4Arthroscopy | JSES KSSTA Arthroscopy 4B journals

Issue 102.3 Arthroscopy, February 2023

Nederlandse Vereniging voor Arthroscopie

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.

BACK

Content
February

Upper extremity

Arthroscopy
Volume 39, issue 2

- Increased HbA1c Levels in Diabetics During the Postoperative 3-6 Months After Rotator Cuff Repair Correlated With Increased Retear Rates
- Pre-existing Mental Health Diagnoses Are Associated With Higher Rates of Postoperative Complications, Readmissions, and Reoperations Following Arthroscopic Rotator Cuff Repair
- Similar Clinical, Return to Sports, Recurrence, and Revision Outcomes Between Female and Male Athletes Following Arthroscopic Bankart Repair
- Arthroscopic-Assisted Double-Bundle Coracoclavicular Ligament Reconstruction Using Cortical Fixation Buttons With Suture Tape Provides Superior Vertical Stability Than the Single-Bundle Reconstruction for Acute Acromioclavicular Joint Dislocation
- Race and Socioeconomic Status Are Associated With Inferior Patient-Reported Outcome Measures Following Rotator Cuff Repair
- No Difference in Complication or Reoperation Rates Between Arthroscopic and Open Debridement for Lateral Epicondylitis: A National Database Study
- Transosseous-Equivalent/Suture Bridge Technique in Combination With Platelet-Rich Plasma Application Yield Optimal Clinical Outcomes in Arthroscopic Rotator Cuff Repair: A Bayesian Network Analysis of Randomized Controlled Trials
- Outcomes After Arthroscopic Revision Bankart Repair: An Updated Systematic Review of Recent Literature
- Arthroscopic Rotator Cuff Repair Results in Improved Clinical Outcomes and Low Revision Rates at 10-Year Follow-Up: A Systematic Review

Journal of Shoulder and Elbow Surgery (JSES)
Volume 32, issue 2

- Arthroscopic rotator cuff repair performed with intra-articular tranexamic acid: could it provide improved visual clarity and less postoperative pain? A prospective, double-blind, randomized study of 63 patients
- Long-term recurrence rate in anterior shoulder instability after Bankart repair based on the on- and off-track concept
- Cyst formation and bony ingrowth inside coil-type open-architecture anchors used for arthroscopic remplissage: a volumetric computed tomographic study of 50 anchors
- Open procedure vs. arthroscopic débridement for chronic medial epicondylitis
- Social determinants of health influence clinical outcomes of patients undergoing rotator cuff repair: a systematic review
- The relationship between preoperative Goutallier stage and retear rates following posterosuperior rotator cuff repair: a systematic review

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA)
Volume 31, Issue 2

- No difference in clinical outcome after rotator cuff repair performed within or later than 3 months after trauma: a retrospective cohort study
- Older age and higher body mass index are independent risk factors for tendon healing in small- to medium-sized rotator cuff tears

BACK

American Journal of Sports Medicine (AJSM)
Volume 51, Issue 2

- A 2-Year Follow-up May Not be Enough to Accurately Evaluate Recurrences After Arthroscopic Bankart Repair: A Long-term Assessment of 272 Patients With a Mean Follow-up of 10.5 Years
- Intraoperative Channeling in Arthroscopic Rotator Cuff Repair: A Multicenter Randomized Controlled Trial
- Long-Term Patient-Reported Outcomes After Arthroscopic Debridement of Grade 3 or 4 Capitellar Osteochondritis Dissecans Lesions

Lower extremity

Arthroscopy
Volume 39, issue 2

- Hip Arthroscopy in the Presence of Advanced Osteoarthritis Results in 57% Survivorship, With 78% Survivor Satisfaction, at 10 Years. A Matched-Control Study
- High-Level Athletes With Borderline Hip Dysplasia Achieve Favorable Outcomes and Return to Sport Rates Following Primary Hip Arthroscopy: Minimum 5-Year Outcomes Comparison to a Propensity-Matched Control Group
- Hip Arthroscopy for Femoroacetabular Impingement Syndrome Shows Good Outcomes and Low Revision Rates, With Young Age and Low Postoperative Pain Score Predicting Excellent 5-Year Outcomes
- Improved Pain and Perioperative Outcomes After Hip Arthroscopy With the Pericapsular Nerve Group Block
- Lateral to Medial Joint Space Ratio is Predictive of Survivorship After Primary Hip Arthroscopy
- The Addition of Either an Anterolateral Ligament Reconstruction or an Iliotibial Band Tenodesis Is Associated With a Lower Failure Rate After Revision Anterior Cruciate Ligament Reconstruction: A Retrospective Comparative Trial
- At 10-Year Minimum Follow-Up, One-Third of Patients Have Patellofemoral Arthritis After Isolated Medial Patellofemoral Ligament Reconstruction Using Gracilis Tendon Autograft
- Blood Flow Restriction Therapy for 2 Weeks Prior to Anterior Cruciate Ligament Reconstruction Did Not Impact Quadriceps Strength Compared to Standard Therapy

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA)
Volume 31, Issue 2

- Eradication and graft retention can be achieved in the treatment for acute septic arthritis after primary posterior cruciate ligament reconstruction: analysis of 1561 reconstructions
- Anatomical double-bundle anterior cruciate ligament reconstruction moderately improved tegner scores over the long-term: a systematic review and meta-analysis of randomized controlled trials
- Low reoperation rate following lateral meniscus root repair: clinical outcomes at 2 years follow-up
- Signal intensity of lateral meniscal allografts deteriorates over time: a longitudinal MRI analysis during a minimum follow-up of 8 years
- Age alone does not affect the joint survivorship after arthroscopic partial meniscectomy for degenerative medial meniscus tears: a propensity-score matched survival analysis
- Arthroscopic centralization reduces extrusion of the medial meniscus with posterior root defect in the ACL reconstructed knee
- Less than 1% risk of donor-site quadriceps tendon rupture post-ACL reconstruction with quadriceps tendon autograft: a systematic review
- Patients older than 55 years regain sporting and recreational activities after arthroscopic anterior cruciate ligament reconstruction

BACK

- Arthroscopic defect size measurement in osteochondral lesions of the talus underestimates the exact defect size and size measurement with arthro-MRI (MR-A) and high-resolution flat-panel CT-arthro imaging (FPCT-A)

American Journal of Sports Medicine (AJSM)
Volume 51, Issue 2

- Outcomes for Treatment of Capsulolabral Adhesions With a Capsular Spacer During Revision Hip Arthroscopy

BACK

Upper extremity

Arthroscopy, Volume 39, Issue 2

Increased HbA1c Levels in Diabetics During the Postoperative 3-6 Months After Rotator Cuff Repair Correlated With Increased Retear Rates

M.S. Kim, S.M. Rhee, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.08.021

Purpose: To evaluate whether glycemic control affects the integrity of the repaired rotator cuff during the postoperative healing period after arthroscopic double-row suture bridge rotator cuff repair (RCR)

Methods: We retrospectively reviewed patients with diabetes mellitus (DM) who underwent arthroscopic double-row suture bridge RCR at our institution between March 2016 and November 2019. We included the patients who evaluated for serum glycosylated hemoglobin (HbA1c) levels within 1 month before and 3–6 months after surgery. Magnetic resonance imaging was conducted 6 months after surgery to evaluate the integrity of the repaired cuff tendon. Patients were categorized into two groups based on comparison between preoperative and postoperative HbA1c values: Group I (increased postoperative HbA1c) and Group D (same or decreased postoperative HbA1c). The correlation between preoperative/postoperative HbA1c, HbA1c increase/same or decrease (during the healing period), and post-RCR integrity was evaluated, including various demographic and radiologic factors.

Results: A total of 103 patients were analyzed, group I was 47, and group D was 56, respectively. The retear rate of 51.1% (24/47) in Group I was significantly higher than 14.3% (8/56) in Group D ($P < .001$). HbA1c levels measured 3-6 months after surgery (mean: 6.9; 95% CI: 6.6–7.3 vs mean: 6.5; 95% CI: 6.3–6.7, $P = .034$), and the proportion of group I and group D were significantly different (75%/25% vs 32.4%/67.6%, $P < .001$) between the retear and healing groups. Multivariable logistic regression analysis identified increased HbA1c as an independent risk factor for retear (odds ratio: 5.402; 95% CI: 2.072–14.086; $P < .001$).

Conclusions: The glycemic control within 3-6 months after surgery when the healing process of the tendon was in progress had a significant effect on retear rate. In particular, the retear rate was higher when the HbA1c level increased at postoperative 3-6 months compared to before surgery.

Level of Evidence: Retrospective case-control comparative study, Level III.

BACK

Pre-existing Mental Health Diagnoses Are Associated With Higher Rates of Postoperative Complications, Readmissions, and Reoperations Following Arthroscopic Rotator Cuff Repair

R.D. Freshman, J.F. Oeding, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.06.040

Purpose: To investigate the association between preoperative mental health disorders and postoperative complications, readmissions, and ipsilateral revision procedures among patients undergoing arthroscopic rotator cuff repair (RCR).

Methods: A retrospective cohort study from 2010 to 2020 was performed using the PearlDiver database. Current Procedural Terminology and International Classification of Diseases codes were used to compare patients with and without mental health disorders who underwent arthroscopic RCR. Mental health disorders evaluated in this study include depressive disorder, major depressive disorder, major depressive affective disorder, bipolar disorder, dysthymic disorder, adjustment disorder, separation anxiety disorder, and posttraumatic stress disorder. Patients were matched at a 1:1 ratio based on age, sex, Charlson Comorbidity Index, body mass index, and tobacco use. Rates of complications and subsequent surgeries were compared between patients with and without a preoperative diagnosis of a mental health disorder.

Results: The 1-year preoperative prevalence of a mental health disorder from 2010 to 2020 was 14.6%. After 1:1 matching, patients with a mental health disorder who underwent arthroscopic RCR were nearly twice as likely to undergo a revision procedure (odds ratio 1.94, 95% confidence interval 1.76-2.14, $P < .001$) and more than twice as likely to experience conversion to shoulder arthroplasty (odds ratio 2.29, 95% confidence interval 1.88-2.80, $P < .001$) within 2 years of initial arthroscopy when compared with patients without a mental disorder. Patients with a mental disorder also experienced increased risk for 90-day readmission (1.9% vs 0%, $P < .001$) as well as multiple postoperative medical complications.

Conclusions: Patients with pre-existing mental health diagnoses experience increased rates of 90-day postoperative complications and readmissions following arthroscopic RCR. In addition, patients with mental health diagnoses are more likely to undergo revision repair and conversion to shoulder arthroplasty within 2 years of the index procedure.

Level of Evidence: Level III.

BACK

Similar Clinical, Return to Sports, Recurrence, and Revision Outcomes Between Female and Male Athletes Following Arthroscopic Bankart Repair

I. Pasqualini, L. A. Rossi, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.09.012

Purpose: To compare return to sports, functional outcomes, and recurrences rates between female and male athletes following arthroscopic Bankart repair (ABR).

Methods: A retrospective comparative study was performed between male and female athletes who underwent an ABR between January 2008 and December 2019. Sports practiced primarily by men in our practice (including rugby, soccer, boxing, and martial arts) were excluded. Functional outcomes included the Rowe score, visual analog scale (VAS) for pain, and shoulder-dependent sports ability measured with the Athletic Shoulder Outcome Scoring System (ASOSS). Return to sport, recurrence, and revisions were evaluated. Additionally, we assessed the period (months) between surgery and recurrence events.

Results: A total of 58 female and 106 male patients were available for analysis at a median follow-up of 60 (interquartile range [IQR], 36-84) months. Ninety-one percent of the patients (n = 150) returned to sports and 84% (n = 126) returned to their preinjury level at a median of 6 months (IQR, 5-8) postoperatively. There were no differences in the rate of return to sports between females and males (91 vs 92% respectively, P = .997). There were no differences between the groups regarding postoperative functional outcomes, with most patients achieving the minimal clinically significant difference (Rowe: 98% female and 99% male, P = .584; ASOSS: 100% female and 99% male, P = .646). The overall recurrence rate was 9.7% (n = 16), with a rate of 10.3% (n = 6) in female and 9.4% (n = 10) in male athletes (P = .851). Time to event analysis showed that the median time to recurrence was 48 months in both groups (P = .848). The overall revision rate was 3% (n = 4), without significant differences between groups (P = .556).

Conclusions: When compared within similar sports, there does not appear to be sex-related differences in functional outcomes, recurrence, or return to play following ABR.

Level of Evidence: III, retrospective comparative study.

BACK

Arthroscopic-Assisted Double-Bundle Coracoclavicular Ligament Reconstruction Using Cortical Fixation Buttons With Suture Tape Provides Superior Vertical Stability Than the Single-Bundle Reconstruction for Acute Acromioclavicular Joint Dislocation

I. Park, S. Lee, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.09.018

Purpose: This study aimed to compare clinical and radiologic outcomes between single- and double-bundle arthroscopic-assisted coracoclavicular (CC) ligament reconstruction using cortical fixation buttons with suture tapes for acute acromioclavicular (AC) joint dislocation.

Methods: Patients who underwent arthroscopic-assisted CC ligament reconstruction using cortical fixation buttons with suture tapes for acute AC joint dislocation from July 2014 to March 2019 were identified. This study included patients treated for acute AC joint dislocation within 2 weeks after an injury, with a Rockwood classification of III or V and at least 2 years of follow-up. Patients were divided into 2 groups based on the reconstruction technique: group I (single-bundle technique) and group II (double-bundle technique). The clinical outcomes were compared using the American Shoulder Elbow Surgeons (ASES) score, Constant score, and visual analog scale for pain score between the 2 groups. On the plain radiograph, the CC interval ratio (CCIR) was measured to evaluate maintenance of CC interval fixation. Postoperative complications, including reduction failure, were also documented.

Results: Fifty-eight patients (26 in group I, 32 in group II) were enrolled. There were no significant differences in CCIR between the 2 groups preoperatively and 3 months postoperatively. However, the CCIR of group I was significantly greater than that of group II 6 months postoperatively (group I: 160.5% ± 48.5%, group II: 125.4% ± 38.9% at 6 months postoperatively, P = .01; group I: 164.0% ± 57.3%, group II: 123.2% ± 35.9% at the last visit, P = .01). Despite radiologic differences, the clinical outcomes demonstrated no significant differences between 2 the groups (ASES score: 93.5 ± 5.2 in group I, 94.4 ± 4.5 in group II, P = .54; Constant score: 92.9 ± 5.3 in group I, 94.8 ± 4.3 in group II, P = .16). Reduction failure occurred in 4 patients (15.3%) in group I and in 1 patient (3.2%) in group II (P = .16).

Conclusions: Arthroscopic-assisted double-bundle CC ligament reconstruction using cortical fixation buttons with suture tapes provided superior vertical stability than the single-bundle technique.

Level of Evidence: Level III, retrospective comparative study.

BACK

Race and Socioeconomic Status Are Associated With Inferior Patient-Reported Outcome Measures Following Rotator Cuff Repair

A.C. Ziedas, J.P. Castle, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.08.043

Purpose: To investigate the impact social determinants of health (SDOH) have on National Institutes of Health Patient-Reported Outcomes Measurement Information System (PROMIS) computer adaptive test scores and postoperative health care use in patients who undergo rotator cuff repair (RCR).

Methods: All patients who underwent RCR surgery by 3 shoulder and/or sports medicine fellowship-trained orthopaedic surgeons between July 2017 and January 2020 were included. The electronic medical record (EMR) was used to identify SDOH for each patient. PROMIS computer adaptive test measures of Upper Extremity function, Pain Interference, and Depression were completed preoperatively and postoperatively (6 months and 1 year). Postoperative health care use (clinical visits, virtual encounters, imaging encounters, and physical therapy visits) were recorded as well. Univariate associations, multiple linear regressions, and Wilcoxon rank-sum tests were used to analyze mean differences between patient groups based on SDOH.

Results: Three hundred thirty-eight patients who underwent RCR were included. Patients who were Black, in lower median household income quartiles, had public insurance, and female reported lower PROMIS scores compared with their counterparts. Smokers and White patients attended fewer postoperative office visits whereas Black patients had more physical therapy and nonvisit encounters compared with their respective counterparts.

Conclusions: Black race and lower socioeconomic status are associated with worse function and pain outcomes post-RCR compared with White race. Similarly, Black race and positive smoking status are associated with differential use of health care following RCR. Further attention may be required for these patients to address health care disparities.

Level of Evidence: III, retrospective cohort study.

BACK

No Difference in Complication or Reoperation Rates Between Arthroscopic and Open Debridement for Lateral Epicondylitis: A National Database Study

J. Moran, S.M. Gillinov, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.08.022

Purpose: To compare complication rates and 5-year reoperation rates between open debridement (OD) and arthroscopic debridement (AD) for lateral epicondylitis.

Methods: The PearlDiver MUExtr database (2010-2019) was reviewed for patients diagnosed with lateral epicondylitis (queried by International Classification of Diseases, Ninth Revision and International Classification of Diseases, Tenth Revision [ICD-10] codes) undergoing OD or AD of the common extensor tendon without repair (queried by Current Procedural Terminology codes). Patients were stratified into 2 cohorts: those who underwent AD and those who underwent OD. Nonoperative treatment modalities were reported for both groups within 1 year before index procedure. The rates of 90-day postoperative complications were compared, and multivariate logistic regression analysis was used to identify risk factors for complications. The 5-year reoperation rates, using laterality-specific ICD-10 codes, were also compared between the 2 groups.

Results: In total, 19,280 patients (OD = 17,139, AD = 2,141) were analyzed in this study. The most common nonoperative treatments for patients who underwent OD or AD were corticosteroid injections (49.5% vs 43.2%), physical therapy (24.8% vs 25.7%), bracing (2.8% vs 3.2%), and platelet-rich plasma injections (1.3% vs 1.0%). There were no significant differences in radial nerve injuries, hematomas, surgical site infections, wound dehiscence, and sepsis events between the 2 procedures (P = .50). The 5-year reoperation rate was not significantly different between the AD (5.0%) and OD (3.9%) cohorts (P = .10).

Conclusions: For lateral epicondylitis, both AD and OD of the extensor carpi radialis brevis (without repair) were found to have low rates of 90-day adverse events, with no significant differences between the 2 approaches. Similarly, the 5-year reoperation rate was low and not statistically different for those treated with OD or AD.

Level of Evidence: Level III, cross-sectional study.

BACK

Transosseous-Equivalent/Suture Bridge Technique in Combination With Platelet-Rich Plasma Application Yield Optimal Clinical Outcomes in Arthroscopic Rotator Cuff Repair: A Bayesian Network Analysis of Randomized Controlled Trials

M. Lv, Q. Xu, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.10.039

Purpose: To assess the clinical evidence defining the optimal combination of arthroscopic suture technique and platelet-rich products (PRP), and application for arthroscopic rotator cuff repair (ARCR).

Methods: All level of evidence (LOE) I randomized controlled trials (RCT) focusing on arthroscopic suture technique and/or PRP application in ARCR were included. The exclusion criteria were LOE II or worse, studies with other interventions, studies reported none of the predetermined clinical outcomes; studies unable to extract any precise data; studies from the same patient group of included studies. A pair-wise meta-analysis and Bayesian network analysis were performed on each comparison. The intervention options were ranked by Bayesian network analysis.

Results: 27 studies comprising 1,947 individuals met the inclusion criteria. The application of transosseous equivalent/suture bridge repair (SB) with PRP (SB+PRP) significantly reduced retear rate (risk ratio [RR], 0.29; 95% confidence interval [CI], [0.15, 0.55].) and increased Constant-Murley score (mean difference, 1.90; 95% CI, [0.14, 3.74]), compared to SB repair. Single-row repair (SR) with PRP usage (SR+PRP) significantly reduced retear rate (RR, 0.27; 95% CI, [0.12, 0.55]) and pain visual analog scale (VAS) (mean difference: −0.84; 95% CI [−1.39, −0.46].), increased University of California, Los Angeles (UCLA) shoulder score (mean difference: 1.48; 95% CI [0.50, 2.58]) and Constant-Murley score (mean difference: 4.53; 95% CI [2.65, 6.38]), compared to SR repair. The ranking for outcomes demonstrated SB+PRP resulted in the best retear rate, UCLA shoulder score, with the second-best postoperative pain, Constant-Murley score, while SR+PRP resulted in the best postoperative pain, Constant-Murley score, with the second-best retear rate and UCLA score.

Conclusion: Arthroscopic rotator cuff repair utilizing SB+PRP yields optimal retear rate and UCLA shoulder score, with the second-best postoperative pain and Constant-Murley shoulder outcome score, while SR+PRP yields the best in these two parameters.

Level of Evidence: Level I, Bayesian network analysis of level I RCT.

BACK

Outcomes After Arthroscopic Revision Bankart Repair: An Updated Systematic Review of Recent Literature

I.S. Hong, J.J. Sonnenfeld, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.03.030

Purpose: To provide an update of recent literature with a specialized focus on clinical outcomes following arthroscopic revision Bankart repair (ARBR) by performing a systematic review of all available literature published between 2013 and 2020.

Methods: A literature search reporting clinical outcomes after ARBR was performed. Criteria for inclusion consisted of original studies; Level of Evidence of I–IV; studies focusing on clinical outcomes after ARBR published between January 1, 2013, and January 4, 2021; studies reporting recurrent dislocation or instability rate after ARBR; reoperation/revision following ARBR, return to sport rates following ARBR; and patient-reported outcomes. The primary outcomes of interest were failure defined as recurrent instability or dislocation, return to sport rates, and patient-reported outcomes at follow-up.

Results: A large proportion of patients undergoing arthroscopic revision Bankart repair were male, ranging between 67.7% and 93.8%. Failure rate and return to sports rate ranged between 6.1% and 46.8% and 25.9% and 88.3%, respectively, when patients with significant or greater than 20% glenoid bone loss was excluded. Patient-reported outcome scores, which included American Shoulder and Elbow Surgeons, Simple Shoulder Test, and visual analog scale, saw significant improvement over mean follow-up of ranging 21.64 to 60 months.

Conclusions: Both the failure rate and RTS rates after ARBR had a wide range, given the heterogeneity of the studies included, which varied in patient selection criteria pertaining to patients with greater than 20% glenoid bone. Although there have been advancements in arthroscopic techniques and a trend favoring arthroscopic stabilization procedures, there is a lack of consensus in recent literature for careful patient selection criteria that would minimize failure rates and maximize RTS rates after ARBR.

Level of Evidence: Level IV, a systematic review of Level III-IV studies.

BACK

Arthroscopic Rotator Cuff Repair Results in Improved Clinical Outcomes and Low Revision Rates at 10-Year Follow-Up: A Systematic Review

M.S. Davey, E.T. Hurley, et al.

DOI : https://doi.org/10.1016/j.arthro.2022.11.002

Purpose: To study the literature to evaluate the functional outcomes, radiologic outcomes, and revision rates following arthroscopic rotator cuff repair (ARCR) at a minimum of 10-years follow-up.

Methods: Two independent reviewers performed a literature search of PubMed, Embase, and Scopus using the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines. Only studies reporting on outcomes of ARCR with a minimum 10-year follow-up were considered for inclusion. Patient demographics, satisfaction, and clinical, radiologic, and surgical outcomes were evaluated.

Results: Our search found 9 studies including 455 shoulders in 448 patients (51.6% male patients), with age at time of surgery ranging from 45 to 90 years met our inclusion criteria. Overall follow-up ranged from 10 to 18 years. At final follow-up, the ranges of American Shoulder & Elbow Surgeons, age- and sex-adjusted Constant–Morley, and University of California Los Angeles scores were reported in 5, 6, and 3 studies, respectively, as 79.4 to 93.2, 73.2 to 94, and 26.5 to 33, respectively. Of the included studies, satisfaction rates varied in 6 studies from 85.7% to 100% in the long-term. Additionally, the overall radiologic retear rate ranged from 9.5% to 63.2%. The overall surgical revision rates ranged in 6 studies from 3.8% to 15.4%, with from 0% to 6.7% requiring revision ARCR and from 1.0% to 3.6% requiring revision subacromial decompression in 6 and 2 studies, respectively, at minimum 10-years' follow-up.

Conclusions: In this study, we found that ARCR results in high rates of patient satisfaction, satisfactory clinical outcomes with respect to patient-reported functional outcomes and range of motion, and low revision rates at minimum 10-years' follow-up. However, an overall 30% retear rate was observed in asymptomatic patients.

Level of Evidence: Level IV, systematic review of Level II-IV studies.

BACK

Journal of Shoulder and Elbow Surgery (JSES), Volume 32, issue 2

Arthroscopic rotator cuff repair performed with intra-articular tranexamic acid: could it provide improved visual clarity and less postoperative pain? A prospective, double-blind, randomized study of 63 patients

C. Bildik, T. Pehlivanoglu

DOI: https://doi.org/10.1016/j.jse.2022.10.007

Background: Tranexamic acid (TXA) has been widely used in orthopedic surgery with the aim of reducing intraoperative and postoperative bleeding, as well as bleeding-related complications. The purpose of this study was to assess whether intra-articular use of TXA during arthroscopic rotator cuff tear (RCT) repair could improve visual clarity, shorten the duration of the operation, and provide superior pain management as compared with placebo.

Methods: We conducted a prospective, randomized, double-blind, placebo-controlled study. Patients aged ≥18 years with a magnetic resonance imaging–confirmed RCT and a history of failed conservative treatment for ≥6 months were included. Patients with a history of coagulopathy; a history of cardiac, renal, or hepatic disease; a history of conservative treatment for <6 months; and/or acute RCTs were excluded. Visual clarity as the primary outcome was assessed using an arthroscopic visual scale comprising 5 grades—ranging from grade 1, best visual clarity, to grade 5, worst visual clarity (requiring conversion to open surgery)—after the procedure by the operating surgeon every 10 minutes throughout the video of the operation. Secondary outcomes were operative duration and postoperative pain scores.

Results: A total of 63 patients with similar demographic data (age and sex) and intraoperative mean arterial pressure were enrolled and randomized into 2 groups: The TXA group comprised 32 patients with a mean age of 56.46 years, and the placebo group comprised 31 patients with a mean age of 57.83 years. The TXA group was reported to have significantly superior visual clarity (mean arthroscopic visual scale score, 1.5 ± 0.5 vs. 2.86 ± 1.7; $P < .001$), with a significantly higher percentage of grade 1 visual clarity (78.1% vs. 32.2%, $P < .001$) and a significantly lower percentage of grade 4 visual clarity (0% vs. 3.2%,$P = .003$). Grade 5 visual clarity was not recorded in any patient in either group. The TXA group showed a significantly shorter operative duration (55.73 minutes vs. 67.26 minutes, $P = .001$) and superior pain scores at 8 hours (2.3 vs. 3.6, $P = .002$) and 24 hours (1.6 vs. 2.4, $P < .001$) postoperatively. No complications were recorded in either group.

Conclusion: This study showed that during arthroscopic rotator cuff repair procedures, intra-articular use of TXA was able to provide superior arthroscopic visual clarity while shortening the total operative duration significantly and providing significantly superior pain management in the first 8 and 24 hours postoperatively as compared with placebo. This study underlines the safety and efficacy of intra-articular TXA use in arthroscopic rotator cuff repair.

Level of evidence: Level I, Randomized Controlled Trial, Treatment Study

BACK

Long-term recurrence rate in anterior shoulder instability after Bankart repair based on the on- and off-track concept

I. Schwihla, K. Wieser et al.

DOI: https://doi.org/10.1016/j.jse.2022.07.025

Background: Since its first proposal, the concept of on- and off-track lesions in anterior shoulder instability has gained clinical relevance as a tool to predict the failure rate of arthroscopic Bankart repair. Current literature only reports either short-term follow-up or long-term results of small sample sizes. The aim of this study was to provide a long-term evaluation of recurrent instability following arthroscopic Bankart repair in a large cohort using the on-track vs. off-track concept as a predictor for failure.

Methods: We retrospectively analyzed 271 patients who underwent primary arthroscopic Bankart repair for anterior shoulder instability between 1998 and 2007. All patients with a minimum follow-up of 78 months and a preoperative computed tomographic (CT) or magnetic resonance imaging (MRI) scan were included into the study. Preoperative CT and/or MRI scans were used to determine the glenoid track and width of Hill-Sachs lesion. Recurrence of instability was defined as presence of instability symptoms (dislocation, subluxation, and/or apprehension) or revision surgery (stabilization procedure) and was assessed as the primary outcome parameter.

Results: The glenoid track of 163 shoulders was assessed (female n = 51, male n = 112) with a mean follow-up of 124 months (99.4-145.6, standard deviation = 2.5) and a mean age of 24 years (20-34.). An off-track Hill-Sachs lesion was found in 77 cases (47%), and in 86 cases (53 %) it was on-track. The rate of recurrent instability in the off-track group was 74% (n = 57) compared with 27% (n = 23) in the on-track group ($P < .001$). The overall rate of revision surgery due to instability was 29% (n = 48) after a mean time of 50.9 months (±42.8) following Bankart repair. The rate of revision surgery in the off-track group was 48% (n = 37) after a mean of 53.5 months (±42.0) vs. 13% (n = 11) after 42.3 months (±46.3) in the on-track group ($P < .001$).

Conclusion: This study shows that the on- and off-track concept helps to distinguish patients for whom an isolated arthroscopic Bankart repair yields long-term benefits. Because of the high rate of recurrent instability in the off-track group, an off-track lesion should be treated surgically in such a way that the off-track lesion is converted into an on-track lesion.

Level of evidence: Retrospective Cohort Comparison, Prognosis Study

BACK

Cyst formation and bony ingrowth inside coil-type open-architecture anchors used for arthroscopic remplissage: a volumetric computed tomographic study of 50 anchors

M.A. Ruiz Ibán, I. Zarcos et al.

DOI: https://doi.org/10.1016/j.jse.2022.07.015

Background: The use of anchors in the proximal humerus during arthroscopic surgery can cause localized bone loss due to osteolysis and cyst formation. The purpose of this study was to use computed tomography (CT) to evaluate the incidence of implant-related bone loss and cyst formation after implantation of polyetheretherketone (PEEK) coil-type open-architecture anchors during remplissage for the management of Hill-Sachs defects (HSDs) in patients with shoulder instability.

Methods: This was a single-cohort, observational study with a minimum of 12 months of follow-up. Subjects undergoing arthroscopic instability surgery with HSD requiring remplissage were included. The volume of the bone defects and the degree of bony ingrowth into the anchor were measured on CT images.

Results: Thirty-one participants (28 males, 3 females; mean age 29.4 years, standard deviation [SD] 10.6) in whom 50 anchors (4.5-mm Healicoil PEEK double-loaded anchors) were used were evaluated with a CT performed at a mean of 14.1 (SD 3.74) months after surgery. Full bony ingrowth inside the anchor was found in 15 anchors (30%, range 17.8%-44.5%); clear ossification with a thin lucent rim was found in 10 anchors (20%, range 10.0%-33.7%); discontinuous ossification was found in 8 anchors (16%, range 7.2%-29.1%); and no ossification was observed inside 17 anchors (34%, range 21.2%-48.7%). Regarding bone defect size, no bone defect was identified in 15 anchors (30%, 95% CI 17.9%-44.6%), a partial bone defect was found in 17 anchors (34%, 95% CI 21.2%-48.7%), hole enlargement was found in 17 anchors (34%, 95% CI 21.2%-48.7%), and 1 anchor caused a cyst larger than twice the size of the hole made for anchor insertion (2%, 95% CI 0.1%-8.6%). At the 1-year evaluation, none of the participants presented recurrence or residual apprehension.

Conclusion: The use of PEEK coil-type open-architecture anchors for remplissage during instability surgery caused large cystic lesions in less than 10% of anchors. There was full bony ingrowth in one-third of anchors, and partial cancellous bone ingrowth occurred in another third of anchors.

Level of evidence: Level IV, Case Series, Treatment Study

BACK

Open procedure vs. arthroscopic débridement for chronic medial epicondylitis

Byung-Sung Kim, Ki Jin Jung et al.

DOI: https://doi.org/10.1016/j.jse.2022.09.018

Background: This retrospective study compared the outcomes after open and arthroscopic treatment of chronic medial epicondylitis (ME).

Methods: The study included 44 elbows in 38 patients: 25 (29-72 years) in the open group and 19 (27-70 years) in the arthroscopy group. The indications for ME surgery were failed conservative therapy for more than 3 months, symptom duration exceeding 6 months, and persistent severe pain. We used radiography, ultrasonography, and magnetic resonance imaging assessments. The clinical assessment included operating time, range of motion, grip strength, visual analog scale (VAS) score, Disabilities of the Arm, Shoulder, and Hand (DASH) score, and complications.

Results: The mean follow-up was 20.2 (12-58) months. The mean operating time was significantly longer in the arthroscopy group (32.5 vs. 23.5 minutes; *P* = .029). In both groups, all outcome measures improved significantly after surgery and there were no significant differences between the DASH scores (preoperative 44.8 vs. 43.9, postoperative 12.5 vs. 13.2), grip strength (preoperative 72.2 vs. 66.8, postoperative 84.8 vs. 83.6), and VAS scores (preoperative 8.5 vs. 8.2, postoperative 1.0 vs. 1.1) in the open and arthroscopy groups. The outcomes were excellent or good in 20 patients (80%) in the open group and 16 (84%) in the arthroscopy group. The only complication was 1 case of transient ulnar neuropathy in the open group.

Conclusion: Open and arthroscopic techniques were very effective and comparable for treating chronic ME. The surgeon can choose either technique for treating chronic ME.

Level of evidence: Level III**,** Retrospective Cohort Comparison**,** Treatment Study

BACK

Social determinants of health influence clinical outcomes of patients undergoing rotator cuff repair: a systematic review

K. Mandalia, A. Ames et al.

DOI: https://doi.org/10.1016/j.jse.2022.09.007

Background: Social determinants of health (SDOH) are the collection of environmental, institutional, and intrinsic conditions that may bias access to, and utilization of, health care across an individual's lifetime. The effects of SDOH are associated with disparities in patient-reported outcomes after hip and knee arthroplasty, but its impact on rotator cuff repair (RCR) is poorly understood. This study aimed to investigate the influences that SDOH have on accessing appropriate orthopedic treatment, as well as its effects on patient-reported outcomes following RCR.

Methods: This systematic review was performed in adherence to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and guidelines outlined by the Cochrane Collaboration. A search of PubMed, the Cochrane Library, and Embase from inception until March 2022 was conducted to identify studies reporting at least 1 SDOH and its effect on access to health care, clinical outcomes, or patient-reported outcomes following RCR. The search term was created with reference to the PROGRESS-Plus framework. Methodological quality of included primary studies was appraised using the Newcastle-Ottawa Scale (NOS) for nonrandomized studies, and the Cochrane Risk of Bias Tool for randomized studies.

Results: Thirty-two studies (level I-IV evidence) from 18 journals across 7 countries, published between 1999 and 2022, met inclusion criteria, including 102,372 patients, 669 physical therapy (PT) clinics, and 71 orthopedic surgery practices. Multivariate analysis revealed female gender, labor-intensive occupation and worker's compensation claims, comorbidities, tobacco use, federally subsidized insurance, lower education level, racial or ethnic minority status, low-income place of residence and low-volume surgery regions, unemployment, and preoperative narcotic use contribute to delays in access to health care and/or more severe disease state on presentation. Black race patients were found to have significantly worse postoperative clinical and patient-reported outcomes and experienced more pain following RCR. Furthermore, Black and Hispanic patients were more likely to present to low-volume surgeons and low-volume facilities. A lower education level was shown to be an independent predictor of poor surgical and patient-reported outcomes as well as increased pain and worse patient satisfaction. Patients with federally subsidized insurance demonstrated significantly worse postoperative clinical and patient-reported outcomes.

Conclusion: The impediments created by SDOH lead to worse clinical and patient-reported outcomes following RCR including increased risk of postoperative complications, failed repair, higher rates of revision surgery, and decreased ability to return to work. Orthopedic surgeons, policy makers, and insurers should be aware of the aforementioned SDOH as markers for characteristics that may predispose to inferior outcomes following RCR.

Level of evidence: Level IV, Systematic Review

BACK

The relationship between preoperative Goutallier stage and retear rates following posterosuperior rotator cuff repair: a systematic review

S. Tsuchiya, A.J. Bois et al.

DOI: https://doi.org/10.1016/j.jse.2022.09.011

Background: An association between higher preoperative Goutallier stage and higher retear rates following primary rotator cuff repairs has been previously reported. However, there are few reviews which have described clear retear rates for each repaired tendon classified according to preoperative Goutallier stage. The purpose of this study was therefore to systematically review the literature on the relationship between preoperative Goutallier stage and retear rates and provide predictable retear rates following primary repair of posterosuperior rotator cuff tears.

Methods: A systematic literature review was performed in compliance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines and checklist utilizing PubMed, MEDLINE, and Cochrane Library. English-language studies of Level I through IV evidence examining the clinical results of primarily repaired posterosuperior rotator cuff tears as a function of Goutallier stage using magnetic resonance imaging were included. The primary outcome of interest was retear rates according to preoperative Goutallier stage. As a secondary outcome, rotator cuff tears were divided into 2 subgroups (Goutallier stage 0-2 and 3-4) and retear rates were assessed between the 2 subgroups. A random effects model with binomial within-study variance was used for both outcomes.

Results: Nine studies (687 shoulders) satisfied all inclusion criteria and reported sufficient data for statistical analysis. In the supraspinatus muscle group, rotator cuff muscles with preoperative Goutallier stages of 0, 1, and 2 had retear rates of 19.1%, 27.8%, and 33.5%, respectively, with no significant differences between each category. In contrast, when preoperative Goutallier stage of 3 and 4 existed, significant differences compared to Goutallier 0, 1, and 2 were observed with a retear rate of 74.1% and 78.5%, respectively. In the infraspinatus muscle group, the retear rates following rotator cuff repairs were 20.0%, 32.1%, and 35.1% in Goutallier 0, 1, and 2, respectively, with no significant differences between each category. In Goutallier 3 and 4, the rate was 76.6% and 100.0%, respectively, with significant differences compared to Goutallier 0, 1, and 2.

Conclusion: The results of this study have clearly demonstrated that retear rates following surgical repair of the rotator cuff increased in proportion to the preoperative Goutallier stage in both the supraspinatus and infraspinatus muscles.

Level of evidence: Level III, Systematic Review

BACK

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA), Volume 31, Issue 2

No difference in clinical outcome after rotator cuff repair performed within or later than 3 months after trauma: a retrospective cohort study

S. Dimmen, C. Owesen et al.

DOI: https://doi.org/10.1007/s00167-022-07193-y

Purpose: Rotator cuff (RC) tear is one of the most common injuries of the shoulder. Patients with RC tears often report a trauma initiating shoulder pain and impaired function. The aim of this retrospective analysis of a prospectively registered cohort was to elucidate whether the time interval between the trauma and RC repair, using a cut off of 3 months, affects the functional outcome after 2 years.

Methods: In a single orthopedic unit, 819 consecutive patients were treated with rotator cuff repair during the period from 2010 to 2014 and 733 of the patients completed the Western Ontario Rotator Cuff (WORC) index preoperatively and at 2-year follow-up. The Constant–Murley (CM) score was completed by trained physiotherapists after a clinical examination both preoperatively and at 2-year follow-up. Preoperative magnetic resonance imaging (MRI) was performed in all patients and postoperatively in 65% of the included patients. Re-tears and partial repairs were excluded, as were patients with pseudoparalysis who were given high priority and underwent surgery during the first 3 weeks after trauma.

Results: Of the 733 treated patients, 437 (60%) reported having had a shoulder trauma in their medical history initiating their shoulder symptoms, and of these, 358 met the inclusion criteria. 296 patients with non-traumatic tears, 9 repairs done within 3 weeks after trauma, 25 partial repairs, 33 re-tears and 12 others were excluded. At 2-year follow-up there was no significant difference in WORC index (n.s.) or CM score (n.s.) between patients who had their RC repaired within or more than 3 months after trauma. In patients where RC repair was performed within 3 months, the WORC index improved by 42.9%, and in the group of patients operated later than 3 months, the increase was 38.7%. This difference between the groups was neither statistically significant (n.s.) nor clinically relevant. On postoperative MRI, 80% of the repairs were healed in both groups.

Conclusion: In this retrospective cohort study, no differences in clinical outcome were found when RC repair was performed between 3 weeks and 3 months or later than 3 months after injury in patients describing their onset of symptoms as traumatic.

Level of evidence: III

BACK

Older age and higher body mass index are independent risk factors for tendon healing in small- to medium-sized rotator cuff tears

A. Erşen, K. Şahin et al

DOI: https://doi.org/10.1007/s00167-022-07234-6

Purpose: Many previous research efforts have been made to identify prognostic factors for rotator cuff healing. However, majority of these studies were conducted with heterogeneous cohorts consisted of different tear characteristics. Healing properties of a rotator cuff tear may differ depending on tear characteristics such as tear size or fatty infiltration. Therefore, studies with subgroups confined by these variables may reflect more accurate results. This study aims to investigate predictive factors for rotator cuff healing in a subgroup with small- to medium-sized tears without significant fatty infiltration.

Methods: This retrospective case–control study was conducted with 94 patients with small- to medium-sized rotator cuff tears. Mean age of patients was 56.0 ± 9.0 years and mean follow-up duration was 38.3 ± 8.1 months. Post-operative magnetic resonance imaging assessment showed that there were 75 (79.8%) successfully healed repairs and 19 (20.2%) healing failures. Age, gender, hand dominancy, body mass index (BMI), smoking habit, diabetes, corticosteroid injection, baseline clinical status, duration of surgery and biceps procedure were variables evaluated as predictive factors.

Results: Both study groups showed significant improvement from baseline regarding clinical outcome measures ($p < 0.05$). However, successfully healed patients had significantly higher post-operative functional scores and lower pain scores ($p < 0.05$). The univariate analysis revealed that healing was significantly affected by age ($p = 0.004$), BMI ($p = 0.01$) and diabetes ($p = 0.03$). In the multivariate analysis, age ($p = 0.02$) and BMI ($p = 0.02$) were found to be significant independent factors for healing. Cutoff values for oldest age and highest BMI were 63 years and 28.1 kg/m^2, respectively, for a successful healing according to receiver-operating characteristic curve analysis.

Conclusion: Healing failure after rotator cuff repair in small- to medium-sized tears is associated with poorer outcomes. Age and BMI are independent predictive factors for healing. A successful repair is more likely in patients younger than 63 years and with BMI less than 28.1 kg/m^2. Surgeons should consider this information during risk assessment, decision making and patient counselling.

Level of evidence: Level III

BACK

American Journal of Sports Medicine (AJSM), Volume 51, Issue 2

A 2-Year Follow-up May Not be Enough to Accurately Evaluate Recurrences After Arthroscopic Bankart Repair: A Long-term Assessment of 272 Patients With a Mean Follow-up of 10.5 Years

Luciano Andrés Rossi MD, PhD, Ignacio Pasqualini MD, Iván Huespe MD, Rodrigo Brandariz MD, Cecilia Fieiras MD, Ignacio Tanoira MD, PhD, Maximiliano Ranalletta MD, PhD

DOI: https://doi.org/10.1177/03635465221139290

Background: There is a great discrepancy between the rates of recurrent instability reported after arthroscopic Bankart repair in relation to the follow-up time.

Purpose: To analyze the rate of recurrences after arthroscopic Bankart repair in the long term, emphasizing whether a minimum follow-up of 2 years is adequate to assess this outcome.

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

Methods: Between January 2008 and April 2013, a total of 356 athletes underwent arthroscopic Bankart repair for anterior glenohumeral instability at our institution. Return to sports, the Rowe score, the Subjective Shoulder Value (SSV), and the Athletic Shoulder Outcome Scoring System (ASOSS) were used to assess functional outcomes. We analyzed the proportion of recurrences before and after 4 years of follow-up. Additionally, we performed a Kaplan-Meier analysis to evaluate recurrence-free time in patients with a recurrence.

Results: The mean follow-up was 10.5 ± 1.6 years, and the mean age was 20.8 ± 3.9 years. In total, 90% of patients were able to return to sports; of these, 91% returned to their preinjury level of play. The Rowe, SSV, and ASOSS scores showed a statistical improvement after surgery ($P < .01$). The proportion of patients with a recurrence during the follow-up period was 25% (95% CI, 20%-31%; n = 70), and the mean time until a recurrence was 3.8 ± 2.6 years. Only 39% of the recurrences (95% CI, 30%-48%) occurred in the first 2 years after surgery, while 61% (95% CI, 50%-73%) occurred in the first 4 years after surgery.

Conclusion: In our study, the effectiveness of Bankart repair to stabilize the shoulder decreased significantly over time. Indeed, less than half of the recurrences occurred after 2 years of follow-up. Therefore, we propose that the recommended minimum follow-up should be 4 years; otherwise, it is very likely that the actual rate of recurrences will be significantly underestimated.

BACK

Intraoperative Channeling in Arthroscopic Rotator Cuff Repair: A Multicenter Randomized Controlled Trial

Peter Lapner MD, FRCSC, Martin Bouliane MD, FRCSC, J W. Pollock MD, FRCSC, Stephanie Coupal MD, FRCSC, Elham Sabri MSc, Taryn Hodgdon, Jason Old, Katie Mcilquham MSc, Peter MacDonald MD, FRCSC, Greg Stranges MD, FRCSC, Randa Berdusco MD, FRCSC, Jonathan Marsh MD, FRCSC, James Dubberley MD, FRCSC, Sheila McRae PhD

DOI: https://doi.org/10.1177/03635465221138562

Background: Despite recent advances in arthroscopic rotator cuff repair, the retear rate remains high. New methods to optimize healing rates must be sought. Bone channeling may create a quicker and more vigorous healing response by attracting autologous mesenchymal stem cells, cytokines, and growth factors to the repair site.

Hypothesis: Arthroscopic rotator cuff repair with bone channeling would result in a higher healing rate compared with arthroscopic rotator cuff repair without adjuvant channeling.

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

Methods: Our primary objective was to compare healing rates in patients undergoing arthroscopic rotator cuff repair for degenerative tears, with and without bone channeling. Secondary objectives included comparisons of the Western Ontario Rotator Cuff Index (WORC) score, American Shoulder and Elbow Surgeons (ASES) score, Constant score, Constant strength subscore, and visual analog scale (VAS) for pain score between groups. Patients undergoing arthroscopic rotator cuff repair were recruited at 3 sites and were randomized to receive either bone channeling augmentation or standard repair. Healing was determined via ultrasound at 24 months postoperatively. WORC, ASES, and Constant scores were compared between groups at baseline and at 3, 6, 12, and 24 months postoperatively.

Results: A total of 168 patients were enrolled between 2013 and 2018. Intention-to-treat analysis revealed no statistical differences in healing rates between the 2 interventions at 24 months postoperatively. Statistically significant improvements occurred in both groups from preoperatively to all time points for the WORC, the ASES score, the Constant score or Constant strength subscore, and the VAS for pain ($P < .0001$). No differences were observed between the bone channeling and control groups in WORC, ASES, Constant, and VAS pain scores at any time point.

Conclusion: This trial did not demonstrate the superiority of intraoperative bone channeling in rotator cuff repair over standard rotator cuff repair at 24 months postoperatively. Healing rates, patient-reported function, and quality-of-life outcomes were similar between groups.

BACK

Long-Term Patient-Reported Outcomes After Arthroscopic Debridement of Grade 3 or 4 Capitellar Osteochondritis Dissecans Lesions

Daniel C. Austin MD, MS, Bryant Song BS, Jorge L. Rojas Lievano MD, MSc, Thomas H. Rogers MD, Jonathan D. Barlow MD, Christopher L. Camp MD, Mark E. Morrey MD, Joaquin L. Sanchez-Sotelo MD, PhD, James S. Fitzsimmons BSc, Shawn W. O'Driscoll PhD, MD

DOI: https://doi.org/10.1177/03635465221137894

Background: Arthroscopic debridement for osteochondritis dissecans (OCD) lesions of the capitellum is a relatively common and straightforward surgical option for failure of nonoperative management. However, the long-term outcomes of this procedure remain unknown.

Hypothesis: Arthroscopic debridement of capitellar OCD would provide satisfactory long-term improvement in patient-reported outcomes.

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

Methods: Patients aged ≤18 years who underwent arthroscopic debridement procedures for OCD lesions (International Cartilage Repair Society grades 3 and 4) were identified. Procedures included loose body removal when needed and direct debridement of the lesion; marrow stimulation with drilling or microfracture was added at the discretion of each surgeon. The cohort consisted of 53 elbows. Patient evaluation included visual analog scale for pain; motion; subjective satisfaction; Quick Disabilities of the Arm, Shoulder and Hand (QuickDASH) scores; reoperation; and rate of return to sports.

Results: At a mean 11 years of follow-up (range, 5-23 years), the median visual analog scale score for pain was 0, and 96% of patients reported being improved as compared with how they were before surgery. The mean ± SD QuickDASH score was 4 ± 9 points (range, 0-52 points), and 80% of patients returned to their sports of interest. The arc of motion significantly improved from 115°± 28° preoperatively to 130°± 17° at latest follow-up (P = .026). Seven elbows (13%) required revision surgery for OCD lesions, resulting in high rates of overall survivorship free of revision surgery: 90% (95% CI, 80%-96%) at 5 years and 88% (95% CI, 76%-94%) at 10 years. At final follow-up, 7 all-cause reoperations were performed without revision surgery on the OCD lesion.

Conclusion: Arthroscopic debridement of grade 3 or 4 OCD lesions of the capitellum produced satisfactory patient-reported outcomes in a majority of elbows, although a subset of patients experienced residual symptoms. The inherent selection bias of our cohort should be considered when applying these results to the overall population with OCD lesions, as we do not recommend this procedure for all patients.

BACK

Lower Extremity

Arthroscopy, Volume 39, Issue 2

Hip Arthroscopy in the Presence of Advanced Osteoarthritis Results in 57% Survivorship, With 78% Survivor Satisfaction, at 10 Years. A Matched-Control Study

D. Filan, K. Mullins, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.07.022

Purpose: To (1) determine the 10-year survivorship (avoidance of total hip arthroplasty, THA) for patients with advanced osteoarthritis (OA) undergoing hip arthroscopy for femoroacetabular impingement, and (2) compare survivorship and patient-reported outcomes (PROs) with a matched-control group without OA.

Methods: Advanced OA hips (Tönnis ≥2) were matched in a 1:1 ratio (age ± 5 years, sex) to hips with preoperative Tönnis grade ≤1. Exclusion criteria was dysplasia, age <18 years, previous hip conditions/surgeries, and bilaterally operated patients with OA on one side only. Survival was estimated by Kaplan–Meier analysis for levels of sex, age groups and Tönnis. Cox proportional hazards model estimated hazard ratios (HR) of undergoing THA conversion. Where THA was avoided, outcomes and proportion of cases achieving patient acceptable symptomatic state was determined

Results: 53 OA hips were matched with 53 control hips. Survival distributions were significantly different for: (1) Group: OA 57.1%, control 87.0% (P = .001); (2) Tönnis grade: Tönnis 0, 89.2%; Tönnis 1, 77.8%; Tönnis 2, 67.6%; Tönnis 3, 25.0% (P < .001); and (3) age: (OA: 75.0% vs 44.8%, control: 100%, vs 75.0%, for <35 and >35 years respectively) (P = .002). Conversion to THA was greater for increasing Tönnis: HR 1.9 (P = .450), 3.5 (P = .032), and 11.0 (P < .001) for Tönnis 1, 2, and 3 respectively, relative to no OA (Tönnis 0) and >35 years: HR 4.3 (95% confidence interval 1.6-11.3, P = .003). Patient acceptable symptomatic state achievement was similar for both groups (78% OA vs 91% control, P = .167). modified Harris Hip Score and Short Form-36 significantly improved within both groups from baseline to 10 years

Conclusions: Arthroscopic correction of femoroacetabular impingement, in the presence of advanced OA results in 57% survivorship at 10 years (68% Tönnis 2, 25% Tönnis 3). Where THA was avoided, 78% considered their 10-year post-HA state to be satisfactory, with patient-reported outcomes similar to a matched non-OA cohort. Tönnis 2 in particular should be considered for arthroscopic hip preservation to avoid the need to prematurely replace the hip joint.

Level of Evidence: IV, case series.

BACK

High-Level Athletes With Borderline Hip Dysplasia Achieve Favorable Outcomes and Return to Sport Rates Following Primary Hip Arthroscopy: Minimum 5-Year Outcomes Comparison to a Propensity-Matched Control Group

J.S. Owens, A.E. Jimenez, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.08.023

Purpose: (1) To report minimum 5-year patient-reported outcomes (PROs) and return to sport (RTS) rates in high-level athletes with borderline hip dysplasia (BHD) following primary hip arthroscopy for labral pathology and femoroacetabular impingement syndrome and (2) to compare results to a propensity-matched control group of athletes with normal acetabular coverage.

Methods: Data were reviewed for surgeries performed between February 2009 and February 2016. Patients were eligible if they underwent primary hip arthroscopy in the setting of BHD (lateral center-edge angle [LCEA] 18-25°) and competed in professional, collegiate, or high school sports. Inclusion criteria were preoperative and minimum 5-year follow-up scores for the modified Harris Hip Score (mHHS), Non-Arthritis Hip Score, Hip Outcome Score–Sport Specific Subscale (HOS-SSS), and visual analog scale for pain. Rates of achieving the minimal clinically importance difference (MCID), patient acceptable symptomatic state (PASS), and maximum outcome improvement satisfaction threshold (MOIST) were recorded in addition to RTS. BHD athletes were matched by age at the time of surgery, sex, body mass index, Tönnis grade, follow-up time, sport type, and competition level to a control group of 58 athletes with normal acetabular coverage (LCEA 25°-40°) for comparison.

Results: A total of 34 BHD athletes were included with a mean follow-up of 73.6 ± 10.7 months. BHD athletes showed significant improvements in all PROs, demonstrated high RTS rates (90.0%), and achieved PASS/MCID/MOIST for mHHS (MCID: 80.0%, PASS: 93.3%, MOIST: 80.0%) and HOS-SSS (MCID: 76.7%, PASS: 73.3%) at high rates. When compared to a propensity-matched group with normal acetabular coverage, BHD athletes demonstrated similar postoperative PROs, rates of achieving psychometric thresholds, and RTS rates ($P > .05$). Additionally, by the latest follow-up, no athlete in either group required conversion to total hip arthroplasty.

Conclusions: High-level athletes with BHD undergoing primary hip arthroscopy for labral pathology and femoroacetabular impingement syndrome may expect favorable midterm outcomes and high RTS rates. These results were comparable to a control group of athletes with normal coverage.

Level of Evidence: Level III, retrospective cohort study.

BACK

Hip Arthroscopy for Femoroacetabular Impingement Syndrome Shows Good Outcomes and Low Revision Rates, With Young Age and Low Postoperative Pain Score Predicting Excellent 5-Year Outcomes

H. Huang, H. Dang, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.03.024

Purpose: To evaluate the clinical outcomes of hip arthroscopy for femoroacetabular impingement syndrome (FAIS) and their predictors at a minimum 5 years' follow-up.

Methods: We retrospectively analyzed patients with FAIS after first-time unilateral hip arthroscopy between January 2010 and July 2016. Patient-reported outcomes (PROs) included the validated modified Harries Hip Score (mHHS) and Visual Analog Scale for Pain (Pain VAS). We included patients with Tönnis grade 0 or 1 and reported PROs, and excluded patients with previous hip diseases or bilateral symptoms. Bivariate and multivariate analyses were used for data analysis.

Results: We included 159 patients with a mean follow-up of 6.4 years, aged 36.18 ± 8.61 years, 41.5% female, and a mean body mass index of 23.61 ± 3.45. The mean postoperative mHHS was 88.82 ± 11.60, and the mean Pain VAS was 1.93 ± 1.89, significantly better than before surgery ($P < .001$). Postoperative alpha angle ($P = .003$) and lateral center edge angle ($P < .001$) were significantly decreased. Most patients (83.7%) achieved clinically important improvement based on patient-acceptable symptom state and minimal clinically important difference (MCID). The overall revision surgery rate was 2.5%. There were no conversions to total hip arthroplasty. Bivariate analysis indicated that age ($P < .001$), preoperative mHHS ($P = .002$), and postoperative Pain VAS ($P <.001$) correlated with postoperative mHHS at a minimum 5 years' follow-up. Multivariate regression analysis of MCID showed that age ($P <.001$), preoperative PROs ($P < .01$ for both), and postoperative Pain VAS ($P < .001$) were significant outcome predictors.

Conclusion: Patients with FAIS after first-time unilateral hip arthroscopy showed significant improvement in PROs at mid-term follow-up, with a low revision surgery rate. Young patients and those with low postoperative Pain VAS showed excellent outcomes at a minimum 5 years' follow-up.

Level of Evidence: Level IV, retrospective case series.

BACK

Improved Pain and Perioperative Outcomes After Hip Arthroscopy With the Pericapsular Nerve Group Block

A. Yusupov, S.M. Fasulo, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.08.036

Purpose: To compare early postoperative pain in patients undergoing hip arthroscopy with versus without the pericapsular nerve group (PENG) block.

Methods: A retrospective chart review of prospectively collected data was performed to identify patients who underwent hip arthroscopy at a single institution between May 2019 and October 2021. Patients were included if they received general anesthesia and were opioid naive. Patients who received the PENG block were compared with patients who did not. Opioid, benzodiazepine, and antiemetic medication administration was recorded both intraoperatively and for the duration of the patient's stay in the postanesthesia care unit (PACU). Opioids administered were converted to morphine milligram equivalents (MMEs). Pain was assessed with a visual analog scale. Time to discharge (in minutes) and complications were recorded.

Results: A total of 53 patients were identified for inclusion, of whom 28 received the PENG block and 25 did not. Opioid consumption was significantly lower in the PENG block group both intraoperatively (16.9 ± 14.1 MMEs vs 40.6 ± 18.3 MMEs, $P < .001$) and in the PACU (14.4 ± 11.4 MMEs vs 31.2 ± 20.1 MMEs, $P < .001$). The highest recorded PACU pain score was significantly greater in the no-PENG block group (7.0 ± 1.9 vs 5.3 ± 2.1, $P = .004$). Within the PENG block group, fewer patients required antiemetics (0 vs 4, $P = .043$). There was a greater time to discharge in the no-PENG block group (161 ± 50 minutes vs 129 ± 34 minutes, $P = .008$). No complications, including postoperative falls, were noted in either group.

Conclusions: The PENG block improves perioperative outcomes by decreasing pain, opioid consumption, time to discharge, antiemetic requirements, and benzodiazepine requirements after hip arthroscopy.

Level of Evidence: Level III, retrospective comparative therapeutic trial.

BACK

Lateral to Medial Joint Space Ratio is Predictive of Survivorship After Primary Hip Arthroscopy

P.J. Rosinsky, J.W. Chen, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.06.025

Purpose: To assess whether preoperative joint space measures would be predictive of survivorship in patients undergoing hip arthroscopy (HA) for femoroacetabular impingement (FAI).

Methods: Data on consecutive patients who underwent hip arthroscopy between February 2008 and February 2018 were retrospectively reviewed. To be eligible for final analysis, patients were required to have preoperative radiographs for joint space measurements and data indicating conversion to a total hip arthroplasty (THA), hip resurfacing, or neither; at a minimum of 2 years after primary hip arthroscopy. Survivorship following HA was defined as remaining conversion free and served as the primary outcome. A multivariate logistic regression analysis and receiver operator curve (ROC) were used to evaluate the correlation between joint space measurements and survivorship following HA.

Results: A total of 1,885 primary arthroscopy cases were included in this study. The multivariate regression analysis found preoperative lateral-to-medial joint space ratio (L/M ratio) to be the strongest predictive factor of survivorship after primary hip arthroscopy (OR = 2.084, CI95% = 1.239–3.503; P = .006). The ROC curve for the model demonstrated acceptable discrimination with an area under the curve (AUC) of 0.792. Patients with an L/M ratio ≥0.75 had a survivorship rate of 91.7% compared to a rate of 75% for patients with an L/M ratio <0.75 (OR: 3.68).

Conclusions: This study found that, of the factors evaluated in this study, the most significant factor in predicting survivorship at 2 years after undergoing primary hip arthroscopy was a larger lateral-to-medial joint space ratio. This may suggest an initiation of primary arthritis at the edge-loading area of the lateral acetabulum.

Level of Evidence: III, retrospective comparative observation study

BACK

The Addition of Either an Anterolateral Ligament Reconstruction or an Iliotibial Band Tenodesis Is Associated With a Lower Failure Rate After Revision Anterior Cruciate Ligament Reconstruction: A Retrospective Comparative Trial

C.P. Helito, M.F. Sobrado, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.06.039

Purpose: To compare the failure rate in patients who underwent revision anterior cruciate ligament (ACL) reconstruction alone or associated with an extra-articular procedure. Secondary objectives were to compare ACL laxity, patient-reported outcome measures, and complication rates in these patients and, subsequently, to compare the outcomes of patients who underwent revision ACL reconstruction associated with anatomical anterolateral ligament (ALL) reconstruction or lateral extra-articular tenodesis (LET).

Methods: This was a retrospective comparative study. Patients were classified into 2 groups, according to whether (group 2) or not (group 1) an extra-articular reconstruction was performed. Patients who underwent an extra-articular procedure were further divided into ALL reconstruction (group 2A) and LET (group 2B). Baseline demographic variables, operative data and postoperative data were evaluated.

Results: The groups with (86 patients) and without (88 patients) an associated extra-articular reconstruction had similar preoperative data. Group 2 had a lower failure rate (4.6% vs 14.7%; P = .038), better KT-1000, better pivot–shift, and better Lysholm. There was no difference regarding complications, except more lateral pain in group 2. Regarding the groups who underwent ALL reconstruction (41 patients) and LET (46 patients), group 2A showed better Lysholm scores. Both groups had similar failure rates and complications.

Conclusions: Patients who underwent revision ACL reconstruction with a laterally based augmentation procedure had a lower failure rate than patients who underwent isolated revision ACL reconstruction. KT-1000 and pivot–shift examination were also significantly better when a lateral augmentation was performed. Complications were similar except for an increase in lateral pain in the augmented group. No clinically important differences were found when comparing the LET group to the ALL group other than a statistical improvement in the Lysholm functional scale, likely not clinically meaningful, favoring the ALL group and an increased duration of post-operative lateral pain in the LET group.

Level of Evidence: III, retrospective comparative therapeutic trial.

BACK

At 10-Year Minimum Follow-Up, One-Third of Patients Have Patellofemoral Arthritis After Isolated Medial Patellofemoral Ligament Reconstruction Using Gracilis Tendon Autograft

J. Shatrov, T. Vialla, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.07.021

Purpose: To report the long-term clinical outcomes after isolated medial patellofemoral ligament reconstruction (MPFLr) to treat recurrent patellar instability.

Methods: This was a single-center study of patients undergoing an isolated MPFLr between 2000 and 2011. All patients underwent reconstruction using hamstring autograft. The inclusion criteria were a minimum 10-year follow-up period and skeletally mature patients with more than 1 episode of patellar dislocation who underwent MPFLr without an associated bony procedure.

Results: A total of 54 knees were available for final analysis. The mean follow-up period was 12.3 years (range, 10-14 year). The mean age at surgery was 25 years. No patients had patellofemoral arthritis (PFA) prior to surgery. Preoperatively, the mean Caton-Deschamps index was 1.1 and the mean tibial tubercle–trochlear groove distance was 14.9 ± 2 mm (range, 7-17 mm). All patients had trochlear dysplasia according to the Dejour classification. At final follow-up, the mean Kujala score was 82.9 ± 15.3; mean International Knee Documentation Committee score, 78.3 ± 18.5; and mean Tegner score, 4.0 ± 1.7. Patients with an unsatisfactory outcome as determined by a Kujala score lower than 80 had a higher Caton-Deschamps index preoperatively and were more likely to be female patients; however, neither factor reached significance. Of the patients, 33 (66%) had no radiographic evidence of PFA whereas 15 (30%) had Iwano stage 1 and 2 had Iwano stage 2 (4%). At final follow-up, 4 patients (7.4%) had recurrent instability requiring revision surgery.

Conclusions: Isolated MPFLr with gracilis tendon autograft in appropriately selected patients is an effective long-term treatment for recurrent patellofemoral instability with low rates of recurrence. One-third of patients exhibit radiographic evidence of PFA more than 10 years after isolated MPFLr.

Level of Evidence: Level IV, case series.

BACK

Blood Flow Restriction Therapy for 2 Weeks Prior to Anterior Cruciate Ligament Reconstruction Did Not Impact Quadriceps Strength Compared to Standard Therapy

J.S. Tramer, L.S. Khalil, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.06.027

Purpose: To evaluate the efficacy of a 2-week home-based blood flow restriction (BFR) prehabiliation program on quadriceps strength and patient-reported outcomes prior to anterior cruciate ligament (ACL) reconstruction.

Methods: Patients presenting with an ACL tear were randomized into two groups, BFR and control, at their initial clinic visit. Quadriceps strength was measured using a handheld dynamometer in order to calculate peak force, average force, and time to peak force during seated leg extension at the initial clinic visit and repeated on the day of surgery. All patients were provided education on standardized exercises to be performed 5 days per week for 2 weeks between the initial clinic visit and date of surgery. The BFR group was instructed to perform these exercises with a pneumatic cuff set to 80% of limb occlusion pressure placed over the proximal thigh. Patient-Reported Outcome Measurement System Physical Function (PROMIS-PF), knee range of motion, and quadriceps circumference were gathered at the initial clinic visit and day of surgery, and patients were monitored for adverse effects.

Results: A total 45 patients met inclusion criteria and elected to participate. There were 23 patients randomized to the BFR group and 22 patients randomized into the control group. No significant differences were noted between the BFR and control groups in any demographic characteristics (48% vs 64% male [P = .271] and average age 26.5 ± 12.0 vs 27.0 ± 11.0 [P = .879] in BFR and control, respectively). During the initial clinic visit, there were no significant differences in quadriceps circumference, peak quadriceps force generation, time to peak force, average force, pain, and PROMIS scales (P > .05 for all). Following completion of a 2-week home prehabilitation protocol, all patients indeterminant of cohort demonstrated decreased strength loss in the operative leg compared to the nonoperative leg (P < .05 for both) However, there were no significant differences in any strength or outcome measures between the BFR and control groups (P > .05 for all). There were no complications experienced in either group, and both were compliant with the home-based prehabilitation program.

Conclusions: A 2-week standardized prehabilitation protocol preceding ACL reconstruction resulted in a significant improvement in personal quadriceps peak force measurements, both with and without the use of BFR. No difference in quadriceps circumference, strength, or patient reported outcomes were found between the BFR and the control group. The home-based BFR prehabiliation protocol was found to be feasible, accessible, and well tolerated by patients.

Level of Evidence: Level II, randomized controlled trial with small effect size

BACK

Patients Undergoing Primary Hip Arthroscopy Report Favorable Outcomes at Minimum 10 Year Follow-Up: A Systematic Review

M.S. Lee, D.N. Kim, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.10.040

Purpose: (1) To evaluate minimum 10-year PROs (patient-reported outcomes) and survivorship after primary hip arthroscopy and (2) to identify predictors of failure for secondary arthroscopy and conversion to total hip arthroplasty (THA).

Methods: A systematic review of the literature was conducted with the following key words: “hip arthroscopy,” “long-term,” “outcomes,” “ten-year,” “survivorship,” “10-year,” “15-year,” “fifteen-year,” 20-year,” “twenty-year,” and “femoroacetabular impingement” in PubMed and Embase in March 2022 using the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines. Level I to Level IV evidence was included and reported on minimum 10-year outcomes or greater after primary hip arthroscopy. Long-term studies were defined as minimum 10-year follow-up in accordance with established standards in the literature. Case reports, review articles, technique articles, and opinion articles were excluded. Articles not in English were excluded. Title, author, publication date, study design, demographic, number of hips, follow-up time, study period, indications for hip arthroscopy, PROs, predictors of failure for THA, and rates of secondary surgeries were recorded. Survivorship was defined as a nonconversion to THA. $P < .05$ was defined as statistical significance.

Results: Twelve studies met the inclusion criteria. In total, 4 studies were Level III, and 8 studies were Level IV. A total of 1,344 hips were included, and follow-up ranged from 10 to 20 years. Femoroacetabular impingement syndrome was the most common indication for hip arthroscopy. Ten of the 12 studies reported on PROs, and 8 studies reported significant improvement after hip arthroscopy at long-term follow-up. The remaining 2 studies reported favorable outcomes that satisfied clinical benefit thresholds at minimum 10-year follow-up. Five studies reported clinical benefit where each patient cohort achieved 80% minimal clinically important difference and 75% patient acceptable symptomatic state for at least one PRO. Rates of secondary arthroscopy ranged from 4.5% to 24%, and rates of conversion to THA varied from 0% to 44.1%. Older age and chondral damage were the most commonly cited predictors for conversion to THA.

Conclusions: At long-term follow-up, patients who underwent primary hip arthroscopy demonstrated favorable outcomes and variable rates of secondary surgeries. Patients undergoing hip arthroscopy within the last 20 years with Tönnis grade <1 and labral repair experienced greater than 90% survivorship. Chondral damage and older age were the most cited predictors for conversion to THA.

Level of Evidence: Level IV, systematic review of Level III and Level IV studies

BACK

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA), Volume 31, Issue 2

Eradication and graft retention can be achieved in the treatment for acute septic arthritis after primary posterior cruciate ligament reconstruction: analysis of 1561 reconstructions

Q. Liang, X Kang et al.

DOI: https://doi.org/10.1007/s00167-022-07059-3

Purpose: Acute septic arthritis after arthroscopic posterior cruciate ligament (PCL) reconstruction is a rare but severe complication. Optimal management has not been established. The purposes of this study were to analyze clinical findings and to retrospectively evaluate the graft-retaining treatment regimen.

Methods: From 2010 to 2021, a total of 1561 primary PCL reconstructions were performed at our institution. Seven patients with septic arthritis were identified and retrospectively analyzed with regard to incidence, clinical manifestations, treatment, postoperative clinical course and follow-up results.

Results: The mean interval from PCL reconstruction to the onset of symptoms was 11.0 ± 4.0 days. *Staphylococcus aureus* was the most commonly found pathogen. Eradication was achieved in all patients after a mean of 1.1 ± 0.4 procedures, with graft retention in all patients. The mean duration of antibiotic treatment was 5.7 ± 1.5 weeks. At the last follow-up, there was no recurrence, graft insufficiency or osteoarthritis.

Conclusion: Arthroscopic graft-retaining treatment combined with individual antibiotic therapy, eradication and good to excellent functional results can be achieved, which might encourage surgeons to try to retain the graft as much as possible.

Level of evidence: Level IV

BACK

Anatomical double-bundle anterior cruciate ligament reconstruction moderately improved tegner scores over the long-term: a systematic review and meta-analysis of randomized controlled trials

Y. Eliya, A-R. Qureshi et al.

DOI: https://doi.org/10.1007/s00167-022-07046-8

Purpose: To assess the effects of anatomical double-bundle (DB) versus single-bundle (SB) for anterior cruciate ligament (ACL) reconstruction in skeletally mature patients with ACL injuries.

Methods: MEDLINE, EMBASE, and CENTRAL were searched from inception to February 7, 2022 were screened for randomized controlled trials. The Anatomic Anterior Cruciate Ligament Reconstruction Checklist was used to categorize studies as anatomic. A random-effects meta-analysis was conducted, with pooled results being summarized using mean difference (MD). Risk of Bias (RoB) was assessed using the RoB 2.0 tool. Certainty of evidence was rated using GRADE.

Results: A search of 1371 unique articles yielded eight eligible trials, representing 735 patients (360 DB, 375 SB) with mean (SD) age of 28.5 (2.86) years and follow-up of 52.1 (36.2) months. Most trials had moderate to low RoB. Overall, DB was not significantly better than SB on Lysholm scores (MD = 0.52, 95% CI, − 1.80–2.85, $p = 0.66$; moderate certainty) or subjective International Knee Documentation Committee (IKDC) scores (MD = − 0.40, 95% CI, − 4.35–3.55, $p = 0.84$; moderate certainty). Tegner scores were significantly higher in SB than DB in the intermediate term (MD = − 0.72, 95% CI, − 1.10 to − 0.34, $p = 0.0002$; high certainty), while significantly higher in DB relative to SB in the long-term (MD = 0.52, 95% CI, 0.02–1.03, $p = 0.04$; high certainty).

Conclusion: DB ACL reconstruction significantly improves Tegner scores relative to SB ACL reconstruction over the long-term ($t \geq 5$ years). Intermediate term Tegner scores favour SB reconstruction. In both durations, there was no clinically significant difference based on the pre-specified minimal clinically important difference of 1.0 point. There were also no significant differences in IKDC or Lysholm scores. Surgeons should consider anatomical DB ACL reconstruction as a result of long-term improvement in patient-reported outcomes.

Level of evidence: I

BACK

Low reoperation rate following lateral meniscus root repair: clinical outcomes at 2 years follow-up

T. De Leissègues, T. Dutra Vieira et al.

DOI: https://doi.org/10.1007/s00167-022-07075-3

Purpose: The aim of this study was to review the outcomes of lateral meniscus posterior root tears repair at the time of ACL reconstruction at a minimum 2-year follow-up.

Methods: Between March 2015 and August 2018, 2017 patients underwent primary ACL reconstruction and were considered for study eligibility. Lateral meniscus posterior root tears were identified arthroscopically, and repair was performed with a transtibial pull-out suture technique or a side-to-side suture technique. Clinical outcomes were recorded at the time of physical examination. At the end of the study period, patients were contacted to determine whether they had required reoperation.

Results: Lateral meniscus posterior root tears were identified in 153 out of the 2,017 primary ACL reconstructions (7.6%). Ninety-nine patients were included for analysis: 23 transtibial pull-out sutures and 76 side-to-side repairs. At a mean follow-up of 42 ± 10 months, one patient (1%) had undergone reoperation for failure of the side-to-side repair. There were 11 reoperations in 10 patients (10.1%), including 6 cyclops syndrome, 1 graft rupture, 1 tibial bone cyst, 1 medial and 1 lateral meniscus repair failure, and 1 arthrolysis. Postoperatively, ninety (90.9%) patients were graded A for the IKDC objective score and 9 (9.1%) patients were graded B, with an IKDC subjective score of 86.9 ± 7.6, a Lysholm score of 90.7 ± 6.7 and a median Tegner Activity Scale of 6 (3–9). All of their objective and subjective evaluations improved after surgery ($p < 0.001$) except for the Tegner Activity Scale. Ten patients underwent second look arthroscopy (10.1%), lateral meniscus healing was observed in 9 out of 10 patients (90%).

Conclusion: This study demonstrated that lateral meniscus posterior root tear repair is a safe procedure with a very low reoperation rate at a minimum follow-up of 2 years.

Level of evidence: IV

BACK

Signal intensity of lateral meniscal allografts deteriorates over time: a longitudinal MRI analysis during a minimum follow-up of 8 years

J-H. Song, S-I. Bin et al

DOI: https://doi.org/10.1007/s00167-022-07069-1

Purpose: To evaluate the serial change of magnetic resonance imaging (MRI) signal intensity (SI) of lateral meniscal allografts in a long-term period of > 8 years and to determine whether the SI change adversely affected clinical outcomes.

Methods: Thirty-three lateral meniscal allograft transplantation (LMAT) patients with MRI taken > 8 years after surgery were included. The allograft was assessed using MRI at five serial time points (1, 2–4, 4–6, 6–8, and > 8 years after surgery), based on the following grading system: grade 1, globular increased SI not adjacent to the articular surface; grade 2, linear SI within the meniscus; and grade 3, increased SI extended to the articular surface. MRI evaluation was performed for three locations of the allograft (anterior horn, mid-body, and posterior horn), and the serial changes of allograft SI at each location were analyzed using the generalized estimating equation (GEE) with cumulative logit link function. The patients were classified according to SI change at each location (stationary group and deterioration group), and the two groups were compared in terms of clinical outcomes using the Lysholm score.

Results: The mean follow-up duration was 9.2 ± 1.2 years. During that period, SI of the allograft deteriorated over time, regardless of the location (anterior horn, $p = 0.034$; mid-body, $p = 0.002$; posterior horn, $p < 0.001$). The amount of SI deterioration at each location of the graft differed with a borderline significance ($p = 0.050$, GEE), and the proportion of grade 3 SI was higher at the posterior horn (36.4%) than at the other locations at the last follow-up ($p < 0.001$, chi-square test). However, no significant differences in the Lysholm scores were found between the stationary group and the deterioration group at all locations.

Conclusion: SI of the meniscal allograft deteriorated over time at all locations during the long-term follow-up. Deterioration of the graft was more prominent at the posterior horn than at the other locations. SI deterioration did not adversely affect the clinical outcomes, which should be interpreted with caution, considering the small sample size of this study. In the prognosis of lateral MAT, SI deterioration at the posterior horn is a more determining factor than that at the other part of the allograft. Therefore, SI at the posterior horn needs to be examined with special concern.

Level of evidence: III

BACK

Age alone does not affect the joint survivorship after arthroscopic partial meniscectomy for degenerative medial meniscus tears: a propensity-score matched survival analysis

J-H. Song, S-I. Bin et al

DOI: https://doi.org/10.1007/s00167-022-07070-8

Purpose: To evaluate the effect of age itself on the joint survivorship after arthroscopic partial meniscectomy (APM) for degenerative medial meniscus tears (DMTs).

Methods: Patients undergoing APM for DMTs during 1999–2010 were retrospectively reviewed. The inclusion criteria were as follows: (1) DMTs identified on preoperative MRI scans, (2) no definite history of trauma, and (3) follow-up duration more than 5 years. In evaluation of the joint survivorship, the endpoint was defined as conversion to arthroplasty (or realignment osteotomy) or progression to Kellgren–Lawrence grade 4. The study population was divided into older and younger groups by a cutoff age at which the difference in the joint survival rates was maximized, using a time-dependent receiver operating characteristic (ROC) curve. The two groups were then matched based on propensity scores. The joint survival rates were compared between the groups using Kaplan–Meier analysis, before and after propensity score matching (PSM).

Results: A total of 633 knees were included. The cutoff age was calculated as 60 years. Before PSM, 239 knees were allocated to the older group (≥ 60 years) and 394 knees to the younger group (< 60 years). A significant difference in the joint survival rates was noted between the groups (log-rank test, $p < 0.001$). After PSM, 183 knees remained in each group. The difference in the survival rates was no more statistically significant (n.s.). The latest Lysholm scores of the older and the younger groups before PSM were 72.2 ± 20.8 and 79.9 ± 19.6, respectively ($p < 0.001$); however, the scores after PSM were 73.2 ± 20.3 and 77.4 ± 20.5, respectively (n.s.).

Conclusion: Joint survivorship after APM was affected by other factors associated with the aging process, such as cartilage status and meniscal tear pattern, rather than age itself. Advanced age should not be the only reason for precluding APM in treatment of DMTs. APM is a viable option when treating DMTs in elderly patients if adopted with caution. According to this study, a surgeon should assess the age-related factors when he considers APM in elderly patients.

Level of evidence: III

BACK

Arthroscopic centralization reduces extrusion of the medial meniscus with posterior root defect in the ACL reconstructed knee

H. Ueki, R. Kanto et al

DOI: https://doi.org/10.1007/s00167-022-07160-7

Purpose: The purpose of this study was to evaluate the effects of arthroscopic meniscal centralization reinforcement for a medial meniscus (MM) posterior root defect on knee kinematics and meniscal extrusion in the anterior cruciate ligament reconstructed (ACLR) knee.
The hypothesis was that the medial meniscus centralization would reduce extrusion and anterior laxity in ACLR knee with a medical meniscal defect.

Methods: Fourteen fresh-frozen human cadaveric knees were tested using a six-degrees-of-freedom robotic system under the following loading conditions: (a) an 89.0 N anterior tibial load, (b) 5.0 Nm internal and external rotational torques, (c) a 10.0 Nm valgus and varus loadings, and (d) a combined 7.0 Nm valgus moment and then a 5.0 Nm internal rotation torque as a static simulated pivot shift. The tested knee states included: (1) anatomic single-bundle cruciate ligament reconstruction with intact medial meniscus (MM Intact), (2) anatomic single-bundle cruciate ligament reconstruction with medial meniscus posterior root defect (MM Defect), (3) Anatomic single-bundle cruciate ligament reconstruction with medial meniscus arthroscopic centralization (MM Centralization). Medial meniscus arthroscopic centralization was performed using 1.4 mm anchors with #2 suture. The MM extrusion (MME) was measured using ultrasound under unloaded and varus loading conditions at 0° and 30° of flexion.

Results: Anterior tibial translation (ATT) increased significantly with MM posterior root defect compared to MM intact at all flexion angles. With MM centralization, ATT was not significantly different from the intact meniscus at 15° and 30° of flexion. Meniscus extrusion increased significantly with the root defect compared to intact meniscus and decreased significantly with meniscal centralization compared to the root defect at both flexion angles.

Conclusion: In ACL reconstruction, cases involving irreparable medial meniscal posterior root tears, applying arthroscopic centralization for avoiding the meniscal extrusion should be considered. Clinically, in ACL reconstruction cases with irreparable medial meniscal posterior root tears, applying arthroscopic meniscal centralization for avoiding the meniscal extrusion should be considered. Meniscal centralization decreases the extrusion of the MM and offers improvements in knee laxity.

BACK

Less than 1% risk of donor-site quadriceps tendon rupture post-ACL reconstruction with quadriceps tendon autograft: a systematic review

H. Singh, I. Glassman et al

DOI: https://doi.org/10.1007/s00167-022-07175-0

Purpose: The purpose of this study is to develop a comprehensive complications profile for quadriceps tendon-autograft anterior cruciate ligament reconstruction (QT ACL-R).

Methods: A traditional and grey literature search was conducted in accordance with PRISMA and R-AMSTAR guidelines. PubMed, EMBASE, MEDLINE, CINAHL, Cochrane, Web of Science, and many grey literature sources were searched from inception to May 29, 2022. All studies were searched and screened in duplicate with included studies being of all levels of evidence, reporting complications, and with patients of all ages undergoing primary ACL reconstruction with quadriceps tendon autograft in the last 15 years. Studies were excluded if they had cadaveric or animal subjects or were reviews. Risk of bias assessment was conducted using MINORS criteria for non-randomised studies and Cochrane's RoB 2.0 for randomised studies. Data were summarised with weighted event rates generated under a random-effects model.

Results: A total of 55 studies (5315 reconstructions) were included: 32 used quadriceps tendon with bone block (B-QT), 19 used all-soft tissue quadriceps tendon (S-QT), and four did not report the QT graft subtype used. Included patients had an age range of 6.2–58 years and an average reported follow-up time of 28.1 months (range, 6–90 months) for non-randomised studies and 34.3 months (range, 0.233–120 months) for randomised studies. Pooled incidence rates for clinically relevant major complications included contralateral ACL injury at 6.0%, postoperative meniscal issues at 5.4%, cyclops lesions at 4.8%, graft failure at 4.1%, patellar fracture at 2.2%, hardware removal at 1.7%, infection at 1.5%, and donor-site quadriceps tendon rupture at 0.7%. Pooled incidence rates for clinically relevant minor complications included anterior knee pain at 9.7%, kneeling pain at 9.5%, sensation deficits at 4.4%, loss of extension at 4.2%, donor-site tendinopathy at 3.9%, cosmetic issues at 1.8%, and hematoma at 1.5%.

Conclusion: QT ACL-R resembles other graft types in its rates and types of postoperative complications. In this exploratory systematic review, no complications of QT ACL-R were found to be disproportionately represented in the literature. This graft type should remain an option with comparable complication rates to other graft choices.

Level of evidence: Level IV.

Registration: This study was preregistered under PROSPERO with preregistration code CRD42022302078.

BACK

Patients older than 55 years regain sporting and recreational activities after arthroscopic anterior cruciate ligament reconstruction

P. Ogunleye, H. Jäger et al.

DOI: https://doi.org/10.1007/s00167-022-07116-x

Purpose: (1) To compare sporting and recreational activity levels before and at a minimum 6 year follow-up, and (2) to assess the clinical and functional outcomes after anterior cruciate ligament (ACL) reconstruction in patients older than 55 years.

Methods: A retrospective evaluation of prospectively collected data of 150 patients with a mean age of 64 ± 4.5 (57–74) years was evaluated 8.6 ± 1.4 (6–11) years after primary ACL reconstruction using hamstring autograft. All patients were assessed using the International Knee Documentation Committee scoring system (IKDC), Knee injury and Osteoarthritis Outcome Score (KOOS), Tegner activity level, and visual analog scale (VAS) for pain. The level of recreational activities was assessed using a sport-specific questionnaire. All patients were categorized according to Isolated and Combined ACL injury groups.

Results: The data of 125 patients were analyzed at the last follow-up. While 25 patients were lost to follow-up, 117 of 125 patients were active before their injury in at least one sports discipline compared to 121 of 125 patients after ACL reconstruction. One hundred and two (82%) patients had returned to their recreational activities at the final follow-up. The mean IKDC subjective score increased from 49.5 ± 23.2 (11.5–100) to 76.2 ± 14.8 (33.3–100) ($p < 0.0001$). The mean KOOS sport increased significantly from 36 ± 36.2 (0–100) to 74.1 ± 25.5 (0–100) ($p < 0.0001$). The mean VAS score improved from 6.0 ± 2.6 (0–10) to 1.0 ± 1.4 (0–6) ($p < 0.0001$). There was no significant difference in the median Tegner activity level (preoperative 5 (2–8) vs. follow-up 5 (2–8) (n.s). There was no significant difference in the number of sports disciplines and duration when comparing pre-injury and mid-term follow-up activity after ACL reconstruction. High-impact activities experienced a significant decline, while a significant increase in participation in low-impact activities was recorded.

Conclusion: The majority of patients with symptomatic instability regained their pre-injury recreational activity level with excellent clinical and functional outcomes after arthroscopic ACL reconstruction. Nevertheless, a change from high-to low-impact activities has been observed.

Level of evidence: Level IV

BACK

Arthroscopic defect size measurement in osteochondral lesions of the talus underestimates the exact defect size and size measurement with arthro-MRI (MR-A) and high-resolution flat-panel CT-arthro imaging (FPCT-A)

A. Ettinger, L. Sonnow et al.

DOI: https://doi.org/10.1007/s00167-022-07241-7

Purpose: The size of osteochondral lesions of the talus (OLTs) is highly relevant for their treatment. In addition to intraoperative measurement of defect size, preoperative planning by means of magnetic resonance imaging (MRI) or computed tomography (CT) is crucial.

Methods: Four defects of different sizes and depths were created on the talar joint surface in 14 cadaver feet. All defects were evaluated, both arthroscopically and via arthrotomy with a probe. Arthro-MRI (MR-A) and high-resolution flat-panel CT arthro scans (FPCT-A) were acquired. Length, width, and depth were measured for every defect and the defect volume was calculated. To determine the exact defect size, each talar defect was filled with plastic pellets to form a cast and the casts were scanned using FPCT to create a 3D multiplanar reconstruction data set. Finally, the surgically measured values were compared with the radiological values and the exact defect size.

Results: Overall, the surgically measured values (both arthroscopic and open) underestimated the exact defect size ($p < 0.05$). Arthroscopically determined defect length and width showed the largest deviation ($p < 0.05$) and underestimated the size in comparison with MR-A and FPCT-A. The FPCT-A measurements demonstrated higher correlation with both the arthroscopic and open surgical measurements than did the MR-A measurements ($p < 0.05$).

Conclusion: The exact defect size is underestimated on intraoperative measurement, in both arthroscopic and open approaches. Arthroscopic defect size measurement underestimates defect size in comparison with MR-A and FPCT-A. FPCT-A was shown to be a reliable imaging technique that allows free image reconstruction in every plane and could be considered as the new reference standard for preoperative evaluation of defect size in OLT.

BACK

American Journal of Sports Medicine (AJSM), Volume 51, Issue 2

Outcomes for Treatment of Capsulolabral Adhesions With a Capsular Spacer During Revision Hip Arthroscopy

Joseph J. Ruzbarsky MD, Spencer M. Comfort BS, Maitland D. Martin BS, Karen K. Briggs MPH, Marc J. Philippon MD

DOI: https://doi.org/10.1177/03635465221145704

Background: The presence of adhesions is a common source of pain and dysfunction after hip arthroscopic surgery and an indication for revision surgery. The placement of a capsular spacer in the capsulolabral recess after lysis of adhesions has been developed to treat and prevent the recurrence of adhesions.

Purpose: To evaluate patient-reported outcomes (PROs) and survivorship at a minimum of 2 years after revision hip arthroscopic surgery with capsular spacer placement for capsular adhesions.

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

Methods: Between January 2013 and June 2018, a total of 95 patients (99 hips) aged ≥18 years underwent revision hip arthroscopic surgery for the treatment of capsular adhesions with the placement of a capsular spacer. Overall, 53 patients (56 hips) met the inclusion criteria and had a minimum 2-year follow-up, forming the cohort of this study. Exclusion criteria included confounding metabolic bone diseases (eg, Legg-Calve-Perthes disease, Marfan syndrome), labral deficiency, or advanced osteoarthritis (Tönnis grade 2 or 3). Preoperative and postoperative outcome scores (modified Harris Hip Score [mHHS], Hip Outcome Score–Activities of Daily Living [HOS-ADL], Hip Outcome Score–Sport-Specific Subscale [HOS-SSS], 12-Item Short Form Health Survey [SF-12], and Western Ontario and McMaster Universities Osteoarthritis Index [WOMAC]) were collected and compared in addition to the revision rate, conversion to total hip arthroplasty, and patient satisfaction.

Results: The mean age of the cohort was 32 ± 11 years, with 32 female hips (57%) and a median number of previous hip arthroscopic procedures of 1 (range, 1-5). The arthroplasty- and revision-free survivorship rate at 2 years was 91%. Overall, 5 patients (6 hips; 11%) underwent revision surgery at a mean of 2.4 ± 1.4 years after capsular spacer placement, with symptomatic capsular defects being the most common finding. There were 4 patients (7%) who converted to total hip arthroplasty. For hips not requiring subsequent surgery (n = 46), there was a significant improvement in outcome scores except for the SF-12 Mental Component Summary, with rates of achieving the minimal clinically important difference of 70%, 70%, and 65% for the mHHS, HOS-ADL, and HOS-SSS, respectively.

Conclusion: Capsular spacers, as part of a systematic approach including lysis of adhesions with early and consistent postoperative physical therapy including circumduction exercises, resulted in improved PROs as well as high arthroplasty– and revision-free survivorship (91%) at a minimum 2-year follow-up. Capsular spacers should be considered in revision hip arthroscopic procedures when an adequate labral volume remains but adhesions continue to be a concern.

BACK