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BACK

Upper extremity

Journal of Arthroscopy, Volume 38, Issue 11

Anterolateral Acromioplasty Does Not Change the Critical Shoulder Angle and Acromion Index in a Clinically Relevant Amount

S. Thiesemann, F. Kirchner, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.06.018

Purpose
Assessment on whether radiographic parameters of the acromion measured in radiographs change significantly after anterolateral acromioplasty.

Methods
This retrospective study included patients that underwent an arthroscopic anterolateral acromioplasty between January 2014 and September 2020. n = 435 subjects with high-quality preoperative and postoperative radiographs according to Suter-Henninger criteria were included in the final assessment. All measurements were independently performed by the first and second author in a blinded fashion using dicomPACS software: acromion index (AI), critical shoulder angle (CSA), lateral acromial angle (LAA), beta angle, acromio-humeral distance (AHD), Aoki angle, frontal supraspinatus outlet angle (FSOW), and acromion type, according to Bigliani. SPSS software was used for statistical analysis.

Results
The beta angle and the CSA did not significantly change after operation (alpha power 0.32 and 0.11, respectively). In a subgroup analysis of patients with a pathological CSA >35° (n = 194), the CSA changed from 38.62 (range: 35.08-47.52, SD 2.83) to 38.04 (range: 29.18-48.12, SD 3.77) postoperatively (P = .028) (Fig 8). All other parameters changed significantly after operation (AI, AHD, FSOW, and Aoki; P = .001, LAA; P = .039) (Fig. 9). The interobserver and intraobserver reliability was good to excellent in the majority of measured values. Mean patient age was 59.2 years (range: 18.1-87.1; SD 11.3), mean height was 1.73 meters (range: 1,50-1.98, SD 0.09), mean weight was 80.2 kg (range: 37.0-133.0, SD 16.68), and mean body mass index was 26.6 (range: 0.0-46.1, SD 4.73).

Conclusion
Anterolateral acromioplasty producing a flat acromion undersurface did not result in a significant change of the CSA in the study population. Pathological preoperative CSA values of >35° were significantly reduced but not to normal values, but only by a small amount that puts the clinical relevance into question.

Level of Evidence
IV, diagnostic study, case series

BACK

Black Race, Hispanic Ethnicity, and Medicaid Insurance Are Associated With Lower Rates of Rotator Cuff Repair in New York State

A. Hwang, L. Zhang, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.06.028

Purpose

To determine the use of operative rotator cuff repair for rotator cuff pathology in New York State and analyze the racial, ethnic, and income-based disparities in receiving rotator cuff repair.

Methods

A retrospective review of the Statewide Planning and Research Cooperative System Database of New York State was conducted to include patients with a new diagnosis of rotator cuff tear between July 1, 2017, and June 30, 2019, with at least 6 months of follow-up. Bivariate analysis using $\chi 2$ tests and multivariable logistic regression models were used to determine racial, ethnic, and income-based disparities in the use of surgical treatment with rotator cuff repair.

Results

A total of 87,660 patients were included in the study. Of these, 36,422 patients (41.5%) underwent surgical treatment with rotator cuff repair. Multivariable analysis showed that Black race (adjusted odds ratio [aOR] 0.78; 95% confidence interval [CI] 0.69-0.87; P < .001), Hispanic/Latino ethnicity (aOR 0.91; 95% CI 0.85-0.97); P = .004), and Medicaid (aOR 0.75; 95% CI 0.70-0.80; P < .001), or other government insurance (aOR 0.82; 95% CI 0.78-0.86; P < .001) were independently associated with lower rates of rotator cuff repair. Male sex (aOR 1.18; 95% CI 1.14-1.22; P < .001), Asian race (aOR 1.27; 95% CI 1.00-1.62; P = .048), workers' compensation insurance (aOR 1.12; 95% CI 1.07-1.18; P < .001), and greater home ZIP code income quartile (aOR 1.19; 95% CI 1.09-1.30; P < .001) were independently associated with greater rates of operative management. Although race was an independent covariate affecting rate of rotator cuff repair, the effects of race were altered when accounting for the other covariates, suggesting that race alone does not account for the differences in rate of surgery for rotator cuff pathology.

Conclusions

In this analysis of all adult patients presenting with rotator cuff tears to New York hospital systems from 2017 to 2019, we identified significant racial, ethnic, and socioeconomic disparities in the likelihood of rotator cuff repair surgery for patients with rotator cuff tears. These include lower rates of rotator cuff repair for those Black, Hispanic, and low-income populations as represented by Medicaid insurance and low home ZIP code income quartile.

Clinical Relevance

This study reports disparities in the use of rotator cuff repair for individuals with rotator cuff pathology.

BACK

Journal of Shoulder and elbow surgery, November 2022, volume 30, issue 11, pages p2211-2216

The effect of tranexamic acid for visualization on pump pressure and visualization during arthroscopic rotator cuff repair: an anonymized, randomized controlled trial

Nicholson, T.A., Kirsch, J.M. et al.

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

Background
Tranexamic acid (TXA) has been used surgically to decrease blood loss. The ability of TXA to improve arthroscopic visualization and allow for reduction in pump pressure is unknown. The purpose of this study was to determine the effect of intravenous (IV) TXA on change in pump pressure and visualization during arthroscopic rotator cuff repair.

Methods
This was a single-center, prospective, randomized, double-anonymized controlled trial. Patients with full-thickness rotator cuff tears undergoing operative repair were enrolled. Patients were randomized to receive 1 g of IV TXA preoperatively or no TXA (control group). All patients underwent arthroscopy using saline irrigation fluid with 3 mL epinephrine injected into the first 1000-mL saline bag. Total operative time, final pump pressure, number of increases in pump pressure, total amount of irrigation fluid used, blood pressure and anesthesia medical interventions for blood pressure were recorded. Visualization was measured by a visual analog scale (VAS) completed by the surgeon at the end of the case. Postoperative VAS pain scores were obtained 24 hours after surgery. The primary aim of this study was to investigate the effect that IV TXA has on change in pump pressure (ΔP) during shoulder arthroscopy, with a ΔP of 15 mm Hg set as a threshold for clinical significance.

Results
There were 50 patients randomized to the TXA group and 50 patients in the no TXA group. No significant differences were found between the TXA group and the control group regarding any measure of pump pressure, including the final arthroscopic fluid pump pressure (44.5 ± 8.1 mm Hg vs. 42.0 ± 8.08 mm Hg, P = .127), the mean ΔP (20.9 ± 10.5 mm Hg vs. 21.8 ± 8.5 mm Hg, P = .845), or the number of times a change in pump pressure was required (1.7 ± 0.9 vs. 1.7 ± 0.8, P = .915). Overall arthroscopic visualization was not significantly different between the TXA group and the control group (7.2 ± 1.8 vs. 7.4 ± 1.6, P = .464). No significant difference existed between the TXA and control groups regarding postoperative pain scores assessed by VAS pain scale (4.1 ± 2.0 vs. 4.3 ± 1.9, P = .519) at 24 hours after surgery.

Conclusion
The use of IV TXA demonstrated no measurable improvement in surgeon ability to maintain a lower pump pressure during arthroscopic rotator cuff repair. Additionally, there was no measurable improvement in arthroscopic visualization or early pain scores.

Level of evidence
Level II, Randomized Controlled Trial, Treatment Study

BACK

Humeral head coverage in arthroscopic partial repair of massive rotator cuff tears improves functional outcomes: an analysis of influential factors

Jung, S., Kim, D.H. et al.

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

Background

Although partial rotator cuff repair has shown good outcomes, differences in clinical outcomes remain concerns. This study was performed to determine whether patients with humeral head coverage would show better functional outcomes than patients without humeral head coverage and to identify the factors for humeral head coverage after arthroscopic partial repair of massive tears.

Methods

We performed a retrospective study of 63 patients with massive rotator cuff tears who underwent arthroscopic partial repair between 2012 and 2018. Two to four margin convergences were first performed; then, the Mason-Allen technique was performed. The patients were divided into 2 groups: those with humeral head coverage (38 cases) and those without humeral head coverage (25 cases). The following factors were evaluated: age; sex; hypertension; diabetes; osteoporosis; preoperative and postoperative pseudoparalysis, visual analog scale (VAS) pain score, Constant score, acromiohumeral distance, and subacromial bony spur; and subscapularis tear and repair. Muscle atrophy and fatty degeneration were evaluated by magnetic resonance imaging preoperatively, and the integrity of the repaired cuff was evaluated by ultrasonography at a minimum of 2 years after surgery.

Results

Compared with preoperative values, significant improvements in VAS pain scores (from 6.27 to 2.32 in patients with humeral head coverage and from 7.00 to 2.81 in those without humeral head coverage) and Constant scores (from 51.35 to 75.95 and from 44.62 to 69.81, respectively) were observed in both groups ($P < .001$). Statistical analysis revealed that postoperative VAS pain scores (2.32 vs. 2.81) and Constant scores (75.95 vs. 69.81) in patients with humeral head coverage were superior to those in patients without humeral head coverage ($P = .044$ and $P = .003$, respectively). The integrity of the repaired cuff was evaluated by ultrasonography, and partial tears were found in 4 of 37 patients with humeral head coverage and 2 of 26 patients without humeral head coverage ($P = .816$). Univariable logistic regression analysis revealed that age ($P < .001$), comorbidity ($P = .005$), symptom duration ($P = .023$), preoperative shoulder mobility ($P < .001$), maintained acromiohumeral distance ($P = .006$), subscapularis tear ($P = .026$), and less preoperative supraspinatus and infraspinatus muscle atrophy ($P = .001$ and $P = .010$, respectively) had significant correlations with humeral head coverage.

Conclusions

Overall satisfactory results were achieved in most patients regardless of high retear rates, but patients with partial repair covering the humeral head were associated with better outcomes than patients without humeral head coverage. Multivariable regression analysis revealed that age (<70 years, $P = .003$), capability of shoulder mobility ($P = .005$), maintenance of the acromiohumeral space (>7 mm, $P = .016$), and less atrophy of the rotator cuff muscles ($P = .021$) were favorable factors to achieve humeral head coverage during surgical partial repair of massive rotator cuff tears.

Level of evidence

Level III, Retrospective Cohort Comparison, Prognosis Study

BACK

Identifying modifiable and nonmodifiable cost drivers of ambulatory rotator cuff repair: a machine learning analysis

Lu, Y., Labott, J.R. et al.

DOI: https://doi.org/10.1016/j.jse.2022.04.008

Introduction

Implementing novel tools that identify contributors to the cost of orthopedic procedures can help hospitals maximize efficiency, minimize waste, improve surgical decision-making, and practice value-based care. The purpose of this study was to develop and internally validate a machine learning algorithm to identify key drivers of total charges after ambulatory arthroscopic rotator cuff repair and compare its performance with a state-of-the-art statistical learning model.

Methods

A retrospective review of the New York State Ambulatory Surgery and Services Database was performed to identify patients who underwent elective outpatient rotator cuff repair (RCR) from 2015 to 2016. Initial models were constructed using patient characteristics (age, gender, insurance status, patient income, Elixhauser Comorbidity Index) as well as intraoperative variables (concomitant procedures and services, operative time). These were subsequently entered into 5 separate machine learning algorithms and a generalized additive model using natural splines. Global variable importance and partial dependence curves were constructed to identify the greatest contributors to cost.

Results

A total of 33,976 patients undergoing ambulatory RCR were included. Median total charges after ambulatory RCR were $16,017 (interquartile range: $11,009-$22,510). The ensemble model outperformed the generalized additive model and demonstrated the best performance on internal validation (root mean squared error: $7112, 95% confidence interval: 7036-7188; logarithmic root mean squared error: 0.354, 95% confidence interval: 0.336-0.373, R2: 0.53), and identified major drivers of total charges after RCR as increasing operating room time, patient income level, number of anchors used, use of local infiltration anesthesia/peripheral nerve blocks, non-White race/ethnicity, and concurrent distal clavicle excision. The model was integrated into a web-based open-access application capable of providing individual predictions and explanations on a case-by-case basis.

Conclusion

This study developed an ensemble supervised machine learning algorithm that outperformed a sophisticated statistical learning model in predicting total charges after ambulatory RCR. Important contributors to total charges included operating room time, duration of care, number of anchors used, type of anesthesia, concomitant distal clavicle excision, community characteristics, and patient demographic factors. Generation of a patient-specific payment schedule based on the Agency for Healthcare Research and Quality risk of mortality highlighted the financial risk assumed by physicians in flat episodic reimbursement schedules given variable patient comorbidities and the importance of an accurate prediction algorithm to appropriately reward high-value care at low costs.

Level of evidence

Level IV, Economic Analysis

BACK

Arthroscopic lateral collateral ligament imbrication of the elbow: short-term clinical results
Kohlprath, R., Vuylsteke, K. et al.

DOI: https://doi.org/10.1016/j.jse.2022.06.001

Introduction
Chronic posterolateral rotatory instability (PLRI) of the elbow results from an insufficient lateral collateral ligament (LCL) complex. Arthroscopic LCL imbrication may prove a minimally invasive alternative to open lateral ulnar collateral ligament (LUCL) reconstruction with a quicker rehabilitation. The purpose of this study is to analyze the validity of a modified arthroscopic imbrication technique. We hypothesized that arthroscopic LUCL imbrication would yield stable elbows in patients with grade 1 or 2 chronic PLRI at a minimum of 2 year of follow-up.

Methods
We retrospectively assessed data of all PLRI patients who underwent arthroscopic LUCL imbrication from 2010 to 2013 (n = 20). Stage 3 PLRIs (frank ulnohumeral dislocations) were excluded from this treatment. After confirmation of PLRI during standard elbow arthroscopy, a doubled absorbable suture is shuttled through as much LCL tissue as possible (from the lateral ulnar border to the area proximal to the lateral epicondyle) and the sutures are tied. This results in a plication of the entire LCL complex. Objective elbow stability was assessed using a combination of the pivot shift, table top, and posterior drawer tests.

Result
Of 20 included patients, 18 were stable subjectively and objectively at a minimum of 2 year of follow-up. Mean Mayo Elbow Performance Score improved from 48 preoperatively to 88.9 at final follow-up ($P < .001$). Mean Quick-Disabilities of the Arm, Shoulder, and Hand score improved from 53 preoperatively to 10.3 at final follow-up ($P < .001$). One patient developed elbow stiffness. Two patients reported tenderness of the subcutaneous PDS knots.

Conclusion
As a less invasive alternative to open LCL reconstruction using a graft, arthroscopic LCL imbrication has demonstrated acceptable rates of perceived elbow stability among patients with stage 1 or 2 PLRI.

Level of evidence
Level IV, Case Series, Treatment Study

BACK

Knee Surgery, Sports Traumatology, Arthroscopy, November 2022, volume 30, issue 11, Pages: 3818 - 3826

Microinstability characterised by small and easily overlooked anterior labral or Hill–Sachs lesions can be managed with arthroscopic anterior labral repair

Kim, S.C., Kim, K.H. et al.

DOI: https://doi.org/10.1007/s00167-022-06941-4

Purpose

Some young individuals present with shoulder pain without a definite history or complaint of instability. However, careful history taking, physical examination, and high-quality magnetic resonance imaging may reveal evidence of instability of which the patient is unaware. Therefore, a clearer definition of these ambiguous patients is needed. This study aimed to report the characteristics and surgical outcomes of patients with microinstability compared to those of patients with classic recurrent anterior shoulder instability.

Methods

From 2005 to 2018, 35 patients with microinstability (group M) underwent arthroscopic anterior labral repair (AALR) and were compared to 35 sex- and age-matched patients with classic recurrent anterior shoulder instability (group C) who also underwent AALR. Baseline characteristics, preoperative apprehension test findings, preoperative imaging for the presence of anterior labral and Hill–Sachs lesions, preoperative and postoperative (over 2 years) range of motion (ROM) and functional scores, final complications, and patient satisfaction were analysed.

Results

The most common chief complaints in groups M and C were pain (29/35) and both pain and instability (27/35), respectively. Only pain during the apprehension test was predominant in group M (M vs. C, 27 vs. 1, $p < 0.001$). High incidence of chronic repetitive injuries (26/35) and acute trauma (28/35) were observed in groups M and C, respectively. Over half of the patients in group M showed anterior labral lesions on magnetic resonance arthrography (MRA, 18/35), and 21 patients had Hill–Sachs lesions on MRA/three-dimensional computed tomography. Finally, 29 patients showed either anterior labral or Hill–Sachs lesions on preoperative imaging. The lesion severity was higher in group C than that in group M. All patients underwent AALR with/without the remplissage procedure, with no significant differences in final clinical outcomes, complications, and patient satisfaction between the groups.

Conclusions

Microinstability is diagnostically challenging and can be diagnosed in young patients with ambiguous shoulder pain during motion, without instability. Pain on anterior apprehension test and subtle labral and/or Hill–Sachs lesion on imaging study could be diagnostic clues. This condition can be managed with arthroscopic anterior labral repair with or without the remplissage procedure. The possibility of microinstability in young patients with shoulder pain should always be considered, and small anterior labral or Hill–Sachs lesions should be closely monitored.

Level of evidence

III.

BACK

Arthroscopic Bankart repair with additional footprint fixation using the double-row technique at the 4 o'clock position anatomically restored the capsulolabral complex and showed good clinical results

Itoigawa, Y., Uehara, H. et al.

DOI: https://doi.org/10.1007/s00167-022-06974-9

Purpose

To investigate the clinical outcome and magnetic resonance imaging (MRI) findings after arthroscopic Bankart repair with additional double anchor footprint fixation (DAFF) at the 4 o'clock position, where the native footprint is widest anatomically, for recurrent anterior shoulder instability.

Methods

Forty-two patients (mean age 27.0 years) with recurrent anterior shoulder instability and without severe glenoid bone defects underwent arthroscopic Bankart repair with additional DAFF at the 4 o'clock position. Using three standard portals, single-row repair was performed at the 2, 3, and 5 o'clock positions, and DAFF with the suture bridging technique was conducted at the 4 o'clock position. MRI was performed preoperatively and at 6 months postoperatively. Patients with follow-up periods of ≥1 year were included in the present study and clinically evaluated at the final follow-up. The morphology at the 2 and 4 o'clock positions on radial MRI slices was compared between the preoperative and 6-month postoperative scans, and the footprint of the repaired capsulolabral complex at 6 months postoperatively was compared between the 2 and 4 o'clock positions.

Results

The average follow-up period was 19.5 ± 6.2 months. The rates of dislocation recurrence and positive apprehension test results were 2.4 and 4.8%, respectively. External rotation was restricted by 3.5°. The University of California at Los Angeles and Rowe scores at the final follow-up were 34.5 ± 1.0 points and 97.2 ± 5.7 points, respectively, representing significant improvements over the preoperative scores ($p < 0.01$). Although the capsulolabral complex at 6 months postoperatively was firmly repaired at both the 2 and 4 o'clock positions compared to its preoperative state, the footprint of the restored capsulolabral complex was wider at the 4 o'clock position than at the 2 o'clock position ($p < 0.01$).

Conclusions

Additional DAFF at the 4 o'clock position improved the glenohumeral stability and function of the shoulder joint. This study suggests that this technique is a reliable and useful treatment for shoulder instability.

Level of evidence

IV.

BACK

Knotless PEEK and double-loaded biodegradable suture anchors ensure comparable clinical outcomes in the arthroscopic treatment of traumatic anterior shoulder instability: a prospective randomized study

Saccomanno, M.F., Cerciello, S. et al.

DOI: https://doi.org/10.1007/s00167-022-06969-6

Purpose

To compare the clinical outcome of arthroscopic capsulolabral repair for traumatic anterior shoulder instability with PEEK knotless and knotted biodegradable suture anchors.

Methods

Arthroscopic stabilization was performed in 78 patients with recurrent traumatic anterior shoulder instability. They were divided into 2 groups of 39 patients each, according to suture anchors used: knotless PEEK anchors in group 1, and biodegradable anchors in group 2. Exclusion criteria were: instability without dislocation, posterior or multidirectional instability, glenoid bone loss > 20%, off-track lesions, concomitant rotator cuff tears and previous surgery. The primary outcome was the Disabilities of the Arm, Shoulder and Hand (DASH) self-administered questionnaire. Secondary outcomes were: Work-DASH, Sport-DASH, Rowe score, recurrent instability and subsequent surgery. The following independent variables were considered: age, gender, dominance, generalized ligamentous hyperlaxity, duration of symptoms, age at first dislocation, number of dislocations, type of work, type of sport, sports activity level, capsule-labral injury pattern, SLAP lesion and number of anchors. Differences between groups for numerical variables were analyzed by use of the Student's t-test or Mann–Whitney U-test. Fisher's exact test was used for analysis of categorical variables. Significance was set at $p < 0.05$.

Results

Seven patients (9%) were lost at follow-up, 5 from group 1 and 2 from group 2. Follow-up ranged from 36 to 60 months (median: 44; IQR: 13). Comparison between groups did not show significant differences for each independent variable considered. No differences could be found either for DASH (n.s.) or Rowe (p = n.s.) scores between the two groups. Overall recurrence rate was 7%. Three re-dislocations were reported in group 1 and two in group 2 (n.s.). Only one patient in each group underwent re-operation.

Conclusions

The study showed no significant differences in clinical outcomes after arthroscopic treatment of traumatic anterior shoulder instability using PEEK knotless or biodegradable knotted anchors at mid-term follow-up.

Level of evidence

I.

BACK

Patch augmentation does not provide better clinical outcomes than arthroscopic rotator cuff repair for large to massive rotator cuff tears

Choi, S., Kim, G. et al.

DOI: https://doi.org/10.1007/s00167-022-06975-8

Purpose

Patch augmentation for large and massive rotator cuff tears (LMRCTs) has been suggested as a repair strategy that can mechanically reinforce tendons and biologically enhance healing potential. The purpose of this study was to determine whether patients who underwent patch augmentation would have lower rates of retears and superior functional outcomes.

Methods

Patients who underwent arthroscopic rotator cuff repair (ARCR) with patch augmentation (group A) were matched by age, sex, degree of retraction, and supraspinatus muscle occupation ratio to those treated with ARCR without using a patch (group B) with a minimum follow-up of 24 months. The retear (Sugaya IV or V) rates were evaluated by magnetic resonance imaging at 3 and 12 months post-surgery. The Constant– Murley Score (CMS), Korean Shoulder Score (KSS), and University of California-Los Angeles Shoulder Rating Scale (UCLA) score were retrospectively analyzed.

Results

This study included 34 patients (group A, n = 17; group B, n = 17). The mean follow-up period was 46.5 ± 17.4 months. At postoperative 1-year follow-up, group B (6 patients, 35.3%) showed higher rates of retears than group A (1 patient, 5.9%), which was statistically significant (P = 0.034). However, the postoperative CMS, KSS, and UCLA scores did not differ between the two groups at 3 months, 12 months, and the final follow-up. Additionally, the clinical outcomes of patients with retear were not significantly different from those of the healed patients in both groups.

Conclusion

The use of an allodermal patch for LMRCT is effective in preventing retears without complications. However, the clinical outcomes of ARCR using allodermal patch augmentation were not superior to those of only ARCR.

Level of evidence

III.

BACK

American Journal of Sports Medicine (AJSM), Volume 50, Issue 13

Inconsistencies in Controlling for Risk Factors for Recurrent Shoulder Instability After Primary Arthroscopic Bankart Repair: A Systematic Review

Nicholas A. Trasolini MD Navya Dandu BS, Eric N. Azua BS, Grant E. Garrigues MD, Nikhil N. Verma MD, Adam B. Yanke MD, PhD

First published 30 September, 2021; pp. 3705–3713

https://doi.org/10.1177/03635465211038712

Background: Failure rates after arthroscopic shoulder stabilization are highly variable in the current orthopaedic literature. Predictive factors for risk of failure have been studied to improve patient selection, refine surgical techniques, and define the role of bony procedures. However, significant heterogeneity in the analysis and controlling of risk factors makes evidence-based management decisions challenging.

Purpose: The goals of this systematic review were (1) to critically assess the consistency of reported risk factors for recurrent instability after arthroscopic Bankart repair, (2) to identify the existing studies with the most comprehensive inclusion of confounding factors in their analyses, and (3) to give recommendations for which factors should be reported consistently in future clinical studies.

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

Methods: A systematic review of the literature was performed in accordance with the PRISMA guidelines. An initial search yielded 1754 titles, from which 56 full-text articles were screened for inclusion. A total of 29 full-text articles met the following inclusion criteria: (1) clinical studies regarding recurrent anterior shoulder instability; (2) surgical procedures performed including arthroscopic anterior labral repair; (3) reported clinical outcome data including failure rate; and (4) assessment of risk factors for surgical failure. Further subanalyses were performed for 15 studies that included a multivariate analysis, 17 studies that included glenoid bone loss, and 8 studies that analyzed the Instability Severity Index Score.

Results: After full-text review, 12 of the most commonly studied risk factors were identified and included in this review. The risk factors that were most consistently significant in multivariate analyses were off-track lesions (100%), glenoid bone loss (78%), Instability Severity Index Score (75%), level of sports participation (67%), number of anchors (67%), and younger age (63%). In studies of bone loss, statistical significance was more likely to be found using advanced imaging, with critical bone loss thresholds of 10% to 15%. Several studies found predictive thresholds of 2 to 4 for Instability Severity Index Score by receiver operating characteristic or multivariate analysis.

Conclusion: Studies reporting risk factors for failure of arthroscopic Bankart repair often fail to control for known confounding variables. The factors with the most common statistical significance among 15 multivariate analyses are off-track lesions, glenoid bone loss, Instability Severity Index Score, level of sports participation, number of anchors, and younger age. Studies found significance more commonly with advanced imaging measurements or arthroscopic assessment of glenoid bone loss and with lower thresholds for the Instability Severity Index Score (2-4). Future studies should attempt to control for all relevant factors, use advanced imaging for glenoid bone loss measurements, and consider a lower predictive threshold for the Instability Severity Index Score.

BACK

Lower Extremity

Journal of Arthroscopy, Volume 38, Issue 11

Preoperative Magnetic Resonance Imaging Offers Questionable Clinical Utility, Delays Time to Hip Arthroscopy, and Lacks Cost-Effectiveness in Patients Aged ≤40 Years With Femoroacetabular Impingement Syndrome: A Retrospective 5-Year Analysis

P.N. Ramkumar, J. Matthew Helm, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.03.025

Purpose
To assess the clinical utility of preoperative magnetic resonance imaging (MRI) and quantify the delay in surgical care for patients aged ≤40 years undergoing primary hip arthroscopy with history, physical examination, and radiographs concordant with femoroacetabular impingement syndrome (FAIS).
Methods
From August 2015 to December 2020, 1,786 consecutive patients were reviewed from the practice of 1 fellowship-trained hip arthroscopist. Inclusion criteria were FAIS, primary surgery, and age ≤40 years. Exclusion criteria were MRI contraindication, reattempt of conservative management, or concomitant periacetabular osteotomy. After nonoperative treatment options were exhausted and a surgical plan was established, patients were stratified by those who presented with versus without MRI. Those without existing MRI received one, and any deviations from the surgical plan were noted. All preoperative MRIs were compared with office evaluation and intraoperative findings to assess agreement. Demographic data, Hip Disability and Osteoarthritis Outcome Score (HOOS)-Pain, and time from office to MRI or arthroscopy were recorded.
Results
Of the patients indicated by history, physical examination, and radiographs alone (70% female, body mass index 24.8 kg/m2, age 25.9 years), 198 patients presented without MRI and 934 with MRI. None of the 198 had surgical plans altered after MRI. Patients in both groups had MRI findings demonstrating anterosuperior labral tears that were visualized and repaired intraoperatively. Mean time from office to arthroscopy for patients without MRI versus those with was 107.0 ± 67 and 85.0 ± 53 days, respectively ($P < .001$). Time to MRI was 22.8 days. No difference between groups was observed among the 85% of patients who surpassed the HOOS-Pain minimal clinically important difference (MCID).
Conclusion
Once indicated for surgery based on history, physical examination, and radiographs, preoperative MRI did not alter the surgical plan for patients aged ≤40 years with FAIS undergoing primary hip arthroscopy. Moreover, preoperative MRI delayed time to arthroscopy. The necessity of routine preoperative MRI in the young primary FAIS population should be challenged.

BACK

Patient-Reported Outcomes Measurement Information System Mobility Computerized Adaptive Testing Maintains High Correlation and Low Test Burden Compared With Legacy Hip-Specific Instruments in Patients Undergoing Hip Arthroscopy for Femoroacetabular Impingement

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

DOI: https://doi.org/10.1016/j.arthro.2022.03.038

Purpose

To evaluate the reliability, construct validity, and responsiveness of the lower extremity–specific Patient-Reported Outcomes Measurement Information System (PROMIS) Mobility (MO) bank in patients who underwent hip arthroscopic surgery for femoroacetabular impingement.

Methods

Patients who underwent primary hip arthroscopic surgery at a large academic musculoskeletal specialty center between November 2019 and November 2020 completed the following baseline and 6-month measures: PROMIS MO, PROMIS Pain Interference (PI), PROMIS Physical Function (PF), modified Harris Hip Score, International Hip Outcome Tool 33, visual analog scale, and Single Assessment Numeric Evaluation. Construct validity was evaluated using Spearman correlation coefficients. The number of questions until completion was recorded as a marker of test burden. The percentage of patients scoring at the extreme high (ceiling) or low (floor) for each measure was recorded to measure inclusivity. Responsiveness was tested by comparing differences between baseline and 6-month measures, controlling for age and sex, using generalized estimating equations. Magnitudes of responsiveness were assessed through the effect size (Cohen d).

Results

In this study, 660 patients (50% female patients) aged 32 ± 14 years were evaluated. PROMIS MO showed a strong correlation with PROMIS PF ($r = 0.84$, $P < .001$), the International Hip Outcome Tool 33 ($r = 0.73$, $P < .001$), PROMIS PI ($r = –0.76$, $P < .001$), and the modified Harris Hip Score ($r = 0.73$, $P < .001$). Neither PROMIS MO, PROMIS PI, nor PROMIS PF met the conventional criteria for floor or ceiling effects (≥15%). The mean number of questions answered (± standard deviation) was 4.7 ± 2.1 for PROMIS MO, 4.1 ± 0.6 for PROMIS PI, and 4.1 ± 0.6 for PROMIS PF. From baseline to 6 months, the PROMIS and legacy measures exhibited significant responsiveness ($P < .05$), with similar effect sizes between the patient-reported outcome measures.

Conclusions

This longitudinal study reveals that in patients undergoing hip arthroscopy, PROMIS MO computerized adaptive testing maintains high correlation with legacy hip-specific instruments, significant responsiveness to change, and low test burden compared with legacy measures, with no ceiling or floor effects at 6-month postoperative follow-up.

Level of Evidence

Level IV, retrospective case series.

BACK

Competitive Athletes Who Underwent Hip Arthroscopy With Capsular Repair Showed Greater Improvement in Patient-Reported Outcome Scores Compared With Those Who Did Not Undergo Repair

A.E. Jimenez, M.S. Lee, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.04.010

Purpose

To compare minimum 2-year postoperative patient-reported outcome (PRO) scores and return to sport between competitive athletes undergoing primary hip arthroscopy for femoroacetabular impingement syndrome with interportal capsulotomy repair and competitive athletes with an unrepaired interportal capsulotomy.

Methods

Data on all consecutive competitive athletes who underwent primary hip arthroscopy for femoroacetabular impingement syndrome between February 2012 and December 2018 were collected. Athletes were divided into 2 groups: those who underwent repair and those without repair. Athletes were considered eligible if they participated in sports within 1 year prior to surgery. Patients were eligible if the return-to-sport status and the following preoperative and minimum 2-year postoperative PROs were available: modified Harris Hip Score, Nonarthritic Hip Score (NAHS), Hip Outcome Score–Sport-Specific Subscale (HOS-SSS), and visual analog scale (VAS) score for pain. Patients were excluded if they underwent prior hip surgery, had Workers' Compensation, were unwilling to consent, had a Tönnis grade greater than 1, or had a previous hip condition. The percentages of patients achieving the minimal clinically important difference (MCID) and maximum outcome improvement satisfaction threshold were recorded. Athletes who underwent interportal capsulotomy repair were propensity score matched in a ratio of 2:1 to athletes without interportal capsulotomy repair according to age, sex, body mass index, sport level, and acetabular labrum articular disruption grade.

Results

Forty-nine athletes (53 hips) without repair with an average follow-up time of 36.5 ± 10.2 months and age of 32.1 ± 13.3 years were matched to 79 athletes (84 hips) with repair with an average follow-up time of 41.3 ± 9.4 months and age of 30.1 ± 12.1 years. Athletes in the repaired group showed significantly greater improvements in the NAHS, HOS-SSS, and VAS score and significantly higher rates of achievement of the MCID for the HOS-SSS compared with athletes in the unrepaired group.

Conclusions

Competitive athletes who underwent primary hip arthroscopy with interportal capsulotomy repair showed a significantly greater magnitude of improvement in PRO scores (NAHS, HOS-SSS, and VAS score) and rates of achieving the MCID (HOS-SSS) compared with a propensity score–matched control group of competitive athletes with an unrepaired interportal capsulotomy.

Level of Evidence

Level III, retrospective comparative therapeutic trial.

BACK

Functional Resistance Training After Anterior Cruciate Ligament Reconstruction Improves Knee Angle and Moment Symmetry During Gait: A Randomized Controlled Clinical Trial

A.K. Johnson, S.R. Brown, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.04.021

Purpose

The purpose of this study was to determine 1) whether progressive functional resistance training (FRT) during walking would improve knee biomechanical symmetry after anterior cruciate ligament (ACL) reconstruction and 2) whether the mode of delivery of FRT would have a differential effect on symmetry.

Methods

Thirty individuals who underwent primary ACL reconstruction at a single institution volunteered for this study. Participants were randomized into one of three groups: 1) BRACE, 2) BAND, or 3) CONTROL. The BRACE group received FRT with a novel robotic knee brace along with real-time kinematic feedback. The BAND group received FRT with a custom resistance band device along with real-time kinematic feedback. The CONTROL group received only real-time kinematic feedback. Participants in all groups received training (2-3/week for 8 weeks) while walking on a treadmill. Knee angle and moment symmetry were calculated immediately prior to beginning the intervention and within 1 week of completing the intervention. Statistical Parametric Mapping was used to assess differences in biomechanical symmetry between groups across time.

Results

There was a significant interaction in knee moment symmetry from 21 and 24% of the stance phase ($P = .046$), in which the BAND group had greater improvements following training compared with both BRACE ($P = .043$) and CONTROL groups ($P = .002$). There was also a significant time effect in knee angle symmetry from 68 to 79% of the stance phase ($P = .028$) and from 97 to 100% of the swing phase ($P = .050$) in which only the BRACE group showed significant improvements after the intervention (stance: $P = .020$ and swing: $P < .001$).

Conclusion

The results of this randomized controlled clinical trial indicate that 8 weeks of progressive FRT during treadmill walking in individuals with ACL reconstruction improves knee angle and moment symmetry during gait. The findings suggest that FRT could serve as a potential therapeutic adjuvant to traditional rehabilitation after ACL reconstruction and can help restore knee joint biomechanical symmetry.

Level of Evidence

Level II, randomized controlled trial.

BACK

Double-Tunnel Technique Was Similar to Single-Tunnel Technique in Clinical, Imaging and Functional Outcomes for Medial Patellofemoral Ligament Reconstruction: A Randomized Clinical Trial

Y. Qiao, J. Xu, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.04.019

Purpose
This study aimed to compare the clinical, functional, and imaging outcomes of single-tunnel (ST) and double-tunnel (DT) techniques for medial patellofemoral ligament (MPFL) reconstruction.

Methods
Ninety-four patients with recurrent patellar instability were randomly divided into 2 groups, receiving either ST or DT MPFL reconstruction. Lateral reticulum release (LRR) and tibial tuberosity (TT) transfer were performed as combined procedures when necessary. Preoperative and postoperative clinical characteristics (symptoms and episodes of redislocation), functional outcomes (Kujala, Lysholm, Tegner, IKDC, and KOOS score), and radiological measurements (congruence angle, patellar tilt angle, lateral patellar angle, and lateral patellar translation) were analyzed.

Results
The analysis included data from 90 patients with 48 patients in the ST group and 42 patients in the DT group. Patients were followed up for a mean period of 37.8 (range: 27-50) months in the ST group and 38.6 (range: 25-53) months in the DT group. Forty-three patients in the ST group and 40 patients in the DT group received combined TT transfer, and all patients underwent LRR. At the latest follow-up, 1 patient in ST group experienced redislocation, while no patient in the DT group sustained clinical failure (P = .347). Imaging measurements decreased significantly to the normal range postoperatively. No significant difference was noted between the postoperative radiological results of the 2 groups. All clinical scores significantly improved postoperatively, and no significant difference was observed between the 2 groups except for the higher Lysholm score (P = .031), KOOS symptoms score (P = .021) and KOOS knee-related quality of life score (P = .043) in the DT group.

Conclusion
Both techniques could equally mitigate the patellar lateral translation or redislocation. Our results demonstrate several significant differences in functional outcomes that favored DT MPFL reconstruction but no difference in clinical failure rates and radiological results between ST and DT MPFL reconstruction.

Level of Evidence
Level I, randomized clinical trial.

BACK

Knee Surgery, Sports Traumatology, Arthroscopy, November 2022, volume 30, issue 11, pages: 3634 – 3643

Prophylaxis for preventing venous thromboembolism in knee arthroscopy and soft tissue reconstruction: consensus statements from an international panel of experts

Easwaran, R., Khan, M. et al.

DOI: https://doi.org/10.1007/s00167-022-06973-w

Purpose

There is a lack of consensus regarding need for Venous Thrombo Embolism (VTE) prophylaxis following arthroscopic knee surgery and open soft tissue knee reconstruction. Clear cut guidelines like ones for trauma surgery and arthroplasty do not exist and the published literature is limited to case reports with a few society guidelines. Given this lack of consensus, we conducted a modified Delphi questionnaire of international experts to provide recommendations on this topic.

Methods

The consensus statements were generated using an anonymised 3 round modified Delphi questionnaire, sent to an international panel of 38 knee surgeons, with an 80% agreement being set as the limit for consensus. The responses were analysed using descriptive statistics with measures like mode, median and box plots. Feedback was provided to all panelists based on responses from the previous rounds to help generate the consensus.

Results

Six consensus statements were generated after the three rounds of Delphi. Patient factors, prolonged surgery duration and family history of thrombogenic events emerged as the main points to be taken into consideration for prophylaxis.

Conclusion

It was established through this study, that there exists a select group of patients undergoing arthroscopic surgery that justify the usage of VTE prophylaxis. The expert responses to most of the questions in different scenarios favoured usage of VTE prophylaxis based on patient factors like advanced age, past history of VTE, smoking, oral contraceptive use etc.

Level of evidence

Level V.

BACK

Quadriceps tendon autograft for pediatric anterior cruciate ligament reconstruction results in promising postoperative function and rates of return to sports: A systematic review
Zakharia, A., Lameire, D.L. et al.

DOI: https://doi.org/10.1007/s00167-022-06930-7

Purpose
To assess the performance of the quadriceps tendon (QT) autograft in pediatric anterior cruciate ligament reconstruction (ACLR).

Methods
A systematic search of MEDLINE, PubMed, and EMBASE was conducted on March 1, 2021. Studies of all levels of evidence reporting outcomes and/or complications after QT autograft ACLR in pediatric patients (≤ 18 years old) were eligible for inclusion. Study demographics, patient demographics, reported outcomes, and complications were abstracted. Screening and data abstraction were designed in accordance with PRISMA and R-AMSTAR guidelines. Descriptive statistics were presented when applicable, with data for heterogeneous outcomes presented in narrative summary fashion.

Results
A total of 14 studies examining 596 patients (46.3% female), mean age 15.4 years, were included in this systematic review. Mean postoperative Lysholm scores ranged from 94.0 to 99.5. Mean postoperative IKDC subjective scores ranged from 75.9 to 94.0. Limb symmetry index ranged from 96.8 ± 10.4 to 100.4 ± 7.6% across multiple hop tests. Return to sports (RTS) rates ranged from 88.9 to 91.7%. Eleven studies reported postoperative complications, whereby 16 patients (4.8%) experienced contralateral complications and injuries. Forty-six patients (9.4%) experienced ipsilateral complications, including ten graft failures (2.5%) and two growth disturbances (0.6%).

Conclusions
QT autograft ACLR in the pediatric population retains the potential of regaining a preinjury level of knee stability, and yields promising postoperative function and rates of RTS, yielding comparable outcomes relative to HT autograft and the reference-standard BPTB ACLR that have previously been described in the literature. Moreover, use of the QT autograft is associated with low rates of postoperative complications, including graft failure and growth disturbances in this active and high-risk patient population in observational studies to date. Therefore, clinical equipoise exists to further appraise the influence of QT autograft on postoperative outcomes compared to aforementioned autograft options in a randomized control trial fashion.

Level of evidence
IV.

BACK

Additional tying on the adjustable-loop device improves the outcomes of anterior cruciate ligament reconstruction using hamstring autograft

Choi, H.G., Jeong, H.W. et al.

DOI: https://doi.org/10.1007/s00167-022-06936-1

Purpose

The purpose of this study was to verify the efficacy of a novel technique for additional tying on the adjustable-loop device to prevent stress concentration on the graft loop end and gradual loop lengthening.

Methods

A total of 124 patients who underwent anterior cruciate ligament reconstruction using hamstring autografts from 2014 to 2017 were included in this retrospective study. After 1:1 propensity score matching, two groups were formed (group I: 50 patients without tying vs. group II: 50 patients with tying). Anterior laxity was evaluated using side-to-side differences. Tunnel length, loop length, and graft-tunnel gap were measured using follow-up magnetic resonance imaging. The signal-to-noise ratio was calculated at the loop end, loop inner side, tunnel entrance, and graft mid-substance. The clinical outcomes were assessed using the International Knee Documentation Committee score, Lysholm score, pivot shift test, and Lachman test.

Results

The average follow-up period was 63.2 ± 4.8 and 53.8 ± 11.9 months in groups I and II, respectively. Anterior laxity showed that side-to-side differences improved significantly 6 months postoperatively in both the groups. Although the anterior laxity improved in group II (2.9 ± 1.0 to 1.6 ± 0.8, $p < 0.001$), it deteriorated in group I (2.5 ± 1.5 to 3.3 ± 1.3 mm, $p < 0.001$) at the final follow-up. The graft-tunnel gap was significantly larger in group I ($p < 0.001$). The signal-to-noise ratios of the loop end and loop inner side were significantly higher in group I ($p < 0.001$ and $p = 0.020$, respectively). The clinical outcomes at the final follow-up were not significantly different between the groups.

Conclusion

The additional tying on the adjustable-loop device was not superior to the control group in clinical stability examination or outcome. However, it was effective in anterior laxity measured by stress radiographs, preventing stress on the adjustable-loop device, and gradual graft loop lengthening.

Level of evidence

Level III.

BACK

High return to sport rate and few re-ruptures at long term in professional footballers after anterior cruciate ligament reconstruction with hamstrings

Bonanzinga, T., Grassi, A. et al.

DOI: https://doi.org/10.1007/s00167-022-06944-1

Purpose

Anterior cruciate ligament (ACL) ruptures are considered high burden injuries in sports with high pivotal activity, especially for professional footballers. A lack of evidence exists about long-term follow up of professional elite athletes who underwent ACL reconstruction. The purpose of the study is to analyze the return to play and the career of professional footballers who underwent ACL reconstruction with hamstrings, to evaluate re-rupture and reoperation at either indexed and contralateral knee, and to assess the long-term clinical subjective outcomes and satisfaction.

Methods

Twenty-eight professional footballers that underwent 33 ACL reconstructions were retrospectively included in the study. All surgical interventions were performed using hamstring tendons graft and an over the top technique. Inclusion criteria were: inability to compete due to joint instability caused by total or subtotal ACL lesion, patients contracted to a professional football team at time of surgery. Exclusion criteria were: multi-ligament reconstruction or concomitant meniscal allograft transplantation. Patients were contacted by phone and a brief questionnaire about surgery was administered. Subsequently, a Lysholm knee scoring scale was obtained. After that, an online research was performed on publicly available websites in order to retrieve information of the patients included after surgery.

Results

In all cases, ACL Reconstruction was performed with hamstring tendons using a non-anatomic Double-Bundle technique in 16 cases (49%), an Over-The-Top Single-Bundle technique in 9 cases (27%), and an Over-The-Top Single-Bundle plus Lateral Plasty technique in 8 cases (24%); moreover, a meniscal lesion was present in 20 cases (61%). Three (9%) of the 33 ACL reconstruction failed (2/16 Double-Bundle, 1/9 Single- Bundle, 0/8 Single-Bundle + Lateral Plasty; p = n.s.), with two of them within 12 months from surgery. Other procedures, mainly arthroscopic meniscectomies, were performed in 10 cases (30%). The first official match was played after an average of 8.0 ± 3.6 (4.6–18.2) months in 31 cases (94%). Patients were evaluated after 12.6 ± 3.3 years (6.7–17.5) from the indexed ACL reconstruction. The average Lysholm score was 94.2 ± 8.3.

Conclusions

In our small case-series, professional soccer players were able to return to play at a competitive level with a hamstrings over the top technique. Patients with long careers had a high percentage of reoperation on the contralateral knee.

Level of evidence

IV.

BACK

Meniscal repair at the time of primary ACLR does not negatively influence short term knee stability, graft rupture rates, or patient-reported outcome measures: the STABILITY experience

Marmura, H., Firth, A. et al.

DOI: https://doi.org/10.1007/s00167-022-06962-z

Purpose

To assess how meniscal repair and excision impact short term patient-reported outcome measures (PROMs), knee stability, and early graft rupture rates following primary hamstring anterior cruciate ligament reconstruction (ACLR) with or without lateral extra-articular tenodesis (LET) in a group of young active patients where meniscal repair is commonly advocated.

Methods

Six hundred and eighteen patients under 25 years of age at high-risk of graft failure following ACLR were recruited to the Stability 1 study. Multivariable regression models were developed to identify statistically and clinically significant surgical and demographic predictors of Knee Injury and Osteoarthritis Outcome Score (KOOS), International Knee Documentation Committee Subjective Knee Form (IKDC), ACL Quality of Life Questionnaire (ACL-QOL) and Marx Activity Rating Scale (MARS) scores. Chi-Square tests of independence were used to explore the association between meniscal status (torn, not torn), meniscal treatment (excision or repair), graft rupture, and rotatory knee laxity.

Results

Medial meniscus repair was associated with worse outcomes on the KOOS ($\beta = -1.32$, 95% CI: −1.57 to −1.10, $p = 0.003$), IKDC ($\beta = -1.66$, 95% CI: −1.53 to −1.02, $p = 0.031$) and ACL-QOL ($\beta = -1.25$, 95% CI: −1.61 to 1.02, p = n.s.). However, these associations indicated small, clinically insignificant changes based on reported measures of clinical relevance. Other important predictors of post-operative PROMs included age, sex, and baseline scores. Medial meniscus excision and lateral meniscus treatment (repair or excision) did not have an important influence on PROMs. There was no significant association between meniscal treatment and graft rupture or rotatory knee laxity.

Conclusion

While repairing the medial meniscus may result in a small reduction in PROM scores at two-year follow-up, these differences are not likely to be important to patients or clinicians. Any surgical morbidity associated with meniscal repair appears negligible in terms of PROMs. Meniscal repair does not affect rotatory laxity or graft failure rates in the short term. Therefore, meniscal repair should likely be maintained as the standard of care for concomitant meniscal tears with ACLR.

Level of evidence

III.

BACK

The immediate meniscal allograft transplantation achieved better chondroprotection and less meniscus degeneration than the conventional delayed transplantation in the long-term
Wang, D., Lee, C.A. et al.

DOI: https://doi.org/10.1007/s00167-022-06982-9

Purpose
The purpose of this study was to compare the long-term clinical and radiological outcomes between the immediate and delayed meniscus allograft transplantation (MAT).

Methods
Nine menisci were transplanted immediately after total meniscectomy (immediate group, IM), and 10 menisci were delayed transplanted in patients with the median of 35 months (range 9–92 months) after total meniscectomy (delayed group, DE). Patient's subjective clinical outcomes including VAS, IKDC, Lysholm and Tegner scores as well as muscle strength measures were compared. Joint degeneration was evaluated by both radiographs to assess joint space width narrowing, Kellegren–Lawrence (KL) grade and MRI with T2 mapping sequences to quantitatively analyze both cartilage and meniscal allograft degeneration.

Results
The median follow-up time was 10.8 years (range 10–14 years). The IKDC (IM vs DE, 89.8 vs 80.9, n.s.) and Lysholm scores (IM vs DE, 87.7 vs 78.0, n.s.) were close in two groups, while the IM group showed slightly lower VAS (IM vs DE, 0.2 vs 1.5, $p = 0.031$), higher Tegner score (IM vs DE, 7 vs 3.5 $p = 0.021$) and better quadriceps muscle strength. The IM group had less joint space narrowing (IM vs DE, 0.35 mm vs 0.71 mm, n.s.), less KL grade progression (IM vs DE, 0.6 vs 1.7, $p = 0.041$) on radiographs and less chondral lesions development on MRIs (Cartilage Degeneration Index, IM vs DE, 252 vs 2038, $p = 0.025$). All meniscal grafts exhibited degeneration by showing grade 3 signal on MRI, and 4 (4/9) in the IM group and 8 (8/10) cases in the DE group. The T2 value of cartilage and meniscal allograft in the IM group was close to that of the healthy control and was significantly lower than that of the DE group.

Conclusion
Compared to the conventional delayed MAT, the immediate MAT achieved better cartilage and meniscus protection in the long-term, while its superiority in patient-reported outcomes was limited.

Level of evidence
IV.

BACK

No differences found in long-term outcomes of a randomized controlled trial comparing ipsilateral versus contralateral hamstring graft in ACL reconstruction

Beaudoin, A., Ogborn, D. et al.

DOI: https://doi.org/10.1007/s00167-022-06980-x

Purpose

Contralateral graft harvest in primary ACL reconstruction is relatively uncommon and the long-term comparative of this approach relative to ipsilateral harvest has not been described. The purpose of this study was to evaluate ACL graft and contralateral rupture following ipsilateral or contralateral semitendinosus and gracilis (STG) graft harvest at follow-up of a minimum 10 years post-reconstruction in the treatment of a complete ACL tear.

Methods

Patients from a previous randomized trial were evaluated. The primary outcome measures were ipsilateral and contralateral reinjury as well as the International Knee Documentation Committee (IKDC) knee assessment form, the ACL Quality of Life questionnaire (ACL-QoL) and the Tegner activity scale. Participants completed four different single-leg hop tests and concentric knee flexion and extension strength were assessed on an isokinetic dynamometer.

Results

Of the original 100 patients, 50 patients (41.3 ± 9.5 years of age, 31 males, 19 females) reported on re-injury at 12.6 ± 1.4 years post-operative. Thirty-eight patients returned for full assessment and 12 responded by mail or phone survey. There were no differences between groups for graft rupture, contralateral injury, ACL-QoL score, IKDC categorization, or anterior tibial translation, though both groups experienced a reduction in the Tegner Activity Scale from their preinjury scores. There was no difference in knee flexor and extensor isokinetic concentric strength, or single leg hop test performance. Knee flexor strength limb symmetry index was reduced when measured in the supine relative to the seated position in both groups, indicating persistent deficits in knee flexor strength when measured in the supine position.

Conclusion

Contralateral hamstring harvest does not put patients at an increased risk of a contralateral ACL tear and long-term outcomes of ACL reconstruction do not differ based on the side of graft harvest. Contralateral STG harvest may provide a safe alternative surgical option for select patients.

Level of evidence

Level II.

BACK

Age, body mass index, female gender, and patellofemoral cartilage degeneration predict worse patient outcome after patellofemoral instability surgery

Žlak, N., Kacin, A. et al.

DOI: https://doi.org/10.1007/s00167-022-06986-5

Purpose

To evaluate predicting factors for patient-reported outcomes and revision interventions following surgical treatment of patients with patellofemoral instability.

Methods

From a prospective database at the university Orthopedic Department, 138 knees from 116 patients who underwent patellofemoral instability surgery (2012–2019) were enrolled in a retrospective analysis: 34 cases of isolated MPFLrec; 92 cases of MPFLrec plus tibial tuberosity transfer; and 12 cases of MPFLrec plus trochleoplasty. Patient-reported outcome measures were recorded for knee-specific function (KOOS), general quality of life (EQ-5D), and activity level (Tegner scale). Post-operative revision interventions were also actively recorded. As potential predicting factors, patient demographic (gender, age, BMI) and radiographic (pre-operative: patellar height and tilt, tibial tuberosity–trochlear groove distance, trochlear dysplasia, knee osteoarthritis; post-operative: MPFL insertion point; intra-operative: isolated vs. combined procedures, chondropenia severity score) parameters were analyzed using multivariate linear regression models.

Results

With median follow-up of 4.4 (1.0–8.9) years, all patient-reported outcome measures had significantly improved from pre-operative levels: KOOS cumulative, from 71 (15) to 78 (16); EQ-5D, from 0.68 (0.20) to 0.78 (0.21); and Tegner activity scale, from 3 (0–10) to 4 (0–10). No patellofemoral instability revision procedures were performed. One-fifth (27/138) of the operated knees required second surgical interventions, predominately due to hardware or arthrofibrosis. Patients who required post-operative knee manipulation under anesthesia or arthroscopic debridement showed lower post-operative improvement for KOOS cumulative and EQ-5D. Age, BMI, patellofemoral knee osteoarthritis, and shorter follow-up time revealed significant negative correlations to some of the post-operative KOOS subscales. Age was negatively correlated to post-operative EQ-5D, while post-operative Tegner activity scale was negatively correlated to female gender and patellofemoral chondropenia severity score. Femoral MPFL insertion point revealed no association with any outcome measures.

Conclusion

Patellofemoral instability surgery for isolated or combined MPFLrec is safe and substantially improves knee function and patient quality of life and activity levels. Serious adverse events are rare, with no recurrent patellofemoral instability. Patients who required post-operative knee manipulation or arthroscopic debridement showed less improvement in subjective measures of treatment outcomes. Older age, higher BMI, worse pre-operative patellofemoral cartilage status, and female gender had negative effects on outcome.

Level of evidence

III.

BACK

Higher pathologic threshold of increased tibial tuberosity–trochlear groove distance should be considered for taller patients

Wang, H., Song, Y. et al.

DOI: https://doi.org/10.1007/s00167-022-06992-7

Purpose

The aim of this study was to evaluate the correlation between tibial tuberosity–trochlear groove distance (TT–TG) and body height or knee size, and to find height-related pathologic thresholds of increased TT–TG.

Methods

One-hundred and fifty-three patients with recurrent patellar instability and 151 controls were included. The TT–TG was measured on axial computed tomography (CT) images. Femora width and tibial width were selected to represent knee size. The correlation of TT–TG and gender, body height, femora width, and tibial width was evaluated. The height-related pathologic threshold of increased TT–TG was produced according to Dejour's method. To combine TT–TG with body height and knee size, three new indexes were introduced, ratio of TT–TG to body height (RTH), ratio of TT–TG to femoral width (RTF), and ratio of TT–TG to tibial width (RTT). The ability to predict patellar instability was assessed by the receiver-operating characteristic (ROC) curve, odds ratios (ORs), sensitivity, and specificity.

Results

In patients with patellar instability, TT–TG showed significantly correlation with patient height, femoral width, and tibial width respectively (range $r = 0.266–0.283$). This correlation was not found in the control group. The pathologic threshold of TT–TG was 18 mm in patients < 169 cm (53%), and the mean TT–TG was 21 mm in patients ≥ 169 cm (54%). There was significant difference in RTH, RTF, and RTT between the two groups. RTH, RTF and RTT have similar large area under the curve (AUC) with TT–TG.

Conclusions

TT–TG showed significant correlation with body height and knee size, respectively. The pathologic threshold of increased TT–TG was suggested to be 21 mm for patients ≥ 169 cm and 18 mm for patients < 169 cm. Body height-related pathologic threshold provided a supplement for indications of tibial tuberosity medialization.

Level of evidence

IV.

BACK

MPFL reconstruction results in lower redislocation rates and higher functional outcomes than rehabilitation: a systematic review and meta-analysis

Cohen, D., Le, N. et al.

DOI: https://doi.org/10.1007/s00167-022-07003-5

Purpose

To determine the effect of early MPFL reconstruction versus rehabilitation on the rate of recurrent patellar dislocations and functional outcomes in skeletally mature patients with traumatic, first-time patellar dislocation.

Methods

Three online databases MEDLINE, PubMed and EMBASE were searched from database inception (1946, 1966, and 1974, respectively) to August 20th, 2021 for literature addressing the management of patients sustaining acute first-time patellar dislocations. Data on redislocation rates, functional outcomes using the Kujala score, and complication rates were recorded. A meta-analysis was used to pool the mean postoperative Kujala score, as well as calculate the proportion of patients sustaining redislocation episodes using a random effects model. Quality assessment of included studies was performed for all included studies using the MINORS and Detsky scores.

Results

A total of 19 studies and 1,165 patients were included in this review. The pooled mean redislocation rate in 14 studies comprising 734 patients in the rehabilitation group was 30% (95% CI 25–36%, I2 = 67%). Moreover, the pooled mean redislocation rate in 5 studies comprising 318 patients undergoing early MPFL reconstruction was 7% (95% CI 2–17%, I2 = 70%). The pooled mean postoperative Kujala anterior knee pain score in 7 studies comprising 332 patients in the rehabilitation group was 81 (95% CI 78–85, I2 = 78%), compared to a score of 87 (95% CI 85–89, I2 = 0%, Fig. 4) in 3 studies comprising 54 patients in the reconstruction group.

Conclusion

Management of acute first-time patellar dislocations with MPFL reconstruction resulted in a lower rate of redislocation of 7% in the reconstruction group vs 30% in the rehabilitation group and a higher Kujala score compared to the rehabilitation group. The information this review provides will help surgeons guide their decision to choose early MPFL reconstruction versus rehabilitation when treating patients with first-time patellar dislocations and may guide future studies on the topic.

Level of evidence

IV.

BACK

Corticosteroid injections 2 months before arthroscopic meniscectomy increases the rate of postoperative infections requiring surgical irrigation and debridement

Forsythe, B., Berlinberg, E.J. et al.

DOI: https://doi.org/10.1007/s00167-022-06981-w

Purpose

Consensus guidelines recommend administering a corticosteroid injection (CSI) for patients with a symptomatic degenerative meniscus lesion prior to arthroscopic partial meniscectomy (APM). A recent study found that CSI administered within 1 month prior to meniscectomy is associated with an increased risk of postoperative infection. However, infections may range in severity from superficial infections to serious infections requiring surgical interventions. The aim of this analysis was to define the rate of infections requiring surgery after APM and determine its relationship to preoperative CSI.

Methods

The PearlDiver Mariner administrative claims database was queried for patients > 35 years old who had a CSI in the year prior to isolated APM. Rates of deep infection and infection requiring surgery within 6 months were reported between matched patients with a CSI and no injection.

Results

After matching, there were 16,009 patients per group with a mean age of 59.4 years (SD = 9.6), 53.5% obesity, and 40% male. Forty-four of 113 patients who developed a postoperative deep infection went on to have a reoperation for irrigation and/or debridement (0.1% of all APM). Of these 44 patients, 30 had a preoperative CSI and 14 were controls unadjusted odds ratio (unadj-OR) if given CSI = 1.95, 95% CI 1.03–3.68, P = 0.04). Having a CSI within the month before surgery conferred a 4.56-fold increase in odds of an infection warranting surgery (95% CI 1.96–10.21, P < 0.01), whilst having a CSI 4–8 weeks before surgery conferred a 2.42-fold increase in odds (95% CI 1.04–5.42, P = 0.03). Receiving multiple CSI in the year prior to APM was associated with 5.27-fold increased odds of an infection requiring surgery (95% CI 1.19–23.27, P = 0.03), compared to having a single CSI.

Conclusions

Serious infections requiring a surgical intervention are rare after a meniscectomy, occurring in 0.1% of APMs in a matched cohort of patients over 35. Patients were five times more likely to return to the operating room for infection after APM if they had a CSI in the month before or had multiple CSIs in the year before surgery. The risk of infection was no longer significant if there was at least a 2-month interval between preoperative CSI and APM.

Level of evidence

Level III.

BACK

The orientation of the ALL femoral tunnel to minimize collision with the ACL tunnel depends on the need or not of far-cortex drilling

Moon, H., Choi, C. et al.

DOI: https://doi.org/10.1007/s00167-022-07007-1

Purpose

To (1) evaluate the optimal drill orientation of the anterolateral ligament (ALL) femoral tunnel to minimize collision with the anterior cruciate ligament (ACL) femoral tunnel during anatomical ACL reconstruction according to the need for far-cortex drilling and (2) investigate the geometric factors that affect tunnel collision secondary to drill orientation of the ALL femoral tunnel.

Methods

A three-dimensional femoral model of patients who underwent anatomical single-bundle ACL reconstruction between 2015 and 2016 was constructed, and the geometric factors were evaluated. Virtual ALL femoral tunnels were created to simulate 45 drilling conditions. For each condition, whether the virtual ALL femoral tunnel and its trajectory violated the femoral cortex and the minimum distance between tunnels was investigated.

Results

Thirty-nine subjects were included. Overall violation rates of the femoral cortex by the ALL tunnels and its trajectories were 11.1% (195 of 1755 conditions) and 40.7% (714 of 1755 conditions), respectively. A drilling angle of axial 0° and coronal − 40° showed the longest minimum distance between tunnels without femoral cortex violation by the ALL tunnel (6.3 ± 4.0 mm; collision rate 2.6% [1 of 39 subjects]). With simultaneous consideration of the ALL tunnel's trajectory representing far-cortex drilling, a drill angle of axial 40° and coronal 10° showed the longest minimum distance between tunnels without femoral cortex violation (0.6 ± 3.9 mm; collision rate 38.5% [15 of 39 subjects]). For surgical techniques requiring far-cortex drilling, regression analyses were performed on geometric factors that could affect tunnel collision, which revealed that the sagittal inclination angle of the ACL and the distance between the ACL femoral tunnel's outlet and ALL's femoral attachment were associated with tunnel collision.

Conclusion

The optimal drill orientations of the ALL femoral tunnel to minimize collision with the ACL femoral tunnel were axial 0° and coronal − 40° for surgical techniques not requiring far-cortex drilling and axial 40° and coronal 10° for techniques requiring far-cortex drilling. For techniques requiring far-cortex drilling, additional adjustment for orientation of the ACL femoral tunnel is required to reduce the risk of tunnel collision. Therefore, an individualized surgical strategy should be applied according to the graft fixation method of the ALL femoral tunnel.

BACK

Surgical management of concurrent lateral ankle instability and osteochondral lesions of the talus increases dynamic sagittal ankle range of motion

Cao, S., Wang, C. et al.

DOI: https://doi.org/10.1007/s00167-022-06993-6

Purpose

A biomechanical study, in which imaging modalities are used to strictly include patients with concurrent lateral ankle instability (LAI) and osteochondral lesions of the talus (OLT), is needed to demonstrate the static and dynamic ankle range of motion (ROM) restriction in these patients, and determine whether ankle ROM restriction can be corrected postoperatively.

Methods

Eight patients with concurrent LAI and OLT treated with the arthroscopic modified Broström procedure and microfracture were recruited from June 2019 to January 2020. Patients were assessed using outcome scales, static ankle ROM, and a stair descent gait analysis for dynamic ankle ROM, a day prior to surgery and one year postoperatively. Eight healthy subjects were assessed using the same modalities upon recruitment. Operative outcomes and variables during stair descent were documented and compared among the preoperative, postoperative, and healthy groups. A curve analysis, one-dimensional statistical parametric mapping, was performed to compare the dynamic ankle kinematics and muscle activation curves over the entire normalised time series.

Results

The functional outcomes of patients with concurrent LAI and OLT were significantly worse than those of healthy subjects preoperatively, but were partially improved postoperatively. Patients had decreased static and dynamic ROM preoperatively, and static ROM did not significantly increase postoperatively (preoperative, 39.6 ± 11.3; postoperative, 44.9 ± 7.1; healthy, 52.0 ± 4.6; $p = 0.021$). Patients showed increased dynamic ankle flexion ROM (preoperative, 41.2 ± 11.6; postoperative, 53.6 ± 9.0; healthy, 53.9 ± 3.4; $p = 0.012$) postoperatively, as well as increased peroneus longus activation (preoperative, 35.8 ± 12.0; postoperative, 55.4 ± 25.1; healthy, 71.9 ± 13.4; $p = 0.002$) and muscle co-contraction of the tibialis anterior and peroneus longus (preoperative, 69.4 ± 23.4; postoperative, 88.4 ± 9.3; healthy, 66.2 ± 18.1; $p = 0.045$).

Conclusions

Patients with concurrent LAI and OLT had decreased static and dynamic sagittal ankle ROM and altered neuromuscular activation patterns. The arthroscopic modified Broström procedure and microfracture did not significantly increase the static sagittal ankle ROM. However, the dynamic sagittal ankle ROM, peroneus longus activation and muscle co-contraction of the tibialis anterior and peroneus longus increased postoperatively.

Level of evidence

IV.

BACK

Improvement in pain and patient-related outcome measures following hip arthroscopy in patients with femoroacetabular impingement syndrome and concomitant generalized ligamentous laxity: a systematic review

Zhu, X.M., Toobaie, A. et al.

DOI: https://doi.org/10.1007/s00167-022-06997-2

Purpose

Within orthopaedic sports medicine, concomitant ligamentous laxity is often found to be a negative prognostic factor for post-operative outcomes following various procedures. The effect of ligamentous laxity on outcomes following hip arthroscopy remains infrequently reported. Therefore, the purpose of this study is to report on the outcomes of hip arthroscopy for the treatment of femoroacetabular impingement syndrome (FAIS) with concomitant generalized ligamentous laxity (GLL).

Methods

A systematic search was performed in Medline, EMBASE, CENTRAL, and SPORTDiscus (from inception to April 2021) for studies reporting outcomes following hip arthroscopy for symptomatic FAIS in patients with concomitant GLL.

Results

Six studies representing 213 patients and 231 hips were included. Outcomes of pain and functional scores as measured by VAS, Harris Hip Score, and Hip Disability and Osteoarthritis Outcomes Score were tabulated. A mean improvement of 4.8 on VAS was observed. Improvements of 30.0 on HHS, 33.1 for ssHOS, and 23.9 for ADL-HOS were observed.

Conclusion

Hip arthroscopy is an effective method of alleviating pain and improving function with statistically significant improvements in all PROM in patients with concomitant FAIS with GLL.

Level of evidence

IV.

BACK

American Journal of Sports Medicine (AJSM), Volume 50, Issue 13

Does Femoral Osteoplasty Improve Long-term Clinical Outcomes and Survivorship of Hip Arthroscopy? A 15-Year Minimum Follow-up Study

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Background: Although femoral osteoplasty is common practice in treating cam-type femoroacetabular impingement (FAI), long-term data are lacking that support the ability of this procedure to optimize outcomes and alter natural history.

Purpose: To compare long-term clinical outcomes and survivorship of treatment for symptomatic FAI via arthroscopic correction of labral or chondral pathology with and without femoral osteoplasty.

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

Methods: A retrospective cohort study was performed across 2 consecutive cohorts of patients with isolated cam-type FAI who underwent hip arthroscopic treatment of labral or chondral pathology without femoral osteoplasty (HS group) or with femoral osteoplasty (HS-OST group). These unique cohorts were established at a distinct transition time in our practice before and after adoption of femoral osteoplasty for treatment of FAI. Clinical outcomes were measured using the modified Harris Hip Score (mHHS). Kaplan-Meier analysis was used to assess for total hip arthroplasty (THA)–free and reoperation-free survivorship.

Results: The final HS group included 17 hips followed for 19.7 ± 1.2 years, and the final HS-OST group included 23 hips followed for 16.0 ± 0.6 years. No significant patient or morphological differences were found between groups. Compared with the HS group, the HS-OST group had significantly higher final mHHS (82.7 vs 64.7 for HS-OST vs HS, respectively; P = .002) and mHHS improvement (18.4 vs 6.1; P = .02). The HS-OST group also had significantly greater 15-year THA-free survivorship versus the HS group (78% vs 41%, respectively; P = .02) and reoperation-free survivorship (78% vs 29%; P = .003).

Conclusion: This study demonstrated superior long-term clinical outcomes and survivorship with combined arthroscopy and femoral osteoplasty compared with hip arthroscopy alone. These long-term data strongly support the practice of femoral osteoplasty in patients with cam FAI morphologies and suggest that this treatment alters the natural history of FAI at long-term follow-up.

BACK

External Validation of a Machine Learning Algorithm for Predicting Clinically Meaningful Functional Improvement After Arthroscopic Hip Preservation Surgery

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Background: Individualized risk prediction has become possible with machine learning (ML), which may have important implications in enhancing clinical decision making. We previously developed an ML algorithm to predict propensity for clinically meaningful outcome improvement after hip arthroscopy for femoroacetabular impingement syndrome. External validity of prognostic models is critical to determine generalizability, although it is rarely performed.

Purpose: To assess the external validity of an ML algorithm for predicting clinically meaningful improvement after hip arthroscopy.

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

Methods: An independent hip preservation registry at a tertiary academic medical center was queried for consecutive patients/athletes who underwent hip arthroscopy for femoroacetabular impingement syndrome between 2015 and 2017. By assuming a minimal clinically important difference (MCID) outcome/event proportion of 75% based on the original study, a minimum sample of 132 patients was required. In total, 154 patients were included. Age, body mass index, alpha angle on anteroposterior pelvic radiographs, Tönnis grade and angle, and preoperative Hip Outcome Score–Sports Subscale were used as model inputs to predict the MCID for the Hip Outcome Score–Sports Subscale 2 years postoperatively. Performance was assessed using identical metrics to the internal validation study and included discrimination, calibration, Brier score, and decision curve analysis.

Results: The concordance statistic in the validation cohort was 0.80 (95% CI, 0.71 to 0.87), suggesting good to excellent discrimination. The calibration slope was 1.16 (95% CI, 0.74 to 1.61) and the calibration intercept 0.13 (95% CI, –0.26 to 0.53). The Brier score was 0.15 (95% CI, 0.12 to 0.18). The null model Brier score was 0.20. Decision curve analysis revealed favorable net treatment benefit for patients with use of the algorithm as compared with interventional changes made for all and no patients.

Conclusion: The performance of this algorithm in an independent patient population in the northeast region of the United States demonstrated superior discrimination and comparable calibration to that of the derivation cohort. The external validation of this algorithm suggests that it is a reliable method to predict propensity for clinically meaningful improvement after hip arthroscopy and is an essential step forward toward introducing initial use in clinical practice. Potential uses include integration into electronic medical records for automated prediction, enhanced shared decision making, and more informed allocation of resources to optimize patient outcomes.

BACK

Elite Female Athletes Demonstrate a Comparable Improvement in Midterm Patient-Reported Outcome Scores and Rate of Return to Sport Compared With Elite Male Athletes After Hip Arthroscopic Surgery: A Sex-Based Comparison in Professional and Collegiate Athletes

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Background: Few studies have compared outcomes, return to sport (RTS), and continuation of sport (CTS) after primary hip arthroscopic surgery between matched groups of male and female athletes with a minimum 5-year follow-up.

Purpose: (1) To report minimum 5-year patient-reported outcome (PRO) scores as well as RTS and CTS rates for elite female athletes undergoing hip arthroscopic surgery for femoroacetabular impingement syndrome (FAIS) and (2) to compare clinical results with those of a matched control group of elite male athletes.

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

Methods: Data were prospectively collected and retrospectively reviewed for elite (collegiate or professional) female athletes who underwent primary hip arthroscopic surgery for FAIS between March 2009 and March 2016. Inclusion criteria were preoperative and minimum 5-year scores for the modified Harris Hip Score, Nonarthritic Hip Score, Hip Outcome Score–Sport Specific Subscale, and visual analog scale for pain. Exclusion criteria were Tönnis grade >1, hip dysplasia, previous ipsilateral hip surgery/conditions, and those unwilling to participate. Rates of achieving the minimal clinically important difference (MCID), Patient Acceptable Symptom State (PASS), and maximum outcome improvement satisfaction threshold (MOIST) were recorded in addition to RTS. CTS was also recorded and defined as athletes reporting continued sport activity at a minimum 5-year follow-up after initially reporting returning to sport. Elite female athletes were propensity matched in a 1:1 ratio to elite male athletes for comparison.

Results: A total of 81 hips in elite female athletes that underwent primary hip arthroscopic surgery met the inclusion criteria, and follow-up was available for 65 hips (80.2%) at a mean of 67.6 ± 6.5 months, with a mean age of 24.3 ± 6.8 years. Female athletes demonstrated significant improvements in all recorded PRO scores; achieved the MCID, PASS, and MOIST at high rates; returned to sport at a rate of 80.4%; and continued sport at a rate of 97.1%. Female athletes demonstrated lower preoperative PRO scores compared with male athletes, but postoperative PRO scores; improvements in scores; rates of achieving the MCID, PASS, MOIST; and RTS and CTS rates were similar between female and male athletes.

Conclusion: Elite female athletes undergoing primary hip arthroscopic surgery for FAIS demonstrated favorable PRO scores and high RTS and CTS rates at a minimum 5-year follow-up. These results were comparable with those of a propensity-matched control group of elite male athletes.

BACK

Arthroscopic Posterior Articular Coverage and Shift (PACS) Procedure for Treatment of Preosteoarthritic Constitutional Static Posterior Shoulder Instability (Type C1)

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Background: Different joint-preserving techniques for treatment of preosteoarthritic, constitutional static (type C1) posterior shoulder instability (PSI) have been proposed, including posterior glenoid open wedge osteotomy and bone graft augmentation. However, the techniques are demanding, the reported complication and reoperation rates are high, and posterior decentering cannot reliably be reversed.

Purpose: To assess the clinical and radiological longitudinal outcomes of patients with type C1 PSI after arthroscopic posterior articular coverage and shift (PACS) surgery.

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

Methods: We performed a retrospective analysis of a prospective database with longitudinal follow-up including 14 shoulders in 13 patients who underwent an arthroscopic PACS procedure for symptomatic preosteoarthritic constitutional static posterior instability (type C1) with previous failed nonoperative treatment. Patients were clinically evaluated before surgery and at 3, 6, 12, and 24 months postoperatively in terms of satisfaction and pain levels as well as standardized physical examination, Subjective Shoulder Value (SSV), Western Ontario Shoulder Instability Index (WOSI) score, Constant score, and Rowe score. Preoperative, postoperative, and follow-up magnetic resonance imaging scans were obtained in all patients. A paired 2-sample t test was used to compare changes in continuous variable parameters over time. Correlation analyses were performed using the Pearson correlation coefficient.

Results: All outcome scores and the pain level improved significantly from preoperatively to postoperatively, and the improvement was sustained over the follow-up period of 2 years (pain level, 6.4 preoperatively vs 3.3 at 2 years, $P < .001$; SSV, 40 vs 70, $P = .001$; WOSI, 33 vs 56, $P = .001$; Constant, 70 vs 79, $P = .049$; Rowe, 52 vs 76, $P < .001$). The mean glenohumeral and scapulohumeral subluxation indices were significantly lower in the early postoperative period compared with preoperative measurements (glenohumeral, 52% ± 6% vs 58% ± 10%, $P = .02$; scapulohumeral, 70% ± 8%; vs 77% ± 9%, $P = .002$, respectively); however, they returned to baseline values at follow-up (57% ± 7% vs 58% ± 10%, $P = .7$; 75% ± 6% vs 77% ± 9%, $P = .4$, respectively). A high scapulohumeral subluxation index, excessive glenoid retroversion, and increased posterior positioning of the humeral head in relation to scapular blade axis and older age were correlated with worse clinical outcomes.

Conclusion: Over the follow-up period of 2 years, the PACS procedure significantly improved outcome scores in patients who had preosteoarthritic constitutional static posterior shoulder instability, especially in younger patients with less severe glenoid retroversion and posterior decentering of the humeral head. However, similar to other techniques, the PACS procedure needs to be considered a symptomatic therapy that does not reverse the underlying cause or stop the progressive pathology.

BACK