either open or under arthroscopy, for the management of failed arthroscopic Bankart

Patients and Methods
Fifty-nine consecutive patients with anterior instability recurrence after arthroscopic Bankart were revised with a Bristow or Latarjet procedure performed either open (25 cases) or under arthroscopy (34 cases). Patients were reviewed for clinical and radiologic examination at a minimum 2-year follow-up. Glenohumeral bony lesions were evaluated preoperatively with computed tomographic scans. Postoperative bone-block position, union, and postinstability arthritis were also evaluated.

Results
The mean follow-up was 89 months (24-193). The epidemiologic analysis showed that patients with failed arthroscopic Bankart were young (age <23 years), 58 (98%) were practicing sports, with contact/forced overhead sports (53%), often in competition (53%), had hyperlaxity (71%), and for the most part of them glenohumeral bone loss (88%). Their mean preoperative Instability Severity Index Score was 5.4 ± 2.2 points. After revision with Bristow-Latarjet procedure, 53 patients (91%) returned to sports, 37 (70%) to their previous sports activity, and 17 (46%) to their previous level. No patient suffered recurrent dislocation. Four patients (7%) had recurrent subluxations, all after open procedure; 8 patients (14.5%) had persistent anterior apprehension. A large and deep Hill-Sachs lesion was a risk factor for persistent anterior apprehension (P = .002) and lower level when returned to sports (P = .04). Ninety-two percent of bone-blocks were positioned flush with the glenoid anterior rim, with 84% of bone union. At last follow-up, 5% of patients had severe postinstability osteoarthritis (Samilson 4).

Conclusion
The Bristow-Latarjet, performed either open or under arthroscopy, is an efficient procedure to restore shoulder stability and allow returning to sports in patients with failed arthroscopic Bankart and glenoid bone loss. Patients with a large and deep Hill-Sachs lesion had more persistent anterior apprehension and a lower sports level.

Level of evidence
Level IV, Case Series

BACK

Inter-rater agreement of rotator cuff tendon and muscle magnetic resonance imaging parameters evaluated preoperatively and during the first postoperative year following rotator cuff repair. Ma, J., Sahoo, S., Imrey, P.B., et al.

DOI: https://doi.org/10.1016/j.jse.2021.04.021

Background
Magnetic resonance imaging (MRI) is standard of care for rotator cuff evaluation, with clinical interpretation usually limited to qualitative judgments. The reliability of MRI-based measurements and scoring systems has been evaluated only preoperatively or ≥6 months following rotator cuff repair, when repairs are in the later stages of healing. This study describes the MRI assessments and inter-rater agreement of various rotator cuff tendon and muscle parameters evaluated preoperatively and 4 times during the first postoperative year.

Methods
Two musculoskeletal radiologists independently assessed MRI scans of 42 patients preoperatively and 3, 12, 26, and 52 weeks after rotator cuff repair. Using standardized reading rules, readers assessed tendon integrity (5-point Sugaya classification), tear dimensions, muscle fat (5-point Goutallier classification) and atrophy (4-point Warner classification), muscle cross-sectional areas, and myotendinous junction distance. Raw exact agreement proportions, κ statistics, and correlation coefficients were used to quantify inter-rater agreement.

Results
Readers showed moderate to substantial above-chance agreement in scoring rotator cuff tendon integrity and supraspinatus muscle atrophy and good to excellent agreement on tear dimensions and muscle cross-sectional areas but only fair to moderate agreement for fatty infiltration and myotendinous junction distance. Only fatty infiltration grades evidenced observer bias. Inter-rater agreement did not appear time dependent.

Conclusion
By use of defined reading rules in a research setting, MRI evaluations of rotator cuff tendon integrity, tear dimensions, muscle atrophy, and cross-sectional areas have reasonable reliability at all time points in the first postoperative year. However, the presence of clinically significant disagreements, even in such favorable circumstances, indicates the need for improved imaging tools for precise rotator cuff evaluation.

Level of evidence
Level IV, Diagnostic Study

BACK

The fate of sutures post rotator cuff repair. Chua, A.X.Y., Hackett, L.M., Lam, P.H., et al.

DOI: https://doi.org/10.1016/j.jse.2021.04.027

Background
Ultrasonographic imaging has been widely used as a diagnostic tool for rotator cuff tears. Several studies have explored the changes in rotator cuff tendon morphology after arthroscopic cuff repair; however, none have addressed the fate of sutures. The aim of this study was to determine (1) if the sutures migrate through the tendon during the postoperative healing period in patients who have had arthroscopic rotator cuff repair; (2) if the sutures do migrate, the time point at which it does; and (3) if the quality of the tendon, in terms of tendon stiffness, modulus of elasticity, bursal thickness, and anatomic footprint, affects suture migration.

Methods
This was a prospective study involving 21 patients who had primary arthroscopic rotator cuff repair performed by a single surgeon. All patients were assessed at 8 days, 6 weeks, 12 weeks, and 24 weeks postrepair; during each assessment, patients underwent an ultrasonographic examination (using a Siemens ACUSON S3000 ultrasonographic system, following a standardized protocol), where supraspinatus tendon thickness and thickness of tendon tissues below and above the suture were measured. Measurements of anatomic footprint, bursal thickness, tendon stiffness, and modulus of elasticity were obtained to assess tendon quality.

Results
Of the 21 participants, 14 (67%) had full-thickness tears and 7 (33%) had partial-thickness tears. Between the 12th- and 24th-week follow-up, 2 patients' tendons were found to be not intact. Within the first 12 weeks of the postrepair healing period, the sutures migrated inferiorly, through to the middle of the tendon at the footprint-articular junction (ie, ratio of tendon tissue thickness below the suture to the total tendon thickness = 0.5) ($P = .03$). The mean anatomic footprint increased from 8.4 ± 1.6 mm to 9.1 ± 1.2 mm between 8 days and 6 weeks ($P = .04$); bursal thickness decreased during the 24-week period from 1.5 ± 0.9 mm to 0.7 ± 0.4 mm ($P = .005$); tendon modulus of elasticity increased from 154 ± 75 kPa to 205 ± 96 kPa between 8 days and 24 weeks ($P = .05$).

Discussion
This is the first study to investigate suture position and migration post arthroscopic rotator cuff repair. The findings of this study suggest that sutures migrating to the middle of the tendon during the postoperative healing process is a normal phenomenon observed on ultrasonography.

Level of Evidence
Level IV, Case Series

BACK

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA), Volume 29, Issue 12, P3910 - 3920

Osteolysis does not affect the outcome of rotator cuff repair: a systematic review and meta-analysis. Lee, H.Y., Cheon, S.J., Seo, H. et al. Periimplant

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-06328-3

Purpose
The goal of this study was to perform a systematic review and meta-analysis to compare the clinical and radiologic outcomes of rotator cuff repair, depending on the presence of developed periimplant osteolysis (PIO) after using suture anchors.

Methods
The electronic databases of MEDLINE, EMBASE, and the Cochrane Central Register of Controlled Trials were searched for articles published up until October 2019 to find relevant articles comparing the outcomes of rotator cuff repair between the periimplant osteolysis group and non-periimplant osteolysis group. Data searching, extraction, analysis, and quality assessment were performed according to the Cochrane Collaboration guidelines. The results are presented as risk ratio (RR) for binary outcomes and standardised mean difference (SMD) for continuous outcomes with 95% confidence intervals (CI).

Results
Six clinical studies were included. No significant differences were found between the group with periimplant osteolysis and the group without periimplant osteolysis regarding retear rate (RR = 1.34; 95% CI 0.93–1.94; I2 = 28%), postoperative clinical scores (SMD = 0.29; 95% CI − 0.26 to 0.83; I2 = 80%) and range of motion (ROM); forward flexion (SMD = 0.39; 95% CI − 0.16 to 0.93; I2 = 0%), external rotation (SMD = − 0.10; 95% CI − 0.64 to 0.45; I2 = 0%) and internal rotation (SMD = − 0.37; 95% CI − 0.92 to 0.17; I2 = 0%).

Conclusion
The presence of periimplant osteolysis after rotator cuff repair with suture anchor does not affect the clinical outcomes such as retear rate, clinical scoring, and ROM. However, as there was no standard consensus on the criteria for evaluating periimplant osteolysis, this result may not fully reflect the effect of periimplant osteolysis depending on its severity.

Level of evidence
Level IV.

BACK

Clinical differences between patients with early and late revision surgery for symptomatic failed arthroscopic rotator cuff repair. Lee, S., Park, I., Kim, MS. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-06333-6

Purpose
Time ranges of revision rotator cuff surgeries after arthroscopic repair are highly variable. However, the cause and clinical relevance of the different timings of revision surgeries have not been analyzed. The purpose of this study was to evaluate the clinical manifestations of patients who required revision surgeries at early and late periods after failed arthroscopic rotator cuff repair, and to identify clinical and radiological differences related to the timing of revision surgery.

Methods
Sixty patients who underwent revision surgery due to symptomatic failed rotator cuff repair after arthroscopic repair were included. Patients were divided into two groups: patients who underwent revision surgeries within 1 year postoperatively (21 patients, group I) and patients who underwent revision surgeries more than 1 year postoperatively (39 patients, group II). Clinical and radiological characteristics were compared between the two groups before primary and revision surgery.

Results
VAS for pain (5.9 ± 1.9 in group I, 3.9 ± 1.4 in group II, $P < 0.001$) and Constant score (50.7 ± 9.9 in group I, 60.4 ± 8.9 in group II, $P < 0.001$) at the time of revision surgery were significantly different between the two groups. In group II, isometric muscle strength of forward flexion (74.1 ± 21.1 to 63.9 ± 15.1, $P = 0.020$) and external rotation (73.0 ± 23.5 to 61.2 ± 15.0, $P = 0.032$) were significantly deteriorated after primary surgery, even with significant improvement of pain and shoulder function (VAS: 5.7 ± 1.9 to 3.9 ± 1.4, $P < 0.001$; Constant score: 50.3 ± 11.0 to 60.4 ± 8.9, $P < 0.001$). On postoperative MRI, re-tear at the tendon–bone interface on the greater tuberosity occurred significantly more in group I (81.0%) than group II (51.3%, $P = 0.024$). Incidence of full-thickness tear of the subscapularis tendon was significantly different between the two groups (42.9% in group I, 12.8% in group II, $P = 0.012$).

Conclusion
Patients who had early revision surgeries had significantly worse clinical outcomes after primary surgery than patients who had late revision surgeries. Healing failure at the tendon–bone interface on the greater tuberosity and re-tear combined with full-thickness tear of subscapularis tendon were related to early revision. Conversely, patients of the late revision group had muscle weakness that considerably impacted daily activities, even with improved pain and shoulder function.

Level of evidence
III.

BACK

Supraspinatus repair and biceps tenodesis in competitive CrossFit athletes allow for a 100% of return to sport. Carbone, S., Castagna, V., Passaretti, D. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-06345-2

Purpose
The shoulder is the most commonly injured body part in CrossFit training. The aim of this study is to report the clinical and MRI results of an arthroscopic repair of supraspinatus tear associated with SLAP lesion in competitive CrossFit athletes.

Methods
Competitive CrossFit athletes affected by a full-thickness supraspinatus tear associated with SLAP lesion secondary to training injury were prospectively enrolled in the study. Clinical diagnosis was confirmed with MRI (> 1.5 T). Functional evaluation was done using the Constant Score (CS) and ASES score (ASES). All lesions were treated with single-row repair and biceps tenodesis. Minimum follow-up (clinical, MRI) was 24 months.

Results
Nineteen patients were available at the final follow-up. The average age was 43-year-old (range 28–52, SD 8), 12 were males and 7 females. Pre-operative CS and ASES were 67 (range 61–77, SD 7) and 71 (range 62–79, SD 5), respectively. At the 24-month follow-up, 19/19 athletes resumed intensive training and 17/19 returned to competitions. CS and ASES rose to 90 ($p = 0.039$) and 93 ($p = 0.04$), respectively. At the final follow-up, MRI indicated complete healing of the tendon in 15 (79%) cases and 4 (21%) cases with type II Sugaya repair integrity. Two of the patients of the latter group did not return to their usual training level and showed type II (Kibler) scapular dyskinesis.

Conclusions
Arthroscopic repair of the supraspinatus tendon associated with biceps tenodesis led to a 100% of return-to-CrossFit training and 90% rate of individuals resuming competitions at 24 months of follow-up. MRI showed 15 (79%) cases of complete healing and 4 (21%) cases with type II Sugaya repair integrity; biceps tenodesis clinically failed only in 1 case and the athlete complained of a decrease in the competitions scores and opted to discontinue CrossFit competitions.

Level of evidence
IV.

BACK

Bilateral coracohumeral distance discrepancy is associated with subscapularis tear in rotator cuff rupture patients. Zhu, S., Tan, J., Wu, D. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06597-6

Purpose
To describe the bilateral coracohumeral morphological discrepancy in rotator cuff rupture patients with and without subscapularis (SSC) involvement and to investigate its association with SSC tears.

Methods
Two hundred and thirteen consecutive patients who were scheduled to have arthroscopic rotator cuff repair were prospectively enrolled in the current study. Patients with acute traumatic rotator cuff rupture, glenohumeral osteoarthritis, bilateral rotator cuff rupture, recurrent shoulder instability, systemic inflammatory disease, and previous shoulder surgery history were excluded. Coracohumeral distance (CHD), coracoid overlap (CO), lesser tuberosity index (LTI) and acromiohumeral interval (AHI) were measured bilaterally using CT scans. Based on arthroscopic findings, patients were included in either the SSC tear group (n = 72) or the control group (n = 141).

Results
In the SSC tear group, the affected shoulder possessed a significantly smaller CHD [95% confidence interval (CI) 6.1–7.2 vs. 7.2–8.0 mm, $p < 0.0001$], larger LTI (95% CI 9.4–9.9 vs. 9.0–9.6 mm, $p < 0.0001$), and smaller AHI (95% CI 5.0–5.5 vs. 7.1–7.5 mm, $p < 0.0001$) than the contralateral normal shoulder. In the control group, there was no significant difference between bilateral CHD and CO, and the AHI bilateral discrepancy was less distinct. CO did not differ significantly in the bilateral comparison in either group. Among all evaluated parameters, bilateral CHD discrepancy was the best predictor of SSC tears, with an area under the curve (AUC) of 0.882. A cutoff value of 0.5 mm had a sensitivity of 76.4% and specificity of 99.3% for SSC tears.

Conclusion
The CHD values are significantly different between affected and contralateral shoulders in SSC tear patients. Bilateral CHD discrepancy is closely associated with subcoracoid impingement and SSC tears, and its presence warrants specific intraoperative SSC inspection.

Level of evidence
Level II.

BACK

Elite professional goalkeepers report high rate of sport resumption after shoulder surgery.
Castagna, A., Ranieri, R., Volpi, P. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06637-1

Purpose
The aim of this study is to evaluate the return to sport after surgical treatment of shoulder injuries in professional goalkeepers in relationship with the mechanism of injury and the pattern of related shoulder lesions.

Methods
Twenty-six shoulders in nineteen elite male professional soccer goalkeepers were retrospectively analyzed considering multiple diseases (instability, rotator cuff, biceps or other tendon injuries). Data was collected for injury modality and context, pathological findings, surgical procedures, time, level of return to sport, and complications.

Results
The mechanism of injury was “mild trauma without contact” in 46% of the cases and 54% of injuries happened during training. 11 patients (42%) reported multiple pattern lesions and 9 patients (35%) classic anterior instability lesions. The mean time for return to differentiated training and unrestricted sport activity was 14 and 20.2 weeks, respectively. 15 athletes (62.5%) reported 100% return to sport, 4 (16.7%) to 90%, 1 (4.2%) to 85%, 3 (12.5%) to 80% and 1 athlete to 50%, stopping professional activity. 21% of the cases reported the persistence of some shoulder symptoms. 3 cases experienced a new injury. Patients with classic anterior instability had significantly lower age (30.7 vs 19.8 years, P = 0.001), experienced injury in different context and reported symptoms more frequently compared to multiple lesion patients (4/8 vs 0/10, P = 0.011).

Conclusion
Professional elite goalkeepers which required shoulder surgery for different causes demonstrated high-rate level of return to play despite the persistence of mild symptoms. The high frequency of multiple lesions, patients’ characteristics, injury context and mechanism, increase the concern for injuries in overstressed shoulder for this category of sport.

Level of evidence
IV.

BACK

Critical shoulder angle does not influence retear rate after arthroscopic rotator cuff repair.
Como, C.J., Hughes, J.D., Lesniak, B.P. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06652-2

Purpose
The critical shoulder angle (CSA) has been implicated as a potential risk factor for failure following arthroscopic rotator cuff repair (RCR). However, there is conflicting evidence regarding the clinical usefulness of this measurement. Given these discrepancies and limited comparisons to clinical outcomes, the aim of the current study was to determine whether higher CSAs correlated with an increased retear rate after arthroscopic rotator cuff repair and to determine if any association between CSA and patient-reported outcomes (PROs) exists. It was hypothesized that there would be no correlation between CSA and retear rate or PROs after arthroscopic rotator cuff repair.

Methods
A total of 164 patients who underwent arthroscopic RCR were retrospectively reviewed. CSA was measured for each patient. Patients were then divided into a retear group of 18 patients and a non-retear group of 146 patients. Patient-reported outcomes (PROs), including PROMIS 10 score, American Shoulder and Elbow Surgeons (ASES) score, Brophy score, and visual analog pain scores (VAS) were recorded post-operatively.

Results
The average CSA was 31.2 ± 4.5° for the retear group and 32.2 ± 4.7° for the non-retear group (n.s.). No correlations were found between CSA and PROMIS score (n.s.), ASES score (n.s.), Brophy score (n.s.), or VAS (n.s.).

Conclusion
Critical shoulder angle had no correlation to retear rate or patient-reported outcomes. CSA should not be used as a clinical predictor to assess rotator cuff retear risk after arthroscopic RCR.

Level of evidence
Level III.

BACK

Arthroscopic rotator cuff repair without antibiotic prophylaxis does not increase the infection rate. Baraza, N., Simon, M.J.K. & Leith, J.M.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06664-y

Purpose
Rotator cuff repair is a commonly performed shoulder procedure. In the past 20 years, there has been a shift from mini-open towards arthroscopic repair, and many units exclusively use arthroscopic techniques for rotator cuff surgery. The aim of this study was to find out whether withholding antibiotics had any effect on the infection rate in patients undergoing arthroscopic rotator cuff repair.

Methods
A retrospective analysis of 336 consecutive patients with an arthroscopic rotator cuff repair (RCR) and a minimum 2-year follow-up was performed. The control group received prophylactic antibiotics (controls) and the cases of interest did not receive perioperative antibiotics. A power analysis was performed according to literature regarding infection proportions. The primary outcome was an infection (superficial or deep) in the operated shoulder.

Results
There were 336 patients who underwent a RCR. Two-hundred-and-twelve in the control group and 124 in the non-antibiotic group. Average ages were 57.3 ± 12.5 and 56.8 ± 13.2 years in each group, respectively. The follow-up times ranged from 24 to 76 months. Equipment used and surgical techniques were identical, only operating times were statistically different between the groups (control 77.2 ± 41.3 min versus no antibiotic cases 52.9 ± 16.7 min) ($p = 0.000009$). There was no recorded infection in either group.

Conclusion
Infection following arthroscopic surgery is uncommon. Small incisions, constant lavage with saline, minimal hardware insertion and short operating times all combine to minimise the risks. Current results point towards no detriment in withholding prophylactic antibiotics in low-risk patients undergoing routine rotator cuff repair surgery. Therefore, judicious use of prophylactic antibiotics in patients undergoing this procedure is advocated to prevent potential harm to those it is administered to.

Level of evidence
Level III.

BACK

Improvement in scapular dyskinesis after rotator cuff repair and subacromial decompression. Song, H.E., Oh, KS., Yoon, J.P. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06681-x

Purpose
To investigate the incidence of scapular dyskinesis (SD) in patients with rotator cuff tears using pre- and postoperative 3D computed tomography, analyze the changes in scapular kinematics that occur after arthroscopic rotator cuff repair, and identify the contributing clinical factors.

Methods
Thirty-five patients (mean age, 62.5 ± 8.4 years) were included. Four scapular angles (upward rotation, internal rotation, protraction, and posterior tilt) were measured. The patients were categorized into three pre-existing SD types according to the difference in measured scapular angles between the affected and unaffected sides (type 1 SD, posterior tilt angle difference < − 5°; type 2 SD, internal rotation angle difference > 5°; and type 3 SD, upward rotation angle difference > 5°). The prevalence, factors influencing SD, and outcomes were compared between the improved and sustained SD groups.

Results
Twenty three of the 35 patients (65.7%) with rotator cuff tears had SD (type 1, 11; type 2, six; type 3, six). Of the 23 preoperative SD patients, 12 (52.1%) showed improved SD postoperatively. Most of the patients with improved SD (9/12) had type 1 SD ($p = 0.021$) and a significantly improved posterior tilt angle ($p = 0.043$). The improvement in SD was correlated with a higher range of motion of forward flexion and higher Constant scores (all $p < 0.05$). No healing failure occurred in the improved SD group ($p = 0.037$).

Conclusion
The prevalence of SD was high in patients with degenerative rotator cuff tears. More than half of the SD cases, especially type 1 SD, improved postoperatively. SD recovery correlated with better function and successful rotator cuff healing.

Level of evidence
IV.

BACK

Rotator cuff repair in HIV-positive patients ages 65 and older: only slight increase in risk of general postoperative surgical complications. Robinson, N.M., Gu, A., Kaar, S.G. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06685-7

Purpose
To examine postoperative complications associated with rotator cuff repair (RCR) in HIV-positive patients ages 65 and older.

Methods
Data were collected from the Medicare Standardized Analytic Files between 2005 and 2015 using the PearlDiver Patient Records Database. Subjects were selected using Current Procedural Terminology (CPT) and International Classification of Diseases (ICD) codes. Demographics including age, sex, medical comorbidities, and smoking status were collected. Complications were examined at 7-day, 30-day, and 90-day postoperative time points. Data were examined with univariate and multivariate analyses.

Results
The study included 152,114 patients who underwent RCR, with 24,486 (16.1%) patients who were HIV-positive. Following univariate analysis, patients with HIV were observed to be more likely to develop 7-day, 30-day, and 90-day postoperative complications. However, the absolute risk of each complication was quite low for HIV-positive patients. Univariate and multivariate analysis showed that within 7 days following surgery, patients with HIV were more likely to develop myocardial infarction (OR 2.5, AR 0.1%) and sepsis (OR 2.5, AR 0.04%). Within 30 days, HIV-positive patients were at increased risk for postoperative anemia (OR 2.8, AR 0.1%), blood transfusion (OR 3.3, AR 0.1%), heart failure (OR 2.3, AR 0.8%), and sepsis (OR 2.7, AR 0.1%). Within 90 days, mechanical complications (OR 2.1, AR 0.1%) were increased in the HIV-positive group.

Conclusion
Postoperative complications of RCR occurred at increased rates in the HIV-positive group compared to the HIV-negative group in patients ages 65 and older. In particular, increased risk for myocardial infarction, sepsis, heart failure, anemia, and mechanical complications was noted in HIV-positive patients. However, the actual percentage of patients who experienced each complication was low, indicating RCR is likely safe to perform even in older HIV-positive patients. As more older adults living with HIV present for elective orthopedic procedures, the results of the present study may reassure physicians who are considering RCR as an option for patients in this particular population, while also informing providers about potential complications.

Level of evidence
III.

BACK

Modified double-pulley suture-bridge techniques with or without medial knot tying show comparable clinical and radiological outcomes in arthroscopic rotator cuff repair. Xu, X., Liu, H., Pan, X. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06708-3

Purpose
The optimal technique for arthroscopic rotator cuff repair is still controversial. The aim of this study was to compare modified arthroscopic double-pulley suture-bridge (DPSB) technique with medial knot tying to those without tying, considering clinical and radiological outcomes.

Methods
This study included 292 patients with large full-thickness rotator cuff tears treated with modified DPSB technique. The patients were divided into 158 cases with medial knot tying (knot-tying group) and 134 without tying (knotless group). At follow-up, clinical outcome was assessed by the Constant score, American Shoulder and Elbow Surgeons (ASES) score, and Shoulder Rating Scale of the University of California at Los Angeles (UCLA) score. The assessment of tendon healing was performed with magnetic resonance imaging (MRI) at a minimum of 12 months postoperatively.

Results
The Constant score, ASES score and UCLA score in the knot-tying and knotless groups all improved significantly from before surgery to 12 months postoperatively ($P < 0.05$, respectively). No significant differences were observed between groups for each phase evaluated (n.s.). Tendon healing was categorised according to Sugaya's classification. The retearing rate was 27/158 (17.0%) in the knot-tying group and 20/134 (14.9%) in the knotless group, with no statistically significant difference between groups (n.s.). Additionally, the retear was classified using the Cho's classification. When comparing the retear rates of different types independently, no statistically significant differences were found between groups (n.s.).

Conclusions
The knotless modified DPSB technique showed comparable short-term functional outcomes to those of the knot tying method in large full-thickness rotator cuff tears. Additionally, no significant differences in repair integrity were observed between the two methods. Both techniques can be considered effective treatments for patients with large-sized full-thickness rotator cuff tears.

Level of evidence
III.

BACK

Age, participation in competitive sports, bony lesions, ALPSA lesions, > 1 preoperative dislocations, surgical delay and ISIS score > 3 are risk factors for recurrence following arthroscopic Bankart repair: a systematic review and meta-analysis of 4584 shoulders.
Verweij, L.P.E., van Spanning, S.H., Grillo, A. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06704-7

Purpose
Determining the risk of recurrent instability following an arthroscopic Bankart repair can be challenging, as numerous risk factors have been identified that might predispose recurrent instability. However, an overview with quantitative analysis of all available risk factors is lacking. Therefore, the aim of this systematic review is to identify risk factors that are associated with recurrence following an arthroscopic Bankart repair.

Methods
Relevant studies were identified by searching PubMed, Embase/Ovid, Cochrane Database of Systematic Reviews/Wiley, Cochrane Central Register of Controlled Trials/Wiley, CINAHL/Ebsco, and Web of Science/Clarivate Analytics from inception up to November 12th 2020. Studies evaluating risk factors for recurrence following an arthroscopic Bankart repair with a minimal follow-up of 2 years were included.

Results
Twenty-nine studies met the inclusion criteria and comprised a total of 4582 shoulders (4578 patients). Meta-analyses were feasible for 22 risk factors and demonstrated that age ≤ 20 years (RR = 2.02; P < 0.00001), age ≤ 30 years (RR = 2.62; P = 0.005), participation in competitive sports (RR = 2.40; P = 0.02), Hill-Sachs lesion (RR = 1.77; P = 0.0005), off-track Hill-Sachs lesion (RR = 3.24; P = 0.002), glenoid bone loss (RR = 2.38; P = 0.0001), ALPSA lesion (RR = 1.90; P = 0.03), > 1 preoperative dislocations (RR = 2.02; P = 0.03), > 6 months surgical delay (RR = 2.86; P < 0.0001), ISIS > 3 (RR = 3.28; P = 0.0007) and ISIS > 6 (RR = 4.88; P < 0.00001) were risk factors for recurrence. Male gender, an affected dominant arm, hyperlaxity, participation in contact and/or overhead sports, glenoid fracture, SLAP lesion with/without repair, rotator cuff tear, > 5 preoperative dislocations and using ≤ 2 anchors could not be confirmed as risk factors. In addition, no difference was observed between the age groups ≤ 20 and 21–30 years.

Conclusion
Meta-analyses demonstrated that age ≤ 20 years, age ≤ 30 years, participation in competitive sports, Hill-Sachs lesion, off-track Hill-Sachs lesion, glenoid bone loss, ALPSA lesion, > 1 preoperative dislocations, > 6 months surgical delay from first-time dislocation to surgery, ISIS > 3 and ISIS > 6 were risk factors for recurrence following an arthroscopic Bankart repair. These factors can assist clinicians in giving a proper advice regarding treatment.

Level of evidence
Level IV.

BACK

Arthroscopic repair of inferior glenoid labrum tears (Down Under lesions) produces similar outcomes to other glenoid tears. Page, R.S., Fraser-Moodie, J.A., Bayne, G. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06702-9

Purpose
Inferior glenoid labral tears are an uncommon but distinct shoulder injury. Only a small number of studies have reported outcomes following arthroscopic repair. The aim of the current study was to report minimum 2-year outcomes following inferior labral repair and to compare outcomes and risk factors associated with the injury to non-inferior labral tears. Whether preoperative MRI or MRA identified inferior labral tears was also assessed.

Methods
A prospective study of 162 consecutive patients undergoing arthroscopic glenoid labral repair, excluding isolated superior labral tears, was conducted. Of the 130 patients available for follow-up, 18 (13.7%) had an inferior labral tear (“Down Under lesion”), the remainder had anterior, posterior or mixed anterior/posterior lesions that did not include the inferior pole. Mean follow-up time for the Down Under group was 44 months (SD 10, range 27–57), and 30 months (SD 14, range 4–60) for the non-Down Under group. Postoperative outcomes included the Oxford Shoulder Instability Score and recurrent instability. Associations between Down Under lesions and injury mechanism, instability at presentation, recurrent instability and family history were assessed with multivariable logistic regression. Preoperative MRI or MRA reports by radiologists were examined to determine if Down Under lesions were identified.

Results
Oxford Shoulder Instability Scores indicated that most patients in both groups had little pain or shoulder problems postoperatively (average Oxford Score 41; 48 = no symptoms). Oxford Scores were not significantly different between the Down Under and non-Down Under groups. Four patients (22.2%) in the Down Under group had recurring symptoms (pain and instability) compared to 12 (10.6%) in the non-Down Under group; this difference was not statistically significant (adjusted OR 1.09, 95% CI 0.19,4.77). Family history of shoulder instability was positively associated with a Down Under lesion (adjusted OR 5.0, 95%CI 1.51,16.7). MRI or MRA identified 52.9% of Down Under lesions.

Conclusion
Down Under lesions were an infrequent type of glenoid labral injury, yet postoperative outcomes were similar to other labral tears. Patients with Down Under lesions had a significant risk factor due to family history of shoulder instability. MRI and MRA could not reliably identify Down Under lesions.

Level of evidence
Level III.

BACK

Dexmedetomidine combined with suprascapular nerve block and axillary nerve block has a synergistic effect on relieving postoperative pain after arthroscopic rotator cuff repair.
Lee, J.J., Kim, DY., Hwang, JT. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-06288-8

Purpose
Suprascapular nerve block (SSNB) is the most commonly used block for the relief of postoperative pain from arthroscopic rotator cuff repair and can be used in combination with axillary nerve block (ANB). Dexmedetomidine (DEX) is a type of alpha agonist that can elongate the duration of regional block. The aim of this study was to compare the effects of the use of dexmedetomidine combined with SSNB and ANB with those of the use of SSNB and ANB alone on postoperative pain, satisfaction, and pain-related cytokines within the first 48 h after arthroscopic rotator cuff repair.

Methods
Forty patients with rotator cuff tears who had undergone arthroscopic rotator cuff repair were enrolled in this single-center, double-blinded randomized controlled trial study. Twenty patients were randomly allocated to group 1 and received ultrasound-guided SSNB and ANB using a mixture of 0.5 ml (50 μg) of DEX and 9.5 ml of 0.75% ropivacaine preemptively. The other 20 patients were allocated to group 2 and underwent ultrasound-guided SSNB and ANB alone using a mixture of 0.5 ml of normal saline and 9.5 ml of ropivacaine. The visual analog scale (VAS) for pain and patient satisfaction (SAT) scores were postoperatively checked within 48 h. The plasma interleukin (IL)-6, IL-8, IL-1β, cortisol, and serotonin levels were also postoperatively measured within 48 h.

Results
Group 1 showed a significantly lower mean VAS (visual analog scale of pain) score 1, 3, 6, 12, 18 and 24 h after operation, and a significantly higher mean SAT (patient satisfaction) score 1, 3, 6, 12, 18, 24 and 36 h after the operation than group 2. Group 1 showed a significantly lower mean plasma IL-8 level 1 and 48 h after the operation, and a significantly lower mean IL-1β level 48 h after the operation than group 2. Group 1 showed a significantly lower mean plasma serotonin level 12 h after the operation than group 2. The mean timing of rebound pain in group 1 was significantly later than that in group 2 (36 h > 23 h, $p = 0.007$). Six patients each in groups 1 and 2 showed rebound pain. The others did not show rebound pain.

Conclusions
Ultrasound-guided SSNA and ANB with DEX during arthroscopic rotator cuff repair resulted in a significantly lower mean VAS score and a significantly higher mean SAT score within 48 h after the operation than SSNB and ANB alone. Additionally, SSNB and ANB with DEX tended to result in a later mean timing of rebound pain accompanied by significant changes in IL-8, IL-1β, and serotonin levels within 48 h after the operation. The present study could provide the basis for selecting objective parameters of postoperative pain in deciding the optimal use of medication for relieving pain.

Level of Evidence
Level I.

BACK

A high rate of children and adolescents return to sport after surgical treatment of osteochondritis dissecans of the elbow: a systematic review and meta-analysis. Cohen, D., Kay, J., Memon, M. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06489-9

Purpose
The purpose of this systematic review was to determine the return to sport rates following surgical management of ostechondritis dissecans of the elbow.

Methods
The databases EMBASE, PubMed, and MEDLINE were searched for relevant literature from database inception until August 2020 and studies were screened by two reviewers independently and in duplicate for studies reporting rates of return to sport following surgical management of posterior shoulder instability. A meta-analysis of proportions was used to combine the rates of return to sport using a random effects model. A risk of bias assessment was performed for all included studies using the MINORS score.

Results
Overall, 31 studies met inclusion criteria and comprised of 548 patients (553 elbows) with a median age of 14 (range 10–18.5) and a median follow-up of 39 months (range 5–156). Of the 31 studies included, 14 studies (267 patients) had patients who underwent open stabilization, 11 studies (152 patients) had patients who underwent arthroscopic stabilization, and 6 studies (129 patients) had patients who underwent arthroscopic–assisted stabilization. The pooled rate of return to any level of sport was 97.6% (95% CI 94.8–99.5%, I2 = 32%). In addition, the pooled rate of return to the preinjury level was 79.1% (95% CI 70–87.1%, I2 = 78%). Moreover, the pooled rate of return to sport rate at the competitive level was 86.9% (95% CI 77.3–94.5%, I2 = 64.3%), and the return to sport for overhead athletes was 89.4% (95% CI 82.5–95.1%, I2 = 59%). The overall return to sport after an arthroscopic procedure was 96.4% (95% CI 91.3–99.6%, I2 = 1%) and for an open procedure was 97.8% (95% CI 93.7–99.9%, I2 = 46%). All functional outcome scores showed improvement postoperatively and the most common complication was revision surgery for loose body removal (19 patients).

Conclusion
Surgical management of osteochondritis dissecans of the elbow resulted in a high rate of return to sport, including in competitive and overhead athletes. Similar rates of return to sport were noted across both open and arthroscopic procedures.

Level of evidence
Level IV.

BACK

American Journal of Sports Medicine (AJSM), Volume 49, Issue 14, P3937–3944

Minimum 10-Year Clinical Outcomes After Arthroscopic 270° Labral Repair in Traumatic Shoulder Instability Involving Anterior, Inferior, and Posterior Labral Injury

Daniel P. Berthold, MD*, Matthew R. LeVasseur, MD, Lukas N. Muench, MD, Michael R. Mancini, BS, Colin L. Uyeki, BA, Julianna Lee, BA, Knut Beitzel, MD, Andreas B. Imhoff, MD, Robert A. Arciero, MD, Bastian Scheiderer, MD, Sebastian Siebenlist, MD, Augustus D. Mazzocca, MS, MD

https://doi.org/10.1177/03635465211053632

Background: Current literature reports highly satisfactory short- and midterm clinical outcomes in patients with arthroscopic 270° labral tear repairs. However, data remain limited on long-term clinical outcomes and complication and redislocation rates in patients with traumatic shoulder instability involving anterior, inferior, and posterior labral injury.

Purpose: To investigate, at a minimum follow-up of 10 years, the clinical outcomes, complications, and recurrent instability in patients with 270° labral tears involving the anterior, inferior, and posterior labrum treated with arthroscopic stabilization using suture anchors.

Study Design: Case series; Level of evidence, 4.

Methods: A retrospective outcomes study was completed for all patients with a minimum 10-year follow-up who underwent arthroscopic 270° labral tear repairs with suture anchors by a single surgeon. Outcome measures included pre- and postoperative Rowe score, American Shoulder and Elbow Surgeons (ASES) score, Simple Shoulder Test, visual analog scale for pain, and Single Assessment Numeric Evaluation (SANE). Western Ontario Shoulder Instability Index (WOSI) scores were collected postoperatively. Complication data were collected, including continued instability, subluxation or dislocation events, and revision surgery. Failure was defined as any cause of revision surgery.

Results: In total, 21 patients (mean ± SD age, 27.1 ± 9.6 years) with 270° labral repairs were contacted at a minimum 10-year follow-up. All outcome measures showed statistically significant improvements as compared with those preoperatively: Rowe (53.9 ± 11.4 to 88.7 ± 8.9; P = .005), ASES (72.9 ± 18.4 to 91.8 ± 10.8; P = .004), Simple Shoulder Test (8.7 ± 2.4 to 11.2 ± 1.0; P = .013), visual analog scale (2.5 ± 2.6 to 0.5 ± 1.1; P = .037), and SANE (24.0 ± 15.2 to 91.5 ± 8.3; P = .043). The mean postoperative WOSI score at minimum follow-up was 256.3 ± 220.6. Three patients had postoperative complications, including a traumatic subluxation, continued instability, and a traumatic dislocation, 2 of which required revision surgery (14.2% failure rate).

Conclusion: Arthroscopic repairs of 270° labral tears involving the anterior, inferior, and posterior labrum have highly satisfactory clinical outcomes at 10 years, with complication and redislocation rates similar to those reported at 2 years. This suggests that repairs of extensile labral tears are effective in restoring and maintaining mechanical stability of the glenohumeral joint in the long term.

BACK

Arthroscopic Revision Rotator Cuff Repair: The Role of Previously Neglected Subscapularis Tears

Tae-Hwan Yoon, MD, Sung-Jae Kim, MD, PhD, Yun-Rak Choi, MD, PhD, Jin-Tae Cho, MD, Yong-Min Chun, MD, PhD†

First Published October 15, 2021; pp. 3952–3958

https://doi.org/10.1177/03635465211047485

Background: Concomitant full-thickness tear of the subscapularis tendon is often neglected during primary posterosuperior rotator cuff repair, and its significance has not been investigated by any previous clinical study.

Purpose: To investigate (1) the clinical and radiological outcomes of revision arthroscopic rotator cuff repair and (2) the number of neglected concomitant subscapularis full-thickness tears in the revision of posterosuperior rotator cuff retears and their structural integrity after repair.

Study Design: Case series, Level of evidence, 4.

Methods: This study retrospectively examined 58 patients who underwent arthroscopic rotator cuff revision for a retear of a previously repaired posterosuperior rotator cuff. Preoperative and postoperative functional scores and active range of motion (ROM) were assessed. The initial and most recent follow-up magnetic resonance imaging scans before revision and arthroscopic findings at the time of primary repair were reviewed to determine whether the concomitant subscapularis tear was newly developed or preexisting. Final confirmation of the tendon's full-thickness tear was made during the revision procedure.

Results: At final follow-up, mean functional shoulder scores and ROM improved significantly compared with the preoperative values ($P < .001$). Among the 58 revision cases, 25 (43.1%) had a neglected full-thickness tear of the subscapularis tendon. The fatty infiltration grade of the neglected subscapularis tear progressed from a mean of 1.1 before primary repair to a mean of 1.6 before revision, and the change indicated statistically significant deterioration ($P < .001$). Despite clinical improvement after revision surgery, the retear rate was considerable in the re-repaired cuff tendons (37.9%) as well as for the repaired concomitant subscapularis tears (24%).

Conclusion: Among revision rotator cuff repairs, 43.1% had neglected subscapularis tears, and fatty infiltration of these initially neglected subscapularis tendons showed further progression at the time of revision. The retear rate after the repair of neglected subscapularis tears was higher than expected. Thus, detecting and treating subscapularis tear via meticulous preoperative evaluation and thorough inspection during primary arthroscopy are essential.

BACK

Biceps Tenodesis as an Attractive Alternative to Superior Labral Anterior-Posterior (SLAP) Repair for Type II SLAP Lesions in Active-Duty Military Patients Younger Than 35 Years

Nata Parnes, MD, John C. Dunn, MD, Hunter Czajkowski, Michael J. DeFranco, MD, Clare K. Green, BS, John P. Scanaliato, MD‖

First Published October 21, 2021; pp. 3945–3951

https://doi.org/10.1177/03635465211049373

Background: Biceps tenodesis has been suggested as a superior surgical technique compared with isolated labral repair for superior labral anterior-posterior (SLAP) tears in patients older than 35 years. The superiority of this procedure in younger patients, however, is yet to be determined.

Purpose: To compare the outcomes of arthroscopic SLAP repair with those of arthroscopic-assisted subpectoral biceps tenodesis for type II SLAP tears in active-duty military patients younger than 35 years.

Study Design: Cohort study; Level of evidence, 3.

Methods: Preoperative and postoperative evaluations with a minimum 5-year follow-up including the visual analog scale (VAS), the Single Assessment Numeric Evaluation (SANE), and the American Shoulder and Elbow Surgeons (ASES) shoulder score were administered, and scores were compared between 2 groups of patients younger than 35 years. One group included 25 patients who underwent SLAP repair, and the second group included 23 patients who underwent arthroscopic-assisted subpectoral biceps tenodesis.

Results: The preoperative patient age (P = .3639), forward flexion (P = .8214), external rotation (P = .5134), VAS pain score (P = .4487), SANE score (P = .6614), and ASES score (P = .6519) did not vary significantly between the 2 study groups. Both groups demonstrated statistically significant increases in function as measured by the ASES and SANE and decreases in pain as measured by the VAS at a minimum of 5 years postoperatively. Also at a minimum of 5 years postoperatively, patients in the tenodesis group had lower pain (1.3 vs 2.6, respectively; P = .0358) and higher SANE (84.0 vs 63.3, respectively; P = .0001) and ASES (85.7 vs 75.4, respectively; P = .0342) scores compared with those in the repair group. Failure rate was 20.0% in the repair group versus 0.0% in the tenodesis group (P = .0234).

Conclusion: Active-duty military patients younger than 35 years with type II SLAP tears had more predictable improvement in pain, better functional outcomes, and lower failure rates after biceps tenodesis compared with SLAP repair for type II SLAP tears. Overall, the results of this study indicate that arthroscopic- assisted subpectoral biceps tenodesis is superior to arthroscopic SLAP repair for the treatment of type II SLAP tears in military patients younger than 35 years.

BACK

Lower Extremity

Arthroscopy, Volume 37, Issue 12, P3434-3441

Repeat Revision Hip Arthroscopy Outcomes Match That of Initial Revision But Not That of Primary Surgery for Femoroacetabular Impingement Syndrome

Browning, R. B., Clapp, I. M., Krivicich, L. M., Nwachukwu, B. U., Chahla, J., & Nho, S. J.

https://doi.org/10.1016/j.arthro.2021.04.031

Purpose
To (1) report on pre- and postoperative patient-reported outcome (PRO) scores for patients undergoing repeat revision surgery in short-term follow-up and (2) compare minimal clinically important difference (MCID) and patient acceptable symptomatic state achievement between primary, revision, and repeat revision hip arthroscopy cohorts.

Methods
Data from consecutive patients undergoing revision hip arthroscopy from January 2012 to February 2019 were retrospectively reviewed. Hips that underwent 2 revision hip arthroscopic surgeries were identified and matched 1:3 to patients undergoing revision surgery and 1:3 to patients undergoing primary surgery by age, sex, and body mass index. Baseline demographic data, surgical indications, and hip-specific PROs were collected were obtained preoperatively and at minimum 1-year follow-up. MCID was calculated individually for each cohort.

Results
Twenty patients who underwent repeat revision were matched to 60 patients who underwent revision and 60 primary patients. Patients who underwent repeat revision achieved MCID on all investigated PROs at a similar rate to patients undergoing primary surgery (90.0% vs 91.7%, P = .588) and at a greater rate than patients undergoing first-time revision surgery (90.0% vs 71.7%, P = .045). Patients who underwent repeat revision achieved patient acceptable symptomatic state on all investigated PROs at a similar rate to patients who underwent first-time revision (30.0% vs 55.0%, P = .053) but at a significantly lower rate than primary patients (30.0% vs 76.7%, P < .001). However, patients undergoing repeat revision surgery had significantly lower preoperative PROs (P < .001 for all) and no significant difference in PROs at minimum 1-year follow-up compared with patients undergoing revision (P > .05). Compared with the primary cohort, patients who underwent repeat revision had significantly lower Hip Outcome Score–Activities of Daily Living (77.3 ± 16.7 vs 86.1 ± 14.4; P = .034), Hip Outcome Score–Sports Subscale (60.6 ± 27.2 vs 76.1 ± 23.8; P < .001), and modified Harris Hip Score (69.2 ± 19.3 vs 81.7 ± 16.1; P = .048) at a minimum of 1-year follow-up.

Conclusions
Second-time revision hip arthroscopy, which often requires advanced procedures, results in clinically significant improvement in PROs; however, outcomes for repeat revision cases are similar to first-time revision cases but inferior to those obtained following primary surgeries.

Level of Evidence
Level III, retrospective case-control study.

BACK

Hip Arthroscopy Volume and Reoperations in a Large Cross-Sectional Population: High Rate of Subsequent Revision Hip Arthroscopy in Young Patients and Total Hip Arthroplasty in Older Patients

Cevallos, N., Soriano, K. K. J., Flores, S. E., Wong, S. E., Lansdown, D. A., & Zhang, A. L.

https://doi.org/10.1016/j.arthro.2021.04.017

Purpose
To report contemporary trends in hip arthroscopy case volume in the United States using a large cross-sectional cohort with accurate laterality tracking for assessment of revision surgery and rates of conversion to total hip arthroplasty (THA).

Methods
Using Current Procedural Terminology codes, we queried the Mariner PearlDiver dataset for patients who underwent hip arthroscopy from 2010 to 2017. Patient demographics were recorded and subsequent hip arthroscopy procedures and THA conversion within 2 years after surgery were tracked using International Classification of Diseases, Tenth Revision codes to accurately identify laterality. Emergency department and hospital admission within 30 days after surgery were queried.

Results
Of the 53,103 patients undergoing hip arthroscopy procedures, hip arthroscopy case volume increased 2-fold from 2010 to 2014 but remained relatively unchanged from 2014 to 2017. The most common age group undergoing surgery was 40 to 49 years, and female patients represented 70% of cases. Two-year subsequent surgery rate was 19%, with 15.1% undergoing a revision arthroscopy and 3.9% converting to THA. The most common revision arthroscopy procedures were femoroplasty (9.5%), labral repair (8.5%), and acetabuloplasty (4.3%). Younger patients were more likely to undergo revision arthroscopy (18% age 10-19 years; 15% age 20-29 years). Older patients had a significant risk for conversion to THA within 2 years (36% age 60-69 years; 28% age 50-59 years). Female patients also demonstrated a slightly greater rate of conversion to THA (4.1% female, 3.5% male, P <.0001). Patients 20 to 29 years had the greatest risk of emergency department admission (5.4%) and hospital admission (0.8%) within 30 days of surgery.

Conclusions
The rise in hip arthroscopy procedures may be starting to plateau in the United States. Cross-sectional data also indicate that there is a greater than previously reported rate of revision hip arthroscopy in patients younger than 30 years of age and conversion to THA in patients older than 50 years of age.

Level of Evidence
III, cross-sectional study.

BACK

Improved Functional Outcome Scores Associated with Greater Reduction in Cam Height Using the Femoroacetabular Impingement Resection Arc During Hip Arthroscopy

Kaplan, D. J., Matache, B. A., Fried, J., Burke, C., Samim, M., & Youm, T.

https://doi.org/10.1016/j.arthro.2021.05.014

Purpose
We sought to evaluate the association between postoperative cam lesion measured by the femoroacetabular impingement resection (FAIR) arc and show 2-year patient outcomes following hip arthroscopy.

Methods
A retrospective review of prospectively gathered data from 2013-2017 was performed. All patients who underwent hip arthroscopy for femoroacetabular impingement resection (FAI) with ≥2-year follow-up were included. Cam FAIR arc measurements were made preoperatively and postoperatively on a 45° Dunn view radiograph. The clinical effect of postoperative cam maximal radial distance (MRD) was assessed using the modified Harris Hip Score (mHHS) and Non-Arthritic Hip Score (NAHS). Patients were divided into subgroups based on relationship to the mean and standard deviations for cam MRD. One half standard deviation above the mean was found to be 3.15 mm.

Results
Sixty-one hips in 59 consecutive patients (age 38.1 ± 13.1; body mass index [BMI]: 25.5 ± 4.3; 36 females) were included. Mean preoperative and postoperative cam maximal radial distances (MRD) were 4.5 ± 1.7 mm and 2.3 ± 1.7 mm ($P < .001$), respectively. The interclass correlation coefficient was excellent (>.9) for all measurements. There were no differences in age, sex, BMI or preoperative mHHS/NAHS between <3.15 mm and >3.15 mm cam MRD groups ($P > .05$). Using linear regression, cam MRD was found to be significantly associated with 2-year outcomes for both mHHS ($R2 = .21$, $P < .001$) and NAHS ($R2 = .004$). Subgroup analysis demonstrated that patients in the cam MRD < 3.15 mm group had significantly higher mHHS (89.7 vs 70.0, $P < .001$) and NAHS scores (90.5 vs 72.9, $P < .001$) than those in the >3.15 mm group. Additionally, more patients in the <3.15 mm group reached the minimal clinically important difference (95.2% vs 78.9%, $P = .048$) and were above patient acceptable symptomatic state (95.2% vs 52.6%, $P < .001$) compared to the >3.15 mm group.

Conclusion
Patients with a lower postoperative cam MRD relative to the FAIR arc demonstrated significantly improved outcomes as compared to those with higher postoperative MRD at two-year follow-up.

Level of Evidence
Level IV, retrospective case series.

BACK

Establishing the Minimal Clinically Important Difference and Patient-Acceptable Symptomatic State After Arthroscopic Meniscal Repair and Associated Variables for Achievement

Maheshwer, B., Wong, S. E., Polce, E. M., Paul, K., Forsythe, B., Bush-Joseph, C., … Chahla, J.

https://doi.org/10.1016/j.arthro.2021.04.058

Purpose
To establish the minimal clinically important difference (MCID) and patient-acceptable symptomatic state (PASS) after arthroscopic meniscal repair and identify the factors associated with achieving these outcomes.

Methods
This is a retrospective study with prospectively collected data. Patient-reported outcome measures (PROMs) were collected from April 2017 to March 2020. All patients who underwent arthroscopic meniscal repair and completed both preoperative and postoperative PROMs were included in the analysis. MCID and PASS were calculated via half the standard deviation of the delta PRO change from baseline (for International Knee Documentation Committee Score [IKDC]) and via anchor-based methodology (Knee Injury and Osteoarthritis Outcome Score [KOOS] subscales).

Results
Sixty patients were included in the final analysis. The established MCID threshold values were 10.9 for IKDC, 12.3 for KOOS Symptoms, 11.8 for KOOS Pain, 11.4 for KOOS Activities of Daily Living (ADL), 16.7 for KOOS Sport, and 16.9 for KOOS Quality of Life (QoL). Postoperative scores greater than the following values corresponded to the PASS: 69.0 for IKDC, 75.0 for KOOS Symptoms, 80.6 for KOOS Pain, 92.7 for KOOS ADL, 80.0 for KOOS Sport, and 56.3 for KOOS QoL. Higher preoperative PRO scores were associated with lower likelihood of achieving MCID. Concomitant ligament procedures were associated with a higher likelihood of achieving PASS. Tears to both menisci were associated with decreased likelihood of achieving MCID and PASS for IKDC. Horizontal tears were associated with decreased likelihood of achieving PASS for IKDC and KOOS. Complex tears were associated with decreased likelihood of achieving MCID for KOOS.

Conclusion
Clinically meaningful outcomes such as MCID and PASS were established for meniscal repair surgery using selected PROMs for IKDC and KOOS subscales. Variables more likely to be associated with achieving these outcomes include lower preoperative PRO score and concomitant ligament procedure, whereas higher preoperative PRO score, tearing of both medial and lateral menisci, and horizontal and complex tear classifications were associated with decreased likelihood of achieving these outcomes.

Level of Evidence

BACK

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA), Volume 29, Issue 12, P4082 - 4090

Mild to moderate osteoarthritis is not considered a contraindication to arthroscopic treatment of symptomatic femoroacetabular impingement: results of an international survey. Toobaie, A., Ayeni, O.R. & Degen, R.M.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06639-z

Purpose
Hip arthroscopy offers a minimally invasive approach for the treatment of femoroacetabular impingement (FAI). Although osteoarthritis (OA) is a known negative prognostic factor for arthroscopy, it is unclear if patients with FAI and concomitant mild to moderate OA benefit from hip preservation surgery. The goal of this study was to evaluate current practice patterns among surgeons experienced in FAI management in the treatment of patients between 40 and 60 years of age with symptomatic FAI and concomitant OA of varying severity.

Methods
A 12-question cross-sectional survey was distributed using a secure electronic survey portal. The survey sought to determine surgical treatment of FAI in patients between the ages of 40 and 60 years old with concomitant OA of various degrees. Surveys were completed electronically and anonymously, with invitations distributed to members of the American Orthopaedic Society for Sports Medicine, International Society for Hip Arthroscopy, Arthroscopy Association of Canada, Canadian Orthopaedic Association, and both current and former Fowler Kennedy sports medicine fellows.

Results
A total of 76 orthopedic surgeons who treat FAI completed the survey. All respondents routinely treat FAI arthroscopically, while only 43.7% have utilized an open surgical approach. Nearly all respondents (96.0%) would consider performing hip arthroscopy in patients over 40 years of age. The respondents ranked an absence of OA (Tönnis 0 or 1) as the most important factor in deciding to move forward with surgery, while a positive response to diagnostic injection was considered the least important factor of the options given. Respondents felt that the role for hip arthroscopy in patients with symptomatic FAI decreased with increasing age and worsening degree of osteoarthritis. In patients 40–50 years old with Tönnis 1, willingness to perform surgery was 89.5%; while with Tönnis 2 this was reduced to 39.5% and with Tönnis 3 it was 5.3%. In patients 50–60 years old with Tönnis 1, 80.3% of respondents found arthroscopy to be beneficial; while with Tönnis 2 this was reduced to 22.4% and with Tönnis 3 it was 2.6%.

Conclusions
Most respondents consider arthroscopy a viable option for patients aged 40–60 years old with mild osteoarthritis (Tönnis 1), while worsening osteoarthritis (Tönnis 3) results in greater rates of non-arthroscopic treatment. The role of arthroscopy with moderate osteoarthritis (Tönnis 2) remains unclear and should be a focus for future studies.

Level of evidence
Level V.

BACK

Preoperative varus alignment and postoperative meniscus extrusion are the main long-term predictive factors of clinical failure of meniscal root repair. Chung, K.S., Ha, J.K., Ra, H.J. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-06405-7

Purpose
No studies have been conducted to determine long-term predictors of clinical failure after surgical root repair. This study identified long-term prognostic factors of clinical failure after pull-out repair of medial meniscus posterior root tears (MMPRTs) at a minimum of 10 year follow-up.

Methods
A total of 37 patients who underwent MMPRT pull-out repair and had been observed for more than 10 years were recruited for this study. The mean follow-up period was 125.9 ± 21.2 months. Clinical failure of the procedures was defined as conversion to total knee arthroplasty (TKA). Participants were categorized into two groups: non-failure and failure groups. Various factors, including demographic features and radiologic findings, were analyzed and compared between the two groups. Meniscus extrusion was assessed at coronal magnetic resonance imaging preoperatively and 1 year postoperatively. Independent risk factors were determined by univariate analysis and logistic regression analysis. To determine the cut-off value for risk factors, the receiver-operating characteristic curve analysis was performed.

Results
In total, eight patients (22%) were converted to TKA during the follow-up period. With univariate analysis, statistically significant differences between two groups were observed in mechanical varus alignment ($P = 0.018$), rate of the number of patient with more meniscal extrusion values after surgery ($P = 0.024$), and the difference between the preoperative and 1-year postoperative value of meniscus extrusion (mm) ($P = 0.010$). In a logistic analysis, OR of mechanical varus alignment and differences in meniscus extrusion value before and 1 year after surgery was 1.5 ($P = 0.048$) and 3.7 ($P = 0.034$). The cut-off values of mechanical varus alignment and differences in meniscus extrusion values were 5 degrees and 0.7 mm.

Conclusion
Clinically, preoperative varus alignment and increased meniscal extrusion after surgery were found to be predictive for a clinical failure after meniscal root repair in a long-term perspective. Thus, these negative prognostic factors should be taken into consideration for performing root repair in MMPRTs.

Level of evidence
Level III.

BACK

Anatomical knee variables result in worse outcomes of lateral meniscal allograft transplantation with discoid lateral menisci than with nondiscoid lateral menisci. Ren, S., Zhou, R., Zhang, X. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06509-8

Purpose
To compare the clinical results of meniscal allograft transplantation (MAT) between patients with discoid lateral meniscus (DLM) and non-DLM (NDLM) and to analyse whether anatomical deformities cause worse clinical results in DLM patients.

Methods
Patients who underwent unilateral MAT from 2005 to 2017, including 115 patients with DLMs or NDLMs, were included in this study. Clinical outcomes [International Knee Documentation Committee (IKDC) scores, Lysholm scores, Tegner scores, and visual analogue scale (VAS) scores] and radiographic and MRI data were assessed. Clinical outcomes and anatomical knee variables were analysed by multivariate stepwise regression.

Results
After more than 2 years of follow-up, 9 patients were lost to follow-up, and 59 patients with DLM and 47 patients with NDLM were included. The mean postoperative results were significantly better than the preoperative data ($P < 0.05$) in both the DLM and NDLM groups. In addition, postoperative IKDC, Lysholm, and VAS scores but not Tegner scores were better in the NDLM group than in the DLM group. Several anatomical knee variables differed significantly between the NDLM and DLM groups and were associated with MAT outcomes. The condylar prominence ratio of the lateral and medial femoral condyles adjacent to the intercondylar notch and squaring of the lateral femoral condyle (the distance of the straight articular condylar surface) were independent factors significantly correlated with the Lysholm scores for MAT at last follow-up.

Conclusion
MAT improved knee function in both patients with DLM and patients with NDLM, but patients NDLM had better clinical outcomes than patients with DLM. The condylar prominence ratio and squaring of the lateral femoral condyle may underlie this result.

Level of evidence
III.

BACK

Age, time from injury to surgery and quadriceps strength affect the risk of revision surgery after primary ACL reconstruction. Cristiani, R., Forssblad, M., Edman, G. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06517-8

Purpose
To identify preoperative, intraoperative and postoperative factors associated with revision anterior cruciate ligament reconstruction (ACLR) within 2 years of primary ACLR.

Methods
Patients who underwent primary ACLR at our institution, from January 2005 to March 2017, were identified. The primary outcome was the occurrence of revision ACLR within 2 years of primary ACLR. Univariate and multivariate logistic regression analyses were used to evaluate preoperative [age, gender, body mass index (BMI), time from injury to surgery, pre-injury Tegner activity level], intraoperative [graft type, graft diameter, medial meniscus (MM) and lateral meniscus (LM) resection or repair, cartilage injury] and postoperative [side-to-side (STS) anterior laxity, limb symmetry index (LSI) for quadriceps and hamstring strength and single-leg-hop test performance at 6 months] risk factors for revision ACLR.

Results
A total of 6,510 primary ACLRs were included. The overall incidence of revision ACLR within 2 years was 2.5%. Univariate analysis showed that age < 25 years, BMI < 25 kg/m2, time from injury to surgery < 12 months, pre-injury Tegner activity level ≥ 6, LM repair, STS laxity > 5 mm, quadriceps strength and single-leg-hop test LSI of ≥ 90% increased the odds; whereas, MM resection and the presence of a cartilage injury reduced the odds of revision ACLR. Multivariate analysis revealed that revision ACLR was significantly related only to age < 25 years (OR 6.25; 95% CI 3.57–11.11; P < 0.001), time from injury to surgery < 12 months (OR 2.27; 95% CI 1.25–4.17; P = 0.007) and quadriceps strength LSI of ≥ 90% (OR 1.70; 95% CI 1.16–2.49; P = 0.006).

Conclusion
Age < 25 years, time from injury to surgery < 12 months and 6-month quadriceps strength LSI of ≥ 90% increased the odds of revision ACLR within 2 years of primary ACLR. Understanding the risk factors for revision ACLR has important implications when it comes to the appropriate counseling for primary ACLR. In this study, a large spectrum of potential risk factors for revision ACLR was analyzed in a large cohort. Advising patients regarding the results of an ACLR should also include potential risk factors for revision surgery.

Level of evidence
III.

BACK

Elevated BMI increases concurrent pathology and operative time in adolescent ACL reconstruction. Traven, S.A., Wolf, G.J., Goodloe, J.B. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06432-y

Purpose
The purpose of this study was to (1) report on the incidence of concurrent surgical pathology at the time of adolescent ACL reconstruction, (2) evaluate patient risk factors for concurrent pathology, and (3) measure the effect of BMI on operating room (OR) time.

Methods
A retrospective analysis of the NSQIP database for the years 2005–2017 was conducted. Nine-hundred and seventeen patients 18 years of age and younger who underwent ACL reconstruction (ACLR) were identified using CPT code 29888 and patients undergoing surgery for multi-ligamentous knee injuries were excluded. The mean patient age was 17.6 years (range 14–18, standard deviation 0.52) and consisted of 546 males (59.5%) and 371 females (40.5%). Logistic regression was used to assess the relationship between BMI and additional CPT codes for internal derangement at the time of surgery. Internal derangement was defined as any procedure for the treatment of a meniscal tear, chondral lesion, or loose body removal. Linear regression analysis was then performed to evaluate the effect of BMI on operative time.

Results
43.7% of patients undergoing ACLR required an associated procedure for internal derangement. Additionally, the risk of requiring additional procedures for internal derangement increased by 3.1% per BMI point. BMI was also predictive of operative time, independent of the number of additional procedures. Specifically, the operative time increased by nearly one minute for every point increase in BMI (58.0 s).

Conclusions
Adolescent patients with an elevated BMI were much more likely to require additional surgical procedures for internal derangement at the time of ACL reconstruction. Additionally, BMI was a significant predictor for longer operative times.

Level of Evidence
Level III.

BACK

Preoperative pain sensitivity questionnaire helps customize pain management after arthroscopic partial meniscectomy. Yaari, L., Dolev, A., Kittani, M. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06438-6

Purpose
To evaluate correlations between preoperative pain sensitivity and postoperative analgesic consumption together with pain perception shortly after arthroscopic partial meniscectomy in non-arthritic knees.

Methods
Ninety-nine patients who underwent primary arthroscopic meniscectomy were prospectively divided into three postoperative treatment groups that were prescribed with betamethasone injection (at the end of surgery), oral celecoxib or rescue analgesia (control). Preoperative pain sensitivity was evaluated by pain sensitivity questionnaires (PSQ). Patients were followed for the first three postoperative weeks to evaluate knee injury and osteoarthritis outcome score (KOOS) pain scores and analgesics consumption. Statistical analysis included correlations among preoperative pain sensitivity, postoperative pain levels and analgesics consumption. A receiver operating characteristic curve was plotted to investigate the cutoff values of the PSQ score to predict insufficient postoperative pain reduction.

Results
There were no differences at baseline among all study groups in age, sex, BMI, level of activity, comorbidities and surgical findings. At the final follow-up, KOOS pain scores improved in all groups ($p < 0.001$). Mean final KOOS pain scores were 76.1 ± 15.2 for the betamethasone group, 70.8 ± 12.6 for the celecoxib group and 78.7 ± 11.6 for the control group. No differences in scores were observed among groups (n.s.). In the control group, a negative correlation was observed between PSQ score and KOOS-pain scores at the end of the follow-up in addition to a positive correlation between PSQ score and rescue analgesia consumption at the first postoperative week. The optimal cutoff value for PSQ score to predict insufficient improvement in KOOS-pain subscale was 5.0 points.

Conclusions
A cutoff value of pain sensitivity questionnaire score above 5.0 points was determined to identify patients with higher sensitivity to pain who underwent arthroscopic partial meniscectomy. These patients reported relatively increased pain and consumed more rescue analgesics postoperatively unless treated with a single intraoperative corticosteroids injection or oral non-steroidal anti-inflammatories. Therefore, surgeons can use pain sensitivity questionnaire score as a preoperative tool to identify patients with high sensitivity to pain and customize their postoperative analgesics protocol to better fit their pain levels.

Level of evidence
II.

BACK

Medial meniscus posterior root repair reduces the extruded meniscus volume during knee flexion with favorable clinical outcome. Zhang, X., Furumatsu, T., Okazaki, Y. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06505-y

Purpose
The volume of medial meniscus (MM) extrusion at 10° and 90° knee flexions using three-dimensional (3D) magnetic resonance imaging (MRI) and assessed relevant clinical outcomes at 1-year follow-up were evaluated.

Methods
Twenty-four patients who underwent MM posterior root repair were retrospectively reviewed. At 10° and 90° knee flexions, the meniscal extrusion distance and volume were measured using 3D meniscus models constructed by SYNAPSE VINCENT®. The correlation between Knee Injury and Osteoarthritis Outcome Score, Lysholm, International Knee Documentation Committee scores, Tegner activity, and pain visual analog scales and changes in MM extrusion were assessed.

Results
No significant differences in the MM medial extrusion were observed between 10° and 90° knee flexions postoperatively. MM posterior extrusion (MMPE) decreased significantly at 10° and 90° knee flexions postoperatively. At 90° knee flexion, the meniscus volume at the intra-tibial surface increased at 3 and 12 months postoperatively. The MM extrusion volume increased slightly at 10° knee flexion; however, the volume decreased significantly at 90° knee flexion postoperatively. The change in MMPE significantly correlated with clinical scores. All 12-month clinical scores were significantly improved compared to preoperative scores.

Conclusions
The progression of meniscus posterior extrusion and reduction of its volume at 90° knee flexion can be suppressed by MM posterior root repair. Postoperative clinical scores correlated with reductions of the posterior extrusion. Regarding clinical relevance, the dynamic stability of the meniscus can be maintained by MM posterior root repair, which is an effective therapeutic method for improving its clinical status.

Level of evidence
Level IV.

BACK

Matrix-induced chondrogenesis is a valid and safe cartilage repair option for small- to medium-sized cartilage defects of the knee: a systematic review. Karpinski, K., Häner, M., Bierke, S. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06513-y

Purpose
The purpose of this study was to perform a systematic review of randomized controlled trials comparing the results of matrix-induced chondrogenesis with other therapies for local chondral lesions of the knee.

Methods
A systematic search for randomized controlled trials (RCT) about matrix-induced chondrogenesis for focal chondral lesions in the knee was performed according to the PRISMA guidelines. Data source was PubMed central, EMBASE and Google scholar.

Results
Five articles could be included, whereas two originated from the same study group. Three studies compared matrix-induced chondrogenesis to microfracture (MFx) only. One trial compared AMIC® to collagen-covered autologous chondrocyte implantation (ACI-C). One study assessed the improvements given by the combination of AMIC® with bone marrow aspirate concentrate (BMAC). In three studies, clinical improvements compared to baseline were seen at 2-year postoperation, irrespective of the technique used. After 5 years, one trial showed better results for the AMIC® group compared to MFx, including MRI defect filling. One study showed also good results after AMIC® with faster recovery for patients with AMIC® + BMAC 12 months postoperatively.

Conclusion
Results of RCTs comparing matrix-induced chondrogenesis with other treatment options showed that matrix-induced chondrogenesis is a valid and safe cartilage repair option for small- to medium-sized cartilage defects of the knee. This one-stage surgical technique presents a good alternative for patients.

Level of evidence
I.

BACK

No decrease in incidence of arthroscopic meniscectomy in a Canadian province. Chan, E.W., Chaulk, R.C., Cheng, Y. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06534-7

Purpose
Arthroscopic meniscectomy (APM) is the most common procedure in orthopedic surgery, despite increasing evidence questioning its benefit over conservative management for treatment of degenerative meniscal tears. The purpose of this study is to determine the epidemiology and trends of APM in Saskatchewan, a Canadian province, over a 20 year period.

Methods
Physician billing codes were used to identify patients who underwent APM in Saskatchewan between January 1, 1998 and December 31, 2017. Records were obtained from eHealth Saskatchewan, a provincial health database. Data was analyzed for overall incidence and age-specific trends of APM.

Results
A total of 35,099 APMs were performed during the study period. The population of Saskatchewan ranged from 992,314 to 1,150,782 (median 1,017,368) during this time interval, with 81 orthopedic surgeons performing APM. Overall incidence rate of APM did not change significantly over time. No decrease was observed in patients presumed to have degenerative tears (≥ 50 years). The number of meniscectomies in patients ≥ 50 years was significantly greater during the second decade of study compared to the first (OR 1.48, $p < 0.01$). Conversely, the increase in incidence rate among older patients was not statistically significant ($R2 = 0.125$, n.s.).

Conclusion
Overall incidence rate of APM in Saskatchewan has not decreased during the last 20 years. Furthermore, APM frequency increased over time for individuals ≥ 50 years. Several regional factors may have contributed to these findings, including the large proportion of Saskatchewan residents engaged in physically demanding work and barriers to accessing physiotherapy services. Given recent evidence disputing the benefit of APM over conservative measures, this study highlights the need for improved dissemination of evidence, as well as the importance of an individualized treatment plan to address patient-specific factors.

Level of evidence
Level IV

BACK

Anatomic all-epiphyseal ACL reconstruction with "inside-out" femoral tunnel placement in immature patients yields high return to sport rates and functional outcome scores a minimum of 24 months after reconstruction. Fourman, M.S., Hassan, S.G., Roach, J.W. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06542-7

Purpose
To understand if anatomic physeal-sparing ACL reconstruction in the immature host preserves range of motion, permits a return to sports, and avoids limb length discrepancy and accelerated intra-articular degeneration with a cross-sectional radiographic, physical examination and patient-reported outcomes analysis.

Methods
A cross-sectional recall study included 38 patients aged 7–15 who underwent all-epiphyseal ACL reconstruction with hamstring allograft performed by a single surgeon at a large academic medical center. All-epiphyseal reconstructions were performed using a modified Anderson physeal-sparing technique, with the femoral tunnel placed using an "inside-out" technique. Assessments consisted of a physical exam, long leg cassette radiographs, KT-1000 measurements, subjective patient metrics, and magnetic resonance imaging.

Results
Thirty-eight (56.7%) of 66 eligible patients returned for in-person clinical and radiographic exams. Patients were 11.4 ± 1.8 years at the time of surgery. Five patients were females (13.2%). Mean follow-up was 5.5 ± 2.4 years. ACL re-injuries occurred in four patients (10.5%), all of whom underwent revision reconstructions. Thirty-three of the remaining 34 (97.1%) patients returned to sports following their reconstruction, and 24 (70.6%) returned to their baseline level of competition. Mean limb length discrepancy (LLD) was 0.2 ± 1.4 cm. Nine patients had an LLD of > 1 cm (26.5%), which occurred at an equivalent age as those with < 1 cm LLD (10.8 ± 2.0 vs. 11.7 ± 1.7, n.s.). Pre-operative Marx scores (13.1 ± 3.5) were not significantly different from post-operative values (12.3 ± 5.1, n.s.). Patients who required ACL revisions had significantly lower Marx scores than those with intact primary grafts (8.3 ± 7.1 vs. 13.4 ± 4.5, p = 0.047). Cohort mean International Knee Documentation Committee (IKDC) score was 89.7 ± 12.7.

Conclusion
Anatomic all-epiphyseal anatomic ACL reconstruction appears to be useful in patients with significant projected remaining growth, with good return-to-sport outcomes and minimal risk of clinically significant physeal complications. However, given the limited patient recall possible in the present study, further large sample size, high-quality works are necessary to validate our findings.

Level of evidence
Level IV.

BACK

Non-anatomic repair of medial meniscus posterior root tears to the posterior capsule provided favourable outcomes in middle-aged and older patients. Zhu, S., Li, X., Wu, JL. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06532-9

Purpose
To describe a non-anatomic arthroscopic all-inside repair technique for middle-aged and older patients with medial meniscus posterior root tears (MMPRTs) and to evaluate the short- to mid-term clinical and radiologic results. The hypothesis was that this procedure would yield good clinical outcome results and structural healing in middle- and older-aged patients.

Methods
This was a retrospective study evaluating patients who had undergone MMPRT repair by suturing the meniscal root directly to the capsule, rather than by the transtibial technique, between 2013 and 2016. This all-inside repair technique was performed for patients with type II MMPRTs who were over 40 years old. Exclusion criteria included tibial osteotomy due to malalignment, concomitant multiple-ligament injuries and follow-up time less than 2 years. The Lysholm score, Tegner activity score and International Knee Documentation Committee (IKDC) score were evaluated preoperatively and at the final follow-up. Medial meniscal extrusion, the International Cartilage Repair Society (ICRS) grades of the medial compartment, and the healing status of the medial meniscus root were assessed on magnetic resonance imaging preoperatively and at the final follow-up.

Results
Twenty-nine patients (mean age 61.7 ± 7.9) were included; the mean follow-up duration was 46.2 ± 7.9 months. The mean Lysholm score significantly improved from 33.7 ± 20.9 preoperatively to 81.7 ± 19.9 at the final follow-up ($p < 0.001$), the median Tegner activity score improved from 1.0 (range 1–4) to 3.0 (range 2–4, $p < 0.001$), and the mean IKDC score improved from 20.1 ± 16.4 to 69.6 ± 16.2 ($p < 0.001$). On MRI, 9 (31%) cases had complete healing; 17 (59%) had partial healing; and 3 (10%) had failed healing (ICCs ≥ 0.92). Mean meniscal extrusion significantly increased from 2.3 ± 1.7 mm preoperatively to 3.5 ± 1.5 mm postoperatively ($p < 0.001$, ICCs ≥ 0.92).

Conclusion
Non-anatomic arthroscopic all-inside repair of MMPRTs to the posterior capsule yielded good to excellent clinical results and a high rate of healing in the medial meniscus root on MRI in middle-aged and older patients at short- to mid-term follow-up, despite increased meniscal extrusion. This method is an alternative to the transtibial pullout repair technique for treating MMPRTs in middle- and older-aged patients.

Level of evidence
Level IV.

BACK

Satisfactory clinical results and low failure rate of medial collagen meniscus implant (CMI) at a minimum 20 years of follow-up. Lucidi, G.A., Grassi, A., Al-zu'bi, B.B.H. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06556-1

Purpose
The aim of the study was to evaluate the long-term clinical results, reoperations, surgical failure and complications at a minimum of 20 year of follow-up of the first 8 medial CMI scaffolds implanted by a single surgeon during a pilot European Prospective study.

Methods
Seven (88%) out of 8 patients were contacted. The Cincinnati Score, VAS, and Lysholm score were collected. Moreover, magnetic resonance imaging (MRI) was performed on 4 patients at the last follow-up. Complications, reoperations and failures were also investigated.

Results
The average follow-up was 21.5 ± 0.5 years. One patient underwent TKA after 13 years from CMI implantation; a second patient underwent valgus high tibial osteotomy 8 years after the index surgery and another patient underwent anterior cruciate ligament hardware removal at 21 years of follow-up. At the final follow-up, 3 patients were rated as "Excellent", 1 as "Good" and 2 as "Fair" according to the Lysholm score. The Cincinnati score and the VAS were substantially stable over time. The MRI showed a mild osteoarthritis progression in 3 out of 4 patients according to the Yulish score, and the CMI signal was similar to the mid-term follow-up revealing 3 cases of myxoid degeneration and 1 case of normal signal with reduced scaffold size.

Conclusion
The medial CMI is a safe procedure: satisfactory clinical results and a low failure rate could be expected even at a long-term follow-up. For this purpose, the correct indication as well as correcting axial malalignment and addressing knee instability at the time of the index surgery is mandatory. On the other hand, a mild osteoarthritis progression could be expected even after meniscus replacement.

Level of evidence
IV.

BACK

Same knee, different goals: patients and surgeons have different priorities related to ACL reconstruction. Marmura, H., Bryant, D.M., Birmingham, T.B. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-021-06550-7

Purpose
The priorities of patients should be shared by those treating them. Patients and surgeons are likely to have different priorities surrounding anterior cruciate ligament reconstruction (ACLR), with implications for shared decision-making and patient education. The optimal surgical approach for ACLR is constantly evolving, and the magnitude of treatment effect necessary for evidence to change surgical practice is unknown. The aim of this study was to determine (1) the priorities of surgeons and patients when making decisions regarding ACLR and (2) the magnitude of reduction in ACLR graft failure risk that orthopaedic surgeons require before changing practice.

Methods
This study followed a cross-sectional survey design. Three distinct electronic surveys were administered to pre-operative ACLR patients, post-operative ACLR patients, and orthopaedic surgeons. Patients and surgeons were asked about the importance of various outcomes and considerations pertaining to ACLR. Surgeons were asked scenario-based questions regarding changing practice for ACLR based on new research.

Results
Surgeons were more likely to prioritize outcomes related to the surgical knee itself, whereas patients were more likely to prioritize outcomes related to their daily lifestyle and activities. Knee instability and risk of re-injury were unanimous top priorities among all three groups. A mean relative risk reduction in ACLR graft failure of about 50% was required by orthopaedic surgeons to change practice regardless of the type of change, or patient risk profile.

Conclusion
There are discrepancies between the priorities of surgeons and patients, and orthopaedic surgeons appear resistant to changing practice for ACLR.

Level of evidence
IV.

BACK

American Journal of Sports Medicine (AJSM), Volume 49, Issue 14

Early Operative Versus Delayed Operative Versus Nonoperative Treatment of Pediatric and Adolescent Anterior Cruciate Ligament Injuries: A Systematic Review and Meta-analysis

Evan W. James, MD, Brody J. Dawkins, BA, Jonathan M. Schachne, BA, Theodore J. Ganley, MD, Mininder S. Kocher, MD, MPH, PLUTO Study Group, Christian N. Anderson, MD, Michael T. Busch, MD, Henry G. Chambers, MD, Melissa A. Christino, MD, Frank A. Cordasco, MD, Eric W. Edmonds, MD, Daniel W. Green, MD, Benton E. Heyworth, MD, J. Todd R. Lawrence, MD, PhD, Lyle J. Micheli, MD, Matthew D. Milewski, MD, Matthew J. Matava, MD, Jeffrey J. Nepple, MD, Shital N. Parikh, MD, Andrew T. Pennock, MD, Crystal A. Perkins, MD, Paul M. Saluan, MD, Kevin G. Shea, MD, Eric J. Wall, MD, Samuel C. Willimon, MD, Peter D. Fabricant, MD, MPH*

First Published March 15, 2021; pp. 4008–4017

https://doi.org/10.1177/0363546521990817

Background: Treatment options for pediatric and adolescent anterior cruciate ligament (ACL) injuries include early operative, delayed operative, and nonoperative management. Currently, there is a lack of consensus regarding the optimal treatment for these injuries.

Purpose/Hypothesis: The purpose was to determine the optimal treatment strategy for ACL injuries in pediatric and adolescent patients. We hypothesized that (1) early ACL reconstruction results in fewer meniscal tears than delayed reconstruction but yields no difference in knee stability and (2) when compared with nonoperative management, any operative management results in fewer meniscal tears and cartilage injuries, greater knee stability, and higher return-to-sport rates.

Study Design: Systematic review and meta-analysis; Level of evidence, 4.

Methods: A systematic search of databases was performed including PubMed, Embase, and Cochrane Library using PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Inclusion criteria were a pediatric and adolescent patient population (≤19 years old at surgery), the reporting of clinical outcomes after treatment of primary ACL injury, and original scientific research article. Exclusion criteria were revision ACL reconstruction, tibial spine avulsion fracture, case report or small case series (<5 patients), non–English language manuscripts, multiligamentous injuries, and nonclinical studies.

Results: A total of 30 studies containing 50 cohorts and representing 1176 patients met our criteria. With respect to nonoperative treatment, knee instability was observed in 20% to 100%, and return to preinjury level of sports ranged from 6% to 50% at final follow-up. Regarding operative treatment, meta-analysis results favored early ACL reconstruction over delayed reconstruction (>12 weeks) for the presence of any meniscal tear (odds ratio, 0.23; P = .006) and irreparable meniscal tear (odds ratio, 0.31; P = .001). Comparison of any side-to-side differences in KT-1000 arthrometer testing did not favor early or delayed ACL reconstruction in either continuous mean differences (P = .413) or proportion with difference ≥3 mm (P = .181). Return to preinjury level of competition rates for early and delayed ACL reconstruction ranged from 57% to 100%.

Conclusion: Delaying ACL reconstruction in pediatric or adolescent patients for >12 weeks significantly increased the risk of meniscal injuries and irreparable meniscal tears; however, early and delayed operative treatment achieved satisfactory knee stability. Nonoperative management resulted in high rates of residual knee instability, increased risk of meniscal tears, and comparatively low rates of return to sports.

BACK

Tranexamic Acid in Anterior Cruciate Ligament Reconstruction: A Systematic Review and Meta-analysis

William L. Johns, MD*, Kempland C. Walley, MD, Sommer Hammoud, MD, Tyler A. Gonzalez, MD, MBA, Michael G. Ciccotti, MD, Nirav K. Patel, MD, FRCS

First Published February 25, 2021; pp. 4030–4041

https://doi.org/10.1177/0363546521988943

Background: Hemarthrosis after anterior cruciate ligament (ACL) reconstruction procedures can delay rehabilitation and have toxic effects on the cartilage and synovium. Tranexamic acid is widely used in adult reconstruction procedures; however, its use in ACL reconstruction is a novel topic of study.

Purpose: To analyze the available literature on hemarthrosis, pain, functional outcomes, and complications after administration of tranexamic acid in ACL reconstruction procedures.

Study Design: Meta-analysis.

Methods: A literature search was performed to retrieve randomized controlled trials examining the use of tranexamic acid at the time of ACL reconstruction procedures. The studied outcomes included postoperative joint drain output, hemarthrosis grade, visual analog scale scores for pain, range of motion, Lysholm score, postoperative rates of deep venous thrombosis, and pulmonary embolism. Outcomes were pooled to perform a meta-analysis.

Results: Five prospective randomized controlled trials met inclusion criteria for analysis. Four studies administered intravenous tranexamic acid in bolus or infusion form before ACL reconstruction, while 2 studies administered tranexamic acid via intra-articular injection. Specifically, tranexamic acid was administered intravenously (preoperative 15-mg/kg bolus 10 minutes before tourniquet inflation with or without 10 mg/kg/h for 3 hours postoperatively) or intra-articularly (10 mL [100 mg/mL] intraoperatively), and 1 study consisted of tranexamic acid administration in combined intravenous and intra-articular forms (15-mg/kg bolus 10 minutes before tourniquet inflation and intra-articular 3 g 10 minutes before tourniquet deflation). Tranexamic acid use in ACL reconstruction cases resulted in a mean reduction of 61.5 mL in postoperative drain output at 24 hours (95% CI, –95.51 to −27.46; P = .0004), lower hemarthrosis grade (P < .00001), improved Lysholm scores, and reduction in visual analog scale scores for pain (−1.96 points; 95% CI, −2.19 to −1.73; P < .00001) extending to postoperative week 6. Range of motion was improved in the immediate postoperative period, and the need for joint aspiration within 2 weeks was reduced (P < .001). There was no difference in venous thromboembolic event rate between the experimental and control groups.

Conclusion: The use of intravenous tranexamic acid in ACL reconstruction surgery results in reduced joint drain output and hemarthrosis and improved pain scores and range of motion in the initial postoperative period without increased complications or thromboembolic events.

BACK

Can We Eliminate Opioids After Anterior Cruciate Ligament Reconstruction? A Prospective, Randomized Controlled Trial

Vasilios Moutzouros, MD, Toufic R. Jildeh, MD, Joseph S. Tramer, MD, Fabien Meta, MD, Noah Kuhlmann, BS, Austin Cross, BS, Kelechi R. Okoroha, MD‡

First Published October 20, 2021; pp. 3794–3801

https://doi.org/10.1177/03635465211045394

Background: Multimodal pain protocols have been effective for postsurgical pain control; however, no published protocol has been effective in eliminating opioid consumption.

Purpose: To compare a multimodal nonopioid pain protocol versus traditional opioid medication for postoperative pain control in patients undergoing anterior cruciate ligament reconstruction (ACLR).

Study Design: Randomized controlled trial; Level of evidence, 1.

Methods: A total of 90 patients undergoing primary ACLR were assessed for participation. We performed a prospective, randomized controlled trial in accordance with the CONSORT (Consolidated Standards of Reporting Trials) 2010 statement. The study arms were a multimodal nonopioid analgesic protocol (acetaminophen, ketorolac, diazepam, gabapentin, and meloxicam) and a standard opioid regimen (hydrocodone-acetaminophen), and the primary outcome was postoperative visual analog scale (VAS) pain scores for 10 days. Secondary outcomes included patient-reported outcomes, complications, and satisfaction. The observers were blinded, and the patients were not blinded to the intervention.

Results: A total of 9 patients did not meet inclusion criteria, and 19 patients declined participation. Thus, 62 patients were analyzed, with 28 patients randomized to the opioid group and 34 to the multimodal nonopioid group. Patients receiving the multimodal nonopioid pain regimen demonstrated significantly lower VAS scores compared with patients who received opioid pain medication ($P < .05$). Patients were administered the Patient-Reported Outcomes Measurement and Information System Pain Interference Short Form, and no significant difference was found in patients' preoperative scores (opioid group, 58.6 ± 7.9; multimodal nonopioid group, 57.5 ± 7.4; $P = .385$) and 1-week postoperative scores (opioid group, 66.3 ± 8.2; multimodal nonopioid group, 61.4 ± 8.8; $P = .147$). When we adjusted for possible confounders (age, sex, body mass index, graft type), no significant differences in pain control were found between the 2 groups. The most common adverse effects for both groups were drowsiness and constipation, with no difference between the groups. All patients in the multimodal nonopioid group reported satisfactory pain management.

Conclusions: A multimodal nonopioid pain protocol provided at least equivalent pain control compared with traditional opioid analgesics in patients undergoing ACLR. Minimal side effects, which did not differ between groups, were noted, and all patients reported satisfaction with their pain management.

BACK

Graft Survivorship After Anterior Cruciate Ligament Reconstruction Based on Tibial Slope

Clemens Gwinner, MD*, Milan Janosec, BSc, Guido Wierer, MD, Michael Wagner, MD, Andreas Weiler, MD, PhDFirst Published October 21, 2021; pp. 3802–3808

https://doi.org/10.1177/03635465211049234

Background: Increased tibial slope (TS) is believed to be a risk factor for anterior cruciate ligament (ACL) tears. Increased TS may also promote graft insufficiency after ACL reconstruction.

Purpose: To delineate the relationship between TS and single as well as multiple graft insufficiencies after ACL reconstruction.

Study Design: Cohort study; Level of evidence 3.

Methods: We retrospectively identified 519 patients who had sustained ACL graft insufficiency after primary or revision ACL reconstruction (1 graft insufficiency, group A; 2 graft insufficiencies, group B; and ≥3 graft insufficiencies, group C). In addition, a subgroup analysis was conducted in 63 patients who received all surgical interventions by 2 specialized high-volume, single-center ACL surgeons. TS was measured by an observer with >10 years of training using lateral knee radiographs, and intrarater reliability was performed. Multiple logistic and univariate Cox regression was used to assess the contribution of covariates (TS, age, sex, and bilateral ACL injury) on repeated graft insufficiency and graft survival.

Results: The study included 347 patients, 119 female and 228 male, who were 24 ± 9 years of age at their first surgery (group A, n = 260; group B, n = 62; group C, n = 25). Mean TS was 9.8°± 2.7° (range, 3°-18°). TS produced the highest adjusted odds ratio (1.73) of all covariates for repeated graft insufficiency. A significant correlation was found between TS and the number of graft insufficiencies (r = 0.48; P < .0001). TS was significantly lower in group A (9.0°± 2.3°) compared with group B (12.1°± 2.5°; P < .0001) and group C (12.0°± 2.6°; P < .0001). A significant correlation was seen between the TS and age at index ACL tear (r = −0.12; P = .02) as well as time to graft insufficiency (r = −0.12; P = .02). A TS ≥12° had an odds ratio of 11.6 for repeated ACL graft insufficiency.

Conclusion: The current results indicate that patients with a markedly increased TS were at risk of early and repeated graft insufficiency after ACL reconstruction. Because the TS is rarely accounted for in primary and revision ACLR, isolated soft tissue procedures only incompletely address recurrent graft insufficiency in this subset of patients.

BACK

Differences in Baseline Characteristics and Outcome Among Responders, Late Responders, and Never-Responders After Anterior Cruciate Ligament Reconstruction

Per-Henrik Randsborg, MD, PhD*, Dakota Adamec, BS, Nicholas A. Cepeda, BS, Andrew Pearle, MD, Anil Ranawat, MD

First Published November 1, 2021; pp. 3809–3815

https://doi.org/10.1177/03635465211047858

Background: Loss to follow-up in registry studies might affect generalizability and interpretation of results.

Purpose: To evaluate the effect of nonresponder bias in our anterior cruciate ligament (ACL) registry.

Study Design: Case-control study; Level of evidence, 3.

Methods: A total of 2042 patients with ACL reconstruction in the Hospital for Special Surgery ACL Registry between 2009 and 2013 were included in the study. Patients who completed the patient-reported outcome measures at 2 or 5 years were considered responders (n = 808). Baseline data and patient characteristics were compared between responders and nonresponders (n = 1234). Both responders and nonresponders were contacted and invited to complete the International Knee Documentation Committee (IKDC) and Marx scores electronically and respond to questions regarding return to sports and subsequent surgeries. Nonresponders who completed the questionnaires after reminders were considered late responders. The remaining nonresponders were considered never-responders. The late responders (n = 367) completed the questionnaires after a mean follow-up of 7.8 years (range, 6.7-9.6 years), while follow-up for the responders was 6.8 years (range, 5.0-9.7 years). Responders and late responders were then compared in terms of differences in IKDC and Marx scores from baseline to final follow-up.

Results: Nonresponders were younger (28.5 vs 31.5 years; $P < .001$) and more often male (60% vs 53%; $P = .003$) compared with responders. Responders had a higher level of education and were more likely to be White (79% vs 74%; $P = .04$). There were no substantial differences in patient characteristics or baseline IKDC and Marx scores between the late responders and never-responders. There were no statistically significant differences in patient-reported outcomes, return to sports, or subsequent surgeries between responders and late responders at a mean follow-up time of 8.8 years (range, 6.7-9.7 years). Repeat email reminders and telephone calls increased response rate by 18% (from 40% to 58%).

Conclusion: There was no difference in clinical outcome as evaluated using IKDC and Marx scores between responders and late responders.

BACK

Femoral and Tibial Bony Risk Factors for Anterior Cruciate Ligament Injuries Are Present in More Than 50% of Healthy Individuals

Grégoire Micicoi, Christophe Jacquet, Raghbir Khakha, Sally LiArno, Ahmad Faizan, Romain Seil, MD, Baris Kocaoglu, MD, Simone Cerciello, Pierre Martz, Matthieu Ollivier, MD, PhD††First

Published October 28, 2021; pp. 3816–3824

https://doi.org/10.1177/03635465211050421

Background: Anterior cruciate ligament (ACL) injuries are multifactorial events that may be influenced by morphometric parameters. Associations between primary ACL injuries or graft ruptures and both femoral and tibial bony risk factors have been well described in the literature.

Purpose: To determine values of femoral and tibial bony morphology that have been associated with ACL injuries in a reference population. Further, to define interindividual variations according to participant demographics and to identify the proportion of participants presenting at least 1 morphological ACL injury risk factor.

Study Design: Cross-sectional study; Level of evidence, 3.

Methods: Computed tomography scans of 382 healthy participants were examined. The following bony ACL risk factors were analyzed: notch width index (NWI), lateral femoral condylar index (LFCI), medial posterior plateau tibial angle (MPPTA), and lateral posterior plateau tibial angle (LPPTA). The proportion of this healthy population presenting with at least 1 pathological ACL injury risk factor was determined. A multivariable logistic regression model was constructed to determine the influence of demographic characteristics.

Results: According to published thresholds for ACL bony risk factors, 12% of the examined knees exhibited an intercondylar notch width <18.9 mm, 25% had NWI <0.292, 62% exhibited LFCI <0.67, 54% had MPPTA <83.6°, and 15% had LPPTA <81.6°. Only 14.4% of participants exhibited no ACL bony risk factors, whereas 84.5% had between 2 and 4 bony risk factors and 1.1% had all bony risk factors. The multivariate analysis demonstrated that only the intercondylar notch width ($P < .0001$) was an independent predictor according to both sex and ethnicity; the LFCI ($P = .012$) and MMPTA ($P = .02$) were independent predictors according to ethnicity.

Conclusion: The precise definition of bony anatomic risk factors for ACL injury remains unclear. Based on published thresholds, 15% to 62% of this reference population would have been considered as being at risk. Large cohort analyses are required to confirm the validity of previously described morphological risk factors and to define which participants may be at risk of primary ACL injury and reinjury after surgical reconstruction.

BACK

The Reliability of 3-T Magnetic Resonance Imaging to Identify Arthroscopic Features of Meniscal Tears and Its Utility to Predict Meniscal Tear Reparability

Jason C. Strawbridge, BS, Grant G. Schroeder, BS, Ignacio Garcia-Mansilla, MD, Amit Singla, MD, Benjamin D. Levine, MD, Kambiz Motamedi, MD, Kristofer J. Jones, MD, Thomas J. Kremen, Jr, MD¶

First Published November 2, 2021; pp. 3887–3897

https://doi.org/10.1177/03635465211052526

Background: The ability to predict meniscus tear reparability based on preoperative magnetic resonance imaging (MRI) is desirable for postoperative planning; however, the accuracy of predictive methods varies widely within the orthopaedic and radiology literature.

Purpose/Hypothesis: The purpose was to determine if the higher resolution offered by 3-T MRI improves the accuracy of predicting reparability compared with previous investigations using 1.5-T MRI. Our hypothesis was that a higher field strength of 3-T MRI would result in improved reliability assessments and predictions of meniscus tear reparability compared with previous studies utilizing a 1.5-T MRI platform.

Study Design: Cohort study (diagnosis); Level of evidence, 2.

Methods: A total of 44 patients who underwent meniscus repair were matched by age, sex, and body mass index to 43 patients who underwent partial meniscectomy. Overall, 2 orthopaedic surgeons and 2 musculoskeletal radiologists independently and blindly reviewed the preoperative MRI scans for all 87 patients. For each meniscus tear, reviewers evaluated the following criteria: tear pattern, tear length, tear distance from the meniscocapsular junction, tear thickness, and integrity of any inner meniscal fragment. The resultant data were then applied to 5 different approaches for predicting meniscal reparability.

Results: The accuracy for all examined prediction methods was poor, ranging from 55% (3-point method) to 72% (classification tree method) among all reviewers. Interobserver reliability for examined criteria was also poor, with kappa values ranging from 0.07 (inner meniscal fragment status) to 0.40 (tear pattern).

Conclusion: MRI continues to be a poor predictor of meniscus tear reparability as assessed by arthroscopic criteria, even when using higher resolution 3-T scanners. Interobserver reliability in this setting can be poor, even among experienced clinicians.

BACK

One Bony Morphology, Two Pathologic Entities: Sex-Based Differences in Patients With Borderline Hip Dysplasia Undergoing Hip Arthroscopy

Benjamin R. Saks, MD, James D. Fox, BBA, Jade S. Owens, BS, David R. Maldonado, MD, Andrew E. Jimenez, MD, Hari K. Ankem, MD, Ajay C. Lall, MD, MS, Benjamin G. Domb, MD§

First Published October 25, 2021; pp. 3906–3914

https://doi.org/10.1177/03635465211043510

Background: Sex-based differences have been largely uncharacterized for patients with borderline hip dysplasia (BHD) undergoing hip arthroscopy.

Purpose: To evaluate for sex-based differences in clinical and pathologic characteristics as well as surgical outcomes in patients with BHD undergoing hip arthroscopy.

Study Design: Cohort study; Level of evidence, 3.

Methods: Between January 2011 and December 2018, data were prospectively collected on all patients with BHD undergoing primary hip arthroscopy. Patients were included if they had preoperative and minimum 2-year postoperative scores for the modified Harris Hip Score (mHHS), Non-arthritic Hip Score (NAHS), and visual analog scale for pain. Patients with previous ipsilateral hip conditions or surgery, Tönnis grade >1, lateral center-edge angle <18° or >25°, or workers' compensation status were excluded. Patients were then divided by sex and propensity score matched in a 1:1 ratio for body mass index, age, and Tönnis grade. The rates of patients who achieved the minimal clinically important difference were recorded for the mHHS and NAHS. The rates of achieving the patient acceptable symptomatic state for the mHHS were calculated.

Results: A total of 344 hips met the inclusion criteria, and 317 hips (92%) had adequate follow-up. Propensity score matching created cohorts of 109 male and 109 female patients. Male patients had significantly higher preoperative average alpha angles (69.79° vs 58.17°, P < .001), more often requiring a femoroplasty (97.2% vs 83.5%, P < .001), and had higher rates of complex labral tearing (50.5% vs 33.0%, P < .001). Male patients also had higher rates of grade 3 and 4 acetabular labral articular disruption (62.4% vs 19.3%, P < .001) and higher rates of grade 3 and 4 acetabular cartilage injury (59.6% vs 20.2%, P < .001) requiring a microfracture more frequently (32.1% vs 7.3%, P < .001). Female patients more typically had painful internal snapping requiring iliopsoas fractional lengthening (60.6% vs 32.1%, P < .001). Female patients also underwent capsular plication more regularly to address hip instability (79.8% vs 45.9%, P < .001). Male and female patients showed significant improvements in all outcome scores after surgery (P < .001). Female patients achieved the minimal clinically important difference for the NAHS at higher rates (85.3% vs 71.6%, P = .020).

Conclusion: Female and male patients with BHD who underwent hip arthroscopy achieved favorable outcomes but had notably dissimilar pathology. Hence, although they share similar acetabular bony morphology, male and female patients with BHD may represent 2 very different pathologic entities.

BACK

Equality in Hip Arthroscopy Outcomes Can Be Achieved Regardless of Patient Socioeconomic Status

Benjamin R. Saks, MD, Vivian W. Ouyang, BS, Elijah S. Domb, Andrew E. Jimenez, MD, David R. Maldonado, MD, Ajay C. Lall, MD, MS, Benjamin G. Domb, MD‖

First Published November 5, 2021; pp. 3915–3924

https://doi.org/10.1177/03635465211046932

Background: Access to quality health care and treatment outcomes can be affected by patients' socioeconomic status (SES).

Purpose: To evaluate the effect of patient SES on patient-reported outcome measures (PROMs) after arthroscopic hip surgery.

Study Design: Cohort study; Level of evidence, 3.

Methods: Demographic, radiographic, and intraoperative data were prospectively collected and retrospectively reviewed on all patients who underwent hip arthroscopy for femoroacetabular impingement syndrome (FAIS) and labral tear between February 2008 and September 2017 at one institution. Patients were divided into 4 cohorts based on the Social Deprivation Index (SDI) of their zip code. SDI is a composite measure that quantifies the level of disadvantage in certain geographical areas. Patients had a minimum 2-year follow-up for the modified Harris Hip Score (mHHS), Nonarthritic Hip Score (NAHS), International Hip Outcome Tool—12, and visual analog scale (VAS) for both pain and satisfaction. Rates of achieving the minimal clinically important difference (MCID) and patient acceptable symptom state (PASS) were calculated for the mHHS, NAHS, and VAS pain score. Rates of secondary surgery were also recorded.

Results: A total of 680 hips (616 patients) were included. The mean follow-up time for the entire cohort was 30.25 months. Division of the cohort into quartiles based on the SDI national averages yielded 254 hips (37.4%) in group 1, 184 (27.1%) in group 2, 148 (21.8%) in group 3, and 94 (13.8%) in group 4. Group 1 contained the most affluent patients. There were significantly more men in group 4 than in group 2, and the mean body mass index was greater in group 4 than in groups 1 and 2. There were no differences in preoperative radiographic measurements, intraoperative findings, or rates of concomitant procedures performed. All preoperative and postoperative PROMs were similar between the groups, as well as in the rates of achieving the MCID or PASS. No differences in the rate of secondary surgeries were reported.

Conclusion: Regardless of SES, patients were able to achieve significant improvements in several PROMs after hip arthroscopy for FAIS and labral tear at the minimum 2-year follow-up. Additionally, patients from all SES groups achieved clinically meaningful improvement at similar rates.

BACK

Labral Tear Management in Patients Aged 40 Years and Older Undergoing Primary Hip Arthroscopy: A Propensity-Matched Case-Control Study With Minimum 2-Year Follow-up

David R. Maldonado, MD, Vivian W. Ouyang, BS, Jade S. Owens, BS, Andrew E. Jimenez, MD, Benjamin R. Saks, MD, Payam W. Sabetian, MD, Ajay C. Lall, MD, MS, Benjamin G. Domb, MD§

First Published October 15, 2021; pp. 3925–3936

https://doi.org/10.1177/03635465211046915

Background: Previous literature has suggested that primary acetabular labral reconstruction leads to lower secondary surgery rates than does labral repair for patients aged ≥40 years.

Purpose: To report minimum 2-year patient-reported outcome (PRO) scores, survivorship, and secondary surgeries in patients aged ≥40 years who underwent primary hip arthroscopy with labral reconstruction compared with a propensity-matched primary labral repair group.

Study Design: Case-control study; Level of evidence, 3.

Methods: Data were prospectively collected and retrospectively reviewed for patients who underwent a primary hip arthroscopy for femoroacetabular impingement syndrome between January 2014 and June 2018. Patients aged ≥40 years who underwent a labral reconstruction or a labral repair and had preoperative and minimum 2-year PROs for the modified Harris Hip Score, Nonarthritic Hip Score, and visual analog scale (VAS) for pain were included. Patients with previous ipsilateral hip conditions and surgery, Tönnis grade >1, hip dysplasia, or workers' compensation status were excluded. Patients in the reconstruction group were propensity matched 1:2 to patients in the repair group based on age, sex, and body mass index. Secondary surgeries and achievement of the minimal clinically important difference (MCID), patient acceptable symptom state (PASS), and maximum outcome improvement (MOI) were recorded.

Results: A total of 53 and 106 hips were included in the labral reconstruction and repair groups, respectively. The average follow-up time was 37.6 months. The average ages for the reconstruction and repair groups were 48.01 ± 5.4 years and 48.61 ± 6.0 years, respectively. Both groups achieved significant improvements in all PROs at a minimum of 2 years, with similar achievements of MCID, PASS, and MOI, and comparable secondary surgery rates.

Conclusion: Patients aged ≥40 years who received primary labral repair and primary labral reconstruction achieved similar significant improvements in all PROs, VAS pain, and patient satisfaction at the minimum 2-year follow-up, with comparable rates of secondary surgeries and achieving MCID, PASS, and MOI. Based on these findings, labral repair remains the gold standard treatment for viable labrum in this population group, while reconstruction is a useful alternative for irreparable labrum.

BACK

Fascia Iliaca Block for Postoperative Pain Control After Hip Arthroscopy: A Systematic Review of Randomized Controlled Trials

John-Rudolph H. Smith, BS*, Matthew J. Kraeutler, MD, Laura E. Keeling, MD, Anthony J. Scillia, MD, Eric C. McCarty, MD, Omer Mei-Dan, MD

First Published March 12, 2021; pp. 4042–4049

https://doi.org/10.1177/0363546521996713

Background: Various analgesic modalities have been used to improve postoperative pain in patients undergoing hip arthroscopy.

Purpose: To systematically review the literature to compare the efficacy of the fascia iliaca block (FIB) with that of other analgesic modalities after hip arthroscopy in terms of postoperative pain scores and analgesic consumption.

Study Design: Systematic review.

Methods: A systematic review was performed by searching PubMed, the Cochrane Library, and Embase up to April 2020 to identify randomized controlled trials that compared postoperative pain and analgesic consumption in patients after hip arthroscopy with FIB versus other pain control modalities. The search phrase used was “hip arthroscopy fascia iliaca randomized.” Patients were evaluated based on postoperative pain scores and total postoperative analgesic consumption.

Results: Five studies (3 level 1, 2 level 2) were identified that met inclusion criteria, including 157 patients undergoing hip arthroscopy with FIB (mean age, 38.3 years; 44.6% men) and 159 patients among the following comparison groups: lumbar plexus block (LPB), intra-articular ropivacaine (IAR), local anesthetic infiltration (LAI), saline placebo, and a no-block control group (overall mean age, 36.2 years; 36.5% men). No significant differences in pain scores were reported in the postanesthesia care unit (PACU) between the FIB and LPB (3.4 vs 2.9; P = .054), IAR (7.7 vs 7.9; P = .72), control group (no FIB: 4.1 vs 3.8; P = .76); or saline placebo (difference, –0.2 [95% CI, –1.1 to 0.7]). One study reported significantly higher pain scores at 1 hour postoperation in the FIB group compared with the LAI group (5.5 vs 3.4; P = .02). Another study reported significantly greater total analgesic consumption (in morphine equivalent dosing) in the PACU among the FIB group compared with the LPB group (20.8 vs 17.0; P = .02). No significant differences were observed in total PACU analgesic consumption between FIB and other analgesic modalities.

Conclusion: In patients undergoing hip arthroscopy, the FIB does not appear to demonstrate superiority to other forms of analgesics in the immediate postoperative period. Therefore, it is not recommended as a routine form of pain control for these procedures.

BACK

Miscellaneous

-

BACK