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Issue 106.3 Arthroscopy, June 2023

Nederlandse Vereniging voor Arthroscopie

Website www.4b.4abstracts.nl

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BACK

Upper extremity

Arthroscopy, Volume 39, Issue 6

Preoperative Substance Use Disorder Is Associated With an Increase in 90-Day Postoperative Complications, 1-Year Revisions and Conversion to Arthroplasty Following Arthroscopic Rotator Cuff Repair: Substance Use Disorder on the Rise

J. Raso, A. Althoff, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.12.026

Purpose: The purpose of the current study was to use a nationwide administrative-claims database to characterize the substance use disorder trends of patients undergoing arthroscopic rotator cuff repair (RCR). Additionally, we sought to evaluate the influence of preoperative substance use disorder on postoperative outcomes following arthroscopic RCR.

Methods: The Mariner database was used to identify patients undergoing RCR using CPT codes, ages 18-84 years old, from 2010 to 2019. Patients were stratified by substance use, including cannabis, cocaine, nicotine, alcohol, opioids, stimulants, or sedative, as defined by International Classification of Diseases (ICD) codes. Substance use disorders trends were reported. Postoperative outcomes assessed consisted of major complications, minor complications, infections, readmissions, and Emergency Department visits within 90 days of surgery. Additionally, postoperative stiffness, revision surgery, and conversion to arthroplasty within 1 year were evaluated. Multivariate logistic regressions were used to control for demographic and comorbid factors.

Results: Substance use trends from 2010 to 2019 show an increase in documentation of substance use in patients undergoing RCR. Individuals with a history of substance use disorder had an increased risk of adverse outcomes, most notably major medical complications (odds ratio [OR]: 1.63; 95% confidence interval [CI]: 1.44-1.86; P < .001), revision surgery (OR: 1.43; 95% CI: 1.30-1.56; P < .001), and conversion to arthroplasty (OR: 1.40; 95% CI: 1.08-1.80; P = .009). Subgroup analysis demonstrated that cannabis users were at higher risk for major medical complications (OR: 1.75; 95% CI: 1.15-2.56; P < .001), conversion to arthroplasty (OR: 3.54; 95% CI: 1.77-6.4; P < .001), and revision (OR: 1.53; 95% CI: 1.12-2.04; P < .05) compared to controls. Additionally, substance use was associated with higher medical costs in terms of procedural cost (β; $3634: $3,490-3,777) and 90-day postoperative costs (β: $436; $375-$498).

Conclusion: Documentation of substance use disorder is increasing in individuals undergoing arthroscopic rotator cuff repair. Substance use is associated with higher rates of postoperative complications, overall costs, and revision surgery following arthroscopic RCR. Nicotine and cannabis use were most commonly associated with increased rates of postoperative complications and treatment failure.

Level of Evidence: IV, retrospective therapeutic case series.

BACK

Arthroscopic Superior Capsular Reconstruction With Tensor Fascia Lata Allograft for Irreparable Rotator Cuff Tears: Clinical and Radiologic Outcomes for a Minimum 1-Year Follow-Up

Y. Kim, K. Jung, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.12.037

Purpose: To confirm the radiologic and clinical outcomes after performing arthroscopic superior capsular reconstruction (ASCR) using a tensor fascia lata (TFL) allograft.

Methods: Thirty-three patients with irreparable rotator cuff tears were treated with ASCR with a TFL allograft. The mean age and follow-up period were 62 years and 20.1 months, respectively. TFL allografts were used as 3, 4, and 6 layers, and the graft thickness was 3.7, 3.9, and 5.4 mm, respectively. Range of motion, visual analog scale (VAS) pain score, American Shoulder and Elbow Surgeons score, and Constant score were evaluated preoperatively and at the final follow-up. The pre-, postoperative, and final acromiohumeral distances (AHD) were compared. The graft integrity was checked through a follow-up magnetic resonance imaging at least 6 months after surgery.

Results: Torn grafts were identified in 6 cases (19%). AHD significantly increased from 5.0 to 8.0 mm postoperatively ($P < .0001$). However, there was no significant difference of 5.0 mm at the final follow-up AHD. Five cases (83%) of torn grafts were induced in the 3-layered graft sheet group, but the difference was not statistically significant ($P = .067$). Visual analog scale, forward elevation, internal rotation, American Shoulder and Elbow Surgeons, and Constant scores significantly improved at the last follow-up. Two cases of early infection were confirmed and the graft materials were all removed.

Conclusions: Despite the possibility of early infection, ASCR using TFL allograft is a reliable procedure for the irreparable rotator cuff tear. In particular, if the number of layers of TFL allograft increases, it is judged that it could become a more effective graft.

Level of Evidence: Level IV, therapeutic case series.

BACK

Patients With Functional Somatic Syndromes—Fibromyalgia, Irritable Bowel Syndrome, Chronic Headaches, and Chronic Low Back Pain—Have Lower Outcomes and Higher Opioid Usage and Cost After Shoulder and Elbow Surgery

R. Masood, K. Mandalia, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.12.028

Purpose: To perform a systematic review assessing the relationship between functional somatic syndromes (FSSs) and patient-reported outcome measures (PROMs), postoperative opioid consumption, and hospitalization costs after shoulder and elbow surgery.

Methods: A systematic review of the PubMed and Web of Science databases was conducted according to Preferred Reporting Items for Systematic Review and Meta-Analysis guidelines to identify all studies evaluating the effect of having at least 1 FSS (fibromyalgia, irritable bowel syndrome, chronic headaches, chronic low back pain) on outcomes after shoulder and elbow surgeries. Outcomes of interest included postoperative analgesic use, PROMs, and hospitalization costs.

Results: The review identified a total of 320 studies, of which 8 studies met the inclusion criteria. The total number of participants in our 8 included studies was 57,389. Three studies (n = 620) reported PROMs. These studies demonstrated that the presence of at least 1 FSS is predictive of significantly greater pain scores and lower quality of recovery, Disability Arm Shoulder and Hand, American Shoulder and Elbow Surgeons Shoulder Score, and Single Assessment Numeric Evaluation scores postoperatively. Although scores were inferior in among patients with FSS, 2 of the 3 studies showed improvement in PROMs in this group of patients. Seven studies (n = 56,909) reported postoperative opioid use. Of these, 5 reported that a diagnosis of at least 1 FSS was a strong risk factor for long-term opioid use after surgery. One study (n = 480) found that time-driven activity-based costs were significantly greater in patients with FSSs.

Conclusions: Patients with functional somatic syndromes have less-favorable PROMs postoperatively, consume more opioids postoperatively, and have greater health care costs after elective shoulder and elbow procedures. Although PROMs among patients with FSSs are inferior compared with those without FSSs, PROMs still improved compared with baseline.

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

BACK

Journal of Shoulder and Elbow Surgery (JSES), Volume 32, issue 6

Is preoperative glenoid defect size a reliable indicator of postoperative recurrence after arthroscopic Bankart repair in teenage competitive athletes?

S. Nakagawa, T. Hirose

DOI: https://doi.org/10.1016/j.jse.2022.11.026

Background: Being younger than 20 years of age at the time of arthroscopic Bankart repair (ABR) is known to be one of the most important risk factors for postoperative recurrence of instability. When deciding on the appropriate surgical approach, surgeons generally consider only the size of a critical glenoid defect, and most of them do not take into account factors such as the size of bone fragments and possible bone union after arthroscopic bony Bankart repair (ABBR). Therefore, this retrospective study aimed to clarify the risk factors for postoperative recurrence after ABR in teenage competitive athletes by focusing on glenoid rim morphologies and bone union.

Methods: Participants were 115 teenage competitive athletes without a capsular injury who underwent primary ABR for chronic traumatic anterior instability and were followed up for a minimum of 2 years. Possible risk factors for postoperative recurrence were investigated by univariate and multivariate analysis. In shoulders with a glenoid defect and bone fragment, the influence of glenoid defect size and bone fragment size on bone union after ABBR was also investigated.

Results: Postoperative recurrence was seen in 16 patients (13.9%). Regarding glenoid defect size, recurrence was seen in 1 (3.2%) of 31 shoulders with a glenoid defect smaller than 5% (including those with a normal glenoid), 15 (22.1%) of 68 shoulders with a glenoid defect of 5%-20%, and 0 (0%) of 16 shoulders with a glenoid defect of 20% or larger (P = .009). Regarding bone union, recurrence was seen in 4 (6.9%) of 58 shoulders with complete or partial bone union after ABBR and 8 (40%) of 20 shoulders with nonunion or disappearance of the bone fragment (P = .001). Regarding bone fragment size, recurrence was seen in 12 (20.7%) of 58 shoulders with a small or no bone fragment (<7.5%) and in 3 (8.6%) of 35 shoulders with a large bone fragment (≥7.5%; P = .154). Multivariate analysis identified non-union or disappearance of the bone fragment after ABBR as a significant risk factor for recurrence. Complete or partial bone union was seen in 25 (58.1%) of 43 shoulders with a small bone fragment (<7.5%) and 33 (94.3%) of 35 shoulders with a large bone fragment (≥7.5%; P < .001).

Conclusion: In teenage competitive athletes, bone union after ABBR affects postoperative recurrence after ABR, regardless of the preoperative glenoid defect size, and bone union rate after ABBR is significantly influenced by bone fragment size.

Level of evidence: Level III, Retrospective Cohort Comparison, Prognosis study

BACK

Superior clinical results for early arthroscopic treatment of grade IIIb and V acromioclavicular joint instability compared to delayed operative treatment

R.-O. Dey Hazra, M. Hanhoff

DOI: https://doi.org/10.1016/j.jse.2022.11.018

Background: Prior literature has associated preoperative corticosteroid shoulder injection (CSI) with infection following shoulder surgery. A recent study found an equally elevated risk of total knee arthroplasty infection with preoperative injection of either CSI or hyaluronic acid. The implication is that violation of a joint prior to surgery, even in the absence of corticosteroid, may pose an elevated risk of infection following orthopedic surgery. The aim of the present study was to determine whether violation of the shoulder joint for magnetic resonance arthrogram (MRA) poses an elevated risk of infection following shoulder arthroscopy, and to compare this risk to that introduced by preoperative CSI.

Methods: A national, all-payer database was queried to identify patients undergoing shoulder arthroscopy between January 2015 and October 2020. Patients were stratified into the following groups: (1) no CSI or MRA within 6 months of surgery (n = 5000), (2) CSI within 2 weeks of surgery (n = 1055), (3) CSI between 2 and 4 weeks prior to surgery (n = 2575), (4) MRA within 2 weeks of surgery (n = 414), and (5) MRA between 2 and 4 weeks prior to surgery (n = 1138). Postoperative infection (septic shoulder or surgical site infection) was analyzed at 90 days, 1 year, and 2 years, postoperatively. Multivariable logistic regression analysis controlled for differences among groups.

Results: MRA within 2 weeks prior to shoulder surgery was associated with an increased risk of infection at 1 year (odds ratio [OR], 2.17; $P = .007$), while MRA 2-4 weeks preceding surgery was not associated with an increased risk of postoperative infection at any time point. By comparison, CSI within 2 weeks prior to surgery was associated with an increased risk of postoperative infection at 90 days (OR, 1.72; $P = .022$), 1 year (OR, 1.65; $P = .005$), and 2 years (OR, 1.63; $P = .002$) following surgery. Similarly, CSI 2-4 weeks prior to surgery was associated with an increased risk of postoperative infection at 90 days (OR, 1.83; $P < .001$), 1 year (OR, 1.62; $P < .001$), and 2 years (OR, 1.79; $P < .001$).

Conclusion: Preoperative CSI within 4 weeks of shoulder arthroscopy elevates the risk of postoperative infection. Needle arthrotomy for shoulder MRA elevates the risk of infection in a more limited fashion. Avoidance of MRA within 2 weeks of shoulder arthroscopy may mitigate postoperative infection risk. Additionally, the association between preoperative CSI and postoperative infection may be more attributed to medication profile than to needle arthrotomy.

Level of evidence: Level III, Retrospective Corhort Comparison Using Large Database, Prognosis Study

BACK

Subpectoral biceps tenodesis with BicepsButton fixation in the young population: which technique works best?

R. Trefzer, S. Diermayr

DOI: https://doi.org/10.1016/j.jse.2022.12.008

Background: Injuries of the long head of the biceps (LHB) tendon are a prevalent source of anterior shoulder pain and are commonly treated with tenodesis. Not only a stable fixation of the LHB but also anatomic restoration of the length-tension relationship plays a central role in providing satisfactory functional and cosmetic outcomes, especially in young patients. We report the clinical outcomes of 2 different subpectoral tenodesis techniques using unicortical button fixation.

Methods: Patients aged ≤ 50 years who were treated between April 2015 and January 2020 with 1 of the 2 following subpectoral tenodesis techniques were retrospectively selected and enrolled to undergo a follow-up examination at least 2 years after surgery: subpectoral in situ tenodesis followed by resection of the intra-articular portion leaving a residual tendon stump in the bicipital groove (group I) vs. tenotomy followed by resection of the stump and subpectoral tenodesis (group II). Patients who underwent concomitant rotator cuff repair, subsequent shoulder surgery, or contralateral biceps surgery were excluded. Clinical outcomes were evaluated using the LHB score and the Constant-Murley Score (CMS), as well as measurements of isometric elbow flexion and forearm supination strength. Sonographic evaluation included assessment of the integrity of the LHB and tenodesis, examination for signs of inflammation within the sulcus or around the tendon, and measurements of the distalization of the myotendinous junction of the LHB compared with the nonoperative side.

Results: A total of 34 patients comprising group I (24 men; mean age at time of surgery, 40.3 years; mean follow-up period, 57.2 months) and 24 patients comprising group II (19 men; mean age at time of surgery, 39.8 years; mean follow-up period, 51.9 months) were evaluated. The total CMS, as well as the scores for each CMS subcategory, did not reveal significant differences between the groups. The overall LHB score was on average 10 points higher in group I (mean, 94 points) than in group II (mean, 84 points) (P = .016). Regarding the LHB score subcategories, group I showed significantly better results for patient-dependent cosmesis (mean, 15 points in group I vs. 12 points in group II; P = .005) and examiner-dependent cosmesis (mean, 14 points in group I vs. 10 points in group II; P = .001). This finding was substantiated by a significantly higher distalization of the myotendinous junction in group II (mean, 3.0 cm in group I vs. 3.8 cm in group II; P = .030).

Conclusion: This study shows that subpectoral in situ tenodesis of the LHB followed by arthroscopic resection of the intra-articular portion provides higher LHB scores and better cosmetic outcomes compared with proximal intra-articular tenotomy followed by subpectoral tenodesis.

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

BACK

Clinical outcomes and tendon lengthening after arthroscopic rotator cuff repair

Y. Harada, S. Yokoya

DOI: https://doi.org/10.1016/j.jse.2022.11.013

Background: There is a phenomenon in which the tendon appears to increase the length after rotator cuff repair. However, it is unclear in which cases tendon lengthening occurs and how the degree of lengthening affects the surgical outcome. This study aimed to evaluate preoperative and postoperative musculotendinous junction (MTJ) and tendon length on magnetic resonance imaging and assess the postoperative tendon lengthening and its impact on postoperative outcomes.

Methods: We reviewed 109 patients with good repair integrity after arthroscopic rotator cuff repair. Patients whose supraspinatus tendons were simply pulled out laterally without any additional procedures were included. They underwent serial magnetic resonance imaging before surgery and at 3, 6, and 24 months after surgery. The location of the MTJ in relation to the line of the glenoid fossa and the supraspinatus tendon length were measured. Clinical evaluation was conducted 2 years after surgery, including the range of shoulder motion, shoulder strength index (affected/unaffected strength), Constant score, University of California, Los Angeles score, and pain numeric rating scale. The characteristics of the preoperative tendon, change in tendon length over time, amount of the lateral shift of MTJ location and tendon length, and impact of tendon lengthening on postoperative clinical outcomes were analyzed.

Results: The preoperative tendon retraction significantly correlated with the MTJ location ($r = -0.75$; $P < .0001$) and preoperative tendon length ($r = -0.46$; $P < .0001$). The tendon length at 3, 6, and 24 months after surgery was significantly longer than those before surgery (26.7 ± 5.8 mm, 27.9 ± 6.6 mm, 28.5 ± 5.6 mm, and 21.5 ± 5.1 mm, respectively). From before surgery to 24 months after surgery, the MTJ location moved 8.4 ± 8.6 mm laterally and the tendon length increased 7.0 ± 6.1 mm. A significant and weak negative correlation was found between tendon lengthening and the abduction strength index ($r = -0.22$; $P = .03$); however, no significant correlation with pain, range of shoulder motion, external rotation strength index, Constant score, and University of California, Los Angeles score was found. Multiple linear regression analysis also showed that tendon lengthening was only associated with the abduction strength index (standardized coefficient = −0.20, $P = .03$).

Conclusion: Tendon lengthening and lateral shift of MTJ location were observed after arthroscopic rotator cuff repair, and they correlated with preoperative tendon retraction. Although the amount of tendon lengthening had negative weak correlation with abduction strength index, it did not affect other postoperative outcomes.

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

BACK

Lateral ulnar collateral ligament reconstruction using an autologous triceps tendon graft for subclinical posterolateral rotatory instability in recalcitrant lateral epicondylitis

M. Eigenschink, L. Pauzenberger

DOI: https://doi.org/10.1016/j.jse.2023.02.123

Purpose: To evaluate midterm outcome of lateral ulnar collateral ligament (LUCL) repair with triceps autograft in patients with PLRI under recalcitrant lateral epicondylitis.

Methods: In total, 25 elbows (23 patients) with recalcitrant epicondylitis longer than 12 months were included into this retrospective study. All patients underwent arthroscopic instability examination. In 18 elbows (16 patients, mean age 47.4 years, range 25-60), PLRI was verified, and an LUCL repair using an autologous triceps tendon graft was performed. Clinical outcome was evaluated before and at least 3 years after surgery using the American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form–Elbow Score (ASES-E), Liverpool Elbow Score (LES), Mayo Elbow Performance Index (MEPI), Patient-Rated Elbow Evaluation score (PREE), Subjective Elbow Value (SEV), quick Disabilities of the Arm, Shoulder, and Hand score (qDASH), and the visual analog scale (VAS) for pain. Postoperative satisfaction with the procedure and complications were recorded.

Results: Seventeen patients were available at a mean follow-up of 66.4 months (range 48-81). Patient satisfaction postoperatively was reported in 15 elbows as excellent (90%-100%) and 2 as moderate, with 93.1% overall. All scores of the 3 female and 12 male patients significantly increased from pre- to the postoperative follow-up (ASES: 28.3 ± 10.7 to 54.6 ± 12.1, $P < .001$; MEPI: 49.2 ± 8.3 to 90.5 ± 15.4, $P < .001$; PREE: 66.1 ± 14.9 to 11.3 ± 23.5, $P < .001$; qDASH: 63.2 ± 21.1 to 11.5 ± 22.6, $P < .001$; VAS: 8.75 ± 1.0 to 1.5 ± 2.0, $P < .001$). All patients suffered from high extension pain preoperatively, which was reported to be relieved after surgery. No recurrent instability or major complication occurred.

Conclusion: The repair and augmentation of the LUCL with a triceps tendon autograft reached significant improvements; hence, it seems to be a good treatment option for posterolateral elbow rotatory instability with promising midterm results under a low rate of recurrent instability.

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

BACK

Clinical outcomes of osteochondritis dissecans lesions of the capitellum treated with arthroscopy with a mean follow-up period of 8.3 years

M.A. Rothermich, E.A. Mussell

DOI: https://doi.org/10.1016/j.jse.2023.02.121

Background and hypothesis: Although numerous studies exist evaluating the short-term clinical outcomes of patients who have undergone elbow arthroscopy for osteochondritis dissecans (OCD) of the capitellum, the literature on minimum 2-year clinical outcomes in a large cohort of patients is limited. We hypothesized that the clinical outcomes of patients treated arthroscopically for OCD of the capitellum would be favorable, with improved postoperative subjective functional and pain scores and with an acceptable return-to-play rate.

Methods: A retrospective analysis of a prospectively collected surgical database was performed to identify all patients treated surgically for OCD of the capitellum at our institution from January 2001 to August 2018. The inclusion criteria for this study included a diagnosis of OCD of the capitellum treated arthroscopically with a minimum 2-year follow-up period. The exclusion criteria included any prior surgical treatment on the ipsilateral elbow, missing operative reports, and cases in which any portion of the surgical procedure was performed in an open manner. Follow-up was performed by telephone using multiple patient-reported outcome questionnaires: American Shoulder and Elbow Surgeons–Elbow (ASES-e), Andrews-Carson, and Kerlan-Jobe Orthopaedic Clinic Shoulder and Elbow Score (KJOC) questionnaires and our institution-specific return-to-play questionnaire.

Results: After the inclusion and exclusion criteria were applied to our surgical database, 107 eligible patients were identified. Of these, 90 were successfully contacted, for a follow-up rate of 84%. The mean age was 15.2 years, and the mean follow-up time was 8.3 years. A subsequent revision procedure was performed in 11 patients, for a 12% failure rate in these patients. The ASES-e pain score was an average of 4.0 on a maximum pain scale of 100, the ASES-e function score was an average of 34.5 of a maximum of 36, and the surgical satisfaction score was an average of 9.1 of 10. The average Andrews-Carson score was 87.1 of 100, and the average KJOC score for overhead athletes was 83.5 of 100. Additionally, of the 87 patients evaluated who played sports at the time of their arthroscopy, 81 (93%) returned to play.

Conclusion: This study demonstrated an excellent return-to-play rate and satisfactory subjective questionnaire scores with a 12% failure rate following arthroscopy for OCD of the capitellum with a minimum 2-year follow-up period.

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

BACK

The clinical impact of retears after repair of posterosuperior rotator cuff tears: a systematic review and meta-analysis

R. Holtedahl, B. Bøe

DOI: https://doi.org/10.1016/j.jse.2023.01.014

Background: Structural integrity after rotator cuff repair is frequently not achieved, but the clinical consequences of a retear remain disputed. The purpose of this meta-analysis was to analyze the relationships between postoperative cuff integrity and shoulder pain and function.

Methods: We searched the literature for studies of surgical repair of full-thickness rotator cuff tears published after 1999 describing rates of retear and clinical outcomes and providing sufficient data to estimate effect sizes (standardized mean differences [SMDs]). Baseline and follow-up data of healed and failed repairs were extracted, including shoulder-specific scores, pain, muscle strength, and health-related quality of life. Pooled SMDs, mean differences, and overall change from baseline to follow-up according to structural integrity at follow-up were calculated. Subgroup analysis was performed to assess the influence of study quality on differences.

Results: This analysis included 43 study arms with 3350 participants. The average age of the participants was 62 years (range, 52-78 years). The median number of participants per study was 65 (interquartile range, 39-108). At a median of 18 months' follow-up (interquartile range, 12-36 months), 844 repairs (25%) were described as retorn on imaging. The pooled SMD between healed repairs and retears at follow-up was 0.49 (95% confidence interval [CI], 0.37 to 0.61) for the Constant-Murley score, 0.49 (95% CI, 0.22 to 0.75) for the American Shoulder and Elbow Surgeons score, 0.55 (95% CI, 0.31 to 0.78) for other shoulder-specific outcomes combined, 0.27 (95% CI, 0.07 to 0.48) for pain, 0.68 (95% CI, 0.26 to 1.11) for muscle strength, and –0.001 (95% CI, –0.26 to 0.26) for health-related quality of life. The pooled mean differences were 6.12 (95% CI, 4.65 to 7.59) for the Constant-Murley score, 7.13 (95% CI, 3.57 to 10.70) for the American Shoulder and Elbow Surgeons score, and 0.49 (95% CI, 0.12 to 0.87) for pain, all below the commonly suggested minimal clinically important differences. The differences were not significantly affected by study quality and were generally modest compared with overall improvements from baseline to follow-up for both healed and failed repairs.

Conclusion: The negative impact of retears on pain and function was statistically significant but judged to be of minor clinical importance. The results indicate that most patients may expect satisfactory outcomes despite retears.

Level of evidence: Level IV, Meta-analysis

BACK

Does needle penetration of the shoulder joint prior to arthroscopy increase infection risk? The effect of preoperative magnetic resonance arthrogram or corticosteroid injection

M.G. Livesey, S.S. Bains

DOI: https://doi.org/10.1016/j.jse.2022.11.018

Background: Prior literature has associated preoperative corticosteroid shoulder injection (CSI) with infection following shoulder surgery. A recent study found an equally elevated risk of total knee arthroplasty infection with preoperative injection of either CSI or hyaluronic acid. The implication is that violation of a joint prior to surgery, even in the absence of corticosteroid, may pose an elevated risk of infection following orthopedic surgery. The aim of the present study was to determine whether violation of the shoulder joint for magnetic resonance arthrogram (MRA) poses an elevated risk of infection following shoulder arthroscopy, and to compare this risk to that introduced by preoperative CSI.

Methods: A national, all-payer database was queried to identify patients undergoing shoulder arthroscopy between January 2015 and October 2020. Patients were stratified into the following groups: (1) no CSI or MRA within 6 months of surgery (n = 5000), (2) CSI within 2 weeks of surgery (n = 1055), (3) CSI between 2 and 4 weeks prior to surgery (n = 2575), (4) MRA within 2 weeks of surgery (n = 414), and (5) MRA between 2 and 4 weeks prior to surgery (n = 1138). Postoperative infection (septic shoulder or surgical site infection) was analyzed at 90 days, 1 year, and 2 years, postoperatively. Multivariable logistic regression analysis controlled for differences among groups.

Results: MRA within 2 weeks prior to shoulder surgery was associated with an increased risk of infection at 1 year (odds ratio [OR], 2.17; $P = .007$), while MRA 2-4 weeks preceding surgery was not associated with an increased risk of postoperative infection at any time point. By comparison, CSI within 2 weeks prior to surgery was associated with an increased risk of postoperative infection at 90 days (OR, 1.72; $P = .022$), 1 year (OR, 1.65; $P = .005$), and 2 years (OR, 1.63; $P = .002$) following surgery. Similarly, CSI 2-4 weeks prior to surgery was associated with an increased risk of postoperative infection at 90 days (OR, 1.83; $P < .001$), 1 year (OR, 1.62; $P < .001$), and 2 years (OR, 1.79; $P < .001$).

Conclusion: Preoperative CSI within 4 weeks of shoulder arthroscopy elevates the risk of postoperative infection. Needle arthrotomy for shoulder MRA elevates the risk of infection in a more limited fashion. Avoidance of MRA within 2 weeks of shoulder arthroscopy may mitigate postoperative infection risk. Additionally, the association between preoperative CSI and postoperative infection may be more attributed to medication profile than to needle arthrotomy.

Level of evidence: Level III, Level III, Retrospective Corhort Comparison Using Large Database, Prognosis Study

BACK

American Journal of Sports Medicine (AJSM), Volume 51, Issue 7

Midterm Outcomes Following Combined Biceps Tenodesis and Anterior Labral Repair in Active Duty Military Patients Younger Than 35 Years

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DOI: https://doi.org/10.1177/03635465231169238

Background: Superior labrum anterior-posterior (SLAP) lesions and anterior instability are common causes of shoulder pain and dysfunction among active-duty members of the United States military. However, little data have been published regarding the surgical management of type V SLAP lesions.

Purpose: To compare the outcomes of arthroscopic-assisted subpectoral biceps tenodesis and anterior labral repair with those of arthroscopic SLAP repair (defined as contiguous repair spanning from the superior labrum to the anteroinferior labrum) for type V SLAP tears in active-duty military patients younger than 35 years.

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

Methods: All consecutive patients from January 2010 to December 2015 who underwent arthroscopic SLAP repair or combined biceps tenodesis and anterior labral repair for a type V SLAP lesion with a minimum 5-year follow-up were identified. The decision to perform type V SLAP repair versus combined biceps tenodesis and anterior labral repair was based on the condition of the long head of the biceps tendon (LHBT). Labral repair was performed in patients who had a type V SLAP tear with an otherwise clinically and anatomically healthy LHBT. Combined tenodesis and repair was performed in patients with evidence of LHBT abnormalities. Outcomes including the visual analog scale (VAS) score, the Single Assessment Numeric Evaluation (SANE) score, the American Shoulder and Elbow Surgeons (ASES) shoulder score, the Rowe instability score, and range of motion were collected preoperatively and postoperatively, and scores were compared between the groups.

Results: A total of 84 patients met the inclusion criteria for the study. All patients were active-duty service members at the time of surgery. A total of 44 patients underwent arthroscopic type V SLAP repair, and 40 patients underwent anterior labral repair with biceps tenodesis. The mean follow-up was 102.59 ± 20.98 months in the repair group and 94.50 ± 27.11 months in the tenodesis group ($P = .1281$). There were no significant differences in preoperative range of motion or outcome scores between the groups. Both groups experienced statistically significant improvements in outcome scores postoperatively ($P < .0001$ for all); however, compared with the repair group, the tenodesis group reported significantly better postoperative VAS (2.52 ± 2.36 vs 1.50 ± 1.91, respectively; $P = .0328$), SANE (86.82 ± 11.00 vs 93.43 ± 8.81, respectively; $P = .0034$), and ASES (83.32 ± 15.31 vs 89.90 ± 13.31, respectively; $P = .0394$) scores. There were no differences in the percentage of patients who achieved the minimal clinically important difference, substantial clinical benefit, and patient acceptable symptom state for the SANE and ASES between the groups. Overall, 34 patients in each group returned to preinjury levels of work (77.3% vs 85.0%, respectively; $P = .3677$), and 32 patients (72.7%) in the repair group and 33 patients (82.5%) in the tenodesis group returned to preinjury levels of sporting activity ($P = .2850$). There were no significant differences in the number of failures, revision surgical procedures, or patients discharged from the military between the groups ($P = .0923$, $P = .1602$, and $P= .2919$, respectively).

BACK

Conclusion: Both arthroscopic-assisted subpectoral biceps tenodesis combined with anterior labral repair and arthroscopic SLAP repair led to statistically and clinically significant increases in outcome scores, marked improvements in pain, and high rates of return to unrestricted active duty in military patients with type V SLAP lesions. The results of this study suggest that biceps tenodesis combined with anterior labral repair produces comparable outcomes to arthroscopic type V SLAP repair in active-duty military patients younger than 35 years.

BACK

Resolution of Sleep Disturbance and Improved Functional Outcomes After Rotator Cuff Repair

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DOI: https://doi.org/10.1177/03635465231169254

Background: Most patients experience sleep disturbances before rotator cuff repair, with these symptoms largely improving postoperatively. However, the relationship between the resolution or persistence of sleep disturbance and patient-reported outcomes after rotator cuff repair remains unknown.

Purpose: To compare outcomes after rotator cuff repair between patients who reported a preoperative sleep disturbance and those who did not. Outcomes at various time points after surgery were also assessed in relation to the persistence or resolution of sleep disturbance.

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

Methods: Patients undergoing primary arthroscopic rotator cuff repair at a tertiary academic center were prospectively enrolled in a registry database. Patient characteristics were obtained preoperatively and validated patient-reported outcome measures (PROMs) were obtained pre- and postoperatively, including the visual analog scale for pain, American Shoulder and Elbow Surgeons score, Single Assessment Numeric Evaluation, Simple Shoulder Test, and Veterans RAND 12-Item Health Survey Physical and Mental components. Sleep disturbance was evaluated via responses to Simple Shoulder Test question 2. Patients with and without sleep disturbance were compared before and after surgery.

Results: In total, 293 patients were prospectively enrolled. A total of 262 (89.8%) patients reported a sleep disturbance preoperatively. Of these, 221 (84.4%) reported a resolution of sleep disturbance by 2 years postoperatively. After adjustment for age, workers' compensation status, and Cofield tear size, patients with a preoperative sleep disturbance reported significantly worse baseline PROMs, apart from the Veterans RAND 12-Item Health Survey Mental component, before surgery. However, postoperatively, these patients had greater improvement in PROMs, and no significant remaining differences were seen at follow-up between patients with and without preoperative sleep disturbance. Among patients who reported a preoperative sleep disturbance, those whose symptoms resolved postoperatively had superior PROM scores as well as significantly greater improvements from preoperative baseline values compared with patients with persistent sleep disturbances after surgery.

Conclusion: Patients with preoperative sleep disturbances reported worse baseline functional scores before rotator cuff repair compared with patients without sleep disturbance. These disturbances largely resolved after surgery, with postoperative outcomes comparable with those of patients who reported no preoperative sleep concerns. Patients whose sleep disturbances resolved postoperatively also reported superior PROM scores compared with patients whose sleep disturbances persisted postoperatively.

BACK

A Systematic Review of Long-term Clinical and Radiological Outcomes of Arthroscopic and Open/Mini-open Rotator Cuff Repairs

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DOI: https://doi.org/10.1177/03635465211073332

Background: Arthroscopic rotator cuff repair (aRCR) has shown similar midterm functional results and retear rates as open/mini-open rotator cuff repair (oRCR). A pooled analysis of long-term results of both techniques is yet missing.

Purpose: To evaluate the long-term results of aRCR and oRCR for full-thickness rotator cuff tears.

Study Design: Systematic review; Level of evidence, 4.

Methods: The systematic review followed the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. The CENTRAL (Cochrane), MEDLINE (PubMed), and Embase databases were searched for studies that reported on long-term clinical and radiographic outcomes of full-thickness aRCR and oRCR with a minimum follow-up of 9 years.

Results: Eleven studies were included: 5 studies on aRCR and 6 studies on oRCR. Studies were based on 550 shoulders (539 patients) with a mean patient age of 56.3 years (range, 25-77). After a mean follow-up of 14.0 years (range, 9-20), the mean preoperative absolute Constant score (CS) and American Shoulder and Elbow Surgeons (ASES) shoulder score were significantly improved postoperatively (CS, 44 to 78 points; ASES, 52% to 91%; both comparisons, $P < .001$). The retear rate was 41% (141 of 342 shoulders) without a significant difference between groups (aRCR, 43%; oRCR, 39%) ($P = .364$). A retear was associated with significantly reduced CS as compared with a healed repair ($P = .004$). No significant differences were found in postoperative functional scores, complications, and retear rates after failed cuff repairs between the arthroscopic and open/mini-open repair groups.

Conclusion: Pooled analysis of arthroscopic and open rotator cuff repairs demonstrated sustained improvement in long-term shoulder scores and pain with a substantial retear rate in both groups, which was associated with inferior shoulder function. There were no significant differences in long-term functional outcomes, retear rates, and complications. Both surgical techniques may be used on the basis of factors such as patient or surgeon preference and cost. Further studies using a more robust randomized controlled trial or larger cohort design are recommended to ascertain whether one surgical repair technique is superior to the other.

Registration: CRD42020180448 (PROSPERO).

BACK

Lower Extremity

Arthroscopy, Volume 39, Issue 6

Reprint of: Outcomes of Arthroscopic All-Inside Repair Are Improved Compared to Transtibial Pull-Out Repair of Medial Meniscus Posterior Root Tears

K.H. Yoon, W. Lee, et al.

DOI: https://doi.org/10.1016/j.arthro.2023.04.003

Purpose: The purpose of the present study was to compare the clinical outcomes of patients who underwent an all-inside repair (with a bony trough) versus transtibial pull-out repair in medial meniscus posterior root tears (MMPRTs).

Methods: We retrospectively investigated consecutive patients who underwent MMPRT repairs in nonacute tears in age over 40 from November 2015 to June 2019. All patients were divided into a transtibial pull-out repair group and an all-inside repair group. Different surgical techniques were used during different time frames. All patients were followed-up for a minimum of 2 years. The data collected included the International Knee Documentation Committee (IKDC) Subjective, Lysholm, and Tegner activity scores. Magnetic resonance imaging (MRI) was performed at the 1-year follow-up to assess meniscus extrusion, signal intensity, and healing.

Results: The final cohort consisted of 28 patients in the all-inside repair group and 16 in the transtibial pull-out repair group. In the all-inside repair group, the IKDC Subjective, Lysholm, and Tegner scores improved significantly at the 2-year follow-up. In the transtibial pull-out repair group, the IKDC Subjective, Lysholm, and Tegner scores did not improve significantly at the 2-year follow-up. Postoperative extrusion ratio increased in both groups, and patient-reported outcomes at follow-up did not differ between the two groups The change in the extrusion ratio was significantly less in the all-inside repair group (P = .009), as was the postoperative meniscus signal (P = .011). Postoperative MRI revealed significantly better healing in the all-inside group (P = .041).

Conclusion: All-inside repair improved the functional outcome scores. Radiologically, all-inside repair was better than transtibial pull-out repair. All-inside repair may be a viable MMPRT treatment option.

Level of Evidence: III, retrospective cohort study.

BACK

Hip Arthroscopy With Bone Marrow Aspirate Injection for Patients With Symptomatic Labral Tears and Early Degenerative Changes Shows Similar Improvement Compared With Patients Undergoing Hip Arthroscopy With Symptomatic Labral Tears Without Arthritis

M.A. Day, K.J. Hancock, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.12.012

Purpose: To define the clinical effect of intra-articular injection of iliac crest–derived bone marrow aspirate concentrate (BMAC) at the time of hip arthroscopy in patients with symptomatic labral tears and early radiographic degenerative changes.

Methods: A retrospective review of a prospectively collected hip registry database was performed. Patients with symptomatic labral tears and Tönnis grade 1 or 2 degenerative changes who underwent labrum-preserving hip arthroscopy with BMAC injection were included and were matched with patients who underwent hip arthroscopy without BMAC injection. Patient-reported outcomes (PROs) collected preoperatively and up to 2 years postoperatively included the modified Harris Hip Score, Hip Outcome Score–Activities of Daily Living, Hip Outcome Score–Sport, and International Hip Outcome Tool 33 score. Clinical relevance was measured with the minimal clinically important difference, patient acceptable symptom state, and substantial clinical benefit for each outcome score.

Results: A total of 35 patients underwent labrum-preserving hip arthroscopy with BMAC injection and were matched with 35 control patients. There were no differences in demographic characteristics between the groups ($P > .05$). The BMAC group consisted of 22 patients (62.9%) with Tönnis grade 1 changes and 13 (37.1%) with Tönnis grade 2 changes, whereas all 35 control patients had Tönnis grade 0 hips. All PROs were significantly improved in both groups at 2 years, with no difference in improvement. The rate of failure requiring conversion to total hip arthroplasty was 14.3% (mean, 1.6 years postoperatively) in the BMAC group and 5.7% (mean, 7 years postoperatively) in the control group ($P = .09$). The difference in the frequency of patients achieving the minimal clinically important difference, patient acceptable symptom state, and substantial clinical benefit was not statistically significant between cohorts.

Conclusions: In a challenging group of patients with symptomatic labral tears and early radiographic degenerative changes, hip arthroscopy with BMAC injection results in statistically and clinically significant improvement in PROs comparable to a group of patients with nonarthritic hips undergoing hip arthroscopy at short-term follow-up.

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

BACK

Changes in Hip Labral Size Two Years After Arthroscopic Repair Are Correlated With Preoperative Measurements on Magnetic Resonance Imaging

R. Liu, G. Gao, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.12.021

Purpose: The purposes of our study were 1) to investigate the potential change of labral size after arthroscopic repair and 2) to analyze the relationship between acetabular labral size and functional outcomes.

Methods: In this retrospective study, patients diagnosed with labral tear and undergoing hip arthroscopic repair in our institution between September 2016 and December 2018 were included. Magnetic resonance imaging was obtained preoperatively and postoperatively, and the labral length and labral height were measured in three anatomic sites: 11:30, 1:30, and 3:00 positions. All patients completed at least 2-year follow-up. Patients whose preoperative labral size in any position wider than 2 standard deviation away from the mean were identified as the hypertrophic labrum group and were compared with the control in radiographic variables and patient-reported outcomes (PROs), including the visual analog scale (VAS), modified Harris Hip Score (mHHS), the International Hip Outcome Tool-12 (iHOT-12) and the Hip Outcome Score-Activities of Daily Living (HOS-ADL).

Results: A total of 82 patients (82 hips) were included, and the mean follow-up period was 39.54 ± 8.48 months. Significant improvement in PROs was determined before and after surgeries. Twelve patients were identified with labral hypertrophy and had higher postoperative mHHS scores, higher postoperative iHOT-12 scores, and greater improvement in HOS-ADL compared with the control group. Patients with larger preoperative anterosuperior labral height exhibited more favorable clinical outcomes. Meanwhile, no significantly morphologic change in labral size was determined.

Conclusion: There is no significantly morphologic change in labral size of superior, anterosuperior, and anterior labrum after arthroscopic repair. Patients with hypertrophic labrum achieved more favorable clinical outcomes compared with those with normal-sized labrum.

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

BACK

Patients With Unhealed or Partially Healed Anterior Capsules After Hip Arthroscopy for Borderline Developmental Dysplasia of the Hips Have Inferior Patient-Reported Outcome Measures

F. Yang, X. Zhang, et al.

DOI: https://doi.org/10.1016/j.arthro.2023.01.024

Purpose: To evaluate the changes in anterior hip capsular thickness on pre- and postoperative magnetic resonance imaging (MRI) and their associated clinical outcomes in patients with borderline developmental dysplasia of the hip (BDDH).

Methods: A minimum 2-year follow-up retrospective analysis was performed using data from symptomatic patients with BDDH who underwent hip arthroscopy with routine capsular closure between 2018 and 2020. An available postoperative hip MRI was a prerequisite for study inclusion. Capsular thickness at the capsulotomy zone was measured on MRI. An analysis of the correlations between anterior capsular thickness differences and demographic factors (including age, sex, body mass index, laterality, preoperative alpha angle and lateral center-edge angle, cartilage lesion grade, follow-up time, and capsule management) was performed. Patients with unhealed or partially healed capsules (study group) were propensity-score matched 1:1 to patients with completely healed capsules based on age, sex, body mass index, and follow-up time. Comparisons and analyses of the following parameters were completed for both groups: patient-reported outcomes (Hip Outcome Score–Activities of Daily Living [HOS-ADL], Hip Outcome Score–Sports-Specific Subscale [HOS-SSS], International Hip Outcome Tool 12-component form [iHOT-12], and modified Harris Hip Score), visual analog scale scores, radiographic measures, performed procedures, and complications.

Results: Data were compiled for 59 patients' hips after patient selection. The majority of the repaired hip capsules remained closed (93.2%) at a minimum 2-year follow-up. Propensity-score matching was applied to distribute 25 subjects in the study group and 25 in the control group. The anterior capsule was significantly thinner postoperation in the study group (3.0 ± 1.2 mm vs 4.1 ± 0.6 mm; $P < .001$). Compared with the control group, patients in the study group had significantly inferior postoperative HOS-ADL (75.1 vs 83.5, $P = .007$), HOS-SSS (64.5 vs 77.1, $P = .005$), and iHOT-12 scores (56.1 vs 70.2, $P = .006$). In addition, patients in the study group were significantly less likely to achieve the minimum clinically important difference for the HOS-ADL score (52% vs 80%, $P = .037$) score and patient acceptable symptomatic state for the HOS-ADL score (32% vs 60%, $P = .047$).

Conclusions: The majority of the repaired hip capsules in patients with BDDH remained closed but not all capsules completely healed at a minimum 2-year follow-up. Patients with an unhealed or partially healed capsule had inferior HOS-ADL, HOS-SSS, and iHOT-12 scores and were less likely to achieve the minimum clinically important difference and patient acceptable symptomatic state for the HOS-ADL score.

Level of Evidence: III, retrospective comparative prognostic study.

BACK

Localized Anterior Arthrofibrosis After Soft-Tissue Quadriceps Tendon Anterior Cruciate Ligament Reconstruction Is More Common in Patients Who Are Female, Undergo Meniscal Repair, and Have Grafts of Larger Diameter

R.M. Haley, J.D. Lamplot, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.11.027

Purpose: To determine factors associated with localized anterior arthrofibrosis (cyclops lesion), such as graft size, warranting early reoperation for lysis of adhesions after anterior cruciate ligament reconstruction (ACLR) with all–soft tissue quadriceps tendon (ASTQT) autograft.

Methods: All primary ASTQT autograft ACLRs within a single surgeon's prospectively collected registry with minimum 6-month follow-up were included. Patients who underwent multiligament knee reconstruction or cartilage restoration procedures were excluded. Localized anterior arthrofibrosis was defined as the requirement for a second procedure to achieve debridement and lysis of adhesions owing to the inability to regain terminal extension within 6 months of ACLR. The sex-specific incidence of arthrofibrosis was evaluated relative to age, weight, femoral and tibial tunnel sizes, meniscal repair, and meniscectomy by a binary logistic regression.

Results: This study included 721 patients (46% female patients). There were 52 cases of localized anterior arthrofibrosis (7.2%). Female patients had a greater incidence of arthrofibrosis than male patients. Male patients with a femoral tunnel diameter of 9.25 mm or greater had an increased incidence of arthrofibrosis compared with those with a diameter of less than 9.25 mm, whereas a similar cutoff was not found to be statistically significant for female patients. Concomitant meniscal repair was associated with an increased risk of arthrofibrosis.

Conclusions: Female sex and concomitant meniscal repair were associated with an increased localized anterior arthrofibrosis incidence. Furthermore, ASTQT with a femoral tunnel diameter of 9.25 mm or greater in male patients was associated with an increased incidence of arthrofibrosis.

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

BACK

Suture Anchor-Based Quadriceps Tendon Repair May Result in Improved Patient-Reported Outcomes but Similar Failure Rates Compared to the Transosseous Tunnel Technique

A.B. Yanke, N. Dandu, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.11.031

Purpose: The purpose of this study was to compare failure rates and patient-reported outcomes between transosseus (TO) suture and suture anchor (SA) quadriceps tendon repairs.
Methods
Following institutional review board approval, patients who underwent primary repair for quadriceps tendon rupture with TO or SA techniques between January 2009 and August 2018 were identified from an institutional database and retrospectively reviewed. Patients were contacted for satisfaction (1-10 scale), current function (0-100 scale), failure (retear), and revision surgeries; International Knee Documentation Committee (IKDC) score and Knee Injury and Osteoarthritis Outcomes Score (KOOS) were also collected to achieve a minimum of 2-year follow-up.

Results: Sixty-four patients (34 SA, 30 TO) were available by phone or e-mail at a mean of 4.81 ± 2.60 years postoperatively. There were 10 failures, for an overall failure rate of 15.6%. Failure incidence did not significantly differ between treatment groups (P = .83). Twenty-seven patients (47% of nonfailed patients) had completed patient-reported outcomes. The SA group reported higher subjective function (SA: 90 [85-100] vs TO: 85 [60-93], 95% CI of difference: –19.9 to –2.1 × 10–5, P = .042), final IKDC (79.6 [50.0-93.6] vs 62.1 [44.3-65.5], 95% CI of difference: –33.0 to –0.48, P = .048), KOOS Pain (97.2 [84.7-97.2] vs 73.6 [50.7-88.2], 95% CI of difference: –36.1 to –3.6 × 10–5, P = .037), Quality of Life (81.3 [56.3-93.8] vs 50.0 [23.4-56.3], 95% CI of difference: –50.0 to –6.2, P = .026), and Sport (75.0 [52.5-90.0] vs 47.5 [31.3-67.5], 95% CI of the difference: –45.0 to –4.1 × 10–5, P = .048).

Conclusions: There is no significant difference in failure rate between transosseus and suture anchor repairs for quadriceps tendon ruptures (P = .83). Most failures occur secondary to a traumatic reinjury within the first year postoperatively. Despite the lack of difference in failure rates, at final follow-up, patients who undergo suture anchor repair may report significantly greater subjective function and final IKDC, KOOS Pain, Quality of Life, and Sport scores.

Level of Evidence: III, retrospective cohort study.

BACK

Machine Learning Model Identifies Preoperative Opioid Use, Male Sex, and Elevated Body Mass Index as Predictive Factors for Prolonged Opioid Consumption Following Arthroscopic Meniscal Surgery

J.P. Castle, T.R. Jildeh, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.12.025

Purpose: To develop a predictive machine learning model to identify prognostic factors for continued opioid prescriptions after arthroscopic meniscus surgery.

Methods: Patients undergoing arthroscopic meniscal surgery, such as meniscus debridement, repair, or revision at a single institution from 2013 to 2017 were retrospectively followed up to 1 year postoperatively. Procedural details were recorded, including concomitant procedures, primary versus revision, and whether a partial debridement or a repair was performed. Intraoperative arthritis severity was measured using the Outerbridge Classification. The number of opioid prescriptions in each month was recorded. Primary analysis used was the multivariate Cox-Regression model. We then created a naïve Bayesian model, a machine learning classifier that uses Bayes' theorem with an assumption of independence between variables.

Results: A total of 581 patients were reviewed. Postoperative opioid refills occurred in 98 patients (16.9%). Multivariate logistic modeling was used; independent risk factors for opioid refills included male sex, larger body mass index, and chronic preoperative opioid use, while meniscus resection demonstrated decreased likelihood of refills. Concomitant procedures, revision procedures, and presence of arthritis graded by the Outerbridge classification were not significant predictors of postoperative opioid refills. The naïve Bayesian model for extended postoperative opioid use demonstrated good fit with our cohort with an area under the curve of 0.79, sensitivity of 94.5%, positive predictive value (PPV) of 83%, and a detection rate of 78.2%. The two most important features in the model were preoperative opioid use and male sex.

Conclusion: After arthroscopic meniscus surgery, preoperative opioid consumption and male sex were the most significant predictors for sustained opioid use beyond 1 month postoperatively. Intraoperative arthritis was not an independent risk factor for continued refills. A machine learning algorithm performed with high accuracy, although with a high false positive rate, to function as a screening tool to identify patients filling additional narcotic prescriptions after surgery.

Level of Evidence: III, retrospective comparative study.

BACK

Anteromedial Portal Technique, but Not Outside-in Technique, Is Superior to Standard Transtibial Technique in Knee Stability and Functional Recovery After Anterior Cruciate Ligament Reconstruction: A Network Meta-analysis

H. Feng, N. Wang, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.11.026

Purpose: To compare the postoperative outcomes of 4 different femoral drilling techniques in anterior cruciate ligament reconstruction.

Methods: Three databases were searched for randomized controlled trials comparing any 2 or more of the following femoral drilling techniques in anterior cruciate ligament reconstruction: standard transtibial (sTT), anteromedial portal (AMP), outside-in (OI), or modified transtibial (mTT) technique. A Bayesian network meta-analysis was performed to assess postoperative stability and functional recovery in terms of the side-to-side difference (measured by arthrometry), Lachman test, pivot-shift test, International Knee Documentation Committee subjective and objective scores, Lysholm score, and Tegner score. The Fisher exact probability test and $\chi 2$ test were used to compare the incidences of infection and graft rupture, respectively.

Results: We included 20 randomized controlled trials involving 1,515 patients. The AMP technique showed a lower side-to-side difference (standardized mean difference, –0.33; 95% credible interval [CrI], –0.53 to –0.12), higher negative rate on the pivot-shift test (odds ratio, 2.19; 95% CrI, 1.38 to 3.44), and higher International Knee Documentation Committee objective score (odds ratio, 3.13; 95% CrI, 1.42 to 7.82) than the sTT technique. However, knee stability and functional outcomes did not differ significantly between the OI and sTT techniques. Safety outcomes of the mTT technique were unavailable. The incidence of graft rupture was 5.20% for the OI technique, 2.27% for the AMP technique, and 1.51% for the sTT technique. The OI technique had a significantly higher incidence of graft rupture than the sTT technique ($\chi 2 = 4.421$, $P = .035$). No significant difference in the incidence of infection was found between the sTT, AMP, and OI techniques ($P = .281$).

Conclusions: The AMP technique, but not the OI technique, was superior to the sTT technique in knee stability and functional recovery. The OI technique had a higher incidence of graft rupture than the sTT technique. There was no significant difference between the AMP and OI techniques or between the mTT technique and any other femoral drilling technique.

Level of Evidence: Level II, meta-analysis of Level I and II studies.

BACK

Hip Arthroscopy Improves Outcomes With Moderate Conversion to Total Hip Arthroplasty Rates in Patients Aged 50 Years or Older: A Systematic Review

A.Shanmugaraj, M.V. Kumar, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.08.019

Purpose: The purpose of this systematic review was to assess the indications, outcomes, and complications of hip arthroscopy in individuals 50 years of age or older over the past 5 years.

Methods: The electronic databases PUBMED, MEDLINE, and EMBASE were searched on March 3, 2022, for studies assessing the use of primary hip arthroscopy for patients aged 50 years or older from the past 5 years. The Methodological Index for Non-randomized Studies (MINORS) was used to assess study quality. Data are presented descriptively.

Results: Overall, 17 studies were included, consisting of 6,696 patients (37.5%) with a mean age of 61.4 ± 5.0 years and a median follow-up of 24 months (range: 1.4-70.1). Indications for hip arthroscopy in patients aged 50 years or older were unspecified/undefined (93.8%), mixed pathology (i.e., combined femoroacetabular impingement [FAI], labral tear, osteoarthritis, etc.) (2.7%), and FAI (2.6%). Eleven studies demonstrated significant improvement in functional outcome scores from baseline to final follow-up. Of the 6 studies that compared outcomes across multiple age groups, 3 demonstrated significantly worse functional outcomes, and 2 demonstrated significantly higher rates of conversion to THA for older patients compared to younger patients. Lastly, the overall complication rates ranged from 0 to 38.3%. The rate of conversion to THA ranged from 0 to 34.6%, occurring between 6 and 60 months postoperatively.

Conclusions: Hip arthroscopy for patients aged 50 years or older yields significant improvements in patient-reported outcomes postoperatively compared to baseline, with a moderate rate of conversion to THA (range: 0 to 34.6%). Clinicians should consider patient history (e.g., imaging, comorbidities, etc.) and values when electing for hip arthroscopy in the older population.

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

BACK

Hip Spine Syndrome Negatively Impacts Arthroscopic Outcomes in the Management of Femoroacetabular Impingement Syndrome: A Systematic Review

B. Akpinar, K. Vasavada, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.08.024

Purpose: To determine whether the presence of spine pathology affects clinical outcomes after hip arthroscopy for femoroacetabular impingement syndrome (FAIS) in the setting of hip-spine syndrome (HSS)

Methods: A systematic review of PubMed and Cochrane was conducted. Primary research articles evaluating patient-reported outcomes (PRO) after hip arthroscopy for FAIS in the presence of concomitant spine pathology were considered

Results: Literature review identified 12 studies meeting criteria. In 2109 FAIS patients undergoing hip arthroscopy, 591 had concomitant spine pathology. Baseline PROs in the hip-spine (modified Harris Hip Score [mHHS]: 39.8–65.29 vs 56.9–78.8, 8 studies; non-arthritic hip score [NAHS]: 42.2–51.5 vs 68.2–75.2, 4 studies; hip outcome score-activities of daily living [HOS-ADL]: 45.9–71.1 vs 49.3–89.51, 9 studies; hip outcome score-Sport (HOS-Sport): 22.8–49.6 vs 50.6–73.1, 3 studies; international hip outcome tool-33 [iHOT-12]: 38.0 vs 66.0, 1 study; visual analog scale [VAS] Pain: 6.43–6.56 vs 1.18–3.60, 3 studies; VAS Satisfaction: 7.18–7.46 range at follow-up, 2 studies) and control (mHHS: 39.3–64.9 vs 70.2–92.6, 6 studies; NAHS: 42.8–54.2 vs 74.0–87.1, 4 studies; HOS-ADL: 59.0–76.4 vs 75.4–97.1, 4 studies; HOS-Sport: 38.1–55.1 vs 60.9–93.9, 3 studies; iHOT-12: 43.4 vs 89.8, 1 study; VAS Pain: 6.18–6.22 vs 1.82–3.44, 2 studies; VAS Satisfaction: 7.74–8.22 range at follow up, 2 studies). Minimal clinically important difference threshold rates achieved in the hip-spine (44.1–86.7, 4 studies) cohorts were significantly lower than control (79.4–88.2%; 4 studies) cohorts in 3 studies. Patient-acceptable symptomatic state threshold rates achieved in the hip-spine (42–63.5, 3 studies) cohorts were significantly lower than control (58.8–81.0, 3 studies) in 1 study. There was no statistical difference in complication and reoperation rates between cohorts.

Conclusion: FAIS patients with concomitant HSS have improved but inferior outcomes after hip arthroscopy compared to patients without HSS

Level of Evidence: IV, systematic review.

BACK

The Outcome of Hip Arthroscopy in the Setting of Lumbar Spine Disease Is Beneficial, Yet Limited: A Systematic Review of Existing Evidence

J.D. Feingold, S. Srikumar, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.09.014

Purpose: To compare hip arthroscopy outcomes in femoroacetabular impingement (FAI) patients with concurrent symptomatic lumbar spine disease to the outcomes of arthroscopic FAI patients without spine disease.

Methods: A systematic review was performed according to PRISMA guidelines via PubMed, Cochrane, Embase, and Google Scholar databases. Studies were valid for inclusion if they had an average follow-up ≥12 months and compared patient-reported outcome measures (PROMs) in hip arthroscopy patients with and without concurrent spinal disease. Data collected included study characteristics, patient demographics, follow-up intervals, surgical indications, spinal pathology, PROMs, and reoperation rates.

Results: Twelve studies were included in this systematic review. 3,107 patients who underwent hip arthroscopy were evaluated: 1,056 with coexisting lumbar spine disease (spine cohort) and 2,051 control subjects without spine disease (control cohort). The average follow-up period was 24 months. Across included studies, there were 35 instances wherein postoperative PROM scores reported by each cohort were compared. In all 35 instances, the spine cohort reported inferior postoperative PROM scores with the difference being significant ($P < .05$) on 23 PROMs. Collectively, 23 cases were available contrasting the proportion of each cohort to achieve the minimal clinically important difference (MCID). In 22 (95.65%) of these cases, the spine cohort achieved the MCID at a lower rate than the control cohort. There were 14 PROMs, wherein intragroup analyses were reported that compared the preoperative and postoperative score reported by the spine cohort. On all 14 PROMs, the spine cohort reported significant ($P < .05$) improvement after arthroscopic intervention.

Conclusion: FAI patients with coexisting lumbar spine pathology experience significant improvement from baseline state after arthroscopic intervention. However, the postoperative outcomes reported are inferior, and the improvement from arthroscopy was limited when compared to surgical control subjects with FAI and normal spinal anatomy.

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

BACK

Combined Meniscal Allograft Transplantation and Anterior Cruciate Ligament Reconstruction Show Good 2- to 14-Year Outcomes: A Systematic Review

K.S.A. Tan, S.K.K. Chua, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.10.042

Purpose: To evaluate the clinical outcomes of anterior cruciate ligament reconstruction (ACLR) with meniscal allograft transplantation (MAT) through a systematic review of current available evidence.

Methods: A systematic database search of PubMed, Embase, Web of Science, and CINAHL was performed from inception up to December 7, 2021, in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analyses. Follow-up studies (inception cohort studies/nonrandomized controlled trials/retrospective cohort studies) and case series that had more than 10 people published in English and involved patients who underwent a combination of ACLR and MAT were included. The quality of these studies was appraised using the Cochrane Risk Of Bias In Non-randomized Studies of Interventions tool. Systematic review of International Knee Documentation Committee (IKDC), Lysholm, and Tegner activity scores were conducted.

Results: Seven studies involving 363 patients were included. The average mean follow-up time was 4.08 years, ranging from 1.75 to 14 years. All studies used the Lysholm Knee Scoring system to report clinical outcomes, whereas 2 studies and 4 studies used the IKDC Questionnaire and Tegner activity scale respectively to measure clinical outcomes postoperatively. Comparing postoperative with preoperative scores, we found an improvement above the minimal clinically important difference for the Lysholm (mean difference [MD] range 16.00-26.10) and Tegner activity scores (MD range 1.50-1.90). All but one study reported an increase above the minimal clinically important difference for IKDC scores postoperatively (MD range 5.60-23.00).

Conclusions: Combined MAT and ACLR have good 2- to 14-year clinical outcomes postoperatively and is an optimal procedure for patients with concurrent ACL injuries with irreparable meniscus injuries.

Level of Evidence: IV, systematic review and/or meta-analysis of studies with Levels I to IV.

BACK

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA), Volume 31, Issue 6

High-level soccer players have a low rate of return to performance after hip arthroscopy for femoroacetabular impingement syndrome

S.S. Anari, A. Olsson

DOI: https://doi.org/10.1007/s00167-023-07336-9

Purpose: Femoroacetabular impingement syndrome (FAIS) is a known cause of impaired sports performance in athletes and the relationship between FAIS and soccer players has previously been described. Hip arthroscopy is a viable treatment option that can facilitate athletes' return to sport (RTS). The aim of this study was to evaluate the RTS and return to performance (RTP) with objective measurements in high-level soccer players after hip arthroscopy for FAIS.

Methods: Soccer players, with a hip sports activity scale (HSAS) level of 7 or 8 before symptom onset and undergoing hip arthroscopy for FAIS between 2011 and 2019 were identified in the Gothenburg hip arthroscopic registry. A total of 83 high-level soccer players, with a mean age of 23.9 (SD 4.4) years at surgery, were included. To verify the activity level and further stratify players as elite or sub-elite, player statistics were collected from soccer-specific scout webpages and the Swedish national soccer association. The return to sport was defined as return to one game of soccer. Return to performance was defined as playing at the same level, or higher, and participating in at least 80% of the number of games played the season before symptom onset or the season before surgery either the first or second season after hip arthroscopy.

Results: In total, 71 (85.5%, 95% confidence interval (CI) 76.1–92.3%) of the players returned to sport the first or second season after surgery. Compared to the season before symptom onset, 31 (37.3%, 95% CI 27.0–48.7%) players returned to performance the first or second season after surgery, and 32 (38.6%, 95% CI 28.1–49.9%) players returned to performance the first or second season after surgery compared to the season before surgery.

Conclusion: A high rate of elite and sub-elite soccer players return to soccer after hip arthroscopy for FAIS. However, less than half of the players RTP when evaluating performance through level of play and number of games played.

Level of evidence: Level IV

BACK

Limited clinical utility of a machine learning revision prediction model based on a national hip arthroscopy registry

R.K. Martin, S. Wastvedt

DOI: https://doi.org/10.1007/s00167-022-07054-8

Purpose: Accurate prediction of outcome following hip arthroscopy is challenging and machine learning has the potential to improve our predictive capability. The purpose of this study was to determine if machine learning analysis of the Danish Hip Arthroscopy Registry (DHAR) can develop a clinically meaningful calculator for predicting the probability of a patient undergoing subsequent revision surgery following primary hip arthroscopy.

Methods: Machine learning analysis was performed on the DHAR. The primary outcome for the models was probability of revision hip arthroscopy within 1, 2, and/or 5 years after primary hip arthroscopy. Data were split randomly into training (75%) and test (25%) sets. Four models intended for these types of data were tested: Cox elastic net, random survival forest, gradient boosted regression (GBM), and super learner. These four models represent a range of approaches to statistical details like variable selection and model complexity. Model performance was assessed by calculating calibration and area under the curve (AUC). Analysis was performed using only variables available in the pre-operative clinical setting and then repeated to compare model performance using all variables available in the registry.

Results: In total, 5581 patients were included for analysis. Average follow-up time or time-to-revision was 4.25 years (± 2.51) years and overall revision rate was 11%. All four models were generally well calibrated and demonstrated concordance in the moderate range when restricted to only pre-operative variables (0.62–0.67), and when considering all variables available in the registry (0.63–0.66). The 95% confidence intervals for model concordance were wide for both analyses, ranging from a low of 0.53 to a high of 0.75, indicating uncertainty about the true accuracy of the models.

Conclusion: The association between pre-surgical factors and outcome following hip arthroscopy is complex. Machine learning analysis of the DHAR produced a model capable of predicting revision surgery risk following primary hip arthroscopy that demonstrated moderate accuracy but likely limited clinical usefulness. Prediction accuracy would benefit from enhanced data quality within the registry and this preliminary study holds promise for future model generation as the DHAR matures. Ongoing collection of high-quality data by the DHAR should enable improved patient-specific outcome prediction that is generalisable across the population.

Level of evidence: Level III

BACK

Periacetabular osteotomy after failed hip arthroscopy demonstrates improved outcomes in a heterogenous patient population: a systematic review

A.J. Curley, I.D. Engler

DOI: https://doi.org/10.1007/s00167-022-07108-x

Purpose: To evaluate the literature on patients undergoing periacetabular osteotomy after failed hip arthroscopy (PAO-FHA) for (1) patient demographics and hip morphology, (2) changes in preoperative to postoperative patient-reported outcomes (PROs), and (3) PROs in comparison to primary periacetabular osteotomy (PAO) patients.

Methods: A systematic literature search of Pubmed, CINAHL/Medline, and cochrane databases was performed in accordance with PRISMA guidelines. The search phrase was "(periacetabular osteotomy or PAO or rotational osteotomy) and (hip arthroscopy or arthroscopic)". The titles, abstracts, and full texts were screened for studies on PAO-FHA. Study quality was assessed, and relevant data were collected. A meta-analysis was not performed due to study heterogeneity.

Results: The search identified 7 studies, including 151 hips (148 patients, 93.9% female) undergoing PAO-FHA, out of an initial 593 studies, with three Level IV and four Level III studies. Mean time from hip arthroscopy to PAO ranged from 17.0 to 29.6 months. Heterogenous hip morphologies and radiologic findings prior to PAO were observed, though patients most frequently demonstrated moderate-to-severe dysplasia (mean or median lateral center edge angle < 20°) and minimal osteoarthritis (Tönnis grade 0 or 1). In all 5 studies that reported concomitant procedures with PAO, femoral and/or acetabular osteoplasty was performed via arthroscopy or arthrotomy. Following PAO-FHA, radiographic acetabular coverage and PROs improved in all 6 studies that reported postoperative outcomes. All four comparative studies of primary PAO vs. PAO-FHA included patients with mean or median LCEAs < 20°, reporting mixed outcomes for the optimal treatment approach.

Conclusion: PAO-FHA is reported in a heterogenous patient population that frequently includes hips with moderate-to-severe dysplasia and minimal osteoarthritis. Regardless of hip morphology or concomitant procedures, all studies that reported postoperative outcomes demonstrated improved PROs following PAO-FHA.

Level of evidence: Level IV

BACK

High survivorship and excellent 5-year outcomes in patients older than 40 years undergoing arthroscopy for femoroacetabular impingement

K. Mullins, D. Filan

DOI: https://doi.org/10.1007/s00167-023-07369-0

Purpose: To assess 5-year clinical outcome, in adults > 40 years of age, following hip arthroscopy for femoroacetabular impingement compared to a younger, matched, control group.

Methods: All primary arthroscopies for FAI between 2009 and 2016 were considered (n = 1762). Hips presenting with Tönnis > 1, lateral centre edge angle < 25°, or prior hip surgery were excluded. Younger (< 40 years) and older hips (> 40 years) were matched for gender, Tönnis grade, capsular repair and radiological parameters. Survival (avoidance of total hip replacement {THR}) was compared between the groups. Patient reported outcome measures (PROMs) were also completed at baseline and 5 years to assess changes in functional capacity. Additionally, hip range of motion (ROM) was assessed at baseline and review. The minimal clinically important difference (MCID) was determined and compared between groups.

Results: Ninety-seven older hips were matched to 97 younger controls (78% male in both groups). The average age of the older group at the time of surgery was 48.0 ± 5.7 years, compared to 26.7 ± 6.0. Six (6.2%) of the older hips and 1 (1%) of younger hips converted to THR (p = 0.043, effect size = 0.74, large). There were statistically significant improvements in all PROMs. At follow-up, there were no differences in PROMs between groups; significant improvements in hip ROM were also observed with no difference in ROM between groups at either time point. Similar achievement of MCIDs was observed in both groups.

Conclusion: Ninety-seven older hips were matched to 97 younger controls (78% male in both groups). The average age of the older group at the time of surgery was 48.0 ± 5.7 years, compared to 26.7 ± 6.0. Six (6.2%) of the older hips and 1 (1%) of younger hips converted to THR (p = 0.043, effect size = 0.74, large). There were statistically significant improvements in all PROMs. At follow-up, there were no differences in PROMs between groups; significant improvements in hip ROM were also observed with no difference in ROM between groups at either time point. Similar achievement of MCIDs was observed in both groups.

Level of evidence: Level IV

BACK

The lasso-loop technique is equivalent to the simple suture technique in arthroscopic anterior talofibular ligament repair

H. Guo, B. Chen

DOI: https://doi.org/10.1007/s00167-022-07283-x

Purpose: To compare the clinical outcomes of the lasso-loop and simple suture techniques in arthroscopic anterior talofibular ligament (ATFL) repair for the treatment of chronic lateral ankle instability (CLAI).

Methods: From 2018 to 2020, patients with CLAI who underwent arthroscopic ATFL repair using the lasso-loop or simple suture technique were matched 1:1 (arthroscopic lasso-loop [AL] group, *n* = 29; simple arthroscopic suture [AS] group, *n* = 29) based on age, sex, affected side, body mass index, and follow-up duration using propensity score matching and retrospectively evaluated. Karlsson score, visual analogue scale (VAS) score, Tegner score, anterior drawer test (ADT) results, complications, patient-reported satisfaction, and magnetic resonance (MR) re-evaluation findings of ATFL quality were used to describe the outcomes.

Results: The patient characteristics or follow-up durations did not significantly differ between the two groups. The Karlsson score, VAS score, and Tegner score improved significantly in both groups after a mean follow-up duration of 29.6 ± 2.8 months. The postoperative clinical scores, ADT results, satisfaction rates, complication rates and MR re-evaluation findings were not significantly different between the two groups at the latest follow-up.

Conclusion: The lasso-loop technique was equivalent to the simple suture technique in arthroscopic ATFL repair for the treatment of CLAI after a minimum follow-up of 2 years, suggesting that the simple suture technique is sufficient for arthroscopic ATFL repair in most patients without the need to add a lasso loop.

Level of evidence: Level III

BACK

Anterior talofibular ligament remnant quality is important for achieving a stable ankle after arthroscopic lateral ankle ligament repair

K. Yoshimoto, M. Noguchi

DOI: https://doi.org/10.1007/s00167-022-07211-z

Purpose: The relationship between ligament remnant quality and postoperative outcomes after arthroscopic lateral ankle ligament repair for chronic lateral ankle instability is controversial. This study aimed to determine whether the signal intensity of the anterior talofibular ligament on preoperative magnetic resonance imaging and ligament remnant quality identified on arthroscopy are associated with recurrent ankle instability after arthroscopic lateral ankle ligament repair.

Methods: A total of 68 ankles from 67 patients with chronic lateral ankle instability who underwent arthroscopic lateral ankle ligament repair were retrospectively studied. The signal intensity of the anterior talofibular ligament was evaluated using T2-weighted magnetic resonance imaging. Arthroscopy was used to evaluate the thickness and mechanical resistance of the anterior talofibular ligament by hook palpation and to classify ankles into two groups: the present anterior talofibular ligament group with adequate mechanical resistance and the absent anterior talofibular ligament group with no mechanical resistance. The outcomes included recurrent ankle instability (respraining of the operated ankle after surgery) and Self-Administered Foot Evaluation Questionnaire scores.

Results: Thirteen ankles were diagnosed with recurrent ankle instability. Patients with a high anterior talofibular ligament T2 signal intensity experienced more recurrent ankle instability than those with a low intensity. As determined via arthroscopy, the absent anterior talofibular ligament group had a higher rate of recurrent ankle instability than the present anterior talofibular ligament group. There were no significant differences in Self-Administered Foot Evaluation Questionnaire scores between patients with high and low anterior talofibular ligament T2 signal intensity, as well as between absent and present anterior talofibular ligament groups based on arthroscopy.

Conclusion: Poor quality of the anterior talofibular ligament remnant could result in recurrent ankle instability after arthroscopic lateral ankle ligament repair. Therefore, when treating chronic lateral ankle instability, surgeons should consider ligament quality.

Level of evidence: Level IV

BACK

Arthroscopic Broström–Gould repair has comparable radiological and clinical outcomes compared to traditional open Broström–Gould repair in high-demand patients

J.H. Baek, J.H. Kim

DOI: https://doi.org/10.1007/s00167-022-07289-5

Purpose: This study sought to confirm whether traditional open Broström–Gould repair and arthroscopic Broström–Gould repair for chronic ankle instability (CAI) would produce comparable radiological and clinical outcomes in high-demand patients.

Methods: This retrospective case–cohort study included high-demand patients, as determined by a pre-injury Tegner Activity Level ≥ 6, who underwent Broström–Gould repair and were followed up for ≥ 2 years. Patients were divided into the arthroscopic Broström–Gould repair group (AS Group) and the open Broström–Gould repair group (Open Group). Perioperative radiological assessments were performed. The Tegner Activity Levels, Foot and Ankle Outcome Scores (FAOSs), Karlsson and Peterson (K–P) scores, and American Orthopaedic Foot and Ankle Society ankle–hindfoot (AOFAS) scores were evaluated clinically.

Results: A total of 65 patients (31 from the AS Group and 34 from the Open Group) were included in the study. There were no differences in age, sex, body mass index, preoperative anterior talar translation, talar tilt, signal-to-noise ratio, FAOS, K–P score, or AOFAS score between the two groups (n.s.). The preinjury median Tegner Activity Level was 7 and unchanged at the final follow-up in both groups. Postoperative stress radiographs showed improvement; however, the groups did not differ significantly. The FAOS, K–P scores, and AOFAS scores improved in each group ($P < 0.001$). However, the clinical scores did not differ between the groups (all n.s.).

Conclusion: Traditional open and arthroscopic Broström–Gould repair for CAI in high-demand patients had comparable radiological and clinical outcomes. Clinically, arthroscopic Broström–Gould repair may represent a viable surgical alternative to open Broström–Gould repair in high-demand patients.

Level of evidence: Level III

BACK

Repair of a meniscus tear within 3 weeks after trauma significantly reduces the likelihood of a recurrent tear compared with later repairs

D.B. Wouters

DOI: https://doi.org/10.1007/s00167-023-07381-4

Purpose: To evaluate the potential benefit of meniscus tear repair within 3 weeks after rupture compared with more than 3 weeks after rupture.

Methods: Ninety-one patients (95 menisci) underwent repair within 3 weeks after meniscus rupture [Group 1] and 15 patients (17 menisci) [Group 2] underwent repair more than 3 weeks after rupture. The posterior part of the ruptured meniscus was repaired with Contour Arrows®, using a Crossbow as the insertion instrument, whereas the middle third was repaired by inserting PDS 2.0 stitches using a Meniscus Mender® outside-in device. The patients were followed-up for a mean(SD) 8.9 years (range: 1–12 years).

Results: Of the 91 patients (95 menisci) in Group 1, 88 (96.7%) healed without complications. One meniscus in one patient did not heal after 11 months, requiring resection**.** Two other menisci in two other patients showed partially healed tears. This part was removed while preserving most of the meniscus (failure rate: 3/91 patients: 3.3%). The other 88 patients recovered without complaints and participated in sports without restraint. Four menisci in four patients experienced a second sports-related incident, resulting in a renewed tear between 12 months and 3 years. These tears were repaired successfully again. Of the 15 patients in Group 2, 12 (80.0%) healed without complications. The ruptured part of the remaining menisci in the other three patients, (20%) was removed, with all patients remaining symptom-free until the end of follow-up. Rates of treatment failure differed significantly in these two groups (3.3% vs 20.0%, $p = 0.04$).

Conclusion: The overall failure rate was significantly lower in patients who underwent meniscus repair within 3 weeks than in those who underwent repair at 3 weeks (or more) after the trauma. Thus, early repair of meniscus tears is beneficial, and can prevent failure of meniscus repair surgery.

Level of evidence: Level III

BACK