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Upper extremity

Arthroscopy, Volume 40, Issue 8

Biceps Rerouting Regardless of a Biceps-Labral Lesion During Rotator Cuff Repair Results in Lower Retear Rates and Comparable Clinical Outcomes to Subpectoral Biceps Tenodesis

Y.T. Kim, K.J. Lee

DOI: 10.1016/j.arthro.2024.01.024

Purpose: To evaluate the radiographic and clinical outcomes when rerouting a pathologic biceps during arthroscopic rotator cuff repair by comparing it with concomitant subpectoral biceps tenodesis (SPBT).

Methods: This retrospective, historical cohort study was conducted with patients who underwent an arthroscopic repair of a full-thickness rotator cuff tear, with intraoperative confirmation of biceps pathology including partial tears, subluxation, pulley lesions, or type II SLAP lesions. Until May 2018, such patients were treated with concomitant subpectoral tenodesis (group SPBT). Afterward, biceps rerouting (BR) was done regardless of biceps pathology (group BR) without biceps or SLAP repair. Radiographic parameters, including fatty degeneration, acromiohumeral distance, Sugaya classification, and retears, were evaluated using preoperative and 1-year postoperative magnetic resonance imaging results. Clinical evaluation with a minimum 2-year follow-up included pain visual analog scale, American Shoulder and Elbow Surgeons, Simple Shoulder Test, and Constant–Murley scores. Whether individual patients exceeded these scores' minimal clinically important difference also was determined.

Results: A total of 64 patients (group SPBT = 32; group BR = 32) were included in the final analysis. The duration of clinical follow-up was 36.2 ± 9.3 months in group SPBT and 29.4 ± 6.9 months in the BR group (P = .002). Compared with group SPBT, group BR demonstrated a significantly lower retear rate (SPBT vs BR: 34.4% vs 12.5%, P = .039). In the BR group, 8 of 32 (25%) patients demonstrated a postoperative LHBT tear. The 4 cuff retears in group BR only took place within these patients. Other postoperative radiographic and clinical outcomes were comparable between the groups. Within each group, significant postoperative improvements were demonstrated (P < .05 for all clinical scores).

Conclusions: Even in the presence of a pathologic LHBT and/or a type II SLAP lesion, augmenting the rotator cuff repair with BR significantly reduced retear rates while achieving clinical scores comparable with SPBT in a minimum 2-year follow-up.

Level of Evidence: Level III, retrospective comparative study.

BACK

Early Postoperative Stiffness After Arthroscopic Rotator Cuff Repair Correlates With Improved Tendon Healing

R. Takahashi, K. Kawakami

DOI: 10.1016/j.arthro.2024.01.038

Purpose: To assess whether early postoperative stiffness predicts long-term stiffness and its relationship with repair integrity in patients who undergo arthroscopic rotator cuff repair (ARCR).

Methods: This was a single-center retrospective study; 427 patients undergoing primary ARCR by a board-certified orthopaedic surgeon over 4 years were considered. Patients with at least 1 year of follow-up were categorized into stiff and non-stiff groups based on their range of motion (ROM) at 3 months' postoperatively. Stiffness was defined as passive forward flexion <120°, external rotation <30°, or internal rotation below L3. We evaluated clinical outcomes using demographics, ROM, Constant Shoulder (CS) score, University of California, Los Angeles (UCLA) score, and visual analog scale (VAS) for pain preoperatively and at 3, 6, and 12 months' postoperatively. Stiffness, retear rates, and tendon integrity were assessed via magnetic resonance imaging at 12 months.

Results: Of 155 patients meeting the inclusion criteria, 68 (43.9%) were stiff, and 87 (56.1%) were non-stiff. The stiff group had significantly lower preoperative CS and UCLA scores (P = .013/.014) and greater VAS score (P = .034). At 3 months, this group showed lower ROM and functional scores (P < .001), persisting at 6 and 12 months (except internal rotation) (P < .001). Their 12-month VAS score was greater (P = .024). Postoperative stiffness occurred in 10.3% of the stiff group and 2.3% of the non-stiff group (P = .035). The 12-month retear rate was 5.9% in the stiff group and 17.2% in the non-stiff group (P = .032). Minimal clinically important difference analysis indicated ROM changes but limited functional score changes in the 2 groups.

Conclusions: This study showed that early postoperative shoulder stiffness correlates with lower preoperative functional scores and greater pain levels. Shoulder stiffness at 3 months' post-ARCR predicts 12-month shoulder stiffness but indicates better tendon integrity. While early stiffness is linked to lower functional scores and more pain, its long-term clinical impact seems limited.

Level of Evidence: Level III, retrospective comparison study.

BACK

Journal of Shoulder and Elbow Surgery (JSES), Volume 33, issue 8

Longer peripheral-track lesions are associated with instability after arthroscopic Bankart repair

J.-H. Kim, Y.-U. Kwon

DOI: 10.1016/j.jse.2023.12.023

Background: The glenoid track concept has enabled the categorization of Hill-Sachs lesions (HSLs) into on-track lesions and off-track lesions. Furthermore, among the on-track lesions, further categorization has been established based on the distance from the medial edge of the Hill-Sachs lesion to the medial edge of the glenoid track, into peripheral-track lesions and central-track lesions. Recent studies on peripheral-track lesions and central-track lesions within the glenoid track have shown inconsistencies in failure rates, which deserves further investigation.

Methods: A retrospective cohort comparison of patients who underwent arthroscopic Bankart repair between 2015 and 2020 was performed. 102 patients with peripheral-track HSLs were included. The patients were divided into 2 groups based on the results of the postoperative apprehension test: the apprehension positive group (n = 30), and the apprehension negative group (n = 72). Using preoperative computed tomography (CT) and an image reconstruction program, 3-dimensional (3D) images were segmented to calculate the length, width, depth, and distance of the HSLs. A multivariate logistic regression was used to determine the risk factors of recurrence, for which odds ratio (OR) and 95% confidence interval (CI) were provided.

Results: A multivariate logistic regression analysis revealed that the length of the peripheral-track HSLs was a significant independent predictor of failure in this study. (OR 1.380; 95% CI 1.170-1.627; $P < .001$). The receiver operating characteristics curve (ROC) demonstrated a predictive power (area under the curve = 0.841) and a threshold value of 14.2 mm.

Conclusion: Length was the only risk factor for the recurrent instability of peripheral-track HSLs after ABR. In the context of surgical decision-making, utilizing the glenoid track concept, medical practitioners may need to evaluate instability by considering the length as a continuous factor, while differentiating between peripheral-track and central-track classifications.

Level of Evidence: Level III, Retrospective Cohort Comparison, Prognosis Study.

BACK

Association between timing of initiating supervised physical rehabilitation after rotator cuff repair and incidence of repeat repair and capsulitis: a population-based analysis

B.Z. Stem, N. Zubizarreta

DOI: 10.1016/j.jse.2024.01.017

Background: There is limited consensus on the optimal time to initiate supervised physical rehabilitation after a rotator cuff repair (RCR). We examined whether timing of initiating supervised physical rehabilitation was associated with repeat RCR or development of adhesive capsulitis within 12 months postoperatively in an observational cohort of commercially insured adults.

Methods: This retrospective cohort study used the IBM MarketScan Commercial Claims and Encounters Database. We included adults aged 18-64 who underwent a unilateral outpatient RCR between 2017 and 2020 and initiated supervised physical rehabilitation 1-90 days postoperatively. Multivariable logistic regression models examined the adjusted association between time of initiating supervised physical rehabilitation (1-13, 14-27, 28-41, and 42-90 days postoperatively) and each of the primary outcomes: repeat RCR and capsulitis. In a sensitivity analysis, time to rehabilitation was alternatively categorized using a data-driven approach of quartiles (1-7, 8-16, 17-30, and 31-90 days postoperatively). We report adjusted odds ratios (OR).

Results: Among 33,841 patients (86.7% arthroscopic index RCR), the median time between index RCR and rehabilitation initiation was 16 days (interquartile range 7-30), with 39.9% initiating rehabilitation at 1-13 days. Additionally, 2.2% underwent repeat RCR within 12 months, and 12-month capsulitis was identified in 1.9% of patients. There were no significant associations between timing of initiating rehabilitation and 12-month repeat RCR (OR 0.85-0.93, P = .18-.49) or 12-month capsulitis (OR 0.83-0.94, P = .22-.63). Lack of associations between timing and outcomes was supported in sensitivity analyses.

Conclusion: Timing of initiating rehabilitation was not significantly associated with adverse outcomes after RCR. The finding of no increased odds of repeat RCR or capsulitis with the earliest timing may support earlier initiation of rehabilitation to accelerate return to daily activities. Findings should be replicated in another dataset of similarly-aged patients.

Level of Evidence: Level III, Retrospective Cohort Comparison Using Large Database, Treatment Study.

BACK

Preoperative patient factors that predict achieving the minimal clinically important difference following arthroscopic treatment of snapping scapula syndrome

M.-C. Rupp, J.C. Rutledge

DOI: 10.1016/j.jse.2024.01.018

Background: The aim of this study was to define the minimal clinically important difference (MCID) values for patient-reported outcomes (PROs) after arthroscopic treatment of snapping scapula syndrome (SSS) using a distribution-based method, and to identify demographic, clinical, and intraoperative factors significantly associated with the achievement of MCID. It was hypothesized that subjective satisfaction scores after the procedure would be strongly associated with the achievement of MCID thresholds for the PROs and that pain, preoperative response to injection, and a scapulectomy in addition to bursal resection would be predictive of clinically relevant improvement.

Methods: Patients who underwent arthroscopic treatment of SSS between October 2005 and September 2020 with a minimum of 2-year short-term postoperative follow-up were enrolled in this retrospective single-center study. The MCID was calculated using a distribution-based approach for the following PROs: 12-Item Short Form Health Survey (SF-12), American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (ASES), Quick Disabilities of the Arm, Shoulder, and Hand questionnaire (QuickDASH), Single Assessment Numeric Evaluation (SANE), and visual analog scale (VAS) pain “today” and “at worst.” The association between achievement of the MCID and postoperative subjective satisfaction was investigated, and factors associated with achievement of MCID were determined using bivariate analysis.

Results: Of a total of 190 patients assessed for eligibility, 77 patients (38.1 ± 14.3 years; 36 females) were included. Within the study population, statistically significant improvements in postoperative SF-12 physical component summary (PCS) ($P < .001$) and mental component summary (MCS) ($P < 0.034$), ASES ($P < .001$), QuickDASH ($P < .001$), SANE ($P < .001$), and VAS pain ($P < .001$) scores were observed at the minimum 2-year follow-up. The calculated MCID threshold values based on the study population were 5.0 for SF-12 PCS, 5.8 for SF-12 MCS, 11.3 for ASES, −10.5 for QuickDASH, 14.7 for SANE, 1.5 for VAS pain, and 1.7 for VAS pain at worst. Reaching the MCID was strongly associated with postoperative satisfaction (rated on a scale of 1-10). Across the PROs, younger age, favorable preoperative response to injection, partial scapuloplasty or scapulectomy, no prior surgery, and pain and function at baseline were significantly associated with attaining MCID.

Conclusion: Patients who underwent arthroscopic treatment for SSS experienced clinically significant improvements in functional scores, pain, and quality of life. This study demonstrated predictive roles for certain patient-specific factors and diagnostic variables for achieving MCID in PROs, which may help surgeons preoperatively assess the probability of success and manage patient expectations.

Level of Evidence: Level III, Retrospective Cohort Comparison, Prognosis Study.

BACK

Superior labrum anterior to posterior (SLAP) repair is associated with increased rate of subsequent rotator cuff diagnoses and revision surgery: a propensity-matched comparison

L.J. Linscheid, S.J. DeShazo

DOI: 10.1016/j.jse.2023.12.015

Background: Surgical management of superior labral anterior to posterior (SLAP) tears remains controversial. Current management utilizes 2 well-established procedures: biceps tenodesis and SLAP repair. This study evaluates the complications associated with arthroscopic SLAP repair vs. an open or arthroscopic biceps tenodesis to further elucidate optimal surgical management.

Methods: In this retrospective cohort study, the TriNetX database was utilized to evaluate patients who underwent repair of SLAP lesions (*International Classification of Diseases, Tenth Revision* code: S43.43) from May 15, 2003, to May 15, 2023. Three patient cohorts were evaluated: those who underwent arthroscopic SLAP repair (*Current Procedural Terminology* [*CPT*] code: 29807), those who underwent arthroscopic biceps tenodesis (*CPT* code: 29828), and those who underwent open tenodesis of the biceps (*CPT* code: 23430). Cohorts were propensity matched for type 2 diabetes, nicotine dependence, alcohol-related disorders, body mass index, and demographic factors such as age at event, ethnicity, race, and sex. The outcomes evaluated were disruption of surgical wound, deep vein thrombosis, mononeuropathy of upper limb, shoulder contusion, humeral fracture, sepsis, deceased, acute postoperative pain, revision, shoulder stiffness, and rotator cuff strain. All outcomes were evaluated within 1 year postprocedure.

Results: A total of 11,081 arthroscopic SLAP repairs, 9960 arthroscopic biceps tenodesis, and 9420 open biceps tenodesis were matched. Compared with patients who underwent arthroscopic biceps tenodesis, those who underwent arthroscopic SLAP repair were 1.8 times more likely to undergo revision (2.9% vs. 1.6%, $P < .0001$). Compared with those who underwent open biceps tenodesis, patients who had SLAP repair performed were 1.4 times more likely to undergo revision (3.1% vs. 2.3%, $P = .013$) and 1.6 times more likely to have a subsequent rotator cuff strain diagnosis (5.1% vs. 3.2%, $P = .0002$). Compared with patients who underwent SLAP repair, those who underwent arthroscopic biceps tenodesis exhibited 1.3 times more instances of acute postoperative pain (5.2% vs. 4.0%, $P = .011$). Similarly, open biceps tenodesis exhibited 1.8 times more instances of acute postoperative pain (6.9% vs. 3.8%, $P < .0001$) and 1.3 times more shoulder stiffness (11.8% vs. 9.0%, $P < .0001$).

Conclusion: In the last 20 years, patients who underwent SLAP repair were associated with higher risk of revision surgery and subsequent rotator cuff strain diagnosis. Conversely, patients who underwent biceps tenodesis were associated with higher rates of acute postoperative pain and shoulder stiffness.

Level of Evidence: Level III, Retrospective Cohort Comparison Using Large Database, Treatment Study

BACK

Higher return to sport and lower revision rates when performing arthroscopic Bankart repair with remplissage for anterior shoulder instability with a Hill-Sachs lesion: a meta-analysis

A.F. Ahmed, T.S. Polisetty

DOI: 10.1016/j.jse.2024.01.045

Background: Recurrent anterior shoulder instability remains the most common complication from a prior shoulder dislocation, especially among young and active individuals who engage in athletic activities. This instability can lead to repeated subluxation or dislocations of the humeral head from the glenoid fossa. The purpose of this study is to compare postoperative recurrence rates, instability-related revision and return to sport (RTS) rates between isolated arthroscopic Bankart repair (ABR) and ABR with remplissage (ABR + R) for anterior shoulder instability with subcritical glenoid bone loss (GBL) and a Hill-Sachs lesion (HSL).

Methods: PubMed, Embase, and Web of Science were searched on June 2022. Studies sought were those comparing postoperative outcomes of ABR + R versus isolated ABR for subcritical GBL and an HSL. Study quality was evaluated using the revised Cochrane tool. Redislocations, instability-related revisions, and RTS rates were extracted and pooled estimates were calculated using the random-effect model.

Results: Twelve studies were included with a mean follow-up of 48.2 months for isolated ABR and 43.2 months for ABR + R. The meta-analytic comparison demonstrated that ABR + R resulted in statistically significant improvement in Rowe and American Shoulder and Elbow Surgeons scores by 6.5 and 2.2 points, respectively; however, the improvements in patient-reported outcomes were not clinically meaningful. ABR + R resulted in reduced external rotation at the side by 1° which was not clinically meaningful and there was no significant difference in terms of forward elevation. ABR + R resulted in a statistically significant reduction of overall postoperative recurrences (odds ratio [OR]: 9.36), postoperative dislocations (OR: 6.28), instability-related revision (OR: 3.46), and RTS to any level (OR: 2.85).

Conclusion: The addition of remplissage to ABR for recurrent anterior shoulder instability with subcritical GBL and HSL results in significantly lower postoperative instability recurrence, lower instability-related revisions, and higher RTS to any level.

Level of Evidence: Level III, Meta-Analysis.

BACK

Arthroscopic stabilization surgery for first-time anterior shoulder dislocations: a systematic review and meta-analysis

H.A. Khalik, D.L. Lameire

DOI: 10.1016/j.jse.2024.01.037

Background: The optimal management of first-time anterior shoulder dislocations (FTASDs) remains controversial. Therefore, the purpose of this study was to assess the efficacy of arthroscopic stabilization surgery for FTASDs through a systematic review and meta-analysis of existing literature.

Methods: MEDLINE, Embase, and Web of Science were searched from inception to December 18, 2022, for single-arm or comparative studies assessing FTASDs managed with arthroscopic stabilization surgery following first-time dislocation. Eligible comparative studies included studies assessing outcomes following immobilization for an FTASD, or arthroscopic stabilization following recurrent dislocations. Eligible levels of evidence were I to IV. Primary outcomes included rates of shoulder redislocations, cumulative shoulder instability, and subsequent shoulder stabilization surgery.

Results: Thirty-four studies with 2222 shoulder dislocations were included. Of these, 5 studies (n = 408 shoulders) were randomized trials comparing immobilization to arthroscopic Bankart repair (ABR) after a first dislocation. Another 16 studies were nonrandomized comparative studies assessing arthroscopic Bankart repair following first-time dislocation (ABR-F) to either immobilization (studies = 8, n = 399 shoulders) or arthroscopic Bankart repair following recurrent dislocations (ABR-R) (studies = 8, n = 943 shoulder). Mean follow-up was 59.4 ± 39.2 months across all studies. Cumulative loss to follow-up was 4.7% (range, 0%-32.7%). A composite rate of pooled redislocation, cumulative instability, and reoperations across ABR-F studies was 6.8%, 11.2%, and 6.1%, respectively. Meta-analysis found statistically significant reductions in rates of redislocation (odds ratio [OR] 0.09, 95% confidence interval [CI] 0.04-0.3, $P < .001$), cumulative instability (OR 0.05, 95% CI 0.03-0.08, $P < .001$), and subsequent surgery (OR 0.08, 95% CI 0.04-0.15, $P < .001$) when comparing ABR-F to immobilization. Rates of cumulative instability (OR 0.32, 95% CI 0.22-0.47, $P < .001$) and subsequent surgery rates (OR 0.27, 95% CI 0.09-0.76, $P = .01$) were significantly reduced with ABR-F relative to ABR-R, with point estimate of effect favoring ABR-F for shoulder redislocation rates (OR 0.59, 95% CI 0.19-1.83, $P = .36$). Return to sport rates to preoperative levels or higher were 3.87 times higher following ABR-F compared to immobilization (95% CI 1.57-9.52, $P < .001$), with limited ABR-R studies reporting this outcome. The median fragility index of the 5 included randomized controlled trials (RCTs) was 2, meaning reversing only 2 outcome events rendered the trials' findings no longer statistically significant.

Conclusion: Arthroscopic stabilization surgery for FTASDs leads to lower rates of redislocations, cumulative instability, and subsequent stabilization surgery relative to immobilization or arthroscopic stabilization surgery following recurrence. Although a limited number of RCTs have been published on the subject matter to date, the strength of their conclusions is limited by a small sample size and statistically fragile results.

Level of Evidence: Level IV, Meta-Analysis.

BACK

A threshold of lower preoperative mental health is associated with decreased achievement of comfort and capability benchmarks following rotator cuff repair: a retrospective cohort study

B.P. Moore, D.Z. Forrister

DOI: 10.1016/j.jse.2023.12.011

Background: Preoperative biomedical patient characteristics are known to affect the time to achievement of clinically significant outcomes (CSOs) following arthroscopic rotator cuff repair (RCR). However, less is known about the association between preoperative mental status and the time to achievement of CSOs. We hypothesize that higher preoperative mental status is associated with faster achievement of CSOs following arthroscopic RCR.

Methods: Patient-reported outcome measures (PROMs) were collected preoperatively and at postoperative intervals up to 2 years. PROMs included pain visual analog scale (VAS), American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (ASES), Single Assessment Numeric Evaluation (SANE), and Veterans RAND 12-Item Health Survey (VR-12) scores. Threshold values for CSOs were obtained from previous literature. Mean time to achievement of CSOs was calculated using a Kaplan-Meier analysis. A Cox proportional hazards regression analysis was performed to identify preoperative variables associated with earlier achievement of CSOs.

Results: Sixty-nine patients with an average age of 59 ± 8 years were included. Patients with higher preoperative mental status, as measured by VR-12 mental component summary (MCS), experienced significantly earlier substantial pain improvement postoperatively (P = .0471). Patients with higher preoperative mental status also achieved CSOs for physical health at earlier time points (P = .0187). Preoperative VR-12 MCS scores ≥ 40 were associated with earlier achievement of CSOs for pain (P = .0005) and physical health (P = .0015). Ninety-eight percent of patients with preoperative MCS scores ≥40 achieved acceptable pain relief at 4.5 months vs. 56% of all other patients at 12.3 months (P = .0001). Patients with preoperative MCS scores ≥40 experienced significantly faster improvement in physical health compared to patients with preoperative MCS scores <40 (P = .0006).

Conclusion: Higher preoperative mental status, especially a preoperative MCS score ≥40, is associated with significantly faster improvement in pain and physical function following arthroscopic RCR. Nearly all patients (98%) with preoperative MCS score ≥40 achieved an acceptable state of pain relief compared with only 56% of patients with preoperative MCS score <40. These findings indicate that a holistic approach with equal consideration of preoperative mental health and rotator cuff pathophysiology is vital to the successful management of rotator cuff tendinopathy.

Level of Evidence: Level III, Retrospective Cohort Comparison, Prognosis Study.

BACK

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA), Volume 32, Issue 8

Modified double-pulley fixation provides better reduction of bone fragments and union compared to single-point fixation in bony Bankart lesions

D. Qu, H. Fu

DOI: https://doi.org/10.1002/ksa.12218

Purpose: The purpose of this study was to compare clinical scores and imaging outcomes of bony Bankart lesions that underwent single-point and modified double-pulley fixation after at least 2 years of follow-up.

Methods: Patients who underwent surgery to treat bony Bankart injuries were included and divided into groups A and B. A total of 69 patients were included (32 in group A and 37 in group B). Patients in group A underwent arthroscopic modified double-pulley fixation and patients in group B underwent arthroscopic single-point fixation. Three-dimensional computed tomography (3D-CT) was used to assess glenoid reduction one day after surgery. Postoperative bony union was assessed using 3D-CT and multiplanar reconstruction images 6 months after surgery. Constant–Murley, Rowe rating system, visual analogue scale and University of California at Los Angeles and American Shoulder and Elbow Surgeons scores were recorded before and after surgery.

Results: In terms of imaging measurements, there was no significant group difference in the preoperative size of the glenoid defect, the size of the bony fragment or the expected postoperative size of the glenoid defect. The sizes of the actual postoperative glenoid defects differed significantly between the groups ($p = 0.027$), as did the absolute difference between the expected and actual glenoid defect sizes ($p < 0.001$). At 6 months postoperatively, 50.0% of group A patients and 24.3% of group B patients exhibited complete bony union ($p = 0.027$); the rates of partial union were 37.5% and 56.8%, respectively. At the final follow-up, all clinical scores were significantly better than the preoperative scores (all $p < 0.05$), with no significant group differences (not significant).

Conclusion: The use of the modified double-pulley technique with two anchors to treat bony Bankart injuries provides a better reduction of bone fragments than single-point fixation with two anchors and was associated with a higher rate of early bone union.

Level of evidence: Level III.

BACK

Instability Severity Index Score predicts recurrent shoulder instability after arthroscopic Bankart repair

M.Y.H. van Blommestein, L.H.M. Govaert

DOI: https://doi.org/10.1002/ksa.12235

Purpose: The Instability Severity Index (ISI) Score was developed to preoperatively assess the risk of recurrent shoulder instability after an arthroscopic Bankart repair. This study aims to validate the use of ISI Score for predicting the risk of recurrence after an arthroscopic Bankart repair in a heterogeneous population and proposes an appropriate cut-off point for treating patients with an arthroscopic Bankart repair or otherwise.

Methods: This study analysed 99 shoulders after a traumatic dislocation that underwent arthroscopic Bankart repair with at least 3 years follow-up. Patients were divided into subcategories based on their respective ISI Score. Recurrence includes either a postoperative dislocation or perceived instability.

Results: The overall recurrence rate was found to be 26.3%. A significant correlation was identified between ISI Score and the recurrence rate (odds ratio [OR]: 1.545, 95% confidence interval [CI]: 1.231–1.939, $p < 0.001$). Furthermore, ISI Score 4–6 (OR: 4.498, 95% CI: 1.866–10.842, $p < 0.001$) and ISI Score > 6 (OR: 7.076, 95% CI: 2.393–20.924, $p < 0.001$) both had a significantly higher risk of recurrence compared to ISI Score 0–3. In ISI Score subcategories 0–3, 4–6 and >6, the recurrence rate was, respectively, 15.4%, 40.7% and 71.4%.

Conclusion: ISI Score has predictive value in determining the recurrence risk of shoulder instability following an arthroscopic Bankart repair in a heterogeneous population. Based on the findings of this study, we recommend using arthroscopic Bankart repair in patients with ISI Score 0–3. Clinical and shared decision-making are essential in the group with ISI Score 4–6, since the recurrence rate is significantly higher than in patients with ISI Score 0–3. Arthroscopic Bankart repair is not suitable for patients with ISI Score > 6.

Level of evidence: Level III.

BACK

American Journal of Sports Medicine (AJSM), Volume 52, Issue 9

No Upper Extremity Abstracts

BACK

Journal of Bone and Joint Surgery (JBJS), Volume 106, Issue 16+17

No Upper Extremity Abstracts

BACK

Clinical Orthopaedics and Related Research (CORR), Volume 482, Issue 8

No Upper Extremity Abstracts

BACK

Bone and Joint Journal (BJJ), Volume 106-B, issue 8

No Upper Extremity Abstracts

BACK

Lower Extremity

Arthroscopy, Volume 40, Issue 8

Hip Arthroscopy for Femoroacetabular Impingement Is Associated With Improved Sexual Function And Quality of Life

C. Smith, L. Nero

DOI: 10.1016/j.arthro.2023.12.015

Purpose: To investigate changes in sexual function and activity after arthroscopic hip surgery for femoroacetabular impingement using the United Kingdom Non-Arthroplasty Hip Registry dataset. Subanalyses were performed between males and females, and patients over 40 and under 40 years old.

Methods: Patients who had arthroscopic hip surgery between January 1, 2012, and October 31, 2020, were aged over 16, and completed the relevant patient-reported outcome measures were included. Question 9 of the International Hip Outcome Tool-12 (sexual activity question [SAQ]) refers to problems with sexual activity, and responses to this were compared before surgery and at 6 and 12 months after surgery. Subanalyses were also performed, including SAQ scores by patients' sex or age. SAQ scores were correlated with Euroqol-5 dimension-5 level self-reporting tool (EQ-5D-5L) scores using Spearman's rank coefficient.

Results: SAQ was answered by 2,547 patients before and at 6 months after surgery (62.3% female, median age = 36.2, interquartile range [IQR] = 29-44 years) and by 2,314 at 12 months (61.9% female, median age = 36.2, IQR = 29-44 years). Scores for sexual activity increased from 35.0 before surgery to 70.0 at 6 months ($P < .001$) and were maintained at 12 months ($P < .001$). Female patients demonstrated a significantly greater improvement in their scores for sexual function from before surgery (median = 30.0, IQR = 14-50) to 6 months (median = 60, IQR = 28-86, $P < .001$) and 12 months (median = 62.0, IQR = 29-90, $P < .001$), compared to male patients (preoperative median = 50.0, IQR 25-84; 6-month median = 80, IQR = 45-97; 12-month median = 80, IQR = 41-98). The effect of age on improvements in sexual function did not demonstrate a significant difference. A significant positive correlation was found between improvements in sexual function and quality of life, as measured by the EQ-5D-5L, at 6 and 12 months ($P < .001$).

Conclusions: Hip arthroscopy for symptomatic femoroacetabular impingement produces an improvement in sexual function and activity. Scores for sexual function improved regardless of patient age or sex; however, female patients experienced a greater improvement in sexual function than males.

Level of Evidence: Level III, Retrospective cohort study.

BACK

Favorable and Durable Outcomes at 10-Year Follow-Up After Endoscopic Gluteus Medius Repair With Concomitant Hip Arthroscopy

B.G. Domb, J.S. Owens

DOI: 10.1016/j.arthro.2023.10.049

Purpose: To evaluate 10-year patient-reported outcome (PRO) scores following endoscopic surgery for gluteus medius partial and full-thickness tears with concomitant hip arthroscopy for labral tears and/or femoroacetabular impingement syndrome (FAIS).

Methods: Prospectively collected data on patients followed for a minimum of 10 years after endoscopic gluteus medius repair with concomitant hip arthroscopy performed by a single surgeon were retrospectively analyzed. Patients with preoperative and 10-year follow-up for the following PROs were included: modified Harris Hip Score (mHHS), Nonarthritic Hip Score (NAHS), Hip Outcome Score-Sports Specific Subscale (HOS-SSS), and Visual Analog Scale (VAS) score for pain.

Results: There were 13 patients eligible for inclusion, 11 (84.6%) of whom had 10-year follow up, with a mean of 127.6 months (range: 120.0-140.2 months). The group consisted of 10 females (90.9%) and one male (9.1%) with a mean age at surgery of 60.1 years (range: 46.2-74.8 years). PRO scores improved from preoperative to 10-year follow-up as follows: mHHS from 60.4 to 88.0 ($P = .011$); NAHS from 50.1 to 90.6 ($P < .001$); HOS-SS from 37.5 to 85.1 ($P = .001$); and VAS from 4.8 to 1.2 ($P = .006$). Mean patient satisfaction rating was 8.3. Patients achieved PASS and MCID for mHHS and HOS-SSS at a rate of 81.8%. There was no significant decline in PROs or satisfaction between 2, 5, and 10 years postoperatively. All patients underwent concomitant hip arthroscopy and labral treatment (debridement or repair). One patient, who had arthroscopic findings of acetabular and femoral outerbridge grade 4 lesions, subsequently underwent total hip arthroplasty; however, the GM was assessed during the THA, and it was verified that the repair was intact. There were no clinical failures, secondary operations, or complications.

Conclusions: Endoscopic repair of gluteus medius tears is a safe procedure with favorable and durable long-term outcomes at minimum 10-year follow-up.

Level of Evidence: Level IV, therapeutic case series.

BACK

Location and Progression of Chondral Injuries at the Time of Revision Anterior Cruciate Ligament Surgery Varies by Sex

M.P. Cote, G.J. Kearney

DOI: 10.1016/j.arthro.2023.12.006

Purpose: To quantify progression of chondral and meniscal injuries between primary and revision anterior cruciate ligament (ACL) surgery.

Methods: Patients who underwent both index and revision ACL reconstruction between 2000 and 2020 at our institution were identified, and dates of injury and surgery, demographics, and clinical data were obtained from operative reports. Outerbridge grade was recorded in each compartment, along with presence and location of meniscal injury. The frequency of each injury between first and second cases was calculated. Differences in injury and progression were compared over time as well as between patient sex and age.

Results: The study included 189 patients (96 female, 93 male). Age at first surgery was 31.7 ± 13.2 years. Mean time to second injury was 3.3 ± 3.0 years. In total, 116 patients had a new or previous chondral injury (odds ratio, 1.6; 95% CI, 1.2-2.1). The medial femoral condyle (31%) and the patella (21%) accounted for the highest proportion of new injury to articular surfaces, whereas new injury to menisci was comparable between the medial (25%) and lateral (23%) meniscus. At the time of revision ACL reconstruction, females had a high prevalence of chondral injuries to the lateral compartment, whereas males had a high prevalence of chondral injury to the medial femoral condyle. The prevalence of new chondral injuries was comparable between sexes, with males having a slightly higher proportion. While time between surgeries, sex, and age had graphical evidence of moderating risk, the effects were small and imprecise.

Conclusions: Revision ACL reconstruction carried a 1.6 increase in the odds for new or progressive chondral lesions in our cohort. At the time of revision, females had a relatively higher proportion of lateral-sided chondral injuries, whereas males had a relatively higher proportion of medial femoral condyle injuries. The greatest increase in the prevalence of new and progressive lesions was observed in the medial femoral condyle and trochlea. This progression appeared to be moderated by time between surgeries, patient sex, and age; however, the differences were small and imprecise.

Level of Evidence: Level IV, therapeutic case series.

BACK

Preoperative Antidepressant Prescriptions Are Associated With Increased Opioid Prescriptions and Health Care Use but Similar Rates of Secondary Surgery Following Primary Anterior Cruciate Ligament Reconstruction in a Young Adult Population

N.K. Pahapill, P.F. Monahan

DOI: 10.1016/j.arthro.2023.12.030

Purpose: To compare adverse events, postoperative opioid-prescribing patterns, health care use, and secondary anterior cruciate ligament reconstruction (ACLR) surgery rates of patients undergoing primary ACLR with a preoperative antidepressant prescription (ADP) against a propensity-matched group with no preoperative antidepressant prescription (NADP) using the TriNetX Diamond Network.

Methods: Patients undergoing primary ACLR between ages 18 and 35 years of age were queried from the database using *International Classification of Diseases*, *Tenth Revision*/Current Procedural Terminology codes. Patients with an ADP were propensity matched in a 1:1 ratio to patients with NADP based on 11 patient characteristics. Postoperative rates of adverse events, emergency department (ED) visits, in-patient hospitalizations, outpatient services, physical therapy evaluations, postoperative opioid prescriptions, and secondary ACLR were compared at various time points.

Results: In total, 3,736 patients with an ADP with an average age of 21.4 ± 4.5 years undergoing primary ACLR were propensity matched to patients with NADP. A significantly greater percentage of patients with an ADP received opioid prescriptions at 2 weeks (ADP 21%, NADP 11.3%, odds ratio [OR] 2.08), 6 weeks (ADP 25.5%, NADP 13.9%, OR 2.13), 3 months (ADP 27.6%, NADP 15.6%, OR 2.07), 6 months (ADP 30.5%, NADP 17.2%, OR 2.1), and 1 year (ADP 35.3%, NADP 20.2%, OR 2.16) postoperatively (P <.0001 for each time point). Patients with ADP had greater rates of ED visits (ADP 9.7%, NADP 7.1%, P < .0001, OR 1.39) and outpatient appointments (ADP 28.3%, NADP 21.8%) P < .0001, OR 1.42) at 3 months' postoperatively. Secondary surgery rates at 1 and 2 years were nonsignificant (P = .381 and P = .062, respectively).

Conclusions: Following ACLR, patients with ADP had a significant increase in postoperative opioid prescriptions at all time points and used more ED resources and outpatient services compared with patients with NADP at 3 months' postoperatively. Thirty-day postoperative adverse events and both 1- and 2-year secondary ACL surgery rates demonstrated no significant differences between the groups.

Level of Evidence: Level III, retrospective comparative case series.

BACK

High Case Volume Predicts Greater Odds of Autograft Use and Meniscal Repair for Anterior Cruciate Ligament Reconstruction

L.T. Li, S.L. Bokshan

DOI: 10.1016/j.arthro.2020.08.011

Purpose: To evaluate how both annual surgeon and facility volume affect the cost and outcomes of anterior cruciate ligament reconstruction surgery. We also aimed to identify trends in how surgeon caseload predicts graft selection.

Methods: The 2014 State Ambulatory and Surgical Database from Florida was used. Every case with Current Procedural Terminology code 29888 ("Arthroscopic anterior cruciate ligament reconstruction") was selected. Surgeon and facility identifiers were used to separate high- and low-volume groups, defined as >25 cases for surgeons and >125 cases for facilities. Univariate analysis was performed for patient demographics and surgical characteristics. Multivariate analysis was performed on significant factors to determine how these variables impact cost and odds of allograft usage, postoperative admission, and meniscal repair.

Results: There were 7905 cases performed between January 1, 2014, and December 31, 2014 after excluding same-year revisions. High-volume surgeons had $6155 lower total charges, were 1.949 times more likely to use an autograft, and had 54.5% lower odds of postoperative admission (all $P < .001$). They were also 1.196 times more likely to perform a meniscal repair ($P = .017$). In patients younger than 18, low-volume surgeons were 3.7 times more likely to use an allograft ($P < .001$). Concomitant multiligamentous procedures were also performed at greater rates in the high-volume group. Postoperative admission added $18,698, and allografts added $9174 (both $P < .001$).

Conclusions: We found that high-volume surgeons were more likely to perform a meniscal repair and less likely to have their patients admitted postoperatively, which was the second largest cost driver of anterior cruciate ligament reconstruction. They were also significantly less likely to use an allograft, especially in patients younger than the age of 18 years. High-volume surgeons had lower costs despite greater rates of concomitant procedures.

Level of Evidence: III, retrospective cohort study.

BACK

All-Inside Anterior Cruciate Ligament Reconstruction Had Clinical Outcome Similar to the Transtibial Technique Except for Improved Side-to-Side Difference and Tegner Activity Scale: A Systematic Review and Meta-analysis

S. Zhu, R. Li

DOI: 10.1016/j.arthro.2024.01.044

Purpose: To compare clinical outcomes of the all-inside technique with the transtibial technique in anterior cruciate ligament reconstruction based on available literature on this topic.

Methods: According to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses checklist, we conducted a systematic search for randomized controlled trials and cohort studies. Our comprehensive search encompassed PubMed, Embase, Cochrane Library, and Web of Science. We included randomized controlled trials (RCTs) and cohort studies that compared the 2 techniques with a minimal 1-year follow-up. Two independent authors assessed RCTs using the risk of bias tool developed by the Cochrane Collaboration and evaluated the quality of cohort studies using the Newcastle-Ottawa Scale for Assessing the Quality of Nonrandomized Comparative Trials. The subjective and objective outcomes, complications, and graft failure were obtained. R software was used to perform the analysis.

Results: The present analysis enrolled 9 RCTs (n = 687) and 11 cohort studies (n = 910). After a minimal 1-year follow-up in RCTs, functional outcomes such as International Knee Documentation Committee (IKDC) subjective score, Lysholm score, Tegner activity scale, Knee Society Score, and hop test were found to be similar between 2 techniques. The laxity outcomes, including the IKDC objective grade and pivot-shift test, were suggested to be comparable. There was a significant difference favoring the transtibial technique in terms of side-to-side difference (P = .04; 95% confidence interval [CI], 0.08-0.90). The pooled data from cohort studies indicated equivalent results in terms of IKDC subjective score, Lysholm score, side-to-side difference, IKDC objective grade, complications, and graft failure, with the exception of statistical difference in the Tegner activity scale (P = .03; 95% CI, –0.50 to –0.04).

Conclusions: Our findings suggest that there is no difference in most outcome scores between the all-inside and transtibial techniques for anterior cruciate ligament reconstruction. There are statistically significant differences in side-to-side difference and Tegner activity scale favoring the all-inside technique.

Level of Evidence: Level IV, meta-analysis of Level I to IV studies.

BACK

Forty-One to 75% of Patients Achieve a Patient Acceptable Symptomatic State After Endoscopic Repair of Hip Abductor Tendon Tears: A Systematic Review

M. Akhtar, D. Razick

DOI: 10.1016/j.arthro.2024.01.001

Purpose: To systematically review clinical and functional outcomes of endoscopic repairs of hip abductor tendon tears.

Methods: A search following guidelines established by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses was performed in the PubMed, Embase, and Cochrane databases using variations of the terms “endoscopy,” “gluteus medius,” “hip abductor,” “outcome,” “success,” and “failure.” Data for patient demographics, tear severity and location, patient-reported outcomes (PROs), clinical benefit, and rates of retears and revision surgery were collected and tabulated. Forest plots depicting preoperative versus postoperative PROs were generated. Quality assessment was performed using the modified Coleman Methodology Score.

Results: In total, 13 studies, 3 Level III and 10 Level IV, were included in this review, with a total of 272 patients whose ages ranged from 46.0 to 66.9 years and follow-up times from 16.4 to 46.7 months. Most tears were isolated to the gluteus medius, with the number of partial- versus full-thickness tears being similar. Trendelenburg gait, reported by 4 studies, persisted in 0% to 13.6% of patients after repair. Of 9 studies reporting both preoperative and postoperative PROs at latest follow-up, 8 reported significant improvements in all PROs ($P < .05$). In 5 studies, rates of achieving minimal clinically important difference and patient-acceptable symptomatic state ranged from 50.0% to 93.3% and 40.7% to 75.0%, respectively. Surgical complication rates were 0% in 11 studies and 4.3% and 18.2% in 2 studies. Retear rates were 0% in 10 studies and ranged from 6.7% to 33.3% in 3 studies. Rates of revision due to retear, reported by 12 studies, were 0% in 8 studies and ranged from 2.2% to 13.0% in 4studies.

Conclusions: Endoscopic repairs of both partial- and full-thickness hip abductor tendon tears have good-to-excellent PROs and low complication, retear, and revision rates. However, rates of minimal clinically important difference and patient-acceptable symptomatic state achievement rates are highly variable and less than favorable.

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

BACK

Athletes Continue to Show Functional Performance Deficits at Return to Sport After Anterior Cruciate Ligament Reconstruction: A Systematic Review

V.S. Gill, S.V. Tummala

DOI: 10.1016/j.arthro.2023.12.033

Purpose: To systematically review the existing literature on the functional performance of athletes at the time of return-to-sport (RTS) clearance after anterior cruciate ligament reconstruction (ACLR).

Methods: A systematic literature search of the MEDLINE, EMBASE, Scopus, and Web of Science databases was performed. The inclusion criteria were original research reports with study populations of athletes who had undergone ACLR and had undergone objective functional testing immediately after clearance to RTS. Functional testing was stratified by hop tests, strength tests, kinetic assessment, and kinematic assessment, and data were extracted from each study using a standardized template.

Results: Of the 937 unique studies identified, 46 met the inclusion criteria. The average time between ACLR and functional testing was 7.9 months among the included studies. In 10 of 17 studies, patients were found to have an average quadriceps strength limb symmetry index of less than 90%. However, only 2 of 12 studies found the average hop test limb symmetry index to be less than 90%. Kinematics included reduced knee flexion angle and increased trunk flexion on landing in ACLR patients compared with matched controls. On evaluation of kinetics, ACLR patients showed reduced peak vertical ground reaction force, lower peak knee extension and knee flexion moments, and altered energy absorption contribution compared with matched controls.

Conclusions: This systematic review suggests that athletes show functional deficits at the time of RTS at an average of 7.9 months after ACLR. Traditional functional tests, such as strength and hop tests, are not able to accurately identify patients who continue to show deficits. The most common biomechanical deficits that persist after RTS clearance include diminished peak knee extension moment, decreased knee flexion angle, increased trunk flexion angle, reduced vertical ground reaction force, and increased hamstring central activation ratio during various functional gait and landing tasks.

Level of Evidence: Level III, systematic review of Level I to III studies.

BACK

Early Anterior Cruciate Ligament Treatment Might Be Crucial for Acute Combined Anterior Cruciate Ligament and Medial Collateral Ligament Injuries: A Systematic Review of the Various Treatment Strategies

J.P. van der List, R.K. Muscott

DOI: 10.1016/j.arthro.2024.01.009

Purpose: To assess the outcomes of acute, combined, complete anterior cruciate ligament (ACL) and medial collateral ligament (MCL) injuries in the literature.

Methods: A literature search using PubMed, Embase, Scopus, and Cochrane Reviews was performed following PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) guidelines. The inclusion criteria were studies reporting outcomes of complete ACL-MCL injuries at a minimum of 12 months' follow-up. Data were presented as ranges.

Results: Twenty-seven studies with 821 patients were included (mean age, 29 years; 61% male patients; mean follow-up period, 27 months). There were 4 randomized trials, 10 Level III studies, and 13 Level IV studies. Nine different strategies were noted, of which nonoperative MCL treatment with acute ACL reconstruction and acute MCL repair with acute ACL reconstruction were most commonly performed. Nonoperative MCL-ACL treatment and acute MCL repair with nonoperative ACL treatment led to low rates of valgus stability at 30° of flexion (27%-68% and 36%-77%, respectively) compared with acute ACL reconstruction with either nonoperative MCL treatment (80%-100%), acute MCL repair (65%-100%), or acute MCL reconstruction (81%-100%). Lysholm scores were not different between the strategies.

Conclusions: Outcomes in this systematic review suggest that ACL stabilization in the acute setting might result in the lowest rates of residual valgus laxity, whereas there is no clear difference between the different MCL treatments along with acute ACL reconstruction. Nonoperative MCL treatment with either nonoperative or delayed ACL reconstruction, as well as acute MCL repair with either nonoperative or delayed ACL reconstruction, leads to higher rates of valgus laxity.

Level of Evidence: Level IV, systematic review of Level I to IV studies.

BACK

Journal of Shoulder and Elbow Surgery (JSES), Volume 33, issue 8

No Lower Extremity Abstracts

BACK

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA), Volume 32, Issue 8

‘Real world’ clinical implementation of blood flow restriction therapy does not increase quadriceps strength after quadriceps tendon autograft ACL reconstruction

Z.J. Herman, J.J. Greiner

DOI: https://doi.org/10.1002/ksa.12217

Purpose: To retrospectively compare strength outcomes of individuals undergoing postoperative rehabilitation following quadriceps tendon (QT) autograft anterior cruciate ligament reconstruction (ACLR) with and without blood flow restriction therapy.

Methods: A retrospective review of consecutive patients undergoing ACLR with QT autograft with a minimum of two quantitative postoperative isometric strength assessments via an electromechanical dynamometer (Biodex) was included. Demographics, surgical variables and strength measurement outcomes were compared between patients undergoing blood flow restriction therapy as part of postoperative rehabilitation versus those who did not.

Results: Eighty-one (81) patients met the inclusion criteria. No differences were found in demographic and surgical characteristics between those who received blood flow restriction compared with those who did not. While both groups had improvements in quadriceps peak torque and limb symmetry index (LSI; defined as peak torque of the operative limb divided by the peak torque of the nonoperative limb) over the study period, the blood flow restriction group had significantly lower mean peak torque of the operative limb at first Biodex strength measurement (95.6 vs. 111.2 Nm; $p = 0.03$). Additionally, the blood flow restriction group had a significantly lower mean LSI than those with no blood flow restriction at the second Biodex measurement timepoint (81% vs. 90%; $p = 0.02$). No other significant differences were found between the strength outcomes measured.

Conclusion: Results of this study show that the ‘real world’ clinical implementation of blood flow restriction therapy to the postoperative rehabilitation protocol following QT autograft ACLR did not result in an increase in absolute or longitudinal changes in quadriceps strength measurements. A better understanding and standardisation of the use of blood flow restriction therapy in the rehabilitation setting is necessary to delineate the true effects of this modality on strength recovery after QT autograft ACLR.

Level of evidence: Level III.

BACK

Do reconstructive techniques for osteochondritis dissecans of the skeletally mature knee work? A systematic review and meta-analysis

V. Lu, T.M. Wong

DOI: https://doi.org/10.1002/ksa.12214

Purpose: Osteochondritis dissecans (OCD) is a common cause of knee pain. Management for adult-onset OCD (AOCD) usually involves surgery. Surgical treatments include palliative, reparative and reconstructive techniques. The aim of this systematic review and meta-analysis is to evaluate the efficacy of reconstructive techniques for the treatment of OCD in skeletally mature knees.

Methods: A systematic search was carried out on four databases up to November 2023 (Medline, Embase, Cochrane Library, Web of Science). The study was registered on international prospective register of systematic reviews and performed according to the Preferred Reporting Items for Systematic Reviews and Meta-Analysis guidelines. Clinical studies on skeletally mature patients were included, which utilised reconstructive techniques such as autologous chondrocyte implantation (ACI), matrix-induced autologous chondrocyte implantation, osteochondral allograft transplantation surgery or bone marrow-derived cellular transplantation. Demographical data, patient-reported outcome measures and postoperative complications were recorded. Quantitative outcome measures that were comparable across studies were pooled for meta-analysis. A random effects model was used. Heterogeneity was assessed using the I^2 statistic and Cochran's Q test. Statistical significance was set at $p < 0.05$. Risk of bias was assessed using the risk of bias in non-randomised studies - of interventions tool for nonrandomised studies.

Results: Sixteen studies were included with 458 OCD lesions in 432 patients. The average age was 24.9, and 62.6% were male. The mean follow-up time was 61.5 months. At 36 months follow-up, International Knee Documentation Committee (IKDC) subjective, Tegner and EuroQol-visual analogue scale (EQ-VAS) scores improved from 42.4 to 78.6 (standard mean difference [SMD]: 2.47; $p < 0.001$), 2.27–4.99 (SMD: 2.363; $p = 0.002$) and 30.4–57.5 (SMD: 2.390; $p < 0.001$), respectively. Overall complication rate was 8.9%. Smaller OCD lesion sizes resulted in a greater improvement in IKDC subjective (SMD: 2.64 vs. 2.01; $p = 0.038$), EQ-VAS (SMD: 3.16 vs. 0.95; $p = 0.046$) and Tegner scores (SMD: 3.13 vs. 1.05; $p = 0.007$) and had a lower complication rate ($p = 0.008$). Males showed a larger improvement in IKDC subjective scores than females (SMD: 2.56 vs. 1.56; $p = 0.029$), while younger patients had a larger improvement in IKDC subjective scores (SMD: 2.71 vs. 2.12; $p = 0.045$) and fewer complications than older patients ($p = 0.003$). There were no significant differences between cohorts treated with ACI and those treated with non-ACI reconstructive techniques. Publication bias was not detected (n.s.).

Conclusion: Reconstructive techniques used to treat OCD in the skeletally mature knee resulted in significant improvements in clinical and functional outcomes, with a low overall complication rate. Since a younger age leads to a greater improvement in IKDC subjective score and a lower complication rate, surgical intervention should not be delayed, especially in AOCD lesions which are more likely to follow a progressive and unremitting clinical course.

Level of evidence: Level III.

BACK

The presence of a deep lateral femoral notch sign in ACL-injured patients is associated with a 2.7° steeper posterior tibial slope and a 19% higher frequency of lateral meniscal injuries

J.N.P. da Silva Vilhena Braz, L.F.T.G. Alves

DOI: https://doi.org/10.1002/ksa.12262

Purpose: The purpose of this study was to study the relationship between the presence of a deep lateral femoral notch sign (DLFNS) in anterior cruciate ligament (ACL)-injured patients and a higher posterior lateral tibial slope (LPTS), a reduced meniscal bone angle (MBA), a higher LPTS/MBA ratio and a higher incidence of concomitant injuries in primary ACL tears.

Methods: A retrospective case-control study was performed in patients submitted to primary ACL reconstruction with an available preoperative magnetic resonance imaging (MRI) scan. Patients with ACL tears and a femoral impactation with a depth ≥2 mm were assorted to the DLFNS group and patients with ACL tear and without a DLFNS to the control group. LPTS and MBA were measured in MRI. The presence of concomitant injuries (meniscal, posterior cruciate ligament, medial collateral ligament, lateral collateral ligament and bone injuries) was assessed in MRI. Quantitative data are presented in the median ± interquartile range (IQR).

Results: There were 206 patients included in the study, with 46 patients assorted to the DLFNS group and 160 patients to the control group. In the DLFNS group, the median LPTS was 6.7° (IQR: 4.0–8.2) versus 4.0° in the control group (IQR: 2.2–6.5) ($p = 0.003$). The LPTS/MBA ratio was significantly higher in the DLFNS group, with a median of 0.32 (IQR: 0.19–0.44), in comparison to the control group, with a median of 0.19 (IQR: 0.11–0.31) ($p < 0.001$). The multivariable logistic regression analysis showed that the LPTS is an independent risk factor to having a DLFNS (odds ratio [OR] = 1.161; 95% confidence interval [CI]: 1.042–1.293, $p = 0.007$). There was a higher incidence of concomitant lateral meniscal injuries in the DLFNS group (67% vs. 48%, $p = 0.017$).

Conclusion: In patients with ACL tears, the presence of a DLFNS is associated with a steeper lateral posterior tibial slope, as well as a higher incidence of concomitant lateral meniscal injuries.

Level of evidence: Level III.

BACK

Differential influence of quadriceps rate of torque development on single- and double-leg landing mechanics in anterior cruciate ligament reconstructed and control females

Y.-L. Huang, C.M.S. Mulligan

DOI: https://doi.org/10.1002/ksa.12222

Purpose: The capacity to explosively contract quadriceps within the critical timeframe associated with anterior cruciate ligament (ACL) injury, quantified by the rate of torque development, is potentially essential for safe landing mechanics. This study aimed to investigate the influence of explosive quadriceps strength on ACL-related sagittal-plane landing mechanics in females with and without ACL reconstruction (ACLR).

Methods: Quadriceps explosive strength and landing mechanics were assessed in 19 ACLR and 19 control females during isometric contractions and double- and single-leg jump landings. A stepwise multiple linear regression model determined the variance in each of the landing biomechanics variables for the ACLR limb and nondominant limb of controls that could be explained by the group, rate of torque development and/or their interaction. If peak kinetic variables could be predicted by the rate of torque development or interaction, additional analyses were conducted, accounting for knee flexion as a covariate in the regression model.

Results: During single-leg landings, ACLR females exhibited greater knee flexion at initial contact than controls ($p = 0.04$). Greater quadriceps rate of torque development predicted higher peak posterior ground reaction force and anterior tibial shear force in both groups ($p = 0.04$). However, after controlling for knee flexion angle at those peak forces, quadriceps rate of torque development was not predictive. In double-leg landings, greater explosive quadriceps strength was associated with quicker attainment of peak knee extension moment and posterior ground reaction force in the ACLR limb ($p = 0.03$).

Conclusion: Regardless of ACL injury status, females with greater explosive quadriceps strength adopted safer single-leg landings through increased knee flexion, potentially mitigating ACL loading despite encountering higher peak forces. During double-leg landings, a greater explosive quadriceps strength of the ACLR limb is associated with faster achievement of peak force upon landing. Incorporating explosive quadriceps strengthening into post-ACLR rehabilitation and injury prevention programmes may enhance landing mechanics for reducing primary and subsequent ACL injury risks.

Level of evidence: Level II.

BACK

Accurate tibial tunnel position in transtibial pullout repair for medial meniscus posterior root tears delays the progression of medial joint space narrowing

K. Kawada, Y. Okazaki

DOI: https://doi.org/10.1002/ksa.12229

Purpose: This study aimed to evaluate the association between the progression of medial joint space (MJS) narrowing, medial meniscus extrusion (MME) and clinical scores and the tibial tunnel position in pullout repairs for medial meniscus posterior root tears (MMPRTs).

Methods: This retrospective study examined 54 patients. Changes in MJS (ΔMJS), MME (ΔMME) and clinical scores and their relationship with the tibial tunnel position were evaluated using correlation coefficients. The distance from the anatomical to technical attachment position in the tibial tunnel position was measured in the anterior and medial directions, and the direct distance was measured using the Pythagorean theorem.

Results: The mean ΔMJS and ΔMME were 0.6 ± 0.8 and 1.3 ± 1.3 mm, respectively, and the mean anterior, medial and direct distances were 1.4 ± 2.3, 2.2 ± 1.7 and 3.4 ± 1.7 mm, respectively. ΔMJS had a significant positive correlation with the medial ($r = 0.580$, $p < 0.001$) and direct ($r = 0.559$, $p < 0.001$) distances, while ΔMME had a significant positive correlation with direct distance ($r = 0.295$, $p = 0.030$). Several clinical scores were significantly negatively correlated with these distances.

Conclusion: In transtibial pullout repair for MMPRTs, accurate tibial tunnel position delayed the progression of MJS narrowing and MME, leading to improved clinical outcomes. The progression of MJS narrowing was associated with the mediolateral direction of the tibial tunnel position, while the clinical scores were associated with the anteroposterior direction of the tibial tunnel position. These findings indicate the need to orient the tip of the guide in a more posterolateral direction when creating the tibial tunnel.

Level of evidence: Level IV.

BACK

The pie-crusting release of the medial collateral ligament in arthroscopic partial meniscectomy is associated with improved clinical outcomes without altering radiological measurements

N. Ercan, G. Arican

DOI: https://doi.org/10.1002/ksa.12303

Purpose: The aim of this study was to evaluate how the pie-crusting technique affects clinical and radiological outcomes in patients undergoing arthroscopic partial meniscectomy.

Methods: A total of 68 patients with Kellgren–Lawrence (K-L) grade 2 who underwent arthroscopic partial meniscectomy between 2015 and 2021 were evaluated and divided into two groups as arthroscopic partial meniscectomy (36 patients) and arthroscopic partial meniscectomy with pie-crusting (32 patients) according to whether the pie-crusting technique was applied or not. All patients were evaluated at a minimum 2-year follow-up in terms of Lysholm score, Tegner activity score, International Knee Documentation Committee (IKDC) score and Visual Analogue Scale (VAS) score. To assess the impact of the pie-crusting technique, radiological measurements were conducted using radiographs taken before and after pie-crusting, as well as postoperative radiographs.

Results: Lysholm, Tegner, IKDC and VAS scores exhibited statistically significant differences after surgery compared to preoperative evaluations in both groups ($p < 0.05$). Furthermore, these scores were significantly superior in the arthroscopic partial meniscectomy with pie-crusting group compared to the arthroscopic partial meniscectomy group at 24 months postoperatively ($p < 0.05$). While the radiological measurements in the arthroscopic partial meniscectomy with pie-crusting group showed statistically significant differences before and after pie-crusting ($p < 0.05$), no significant difference was observed between before pie-crusting and 12 and 24 months postoperatively (n.s.).

Conclusion: The current study is the first to demonstrate the true effectiveness of the pie-crusting technique. The application of the pie-crusting technique when necessary results in a statistically significant improvement in clinical scores without affecting radiological measurements for patients undergoing arthroscopic partial meniscectomy compared to not utilising it.

Level of evidence: Level III.

BACK

Arthroscopic anterior deltoid plication with bone anchor is an effective procedure to control residual talar anterior translation after lateral ligament repair

J. Vega, F. Malagelada

DOI: https://doi.org/10.1002/ksa.12328

Purpose: Residual symptoms can be observed after ankle lateral ligament repairs commonly due to hyperlaxity, severe ankle instability or a failed stabilization. In order to increase joint stability, ligament or capsular-ligament plication has been used in other joints. Given that the anterior portion of the deltoid is a stabilizer against anterior talar translation, it could be used as an augmentation to restrict anterior talar translation. The aim of this study was to describe an arthroscopic anterior deltoid plication with a bony anchor as an augmentation to the lateral stabilization. The results in a series of eight patients were presented.

Methods: Eight patients (seven males, median age 31 [range, 22–43] years) presented residual instability after arthroscopic all inside lateral collateral ligament repair. Arthroscopic anterior deltoid ligament plication was performed in these patients. Median follow-up was 22 (range, 15–27) months. Using an automatic suture passer and a knotless anchor, the anterior deltoid was arthroscopically plicated to the anterior aspect of the medial malleolus.

Results: During the arthroscopic procedure, only an isolated detachment of the anterior talofibular ligament was observed without any deltoid open-book injury in any case. All patients reported subjective improvement in their ankle instability after the arthroscopic all-inside ligament repair and the anterior deltoid plication with a bony anchor. On clinical examination, the anterior drawer test was negative in all patients. The median American Orthopedic Foot and Ankle Society score increased from 68 (range, 64–70) preoperatively to 100 (range, 90–100) at final follow-up.

Conclusion: The arthroscopic anterior deltoid plication is a feasible procedure to augment stability and control anterior talar translation when treating chronic ankle instability in cases of residual excessive talar translation.

Level of evidence: Level IV.

BACK

American Journal of Sports Medicine (AJSM), Volume 52, Issue 9

Sex-Specific Outcomes After Anterior Cruciate Ligament Reconstruction Using an All–Soft Tissue Quadriceps Tendon Autograft in a Young Active Population

C.B. Petit, H.S. Slone

DOI: https://doi.org/10.1177/03635465241262018

Background: The ideal graft for anterior cruciate ligament (ACL) reconstruction (ACLR) in young athletes has a high return-to-sport (RTS) rate and a low reinjury rate. Quadriceps tendon autografts are being used with increasing frequency for ACLR in this population, despite a paucity of evidence to support their use.

Purpose: To report the RTS rate, ipsilateral reinjury rate, and contralateral ACL injury rate in a young athletic population undergoing primary ACLR using an all–soft tissue quadriceps tendon (ASTQT) autograft.

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

Methods: Patients aged 14 to 22 years who underwent primary ACLR using an ASTQT autograft by a single surgeon between January 1, 2005, and April 30, 2020, were identified via electronic medical records and contacted ≥24 months after ACLR to complete a survey regarding subsequent ipsilateral or contralateral ACL injuries and RTS. Patients who had undergone previous ACLR (ipsilateral or contralateral) were excluded.

Results: A total of 656 patients (330 male, 326 female; mean age, 17.9 years) were identified, and 395 patients completed the survey (60.2%; 174 male, 221 female; mean age, 17.8 years) with a mean follow-up of 73 ± 29 months (range, 24-139 months). The RTS rate was high (male: 87.7%; female: 82.8%; P = .19). Male and female patients had similar rates of revision ACLR (male: 12.6%; female: 10.0%; P = .40) and contralateral ACL injuries (male: 13.8%; female: 11.3%; P = .46).

Conclusion: A high RTS rate and similar rates of ipsilateral and contralateral ACL injuries were found for male and female patients in a young athletic population undergoing primary ACLR using an ASTQT autograft. These results help one to better understand the utility of ASTQT grafts to support successful ACLR in young athletic populations, for which ASTQT grafts appear to yield favorable outcomes.

BACK

Effect of Preoperative Anterolateral Ligament Injury on Outcomes After Isolated Acute ACL Reconstruction With Hamstring Graft: A Prospective Study With Minimum 5-Year Follow-up

M.F. Sobrado, A.G. Moreira da Silva

DOI: https://doi.org/10.1177/03635465241263599

Background: The potential influence of a preoperative anterolateral ligament (ALL) lesion seen on magnetic resonance imaging (MRI) on the mid- and long-term surgical outcomes of anterior cruciate ligament (ACL) reconstruction is still controversial.

Purpose: To evaluate the clinical outcomes and failure rate of isolated ACL reconstruction at a minimum 5-year follow-up in patients with and without ALL injury diagnosed preoperatively using MRI.

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

Methods: A prospective cohort of patients with acute ACL injury was divided into 2 groups based on the presence (ALL injury group) or absence (control group) of ALL injury on preoperative MRI. This is a longer-term follow-up study of a previously published study that had a minimum 2-year follow-up. Both groups underwent anatomic isolated reconstruction of the ACL. The Lysholm and subjective International Knee Documentation Committee scores, KT-1000 arthrometer and pivot-shift tests, reconstruction failure rate, incidence of contralateral ACL injury, presence of associated meniscal injury, and presence of knee hyperextension were evaluated. The evaluation at the 5-year follow-up was also compared with the same patient's evaluation at 2 years of follow-up.

Results: A total of 156 patients were evaluated. No significant differences were found between the groups in the preoperative evaluation. In the postoperative evaluation, patients in the ALL injury group had a higher reconstruction failure rate (14.3% vs 4.6% for the control group; $P = .049$) and worse clinical outcomes according to the Lysholm scores (85.0 ± 10.3 vs 92.3 ± 6.6; $P < .00001$). Although the pivot-shift test results were similar, anteroposterior translation using the KT-1000 arthrometer revealed worse results for the ALL injury group (2.8 ± 1.4 mm vs 1.9 ± 1.3 mm; $P = .00018$). Patients in the ALL injury group also had an increase in KT-1000 arthrometer values from 2 to 5 years (2.4 ± 1.6 vs 2.8 ± 1.4; $P = .038$). Patients in the control group had no differences in outcomes from 2 to 5 years of follow-up.

Conclusion: Combined ACL and ALL injuries were associated with significantly less favorable outcomes than were isolated ACL injuries at a minimum follow-up of 5 years after isolated ACL reconstruction with hamstring autograft. Patients with concomitant ALL injury showed a higher failure rate and worse functional scores. Also, knee stability tended to slightly worsen from 2 to 5 years in cases of associated ALL injury.

BACK

Career Length After Surgically Treated ACL Plus Collateral Ligament Injury in Elite Athletes

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DOI: https://doi.org/10.1177/03635465241262440

Background: Limited data are available regarding career length and competition level after combined anterior cruciate ligament (ACL) and medial- or lateral-sided surgeries in elite athletes.

Purpose: To evaluate career length after surgical treatment of combined ACL plus medial collateral ligament (MCL) and ACL plus posterolateral corner (PLC) injuries in elite athletes and, in a subgroup analysis of male professional soccer players, to compare career length and competition level after combined ACL+MCL or ACL+PLC surgeries with a cohort who underwent isolated ACL reconstruction (ACLR).

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

Methods: A consecutive cohort of elite athletes undergoing combined ACL+MCL and ACL+PLC surgery was analyzed between February 2001 and October 2019. A subgroup of male elite soccer players from this population was compared with a previously identified cohort having had isolated primary ACLR without other ligament surgery. A minimum 2-year follow-up was required. Outcome measures were career length and competition level.

Results: A total of 98 elite athletes met the inclusion criteria, comprising 50 ACL+PLC and 48 ACL+MCL surgeries. The mean career length after surgical treatment of combined ACL+MCL and ACL+PLC injuries was 4.5 years. Return-to-play (RTP) time was significantly longer for ACL+PLC injuries (12.8 months; P = .019) than for ACL+MCL injuries (10.9 months). In the subgroup analysis of soccer players, a significantly lower number of players with combined ACL+PLC surgery were able to RTP (88%; P = .003) compared with 100% for ACL+MCL surgery and 97% for isolated ACLR, as well as requiring an almost 3 months longer RTP timeline (12.9 months; P = .002) when compared with the isolated ACL (10.2 months) and combined ACL+MCL (10.0 months) groups. However, career length and competition level were not significantly different between groups.

Conclusion: Among elite athletes, the mean career length after surgical treatment of combined ACL+MCL and ACL+PLC injuries was 4.5 years. Professional soccer players with combined ACL+PLC surgery returned at a lower rate and required a longer RTP time when compared with the players with isolated ACL or combined ACL+MCL injuries. However, those who did RTP had the same career longevity and competition level.

BACK

Patient and Operative Risk Factors for Osteoarthritis After Primary Anterior Cruciate Ligament Reconstruction: A Cohort Study of 41,976 Patients

H.A. Prentice, P.H. Chan

DOI: https://doi.org/10.1177/03635465241261357

Background: The reported incidence of posttraumatic knee osteoarthritis (PTOA) after primary anterior cruciate ligament reconstruction (ACLR) varies considerably. Further, there are gaps in identifying which patients are at risk for PTOA after ACLR and whether there are modifiable factors.

Purpose: To (1) determine the incidence of PTOA in a primary ACLR cohort and (2) identify patient and perioperative factors associated with the development of PTOA after primary ACLR.

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

Methods: Data from the Kaiser Permanente ACLR Registry were used to conduct a cohort study. Patients who had undergone primary ACLR without a previous diagnosis of osteoarthritis were identified (2009-2020). The crude incidence of PTOA was calculated using the Aalen-Johansen estimator with a multistate model. The association of patient and operative factors with the development of PTOA after primary ACLR was modeled as a time to event using multistate Cox proportional hazards regression. Models stratified by age (<22 and ≥22 years) were also conducted because of the effect modification of age.

Results: The study sample included 41,976 cases of primary ACLR. The incidence of PTOA was 1.7%, 5.1%, and 13.6% at 2, 5, and 10 year follow-ups, respectively. Risk factors for PTOA that were consistently identified in the overall cohort and age-stratified groups included a body mass index ≥30 versus <30 and an allograft or quadriceps tendon autograft versus a hamstring tendon autograft. Patients presenting with knee pain after ACLR were further identified when considering postoperative factors. Other risk factors for PTOA in the overall cohort included age ≥22 versus <22 years, bone–patellar tendon–bone autograft versus hamstring tendon autograft, hypertension, cartilage injury, meniscal injury, revision after primary ACLR with concomitant meniscal/cartilage surgery, multiligament injury, other activity at the time of injury compared with sport, and tibial tunnel drilling technique rather than the anteromedial portal.

Conclusion: Knee pain after ACLR may be an early sign of PTOA. Surgeons should consider the adverse associations of a higher body mass index and an allograft or quadriceps tendon autograft with the development of PTOA, as these were factors identified with a higher risk, regardless of a patient's age at the time of primary ACLR.

BACK

Association of Serum Biochemical Biomarker Profiles of Joint Tissue Inflammation and Cartilage Metabolism With Posttraumatic Osteoarthritis-Related Symptoms at 12 Months After ACLR

C. Lisee, S. Obudzinski

DOI: https://doi.org/10.1177/03635465241262797

Background: Anterior cruciate ligament injury and anterior cruciate ligament reconstruction (ACLR) are risk factors for symptomatic posttraumatic osteoarthritis (PTOA). After ACLR, individuals demonstrate altered joint tissue metabolism indicative of increased inflammation and cartilage breakdown. Serum biomarker changes have been associated with tibiofemoral cartilage composition indicative of worse knee joint health but not with PTOA-related symptoms.

Purpose: The purpose of this study was to determine associations between changes in serum biomarker profiles from the preoperative sample collection to 6 months after ACLR and clinically relevant knee PTOA symptoms at 12 months after ACLR. It was hypothesized that increases in biomarkers of inflammation, cartilage metabolism, and cartilage degradation would be associated with clinically relevant PTOA symptoms after ACLR.

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

Methods: Individuals undergoing primary ACLR were included (N = 30). Serum samples collected preoperatively and 6 months after ACLR were processed to measure markers indicative of changes in inflammation (ie, monocyte chemoattract protein 1 [MCP-1]) and cartilage breakdown (ie, cartilage oligomeric matrix protein [COMP], matrix metalloproteinase 3, ratio of type II collagen breakdown to type II collagen synthesis). Knee injury and Osteoarthritis Outcome Score surveys were completed at 12 months after ACLR and used to identify participants with and without clinically relevant PTOA-related symptoms. K-means cluster analyses were used to determine serum biomarker profiles. One-way analyses of variance and logistic regressions were used to assess differences in Knee injury and Osteoarthritis Outcome Score subscale scores and clinically relevant PTOA-related symptoms between biomarker profiles.

Results: Two profiles were identified and characterized based on decreases (profile 1: 67% female; age, 21.4 ± 5.1 years; body mass index, 24.4 ± 2.4) and increases (profile 2: 33% female; age, 21.3 ± 3.2 years; body mass index, 23.4 ± 2.6) in sMCP-1 and sCOMP preoperatively to 6 months after ACLR. Participants with profile 2 did not demonstrate differences in knee pain, symptoms, activities of daily living, sports function, or quality of life at 12 months after ACLR compared to those with profile 1 ($P = .56$-$.81$; $\eta 2 = 0.002$-0.012). No statistically significant associations were noted between biomarker profiles and clinically relevant PTOA-related symptoms (odds ratio, 1.30; 95% CI, 0.23-6.33).

Conclusion: Serum biomarker changes in MCP-1 and sCOMP within the first 6 months after ACLR were not associated with clinically relevant PTOA-related symptoms.

BACK

The Association of Preoperative Hip Pain Duration With Delayed Achievement of Clinically Significant Outcomes After Hip Arthroscopic Surgery for Femoroacetabular Impingement Syndrome

M.J. Vogel, K. Jan

DOI: https://doi.org/10.1177/03635465241262336

Background: Patients with hip pain ≥2 years before hip arthroscopic surgery for femoroacetabular impingement syndrome (FAIS) have been shown to achieve inferior short-term and midterm outcomes compared with patients with a shorter pain duration, although there is limited literature that has evaluated the time to achieve clinically significant outcomes (CSOs) in this population.

Purpose: To compare the time to achieve CSOs after hip arthroscopic surgery for FAIS in patients with and without prolonged hip pain and to identify independent predictors of the delayed achievement of CSOs.

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

Methods: Patients who underwent primary hip arthroscopic surgery for FAIS between January 2012 and July 2019 with 6-month, 1-year, and 2-year Hip Outcome Score–Activities of Daily Living (HOS-ADL) and Hip Outcome Score–Sports Subscale (HOS-SS) scores were identified. Patients with prolonged hip pain (preoperative duration ≥2 years) were propensity score matched to a control group (preoperative duration <2 years), controlling for age, sex, and body mass index (BMI). The times to achieve the minimal clinically important difference and Patient Acceptable Symptom State were compared between groups using Kaplan-Meier survival analysis. Multivariate Cox regression considering age, sex, BMI, pain duration, activity level, and chondral status was used to identify independent predictors of the delayed achievement of CSOs.

Results: A total of 179 patients with prolonged hip pain were matched to 179 control patients (mean pain duration, 60.5 ± 51.2 vs 9.7 ± 5.1 months, respectively; $P < .001$) of a similar age, sex, and BMI ($P \geq .488$) with similar baseline HOS-ADL and HOS-SS scores ($P \geq .971$). The prolonged hip pain group showed delayed achievement of the minimal clinically important difference and Patient Acceptable Symptom State for both the HOS-ADL and HOS-SS on Kaplan-Meier analysis ($P \leq .020$). On multivariate Cox regression, hip pain duration ≥2 years was shown to be an independent predictor of the delayed achievement of CSOs, with hazard ratios ranging from 1.32 to 1.65 ($P \leq .029$). Additional independent predictors of the delayed achievement of CSOs included increasing age, increasing BMI, female sex, self-endorsed weekly participation in physical activity, and high-grade chondral defects (hazard ratio range, 1.01-4.89; $P \leq .045$).

Conclusion: Findings from this study demonstrate that preoperative hip pain duration ≥2 years was an independent predictor of the delayed achievement of CSOs after primary hip arthroscopic surgery for FAIS.

BACK

Hip Arthroscopy Versus Physical Therapy for the Treatment of Symptomatic Acetabular Labral Tears in Patients Older Than 40 Years: 24-Month Results From a Randomized Controlled Trial

S.D. Martin, M.C. Dean

DOI: https://doi.org/10.1177/03635465241263595

Background: The indications for hip arthroscopy in patients aged ≥40 years remain controversial, as observational studies have suggested that advanced age portends poor functional outcomes, poor durability of improvement, and high rates of conversion to total hip arthroplasty.

Purpose: To compare hip arthroscopy versus nonoperative management for symptomatic labral tears in patients aged ≥40 years with limited radiographic osteoarthritis.

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

Methods: This single-surgeon, parallel randomized controlled trial included patients aged ≥40 years with limited osteoarthritis (Tönnis grades 0-2) who were randomized 1:1 to arthroscopic surgery with postoperative physical therapy (SPT) or physical therapy alone (PTA). Patients who received PTA and achieved unsatisfactory improvement were permitted to cross over to SPT after completing ≥14 weeks of physical therapy (CO). The primary outcomes were the International Hip Outcome Tool-33 score and modified Harris Hip Score at 24 months after surgery, and secondary outcomes included other patient-reported outcome measures and the visual analog scale for pain. The primary analysis was performed on an intention-to-treat basis using linear mixed-effects models. Sensitivity analyses included modified as-treated and treatment-failure analyses.

Results: A total of 97 patients were included, with 52 (53.6%) patients in the SPT group and 45 (46.4%) patients in the PTA group. Of the patients who underwent PTA, 32 (71.1%) patients crossed over to arthroscopy at a mean of 5.10 months (SD, 3.3 months) after physical therapy initiation. In both intention-to-treat and modified as-treated analyses, the SPT group displayed superior mean patient-reported outcome measure and pain scores across the study period for nearly all metrics relative to the PTA group. In the treatment-failure analysis, the SPT and CO groups showed greater improvement across all metrics compared with PTA; however, post hoc analyses revealed no significant differences in improvement between the SPT and CO groups. No significant differences were observed between groups in rates of total hip arthroplasty conversion.

Conclusion: In patients ≥40 years of age with limited osteoarthritis, hip arthroscopy with postoperative physical therapy led to better outcomes than PTA at a 24-month follow-up. However, additional preoperative physical therapy did not compromise surgical outcomes and allowed some patients to avoid surgery. When surgery is indicated, age ≥40 years should not be considered an independent contraindication to arthroscopic acetabular labral repair.

BACK

Patient Factors Influencing Outcomes at 12-Year Follow-up of Hip Arthroscopy for Femoroacetabular Impingement

G. Champagne, J. Dartus

DOI: https://doi.org/10.1177/03635465241265721

Background: Arthroscopic treatment of femoroacetabular impingement has increased in popularity since the early 2000s when it was first described, although only a few midterm follow-up studies have been published.

Purpose: To describe the outcomes of patients undergoing hip arthroscopy for femoroacetabular impingement at a mean 12-year follow-up and to determine the risk factors for failure.

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

Methods: The Non-Arthritic Hip Score (NAHS) and a radiographic evaluation were completed preoperatively and at midterm follow-up. Participants were divided into 2 groups according to their clinical evolution. The success group consisted of patients whose NAHS at the final follow-up was above the established Patient Acceptable Symptom State (PASS) threshold of 81.9, whereas patients who underwent a second surgical intervention or did not reach the PASS threshold at final follow-up were assigned to the failure group. These groups were compared to identify preoperative differences in demographic, pathological, and surgical factors.

Results: A total of 95 hips were included, after 23 were lost to follow-up (80.5% follow-up). At a mean follow-up of 12.1 years (range, 9.2-16.0 years), 9 hips required total hip arthroplasty (9.5%), 5 required revision hip arthroscopy (5.3%), 29 did not achieve the NAHS PASS threshold (30.5%), and 52 achieved the NAHS PASS threshold (54.7%). The mean NAHS was 82.4 at final follow-up compared with 66.9 preoperatively (mean difference = 15.5; $P < .001$). Higher mean body mass index (24.9 vs 23.0; $P = .030$), older age (30.0 vs 27.2; $P = .035$), and inferior preoperative lateral joint space width (3.9 vs 4.4; $P = .019$) were associated with inferior prognosis in the failure group versus success group. Osteoarthritis progression was observed in 69.2% of the failure group and in 34.8% of the success group ($P = .082$). Labral ossification was observed in 78.3% of all patients, and its lateral projection length was statistically associated with failure ($P = .015$).

Conclusion: At a mean 12-year follow-up, hip arthroscopy for femoroacetabular impingement led to significant clinical improvement, with 55% PASS achievement. In total, 31% of patients were below the PASS threshold, 5% had revision arthroscopy, and only 9% had conversion to total hip arthroplasty for a 45% global failure rate. Increased body mass index, older age, and smaller preoperative lateral joint space width were significant negative prognostic factors. Postoperative degenerative changes were highly prevalent and demonstrated association with failure.

BACK

Midterm Outcomes After Simultaneous Hip Arthroscopic Surgery for Bilateral Femoroacetabular Impingement

E. Marty, C. Keeter

DOI: https://doi.org/10.1177/03635465241263597

Background: Bilateral hip arthroscopic surgery for the treatment of femoroacetabular impingement (FAI) has demonstrated good outcomes at short-term follow-up, with significant improvements in pain, hip function, and patient-reported outcomes, coupled with a complication rate similar to that of unilateral surgery.

Purpose: To investigate whether, in patients with bilateral symptomatic FAI, simultaneous bilateral hip arthroscopic surgery is an efficacious option that produces effective midterm outcomes.

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

Methods: A prospective database of patients who underwent primary hip arthroscopic surgery between August 2012 and October 2020 was used to collect clinical data on 2 groups. Group 1 consisted of patients who underwent simultaneous bilateral hip arthroscopic surgery for the treatment of FAI. Group 2 represented a matched-pair control group of patients selected based on sex and age with signs and symptoms of unilateral FAI and in whom a single side was evaluated and treated. Differences in the International Hip Outcome Tool–12 and Non-Arthritic Hip Score scores were evaluated up to 5 years postoperatively.

Results: In total, 171 patients (235 hips) were included, of whom 64 underwent simultaneous bilateral hip arthroscopic surgery (128 hips) and a control group of 107 patients (107 hips) underwent unilateral hip arthroscopic surgery. No significant differences were observed in International Hip Outcome Tool–12 scores between the 2 groups at 6 weeks, 3 months, 1 year, 2 years, and 5 years postoperatively. No significant differences were observed in Non–Arthritic Hip Score scores between the simultaneous bilateral and control groups at 6 weeks, 3 months, 6 months, 1 year, 2 years, and 5 years postoperatively. Overall, 18% of hips in the simultaneous bilateral group reported lateral femoral cutaneous nerve palsy at 2-week follow-up in comparison to 16% of hips in the control group.

Conclusion: Simultaneous bilateral hip arthroscopic surgery for the treatment of FAI represents a safe treatment option, producing effective midterm outcomes in appropriately selected patients.

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No Lower Extremity Abstracts

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Clinical Orthopaedics and Related Research (CORR), Volume 482, Issue 8

Hip Arthroscopy Improves Sexual Function in Receptive Partners with Femoroacetabular Impingement Syndrome

N.D. Rynecki T. Matthew

DOI: 10.1097/CORR.0000000000003016

Background: Hip pain due to femoroacetabular impingement (FAI) is thought to adversely impact sexual satisfaction because of exacerbation of symptoms with hip ROM. However, the effect of FAI on sexual satisfaction and improvement after surgery to treat FAI is largely absent from published studies, despite patients' apparent interest in it as registered by the frequent appearance of these topics on online anonymous discussion platforms. In addition, details regarding its impact on the decision to pursue surgery and the success of hip arthroscopy in alleviating FAI-related sexual dysfunction based on the specific role assumed during intercourse (penetrative versus receptive) remains unknown.
Questions/purposes: Given that sexual intercourse involves different amounts of hip ROM depending on whether patients assume the penetrative or receptive role, this study evaluated the effect of FAI and hip arthroscopy on sexual activity based on role. Compared with patients who participate in the penetrative role during sexual intercourse, do patients who participate in the receptive role (1) experience greater difficulty with sexual function because of FAI symptoms, (2) take longer to return to sexual intercourse after hip arthroscopy, and (3) experience greater improvements in reported sexual function after hip arthroscopy for FAI?

Methods: This was a retrospective cohort study of patients undergoing hip arthroscopy for FAI. Between January 2017 and December 2021, 293 patients were treated with hip arthroscopy for FAI and enrolled in our longitudinally maintained database. Among all patients treated surgically, 184 patients were determined to be potentially eligible for study inclusion based on a minimum follow-up of 6 months postoperatively. The 6-month timepoint was chosen based on published data suggesting that at this timepoint, nearly 100% of patients resumed sexual intercourse with minimal pain after hip arthroscopy. Of the potentially eligible patients, 33% (61 patients) could not be contacted by telephone to obtain verbal consent for participation and 9% (17 patients) declined participation, leaving 106 eligible patients. Electronic questionnaires were sent to all eligible patients and were returned by 58% (61 patients). Forty-two percent of eligible patients (45) did not respond to the questionnaire and were therefore excluded from the analysis. Two percent (2) completed most survey questions but did not specify their role during intercourse and were therefore excluded. The mean age of included patients was 34 ± 9 years, and 56% were women The mean follow-up time was 2 ± 1 years. In total, 63% of included patients reported participating in the receptive role during sexual intercourse (49% receptive only and 14% both receptive and penetrative). Hip symptoms during sexual intercourse preoperatively and postoperatively were evaluated using a questionnaire created by our team to answer our study questions, drawing from one of the only published studies on the matter and combining the questionnaire with sexual position–specific questions garnered from arthroplasty research. Patients who reported participating in the receptive role during intercourse (either exclusively or in addition to the penetrative role) were compared with those who participated exclusively in the penetrative role. There were no specific postoperative recommendations in terms of the timing of return to sexual intercourse, other than to resume when comfortable.

Results: Overall, 61% of patients (36 of 59) reported that hip pain somewhat or greatly interfered with sexual intercourse preoperatively. Patients who participated in receptive intercourse were more likely to experience preoperative hip pain that interfered with intercourse than patients who participated exclusively in penetrative intercourse (odds ratio 5 [95% confidence interval 2 to 15]; $p < 0.001$). Postoperatively, there was no difference in time until return to sexual activity between those in the penetrative group (median 6 weeks [range 2 to 14 weeks]) and those in the receptive group (median 6 weeks [range 4 to 14 weeks]; $p = 0.28$). Postoperatively, a greater number of

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patients participating in the penetrative role reported no or very little pain, compared with patients participating in the receptive role (67% [14 of 21] versus 49% [17 of 35]). However, with regard to preoperative to postoperative improvement, patients who participated in the receptive role had greater pain with positions involving more hip flexion and abduction and experienced a greater improvement than their penetrative counterparts in these positions postoperatively. Despite this improvement, however, 33% of patients (7 of 21) participating in the penetrative role and 51% of patients (18 of 35) participating in the receptive role continued to report either some or a great amount of pain at final follow-up.

Conclusion: Hip pain secondary to FAI interferes with sexual relations, particularly for partners who participate in the receptive role. Postoperatively, both patients participating in receptive and penetrative intercourse resumed sexual intercourse at a median of 6 weeks. After hip arthroscopy, the greatest improvement in pain was seen in receptive partners during sexual positions that involved more hip flexion and abduction. Despite this improvement, most patients, regardless of sexual role assumed, reported some degree of residual pain. Patients planning to undergo arthroscopic surgery for FAI, particularly those who participate in receptive intercourse, should be appropriately counseled about reasonable postoperative expectations based on our findings.

Level of Evidence: Level III, therapeutic study.

BACK

Bone and Joint Journal (BJJ), Volume 106-B, issue 8

Radiological predictors of outcomes in hip arthroscopy for femoroacetabular impingement

M. Wagner, L. Schaller

DOI: https://doi.org/10.1302/0301-620x.106b8.bjj-2023-1478.r2

Aims: Hip arthroscopy has gained prominence as a primary surgical intervention for symptomatic femoroacetabular impingement (FAI). This study aimed to identify radiological features, and their combinations, that predict the outcome of hip arthroscopy for FAI.

Methods: A prognostic cross-sectional cohort study was conducted involving patients from a single centre who underwent hip arthroscopy between January 2013 and April 2021. Radiological metrics measured on conventional radiographs and magnetic resonance arthrography were systematically assessed. The study analyzed the relationship between these metrics and complication rates, revision rates, and patient-reported outcomes.

Results: Out of 810 identified hip arthroscopies, 359 hips were included in the study. Radiological risk factors associated with unsatisfactory outcomes after cam resection included a dysplastic posterior wall, Tönnis grade 2 or higher, and over-correction of the α angle. The presence of acetabular retroversion and dysplasia were also significant predictors for worse surgical outcomes. Notably, over-correction of both cam and pincer deformities resulted in poorer outcomes than under-correction.

Conclusion: We recommend caution in performing hip arthroscopy in patients who have three positive acetabular retroversion signs. Acetabular dysplasia with a lateral centre-edge angle of less than 20° should not be treated with isolated hip arthroscopy. Acetabular rim-trimming should be avoided in patients with borderline dysplasia, and care should be taken to avoid over-correction of a cam deformity and/or pincer deformity.

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