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4B Arthroscopy founders: D.P. ter Meulen, B. Lubberts

Contact 4@erasmusmc.nl

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BACK

Upper extremity

Arthroscopy, Volume 39, Issue 3

Social Determinants of Health Disparities Are Associated With Increased Costs, Revisions, and Infection in Patients Undergoing Arthroscopic Rotator Cuff Repair

J. Raso, P. Kamalapathy, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.10.011

Purpose: The purpose of this study was to use a national claims database to assess the impact of pre-existing social determinants of health disparities (SDHD) on postoperative outcomes following rotator cuff repair (RCR).

Methods: A retrospective review of the Mariner Claims Database was used to capture patients undergoing primary RCR with at least 1 year of follow-up. These patients were divided into two cohorts based on the presence of a current or previous history of SDHD, encompassing educational, environmental, social, or economic disparities. Records were queried for 90-day postoperative complications, consisting of minor and major medical complications, emergency department (ED) visits, readmission, stiffness, and 1-year ipsilateral revision surgery. Multivariate logistic regression was employed to assess the impact of SDHD on the assessed postoperative outcomes following RCR.

Results: 58,748 patients undergoing primary RCR with a SDHD diagnosis and 58,748 patients in the matched control group were included. A previous diagnosis of SDHD was associated with an increased risk of ED visits (OR 1.22, 95% CI 1.18-1.27; P < .001), postoperative stiffness (OR 2.53, 95% CI 2.42-2.64; P < .001), and revision surgery (OR 2.35, 95% CI 2.13-2.59; P < .001) compared to the matched control group. Subgroup analysis revealed educational disparities had the greatest risk for 1-year revision (OR 3.13, 95% CI 2.53-4.05; P < .001).

Conclusions: The presence of a SDHD was associated with an increased risk of revision surgery, postoperative stiffness, emergency room visits, medical complications, and surgical costs following arthroscopic RCR. Overall, economic and educational SDHD were associated with the greatest risk of 1-year revision surgery.

Level of Evidence: III, retrospective cohort study.

BACK

Increased Failure Rates After Arthroscopic Bankart Repair After Second Dislocation Compared to Primary Dislocation With Comparable Clinical Outcomes

M.A. Fox, N.P. Drain, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.10.012

Purpose: The purpose of this study was to compare rates of recurrent dislocation and postsurgical outcomes in patients undergoing arthroscopic Bankart repair for anterior shoulder instability immediately after a first-time traumatic anterior dislocation versus patients who sustained a second dislocation event after initial nonoperative management.

Methods: A retrospective chart review was performed of patients undergoing primary arthroscopic stabilization for anterior shoulder instability without concomitant procedures and minimum 2-year clinical follow-up. Primary outcome was documentation of a recurrent shoulder dislocation. Secondary clinical outcomes included range of motion, Visual Analog Scale (VAS), American Shoulder and Elbow Surgeons Shoulder Score (ASES), and Shoulder Activity Scale (SAS).

Results: Seventy-seven patients (mean age 21.3 years ± 7.3 years) met inclusion criteria. Sixty-three shoulders underwent surgical stabilization after a single shoulder dislocation, and 14 underwent surgery after 2 dislocations. Average follow-up was 35.9 months. The rate of recurrent dislocation was significantly higher in the 2-dislocation group compared to single dislocations (42.8% vs 14.2%, P = .03). No significant difference was present in range of motion, VAS, ASES, and SAS scores. The minimal clinically important difference (MCID) was 1.4 for VAS and 1.8 for SAS scores. The MCID was met or exceeded in the primary dislocation group in 31/38 (81.6%) patients for VAS, 23/31 (74.1%) for ASES, and 24/31 for SES (77.4%) scores. For the second dislocation cohort, MCID was met or exceeded in 7/9 (77.8%) for VAS, 4/7 (57.1%) for ASES, and 5/7 for SES (71.4%) scores.

Conclusion: Immediate arthroscopic surgical stabilization after a first-time anterior shoulder dislocation significantly decreases the risk of recurrent dislocation in comparison to those who undergo surgery after 2 dislocation events, with comparable clinical outcome scores. These findings suggest that patients who return to activities after a primary anterior shoulder dislocation and sustain just 1 additional dislocation event are at increased risk of a failing arthroscopic repair.

Study Design: Retrospective comparative study; Level of evidence, 3.

BACK

Remplissage in Addition to Arthroscopic Bankart Repair for Shoulder Instability With On-Track Hill–Sachs Lesions Reduces Residual Apprehension Without External Rotation Limitation

W. Yu, H. Kim, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.10.013

Purpose: To evaluate the role of remplissage as an adjunct to Bankart repair in patients with recurrent anterior shoulder dislocation combined with on-track Hill–Sachs lesion.

Methods: Arthroscopic Bankart repair with remplissage data (December 2018-2020) were collected (BR group). Inclusion criteria were (1) recurrent anterior shoulder dislocation, (2) on-track Hill–Sachs lesion, (3) minimal/subcritical glenoid bone loss (<17%), and (4) postoperative follow-up >1 year. Exclusion criteria were (1) revision surgery, (2) first dislocation with acute glenoid rim fracture, and (3) combined with other surgery. The control group was identified in Bankart repair–only cohort (B group). All patients were evaluated preoperatively, and at 3 weeks, 6 weeks, 3 months, 6 months, and then annually postoperatively. Visual analogue scale for pain, Self-Assessment Numerical Evaluation, American Shoulder and Elbow Surgeons Shoulder score, ROWE, and Western Ontario Shoulder Instability were evaluated at preoperative and final follow-up. Residual apprehension experience and external rotation deficit were evaluated. Patients, who were followed-up for more than 1 year, were asked how often they experienced any subjective apprehension in 4 grades (1: always, 2: frequently, 3: occasionally, 4: never). Patients who had a history of recurrent dislocation or revision surgery were investigated.

Results: In total, 53 patients (B, 28; BR, 25) were included. At final follow-up, both groups showed improvement in 5 clinical scores postsurgery ($P < .001$). The BR group showed greater ROWE scores than the B group (B: 75.2 ± 13.6, BR: 84.4 ± 10.8; $P = .009$). Residual apprehension patient ratio (B: 71.4% [20/28], BR: 32% [8/25]; $P = .004$) and the mean subjective apprehension grade (B: 3.1 ± 0.6, BR: 3.6 ± 0.6; $P = .005$) showed statistically significant difference, whereas no patients in either group experienced external rotation deficit (B: 14.8 ± 12.9°, BR: 18.0 ± 15.2°, $P = .420$). Only 1 patient in the B group had not responded to surgery, with dislocation recurrence ($P = .340$).

Conclusions: Remplissage with arthroscopic Bankart repair in on-track Hill–Sachs lesion has a role in reducing residual apprehension without external rotation limitation.

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

BACK

Biceps Tenodesis in Patients Age 35 Years and Younger Yields Favorable Clinical Outcomes With Variable Rates of Return to Sport and Complications: A Systematic Review

G.R. Jackson, T. Tuthill, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.12.009

Purpose: To systematically evaluate reported clinical outcomes, return-to-sport (RTS) rates, and complications following biceps tenodesis in patients aged 35 years and younger and compare outcomes between overhead and nonoverhead athletes.

Methods: A literature search was performed by querying Scopus, EMBASE, and PubMed computerized databases from database inception through August 2022 in accordance with the 2020 Preferred Reporting Items for Systematic Review and Meta-Analysis guidelines. Studies that evaluated clinical outcomes following biceps tenodesis in patients aged 35 years or younger were included. Study quality was assessed via the Methodological Index for Non-Randomized Studies criteria. Clinical outcomes, RTS rates, and complications were aggregated.

Results: Nine studies from 2011 to 2022 comprising 161 patients (mean age, 25 years; range, 19.7-28.9 years) were included. At an average follow-up of 59 months, postoperative American Shoulder and Elbow Surgeons score ranged from 81.6 to 96 and the mean visual analog scale score ranged from 0 to 2.1. Mean overall RTS rate ranged from 35% to 100% for the entire patient cohort 35% to 86% among overhead athletes, and 46% to 100% among nonoverhead athletes. Among the overhead athletes, 24 were baseball pitchers. 17% to 100% able to return to sport at any level. Complications were reported in 0% to 19% of patients. 0 to 18% of patients underwent revision surgery.

Conclusions: Biceps tenodesis in patients 35 years of age and younger yields a wide variability in reported RTS rates, excellent clinical outcome scores, and low but variable reported rates of complications, reoperations, and failure.

Level of Evidence: IV; Systematic Review of Level III and IV studies.

BACK

Journal of Shoulder and Elbow Surgery (JSES), Volume 32, issue 3

Risk of nerve injury during elbow arthroscopy: ultrasonographic evaluation of preoperative patients

K. Temporin, Y. Miyoshi

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

Background: To clarify the real risk of nerve injury during elbow arthroscopy, the distances of the radial and median nerves to the elbow joint were investigated using ultrasonography in patients who underwent surgery.

Methods: A total of 35 patients who underwent arthroscopic surgery of the elbow were investigated. The distances of the nerves to the capsule and bony landmarks were measured using ultrasonography. The radial nerve distances were measured at the capitellum, joint space, radial head, and radial neck levels. The median nerve distances were measured at the trochlear, joint space, and coronoid process levels. The patients were divided into 2 groups: nine patients in the hydrarthrosis (HA) group and 26 patients in the non-hydrarthrosis (non-HA) group. HA was defined as the intra-articular effusion on magnetic resonance imaging scans.

Results: The radial nerve ran closer to the capsule at the radial neck level in the HA group than in the non-HA group (2.0 mm vs. 5.9 mm, $P < .01$). In the non-HA group, the radial nerve ran closer to the radial head than in the HA group (6.3 mm vs. 8.5 mm, $P = .01$). The median nerve ran closer to the capsule at the trochlear level in the HA group than in the non-HA group (5.2 mm vs. 8.8 mm, $P < .01$). Nerves at a distance of ≤2 mm from the capsule were found in 7 patients at the radial neck of the radial nerve and in 2 patients at the trochlear region of the median nerve in the HA group. In the non-HA group, they were found in 3 patients at the radial head and in 1 patient at the joint space of the radial nerve.

Conclusion: The dangerous locations for nerve injury during elbow arthroscopy vary according to hydrarthrosis, and this risk should be recognized during arthroscopic surgery.

Level of evidence: Anatomy Study, Imaging

BACK

Fourteen years of follow-up after first arthroscopic Bankart repair in athletes: functional outcomes and magnetic resonance imaging findings

A. Bauer, G. Engel

DOI: https://doi.org/10.1016/j.jse.2022.09.019

Background: The arthroscopic Bankart procedure is the most performed surgery for shoulder stabilization. Short-term to midterm results are well studied; however, long-term results over 10 years are rare.

Purpose: This study evaluates the long-term results and magnetic resonance imaging (MRI) findings in athletes at a mean follow-up of 14 years after an arthroscopic Bankart stabilization as well as risk factors for osteoarthritis.

Methods: A total of 63 athletes had an arthroscopic Bankart repair between 2001 and 2008, of whom 46 patients (73.0%) participated in the final follow-up. The Constant, Rowe, and Western Ontario Shoulder Instability Index (WOSI) score and the rate of return to sports were evaluated. Glenohumeral osteoarthritis was assessed using the Samilson-Prieto classification. Known risk factors for osteoarthritis were analyzed. MRI findings (bone marrow edema, cysts, and joint effusion) were analyzed.

Results: The average follow-up was 14 years. Assessment was performed on 46 athletes with an average age of 21.6 at the time of surgery. The overall redislocation rate was 21.7%. The Constant score was 96.7, the Rowe score was 83.4, and the Western Ontario Shoulder Instability Index score was 90.7 out of 100. A total of 84.8% of the athletes returned to their initial sports level. Glenohumeral osteoarthritis occurred in 28.1%. Known risk factors for osteoarthritis were confirmed. Further MRI findings were rare.

Conclusion: Arthroscopic Bankart repair in athletes shows good long-term clinical results. However, this is only in patients without osteoarthritis, which was rare, but was confirmed as a risk factor. We assume that resorption of anchors differs in patients. If it does have an impact on developing arthrosis, this should be confirmed in further studies.

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

BACK

Payor type is associated with increased rates of reoperation and health care utilization after rotator cuff repair: a national database study

S.B. Sequeira, M.A. Wright

DOI: https://doi.org/10.1016/j.jse.2022.09.003

Background: Despite strong evidence supporting the efficacy of rotator cuff repair (RCR), previous literature has demonstrated that socioeconomic disparities exist among patients who undergo surgery. There is a paucity of literature examining whether payor type, including Medicare, Medicaid, and commercial insurance types, impacts early medical complications and rates of reoperation after RCR.

Methods: Patients with Medicare, Medicaid, or commercial payor–type insurance who underwent primary open or arthroscopic RCR between 2010 and 2019 were identified using a large national database. Ninety-day incidence of medical complications, emergency department (ED) visit, and hospital readmission, as well as 1-year incidence of revision repair, revision to arthroplasty, and cost of care were evaluated. Propensity-score matching was used to control for patient demographic factors and comorbidities as covariates.

Results: A total of 113,257 Medicare, 23,074 Medicaid, and 414,447 commercially insured patients were included for analysis. Medicaid insurance was associated with an increased 90-day risk of various medical complications, ED visit (odds ratio [OR]: 2.87; $P < .001$), and 1-year revision RCR (OR: 1.60; $P < .001$) compared with Medicare insurance. Medicaid insurance was also associated with an increased risk of various medical complications, ED visit (OR: 2.98; $P < .001$), and hospital readmission (OR: 1.56; $P = .002$), as well as 1-year risk of revision RCR (OR: 1.60; $P < .001$) and conversion to arthroplasty (OR: 1.4358; $P < .001$) compared with commercially insured patients. Medicaid insurance was associated with a decreased risk of conversion to arthroplasty compared with Medicare patients (OR: 0.6887; $P < .001$). Medicaid insurance was associated with higher 1-year cost of care compared with patients with both Medicare ($P < .001$) and commercial insurance ($P < .001$).

Discussion: Medicaid insurance is associated with increased rates of medical complications, health care utilization, and reoperation after rotator cuff surgery, despite controlling for covariates. Medicaid insurance is also associated with a higher 1-year cost of care. Understanding the complex relationship between sociodemographic factors, such as insurance status, medical comorbidities, and outcomes, is necessary to ensure optimal health care access for all patients and to allow for appropriate risk stratification.

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

BACK

Peripheral microcirculation alteration as cause of posterosuperior rotator cuff tear: the possible indirect contribution of nailfold capillaroscopy

S. Gumina, R. Proietti

DOI: https://doi.org/10.1016/j.jse.2022.08.015

Background: Most of the recent literature regarding rotator cuff tear etiology identifies in peripheral microcirculation disorders the probable main cause of tissue degeneration, and consequently of tendon rupture. Nailfold capillaroscopy is a practical and inexpensive diagnostic technique used to evaluate the health status of peripheral microcirculation, and recently, its use has found other indications in addition to that of diagnosing connective tissue diseases and Raynaud phenomenon. We verified the possible indirect contribution of nailfold capillaroscopy in the identification of peripheral microcirculation disturbances in a group of patients with rotator cuff tear and whether these possible alterations could be related to rotator cuff tear size.

Methods: A case-control study was performed. One hundred patients (56 male, 44 female; mean age ± standard deviation [SD]: 60.46 ± 5.46 years) with different-sized posterosuperior cuff tears and 100 healthy controls (38 male, 62 female; mean age ± SD: 60.40 ± 6.34 years) were submitted to capillaroscopic examination. The following parameters were examined: capillary morphology and density, avascular areas, visibility of the subpapillary venous plexus, enlarged and giant capillaries, ectasias and microaneurysms, neoangiogenesis, hemosiderin deposits, pericapillary edema, and capillary blood flow. Severe exclusion criteria were applied. Statistical analysis was performed.

Results: Visibility of subpapillary venous plexus ($P < .001$), pericapillary edema ($P < .001$), capillary blood flow ($P < .001$), ectasias and microaneurysms ($P < .001$), and neoangiogenesis ($P = .04$) were significantly associated with presence of a rotator cuff tear.

Conclusion: Our results support the hypothesis that microcirculation disorder has a relevant role in the genesis of cuff degeneration and, consequently, of tendon rupture. However, these alterations do not seem to be related to rotator cuff tear size.

Level of evidence: Level IV, Case Control Design, Diagnostic Study

BACK

Arthroscopic Latarjet procedure and suture-button fixation: can we predict nonunion early?

P. Teissier, H. Bouhali

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

Background: The arthroscopic Latarjet procedure is a technically challenging technique that provides well-known results. The first series reported fixation with screws. An alternative fixation technique has been proposed, using a button, to improve the reproducibility and to decrease the complications due to screws. The first reports using this fixation technique have yielded comparable rates of fusion. The objective of this study was to assess the fusion rate and bone modifications with this type of fixation.

Methods: Two hundred sixteen patients were included in this prospective study. An arthroscopic Latarjet procedure, fixed with 1 button according to the Smith & Nephew technique, was performed by a single surgeon for the treatment of anterior instability. The radiographic protocol consisted of computed tomography scans at 3, 12, and 24 weeks postoperatively. We measured the coronal and sagittal positions of the bone block, distance between the bone block and the glenoid, diameter of the glenoid tunnel, fusion rate, and time to fusion.

Results: The position was deemed flush in 92.6% of cases in the coronal plane and under the equator in 87.5% of cases in the sagittal plane. At last follow-up, we observed 9 cases of nonunion (4%), as well as 18 cases of delayed fusion. The fusion rate was 92% at 3 months and 96% at 6 months. For bone blocks that ultimately healed, the diameter of the glenoid tunnel was <2 mm in 62% of cases at 3 weeks and <1 mm in 90% of cases at 3 months. Conversely, the diameter of this tunnel significantly increased and was >3 mm in all cases of delayed union or nonunion.

Conclusion: The described technique achieved a reliable position of the bone block and a very good fusion rate with a new type of fixation. The time to obtain fusion can be lengthy, occurring between the third and sixth months. The diameter of the glenoid tunnel was the best predictive factor for fusion. Widening of the glenoid tunnel diameter >3 mm during the first 3 weeks was the most predictive factor for delayed union or nonunion of the bone block. This finding is probably explained by a sliding effect of the sutures through this tunnel, comparable to the bungee effect in anterior cruciate ligament repair in the knee.

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

BACK

Coracoid graft resorption after the Latarjet procedure does not depend on the preoperative glenoid defect

D. Sahu, D. Shah

DOI: https://doi.org/10.1016/j.jse.2022.09.013

Background: The primary purpose was to compare coracoid graft resorption after the Latarjet procedure in patients without preoperative glenoid bone loss vs. those with more than critical glenoid loss. The secondary purposes were to compare the functional outcomes and to investigate the association of graft position, angle of the screws, preoperative glenoid defect, age at surgery, and smoking status with graft resorption.

Methods: Sixty consecutive patients with recurrent anterior instability were treated by the Latarjet procedure as the index procedure, irrespective of the glenoid bone loss between 2018 and 2021. Fifty-five patients were evaluated via computed tomography scans after a minimum of 1 year after surgery (range: 1-4 years). Twenty-five patients had no prior glenoid defect (No-defect group), 24 patients had preoperative glenoid defects ≥15% (Critical defect group), and 6 patients had glenoid defects between 5% and 15%. The No-defect group (n = 25) was compared with the Critical defect group (n = 24). Multivariate logistical regression was performed to evaluate the association of independent factors with the grade of resorption for all 55 patients in the cohort.

Results: Major graft resorption at the level of the superior screw was observed in 72%-84% of patients in the No-defect group (n = 25) and in 75%-83% of patients in the Critical defect group (n = 24) (P = 1, P = 1; no significant difference). No to mild resorption at the level of the inferior screw was observed in 96% of patients in the No-defect group and 100% of patients in the Critical defect group (P = 1; no significant difference). Postoperative Rowe scores (100 [95-100] vs. 100 [95-100]; P = .8) and shoulder subjective value (87 [11] vs. 86 [9]; P = .9) were not significantly different between the 2 groups. None of the independent factors, including the corresponding screw angle, the mediolateral graft positioning, prior glenoid defect, age, and smoking status, were associated with graft resorption in multivariate logistical regression.

Conclusion: Graft resorption after the Latarjet procedure does not depend on the preoperative glenoid defect. The coracoid graft may be mostly resorbed around the superior screw but mildly or none at the level of the inferior screw, but this graft resorption is not dependent on the smoking status, age, prior glenoid defect, mediolateral graft positioning, and the angle of the screws.

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

BACK

Synthetic polytetrafluoroethylene patches for irreparable rotator cuff tears—how are they doing at 5 years?

H. Sandhu, L. Hackett

DOI: https://doi.org/10.1016/j.jse.2022.08.016

Background: Treating massive and irreparable rotator cuff tears are problematic. Several studies have reported that polytetrafluoroethylene (PTFE) patches demonstrated excellent construct integrity and positive clinical and patient outcomes. However, these studies either had small sample sizes or short follow-up periods.

Purpose: To determine the survivorship, efficacy, and medium-term (2-19 years) outcomes of PTFE patch repairs.

Methods: This retrospective study used prospectively collected data to establish the medium-term outcomes of PTFE interposition patch repairs for massive rotator cuff tears that could not be repaired by the standard technique. Patients included those who met the ≥2-year follow-up criteria post repair. Standardized assessments of patient-ranked shoulder pain and function and shoulder strength and passive range of motion (ROM) were performed preoperatively and at follow-up visits. Radiographs and ultrasonography were used to evaluate repair integrity, measure proximal humeral head migration, and determine glenohumeral arthritis scores.

Results: Forty-one shoulders formed the study cohort at a mean follow-up period of 5 years (range: 2-19 years). The mean age of this group was 72 (standard deviation: 10; range: 50-88) and had 14 cm^2 tears at surgery. Twenty-five of 41 (61%) PTFE interposition patch repairs remained intact at an average of 5 years postrepair. Thirteen patches failed at the patch-tendon junction, 1 was removed, and 2 patients underwent reverse total shoulder replacement. Patient-ranked shoulder stiffness ($P < .05$), frequency of pain during activity and sleep ($P < .001$), pain levels during overhead activity and rest ($P < .001$), and overall shoulder function significantly improved from bad preoperatively to fair at the mean 5-year postoperative visit ($P < .001$). No significant improvements were demonstrated in dynamometer-measured shoulder strength maneuvers and passive ROM. All patients demonstrated proximal humeral head migration on shoulder radiographs regardless of repair integrity (mean Upper Migration Index = 1.2). Failed repairs were associated with higher mean preoperative glenohumeral arthritis grades compared with intact repairs (grade 2 in failed repairs compared with grade 1 in intact repairs) ($P < .01$).

Conclusion: PTFE interposition patch repairs for massive and irreparable tears had good construct integrity and clinical outcomes at 2 years. These outcomes were not maintained. PTFE patch repairs often failed at the patch-tendon junction at 4 years and beyond and were ineffective in (1) preventing proximal humeral head migration, (2) stopping progression of glenohumeral arthritis, and (3) improving shoulder strength and ROM.

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

BACK

American Journal of Sports Medicine (AJSM), Volume 51, Issue 3

Functional and Structural Outcomes After Arthroscopic Rotator Cuff Repair With or Without Preoperative Corticosteroid Injections

Sijia Feng MD, Huizhu Li MD, Yuting Zhong MD, Yuxue Xie MD, Jun Chen PhD, Yuzhou Chen MD, PhD, Shiyi Chen MD, PhD

DOI: https://doi.org/10.1177/03635465221145949

Background: Corticosteroid injections (CSIs) are effective in alleviating pain in patients with rotator cuff tears, but controversy still exists regarding their potential adverse effects on clinical outcomes after rotator cuff repair.

Purpose: To compare both the functional and the structural outcomes in patients who underwent arthroscopic rotator cuff repair with or without preoperative CSIs.

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

Methods: A retrospective cohort study was carried out among patients who underwent arthroscopic rotator cuff repair for partial- and full-thickness tears between 2015 and 2019. The patients who received preoperative CSIs were included in the CSI group and compared with a group without preoperative CSIs (non-CSI group), matched at a ratio of 1:2 based on tear size, age, and follow-up time. Both functional evaluation and structural assessments using magnetic resonance imaging (MRI) were performed at the final follow-up. Clinical outcomes—including retear rate as the primary outcome; pain; functional scores including the Constant-Murley score, American Shoulder and Elbow Surgeons score, and Fudan University Shoulder Score; range of motion (ROM); tendon integrity; tendon healing type; and cartilage thickness—were compared between the 2 groups with a statistical significance of $P < .05$ and power of 0.9.

Results: Thirty-one patients were included in the CSI group, and 62 were included in the non-CSI group. After a mean 3-year follow-up, the 2 groups demonstrated no significant differences in retear rate; visual analog scale for pain; shoulder functional scores; and active ROM including forward flexion, abduction, external rotation, and internal rotation. No significant differences were observed on postoperative MRI scans of the rotator cuff tendon (tendon integrity, healing type, residual tendon attachment area, etc), cartilage thickness, and muscle atrophy.

Conclusion: No significant differences were found at a mean 3-year follow-up in the retear rates, pain, ROM, and glenohumeral structure on postoperative MRI scans after arthroscopic rotator cuff repair with or without preoperative CSIs.

BACK

Lower Extremity

Arthroscopy, Volume 39, Issue 3

There Is Substantial Variation in Rehabilitation Protocols Following Anterior Cruciate Ligament Reconstruction: A Survey of 46 American Orthopaedic Surgeons

K.E. Glattke, S.V. Tummala, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.07.024

Purpose: To identify the clinical practice preferences of orthopaedic surgeons regarding anterior cruciate ligament reconstruction (ACLR) rehabilitation through a survey of members of the Arthroscopy Association of North American (AANA) and the American Orthopaedic Society for Sports Medicine (AOSSM).

Methods: An online survey was distributed to members of AANA and AOSSM between November 2020 and September 2021. Participants reported on their clinical preferences for ACLR protocol development and patient selection, use of technology in ACLR recovery and rehabilitation, and preferences for advancing through multiple phases of the rehabilitative process.

Results: Responses from 46 orthopaedic surgeons were analyzed. Patient-reported outcome measures were not found to be utilized often at various phases of the perioperative period. Thirty-eight (82.6%) participants reported utilization of postoperative bracing. There was no consensus on when participants allow their patients to advance through rehabilitation, but most report waiting 3 to 4 months for advancement to jogging/lateral movement, 6 to 8 months for return to noncontact sport, and 9 months of more for return to unrestricted sport. Many participants utilize functional and strength testing with associated limb symmetry indices to determine patient readiness to return to sport, with 18, 26, and 25 participants reporting use of functional testing and 28, 26, and 27 participants reporting use of strength testing at the return to jogging/lateral movements, noncontact return to sport, and unrestricted return-to-sport phases, respectively.

Conclusions: This study provides an insight into the rehabilitative protocols and modalities utilized for ACLR by orthopaedic surgeons in practice across the United States. There is notably substantial variation in rehabilitative patterns and preferences, particularly with regards to what constitutes criteria for progressing patients through the phases of returning to unrestricted sport. Additionally, our findings show that while many surgeons believe that quantitative assessment technology could be beneficial in decision-making for returning patients to sport, there are still many barriers that stand in the way of its implementation into clinical practice.

Clinical Relevance: Postoperative rehabilitative protocols after ACLR vary by surgeon.

BACK

Over One-Third of Patients With Multiligament Knee Injuries and an Intact Anterior Cruciate Ligament Demonstrate Medial Meniscal Ramp Lesions on Magnetic Resonance Imaging

J. Moran, C.A. Scheble, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.10.022

Purpose: To determine the incidence of ramp lesions and posteromedial tibial plateau (PMTP) bone bruising on magnetic resonance imaging (MRI) in patients with multiligament knee injuries (MLKIs) and an intact anterior cruciate ligament (ACL).

Methods: A retrospective review of consecutive patients surgically treated for MLKIs at 2 level I trauma centers between January 2001 and March 2021 was performed. Only MLKIs with an intact ACL that received MRI scans within 90 days of the injury were included. All MLKIs were diagnosed on MRI and confirmed with operative reports. Two musculoskeletal radiologists retrospectively rereviewed preoperative MRIs for evidence of medial meniscus ramp lesions (MMRLs) and PMTP bone bruises using previously established classification systems. Intraclass correlation coefficients were used to calculate the reliability between the radiologists. The incidence of MMRLs and PMTP bone bruises was quantified using descriptive statistics.

Results: A total of 221 MLKIs were identified, of which 32 (14.5%) had an intact ACL (87.5% male; mean age of 29.9 ± 8.6 years) and were included. The most common MLKI pattern was combined injury to the posterior cruciate ligament and posterolateral corner (n = 27, 84.4%). PMTP bone bruises were observed in 12 of 32 (37.5%) patients. Similarly, MMRLs were diagnosed in 12 of 32 (37.5%) patients. A total of 8 of 12 (66.7%) patients with MMRLs demonstrated evidence PMTP bone bruising.

Conclusions: Over one-third of MLKI patients with an intact ACL were diagnosed with MMRLs on MRI in this series. PMTP bone bruising was observed in 66.7% of patients with MMRLs, suggesting that increased vigilance for identifying MMRLs at the time of ligament reconstruction should be practiced in patients with this bone bruising pattern.

Level of Evidence: Level IV, retrospective case series.

BACK

Increased Time to Surgery After Anterior Cruciate Ligament Tear in Female Patients Results in Greater Risk of Medial Meniscus Tear: A Study of 489 Female Patients

L. Giordano, N. Maffulli, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.10.014

Purpose: This study assessed the incidence of meniscal tears in anterior cruciate ligament (ACL)-deficient knees, considering the time between injury and reconstruction in a large sample of female patients. Furthermore, we evaluated whether the rate of meniscal repair or meniscectomy was affected by age and body mass index (BMI).

Methods: The medical records of 489 patients who underwent ACL-reconstructive surgery between January 2011 and April 2021 were analyzed to collect data on the prevalence of meniscal tears, surgical timing, patient age, and BMI. Logistic regression was performed to estimate the association between the prevalence of meniscal tears and the independent variables of surgical timing, age, and BMI.

Results: Between 24 and 60 months after their injury, female patients showed a statistically significant increase in the presence of associated meniscal lesions when compared with ACL reconstruction performed earlier (odds ratio [OR] of 3.11; 95% 1.06-9.10 confidence interval [CI]), especially for medial meniscal tears, with an OR of 1.94 (95% CI 1.23-3.05, P = .004) between 12 and 24 months. There is a statistically significant difference after 12 months in the rate of meniscal suturing for medial meniscus tears (OR 3.30; CI 1.37-7.91 P = .007). Increasing age was associated with a greater prevalence of meniscal tears up to 30-50 years, but there was no clear association between BMI and associated lesions other than a greater rate of meniscectomies.

Conclusions: In female patients who experienced an ACL injury, a delay in surgery greater than 12 months is associated with a gradual increase in the risk of nonrepairable medial meniscal tear; this risk becomes statistically significant after 24 months. A high BMI does not seem to have relevance in the onset of associated lesions in women but results in a greater rate of meniscectomies compared with meniscal sutures, whereas age between 30 and 50 years is associated with a greater risk of associated injuries.

Level of Evidence: III, retrospective comparative prognostic trial.

BACK

Tourniquet Use Improves Intraoperative Parameters, Leading to Similar Postoperative Outcomes Compared With No Tourniquet Use in Anterior Cruciate Ligament Reconstruction: A Prospective, Double-Blind, Randomized Clinical Trial

H.H.G. Zaid, X. Hua, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.10.033

Purpose: To examine the effect of tourniquet use in arthroscopic anterior cruciate ligament reconstruction in terms of: (1) intraoperative visualization with operative time and consumption of sterile saline, and (2) intra- and postoperative blood loss, postoperative pain, opioid consumption, swelling, serum creatine phosphokinase (CPK) and hemoglobin (Hb) concentrations, clinical outcomes, and graft healing.

Methods: In this prospective randomized clinical trial, patients were assigned to tourniquet inflation (tourniquet-up) or tourniquet deflation (tourniquet-down) groups. Primary outcomes were intraoperative visualization with operative time and sterile saline consumption. Secondary outcomes were intra- and postoperative blood loss, postoperative pain, opioid consumption, swelling, serum CPK, Hb concentration, subjective and objective functional scores, and graft healing.

Results: Intraoperative visualization was satisfactory in 100 of 100 cases in the tourniquet-up group and 64 of 100 cases in the tourniquet-down group ($P < .05$). The mean operative time was 58.4 ± 5.7 minutes in the tourniquet-up group and 72.5 ± 8.6 minutes in the tourniquet-down group ($P < .05$). The mean sterile saline consumption was 6.4 ± 2.5 L in the tourniquet-up group and 8.7 ± 4.6 L in the tourniquet-down group ($P < .05$). The respective amounts of estimated intraoperative and postoperative blood loss were 95.3 ± 25.1 mL and 240.3 ± 44.5 mL in the tourniquet-up group and 230.2 ± 22.3 mL and 75.6 ± 15.3 mL in the tourniquet-down group ($P < .05$). Our results showed no significant difference in postoperative pain, opioid consumption, percentage of patients using opioids, swelling, mean serum CPK and Hb levels, subjective and objective functional scores, or graft healing ($P > .05$) between the 2 groups.

Conclusions: Tourniquet use during anterior cruciate ligament reconstruction significantly improves intraoperative visualization, shortens operative time, and decreases intraoperative sterile saline consumption and blood loss without serious adverse events or greater complication rates based on early postoperative outcomes.

Level of Evidence: Level I, randomized controlled trial.

BACK

Staging Bilateral Hip Arthroscopies Less Than 1 Year Apart May Reduce the Risk of Revision Surgery

P. Ramamurti, P. Kamalapathy, et al.

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

Purpose: To identify the influence of timing between staged bilateral hip arthroscopy on 90-day postoperative medical complications and 2-year surgical complications including revision, conversion to total hip arthroplasty (THA), and infection.

Methods: The Mariner data set of the PearlDiver all-payer claims database was queried for patients undergoing staged bilateral hip arthroscopy. Patients were stratified into cohorts based on time between arthroscopies: (1) ≤3 months, (2) 3 to ≤6 months, (3) 6 to ≤12 months, and (4) >1 year. Multivariate logistic regression was utilized to control for any confounding variables.

Results: In total, 998 patients underwent staged bilateral hip arthroscopy out of 38,080 patients who underwent primary hip arthroscopy. The 2-year revision rate was 7.6% for all patients undergoing bilateral hip arthroscopy, while 1.9% of patients underwent conversion to THA. Patients with arthroscopy procedures staged less than 1 year apart (cohorts 1, 2, and 3) had significantly decreased risk of revision compared to the greater than 1 year cohort (P = .008, .025, and .044, respectively). There were no differences in rates of major medical, minor medical, or remaining surgical complications between the cohorts. Direct comparisons between the cohorts staged ≤1 year apart showed no significant differences in medical or surgical complications (P > .05).

Conclusions: The revision rate in all patients undergoing staged bilateral hip arthroscopy was 7.6%. Staging hip arthroscopy ≤1 year apart was associated with a decreased risk of revision when compared to the staged cohort >1 year. Among those staged less than 1 year, the timing of staging had no association with rates of medical or surgical complications. Patients who are indicated for bilateral hip arthroscopy may benefit from staging under 1 year apart to reduce the risk of revision surgery. Optimal timing decisions may be patient specific and rely on the duration of symptoms, severity of pathology, or progression of rehabilitation after the index procedure.

Level of Evidence: III, retrospective comparative study.

BACK

Postless Hip Distraction Systems Decrease the Amount of Traction Force Needed to Obtain Adequate Hip Distraction Versus a Conventional Post Hip Distractor

D.C. O'Neill, J. Featherall, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.10.009

Purpose: To directly compare hip distraction distance and traction force data for hip arthroscopy performed using a post-basedsystem versus a postless system.

Methods: Adult patients undergoing primary hip arthroscopy for femoroacetabular impingement were prospectively enrolled. Before March 26, 2019, arthroscopy was performed using a post-based system. After this date, the senior author converted to using a postless system. Intraoperative traction force and fluoroscopic distraction distance were measured to calculate hip stiffness coefficients at holding traction (k-hold) and maximal traction (k-max). We used multivariable regression analysis to determine whether postless arthroscopy was predictive of lower stiffness coefficients when controlling for other relevant patient-specific factors.

Results: Hip arthroscopy was performed with a post-based system in 105 patients and with a postless system in 51. Mean holding traction force (67.5 ± 14.0 kilograms-force [kgf] vs 55.8 ± 15.3 kgf) and mean maximum traction force (96.0 ± 16.6 kgf vs 69.9 ± 14.1 kgf) were significantly lower in the postless group. On multivariable analysis, postless traction was an independent predictor of decreased k-hold (β = –31.4; 95% confidence interval, –61.2 to –1.6) and decreased k-max (β = –90.4; 95% confidence interval, –127.8 to –53.1). Male sex, Beighton score of 0, and poor hamstring flexibility were also predictors of increased k-hold and k-max in the multivariable model.

Conclusions: Postless traction systems decrease the amount of traction force required for adequate hip distraction for both maximal and holding traction forces when compared with post-based systems. Postless traction systems may help further reduce distraction-type neurologic injuries and pain after hip arthroscopy by lowering the traction force required to safely distract the hip.

Level of Evidence: Level III, prospective cohort–historical control comparative study.

BACK

Combined Lateral Extra-Articular Tenodesis or Combined Anterolateral Ligament Reconstruction and Anterior Cruciate Ligament Reconstruction Improves Outcomes Compared to Isolated Reconstruction for Anterior Cruciate Ligament Tear: A Network Meta-analysis of Randomized Controlled Trials

Y. Park, H. Lee, et al.

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Purpose: To conduct a network meta-analysis (NMA) comparing the results of randomized controlled trials (RCTs) among patients who underwent either isolated anterior cruciate ligament (ACL) reconstruction or combined lateral extra-articular tenodesis (LET) or anterolateral ligament reconstruction (ALLR).

Methods: RCTs that compared isolated ACL reconstruction and combined LET or ALLR were included with minimum 12 months follow-up. Studies that used the double-bundle technique were excluded. Outcome assessment included the number of positive pivot shifts, amount of anterior tibial translation, and International Knee Documentation Committee (IKDC) subjective, Tegner, and Lysholm scores. Bayesian NMA and the surface under the cumulative ranking area (SUCRA) were evaluated.

Results: A total of 1,077 patients from 11 RCTs were enrolled in this study. In NMA, the odds ratios (ORs) of positive pivot shift were significantly lower in ACL + ALLR (OR: 0.17; 95% CI: 0.027–0.67) than isolated ACL reconstruction, but no difference between ACL + ALLR and ACL + LET. There were no significant differences in anterior tibial translation among the techniques, but the IKDC subjective and Lysholm scores of ACL + ALLR and ACL + LET were significantly higher than isolated ACL reconstruction. ACL + ALLR were the most preferred in terms of residual pivot shift, anterior tibial translation, and IKDC subjective scores (SUCRA = 88.2%, 86.4%, and 93.1%, respectively). Additional lateral procedures resulted in significantly lower risk of graft failure (OR: 0.27; 95% CI: 0.1–0.71) than isolated ACL reconstruction.

Conclusions: ACL + ALLR were found to have significantly better outcomes in terms of knee rotational stability and graft failure rate than isolated ACL reconstructions, but the clinical outcomes were uncertain after a minimum 12 months follow-up. Considering the greatest probability of obtaining better knee rotational stability in this NMA, ACL + ALLR was found to be the most preferred technique for patients with ACL injury.

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

BACK

Machine Learning Can Accurately Predict Overnight Stay, Readmission, and 30-Day Complications Following Anterior Cruciate Ligament Reconstruction

C.D. Lopez, A. Gazgalis, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.06.032

Purpose: This study aimed to develop machine learning (ML) models to predict hospital admission (overnight stay) as well as short-term complications and readmission rates following anterior cruciate ligament reconstruction (ACLR). Furthermore, we sought to compare the ML models with logistic regression models in predicting ACLR outcomes.

Methods: The American College of Surgeons National Surgical Quality Improvement Program database was queried for patients who underwent elective ACLR from 2012 to 2018. Artificial neural network ML and logistic regression models were developed to predict overnight stay, 30-day postoperative complications, and ACL-related readmission, and model performance was compared using the area under the receiver operating characteristic curve. Regression analyses were used to identify variables that were significantly associated with the predicted outcomes.

Results: A total of 21,636 elective ACLR cases met inclusion criteria. Variables associated with hospital admission included White race, obesity, hypertension, and American Society of Anesthesiologists classification 3 and greater, anesthesia other than general, prolonged operative time, and inpatient setting. The incidence of hospital admission (overnight stay) was 10.2%, 30-day complications was 1.3%, and 30-day readmission for ACLR-related causes was 0.9%. Compared with logistic regression models, artificial neural network models reported superior area under the receiver operating characteristic curve values in predicting overnight stay (0.835 vs 0.589), 30-day complications (0.742 vs 0.590), reoperation (0.842 vs 0.601), ACLR-related readmission (0.872 vs 0.606), deep-vein thrombosis (0.804 vs 0.608), and surgical-site infection (0.818 vs 0.596).

Conclusions: The ML models developed in this study demonstrate an application of ML in which data from a national surgical patient registry was used to predict hospital admission and 30-day postoperative complications after elective ACLR. ML models developed performed well, outperforming regression models in predicting hospital admission and short-term complications following elective ACLR. ML models performed best when predicting ACLR-related readmissions and reoperations, followed by overnight stay.

Level of Evidence: IV, retrospective comparative prognostic trial.

BACK

Return to Sport After Anterior Cruciate Ligament Reconstruction Requires Evaluation of >2 Functional Tests, Psychological Readiness, Quadriceps/Hamstring Strength, and Time After Surgery of 8 Months

R. Turk, S. Shah, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.08.038

Purpose: The purpose of this study was to examine the factors commonly used to determine readiness for return to sport (RTS) in the ACL reconstruction (ACL-R) patient population and assess which were most influential to successfully returning to sport and avoiding re-tear.

Methods: The PUBMED, EMBASE and Cochrane Library databases were queried for studies related to RTS in ACL-R. Inclusion and exclusion criteria were applied to identify studies with greater than 1-year outcomes detailing the rate of return and re-tear given a described RTS protocol. Data of interest were extracted, and studies were stratified based on level of evidence and selected study features. Meta-analysis or subjective synthesis of appropriate studies was used to assess more than 25 potentially significant variables effecting RTS and re-tear.

Results: After initial search of 1503 studies, 47 articles were selected for inclusion in the final data analysis, including a total of 1432 patients (31.4% female, 68.6% male). A meta-analysis of re-tear rate for included Level of Evidence 1 studies was calculated to be 2.8%. Subgroups including protocols containing a strict time until RTS, strength testing, and ≥2 dynamic tests demonstrated decreased RTS and re-tear heterogeneity from the larger group. Time to RTS, strength testing, dynamic functional testing, and knee stability were also found to be among the most prevalent reported criteria in RTS protocol studies.

Conclusions: This study suggests a multifactorial clinical algorithm for successful evaluation of RTS. The “critical criteria” recommended by the authors to be part of the postoperative RTS criteria include time since surgery of 8 months, use of >2 functional tests, psychological readiness testing, and quadriceps/hamstring strength testing in addition to the modifying patient factors of age and female gender.

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

BACK

Operative Management for Anterior Cruciate Ligament Injury in Patients Over 40 Years Old Yields Increased Clinical Outcome: A Systematic Review

J. Roberts, B. Ness, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.06.030

Purpose: To evaluate outcomes of anterior cruciate ligament (ACL) rupture in patients ≥40 years treated nonoperatively or with ACL reconstruction (ACLR).

Methods: A review of MEDLINE, CINAHL, SportDiscus, Embase, Web of Science, and Cochrane databases from inception to June 1, 2021, was performed to identify randomized controlled trials, prospective or retrospective cohorts, case controls, or case series that met the following criteria: English-language studies reporting at least one subjective and/or objective outcome measure in ACL rupture patients ≥40 years treated nonoperatively or by ACLR. No limits were placed on graft type, time-to-surgery/follow-up, or concomitant procedures. Variability in patient-reported outcome scores, including subjective IKDC score, Lysholm score, Tegner activity score, and Knee Injury and Osteoarthritis Outcome Score, was assessed to evaluate the utility of applying previously established clinically meaningful thresholds to pooled outcome data.

Results: 12,605 citations were identified using screening criteria. Sixty studies satisfied criteria following full-text review. As previous systematic reviews reported on earlier literature evaluating ACLR outcomes in patients ≥40 years, studies in this review were limited to include only those published in the last 10 years (40 studies). An additional 16 studies were excluded based on aims of the review not identified during initial screen. Although preoperative to postoperative population-based improvements in Lysholm score, Tegner score, and IKDC score surpassed minimal clinically important differences (MCID) in at least 50% of studies, the variability present in the pooled data may limit its application. No studies evaluated nonoperative outcomes.

Conclusions: Evidence supports operative management in patients ≥40 years, as studies generally demonstrated preoperative to postoperative improvements in clinical outcomes based on population-level changes. However, application of patient-level clinically relevant thresholds to pooled outcome data should be undertaken with caution as reporting of population-based outcome scores may not accurately reflect changes in individual patients.

Level of Evidence: Systematic review, IV.

BACK

Labral Tears and Chondral Lesions Are Common Comorbidities Identified During Endoscopic Repair of Gluteal Tendon Tears for Greater Trochanteric Pain Syndrome: A Systematic Review

C. Yee, M. Wong, et al.

DOI: https://doi.org/10.1016/j.arthro.2022.06.031

Purpose: The primary purpose of this study was to systematically review the literature on intraoperative findings during endoscopic treatment for greater trochanteric pain syndrome (GTPS). Secondary outcomes were preoperative imaging findings and postoperative functional outcome measures.

Methods: Medline, PubMED, and Embase databases were searched from inception (1946, 1966, and 1974, respectively), to July 15, 2021, for records reporting intraoperative findings during endoscopic surgery for GTPS. Studies of Level I-IV evidence were eligible. All studies were assessed for quality using the Methodological Index for Non-Randomized Studies (MINORS) score.

Results: Sixteen studies met the inclusion criteria. Most patients underwent endoscopic greater trochanteric bursectomy with repair of the gluteal tendons. Intraoperative conditions reported were gluteal tendon tears usually involving the gluteus medius tendon, labral tears, and chondral lesions. Three studies reported an average of 9% of patients who subsequently underwent conversion to total hip arthroplasty. Pain was assessed using the visual analog scale, and functional outcome measures were measured using the modified Harris Hip Score, Non-Arthritic Hip Score, Hip Outcome Score Sport-Specific subscale, Hip Outcome Score Activities of Daily Living subscale, and iHOT-12. Pain and functional outcomes demonstrated significant improvement in nearly all the studies where they were reported.

Conclusions: Patients who underwent endoscopic management of GTPS commonly underwent repair of gluteal tendon tears, and in many cases had concomitant labral tears and chondral lesions identified intraoperatively. There were low rates of adverse events, repair failure, and revision surgery. Patient-reported functional outcomes were improved at follow-up at least 1 year postoperatively.

Level of Evidence: IV, systematic review of level IV or better investigations.

BACK

American Journal of Sports Medicine (AJSM), Volume 51, Issue 3

Clinical and Second-look Arthroscopic Results for Derotational Distal Femoral Osteotomy With Medial Patellofemoral Ligament Reconstruction for Recurrent Patellar Dislocation With Increased Femoral Anteversion: A Series of 102 Cases With a Minimum Clinical Follow-up of 2 Years

Zhi-Jun Zhang MD, Meng Lin Qian Di MD, Guan-Yang Song MD, Yue Li MD, Yan-Wei Cao MD, Tong Zheng MD, Hua Feng MD, Hui Zhang MD

DOI: https://doi.org/10.1177/03635465221147484

Background: Derotational distal femoral osteotomy (DDFO) has been used to treat patients with recurrent patellar dislocation (RPD) with increased femoral anteversion. However, no study has reported second-look arthroscopic findings in the patellofemoral joint after DDFO.

Purpose: To report clinical and second-look arthroscopic outcomes for DDFO with combined medial patellofemoral ligament reconstruction (MPFL-R) in treating RPD with increased femoral anteversion.

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

Methods: From 2015 to 2019, 131 consecutive patients (144 knees) with RPD were treated with combined MPFL-R and DDFO. Patients with a femoral anteversion angle >30° and a minimum 2-year clinical follow-up period were included in the study. Three-dimensional computed tomography was performed to evaluate rotational deformities of the lower leg. Radiographic parameters presenting bony abnormalities associated with RPD were measured. Second-look arthroscopic evaluations were available for 86 knees to assess patellar tracking and chondral lesion changes. Moreover, clinical and radiologic outcomes were assessed pre- and postoperatively at a minimum 2 years.

Results: A total of 102 knees in 92 patients were included in the present study with a mean clinical follow-up of 4.1 years (range, 2.0-5.6 years). Mean ± SD femoral anteversion changed significantly from 34.7°± 7.5° preoperatively to 11.3°± 0.2° postoperatively ($P < .001$), and mean tibial tubercle–trochlear groove distance decreased significantly from 19.6 ± 3.5 mm preoperatively to 17.4 ± 3.2 mm postoperatively ($P < .001$). In the majority of knees, at the time of second-look arthroscopic assessment, chondral lesion status remained unchanged at the lateral patellar facet (96%) and trochlear groove (95%); in contrast, chondral damage at the medial patellar facet was aggravated in 9 cases (10%). All functional scores (Tegner, Lysholm, visual analog scale, and Kujala scores) improved significantly at final follow-up. None of the patients experienced redislocation or subluxation after surgery.

Conclusion: Chondral lesions in the patellofemoral joint remained unchanged in the majority of cases in second-look arthroscopy after combined MPFL-R and DDFO. Moreover, high-grade trochlear dysplasia and arthroscopic residual patellar maltracking might be associated with cartilaginous deterioration at the medial patellar facet after surgery.

BACK

High Survivorship and Comparable Patient-Reported Outcomes at a Minimum 5 Years After Hip Arthroscopic Surgery in Patients With Femoroacetabular Impingement, With and Without Lateral Rim Dysplasia

Karen Mullins PhD, David Filan MSc, Patrick Carton MD, FRCS (Tr&Orth), FFSEM

DOI: https://doi.org/10.1177/03635465221145018

Background: Femoroacetabular impingement (FAI) in patients with dysplasia presents a unique challenge to surgeons. Short-term outcomes are conflicting, while longer term follow-up data are only emerging.

Purpose: To quantify midterm (minimum 5-year follow-up) outcomes after the arthroscopic correction of FAI in the presence of lateral rim dysplasia compared with a matched control group with FAI with normal acetabular coverage.

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

Methods: Prospective outcome data, collected in a consecutive series of patients undergoing arthroscopic FAI correction with lateral rim dysplasia (lateral center-edge angle [LCEA] of 13°-25°), were reviewed (N = 75 cases). An age- and sex-matched control group of 120 cases was also formed (LCEA >25°). Survivorship was defined as the avoidance of total hip replacement and assessed using a Kaplan-Meier curve with the log-rank test. Survival rates and patient-reported outcome measure (PROM) scores (modified Harris Hip Score [mHHS], University of California, Los Angeles [UCLA], 36-Item Short Form Health Survey [SF-36], and Western Ontario and McMaster Universities Osteoarthritis Index [WOMAC] preoperatively and at 5 years postoperatively) were compared between the groups. The proportion of patients across groups achieving the minimal clinically important difference (MCID) was compared for each PROM. The dysplasia group was also analyzed independently to identify any factors that may indicate a less favorable outcome using regression analysis. The group was divided into 2 subgroups: borderline dysplasia (LCEA of 20°-25°) and severe dysplasia (LCEA <20°).

Results: The survival rate in the dysplasia group was 97%. There was no statistical difference with respect to survival rates or any PROM scores (P > .05 for all) between the groups. There were similar rates of achieving the MCID between the groups for the mHHS, UCLA, and WOMAC. The FAI control group had a higher rate of achieving the MCID for the SF-36 (P = .012; effect size = 0.274 [small]). Subgroup analysis indicated a lower survival rate (78% vs 100%, respectively; P < .001) in female cases in the dysplasia group (n = 9) compared with male cases in the dysplasia group (n = 66). The UCLA score in female cases in the dysplasia group at 5 years was statistically lower compared with that in male cases in the dysplasia group (6 vs 10, respectively; P = .003; effect size = 0.378 [medium]), but no other outcome revealed any differences between the sexes. There were also no variables identified on regression analysis that accurately predicted a poorer outcome in the dysplasia group. When stratified by severity, there was no difference in survivorship or outcomes between those with severe dysplasia (LCEA <20°; n = 11) and those with borderline dysplasia (LCEA of 20°-25°; n = 64).

Conclusion: An arthroscopic intervention was a successful treatment option for FAI in the presence of lateral rim dysplasia at midterm follow-up. Irrespective of the severity of dysplasia, patients can expect similar improvements to those in patients with normal femoral head coverage.

BACK