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Issue 79.3, Arthroscopy, 03-2021

Nederlandse Vereniging voor Arthroscopie

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March 2021

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Upper extremity

Arthroscopy, Volume 37, Issue 03, p 795-803

Excellent Clinical and Radiological Midterm Outcomes for the Management of Recurrent Anterior Shoulder Instability by All-Arthroscopic Modified Eden-Hybinette Procedure Using Iliac Crest Autograft and Double-Pair Button Fixation System: 3-Year Clinical Case Series With No Loss to Follow-Up

Avramidis, G., Kokkineli, S., Trellopoulos, A., Tsiogka, A., Natsika, M., Brilakis, E., & Antonogiannakis, E.

https://doi.org/10.1016/j.arthro.2020.10.036

Purpose
To evaluate the clinical, functional, and radiological midterm outcomes of the all-arthroscopic modified Eden-Hybinette procedure in patients with recurrent anterior shoulder instability.

Methods
A retrospective, single-center case series with prospectively collected data was conducted. The inclusion criterion was traumatic recurrent anterior shoulder instability with significant glenoid bone loss; patients with atraumatic or multidirectional instability were excluded. An all-arthroscopic modified Eden-Hybinette procedure using iliac crest autograft and double-pair button fixation was carried out. All patients were postoperatively assessed for recurrence and apprehension. Shoulder range of motion values and functional scores, including American Shoulder and Elbow Surgeons Score, Oxford instability, Rowe instability, and Walch-Dupplay, were recorded. Graft positions, healing, and absorption were evaluated with computed tomography. Comparisons of values were performed with paired t tests for normally distributed differences and with nonparametric Wilcoxon's signed rank test otherwise.

Results
The final study cohort included 28 patients, mean age 36 ± 10 years, and mean follow-up period 43 ± 6 months (range 36 to 53). Median glenoid bone loss was 12.4% (range 8% to 33%). No recurrence occurred, no subjective shoulder instability was reported, and no major complications were documented through the last follow-up. Postoperative shoulder range of motion had no significant differences compared with the healthy side. All final postoperative functional scores significantly increased to show excellent results compared with preoperative values. All grafts were positioned and healed optimally, and none was completely reabsorbed.

Conclusions
The all-arthroscopic modified Eden-Hybinette procedure is safe, leading to excellent clinical and radiological midterm outcomes in patients with recurrent anterior shoulder instability. This technique restores glenoid bone defects and preserves the normal shoulder anatomy.

Level of Evidence
IV, therapeutic, retrospective case series

BACK

Increased Risk of Short-Term Complications and Venous Thromboembolism in Latarjet-Bristow Procedures Compared With Bankart Repairs

Goodloe, J. B., Traven, S. A., Johnson, C. A., Woolf, S. K., Nutting, J. T., & Slone, H. S.

https://doi.org/10.1016/j.arthro.2020.10.039

Purpose
To (1) determine the rate of surgical complications and venous thromboembolism (VTE) in patients undergoing arthroscopic Bankart repair, open Bankart repair, or Latarjet-Bristow; and (2) assess potential risk factors for surgical complications and VTE in patients undergoing shoulder stabilization procedures.

Methods
The NSQIP database was used to identify patients undergoing isolated surgery for shoulder instability from 2005 to 2017. Demographic data were collected and compared. Logistic regression was used to assess the risk factors for developing a postoperative complication, and regression analyses were used to evaluate the odds of postoperative complications between types of surgery.

Results
We identified 7,233 patients for inclusion. Patients undergoing Latarjet-Bristow were more likely to be male and Black and to report current tobacco use. Overall, there was a low rate of surgical complications (0.4%) and VTE (0.2%). However, patients undergoing Latarjet-Bristow had nearly a 10-fold increase in the risk of surgical complications compared with an arthroscopic or open Bankart repair (1.9% versus 0.2%, $P < .001$), including deep surgical site infections, return to operating room within 30 days, and symptomatic VTE (deep venous thrombosis rate: arthroscopic Bankart repair, 0.1%; Latarjet-Bristow, 0.8%; $P < .001$). There were no differences in the odds of developing a surgical complication or VTE between patients undergoing arthroscopic or open Bankart repair.

Conclusion
This study used a nationally representative, widely validated, peer-reviewed database to demonstrate that patients undergoing a Latarjet-Bristow procedure are at significantly higher risk for short-term postoperative complications, including deep surgical site infections, return to the operating room, and symptomatic VTE, than those undergoing Bankart repair. These findings should not discourage surgeons from proceeding with a coracoid transfer procedure when indicated for glenoid deficiencies, but should inform preoperative counseling and help guide perioperative care to optimize patient outcomes.

Level of Evidence
III, retrospective comparative trial

BACK

Acceptable Long-Term Outcomes of Arthroscopic Bone Grafting for Recurrent Posterior Shoulder Instability: Minimum Follow-Up of 5 Years

Roland S. Camenzind, Javier M. Becerra, Louis Gossing, Julien Serane-Fresnel, Eric R Wagner, Laurent Lafosse

https://doi.org/10.1016/j.arthro.2020.10.052

Purpose
To examine the long-term clinical outcome associated with arthroscopically placed autologous iliac crest bone graft (ICBG) for recurrent posterior shoulder instability.

Methods
From January 2008 to December 2013, patients treated with posterior ICBG and a minimum follow-up of 5 years were included. Clinical outcome of patients operated with a posterior ICBG was analyzed with multiple patient-reported outcome measures included Constant (CS), American Shoulder and Elbow Surgeons (ASES), Walch–Duplay, and Rowe scores, shoulder subjective value, and pain visual analog score. Patient satisfaction was assessed by asking the patients their overall level of satisfaction at last follow-up on a 1 to 10 scale.

Results
In total, 18 patients (19 shoulders) were included. At a mean follow-up of 7.3 years (range, 5-10 years), patients had significant improvements in their mean CS from 63 (standard deviation [SD] 18) to 80 (SD 18; P = .005), ASES from 57 (SD 18) to 81 (SD 18; P = .003), Walch–Duplay from 34 (SD 31) to 79 (SD 22; P < .001), and Rowe score from 37 (SD 23) to 79 (SD 24; P < .001). Pain level decreased from 5.6 (SD 2.5) preoperative to 2.3 (SD 2.3; P < .001) and shoulder subjective value improved 58 (SD 20) to 76 (SD 24; P = .002). Global satisfaction with the procedure was 8.4 (SD 2.1). Clinical significance was met or exceeded by 84% for CS and 89% of the patients for ASES and 95% met or exceeded satisfaction threshold for CS. There were 7 shoulders (37%) reoperated for symptomatic screw irritation.

Conclusions
This series reporting on the long-term follow-up after arthroscopic posterior ICBG for recurrent posterior shoulder instability demonstrates, despite a high number of reoperations for symptomatic screw irritation, its effectiveness with acceptable clinical outcomes and satisfied patients.

Level of Evidence
IV, therapeutic case series.

BACK

Arthroscopic Iliac Crest Bone Allograft Combined With Subscapularis Upper-Third Tenodesis Shows a Low Recurrence Rate in the Treatment of Recurrent Anterior Shoulder Instability Associated With Critical Bone Los

Raffaele Russo,Marco Maiotti,Andrea Cozzolino,...Antonio Guastafierro,Carlo Massoni,Stefano Viglione

https://doi.org/10.1016/j.arthro.2020.11.037

Purpose
To evaluate the clinical and radiologic outcomes of patients undergoing arthroscopic glenoid bone allograft combined with subscapularis upper-third tenodesis for anterior shoulder instability associated with clinically relevant bone loss and hyperlaxity.

Methods
Between January 2016 and December 2017, patients with recurrent anterior shoulder instability associated with bone loss and hyperlaxity were selected and treated with arthroscopic iliac crest bone graft combined with subscapularis upper-third tenodesis. The selection criteria were as follows: more than 5 dislocations; positive apprehension, anterior drawer, and Coudane-Walch test results; glenoid bone defect between 15% and 30% and humeral bone defect with an engaging Hill-Sachs lesion; and no previous shoulder surgery. All patients were followed up with the Constant score, University of California–Los Angeles (UCLA) rating, Rowe score, and visual analog scale evaluation. Assessments were performed with plain radiographs and a PICO computed tomography scan before surgery and at 2 years of follow-up.

Results
Nineteen patients were included in the study, with a mean follow-up duration of 34.6 months (range, 24-48 months). In 17 patients (89%), excellent clinical results were recorded according to the Rowe score. The Constant score improved from 82.9 (standard deviation [SD], 5.2) to 88.9 (SD, 4.3) ($P = .002$); Rowe score, from 25.3 (SD, 5.3) to 89.1 (SD, 21.8) ($P < .001$); UCLA score, from 23.7 (SD, 3) to 31.5 (SD, 4.8) ($P < .001$); and visual analog scale score, from 3.2 to 1.3 ($P < .001$). Patients met the minimal clinically important difference 94.7%, 89.5%, and 47.3% of the time for the Rowe score, UCLA score, and Constant score, respectively. Bone graft resorption was observed in all patients: partial in 9 and complete in 10. We recorded 2 recurrent traumatic dislocations (11%), with no case of persistent anterior apprehension or other complication.

Conclusions
An arthroscopic glenoid bone graft combined with subscapularis upper-third tenodesis may be a valid surgical option to treat recurrent anterior instability associated with both bone loss and hyperlaxity.

Level of Evidence
Level IV, case series.

BACK

Journal of Shoulder and Elbow Surgery (JSES), Volume 30, issue 03, pages 469-478

Comparison of arthroscopy-assisted vs. open reduction and fixation of coronoid fractures of the ulna.

Oh, W.T., Do, W.S., Oh, J.C., et al.

DOI: https://doi.org/10.1016/j.jse.2020.06.037

Purpose
The purpose of this study was to compare clinical and radiographic outcomes and complications for arthroscopy-assisted vs. open reduction and fixation of coronoid fractures in patients with complex elbow fracture-dislocations.

Methods
This retrospective study analyzed patients with complex elbow fracture-dislocations who underwent surgical fixation for coronoid fractures of the ulna from March 2009 to January 2016. Subjects included those who received either arthroscopy-assisted (group A) or open surgery (group O) for coronoid fractures and concurrent reconstruction of the lateral column (radial head and/or lateral ulnar collateral ligament) with follow-up for at least 2 years. Clinical outcomes were assessed using the visual analog scale for pain, range of motion, Mayo Elbow Performance Score, and Disabilities of the Arm, Shoulder, and Hand score at 2 years after surgery. For radiographic assessment, union of the coronoid, development of heterotopic ossification, and arthritic changes were evaluated. We also reviewed surgery-related complications.

Results
Twenty-five patients (mean age, 40.0 ± 12.4 years) were enrolled in this study (group A, 15 patients; group O, 10 patients), and there were no statistical differences in baseline data between the 2 groups. Clinical outcomes did not differ between the 2 groups. All fractures were united and that the prevalence of heterotopic ossification and arthritic changes were similar between the 2 groups. However, operation-related complications were more common in group O than in group A (group A, 13.3%; group O, 40.0%), including 1 patient who underwent ulnar nerve neurolysis and anterior transposition at 3 months after the initial operation.

Conclusions
Eliciting fewer complications, arthroscopy-assisted reduction and fixation of coronoid fractures shows union rates and clinical results comparable to open fixation in patients with complex elbow fracture-dislocation.

Level of Evidence
Level III, Retrospective Cohort.

BACK

Genetic variants associated with rotator cuff tearing utilizing multiple population-based genetic resources.

Tashjian, R.Z., Kim, S.K., Roche M.D., et al.

DOI: https://doi.org/10.1016/j.jse.2020.06.036

Background
The etiology of rotator cuff tearing is likely multifactorial, including a potential genetic predisposition. The purpose of the study was to identify genetic variants associated with rotator cuff tearing utilizing the UK Biobank (UKB) cohort, confirm variants using a separate genetic database, and evaluate tissue expression of genes with associated variants following rotator cuff tearing using RNA sequencing.

Methods
Genome-wide association study (GWAS): A GWAS was performed using data from UKB with 5701 cases of rotator cuff injury. RNA sequencing analyses: rotator cuff biopsies were obtained from 24 patients with full-thickness rotator cuff tears who underwent arthroscopic rotator cuff repair (cases) and 9 patients who underwent open reduction internal fixation for a proximal humerus fracture (controls). Total RNA was extracted and differential gene expression was measured by RNAseq for genes with variants associated with rotator cuff tearing.

Results
The results of the UKB GWAS identified 3 loci that reached genome-wide statistical significance: 2 loci on chromosome 7 in GLCCI1 (rs4725069; P = 5.0E–09) and THSD7A (rs575224171; P = 5.3E–09), and 1 locus on chromosome 2 in ZNF804A (rs775583810; P = 3.9E–09). The association with rotator cuff injury of the GLCCI1 single-nucleotide polymorphism (SNP; rs4725069) was confirmed in the Kaiser Permanente Research Bank cohort (P = .008). Twenty previously reported SNPs in 12 genes were evaluated using summary statistics from the UKB GWAS, which confirmed 3 SNPs in TNC with rotator cuff injury (rs1138545, rs72758637, and rs7021589; all P < .0024). Of 17 genes with variants associated with rotator cuff injury (14 previously from literature plus 3 new genes from current UKB GWAS), TIMP2, Col5A1, TGFBR1, and TNC were upregulated (P < .001 for all) and THSD7A was downregulated (P = .005) in tears vs. controls in the RNA sequencing data set.

Conclusion
The UKB GWAS has identified 3 novel loci associated with rotator cuff tearing (ZNF804A, GLCCI1, THSD7A). Expression of the THSD7A gene was significantly downregulated in rotator cuff tears vs. controls supporting a potential functional role. Three previously reported SNPs in the TNC gene were validated in the UKB GWAS, supporting a role for this gene in rotator cuff tearing. Finally, TIMP2, Col5A1, TGFBR1, and TNC genes were found to have significantly upregulated tissue expression in cases vs. controls supporting a biologic role in tearing for these genes.

Level of Evidence
Basic Science Study, Molecular Biology

BACK

The incidence and incubation period of false-positive culture results in shoulder surgery.

McCarroll, T.R., Jaggers, D.R., Cagle, R.A., et al.

DOI: https://doi.org/10.1016/j.jse.2020.06.030

Background
Postoperative shoulder infection is a significant complication requiring timely identification and treatment. Indolent infections such as those involving Cutibacterium acnes (formerly Propionibacterium acnes) provide a diagnostic dilemma as they present differently, without the acute symptoms associated with most postoperative bone and joint infections. Furthermore, C acnes is thought to be a common contaminant isolated from intraoperative cultures. With no consensus algorithm, long-held cultures play a major role in guiding management decisions in potential postoperative shoulder infection. Our study sought to determine the incidence of positive culture results in both open and arthroscopic procedures in noninfected patients, as well as to clarify whether an increase in the incubation time frame leads to an increased rate of culture growth.

Methods
One hundred patients were prospectively enrolled into either the open or arthroscopic procedure group. Patients with abnormal inflammatory laboratory findings, a history of shoulder surgery, or corticosteroid injection within 6 months of surgery were excluded from the study. Three cultures were obtained for each patient: superficial tissue culture, tissue culture, and “sterile” control swab. Cultures were held for 28 days and checked at regular intervals. All patients were followed up clinically for 6 months to ensure no signs of postoperative infection occurred.

Results
Ultimately, 95 patients were included in the final analysis. The false-positive rate was 17.0% in those who underwent open shoulder surgery and 10.4% in those who underwent arthroscopic shoulder surgery. The incidence of positive C acnes culture results was 6.4% in the open group, whereas C acnes was not isolated in the arthroscopic group. All positive bacterial culture results were reported within 7 days of collection. One culture result was positive for mold at 26 days.

Conclusion
A relatively high false-positive culture rate occurred in both open and arthroscopic shoulder surgery. C acnes was the most commonly identified bacterium in cultures in the open surgery group. Knowledge of one’s institutional false-positive culture rate could be important in avoiding potentially inappropriate treatment. Additionally, we found that holding cultures longer than 14 days did not lead to an increased rate of false-positive culture results.

Level of evidence
Basic Science Study, Descriptive Epidemiology

BACK

Arthroscopic superior capsule reconstruction with Teflon felt synthetic graft for irreparable massive rotator cuff tears: clinical and radiographic results at minimum 2-year follow-up.

Okamura, K., Abe, M., Yamada, Y., et al.

DOI: https://doi.org/10.1016/j.jse.2020.06.022

Background
Superior capsule reconstruction (SCR) was developed to improve shoulder function and relieve pain in patients with irreparable rotator cuff tears. Here, we investigated the clinical and radiographic outcomes and postoperative complications of SCR using a Teflon graft for reconstruction.

Methods
Thirty-five consecutive patients with irreparable rotator cuff tears underwent SCR with Teflon grafts. The American Shoulder and Elbow Surgeons score, active shoulder elevation, shoulder muscle strength, visual analog scale pain scores, acromiohumeral distance, and postoperative complications were investigated. Data obtained before and after surgery were compared by using a paired t-test, $\chi 2$ test, and 1-way analysis of variance, and data from 1-layer-graft SCR (15 patients; mean age, 75.1 years) and 3-layer-graft SCR (20 patients; mean age, 76.6 years) were compared by using an unpaired t-test. The average time to final follow-up was 42 months (range, 24-69 months).

Results
SCR using Teflon grafts of either 1 or 3 layers significantly improved the American Shoulder and Elbow Surgeons score (by 20.8, $P = .001$ for a 1-layer graft; and by 31.1, $P < .0001$ for a 3-layer graft), visual analog scale score for motion pain (by 3.2, $P = .001$; and by 3.0, $P < .0001$), and muscle strength in shoulder abduction (by 11.9 N, $P = .02$; and by 10.9 N, $P = .008$). Active elevation at final follow-up was significantly greater in the 3-layer-graft group (142° ± 27°) than in the 1-layer-graft group (107° ± 42°) ($P = .006$). One year after SCR, acromiohumeral distance in the 3-layer-graft group was significantly greater than preoperatively ($P = .04$), whereas in the 1-layer-graft group, it was not. On postoperative magnetic resonance imaging, none of the patients in the 3-layer-graft group had graft tears, whereas 2 patients had graft tears and 1 patient had severe synovitis after 1-layer-graft SCR.

Conclusion
SCR using a Teflon graft—especially a 3-layer graft—significantly improved shoulder function and shoulder abduction strength, with pain relief and a low rate of postoperative complications. SCR using a Teflon graft can be a viable option for irreparable rotator cuff tears, especially when an autograft or allograft is not available.

Level of evidence
Level III, Retrospective Cohort Comparison Treatment Study

BACK

Massive irreparable posterosuperior rotator cuff tears: does it work in the elderly population? A comparative study between 2 age groups (≤55 vs. ≥75 years old).

Kany, J., Sekakaran, P., Amavarathi, R.S., et al.

DOI: https://doi.org/10.1016/j.jse.2020.06.018

Background
Management of irreparable posterosuperior rotator cuff tears (RCTs) presents a significant challenge to shoulder surgeons. Previous studies on latissimus dorsi transfer (LDT) have demonstrated good to excellent outcomes in younger patients, but this indication is debatable in the elderly. The main objective of this study was to compare the results of LDT in a group of patients aged ≤55 years vs. one of patients aged ≥75 years. We hypothesized that LDT could give equally good results in the elderly as in the younger population.

Methods
Between 2014 and 2017, a total of 153 patients who underwent LDT either for irreparable posterosuperior RCT or for failed prior repair were enrolled. All LDTs were performed by a single surgeon, were arthroscopically assisted, and fixed onto the humeral head with 2 anchors. A retrospective comparative clinical study was conducted. Patients with a minimum of 24 months of follow-up were divided into 2 groups: group A (≤55 years old at surgery) and group B (≥75 years old at surgery). The age-adjusted Constant-Murley score (aCMS), Subjective Score Value (SSV), Simple Shoulder Test (SST), Activities of Daily Living requiring active External Rotation (ADLER) score, visual analog scale for pain (VAS), American Shoulder and Elbow Surgeons Standardized Shoulder Assessment Form (ASES) score, patient's satisfaction, and rate of LD tendon rupture at last follow-up were compared.

Results
A total of 66 patients met inclusion criteria. Four in 66 patients (6%) were lost to follow-up. There were 31 patients in group A and 31 patients in group B. The mean age was 52 and 77 years for the respective groups. Preoperatively, the 2 groups were comparable with respect to other characteristics like the mean number of ruptured tendons, mean preoperative Hamada stage, mean SST, and mean aCMS. The mean follow-up was 33 and 31 months, respectively. At last follow-up, there was no significant difference in the scores evaluated between groups A and B with SSV (61 vs. 66.7 points), ADLER (23 vs. 26.4 points), VAS (2.8 vs. 2.2 points), and ASES (64.4 vs. 72.4 points), respectively, except for the aCMS (75 vs. 96.3; ±001) and the SST (6.2 vs. 8.3; $P < .001$). Patient's satisfaction was not significantly different in both groups (81% of either satisfied or very satisfied patients in both groups). The rate of LD tendon rupture was higher in group A: 10 (33%) vs. 8 (26%).

Conclusion
Posterior transfer of latissimus dorsi tendon could be an effective surgical option for the treatment of massive irreparable posterosuperior cuff tears in patients ≥75 years of age.

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

BACK

Improvements in sexual function following arthroscopic rotator cuff repair.

Nugent, R.E., Cheesman, Q.T., Bradian, A.K., et al.

DOI: https://doi.org/10.1016/j.jse.2020.06.017

Background
Three-fourths of Americans are sexually active, and studies show a correlation between sexual activity and good health. Rotator cuff tears and subsequent repairs can cause significant disruption in daily living including sexual activity. Orthopedic surgeons rarely discuss sexual activity with patients. Therefore, patients have little information about expectations, restrictions, and return to sexual activity. The primary goal of this study was to evaluate patient improvement in sexual activity following arthroscopic rotator cuff repair and evaluate factors that affect sexual activity.

Methods
An anonymous 20-item multiple-choice survey was sent to patients > 6 months after arthroscopic rotator cuff repair performed by 7 fellowship-trained orthopedic shoulder and elbow surgeons between March 2018 and May 2019. The survey assessed preoperative and postoperative sexual activity and included questions regarding frequency, pain, positioning, and postoperative injury.

Results
A total of 88 patients met the inclusion criteria and completed the survey. Preoperatively, 65% of patients admitted that their shoulder interfered with the quality and/or frequency of their sexual activity, most commonly secondary to an inability to bear weight on the affected arm (31%). Postoperatively, the majority of patients (79%) found it easier to engage in sexual activity, with 35% of patients attributing this to less pain. At 6 weeks postoperatively, 72% of patients returned to sexual activity. The overall trend demonstrated a statistically significant ($P < .001$) increase in sexual activity frequency as one progressed from his or her operative date. It is interesting to note that 31% of patients removed their sling to engage in sexual activity after surgery, with 7% admitting to aggravating their shoulder or causing significant pain.

Conclusion
Prior to arthroscopic rotator cuff repair, most patients experience limitations in the quality and/or frequency of their sexual activity secondary to their shoulder. Following surgery, the majority of patients will more easily engage in sexual activity by 6 weeks, with increasing frequency as time progresses from surgery. Many patients are noncompliant with sling wear during sexual activity, and 7% will aggravate their shoulder.

Level of evidence
Level IV, Case Series Treatment Study

BACK

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA), Volume 29, Issue 3, P 998-1005

Clinical outcome of rotator cuff repair in patients with mild to moderate glenohumeral osteoarthritis.

Kim, D.H., Min, S.G., Lee, H.S. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-06307-8

Purpose
Osteoarthritis (OA) in the glenohumeral joint is a concomitant lesion with rotator cuff tear that commonly occurs in older patients. The authors aimed to evaluate the effect of associated OA on the treatment outcome of rotator cuff repair.

Methods
A total of three hundred and forty-eight patients who underwent full-thickness arthroscopic rotator cuff repair were retrospectively reviewed, and the data were prospectively collected. The severity of OA was evaluated using the Samilson and Prieto method preoperatively and the Outerbridge classification intraoperatively. The patients were divided into the small-to-medium group and large-to-massive group according to rotator cuff tear size and were evaluated for presence or absence of OA. The postoperative clinical outcomes were assessed using the visual analog scale for pain, simple shoulder test (SST), University of California–Los Angeles, Constant, and American Shoulder and Elbow Surgeons (ASES) scoring systems at baseline and at final follow-up.

Results
Forty-five patients were diagnosed with glenohumeral OA (12.9%). Overall, no significant differences were observed in demographic and baseline data between the two groups according to the presence or absence of OA. The clinical symptoms of both groups significantly improved at the final follow-up. At the final follow-up, no significant differences were found in the VAS for pain, SST, UCLA, Constant, and ASES scores between the two groups. In the large-to-massive tear group, patients with OA had significantly inferior clinical results compared with those without OA.

Conclusion
The clinical outcome scores improved after rotator cuff repair regardless of the presence of concomitant OA. However, glenohumeral OA should be considered as a potential negative prognostic factor in patients with large-to-massive rotator cuff tears.

Level of evidence
III.

BACK

Lower Extremity

Arthroscopy, Volume 37, Issue 03, P 862-870

Volume of Gluteus Maximus and Minimus Increases After Hip Arthroscopy for Femoroacetabular Impingement Syndrome

Fan Yang,Mahmut Mamtimin,Yu-Peng Duan,...Jia-Lin Fan,Hong-Jie Huang,Jian-Quan Wang

https://doi.org/10.1016/j.arthro.2020.10.033

Purpose
To investigate the change in muscle volume around the hip in patients with femoroacetabular impingement (FAI) after arthroscopy and evaluate other factors related to muscle change.

Methods
We performed a retrospective review of magnetic resonance imaging data of patients with FAI who underwent hip arthroscopy. Magnetic resonance imaging was obtained pre- and postoperatively. The cross-sectional area (CSA) of muscles were determined on axial images. The Wilcoxon signed-rank test was used to determine the differences between pre- and postoperative hip muscle CSA. The correlations of change in muscle CSA with age, sex, body mass index, pain level, preoperative symptom duration, follow-up time, and multiple validated patient-reported outcomes were also analyzed with a Spearman rank correlation test.

Results
Fifty-one patients with a mean age of 36.5 ± 5.6 years were included and analyzed. The follow-up was 26.6 ± 0.5 months (range, 24-40 months), and 27 (52.9%) were women. Patients with FAI showed increased hip muscle CSA of gluteus maximus (P = .002) and gluteus minimus (P = .001). Post- compared with preoperative, the value for the change in medius CSA was underpowered, and no differences in other hip muscle CSAs were observed. The increased muscle CSA of the gluteus maximus was significantly correlated with the improvement of modified Harris Hip Score (ρ = 0.404; P = .003). The increased muscle CSA of the gluteus minimus was significantly correlated with the improvement of pain Visual Analog Scale (ρ = 0.452; P = .001). Age, body mass index, sex, symptom duration, and follow-up time were not significantly correlated with change in muscle CSA.

Conclusions
Patients with FAI have a significantly increased postoperative muscle CSA of the gluteus maximus (7.8%) and the gluteus minimus (11.6%) compared with preoperative values. The increased muscle CSA of the gluteus maximus and gluteus minimus was significantly correlated with improvement in modified Harris Hip Score and pain Visual Analog Scale, respectively. The increase of muscle volume may be associated with the improvement of subjective function and pain relief.

Levels of Evidence
Level IV, therapeutic case series

BACK

Improvements in Sleep Quality Are Maintained at a Minimum of 2 Years Following Hip Arthroscopy for Femoroacetabular Impingement Syndrome

Kunze, K. N., Rasio, J., Clapp, I., & Nho, S. J.

https://doi.org/10.1016/j.arthro.2020.10.048

Purpose
To present the results of a mid-term follow-up study on sleep quality at a minimum of 2 years after hip arthroscopy for femoroacetabular impingement syndrome.

Methods
Original inclusion criteria were consecutive patients undergoing primary hip arthroscopy for cam/pincer correction between March 1, 2017, and July 1, 2017, who did not respond to nonoperative management, whereas exclusion criteria were revision arthroscopy, gluteus medius repair, contralateral procedure during the follow-up period, and known sleep disorders. Patients who had followed up at 6 months were contacted at a minimum of 2 years following their surgery. In total, 37 of 55 (67.3%) were available for follow-up. New Pittsburgh Sleep Quality Index (PSQI) scores were obtained and compared with previously reported scores at preoperative and 6-month time points. The PSQI ranges from 0 to 21, with a score of ≥5 indicating poor sleep quality. Point biserial correlations and $\chi 2$ tests of associations were used to investigate associations between demographics, preoperative patient-reported outcome measures, and the incidence of poor sleep quality at 2 years postoperatively.

Results
Preoperatively, 94.5% of patients (52/55) had a PSQI of ≥5 with a mean PSQI score of 9.8 ± 4.2. Statistically significant improvements were observed at both 6 (PSQI: 2.2 ± 0.2, $P < .001$) and 24 months (PSQI: 4.3 ± 3.9) postoperatively compared to baseline ($P < .001$, both). The mean PSQIs at 2 years and 6 months postoperatively were not statistically different ($P = .06$). A total of 21.7% (10/46) of patients continued to experience poor sleep quality at 6 months postoperatively, whereas a total of 29.7% (11/37) did so at 2 years postoperatively ($P = .36$). No preoperative factors were associated with poor sleep quality ($P > .05$ all).

Conclusions
The early improvements in sleep quality observed 6 months postoperatively from an original small cohort were maintained at a mean 2.8-year follow-up in those who responded. However, approximately 30% of hip arthroscopy patients still experience poor sleep quality.

Level of Evidence
IV, therapeutic case series.

BACK

Mid- to Long-Term Outcomes of Hip Arthroscopy: A Systematic Review

Kyin, C., Maldonado, D. R., Go, C. C., Shapira, J., Lall, A. C., & Domb, B. G.

https://doi.org/10.1016/j.arthro.2020.10.001

Purpose
To assess mid- to long-term patient-reported outcomes (PROs) of hip arthroscopy as well as the rates of secondary surgery and to identify indications for surgery and noted predictors of failure.

Methods
A systematic review of the current literature was performed with the terms “hip arthroscopy,” “outcomes,” “patient-reported outcomes,” “mid-term,” “5-year,” “long-term,” and “10-year” in the PubMed, Cochrane, and Embase databases in April of 2020 according to the Preferred Reporting Items for Systematic Reviews and Meta-analyses guidelines. Data for study characteristics, patient demographics, follow-up time, indications for surgery, PROs, predictors of failure or unfavorable PROs, and rates of secondary hip preservation surgery and conversion to total hip arthroplasty were collected.

Results
Thirteen articles were included. Four studies were level III and 9 were level IV. In total, 1571 hips were included, and the average follow-up time ranged from 60 to 240 months. The most common indications for hip arthroscopy were labral tears and femoroacetabular impingement syndrome. Twelve studies reported on PROs and all reported improvement at latest follow-up. The most reported on scores were the modified Harris Hip Score, Harris Hip Score, and the Hip Outcome Score-Sport Specific Subscale. When grouped based on average follow-up time, the conversion rates at the 5- and 10-year time points ranged from 3.0% to 17.9% and 2.4% to 32.5%, respectively. One study with 20-year follow-up reported a conversion rate of 41.0%. Osteoarthritis and increased age were the most cited predictors for secondary surgery or decreased PROs.

Conclusions
At mid- to long-term follow-up, patients who underwent primary hip arthroscopy demonstrated improvement in several PROs. There was great variability in rates for revision surgery and conversion to total hip arthroplasty. The most common indications for hip arthroscopy were labral tears and femoroacetabular impingement syndrome. Osteoarthritis and increased age were the most cited predictors for unfavorable outcomes.

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

BACK

Bone Versus All Soft Tissue Quadriceps Tendon Autografts for Anterior Cruciate Ligament Reconstruction: A Systematic Review

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https://doi.org/10.1016/j.arthro.2020.10.018

Purpose
To examine existing literature on objective and patient-reported outcomes and complications after anterior cruciate ligament reconstruction (ACLR) with bone-quadriceps-tendon (B-QT) or soft tissue-quadriceps tendon (S-QT) to further clarify the role of graft type in primary ACLR.

Methods
In accordance with PRISMA guidelines, PubMed, Embase, and Medline were searched in October 2019 for English-language, human studies of all evidence levels on patients undergoing primary ACLR with B-QT or S-QT autograft.

Results
24 of 1,381 studies satisfied criteria, with 20 using B-QT (1,534 patients, mean age 29.6 years [range 14 to 59], mean follow-up 41.2 months [range 12 to 120]) and 5 using S-QT (181 patients, mean age 32.4 years [range 15 to 58), mean follow-up 25.5 months [range 12 to 46]). International Knee Documentation Committee (IKDC) scores were 67.3 to 89.5 with B-QT and 80.4 to 81.6 with S-QT. Lysholm scores were 85.7 to 97.4 with B-QT and 81.6 to 89.2 with S-QT. More B-QT patients demonstrated rotatory laxity on pivot shift compared with S-QT (0% to 39% versus 0%, respectively). The most common complication was graft rupture, and no differences were observed between graft choices (B-QT 0% to 9% versus S-QT 0% to 3.8%).

Conclusions
The main findings from this review report that more B-QT patients demonstrated postoperative rotatory instability than S-QT patients, and that there are no differences in graft rupture between the 2 graft choices. Although statistical conclusions may not be drawn because of heterogeneity in reporting, it appears that the B-QT group featured much wider major and minor complication profiles.

Level of evidence
IV, systematic review of level I–IV studies

BACK

Knee Surgery, Sports Traumatology, Arthroscopy, Volume 29, issue 03, P 725-731

Effectiveness of thicker hamstring or patella tendon grafts to reduce graft failure rate in anterior cruciate ligament reconstruction in young patients.

Murgier, J., Powell, A., Young, S. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-05973-y

Purpose
The purpose of this study was to determine the anterior cruciate ligament reconstruction (ACLR) failure rate in young patients utilizing the New Zealand (NZ) anterior cruciate ligament (ACL) Registry. The hypothesis was that the ACLR rupture rate would be lower for thicker hamstring graft and bone patellar tendon bone (BPB) grafts in comparison to the classic hamstring technique. The ACLR failure rate was assessed according to graft type and patients' sex.

Methods
The NZ ACL registry was utilized to identify all patients aged 20 years or younger at the time of surgery who were skeletally mature and had a minimum 2-year follow-up. Graft ruptures, defined as an ACL revision, were identified according to graft type (traditional 4 strands hamstring semitendinosus and gracilis, 4 strands semitendinosus, 5–6 strands semitendinosus and gracilis, 7–8 strands semitendinosus and gracilis, bone-patella-bone graft).

Results
Nine-hundred and ninety-two patients were included. At a mean follow-up of 38 months, 52 cases of graft rupture were recorded, (overall failure rate: 5.2%). The failure rate was not statistically influenced by the graft diameter. Patients with a thinner graft (< 8 mm—196 patients) had a similar failure rate (6%) to patients with a thicker graft (8 mm or more—485 patients) (6.2%). There was a lower failure rate in the BPB group (3.1%) versus all hamstrings group (6%) (ns). Finally, BPB in females had a lower failure rate than all hamstring constructs together (0% versus 5.1%; p = 0.023)

Conclusion
In a young population traditional four-strand hamstring grafts, multiple strand configurations or BPB ACLR, whatever their size (> or < 8 mm), showed no significant difference in the failure rate in the NZ ACL registry. Female patients who had an ACL reconstruction with BPB graft had a significant lower failure rate than patients who had a hamstring graft.

Level of evidence
III.

BACK

In situ cross-sectional area of the quadriceps tendon using preoperative magnetic resonance imaging significantly correlates with the intraoperative diameter of the quadriceps tendon autograft.

Takeuchi, S., Rothrauff, B.B., Taguchi, M. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-05993-8

Purpose
Preoperative assessment to determine the sizes of potential autografts is necessary for individualized anterior cruciate ligament reconstruction (ACLR). However, no study has investigated the prediction of the intraoperative diameter of the quadriceps tendon (QT) autograft based upon preoperative imaging. This study investigated the correlation between the intraoperative diameter of a QT autograft and in situ thickness or cross-sectional area (CSA) measured using preoperative MRI.

Methods
Thirty-one knees of 31 patients (mean age 20.9 ± 5.0 years) who underwent individualized anatomic ACLR using all soft tissue QT autograft were included retrospectively. At 15 mm proximal to the superior pole of the patella, the maximum QT thickness was assessed in the sagittal plane and the CSA was assessed at the central 10 mm of the QT in the axial plane. The angle between the axial plane and a line perpendicular to the QT longitudinal axis was used to calculate an adjusted CSA using a cosine function. Intraoperatively, each QT autograft was harvested with 10 mm width and the diameter was measured using a graft sizing device.

Results
Intra- and inter-observer reliabilities of all measurements using preoperative MRI were excellent (intra-class correlation coefficient, 0.833–0.970). Significant correlations were observed between the thickness, CSA, or adjusted CSA, and the intraoperative diameter ($R = 0.434$, 0.607, and 0.540, respectively; $P < 0.05$).

Conclusions
The CSA correlated most strongly with the QT autograft diameter. For individualized anatomic ACLR, measuring in situ CSA can be useful for preoperative planning of appropriate graft choices prior to surgery.

Level of evidence
III.

BACK

Antero-lateral ligament reconstruction improves knee stability alongside anterior cruciate ligament reconstruction.

Hurley, E.T., Fried, J.W., Kingery, M.T. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-06002-8

Purpose
Recent evidence has found the antero-lateral ligament (ALL) may play a role in stabilizing the knee, but its role in anterior cruciate ligament (ACL) reconstruction is controversial. The purpose of the current study is to systematically review and meta-analyze the current evidence in the literature to ascertain whether ACL reconstruction combined with ALL reconstruction affects knee stability, re-rupture rates and patient-reported outcomes compared to ACL reconstructions performed alone.

Methods
A literature search was performed based on the PRISMA guidelines. Cohort studies comparing ACL + ALL reconstruction and ACL reconstruction alone were included.

Results
Six clinical trials (LOE I: I, LOE II: 2, LOE III: 3) with 729 patients were included, with a mean follow-up time of 34.2 (24–54.9) months. There was a significant difference in favor of combined ACL + ALL reconstruction for reduced re-rupture rate (2.4% vs 7.3%, $p < 0.01$), residual positive pivot shift rate (33.3% vs 11.4%, $p < 0.01$), and reduced KT-arthrometer evaluation (1.6 vs 2.6, $p < 0.01$). Combined ACL + ALL reconstruction resulted in improved IKDC scores (92.5 vs 87.8, $p < 0.01$), Lysholm scores (95.7 vs 91.2, $p < 0.01$) and Tegner scores (6.7 vs 5.7, $p < 0.01$). There was no significant difference in rate of return to play at the same level (54.3% vs 46.0%, n.s.).

Conclusion
The current evidence suggests alongside soft tissue graft ACL reconstruction that concomitant ALL reconstruction improves clinical outcomes, with improved knee stability and lower re-rupture rates.

Level of evidence
III.

BACK

Combination of anterior tibial and femoral tunnels makes the signal intensity of antero-medial graft higher in double-bundle anterior cruciate ligament reconstruction.

Chiba, D., Yamamoto, Y., Kimura, Y. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-06014-4

Purpose
To elucidate whether sagittal graft tunnel affects the signal intensity in anatomical ACL reconstruction (ACLR) and to clarify the prevalence of intercondylar roof impingement. It was hypothesized that if the tunnel apertures are located within the anatomical footprint of ACL, tunnel position would not affect the signal intensity.

Methods
A total of 132 patients who underwent anatomical double-bundle ACLR (DB-ACLR) using hamstring autograft were recruited. Tunnel position was determined by the quadrant method on three-dimensional computed tomography; the femoral tunnel position was defined as “high and low” or “deep and shallow”, while that of the tibial side was defined as “anterior and posterior” or “medial and lateral”. Subjects were divided into three groups according to the tertile of % deep–shallow. The signal intensity was evaluated by the region of interest value of the antero-medial bundle (AMB) and postero-lateral bundle on magnetic resonance imaging at 12 months after reconstruction. Linear regression analysis was conducted to elucidate the relationship between the percentage position of each tunnel and the graft signal intensity.

Results
In the shallow tertile group, AMB signal intensity increased in the anterior position of the tibial tunnel ($\beta = -0.34$; $P = 0.025$). In the intermediate and deep tertile groups, the tunnel position did not correlate with the signal intensity.

Conclusions
A more anterior tibial tunnel position increases AMB signal intensity in shallower femoral tunnel. Conversely, this correlation is attenuated for deeper femoral tunnels. Surgeons should pay attention to sagittal femoral tunnel position to create a more anterior tibial tunnel position.

Level of evidence
Level III.

BACK

Soaking of autografts with vancomycin is highly effective on preventing postoperative septic arthritis in patients undergoing ACL reconstruction with hamstrings autografts.

Banios, K., Komnos, G.A., Raoulis, V. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-06040-2

Purpose
To evaluate the impact of local soaking of the autografts with vancomycin during anterior cruciate ligament (ACL) reconstruction on postoperative infection rates.

Methods
Between 2003 and 2014 (first study period), 1,242 patients underwent ACL reconstruction using autografts, without soaking them in vancomycin solution, while between 2014 and 2019 (second study period) all ACL autografts in 593 patients were soaked in a 5-mg/ml vancomycin solution, in a territory University Hospital. The same standard treatment of perioperative IV antibiotics was applied in both groups.

Results
Postoperative septic arthritis occurred in seven out of 1,242 patients (0.56%) during the first study period. Bone patellar tendon bone autograft was used in 311 (25%) patients, and hamstring tendon autograft was used in the rest 931 (75%) of the study population during this period. All infected cases were male and had a hamstrings graft implanted. There were no postoperative infections (0%) in 593 ACL reconstructions during the second study period. Bone patellar tendon bone autograft was used in 178 (30%) patients while hamstring tendon autograft was used in the rest 415 (70%) of the study population, during this period. Statistical analysis revealed a significantly reduced postoperative infection rate ($p = 0.018$) between the two reported periods, with the main impact referring to the use of hamstrings autograft ($p = 0.031$) for the first study period.

Conclusions
Septic arthritis following ACL reconstruction can be significantly reduced (or even eliminated) by soaking ACL autografts in a 5 mg/ml vancomycin solution. Of note, this strategy seems to be more effective in the setting of hamstring tendon autograft use, since the risk of postoperative knee infection is significantly higher when this type of graft is used.

BACK

Femoral and tibial bone bruise volume is not correlated with ALL injury or rotational instability in patients with ACL-deficient knee.

Marot, V., Corin, B., Reina, N. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-06045-x

Purpose
Some researchers have suggested that bone bruises are evidence of rotational instability. The hypothesis was that the extent of lateral bone edema is correlated with the presence of an anterolateral ligament (ALL) injury. The main objective was to determine whether there was a correlation between the presence of an ALL injury the extent of bone bruises.

Methods
A prospective diagnostic study enrolled all the patients who suffered an acute anterior cruciate ligament (ACL) who were operated on within 8 weeks. The extent of bone bruising according to the ICRS classification was measured on preoperative MRIs by two independent blinded raters twice with an interval of 4 weeks. Dynamic ultrasonography (US) to look for ALL injury and the pivot shift test were performed before the ACL surgery. The correlation between ALL injury and bone bruises, and the correlation between an ALL injury and a high-grade pivot shift test were determined.

Results
Sixty-one patients were included; 52% of patients had an ALL injury on US. The extent of lateral bone bruise was not related to the presence of an ALL injury, nor related to the presence of a high-grade pivot shift. A grade 2 or 3 pivot shift was significantly correlated with an ALL injury ($p < 0.0001$). Inter- and intra-rater reliability for the bone bruise rating was excellent.

Conclusion
The extent of lateral bone bruise is not correlated with ALL injury or a high-grade pivot shift; thus, it is not correlated with rotational instability of the knee.

Level of evidence
II.

BACK

Concurrent arthroscopic meniscal repair during open-wedge high tibial osteotomy is not clinically beneficial for medial meniscus posterior root tears.

Ke, X., Qiu, J., Chen, S. et al.

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-06055-9

Purpose
This prospective study aimed to investigate the clinical benefits of meniscal repair during open-wedge high tibial osteotomies (OWHTOs) in patients with medial meniscus posterior root tears (MMPRTs) and to identify potential risk factors for meniscal healing.

Methods
Ninety patients with degenerative MMPRTs were included in the final cohort and randomized into three groups. The patients in Group A (n = 30) underwent OWHTO and arthroscopic all-inside meniscal repair concurrently, those in Group B (n = 34) underwent OWHTO only, and those in Group C (n = 26) underwent arthroscopic partial meniscectomy. Clinical and radiological outcomes were recorded, and meniscal healing was evaluated during second-look arthroscopy. Logistic regression analysis was performed to identify risk factors for meniscal healing.

Results
After a minimum follow-up of 24 months, no significant differences between Groups A and B regarding the final Lysholm ($p = 0.689$) or Hospital for Special Surgery (HSS) scores ($p = 0.256$) were observed. There were significant differences among the three groups regarding the hip–knee–ankle angle (HKA), weight-bearing line (WBL) ratio, medial proximal tibial angle (MPTA), and joint line convergence angle (JLCA) ($p < 0.001$, respectively), but the differences between Groups A and B were not significant. During second-look arthroscopy, the healing rate of the MMPRTs was significantly higher in Group A (63.3%) than in Group B (35.3%). Concurrent meniscal repair and changes in the HKA, and MPTA were risk factors for meniscal healing.

Conclusion
Concurrent arthroscopic meniscal repair during OWHTO did not lead to significant clinical benefits in the treatment of MMPRTs, except for an increased rate of meniscal healing, which was not associated with clinical outcomes.

Level of evidence
II, prospective comparative study.

BACK

American Journal of Sports Medicine (AJSM), Volume 49, Issue 03, P 620-625

Posterior Tibial Slope in Patients Undergoing Anterior Cruciate Ligament Reconstruction With Patellar Tendon Autograft: Analysis of Subsequent ACL Graft Tear or Contralateral ACL Tear

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https://doi.org/10.1177/0363546520982241

Background:
Reports on greater posterior tibial slope (PTS) and its relationship to subsequent anterior cruciate ligament (ACL) injury show conflicting results; it has not been studied much in patients after ACL reconstruction with patellar tendon autograft (PTG).

Hypothesis:
Patients who suffered a subsequent ACL injury would have a larger PTS than patients who did not suffer a subsequent injury after primary or revision ACL reconstruction.

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

Methods:
Patients received primary (n = 2439) or revision (n = 324) ACL reconstruction with PTG and were followed prospectively to determine the rate of graft tear and contralateral ACL tear. The PTS was measured preoperatively on digital lateral view radiographs. Intersecting lines were drawn along the medial tibial plateau and posterior tibia; the value of the acute angle at the lines' intersection was then subtracted from 90° to obtain the PTS. This procedure was completed by a clinical assistant with an intrarater reliability of 0.89. Chi-square analysis and t tests were used to determine the differences between rate of tears and measurements between groups. A threshold of PTS ≥10° was used for analysis.

Results:
The mean follow-up time was 11.6 ± 4.0 years. After primary surgery, the mean PTS in patients with graft tears was 5.4°± 3.1° versus 4.8°± 2.9° for patients without a tear (P = .041). The mean PTS was 4.9°± 3.4° for patients with contralateral tears (not statistically significantly different than the no-tear group; P = .80). Furthermore, patients with primary reconstruction with PTS ≥10° had a statistically significantly higher rate of graft tear (9.7%) than patients with PTS ≤9° (4.8%) (P = .003), but not a higher rate of contralateral tear. Among patients undergoing revision surgery, there were no statistically significant differences between the graft tear, contralateral tear, and no-tear groups with relation to PTS ≥10°.

Conclusion:
After primary ACL reconstruction, patients with PTS >10° had a higher rate of subsequent graft tear but not a higher rate of contralateral tear. With revision surgery, there was no significant association between PTS and the rate of subsequent tear. Therefore, caution should be exercised when considering more radical interventions, such as osteotomy, to prevent retear in patients with high PTS.

BACK

Effects of Anterolateral Structure Augmentation on the In Vivo Kinematics of Anterior Cruciate Ligament–Reconstructed Knees

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https://doi.org/10.1177/0363546520981743

Background:
Double-bundle anterior cruciate ligament (ACL) reconstruction (ACLR) is a well-known treatment that restores the stability of ACL-deficient knees. However, some isolated ACL-reconstructed knees ultimately show rotatory laxity and develop osteoarthritis. Whether combined ACLR with anterolateral structure (ALS) augmentation (ALSA) can provide better improvement in the in vivo knee rotational kinematics remains unknown.

Hypothesis:
When compared with isolated double-bundle ACLR, combined double-bundle ACLR with ALSA can improve knee in vivo rotational kinematics and provide better restoration of knee kinematics.

Study Design:
Controlled laboratory study.

Methods:
Sixteen patients with unilateral ACL injury were randomly divided into 2 groups to receive either combined double-bundle ACLR and ALSA (ALSA group) or isolated double-bundle ACLR (ACLR group). All patients performed a single-leg lunge using the operative and nonoperative/contralateral legs under dual-fluoroscopic imaging system surveillance during a hospital visit at a minimum 1 year (12-13 months) of follow-up to assess the 6 degrees of freedom knee kinematics. Functional evaluation using the Lysholm and Marx rating scales and clinical examinations were also performed.

Results:
From full extension to approximately 90° of knee flexion at 5° intervals, the mean ± SD internal rotation of the reconstructed knees in the ALSA group (1.5°± 0.9°) was significantly smaller than that of the contralateral knees (8.2°± 1.9°; P = .008). The ALSA group knees also showed significantly (P = .045) more medial translation than the contralateral knees. In the ACLR group, the mean internal rotation of the reconstructed knee (6.0°± 2.1°) was significantly smaller than that of the contralateral knees (8.9°± 0.6°; P < .001). At full extension, the tibia was significantly more externally rotated than that of the contralateral legs (0.5°± 7.4° vs 7.6°± 3.4°, P = .049).

Conclusion:
When compared with isolated double-bundle ACLR, double-bundle ACLR augmented with ALS reconstruction resulted in anterolateral rotatory overconstraint during the lunge motion.

Clinical Relevance:
Additional ALSA of double-bundle ACL-reconstructed knees overconstrained rotatory stability. Therefore, the use of ALSA for ACL-reconstructed knees should be considered with caution for patients with ACL deficiency and anterolateral rotatory instability. Longer-term follow-up to evaluate long-term outcomes and altered kinematics over time is recommended.

BACK

Patient-Reported Outcomes and Knee Mechanics Correlate With Patellofemoral Deep Cartilage UTE-T2* 2 Years After Anterior Cruciate Ligament Reconstruction

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https://doi.org/10.1177/0363546520982608

Background:
Patellofemoral joint degeneration and dysfunction after anterior cruciate ligament reconstruction (ACLR) are increasingly recognized as contributors to poor clinical outcomes.

Purpose:
To determine if greater deep cartilage matrix disruption at 2 years after ACLR, as assessed by elevated patellofemoral magnetic resonance imaging (MRI) ultrashort echo time–enhanced T2* (UTE-T2*), is correlated with (1) worse patient-reported knee function and pain and (2) gait metrics related to patellofemoral tracking and loading, such as greater external rotation of the tibia at heel strike, reduced knee flexion moment (as a surrogate of quadriceps function), and greater knee flexion angle at heel strike.

Study Design:
Cross-sectional study; Level of evidence, 3.

Methods:
MRI UTE-T2* relaxation times in patellar and trochlear deep cartilage were compared with patient-reported outcomes and ambulatory gait metrics in 60 patients with ACLR at 2 years after reconstruction. ACLR gait metrics were compared with those of 60 uninjured reference patients matched by age, body mass index, and sex. ACLR UTE-T2* values were compared with those of 20 uninjured reference patients.

Results:
Higher trochlear UTE-T2* values were associated with worse Knee injury and Osteoarthritis Outcome Scores (KOOS) Sport/Recreation subscale scores (rho = −0.32; P = .015), and showed a trend for association with worse KOOS Pain subscale scores (rho = −0.26; P = .045). At 2 years after ACLR, greater external rotation of the tibia at heel strike was associated with higher patellar UTE-T2* values (R = 0.40; P = .002); greater knee flexion angle at heel strike was associated with higher trochlear UTE-T2* values (rho = 0.39; P = .002); and greater knee flexion moment showed a trend for association with higher trochlear UTE-T2* values (rho = 0.30; P = .019). Patellar cartilage UTE-T2* values, knee flexion angle at heel strike, and external rotation of the tibia at heel strike were all elevated in ACLR knees as compared with reference knees (P = .029, .001, and .044, respectively).

Conclusion:
Patellofemoral deep cartilage matrix disruption, as assessed by MRI UTE-T2*, was associated with reduced sports and recreational function and with gait metrics reflective of altered patellofemoral loading. As such, the findings provide new mechanistic information important to improving clinical outcomes related to patellofemoral dysfunction after ACLR.

BACK

Outcomes More Than 2 Years After Meniscal Repair for Longitudinal Tears of the Lateral Meniscus Combined With Anterior Cruciate Ligament Reconstruction

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https://doi.org/10.1177/0363546520981976

Background:
Meniscal function after repair of longitudinal tears of the lateral meniscus (LM) with anterior cruciate ligament reconstruction (ACLR) has not been comprehensively investigated.

Purpose:
To evaluate not only the clinical outcomes and radiographic findings of patients who underwent repair of longitudinal tears of the LM combined with ACLR but also the healing status of the repaired meniscus and changes in chondral status with second-look arthroscopy.

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

Methods:
Among 548 patients who underwent primary anatomic ACLR at our institution between 2010 and 2017, 39 who had concomitant longitudinal tears of the LM and underwent repair were studied. During follow-up for more than 2 years, all patients were evaluated clinically (pain, range of motion, swelling, and knee instability) and with imaging (plain radiograph and magnetic resonance imaging [MRI]), and compared with a matched control group (based on age, sex, body mass index, and follow-up period) without any concomitant injuries who underwent ACLR. Measurements on MRI were recorded preoperatively, immediately after surgery, and at final follow-up, and the change in the values over time was assessed. Of the 39 patients in each group, 24 were assessed by second-look arthroscopy with hardware removal 2 years postoperatively.

Results:
The mean follow-up times of the study and control group were at a mean of 42.4 and 45.4 months, respectively. There were no significant differences in clinical findings, lateral joint space narrowing on radiographs, and chondral status at the lateral compartment between groups, whereas lateral and posterior meniscal extrusion on MRI progressed significantly in the study group (0.43 ± 1.0 mm vs -0.29 ± 1.1 mm, P = .003; 1.9 ± 1.9 mm vs 0.14 ± 1.1 mm, P < .0001, respectively). Second-look arthroscopy revealed complete healing in 12 patients (50%), partial healing in 9 (37.5%), and failure in 3 (12.5%) in the study group, and no new tear in the control group.

Conclusion:
The clinical and imaging outcomes after repair of longitudinal tears of the LM combined with anatomic ACLR were successful and comparable with those after isolated ACLR without any other injuries at 42 months postoperatively, although meniscal extrusion showed progression on coronal/sagittal MRI. Based on the MRI findings and the result that only half of patients achieved complete healing, meniscal function could not be fully restored even after repair. Although degenerative changes were not apparent, longer-term follow-up is needed.

BACK

Outcomes of Open and Endoscopic Repairs of Chronic Partial- and Full-Thickness Proximal Hamstring Tendon Tears: A Multicenter Study With Minimum 2-Year Follow-up

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https://doi.org/10.1177/0363546520981767

Background:
The preponderance of literature on the repair of proximal hamstring tendon tears focuses on the acute phase (<4 weeks). As such, there is a paucity of data reporting on the outcomes of chronic proximal hamstring tears.

Purpose:
To report minimum 2-year postoperative patient-reported outcome (PRO) scores, visual analog scale (VAS) for pain, and patient satisfaction from patients who underwent open or endoscopic repair of partial- and full-thickness chronic proximal hamstring tendon tears.

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

Methods:
Between April 2002 and May 2017, prospectively collected data from 3 tertiary care institutions were retrospectively reviewed for patients who underwent open and endoscopic repair of partial- and full-thickness chronic proximal hamstring tendon tears. Patients were included only if they had a chronic proximal hamstring tear (defined as ≥4 weeks from symptom onset to surgery). Patients were excluded if they had a tear treated <4 weeks after injury, underwent hamstring reconstruction, or claimed workers' compensation. Patients who reported minimum 2-year follow-up for VAS, patient satisfaction, and the following PROs had their outcomes analyzed: the modified Hip Harris Score, Non-arthritic Hip Score, iHOT-12 (International Hip Outcome Tool), and Hip Outcome Score–Sports Specific Subscale.

Results:
Fifty patients (34 females and 16 males) were included in this study. There were 19 endoscopic repairs and 31 open repairs. Within the cohort, 52.0% had a full-thickness tendon tear on magnetic resonance imaging, and 48.0% had a partial tear. Average follow-up time was 58.07 ± 37.27 months (mean ± SD; range, 24-220 months). The mean age and body mass index of the group were 46.13 ± 13 years and 25.43 ± 5.14. The average time from injury to surgery was 66.73 weeks (range, 5.14-215.14 weeks). Average postoperative PROs were as follows: modified Hip Harris Score, 91.94 ± 9.96; Non-arthritic Hip Score, 91.33 ± 9.99; iHOT-12, 87.17 ± 17.54; Hip Outcome Score–Sports Specific Subscale, 87.15 ± 18.10; and VAS, 1.16 ± 1.92. Patient satisfaction was 8.22 ± 1.20.

Conclusion:
Patients who underwent open and endoscopic repairs for chronic partial- and full-thickness proximal hamstring tendon tears reported high PROs and satisfaction at a minimum 2-year follow-up with low rates of complications.

BACK

Outcomes of 1- Versus 2-Stage Revision Anterior Cruciate Ligament Reconstruction: A Systematic Review and Meta-analysis

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https://doi.org/10.1177/0363546520923090

Background:
Anterior cruciate ligament reconstruction (ACLR) is a common orthopaedic sports medicine procedure, but graft failure is not uncommon and often leads to revision ACLR. Revision surgery can be performed in a 1- or 2-stage fashion.

Hypothesis:
Graft failure risk, patient-reported outcomes, and anterior knee laxity are similar after 1- and 2-stage revision ACLR.

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

Methods:
A systematic review of the literature was performed to evaluate patient outcomes after 1- versus 2-stage revision ACLR. A search was performed with the phrase “revision anterior cruciate ligament reconstruction” across Embase, PubMed, Scopus, and SportDiscus from the beginning of their archives through July 12, 2019.

Results:
Thirteen studies met inclusion criteria and included 524 patients: 319 patients who underwent 1-stage revision ACLR and 205 patients who underwent 2-stage revision ACLR. Two studies compared outcomes of 1- versus 2-stage revision ACLR; 4 studies reported outcomes after 2-stage revision ACLR; and the remaining 7 studies documented outcomes after 1-stage ACLR. The mean follow-up was 4.1 years. The 2 studies that compared 1- versus 2-stage ACLR reported no differences in functional, radiologic, or patient-reported outcomes or failure risk. Overall, 9 studies reported subjective International Knee Documentation Committee (IKDC) scores; 4 studies, Knee injury and Osteoarthritis Outcome Score values; 8 studies, Lysholm scores; and 7 studies, Tegner scores; 8 studies measured anterior laxity with a KT-1000 arthrometer. The mean weighted subjective IKDC score for all studies including this outcome at final follow-up was 66.6 for 1-stage revisions and 65.9 for 2-stage revisions.

Conclusion:
The available evidence comparing 1- versus 2-stage revision ACLR is retrospective and limited. The results of each approach are similar in appropriately selected patients.

BACK

Achievement of Meaningful Clinical Outcomes Is Unaffected by Capsulotomy Type During Arthroscopic Treatment of Femoroacetabular Impingement Syndrome: Results From the Multicenter Arthroscopic Study of the Hip (MASH) Study Group

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https://doi.org/10.1177/0363546520987226

Background:
Capsule management has emerged as an important topic in the field of hip arthroscopy. The 2 most popular techniques are interportal capsulotomy and T-type capsulotomy, but few studies have compared outcomes between these 2 techniques.

Purpose:
To compare 2-year (±2 months) patient-reported outcomes (PROs) between patients who underwent interportal versus T-type capsulotomy during arthroscopic labral repair for femoroacetabular impingement syndrome (FAIS).

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

Methods:
A retrospective review of a large multicenter registry of patients undergoing arthroscopic hip preservation surgery for FAIS was performed. Data from 9 surgeons across 9 sites between January 2014 and February 2018 were included in the study. Baseline demographic data, preoperative PROs, and minimum 2-year postoperative PROs including Hip Outcome Score–Activities of Daily Living (HOS-ADL), HOS–Sports Subscale (HOS-SS), modified Harris Hip Score, and International Hip Outcome Tool–12 (iHOT-12) were recorded. Patients were divided into 2 groups based on whether interportal or T-type capsulotomy was performed according to the senior surgeon's preference and training, and all capsulotomies were then routinely repaired. The 2 groups were matched 1:1 by age, sex, and body mass index (BMI). Achievement of minimal clinically important difference (MCID), Patient Acceptable Symptomatic State (PASS), and substantial clinical benefit (SCB) was compared for the HOS-ADL, HOS-SS, and iHOT-12 between the 2 groups.

Results:
The final analysis included 658 of 1483 eligible patients with a mean ± SD age of 32.6 ± 11.6 years and BMI of 24.0 ± 3.7; of these, 329 patients were treated via interportal capsulotomy, and 329 patients were treated via T-type capsulotomy. Female patients comprised 66.3% of the study population. Capsulotomy type was not a predictor of 2-year postoperative PROs on multivariate linear regression analysis when adjusted for covariates. Chi-square analysis showed no statistical difference in achievement of MCID, PASS, and SCB between the interportal and T-type groups for HOS-ADL (80.3%, 75.8%, 52.7% and 77.1%, 71.7%, 53.6%, respectively; $P > .01$ for all), HOS-SS (83.6%, 72.5%, 51.5% and 81.7%, 68.4%, 49.2%, respectively; $P > .01$ for all), and iHOT-12 (87.5%, 72.0%, 50.5% and 80.0%, 64.7%, 45.6%, respectively; $P > .01$ for all).

Conclusion:
Arthroscopic management of FAIS resulted in significant clinical improvement that was independent of capsulotomy type when the capsulotomy included repair.

BACK

High Rate of Full Duty Return to Work After Hip Arthroscopy for Femoroacetabular Impingement Syndrome in Workers Who Are Not on Workers' Compensation

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https://doi.org/10.1177/0363546520985517

Background:
Femoroacetabular impingement syndrome (FAIS) is an increasingly common diagnosis among working-age adults. Hip arthroscopy provides reliable improvements in pain and may allow patients to return to physical activities. No study to date has evaluated return to work (RTW) among a general population of adults after arthroscopic surgery for FAIS.

Purpose:
To evaluate (1) patients' rate of RTW, (2) time required to RTW, and (3) factors correlated with time required to RTW after arthroscopic surgery for symptomatic FAIS.

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

Methods:
Consecutive patients aged 25 to 59 years who underwent arthroscopic surgery for FAIS between June 2018 and December 2018 were reviewed. Workers' compensation cases and patients with <1-year follow-up were excluded. The following were collected at a minimum of 1 year postoperatively: demographics, employment characteristics, Hip Outcome Score (HOS; Activities of Daily Living and Sports Specific subscales), modified Harris Hip Score, 12-Item International Hip Outcome Tool (iHOT-12), visual analog scale for pain, and RTW characteristics. Work physical activity level was classified as sedentary, light, moderate, heavy, or very heavy per established criteria.

Results:
A total of 97 patients were selected through inclusion and exclusion criteria. RTW surveys were collected for 79 (81.4%), and 61 were employed preoperatively. Time worked per week was 42.8 ± 12.5 hours (mean ± SD). Patients' work level was most commonly classified as sedentary (42.6%), followed by moderate (24.6%). All 61 (100%) patients returned to work at a mean 7.3 weeks (range, <1-88 weeks) postoperatively. Sixty patients (95.2%) returned to full duty. Time required to full duty RTW was strongly correlated with expected time off from work ($r = 0.900$; $P < .0001$) and moderately correlated with work classification ($r = 0.640$; $P = .0001$). All patients had significant pre- to postoperative improvements in the HOS–Activities of Daily Living (64.8 ± 15.3 to 87.1 ± 12.2; $P < .001$), HOS–Sports Specific (42.8 ± 18.8 to 76.7 ± 16.5; $P < .001$), iHOT-12 (31.3 ± 18.8 to 69.3 ± 21.1; $P < .001$), modified Harris Hip Score (61.8 ± 12.1 to 80.3 ± 14.1; $P < .001$), and visual analog scale for pain (5.19 ± 2.11 to 2.40 ± 1.96; $P < .001$).

Conclusion:
Patients undergoing arthroscopic treatment for FAIS demonstrated a high rate of RTW at a mean of <2 months postoperatively. A patient's expected time off from work and the level of physical demands required for work were highly associated with time required to RTW. These results are valuable for orthopaedic surgeons, patients, and employers when establishing a timeline for expected RTW after surgery.

BACK

Iliopsoas Tenotomy During Hip Arthroscopy: A Systematic Review of Postoperative Outcomes

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https://doi.org/10.1177/0363546520922551

Background:
Arthroscopic iliopsoas tendon release is a surgical treatment option for painful snapping hips, although it has been associated with controversy surrounding potential complications including decreased hip flexion strength, iatrogenic hip instability, and iliopsoas atrophy.

Purpose:
To systematically assess the efficacy and safety of arthroscopic iliopsoas tenotomy during hip arthroscopic surgery as an intervention for painful snapping hips.

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

Methods:
A total of 3 online databases (Embase, PubMed, and MEDLINE) were searched from database inception until September 2019 for studies investigating iliopsoas tenotomy during hip arthroscopic surgery. Studies were screened by 2 reviewers independently and in duplicate, and studies investigating arthroscopic iliopsoas tendon release were included. Demographic data as well as data on treatment success, functional outcome scores, and radiological outcomes were recorded. A risk of bias assessment was performed for all included studies.

Results:
Overall, 21 studies were identified with a total of 824 patients (875 hips). These patients were 82.5% female (680/824), with a mean age of 28.1 years (range, 12-62 years) and mean follow-up of 32.1 months (range, 3-73 months). Arthroscopic iliopsoas tenotomy was performed at the level of the labrum in 811 hips (92.7%) or the lesser trochanter in 64 hips (7.3%). The overall reported success rate of the procedure in resolving snapping hips was 93.0% (266/286), and all studies reported an improvement in functional outcome scores. Only 6 studies (93 hips) discussed postoperative hip flexion strength, with complete recovery of strength reported in 4 studies (47 hips) and mild decreases reported in the other 2 studies (46 hips). Iliopsoas atrophy was evaluated radiologically (3 studies; 66 hips) and was found postoperatively in 92.4% (61/66) of hips. No major complications were reported.

Conclusion:
Arthroscopic release of the iliopsoas tendon was effective in alleviating pain and persistent clicking associated with a snapping hip. Although patients demonstrated some early postoperative weakness and iliopsoas atrophy on radiological imaging, the results from studies to date showed satisfactory clinical function and return to sports/activities. High-quality comparative studies are needed to further assess arthroscopic iliopsoas tendon release to determine the optimal technique and location of tendon release.

BACK

Miscellaneous

Arthroscopy, Volume 37, Issue 3, P 919-923

Opioid Consumption After Knee Arthroscopy

Kamdar, P. M., Liddy, N., Antonacci, C., Mandava, N. K., Delos, D., Vadasdi, K. B., … Sethi, P. M.

https://doi.org/10.1016/j.arthro.2020.10.019

Purpose
To prospectively observe opioid consumption in patients undergoing knee arthroscopy and to create an evidence-based guideline for opioid prescription.

Methods
This prospective multicenter observational study enrolled patients undergoing outpatient knee arthroscopy for meniscal repair, meniscectomy, or chondroplasty. Patients were provided with a pain journal to record postoperative opioid consumption, Numeric Pain Rating Scale (NPRS) pain scores, and Likert scale satisfaction scores for 1 week postoperatively. State databases were reviewed for additional opioid prescriptions.

Results
One hundred patients were included in this study. Patients were prescribed a median of 5 pills (37.5 oral morphine equivalent [OME]). Median postoperative opioid consumption was 0 pills, with a mean of 0.6 pills (4.4 OME), and 74% of patients did not consume any opioid medication postoperatively. All patients consumed ≤5 pills (37.5 OME), and no patient required a refill. Patients reported a mean daily NPRS value of 1.9 out of 10 and a mean Likert score of 4.4 out of 5.

Conclusion
We found that current opioid prescribing habits exceed the need for postoperative pain management. Overall, all patients consumed ≤5 opioid pills, and 92% of patients discontinued opioids by the second postoperative day. In spite of the low prescription quantity, patients reported high satisfaction rates and low NPRS pain scores and required no refills. Therefore, we recommend that patients undergoing knee arthroscopy are prescribed no more than 5 oxycodone 5-mg pills.

Level of Evidence
II, prospective prognostic cohort investigation.

BACK

Combined Oral Contraceptive Use Increases the Risk of Venous Thromboembolism After Knee Arthroscopy and Anterior Cruciate Ligament Reconstruction: An Analysis of 64,165 Patients in the Truven Database

Traven, S. A., Farley, K. X., Gottschalk, M. B., Goodloe, J. B., Woolf, S. K., Xerogeanes, J. W., & Slone, H. S.

https://doi.org/10.1016/j.arthro.2020.10.025

Purpose
To use the Truven MarketScan database to (1) report the incidence of venous thromboembolism (VTE), including deep vein thromboses (DVTs) and pulmonary embolism (PE), in patients undergoing simple knee arthroscopy and anterior cruciate ligament (ACL) reconstruction, and (2) evaluate combined oral contraceptive (COCP) use as a potential risk factor for VTE in patients undergoing knee arthroscopy.

Methods
All female patients between the ages of 16 and 40 years undergoing knee arthroscopy and ACL reconstruction between 2010 and 2015 were identified in the MarketScan database. Patients were stratified by whether they had a documented pharmaceutical claim for COCP therapy, and the primary outcome was the risk of DVT and or PE within 90 postoperative days.

Results
In total, 64,165 patients were identified for inclusion. While the overall incidence of VTE was low, patients taking COCPs had an increased risk of a DVT or PE compared with those not on COCPs (odds ratio [OR] 2.1, $P < .001$). When patients were analyzed by procedural subgroup (ACL reconstruction and simple knee arthroscopy), similar results held true. Furthermore, smoking and obesity had a synergistic effect when combined with COCPs use on the risk of VTE. Specifically, 3.1% of patients with obesity on COCPs (OR 3.1, $P < .001$) and 4.0% of smokers on COCPs (OR 4.3, $P < .001$) developed a postoperative VTE.

Conclusions
This study demonstrates that COCP use is associated with an increased risk for a symptomatic DVT or PE (1.70% and 0.27%, respectively) after knee arthroscopy and an increased risk for DVT, but not PE (1.80% and 0.23%, respectively), after ACL reconstruction. In addition, patients with multiple risk factors present such as tobacco use, obesity, and COCP use had odds ratios greater than the sum of the individual risk factors alone.

Level of Evidence
level III prognostic cohort study

BACK

Preoperative Patient-Centric Predictors of Postoperative Outcomes in Patients Undergoing Arthroscopic Meniscectomy

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https://doi.org/10.1016/j.arthro.2020.10.042

Purpose
To determine the minimal clinically important difference (MCID) using Patient-Reported Outcome Measurement Information System (PROMIS) computer-adaptive testing assessments in patients undergoing arthroscopic partial meniscectomy. The secondary purpose was to identify which preoperative patient factors are associated with MCID achievement.

Methods
Three PROMIS computer-adaptive testing assessments (Physical Function [PF], Pain Interference [PI], and Depression [D]) were administered to all patients presenting to 1 of 2 board-certified, sports medicine orthopaedic surgeons. Patients with Current Procedural Terminology codes of 29880 or 29881 were chart reviewed for a host clinical and demographic factors. PROMIS scores were assessed for improvement and patient characteristics were assessed for influence on any improvement. MCID was calculated according to the distribution methodology and receiver operating characteristics were used to assess preoperative scores predictive ability.

Results
In total, 166 patients met inclusion criteria (58 exclusions). Postoperative PROMIS-PF (45.6), PROMIS-PI (54.6), and PROMIS-D (44.1) significantly improved at least 3 months after surgery when compared with baseline (P = .002). MCID values for PROMIS-PF, PROMIS-PI, and PROMIS-D were 3.5, 3.3, and 4.4, respectively. Individuals with PROMIS-PF scores below 34.9 yielded an 82% probability of achieving MCID, while PROMIS-PI scores above 67.5 yielded an 86% probability of achieving MCID and a cutoff of 58.9 for PROMIS-D yielded a 60% probability of achieving MCID, with 90% specificity.

Conclusions
PROMIS scores, obtained preoperatively, were shown to be valid predictors of postoperative clinical improvement in patients undergoing meniscectomy. Our findings suggest that patients with physical function scores of 34.9 or less have an increased probability of reaching a minimal clinically important difference. Similarly, patients with pain interference scores of 67.5 and above have increased probability of reaching MCID for pain interference. These cutoffs may be used by physicians to aid in the counseling of patients considering arthroscopic meniscectomy.

Level of Evidence
IV, Case Series.

BACK

Large Heterogeneity Among Minimal Clinically Important Differences for Hip Arthroscopy Outcomes: A Systematic Review of Reporting Trends and Quantification Methods

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https://doi.org/10.1016/j.arthro.2020.10.050

Purpose
To perform a systematic review of reporting trends and quantification methods for the minimal clinically important difference (MCID) within the hip arthroscopy literature.

Methods
Cochrane, PubMed, and OVID/MEDLINE databases were queried for hip arthroscopy articles that reported the MCID. Studies were classified as (1) calculating new MCID values for their specific study-population or (2) referencing previously established MCID values. Data pertaining to patient demographics, study characteristics, outcome measures, method of MCID quantification, MCID value, anchor questions, measurement error, and study from which referenced MCID values were obtained were extracted.

Results
A total of 59 articles with 18,830 patients (19,867 hips) was included. A total of 19 unique outcome measures was reported. A total of 33 (n = 55.9%) studies (follow-up range 6-60 months) used previously established MCID values to assess their study population (MCID values established at a follow-up range 6-31 months). The remaining 26 studies (44.1%) performed new MCID calculations. The MCID values were inconsistent and varied widely (Hip Outcome Score–Activities of Daily Living: 5.0-15.4; Hip Outcome Score–Sports Subscale: 6-25; modified Harris hip score: 2.4-20.9). Among the 33 studies that used previously established MCID values, 10 different studies were cited as the reference. Among the remaining 26 studies that calculated a new MCID value, the most common method was 0.5 standard deviation method (n = 21, 80.8%). Only 3 of 26 (11.5%) studies reported a measurement of error in conjunction with their MCID values.

Conclusions
Inconsistencies in MCID reporting and quantification methods led to a wide range of MCID values for commonly administered outcome measures within the hip arthroscopy literature—even for the same outcome measures. The majority of studies referenced previously established MCID values with variable ranges of follow-up and applied those values to assess their specific study population at varying follow-ups.

Level of Evidence
IV, systematic review.

BACK