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Upper extremity

Arthroscopy, Volume 38, Issue 3, P 673-681

A Glenoid Defect of 13.5% or Larger Is Not Always Critical in Male Competitive Rugby and American Football Players Undergoing Arthroscopic Bony Bankart Repair: Contribution of Resultant Large Bone Fragment

S. Nakagawa, T. Hirose et al.

DOI: https://doi.org/10.1016/j.arthro.2021.07.033

Purpose
To investigate bone union and postoperative recurrence after arthroscopic bony Bankart repair (ABBR) in male competitive rugby and American football players with a subcritical glenoid defect of ≥13.5% and to compare findings with those in players with a glenoid defect of <13.5%.

Methods
Participants were male competitive rugby or American football players with a glenoid defect and bone fragment who underwent ABBR from July 2011 to December 2018 and were followed for a minimum of 2 years. We investigated the influence of glenoid defect and bone fragment size on bone union and postoperative recurrence after ABBR.

Results
We included 45 rugby players and 35 American football players. A total of 38 shoulders were assigned to the small defect group (<13.5%) and 42 to the large defect group (≥13.5%). The complete bone union rate was 47.4% in the small defect group and 71.4% in the large defect group (P = .040), and postoperative recurrence was seen in 13 (34.2%) and 5 shoulders (11.9%), respectively (P = .030). In the small defect group, the bone fragment size was <7.5% in 30 shoulders and ≥7.5% in 8 shoulders; in comparison, the respective numbers were 12 and 30 shoulders in the large defect group, and large fragments (>7.5%) were significantly more common in this group (P < .001). The complete union rate was significantly higher in shoulders with a large fragment (≥7.5%) than in those with a small fragment (<7.5%; 78.9% versus 42.9%, respectively; P = .001). The recurrence rate was 33.3% in shoulders with a small fragment (<7.5%) and 10.5% in shoulders with a large fragment (≥7.5%; P = .017) and was significantly lower in shoulders with a complete union than in those without a complete union (6.3% versus 46.9%, respectively; P < .001).

Conclusion
The postoperative recurrence rate after ABBR was lower in male competitive rugby and American football players with a large glenoid defect (≥13.5%) than in those with a small glenoid defect (<13.5%) and might be associated with a higher rate of complete bone union of the resultant large bone fragment (≥7.5%).

Level of evidence
III, case-control study.

Arthroscopy, Volume 38, Issue 3, P 684-691

High Rate of Return to Work by 3 Months Following Latarjet for Anterior Shoulder Instability

A. Agarwalla, A.K. Gowd, et al.

DOI: https://doi.org/10.1016/j.arthro.2021.06.027

Purpose
To evaluate the rate and duration of return to work in patients undergoing Latarjet for failed soft-tissue stabilization or glenoid bone loss.

Methods
Consecutive patients undergoing Latarjet from 2005 to 2015 at our institution were retrospectively reviewed at a minimum of 2 years postoperatively. Patients completed a standardized and validated work questionnaire, Western Ontario Shoulder Instability Index Survey, and a satisfaction survey.

Results
Of 89 eligible patients who had Latarjet, 67 patients (75.3%) responded to the questionnaire, of whom 51 patients (76.1%) were employed within 3 years before surgery (mean age: 29.9 ± 11.8 years; mean follow-up: 54.6 ± 11.9 months) and had an average glenoid bone loss of 14.5 ± 6.1%. Fifty patients (98.0%) returned to work by 2.7 ± 3.0 months postoperatively; 45 patients (88.2%) patients returned to the same level of occupational intensity. Those who held sedentary, light, moderate, or heavy intensity occupations returned to their previous occupation at a rate of 100.0%, 93.3%, 90.0%, and 66.7% (P = .2) at a duration of 1.2 ± 1.6 months, 1.8 ± 1.9 months, 3.1 ± 3.5 months, and 6.5 ± 4.1 months (P = .001), respectively. The average postoperative Western Ontario Shoulder Instability Index score was 70.9 ± 34.2. Fifty patients (98.0%) noted at least “a little improvement” in their quality of life following surgery, with 35 patients (68.6%) noting great improvement. Furthermore, 49 patients (96.1%) reported being satisfied with their procedure, with 25 patients (49.0%) reporting being very satisfied. Four patients (7.8%) returned to the operating room, with 1 patient (2.0%) requiring arthroscopic shoulder stabilization.

Conclusions
Approximately 98% of patients who underwent Latarjet returned to work by 2.7 ± 3.0 months postoperatively. Patients with greater-intensity occupations had a longer duration of absence before returning to their preoperative level of occupational intensity. Information regarding return to work is imperative in preoperative patient consultation to manage expectations.

Level of Evidence
IV, case series.

Arthroscopy, Volume 38, Issue 3, P 692-698

Interposition Graft Bridging Reconstruction of Irreparable Rotator Cuff Tears Using Acellular Dermal Matrix: Medium-Term Results

M.A.Awad, S. Sparavalo, et al.

DOI: https://doi.org/10.1016/j.arthro.2021.08.001

Purpose
In this study, we aimed to evaluate the medium-term clinical outcomes for patients who underwent bridging reconstruction.

Methods
A retrospective chart review was conducted for all patients who underwent bridging reconstruction between 2010 and 2018. Patients who were missing either pre- or postoperative outcome scores were excluded. All included patients completed self-reported questionnaires (Western Ontario Rotator Cuff [WORC] and Disabilities of the Arm, Shoulder and Hand [DASH]) pre- and postoperatively at 6 months, 1 year, and annually thereafter. All scores were reported out of 100.

Results
Ninety-one patients initially met our inclusion criteria, and 33 were excluded owing to lack of either pre- or postoperative outcome scores. Nine patients were lost to follow-up; therefore, 49 patients were finally evaluated, including 30 males (61.2%) and 19 females (38.8%) with an age of 59.6 ± 10.4 years (mean ± standard deviation) and mean follow-up of 5.3 years (range 2 to 9). Both WORC and DASH scores significantly improved from pre- to postoperatively (WORC: 69.6 ± 12.2 to 27.9 ± 23.7, $P < .001$; DASH: 51.5 ± 17.5 to 24.5 ± 23.0, $P = .001$). For WORC and DASH, 92% and 74% of patients, respectively, met the minimal clinical importance difference.

Conclusion
Our results showed that patients' clinical outcome scores significantly improved with an average of 5-year follow-up, which demonstrates that bridging reconstruction is a safe procedure with promising midterm clinical outcomes.

Level of Evidence
IV, retrospective case series

Arthroscopy, Volume 38, Issue 3, P 729-734

Reliable Clinical and Sonographic Outcomes of Subpectoral Biceps Tenodesis Using an All-Suture Anchor Onlay Technique

H. Degenhardt, J. Pogorzelski, et al.

DOI: https://doi.org/10.1016/j.arthro.2021.08.033

Purpose
To evaluate the clinical outcomes and structural integrity of primary subpectoral biceps tenodesis using an all-suture anchor onlay technique for long head of the biceps (LHB) tendon pathology.

Methods
We conducted a retrospective case series with prospectively collected data of patients who underwent primary, isolated subpectoral biceps tenodesis with a single all-suture anchor onlay fixation between March 2017 and March 2019. Outcomes were recorded at a minimum follow-up of 12 months based on assessments of the American Shoulder and Elbow Surgeons (ASES) score, LHB score, and elbow flexion strength and supination strength measurements. The integrity of the tenodesis construct was evaluated using ultrasound.

Results
Thirty-four patients were available for clinical and ultrasound examination at a mean follow-up of 18 ± 5 months. The mean ASES score significantly improved from 51.0 ± 14.2 points preoperatively to 89.8 ± 10.5 points postoperatively ($P < .001$). The minimal clinically important difference for the ASES score was 8.7 points, which was exceeded by 31 patients (91.2%). The mean postoperative LHB score was 92.2 ± 8.3 points. Regarding subcategories, an average of 47.2 ± 6.3 points was reached for “pain/cramps”; 26.4 ± 6.1 points, “cosmesis”; and 18.6 ± 2.6 points, “elbow flexion strength.” Both elbow flexion strength and supination strength were similar compared with the nonoperated side ($P = .169$ and $P = .210$, respectively). In 32 patients, ultrasound examination showed an intact tenodesis construct, whereas 2 patients (5.9%) sustained failure of the all-suture anchor fixation requiring revision.

Conclusions
Primary subpectoral biceps tenodesis using an all-suture anchor onlay technique for pathology of the LHB tendon provides reliable clinical results and a relatively low failure rate (5.9%).

Level of Evidence
Level IV, case series.

Arthroscopy, Volume 38, Issue 3, P 737-742

Analysis of Risk Factors, Complications, Reoperations, and Demographics Associated With Open and Arthroscopic Rotator Cuff Repair: An Analysis of a Large National Database

P. Danilkowicz, J.M. Levin

DOI: https://doi.org/10.1016/j.arthro.2021.09.001

Purpose
To assess the national trends in arthroscopic and open rotator cuff repair surgery and the associated demographics, complications, and risk factors specific to each procedure.

Methods
A retrospective cohort study was performed using the National Surgical Quality Improvement Program (NSQIP) dataset between the years 2007 and 2018. Patients were identified using Common Procedural Terminology codes for open and arthroscopic rotator cuff repair. Variables collected including basic demographics, procedural, and outcome specific variables as available through the NSQIP repository. Appropriate statistical measures were used to compare the groups, with the $\chi 2$ test used for categorical variables and t test for continuous variables.

Results
The arthroscopic cohort comprised 39,013 patients; the open group consisted of 8,664. Reported arthroscopic and open cases increased significantly between 2007 and 2018 from 135 to 7,269 and 65 to 1,168, respectively. Average operative time for arthroscopic procedure was 89 minutes and 76 minutes for open. The open group consisted of a slightly greater percentage of smokers, 18.3% versus 15.2%, and patients with diabetes, 18.2% versus 15.9%, both of which were statistically significant ($P < .001$). Open cases had an odds ratio of 3.05 for superficial infections and 7.40 for deep infections, both of which were statistically significant ($P < .001$). The open cohort also had an odds ratio of 1.71 for unplanned readmissions when compared with the arthroscopic cohort, which was also statistically significant ($P < .001$).

Conclusions
According to the NSQIP database, the increase in arthroscopic procedures is significantly outpacing the increase in open procedures during this study period, which matches the trends seen in previous studies. Patients with diabetes and who smoke also represent a greater risk group for postoperative complications when undergoing open surgery. These findings suggest that perhaps the decision to pursue one technique over the other may be influenced both by provider preference and patient-related factors.

Level of Evidence
III, retrospective comparative trial.

Arthroscopy, Volume 38, Issue 3, P 743-749

Double-Pulley Remplissage in Active-Duty Military Population With Off-Track Anterior Shoulder Instability Results in Improved Outcomes and Low Recurrence at Minimum 4-Year Follow-Up

J.P. Scanaliato, J.C. Dunn et al.

DOI: https://doi.org/10.1016/j.arthro.2021.09.003

Purpose
To report mid-term outcomes of active-duty patients with anterior shoulder instability following our technique for double-pulley remplissage (DPR) with concomitant anterior labral repair.

Methods
All consecutive patients from 1/2010 through 12/2016 that underwent DPR by the senior surgeon with complete outcome scores were identified. All patients had experienced a shoulder dislocation following a traumatic event, and had subsequent instability recalcitrant to conservative management. Patients were excluded if they were lost to follow-up (3) of if they underwent stabilization procedures other than DPR (148). Outcome measures were completed by patients within 1 week prior to surgery and at latest follow-up. Twenty-four patients met the inclusion criteria for the study, and all were active-duty military at the time of surgery.

Results
20/24 (83.3%) patients met the patient acceptable symptomatic state (PASS), while 21/24 (87.5%) achieved substantial clinical benefit (SCB) and 22/24 (91.7%) exceeded the minimal clinically important difference (MCID) for their operative shoulder, as determined by the American Shoulder and Elbow Surgeons (ASES) Score. 21/24 (87.5%) patients met the PASS, while 19/24 (79.2%) achieved SCB and 20/24 (83.3%) exceeded the MCID for their operative shoulder, as determined by the single assessment numeric evaluation (SANE). In addition, 23/24 (95.8%) patients exceeded the MCID for their operative shoulder, as determined by the Rowe Instability score. Preoperative and postoperative range of motion did not vary significantly. All patients had decreased pain postoperatively ($P < .0001$); 22/24 (91.67%) of patients remained on active-duty status. Failure rate, defined as recurrent subluxation or dislocation, was 4.2%.

Conclusions
Mid-term outcomes in this population of active-duty patients undergoing DPR for shoulder instability without glenoid bone loss demonstrate a statistically and clinically significant improvement in patient-reported outcomes, a significant decrease of pain and an overall return to active-duty rate of 91.67%.

Level of Evidence
IV, therapeutic case series.

Arthroscopy, Volume 38, Issue 3, P 761-772

Arthroscopic Treatment of Scaphoid Nonunion With Olecranon Bone Graft and Screw Fixation Leads to Union and Improved Outcomes

T. Waitayawinyu, W. Lertcheewanan, et al.

DOI: https://doi.org/10.1016/j.arthro.2021.09.018

Purpose

To evaluate the outcomes of arthroscopic treatment of scaphoid nonunion using olecranon bone graft and screw fixation and to analyze the outcomes in accordance with variations in the chronicity, location, and severity of nonunion.

Methods

Between March 2012 and December 2020, patients with diagnoses of scaphoid delayed nonunion and nonunion with substantial bone resorption (Slade and Dodds grade IV-VI) underwent arthroscopic-assisted olecranon bone graft and screw fixation. Preoperative and postoperative measurements included the visual analog scale score for pain; range of motion; grip strength; the Modified Mayo Wrist Score; the Disabilities of the Arm, Shoulder and Hand (DASH) score; and the minimal clinically important difference for the DASH score. Union rate and duration were also evaluated. The outcomes between groups of patients with different conditions were analyzed.

Results

Twenty-two patients were included. The average follow-up period was 32.5 months. The visual analog scale pain score, range of motion, grip strength, Modified Mayo Wrist Score, and DASH score were significantly improved after surgery ($P < .001$). The minimal clinically important difference threshold for the DASH score was reached by 100% of patients. At final follow-up, all patients had united scaphoid with no complications. The average time to union was 15.3 weeks. Group analysis showed significant improvements in mean grip strength between patients with delayed union (3-6 months) and those with chronic nonunion (> 1 year) (17.75 kg vs 12.25 kg, $P = .032$), between grade IV nonunion and grade V nonunion (14.86 kg vs 10.43 kg, $P = .035$), and between grade V nonunion and grade VI nonunion (10.43 kg vs 15.63 kg, $P = .013$). Patients with grade VI nonunion achieved union at 17.8 weeks postoperatively, a significantly longer period than that for patients with grade IV nonunion (11.4 weeks, $P = .014$).

Conclusions

Arthroscopic treatment of scaphoid nonunion using olecranon bone graft and screw fixation provided satisfactory outcomes regardless of the chronicity, location, and severity of nonunion.

Level of Evidence

Level IV, therapeutic case series.

Arthroscopy, Volume 38, Issue 3, P 967-979

Better Short-Term Outcomes After Rotator Cuff Repair in Studies With Poorer Mean Shoulder Scores and Predominantly Small to Medium-Sized Tears at Baseline: A Systematic Review and Meta-analysis

R. Holtedahl, B. Bøe, et al.

DOI: https://doi.org/10.1016/j.arthro.2021.08.019

Purpose
To perform a meta-analysis to explore factors associated with clinical and structural short-term outcomes in randomized and nonrandomized prospective studies of rotator cuff repair.

Methods
Medline, clinicaltrials.gov, and Mendeley were searched for literature published from January 2000 to December 2020 to identify randomized controlled trials (RCT) and nonrandomized prospective cohort studies (PCS) describing the outcome of surgical repair of full-thickness rotator cuff tears. Study quality was assessed by two independent reviewers. We calculated standardized mean difference (SMD) from baseline to follow-up in each trial arm, preferably at 12 months follow-up. Between-study heterogeneity of outcomes, small-study effects and rates of retear were assessed. Meta-regression was performed to estimate associations between prespecified variables and clinical and structural outcomes.

Results
Outcomes in 64 RCT and 19 PCS trial arms were analyzed. Median age was 59 years. There was substantial between-study heterogeneity in clinical outcomes (SMD range: .42 to 6.44; $I2$ = 93% in RCT, 88% in PCS) and summary estimates were not calculated. On the basis of multivariate analysis, better clinical outcome was associated with lower (worse) mean outcome value at baseline, smaller tear size, and lower proportion of large-massive tears ($R2$ = 56 and 44%, respectively). Overall retear rate at median 13-month follow-up was 19.9% (interquartile range: 10-30). Higher mean age together with larger tear size and higher proportion of large-massive tears were associated with increased retear rates ($R2$ = 33% and 58%, respectively). Clinical outcome was not significantly related to rate of retear.

Conclusions
Studies with lower mean outcome values at baseline and predominantly small- to medium-sized tears reported better clinical outcomes. Studies with higher mean age and a predominance of large-massive tears had significantly increased retear rates, but retear rates were not associated with clinical outcome.

Level of Evidence
Level II, meta-analysis of level I and II studies

Arthroscopy, Volume 38, Issue 3, P 989-1000

Shoulder Surgery as an Effective Treatment for Shoulder-Related Sleep Disturbance: A Systematic Review

A.F. Barandiaran, D.A. Houck et al.

DOI: https://doi.org/10.1016/j.arthro.2021.06.027

Purpose

The purpose of this systematic review is to evaluate the current literature in an effort to investigate sleep quality and disturbances and the association with clinical outcomes of patients undergoing shoulder surgery.

Methods

A systematic review of the PubMed, Embase, and Cochrane Library databases was performed according to PRISMA guidelines. All English-language literature reporting clinical outcomes and sleep quality and disturbance after shoulder surgery was reviewed by 2 independent reviewers. Outcomes assessed included patient-reported outcomes (PROs) and sleep quality. Specific PROs included the Pittsburgh Sleep Quality Index (PSQI), Visual Analog Scale (VAS) for pain, Simple Shoulder Test (SST), University of California Los Angeles (UCLA) Shoulder Rating Scale, and American Shoulder and Elbow Surgeons Score (ASES). Study methodology was assessed using the Modified Coleman Methodology Score. Descriptive statistics are presented.

Results

Sixteen studies (11 level IV, 2 level III, 3 level II) with a total of 2748 shoulders were included (age, 12-91 years; follow-up, 0.25-132 months). In total, 2198 shoulders underwent arthroscopic rotator cuff repair (RCR), 131 shoulders underwent arthroscopic capsular release, 372 shoulders underwent total shoulder arthroplasty (TSA), 18 shoulders underwent comprehensive arthroscopic management, and 29 shoulders underwent sternoclavicular joint procedures. All shoulder surgeries improved self-reported sleep and PROs from before to after surgery. In RCR patients, PSQI scores were significantly associated with VAS scores, SST scores ($r = 0.453$, $r = -0.490$, $P < .05$, respectively), but not significantly associated with UCLA Shoulder rating scale or the ASES scores ($r = 0.04$, $r = 0.001$, $P > .05$, respectively). In TSA patients, PSQI scores were significantly associated with ASES scores ($r = -0.08$, $P < .05$). All 4 RCR studies and 1 TSA study using PSQI found significant improvements in mean PSQI scores within 6 to 24 months ($P < .05$).

Conclusions

Surgical intervention for rotator cuff tear and glenohumeral osteoarthritis significantly improves self-reported sleep in patients with shoulder pain. However, there remains a dearth of available studies assessing the effects of surgical intervention for adhesive capsulitis, sternoclavicular joint instability, and sternoclavicular osteoarthritis on sleep. Future studies should use sleep-specific PROs and quantitative measures of sleep to further elucidate the relationship between sleep and the effect of shoulder surgery.

Level of Evidence

Level IV, systematic review of Level II-IV studies

Journal of Shoulder and elbow surgery, March 2022, volume 31, issue 3, pages 616 -622.

Results of arthroscopic rotator cuff repair for calcific tendonitis: a comparative analysis.
Ernat, J.J., Rakowski, D.R., Casp, A.J., et al.

DOI: https://doi.org/10.1016/j.jse.2021.08.007

Background
Outcomes following arthroscopic excision of calcific tendonitis and arthroscopic rotator cuff repair (CT-ARCR) are relatively limited without comparison analysis to standard arthroscopic rotator cuff repair (ARCR). The purpose of this study was to evaluate patient-reported outcomes (PROs) after CT-ARCR compared against a matched cohort who received standard ARCR.

Methods
An institutional review board–approved retrospective review was performed for patients aged 18-80 years receiving CT-ARCR by a single surgeon from 2006-2018. These were matched 1:3 with patients receiving ARCR. Patients with concurrent labral repair, subscapularis repair, or glenohumeral joint arthritis procedures; refusal to participate; deceased; inadequate contact information; or those with inadequate records were excluded. PROs included Short Form–12 Physical Component Summary (SF-12 PCS) score; American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (ASES); Single Assessment Numeric Evaluation (SANE); Quick Disabilities of the Arm, Shoulder, and Hand questionnaire (QuickDASH); patient satisfaction; activity level/symptoms; and sport participation scores.

Results
21 CT-ARCR patients (mean age 50 years, range 36-62) and 54 ARCR patients (mean age 52 years, range 19-77) were included. Minimum 2-year follow-up was obtained in 18 of 21 (86%) CT-ARCR (mean 5.9 years) and 45 of 54 (83%) ARCR patients (mean 5.6 years). CT-ARCR patients improved pre- to postoperation in mean SF-12 PCS (41.1 to 50.0), ASES (54.2 to 94.0), and QuickDASH (54.2 to 94.0). SANE score improvements (57.6 to 82.8) were not significant. ARCR controls improved pre- to postoperation in mean SF-12 PCS (41.4 to 49.0), ASES (59.4 to 88.0), QuickDASH (35.1 to 13.8), and SANE scores (52.6 to 80.8). Pre- to postoperative pain during recreation and sport participation similarly improved in both groups. The only postoperative difference observed between CT-ARCR and ARCR was better patient satisfaction with CT-ARCR (9.7 vs. 8.3).

Conclusion
CT-ARCR results in excellent PROs, activity symptoms, and sports participation at final follow-up. CT-ARCR results were comparable to patients who received conventional ARCR for similar-sized rotator cuff tears that did not have calcific tendonitis.

Level of evidence
Level III

Surgical treatment of anterior shoulder instability with glenoid bone loss with the Latarjet procedure in active-duty military service members.

Cruz, C.A., Sy, J., Miles, R., et al.

DOI: https://doi.org/10.1016/j.jse.2021.08.015

Introduction

The arthroscopic Bankart repair in the setting of glenoid bone loss has high rates of failure. In patients with anterior glenoid bone loss, the Latarjet provides glenohumeral stability through restoration of the glenoid bone, the conjoint tendon acting as a sling on the subscapularis, and anterior capsulolabral repair. Active-duty military personnel are at high risk for glenohumeral instability and have been equated to the contact athlete; most are young, male, and engage in contact sports. The purpose of this study is to assess the return to full-duty rates in active-duty military personnel following the Latarjet for anterior glenohumeral instability with glenoid bone loss.

Methods

A retrospective review of all glenohumeral instability procedures were reviewed at a tertiary training hospital from June 2014 to June 2019. The patient population consisted of active-duty military personnel with glenoid bone loss and anterior glenohumeral instability, who were treated with a Latarjet. The primary outcome was return to full-duty status.

Results

There were 50 patients identified for the study. Four patients were lost to follow-up, leaving 46 of 50 patients (92.0%) eligible for this study. The average age at the time of the index procedure was 23.1 years. The average percentage bone loss was 18.4%. Forty-one patients (89.1%) were able to return to full-duty status. Four patients (8.7%) sustained a recurrent dislocation following the Latarjet; all 4 dislocations occurred during a combat deployment. Four patients (8.7%) reported episodes of subluxation without dislocation. Forty-one patients (89.1%) reported that their shoulders felt stable, and we found an average return to full duty at 5.3 months

Conclusion

In our active-duty military cohort, we found an 8.7% rate of recurrent instability after a Latarjet procedure, and 41 patients (89.1%) were able to return to full-duty status. In conclusion, the Latarjet procedure in the active-duty military population with anterior glenoid bone loss resulted in a high rate of return to duty, excellent functional outcomes, low rate of recurrent instability, and a low overall complication rate.

Level of evidence

Level IV

BACK

The effects of smoking on clinical and structural outcomes after rotator cuff repair: a systematic review and meta-analysis.

Fan, N., Yuan, S., Du, P., et al.

DOI: https://doi.org/10.1016/j.jse.2021.10.026

Background

Several factors have been reported to adversely affect clinical and structural outcomes after rotator cuff repair (RCR). However, the effects of smoking on rotator cuff healing and clinical outcomes remain controversial. The purpose of this study was to compare the clinical and structural outcomes after RCR between smokers and nonsmokers. We hypothesized that there would be no significant difference in the clinical scores after RCR and that smoking would be associated with a significantly increased risk of retear and reoperation.

Methods

This systematic review was performed in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines using the PubMed, Cochrane Library, and Embase databases. We included only articles in which patients underwent arthroscopic and open RCR, the clinical outcome scores were reported for smokers and nonsmokers, and the number of rotator cuff retears and reoperations were reported. Data relevant to this study were extracted and statistically analyzed. We used the Newcastle-Ottawa Scale to assess the risk of bias in each study and calculated the I2 value to quantify the effect of heterogeneity.

Results

Fourteen eligible articles were identified, with 73,817 participants (8553 smokers and 65,264 nonsmokers). The meta-analysis demonstrated that there were no significant differences in the American Shoulder and Elbow Surgeons score ($P = .10$), Simple Shoulder Test score ($P = .19$), University of California–Los Angeles score ($P = .09$), or visual analog scale score ($P = .19$) between smokers and nonsmokers after surgery, but the Constant score was significantly lower ($P = .005$) for smokers. Smoking was significantly associated with an increased risk of retear ($P = .002$; risk ratio, 2.06 [95% confidence interval, 1.30-3.28]; $I2 = 31\%$) and reoperation ($P < .001$; risk ratio, 1.29 [95% confidence interval, 1.20-1.40]; $I2 = 36\%$) in patients after RCR.

Conclusion

Besides the Constant score, which was lower in smokers, there were no significant differences in the clinical scores after RCR between smokers and nonsmokers. However, smoking was associated with a significantly increased risk of retear and reoperation.

Level of evidence

Level III

BACK

The middle glenohumeral ligament: a classification based on arthroscopic evaluation.
Kaptan, A.Y., Özer, M., Alim, E., et al.

DOI: https://doi.org/10.1016/j.jse.2021.07.026

Background
Although middle glenohumeral ligament (MGHL) variations have been shown in the literature, their clinical effect and relationship with intra-articular pathologies have yet to be revealed, except for the Buford complex. This study was designed to classify MGHL and to reveal its relationship with clinical pathologies.

Methods
A total of 843 consecutive shoulder arthroscopies were evaluated retrospectively, and a classification system was proposed for MGHL with regard to its structure and its relation to the anterior labrum. The associations of each MGHL type with superior labrum anterior-posterior (SLAP) lesions, subscapularis tears, and anterior instability were investigated.

Results
MGHL variations were grouped into 6 types according to the classification. A significant difference in favor of type 6 MGHL (Buford complex) was observed in the distribution of SLAP lesions ($P < .001$). There was no significant difference between MGHL types and the distribution of anterior instability history ($P = .131$) and subscapularis tears ($P = .324$).

Conclusion
SLAP lesions accompany type 6 MGHLs (Buford complex) significantly more frequently than other types. There is also a negative relation between the anterior instability and thicker MGHL variants.

Level of evidence
Level IV

BACK

Treatment of rotator cuff tears: a systematic review and meta-analysis.
Lapner, P., Henry, P., Athwal, G.S., et al.

DOI: https://doi.org/10.1016/j.jse.2021.11.002

Background
There is ongoing controversy regarding optimal treatment for full-thickness rotator cuff tears. Given that the evidence surrounding the use of various treatment options has expanded, an overall assessment is required.

Objectives
The following were compared to determine which resulted in improved patient-reported function, pain, and reoperation rates for each: (1) double-row (DR) fixation and single-row (SR) fixation in arthroscopic cuff repair; (2) latissimus dorsi transfer (LDT) with lower trapezius transfer (LTT), partial rotator cuff repair, and superior capsular reconstruction (SCR); and (3) early and late surgical intervention.

Methods
Medline, Embase, and Cochrane were searched through to April 20, 2021. Additional studies were identified from reviews. The following were included: (1) All English-language randomized controlled trials (RCTs) in patients ≥18 years of age comparing SR and DR fixation, (2) observational studies comparing LDT with LTT, partial repair, and SCR, and (3) observational studies comparing early vs. late treatment of full-thickness rotator cuff tears.

Results
A total of 15 RCTs (n = 1096 randomized patients) were included in the meta-analysis of SR vs. DR fixation. No significant standardized mean differences in function (0.08, 95% confidence interval [CI] –0.09, 0.24) or pain (–0.01, 95% CI –0.52, 0.49) were observed. There was a difference in retear rates in favor of DR compared with SR fixation (RR 1.56, 95% CI 1.06, 2.29). Four studies were included in the systematic review of LDT compared with a surgical control. LDT and partial repair did not reveal any differences in function (–1.12, 95% CI –4.02, 1.78) on comparison. A single study compared arthroscopically assisted LDT to LTT and observed a nonstatistical difference in the Constant score of 14.7 (95% CI –4.06, 33.46). A single RCT compared LDT with SCR and revealed a trend toward superiority for the Constant score with SCR with a mean difference of –9.6 (95% CI –19.82, 0.62). Comparison of early vs. late treatment revealed a paucity of comparative studies with varying definitions of “early” and “late” treatment, which made meaningful interpretation of the results difficult.

Conclusion
DR fixation leads to similar improvement in function and pain compared with SR fixation and results in a higher healing rate. LDT transfer yields results similar to those from partial repair, LTT, and SCR in functional outcomes. Further study is required to determine the optimal timing of treatment and to increase confidence in these findings. Future trials of high methodologic quality comparing LDT with LTT and SCR are required.

Level of evidence
Level III

BACK

Journal of Bone and Joint Surgery (JBJS), Volume 104, Issue 5

Prospective Randomized Trial of Continuous Passive Motion Versus Physical Therapy After Arthroscopic Release of Elbow Contracture

O. W. Shawn, J.R. Lievano, et al.

DOI: 10.2106/JBJS.21.00685

Background
Continuous passive motion (CPM) has been used for decades, but we are not aware of any randomized controlled trials (RCTs) in which CPM has been compared with physical therapy (PT) for rehabilitation following release of elbow contracture.

Methods
In this single-blinded, single-center RCT, we randomly assigned patients undergoing arthroscopic release of elbow contracture to a rehabilitation protocol involving either CPM or PT. The primary outcomes were the rate of recovery and the arc of elbow motion (range of motion) at 1 year. The rate of recovery was evaluated by measuring range of motion at 6 weeks and 3 months. The secondary outcomes included other range-of-motion-related outcomes, patient-reported outcome measures (PROMs), flexion strength and endurance, grip strength, and forearm circumference at multiple time points.

Results
A total of 24 patients were assigned to receive CPM, and 27 were assigned to receive PT. At 1 year, CPM was superior to PT with regard to the range of motion, with an estimated treatment difference of 9° (95% confidence interval [CI], 3° to 16°; p = 0.007). Similarly, the use of CPM led to a greater range of motion at 6 weeks and 3 months than PT. The percentage of lost motion recovered at 1 year was higher in the CPM group (51%) than in the PT group (36%) (p = 0.01). The probability of restoring a functional range of motion at 1 year was 62% higher in the CPM group than in the PT group (risk ratio for functional range of motion, 1.62; 95% CI, 1.01 to 2.61; p = 0.04). PROM scores were similar in the 2 groups at all time points, except for a difference in the American Shoulder and Elbow Surgeons (ASES) elbow function subscale, in favor of CPM, at 6 weeks. The use of CPM decreased swelling and reduced the loss of flexion strength, flexion endurance, and grip strength on day 3, with no between-group differences thereafter.

Conclusions
Among patients undergoing arthroscopic release of elbow contracture, those who received CPM obtained a faster recovery and a greater range of motion at 1 year, with a higher chance of restoration of functional elbow motion than those who underwent routine PT.

Level of Evidence
Therapeutic Level I. See Instructions for Authors for a complete description of levels of evidence.

BACK

Lower Extremity

Arthroscopy, Volume 38, Issue 3, P 786-792

Surgeon-Specific Traction Time During Hip Arthroscopy for Primary Labral Repair Can Continue to Decrease After a Substantial Number of Surgeries

M.B. Meghpara, S.C. Diulus, et al.

DOI: https://doi.org/10.1016/j.arthro.2021.05.059

Purpose
The purpose of this study was to evaluate the total traction time and traction time as a function of anchors placed (TTAP) for primary labral repair in patients undergoing hip arthroscopy by a single surgeon.

Methods
Patients were included if they received a primary labral repair with or without acetabuloplasty, chondroplasty, or ligamentum teres debridement as part of the treatment for femoroacetabular impingement (FAI). Patients were excluded if they had a previous ipsilateral hip surgery, prior hip conditions, Tönnis grade >1, open procedures, microfracture, ligamentum teres reconstruction, or labral reconstruction. TTAP was calculated by dividing total traction time by the number of anchors placed.

Results
2,350 hips met the inclusion criteria. The mean age and BMI in this cohort were 34.22 years and 25.72 kg/m2, respectively. A total traction time of 60 minutes was first achieved after 268 cases. Mean overall total traction time was 58.16 minutes (95% CI [57.35, 58.97]) and mean TTAP was 16.24 minutes (95% CI [15.93,16.55]) after 2,350 cases. Total traction time plateaued after 374 cases at 55.92 minutes, while TTAP plateaued after 487 cases at 14.93 minutes.

Conclusion
Surgeons who introduce hip arthroscopy into their practice can expect to see improvements in traction time during the first 500 surgeries performed, as total traction time plateaued after 374 cases and TTAP plateaued after 487 cases.

Level of Evidence
IV: case series.

BACK

Arthroscopy, Volume 38, Issue 3, P 802-807

Comparison of Complications in X-Ray Versus Ultrasound-Guided Hip Arthroscopy

E. Gordey, I. Wong et al.

DOI: https://doi.org/10.1016/j.arthro.2021.06.029

Purpose
To report the complication rates and frequency of iatrogenic injury to the cartilage and labrum when using an ultrasound-guided hip arthroscopic technique compared with the standard x-ray–guided technique.

Methods
In this retrospective cohort study of prospectively collected data, intraoperative videos were evaluated for iatrogenic injury during portal establishment. Postoperative complications and revision procedures were monitored for 12 months.

Results
The study included 460 patients, with 38% in the ultrasound cohort. Video review showed a 2% complication rate of femoral head scuffing and <2% labral injury in both techniques, with no significant difference between techniques in cartilage injury (P = .90) or labrum puncture (P = .41). Six patients underwent revision procedures, 2 in the x-ray group and 6 in the ultrasound group. One patient developed a deep infection postoperatively. There were no other major complications.

Conclusion
Ultrasound-guided hip arthroscopy is a safe alternative to the standard x-ray–guided procedure in patients with a BMI less than 35.

Level of Evidence
III, retrospective cohort

BACK

Arthroscopy, Volume 38, Issue 3, P 808-815

Preoperative Quadratus Lumborum Block Reduces Opioid Requirements in the Immediate Postoperative Period Following Hip Arthroscopy: A Randomized, Blinded Clinical Trial

S.H. Wilson, R.M. George, et al.

DOI: https://doi.org/10.1016/j.arthro.2021.07.029

Purpose
To examine acute postoperative opioid consumption in patients undergoing hip arthroscopy and randomized to either receive a preoperative lateral quadratus lumborum block or sham injection.

Methods
This trial randomized 46 subjects undergoing hip arthroscopy with a single surgeon to receive a preoperative lateral quadratus lumborum block (40 mL, ropivacaine 0.25%) or sham injection. The primary outcome was postoperative opioid consumption in patients with and without a block. All opioid medications were converted to morphine milligram equivalents for comparisons. Categorical data were compared with $\chi 2$ tests and Fisher exact tests where appropriate. Continuous data were compared with 2-sided t-test and Wilcoxon rank-sum tests.

Results
Forty-six subjects scheduled for elective hip arthroscopy were successfully consented and randomized. Demographic and clinical characteristics did not differ. Postoperative opioid consumption decreased 28.3% in patients who received a preoperative lateral quadratus lumborum block ($P = .04$). Total perioperative opioid consumption (intraoperative and postoperative combined) was reduced 20% in the block group; however, this did not achieve statistical significance ($P = .05$). Three subjects in the sham group (12.5%) required unblinding for a rescue block in the postoperative anesthetic care unit (PACU) for uncontrolled pain despite systemic analgesics. While cold sensation was decreased postoperatively over the abdomen ($P < .001$) and anterior thigh ($P = .03$) in the block group, other PACU variables did not differ, including VAS pain scores, motor function, side effects, PACU duration, and patient satisfaction.

Conclusions
Opioid consumption was reduced in patients who received a preoperative lateral quadratus lumborum block combined with a standardized, multimodal protocol as compared with patients who did not receive a block. Our findings support the growing evidence that quadratus lumborum blocks are an effective component of multimodal analgesia options for patients undergoing elective hip arthroscopy.

Level of Evidence
Level I, randomized controlled trial.

BACK

Arthroscopy, Volume 38, Issue 3, P 818-830

Osteochondroplasty Benefits the Pragmatic Patient With Femoroacetabular Impingement: Analysis From the Embedded Prospective Cohort of the Femoroacetabular Impingement RandomiSed Controlled Trial (FIRST)

M. Almarsi, M. Simunovic, et al.

DOI: https://doi.org/10.1016/j.arthro.2021.06.026

Purpose
To determine whether arthroscopic osteochondroplasty demonstrated effectiveness in a pragmatic femoroacetabular impingement patient population embedded within FIRST (the Femoroacetabular Impingement RandomiSed controlled Trial).

Methods
All cohort patients were not randomized and were followed prospectively with a follow-up assessment protocol identical to that in FIRST. The primary outcome was hip pain using a 100-point visual analog scale. Secondary outcomes included hip function (Hip Outcome Score, International Hip Outcome Tool-12), health utility (EuroQol 5 Dimensions), and health-related quality of life (Short Form-12) at 12 months, as well as operatively and nonoperatively treated hip complications at 24 months. We performed multivariable regressions to compare these outcomes between 3 groups of patients: (1) those randomized to lavage in FIRST, (2) those randomized to osteochondroplasty in FIRST, and (3) those who received osteochondroplasty as part of the cohort study.

Results
All groups had improvements across all questionnaire outcomes from baseline to 12 months, with no significant differences. There were significantly more reoperations in the lavage trial group compared with those in the embedded cohort (adjusted odds ratio [aOR] 3.08; 95% confidence interval [CI] 1.23-7.73; P = .016). There were significantly more nonoperatively treated hip complications in the lavage trial group and in the osteochondroplasty trial group when compared with those in the embedded cohort (aOR 3.81; 95% CI 1.19-12.17; P = .024 and aOR 4.55; 95% CI 1.43-14.42; P = .010, respectively).

Conclusions
Hip arthroscopic osteochondroplasty and lavage led to improvement in hip pain, function, and health-related quality of life at 12 months across both randomized controlled trial (RCT) and cohort patients. The pragmatic cohort receiving osteochondroplasty had (1) significantly fewer complications than RCT patients, (2) significantly less reoperations than RCT patients randomized to arthroscopic lavage, and (3) fewer, although nonsignificant, reoperations than RCT osteochondroplasty patients.

Level of Evidence
II, therapeutic.

BACK

Arthroscopy, Volume 38, Issue 3, P 839-847

A Machine-Learning Algorithm to Predict the Likelihood of Prolonged Opioid Use Following Arthroscopic Hip Surgery

C.F. Grazal, L.T.A.B. Anderson, et al.

DOI: https://doi.org/10.1016/j.arthro.2021.08.009

Purpose
To develop a machine-learning algorithm and clinician-friendly tool predicting the likelihood of prolonged opioid use (>90 days) following hip arthroscopy.

Methods
The Military Data Repository was queried for all adult patients undergoing arthroscopic hip surgery between 2012 and 2017. Demographic, health history, and prescription records were extracted for all included patients. Opioid use was divided into preoperative use (30-365 days before surgery), perioperative use (30 days before surgery through 14 days after surgery), postoperative use (14-90 days after surgery), and prolonged postoperative use (90-365 days after surgery). Six machine-learning algorithms (Naïve Bayes, Gradient Boosting Machine, Extreme Gradient Boosting, Random Forest, Elastic Net Regularization, and artificial neural network) were developed. Area under the receiver operating curve and Brier scores were calculated for each model. Decision curve analysis was applied to assess clinical utility. Local-Interpretable Model-Agnostic Explanations were used to demonstrate factor weights within the selected model.

Results
A total of 6,760 patients were included, of whom 2,762 (40.9%) filled at least 1 opioid prescription >90 days after surgery. The artificial neural network model showed superior discrimination and calibration with area under the receiver operating curve = 0.71 (95% confidence interval 0.68-0.74) and Brier score = 0.21 (95% confidence interval 0.20-0.22). Postsurgical opioid use, age, and preoperative opioid use had the most influence on model outcome. Lesser factors included the presence of a psychological comorbidity and strong history of a substance use disorder.

Conclusions
The artificial neural network model shows sufficient validity and discrimination for use in clinical practice. The 5 identified factors (age, preoperative opioid use, postoperative opioid use, presence of a mental health comorbidity, and presence of a preoperative substance use disorder) accurately predict the likelihood of prolonged opioid use following hip arthroscopy.

Level of Evidence
III, retrospective comparative prognostic trial.

BACK

Arthroscopy, Volume 38, Issue 3, P 881-891

A Comparison of Two-Year Anterior Cruciate Ligament Reconstruction Clinical Outcomes Using All-Soft Tissue Quadriceps Tendon Autograft With Femoral/Tibial Cortical Suspensory Fixation Versus Tibial Interference Screw Fixation

D.N. Greif, B.J. Shallop, et al.

DOI: https://doi.org/10.1016/j.arthro.2021.06.024

Purpose
To contribute to future quadriceps tendon harvest and fixation guidelines in the setting of anterior cruciate ligament reconstruction by comparing 2-year patient-reported subjective knee outcome scores and incidence of graft-related complications between the shorter harvest all-inside tibial-femoral suspensory fixation (TFSF) approach versus the longer harvest standard tibial interference screw fixation technique.

Methods
Patients who underwent primary anterior cruciate ligament reconstruction with all soft tissue quadriceps tendon autograft from January 2017 to May 2019 were identified for inclusion. Patients were matched into 2 cohorts of 62 based on reconstruction technique. All patients completed baseline and minimum 2-year International Knee Documentation Committee, Tegner Activity Level, and Lysholm questionnaires and were queried regarding subsequent procedures and complications to the operative knee.

Results
Average graft length for the all-inside TFSF was 69.55 (95% confidence interval 68.99-70.19) mm versus 79.27 (95% confidence interval 77.21-81.34) mm in the tibial screw fixation cohort (P = .00001). Two-year Lysholm scores were greater in the TFSF cohort (P = .04) but were not clinically significant. There was no difference in 2-year International Knee Documentation Committee (P = .09) or Tegner (P = .69) scores between cohorts, but more patients in the TFSF cohort returned to or exceeded their baseline activity level compared with the tibial screw fixation cohort (73% vs 61%, P = .25). Seven patients in the TFSF cohort versus 13 in the tibial screw fixation cohort reported anterior knee pain or kneeling difficulty (P = .22). There were no differences in reported complications.

Conclusions
All-inside soft-tissue quadriceps tendon autograft with TFSF resulted in clinically comparable subjective outcome scores at 2 years to tibial screw fixation. There were also no differences in complications or reports of anterior knee pain or kneeling difficulty. All-inside TFSF can be a viable alternative to tibial screw fixation for all-soft tissue quadriceps autograft.

Level of Evidence
III, comparative therapeutic trial.

BACK

Arthroscopy, Volume 38, Issue 3, P 892-899

Arthroscopic Lateral Patellar Facetectomy and Lateral Release Can Be Recommended for Isolated Patellofemoral Osteoarthritis

A. Douiri, V. Lavoué, et al.

DOI: https://doi.org/10.1016/j.arthro.2021.06.021

Purpose
To analyze the clinical outcomes and survival curve of arthroscopic lateral patellar facetectomy and lateral release for isolated patellofemoral osteoarthritis (PFOA).

Methods
All patients undergoing arthroscopic lateral patellar facetectomy and lateral release between January 2008 and January 2018 were evaluated retrospectively. The inclusion criteria were 1) diagnosis of isolated symptomatic lateral PFOA, 2) PFOA with kissing lesions (defined as a lesion on both the patella and trochlea, which were in direct contact, 3) arthroscopic lateral patellar facetectomy and lateral release, and 4) two-year minimum follow-up. Evaluation included preoperative and postoperative subjective International Knee Documentation Committee (IKDC), Knee Injury and Osteoarthritis Outcome Score (KOOS) scores, and visual analogue pain scale (VAS). The primary end point determining the survival curve was revision of lateral facetectomy.

Results
A retrospective analysis was conducted of 61 consecutive arthroscopic lateral patellar facetectomy and lateral release procedures, performed in 55 patients for a diagnosis of isolated PFOA. Five patients were lost to follow-up, leaving 56 knees (50 patients) available at a mean follow up of 7.5 years (range: 2-10). The cohort included 37 women and 13 men with a mean age of 59 years (range: 34-87). Nine patients (18%) underwent revision surgery: six total knee replacements (TKR), two high tibial osteotomies, and one revision arthroscopic lateral patellar facetectomy. The mean time from arthroscopic facetectomy to TKR was 51 months (range: 10-114). The survival curve rate was 86% at 7.5 years. Both KOOS and IKDC scores improved significantly. These results are confirmed by an analysis of MCID. The mean VAS decreased from 6.98 ± 1.2 preoperatively to 2.06 ± 1.6 at the last follow-up ($\Delta CI95\% = [-5.6; -4.4]$; $P = .0001$).

Conclusion
Arthroscopic lateral patellar facetectomy and lateral release for isolated PFOA demonstrates sustained significant improvement in knee clinical outcome scores and pain with a low rate of complications and revision surgery at mid-term follow-up. This operation can be recommended in cases of symptomatic isolated PFOA.

Level of Evidence
IV, case series

BACK

Arthroscopy, Volume 38, Issue 3, P 928-935

Serial Improvement of Medial Meniscus Extrusion Following Medial Open-Wedge High Tibial Osteotomy Does Not Correlate With Clinical Outcomes and Arthroscopic Articular Cartilage Improvement

J.K. Bae, J.H. Kim, et al.

DOI: https://doi.org/10.1016/j.arthro.2021.07.024

Purpose
To assess serial change up to 2 years in medial meniscus extrusion (MME) following medial open-wedge high tibial osteotomy (MOWHTO) and to determine whether postoperative changes in MME correlated with clinical outcomes and arthroscopic articular cartilage status.

Methods
This study included 26 patients from December 2016 to March 2018 who underwent MOWHTO for primary medial osteoarthritis with varus malalignment. Second-look arthroscopy with plate removal was performed at postoperative 2 years. MME was consecutively measured using coronal magnetic resonance imaging at preoperative and postoperative 3 months, 6 months, 1.5 years, and 2 years. We also assessed which preoperative parameters could reflect the postoperative changes in MME and evaluated whether postoperative clinical outcomes and arthroscopic articular cartilage improvement would be influenced by the MME changes.

Results
Regarding the postoperative serial changes in MME values, significant improvement in MME was noted from postoperative 6 months ($P = .003$), and thereafter, mean MME was further improved with time until postoperative 2 years ($P < .001$). Regarding the correlation between preoperative parameters and MME changes, preoperative medial proximal tibial angle (MPTA) showed significant correlations in univariate and multivariate analysis ($P = .004$ and $P = .004$, respectively). Meanwhile, changes in MME were not correlated with postoperative clinical outcomes or arthroscopic articular cartilage improvement.

Conclusion
After MOWHTO, MME improved with time and was significantly correlated with preoperative MPTA. However, the changes in MME after MOWHTO did not reflect postoperative clinical and arthroscopic articular cartilage improvement.

Level of Evidence
IV, case series.

BACK

Arthroscopy, Volume 38, Issue 3, P 936-944

Better Outcomes but No Difference in Joint Space Narrowing at Five Years Among Patients Without Unstable Chondral Lesions Versus Those With Unstable Chondral Lesions (Left In Situ) at the Time of Arthroscopic Partial Meniscectomy

L.J. Bission, M.A. Kluczynski et al.

DOI: https://doi.org/10.1016/j.arthro.2021.06.030

Purpose
To compare 5-year outcomes among patients with and without unstable chondral lesions undergoing arthroscopic partial meniscectomy (APM).

Methods
Using data from the Chondral Lesions And Meniscal Procedures (ChAMP) Trial, we compared outcomes for patients with unstable chondral lesions found at the time of APM and left in situ (CL-noDeb, N = 71) versus patients without unstable chondral lesions (NoCL, N = 47) at 5 years after APM. Outcomes included the Western Ontario and McMaster Universities Arthritis Index (WOMAC), Knee Injury and Osteoarthritis Outcome Score (KOOS), visual analog pain scale, Short-form Health Survey (SF-36), physical knee measurements, progressive joint space narrowing on radiographs, and the rate of additional knee surgery. Multivariate linear regression was used to obtain mean differences (MDs) with corresponding 95% confidence intervals (CIs) adjusted for age, body mass index, and preoperative score (for postoperative scores).

Results
Compared with CL-noDeb, NoCL subjects had significantly greater improvement at 5 years in the KOOS score for function in sport and recreation (MD = 9.9 [95% CI, 0.7-19.1]), SF-36 pain (MD = 13.9 [95% CI, 5.5-22.3]), knee extension (MD = 0.8 [95% CI, 0.1-1.5]), and decreased quadriceps circumference at the mid-portion of the patella (MD = −1.5 [95% CI, −2.7 to −0.3). A greater proportion of patients in the NoCL group achieved the MCID for all outcome scores except for the WOMAC pain score (89% CL-NoDeb vs 87% NoCL) and SF-36 general (29% CL-NoDeb vs 23% NoCL). There were no significant group differences in measures of progressive radiographic joint space narrowing in any compartments of the operative knee and no significant difference in the rate of additional knee surgery within 5 years of the initial APM.

Conclusions
Patients undergoing APM without unstable chondral lesions had statistically significantly better outcomes than patients with unstable chondral lesions at 5 years after surgery; however, there were no group differences in progressive radiographic joint space narrowing.

Level of Evidence
Level II, prospective comparative study.

BACK

Arthroscopy, Volume 38, Issue 3, P 936-944

Male Sex, Cartilage Surgery, Tobacco Use, and Opioid Disorders are Associated with an Increased Risk of Infection After Anterior Cruciate Ligament Reconstruction

Z. Roecker, P. Kamalapathy, et al.

DOI: https://doi.org/10.1016/j.arthro.2021.07.025

Purpose
To identify patient-related risk factors for infection following anterior cruciate ligament reconstruction (ACLR).

Methods
The Mariner database within PearlDiver was queried for patients from 2010 to 2019 undergoing primary arthroscopic ACLR. Patients undergoing ACLR with concomitant open surgery or additional ligament reconstructions were excluded. Postoperative diagnoses or procedures for superficial or deep infection within 6 months were assessed. A multivariable logistic regression analysis was then used to evaluate patient-related risk factors for postoperative infection. Adjusted odds ratios (OR) and 95% confidence intervals (CIs) were calculated for each risk factor, with $P < .05$ considered statistically significant.

Results
In total, 217,541 patients underwent ACLR and 1779 (0.8%) patients had a postoperative infection within 6 months. Significant independent risk factors included male sex (OR 1.58, 95% CI 1.43-1.75, $P < .001$), obesity (OR 1.22, 95% CI 1.05-1.43, $P = .020$), morbid obesity (OR 2.54, 95% CI 2.11-3.06, $P = .002$), tobacco use (OR 1.36, 95% CI 1.19-1.55, $P < .001$), age younger than 40 years (OR 1.21, 95% CI 1.07-1.37, $P = .033$), depression (OR 1.18, 95% CI 1.04-1.34, $P = .012$), opioid disorder (OR 1.50, 95% CI 1.22-1.85, $P < .001$), concomitant simple cartilage surgery (OR 1.63, 95% CI 1.43-1.86, $P < .001$), and complex cartilage surgery (OR 1.67, 95% CI 1.20-2.32, $P = .002$). Partial meniscectomy and meniscal repair at the time of ACLR were not associated with an increased risk of infection.

Conclusions
In a large national sample, male sex, obesity, tobacco use, older age, depression, opioid disorders and concomitant cartilage surgery were significant risk factors for infection following ACLR.

Level of Evidence
Therapeutic Level IV, retrospective case series.

BACK

Knee Surgery, Sports Traumatology, Arthroscopy, March 2022, volume 30, issue 3, pages.

Machine-learning model successfully predicts patients at risk for prolonged postoperative opioid use following elective knee arthroscopy.

Lu, Y., Forlenza, E., Wilbur, R.R. et al.

DOI: https://doi.org/10.1007/s00167-020-06421-7

Purpose

Recovery following elective knee arthroscopy can be compromised by prolonged postoperative opioid utilization, yet an effective and validated risk calculator for this outcome remains elusive. The purpose of this study is to develop and validate a machine-learning algorithm that can reliably and effectively predict prolonged opioid consumption in patients following elective knee arthroscopy.

Methods

A retrospective review of an institutional outcome database was performed at a tertiary academic medical centre to identify adult patients who underwent knee arthroscopy between 2016 and 2018. Extended postoperative opioid consumption was defined as opioid consumption at least 150 days following surgery. Five machine-learning algorithms were assessed for the ability to predict this outcome. Performances of the algorithms were assessed through discrimination, calibration, and decision curve analysis.

Results

Overall, of the 381 patients included, 60 (20.3%) demonstrated sustained postoperative opioid consumption. The factors determined for prediction of prolonged postoperative opioid prescriptions were reduced preoperative scores on the following patient-reported outcomes: the IKDC, KOOS ADL, VR12 MCS, KOOS pain, and KOOS Sport and Activities. The ensemble model achieved the best performance based on discrimination (AUC = 0.74), calibration, and decision curve analysis. This model was integrated into a web-based open-access application able to provide both predictions and explanations.

Conclusion

Following appropriate external validation, the algorithm developed presently could augment timely identification of patients who are at risk of extended opioid use. Reduced scores on preoperative patient-reported outcomes, symptom duration and perioperative oral morphine equivalents were identified as novel predictors of prolonged postoperative opioid use. The predictive model can be easily deployed in the clinical setting to identify at risk patients thus allowing providers to optimize modifiable risk factors and appropriately counsel patients preoperatively.

Level of evidence

III.

BACK

Arthroscopic lateral retinacular release improves patello-femoral and femoro-tibial kinematics in patients with isolated lateral retinacular tightness.

Pohlig, F., Lenze, U., Lenze, F.W. et al.

DOI: https://doi.org/10.1007/s00167-021-06434-w

Purpose

Arthroscopic lateral retinacular release (LRR) has long been considered the gold standard for the treatment for anterior knee pain caused by lateral retinacular tightness (LRT). However, one-third of patients experience continuous pain postoperatively, which is thought to be related to persistent maltracking of the patella and altered femoro-tibial kinematics. Therefore, the aim of the present study was to simultaneously assess femoro-tibial and patello-femoral kinematics and identify the influence of arthroscopic LRR.

Methods

Sixteen healthy volunteers and 12 patients with unilateral, isolated LRT were prospectively included. Open MRI scans with and without isometric quadriceps contraction were performed in 0°, 30° and 90° of knee flexion preoperatively and at 12 months after surgery. Patellar shift, tilt angle, patello-femoral contact area and magnitude of femoro-tibial rotation were calculated by digital image processing.

Results

Postoperatively, patellar shift was significantly reduced at 90° of knee flexion compared to preoperative values. The postoperative patellar tilt angle was found to be significantly smaller at 30° of knee flexion compared to that preoperatively. Isometric muscle contractions did not considerably influence patellar shift or tilt in either group. The patello-femoral contact area increased after LRR over the full range of motion (ROM), with significant changes at 0° and 90°. Regarding femoro-tibial kinematics, significantly increased femoral internal rotation at 0° was observed in the patient group preoperatively, whereas the magnitude of rotation at 90° of knee flexion was comparable to that of healthy individuals. The pathologically increased femoral internal rotation at 30° without muscular activity could be significantly decreased by LRR. With isometric quadriceps contraction no considerable improvement of femoral internal rotation could be achieved by LRR at 30° of knee flexion.

Conclusions

Patello-femoral and femoro-tibial joint kinematics could be improved, making LRR a viable surgical option in carefully selected patients with isolated LRT. However, pathologically increased femoral internal rotation during early knee flexion remained unaffected by LRR and thus potentially accounts for persistent pain.

Level of evidence

II.

BACK

Development of new cartilage lesions after ACL reconstruction is associated with abnormal knee rotation.

Zampeli, F., Pappas, E., Velonakis, G. et al.

DOI: https://doi.org/10.1007/s00167-020-06387-6

Purpose

The purpose of this study is to examine the association between the development of articular cartilage pathology and knee rotation after single-bundle anterior cruciate ligament (ACL) reconstruction.

Methods

Seventeen patients that underwent single-bundle ACL reconstruction and did not have any cartilage lesions at the time of surgery based on the Outerbridge classification or meniscal injury that required meniscectomy > 20% were examined by MRI and in the biomechanics laboratory at a 6-year minimum follow-up. Cartilage lesions that occurred after reconstruction were graded on MRI according to a modified Noyes scale. For cartilage evaluation, the lateral and medial femoral condyles were divided into 9 segments each (lateral, central, and medial third and each third was divided into anterior, central, and posterior segment). Tibial rotation during a pivoting task was measured with optoelectronic motion analysis system and side-to-side differences of tibial rotation between the reconstructed and contralateral intact knees were calculated. The association between the total modified Noyes scale score (outcome variable) and side-to-side differences of tibial rotation after controlling for meniscectomy and meniscal repair was investigated with hierarchical regression models.

Results

Side-to-side difference of tibial rotation was associated with total modified Noyes scale score ($p = 0.015$, $\beta = 0.667$, adjusted $R2 = 42.1\%$). All patients developed new cartilage lesions in MRI located mainly at the central region of the lateral femoral condyle and less frequently in the central and anterior regions of the medial femoral condyle.

Conclusion

Abnormally increased tibial rotation that persists after ACL-R is significantly associated with the development of new articular cartilage lesions at mean 8.4 years after reconstruction which were located mainly at the central region of the LFC and secondarily in the central and anterior regions of the MFC (more superficial lesions). These findings suggest that there is emerging evidence that abnormal rotational kinematics is a potential risk factor for the pathogenesis and onset of posttraumatic articular cartilage degeneration after ACLR.

Level of evidence

IV.

BACK

Bilateral hip arthroscopy for treating femoroacetabular impingement: a systematic review.
Kumar, M.V., Shanmugaraj, A., Kay, J. et al.

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Purpose
Femoroacetabular impingement (FAI) is a hip disorder which can often present bilaterally. The purpose of this systematic review was to explore the current practices for bilateral hip arthroscopy in treating FAI as they relate to outcomes and complications.

Methods
This review has been conducted according to the guidelines of Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA). The electronic databases PubMed, MEDLINE, EMBASE, and CENTRAL (Cochrane Central Register of Controlled Trials) were searched from data inception to October 18th, 2020. The Methodological Index for Non-randomized Studies (MINORS) was used to assess study quality. Data are presented descriptively.

Results
Overall, 19 studies were identified, comprising 957 patients (48.6% male) with a mean age of 27.9 ± 7.1 years and a mean follow-up of 31.7 ± 20.8 months. The majority of patients were treated with a staged bilateral hip arthroscopy (78.5%) with a mean duration between surgeries of 7.1 ± 4.0 months. Significant preoperative-to-postoperative improvements for clinical outcomes such as pain, hip function, and health-related daily living as well as radiographic outcomes were reported in six studies for staged procedures ($p < 0.05$) and three studies for simultaneous procedures ($p < 0.02$). Significant improvements in patient-reported outcomes (e.g., HOS-ADL, Pain, HOS-SS, mHHS, and NAHS) were found in favor of those undergoing a shorter delay between surgeries in three studies (i.e., < 3, 10 or 17 months) ($p < 0.05$) compared to those who had delayed surgeries (i.e., > 3, 10, or 17 months). The overall complication rate was 10.1% (97/957).

Conclusions
Bilateral surgery for FAI yields improved outcomes postoperatively and complication rates similar to unilateral surgery. The overall complication rate was 10.1% with the most common complication being revision surgery. Staged bilateral surgery is more commonly performed than simultaneous surgery. Clinicians should consider preoperative imaging, clinical history, and patient values when deciding between staged and simultaneous procedures for bilateral FAI surgery. Future studies are required to determine the optimal indications for simultaneous versus staged procedures, as well as the ideal timing between surgeries for the latter.

Level of evidence
Level IV.

BACK