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BACK

Upper extremity

Arthroscopy, Volume 36, Issue 10, p2635-2641

Rehabilitation Posture Does Not Affect the Outcome of Arthroscopically Treated Acromioclavicular Dislocation

Amr Ibrahim,Saleh Gameel,Khaled Abdelghafar,Tarek Mohamed Ghandour,Begad M. Samy Abbas

https://doi.org/10.1016/j.arthro.2020.05.043

Purpose
To assess the effect of the patient's posture (erect or supine) during rehabilitation sessions on pain, function, and the coracoclavicular (CC) distance after arthroscopic treatment of acromioclavicular joint dislocation.

Methods
Sixty patients with acute type III or V acromioclavicular dislocation injuries were randomly allocated into 2 groups according to their posture during the rehabilitation phase: supine rehabilitation group (SRG) or erect rehabilitation group (ERG). Arthroscopic stabilization with a suspensory fixation device was used in all patients. The visual analog scale (VAS) score was assessed on the first postoperative day and at 1, 3, and 6 months postoperatively. The Constant-Murley score (CMS) was recorded preoperatively and at 3, 6, 12, and 24 months postoperatively. The CC distance was assessed preoperatively; on the first postoperative day; and at 6, 12, and 24 months postoperatively.

Results
No significant differences were found between the 2 groups in terms of the VAS score, CMS, and CC distance changes. A significant improvement over the follow-up phase was identified in the VAS score and CMS in both groups. The CC distance in both groups was significantly reduced from preoperatively (29.34 mm in the ERG and 28.65 mm in the SRG) to the first postoperative day (10.44 mm and 10.11 mm, respectively). However, a statistically significant re-widening of the CC distance ($P < .001$) occurred within the first 6 months after surgery (13.55 mm in the ERG and 13.50 mm in the SRG) and at 12 months (15.51 mm and 15.80 mm, respectively).

Conclusions
The patient's posture during early postoperative rehabilitation does not affect the CC distance changes.

Level of Evidence
Level I, randomized prospective comparative study

BACK

Increased Health Care Costs and Opioid Use in Patients with Anxiety and Depression Undergoing Rotator Cuff Repair

Cronin, K. J., Mair, S. D., Hawk, G. S., Thompson, K. L., Hettrich, C. M., & Jacobs, C. A.

https://doi.org/10.1016/j.arthro.2020.05.038

Purpose
To (1) quantify the prevalence of mood disorders in patients undergoing arthroscopic rotator cuff repair (RCR) by use of a large claims database and (2) compare opioid use and medical costs in the year before and the year after RCR between patients with and without comorbid mood disorders.

Methods
A large claims database was queried to identify patients who underwent arthroscopic RCR (Current Procedural Terminology code 29827) between October 2010 and December 2015. All patients were then screened for insurance claims relating to either anxiety or depression. We compared net costs and opioid use both 1 year preoperatively and 1 year postoperatively between patients with and without mood disorders by use of an analysis of covariance.

Results
A total of 170,329 patients (97,427 male patients [57.2%] and 72,902 female patients [42.8%]) undergoing arthroscopic RCR were identified. Of the 170,329 patients, 46,737 (27.4%) had comorbid anxiety or depression, and after adjustment for preoperative cost, sex, age, and both preoperative and postoperative opioid use, the 1-year postoperative cost was 7.05% higher for those with a preoperative mood disorder than for those without a mood disorder. In addition, opioid use both in the 180 days prior to surgery (36.7% vs 26.9%) and more than 90 days after surgery (33.0% vs 27.2%) was substantially greater in the group with comorbid depression or anxiety.

Conclusions
In patients with comorbid mood disorders, opioid use and health care costs were increased both preoperatively and postoperatively. The increased cost in this patient population is estimated at $62.3 million annually. In an effort to provide high-quality, value-based care, treatment strategies should be developed to identify these patients preoperatively and provide the appropriate resources needed to improve the probability of a successful surgical outcome.

Level of Evidence
Level III, retrospective, comparative therapeutic study

BACK

Journal of Shoulder and Elbow Surgery (JSES), Volume 29, issue 10, pages 2015 - 2026

Three-year functional outcome of transosseous-equivalent double-row vs. single-row repair of small and large rotator cuff tears: a double-blinded randomized controlled trial.

Imam, M., Sallam, A., Ernstbrunner, L., et al.

DOI: https://doi.org/10.1016/j.jse.2020.05.005

Background
The trial aimed to prospectively compare the functional outcomes of patients undergoing arthroscopic rotator cuff repair using transosseous-equivalent double-row (TEDR) or single-row (SR) suture anchor techniques at 3 years postoperatively for both large (>3 cm) and small (<3 cm) tears.

Methods
Eighty patients with a symptomatic and magnetic resonance imaging (MRI)–proven full-thickness rotator cuff tear, who had failed conservative management of at least 6 months' duration and who had a complete passive range of motion of the affected shoulder, were enrolled in the trial. Patients were randomized to TEDR repair (n = 40) or SR repair (n = 40). Subgroup analysis was conducted for tears <3 cm (TEDR n = 17, SR n = 19) and tears >3 cm (TEDR n = 23, SR n = 21). Primary outcomes included the Oxford Shoulder Score (OSS), the University of California, Los Angeles (UCLA) score, and the Constant-Murley score (CMS). The secondary outcomes included a 0-100-mm visual analog scale (VAS) score for pain, range of motion (ROM), and EQ-5D scores. All patients completed a follow-up of 3 years.

Results
There was a significant difference in the mean OSS postoperative score for tears >3 cm (P = .01) and mean improvement from baseline in the TEDR group (P = .001). For tears >3 cm, mean postoperative scores were also significantly higher in the TEDR group for UCLA (P = .015) and CMS (P = .001). Post hoc testing showed that the differences between these groups was statistically significant (P < .05). For tears <3 cm, a significant postoperative difference in favor of SR repair was seen in the mean CMSs (P = .011), and post hoc testing showed that the difference was statistically significant (P = .015). No significant difference was seen with mean postoperative OSS or UCLA, and post hoc testing did not show a statistically significant difference between groups.

Conclusions
TEDR repair showed improved functional outcomes for tears >3 cm compared with SR repair. For tears <3 cm, no clear benefit was seen with either technique.

Level of evidence
Level I: Randomized Controlled Trial

BACK

Improving the safety of shoulder arthroscopy in the beach chair position: a prospective randomized trial investigating the effect of compression stockings on cerebral desaturation events in obese patients.

Golz, A.G., Davis, W.J., Perry, M.W., et al.

DOI: https://doi.org/10.1016/j.jse.2020.05.037

Background
Devastating transient and permanent postoperative neurocognitive complications in previously healthy, low-risk patients have been observed after elective shoulder arthroscopy in the beach chair position (BCP). Continuous monitoring of cerebral oxygen saturation has been recommended to identify cerebral desaturation events (CDEs) and improve patient safety. However, the relatively high cost and limited availability of monitoring may not be cost-effective. More cost-effective and available measures, including the use of thigh-high compression stockings (CS), have been investigated. However, efficacy data of CS usage is limited, especially for obese patients, who have been shown to be at increased risk for CDEs. The purpose of this was study was to determine if the intraoperative addition of thigh-high compression stockings decreases the incidence, frequency, and magnitude of CDEs in obese patients undergoing shoulder arthroscopy in the BCP.

Methods
Thirty-three patients in the treatment group wore both thigh-high compression stockings (CS) and sequential compression devices (SCDs), and the remaining 33 patients in the control group wore SCDs alone. Cerebral oximetry was monitored during surgery using near-infrared spectroscopy.

Results
The incidence of CDEs was equal between groups, with 9 patients (27%) in each experiencing desaturation events. The median number of CDEs per patient was 3 for the control group and 1 for patients wearing CS (P = .29). There was no difference between groups in terms of median time from induction of anesthesia to onset of CDE (P = .79), median time from upright positioning to onset of CDE (P = .60), mean CDE duration per patient (P = .22), and median cumulative CDE duration (P = .19). The median maximal desaturation from baseline was also not different between groups: 27.6% in the control group and 24.3% in the treatment group (P = .35).

Conclusion
The combination of thigh-high CS and SCDs did not decrease the incidence, frequency, or magnitude of CDEs in patients undergoing shoulder arthroscopy in the BCP. Twenty-seven percent of patients undergoing shoulder arthroscopy in the BCP demonstrated CDEs with or without the use of CS. Therefore, further research is required to identify cost-effective, minimally invasive, and universally available methods of decreasing the incidence of CDEs during this common surgical procedure.

Level of Evidence
Level I. Randomized Controlled Trial

BACK

Where and what damage occurs at the acromial undersurface in patients with rotator cuff tears?

Miyake, S., Tamai, M., Takeuchi, Y., et al.

DOI: https://doi.org/10.1016/j.jse.2020.02.002

Background
The gross pathology of the acromial undersurface in shoulders with rotator cuff tears with subacromial impingement is not completely understood. Many researchers have focused on damage to the anterior one-third area of the acromial undersurface, but few have studied the middle and posterior one-third areas. The purpose of this study was to clarify where and what damage occurs at the acromial undersurface in patients with rotator cuff tears.

Methods
We performed arthroscopic shoulder (n = 182, all with rotator cuff tears; mean age, 64.9 ± 8.4 years) and cadaveric shoulder (n = 23, 14 intact cuffs and 9 rotator cuff tears; mean age, 74.8 years) evaluations to observe the extent and degree of damage to the acromial undersurface. We statistically analyzed the association between the severity of the damage to the acromial undersurface (assessed using the Copeland-Levy classification as A0, normal; A1, minor scuffing; A2, major damage; or A3, visualization of bare bone area) and rotator cuff tear size (assessed using the classification of DeOrio and Cofield as partial; small, <1 cm; medium, 1-3 cm; or large or massive, >3 cm).

Results
The anterior, middle, and posterior one-thirds of the acromial undersurface were somewhat damaged (class A1-A3) in 92.6%, 90.1%, and 78.6% of shoulders with rotator cuff tears, respectively, according to arthroscopic evaluation. Increasing cuff tear size was significantly associated with worsening degree of damage to the acromial undersurface ($P < .001$). In the 9 cadaveric shoulders with rotator cuff tears, class A1-A3 damage was identified in the anterior one-third area in 100%, in the middle one-third area in 88.9%, and in the posterior one-third area in 33.3%. In the 14 cadaveric shoulders with a normal rotator cuff, class A1-A3 damage was identified in the anterior one-third area in 35.7%, in the middle one-third area in 14.3%, and in the posterior one-third area in 0.71%.

Conclusion
Damage to the acromial undersurface in patients with rotator cuff tears occurred at the middle, posterior, and anterior one-third areas, and the degree of damage was related to cuff tear size. Surgeons should evaluate the entire acromial undersurface to check for subacromial impingement damage at the middle and posterior one-third areas as well as the anterior one-third area of the acromial undersurface; this might aid in the treatment of patients with rotator cuff disease or subacromial impingement syndrome.

Level of evidence
Level III

BACK

A comparative study of arthroscopic débridement versus repair for Ellman grade II bursal-side partial-thickness rotator cuff tears.

Zhang, Y., Zhai, S., Qi, C., et al.

DOI: https://doi.org/10.1016/j.jse.2020.03.006

Hypothesis
We aimed to report the clinical outcomes of arthroscopic débridement vs. repair for Ellman grade II bursal-side partial-thickness rotator cuff tears.

Methods
Patients who presented with Ellman grade II bursal-side partial-thickness rotator cuff tears from September 2015 to August 2017 were included. On the basis of preoperative findings and patient preference, 20 patients underwent débridement whereas 26 underwent arthroscopic repair. The visual analog scale (VAS), Constant-Murley shoulder, American Shoulder and Elbow Surgeons, and University of California–Los Angeles scores were assessed. Magnetic resonance imaging and B-mode ultrasonography were performed preoperatively and at 6, 12, and 24 months postoperatively.

Results
All 46 patients were available throughout follow-up. At 2 years postoperatively, the VAS score had improved from 6.42 ± 1.56 to 0.65 ± 0.51 in the débridement group and from 6.26 ± 1.32 to 0.75 ± 0.42 in the repair group. The VAS score differed significantly between the 2 groups at 6 months postoperatively. All patient-reported outcomes improved in both groups. The American Shoulder and Elbow Surgeons score (P = .009), Constant-Murley shoulder score (P = .014), and University of California–Los Angeles score (P = .030) differed significantly between the 2 groups (higher in the débridement group) at 6 months postoperatively. Finally, 44 patients having intact tendon repairs with no interval worsening of partial-thickness tears underwent postoperative scheduled magnetic resonance imaging and B-mode ultrasonography examinations.

Conclusion
Arthroscopic débridement and repair of Ellman grade II bursal-side partial-thickness rotator cuff tears achieved comparable clinical scores and low retear rates during 2 years of follow-up. However, débridement achieved better results, especially within 6 months postoperatively, and achieved a favorable prognosis up to 2 years postoperatively.

Level of evidence
Level III

BACK

Latissimus dorsi transfer for irreparable subscapularis tear.

Elhassan B.T., Wagner, E.R., Kany J.

DOI: https://doi.org/10.1016/j.jse.2020.02.019

Background
There is a paucity of information on latissimus dorsi transfer (LDT) for subscapularis insufficiency. The purpose of this study is to report the outcome of LDT to reconstruct an irreparable subscapularis tear.

Methods
Excluding patients with prior failed Latarjet procedures, we examined 56 consecutive patients who underwent open (n = 14) or arthroscopic (n = 42) LDT. The average age was 53 years (range, 23-79), and 46 patients had a prior surgery. Outcome measures included visual analog scale score for pain, range of motion (ROM), subjective shoulder value (SSV), and Constant shoulder score (CSS).

Results
At a mean 13-month follow-up (7-51 months), patients had significant improvements in their pain, ROM, SSV, and CSS when compared to preoperatively. At final follow-up, 26% of patients continued to have proximal migration, and 11% of patients had anterior subluxation. The patients with frank anterior escape had a higher likelihood of having proximal migration and anterior subluxation, but this was not statistically significant. Stages of arthritis did not progress. Revision surgeries included 2 patients who revised to a reverse shoulder arthroplasty for rupture of the tendon transfer. Furthermore, 3 patients had LDT ruptures but did not elect to undergo further surgery.

Conclusions
LDT for irreparable subscapularis tears has the potential to lead to significant clinical improvements. Most patients improve in many of the signs of subscapularis insufficiency, including anterior and/or proximal subluxation, clinical examination maneuvers, and shoulder function. Overall, this transfer represents a reasonable option for this difficult pathology.

Level of Evidence
Level IV

BACK

Outcome of arthroscopically assisted lower trapezius transfer to reconstruct massive irreparable posterior-superior rotator cuff tears

Elhassan, B.T., Sanchez-Sotelo, J., Wagner, E.R.

DOI: https://doi.org/10.1016/j.jse.2020.02.018

Background
The purpose of this study is to report the outcome of arthroscopically assisted lower trapezius transfer to reconstruct irreparable posterior-superior rotator cuff tear.

Methods
Forty-one consecutive patients with irreparable posterior-superior rotator cuff tears who underwent an arthroscopically assisted transfer of the lower trapezius transfer were included in this study. The patients' average age was 52 years (range 37-71), and average follow-up was 14 months (range 6-19 months). Nineteen patients had true pseudoparalysis preoperatively, whereas 66% had a prior failed rotator cuff repair. Outcome measures included visual analog scale (VAS) pain score, range of motion, Subjective Shoulder Value (SSV), and Disabilities of the Arm, Shoulder, and Hand (DASH) score.

Results
Thirty-seven (90%) patients had significant improvement of all outcome scores: VAS, SSV, and DASH. The presence of a subscapularis tear did not affect the outcome. However, 3 patients who had preoperative rotator cuff arthropathy changes of the shoulder had persistent pain and limited range of motion of the shoulder after surgery, and 2 of them underwent reverse shoulder arthroplasty. Two additional patients had a traumatic rupture of the transfer as a result of fall (at 5 and 8 months postop). One underwent revision arthroscopic repair and did well after surgery, and the other had good pain relief but recurrent weakness and limited range of motion, and elected not to have a revision surgery.

Conclusions
Arthroscopic-assisted lower trapezius transfer may lead to a good outcome in patients with massive irreparable posterior-superior rotator cuff tears, including patients with pseudoparalysis. The presence of an associated reparable subscapularis tear did not affect the outcome.

Level of evidence
Level IV

BACK

Arthroscopic Bankart repair with remplissage versus Latarjet procedure for management of engaging Hill-Sachs lesions with subcritical glenoid bone loss in traumatic anterior shoulder instability: a systematic review and meta-analysis.

Haroun, H.K., Sobhy, M.H., Abdelrahman, A.A.

DOI: https://doi.org/10.1016/j.jse.2020.04.032

Background
A large engaging Hill-Sachs lesion (HSL) with subcritical glenoid bone loss (GBL) is approached through either increasing the glenoid arc by the Latarjet procedure or converting the HSL to an extra-articular defect by arthroscopic Bankart repair with remplissage (BRR). Until now, there has been no evidence-based consensus about which of these 2 most appropriate procedures is the better surgical choice. The purpose of this study was to analyze the current literature comparing results of BRR vs. the Latarjet procedure in the treatment of engaging HSLs with subcritical GBL.

Methods
A comprehensive review of the PubMed and Cochrane databases was completed for studies that compared the clinical outcomes and complications of BRR vs. the Latarjet procedure with minimum follow-up of 2 years. The outcome measures analyzed included postoperative Rowe score, visual analog scale pain score, postoperative range of motion (ROM), and rates of recurrent instability and other complications.

Results
Overall, 4 articles (level III evidence in 3 and level II in 1) were included from an initial 804 abstracts. The study population consisted of a total of 379 patients, of whom 194 underwent BRR and 185 underwent the Latarjet procedure. There were no unacceptable differences in baseline characteristics between the 2 groups. For the rate of recurrent instability, both groups had comparable risk ratios (RRs) (N = 379; RR, 0.72; 95% confidence interval [CI], 0.37-1.41). The risk of other complications was significantly increased with the Latarjet procedure (by about 7 times) relative to the the BRR procedure (N = 379; RR, 7.37; 95% CI, 2-27). Both groups had comparable postoperative Rowe scores (n = 190; mean difference [MD], –0.9; 95% CI, –3.45 to 1.7) and visual analog scale pain scores (n = 347; MD, –0.2; 95% CI, –0.6 to 0.2). Moreover, both groups had comparable postoperative external rotation ROM (MD, –1.7°; 95% CI, –9.4° to 6°) and internal rotation ROM (MD, 1.95°; 95% CI, –5.35° to 9.25°). There was substantial heterogeneity in the effect of both procedures on postoperative pain and ROM (external rotation and internal rotation).

Conclusion
Both the BRR and Latarjet procedures are effective for the management of engaging HSLs with subcritical GBL and give comparable clinical outcomes. However, given the fewer overall postoperative complications, remplissage may be safer. The results of the included studies were adequately consistent for most analyzed outcomes. However, for the intervention effect on postoperative pain and ROM, there was a small body of evidence, limiting the strength of the reported conclusions.

Level of evidence
Level III

BACK

American Journal of Sports Medicine, Volume 48, Issue 12, p3036–3041

Risk Factors for Recurrence After Arthroscopic Instability Repair—The Importance of Glenoid Bone Loss >15%, Patient Age, and Duration of Symptoms: A Matched Cohort Analysis

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https://doi.org/10.1177/0363546520949840

Background: Glenoid bone loss (GBL) has been implicated as a risk factor for failure of arthroscopic anterior glenohumeral instability repair. Although certain amounts of GBL are associated with higher recurrence rates, there are limited studies on successes versus failures in these cohorts.

Purpose: To compare the outcomes of arthroscopic Bankart repair in patients with and without GBL to determine a threshold percentage of GBL that predicts success.

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

Methods: All consecutive patients who underwent arthroscopic Bankart repair for anterior shoulder instability between 2004 and 2013 were prospectively enrolled. Patients with ≤25% GBL were included. Patients with no GBL were grouped and compared with those having 5% to 25% GBL. Outcomes included Single Assessment Numerical Evaluation, Western Ontario Shoulder Index, and American Shoulder and Elbow Surgeons scores, with evidence of recurrent instability. Patients with and without GBL were statistically compared with respect to outcomes and recurrence rates.

Results: Of 434 eligible patients, the cases of 405 (45 female, 360 male; mean age, 27.5 years [range, 18-47 years]) were followed for a mean 61 months (range, 48-96 months). There were 189 (46.6%) with no GBL and 216 (53.3%) with GBL; the mean GBL of the latter cohort was 15% (range, 5%-25%). The mean duration of instability symptoms was 7.9 months (range, 1-21 months) and was significantly longer in the GBL group ($P < .05$). The mean recurrence rate was 14.8%, which was significantly greater in patients presenting with GBL versus those with none (48/216 [22.2%] vs 12/189 [6.3%]; $P < .01$). Within the GBL group, GBL ≥15%, duration of symptoms >5 months, and younger age (<20 years) were independent risk factors for failure ($P < .01$). Patients with any GBL had >4-times greater odds of recurrence after arthroscopic stabilization (odds ratio, 4.21; 95% CI, 2.16-8.21). Moreover, patients presenting for arthroscopic Bankart repair with GBL ≥15% had nearly 3-times greater odds of recurrent instability.

Conclusion: GBL ≥15% in an active patient population portends to increased odds of recurrent instability events and inferior clinical outcomes after arthroscopic Bankart repair. Furthermore, nonmodifiable risk factors, such as age (<20 years) and duration of symptoms before presentation (>5 months), significantly affect risk of recurrence and should be key factors when counseling patients on risk of failure and determining the ideal procedure for the individual patient.

BACK

Preoperative Lymphocyte to Monocyte Ratio Can Be a Prognostic Factor in Arthroscopic Repair of Small to Large Rotator Cuff Tears

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https://doi.org/10.1177/0363546520953427

Background: Complete arthroscopic repair can treat small to large rotator cuff tears (RCTs) with good outcomes; however, the repair might be compromised by inflammation.

Purpose: To investigate the prognostic value of preoperative lymphocyte to monocyte ratio (LMR), a marker of systemic inflammation before surgery, in arthroscopic rotator cuff repair.

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

Methods: Between January 2014 and January 2016, primary small to large RCTs without stiffness, significant muscle fatty infiltration, or atrophy were completely repaired in 110 consecutive patients and followed. Preoperative LMR was obtained from blood routinely examined 1 day before surgery. Descriptive data and pre- and intraoperative variables were collected. Correlation analysis and multivariable linear regression analysis were used to determine the relationship between preoperative LMR and recovery including American Shoulder and Elbow Surgeons (ASES) score, Constant-Murley score, Fudan University Shoulder Score (FUSS), visual analog scale (VAS) score for pain, and range of motion (ROM). Poor recovery was defined as ASES score <80, shoulder stiffness as external rotation ≤20°, and pain as VAS score >3. The predictive value of preoperative LMR was determined by receiver operating characteristic (ROC) curve.

Results: A total of 99 patients (101 shoulders) were followed for 2.88 ± 0.43 years. Overall, mean ASES, Constant-Murley, FUSS, and VAS scores were significantly improved at the final follow-up; however, 27 cases had either ASES <80, shoulder stiffness, pain, or a combination of these. Correlation analysis and multivariable linear analysis showed that preoperative LMR was the only factor independently associated with functional recovery, pain, and ROM. Patients with poor recovery had lower preoperative LMR than those with good recovery. Based on the ROC curve, the cutoff value of preoperative LMR was 4.760. Patients with preoperative LMR <4.760 had significantly inferior clinical outcomes compared with their counterparts. The corresponding specificity was 0.542, and sensitivity was 0.779.

Conclusion: Arthroscopic repair for small to large RCTs yielded good outcomes; however, some patients still had inferior functional scores, shoulder stiffness, or pain, which correlated with the level of preoperative systemic inflammation. As a marker of systemic inflammation, preoperative LMR could be prognostic for rotator cuff repair.

BACK

Arthroscopic Biceps Tenodesis Outcomes: A Comparison of Inlay and Onlay Techniques

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First Published September 14, 2020; pp. 3051–3056

https://doi.org/10.1177/0363546520952357

Background: Arthroscopic biceps tenodesis (ABT) high in the groove can be achieved using an inlay or an onlay technique. However, there is little information comparing outcomes between the 2.

Purpose: To compare postoperative healing and functional outcomes of ABT high in the groove performed using either an onlay or an inlay technique.

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

Methods: A retrospective study was performed on patients undergoing ABT at the articular margin (high in the groove) at a single center over a 2-year period. An inlay technique using an interference screw was performed during the first year, followed by an onlay technique using a knotless suture anchor during the second. Tendon healing, elbow flexion strength, functional outcome, and complications were evaluated at a postoperative minimum of 1 year.

Results: A total of 37 patients with inlay and 53 with onlay ABTs were available for follow-up. There was no difference in range of motion, functional outcome scores, or elbow flexion strength between the groups. A postoperative popeye deformity was noted in 27% of patients in the inlay group as compared with 9.4% of the onlay group (P = .028). Four patients (10.8%) in the inlay group required revision surgery (2 of which were biceps tenodesis related) as compared with 0% in the onlay group (P = .015).

Conclusion: An onlay technique using a knotless suture anchor for ABT at the top of the articular margin is an acceptable alternative to an inlay technique using an interference screw. The onlay technique was associated with lower rates of postoperative popeye deformity and revision surgery as compared with the inlay technique.

BACK

Lower Extremity

Arthroscopy, Volume 36, Issue 10, p 2583-2597

Circumferential Labral Reconstruction for Irreparable Labral Tears in the Primary Setting: Minimum 2-Year Outcomes With a Nested Matched-Pair Labral Repair Control Group

Benjamin G. Domb et al.

https://doi.org/10.1016/j.arthro.2020.02.014

Purpose
(1) To report minimum 2-year patient-reported outcome (PRO) scores of primary circumferential acetabular labral reconstruction using anterior tibialis allograft and the knotless pull-through technique in the setting of femoroacetabular impingement syndrome (FAIS) and irreparable labral tears and (2) to compare these PROs with a matched-pair primary labral repair group.

Methods
Data were prospectively collected and retrospectively reviewed. Patients were included if they underwent primary circumferential labral reconstruction with anterior tibialis tendon allograft during February 2016 to April 2017 for irreparable labral tears and FAIS and had preoperative and minimum 2-year follow-up for modified Harris Hip Score (mHHS), Hip Outcome Score–Sport-Specific Subscale, Non-arthritic Hip Score, International Hip Outcome Tool 12 (iHOT-12), 12-Item Short Form Health Survey physical component and mental component, Veterans RAND 12-Item Health Survey physical component and mental component, and visual analog scale for pain. The exclusion criteria were previous ipsilateral hip conditions or surgical procedures, Tönnis grade 2 or higher, or dysplasia (lateral center-edge angle ≤ 18°). Labral tears were considered irreparable if the labrum appeared (1) to be mostly or completely calcified and (2) to be inadequate (nonviable) and not amenable for labral repair. The reconstruction group was matched 1:3 based on age, sex, and body mass index to a benchmark control group of hips undergoing labral repair from the same period. The minimal clinically important difference and patient acceptable symptomatic state for the mHHS and iHOT-12 score were calculated.

Results
A total of 37 hips (37 patients) underwent circumferential labral reconstruction. There were 19 female patients (51.4%) and 18 male patients (48.6%). The mean age was 45.6 ± 11.6 years, and the average body mass index was 27.1 ± 5. At minimum 2-year follow-up, the circumferential labral reconstruction group showed statistically significant improvements in the mHHS, Non-arthritic Hip Score, Hip Outcome Score–Sport-Specific Subscale, iHOT-12 score, and visual analog scale score. All hips in the reconstruction group were successfully matched to 111 labral repair hips. At latest follow-up, improvements in all PROs between the 2 groups were comparable. The revision rates were 0% and 3.6% in the reconstruction and repair groups, respectively.

Conclusions
After primary hip arthroscopy , primary circumferential labral reconstruction using anterior tibialis allograft and the knotless pull-through technique in the setting of FAIS and irreparable labral tears resulted in significant improvements in several PROs at minimum 2-year follow-up and high patient satisfaction. Primary circumferential labral reconstruction reached comparable functional outcomes to those of a benchmark matched-pair primary labral repair control group.

Level of Evidence
Level III , case-control study.

BACK

Primary and Revision Circumferential Labral Reconstruction for Femoroacetabular Impingement in Athletes: Return to Sport and Technique

John P. Scanaliato,Jesse Chasteen,Michael M. Polmear,Catherine Salfiti,Andrew B. Wolff

https://doi.org/10.1016/j.arthro.2020.04.045

Purpose
To determine return-to-play rates and hip-specific outcomes in athlete hips with femoroacetabular impingement syndrome treated with circumferential labral reconstruction (CLR).

Methods
All consecutive patients who underwent CLR from January through December 2016 performed by the senior surgeon with complete 2-year outcome scores were identified. The hips of 57 non-athletes who underwent CLR were excluded from analysis, as were 165 patients who underwent labral repair and 4 patients who underwent labral debridement. Outcome measures were completed by patients within 1 week prior to surgery and between 22 and 26 months postoperatively. Thirty patients met the inclusion criteria for this study. All 30 participated in regular, competitive athletic events and had magnetic resonance arthrogram–confirmed labral tears, and nonsurgical measures had failed. Of the 30 patients, 5 (16.7%) participated in cutting sports; 5 (16.7%), asymmetrical or overhead sports; 4 (13.3%), contact sports; 13 (43.3%), endurance sports; and 3 (10.0%), flexibility sports. Moreover, 25 of 30 (83.3%) were high-level athletes. Both primary (n = 23) and revision (n = 7) procedures were included.

Results
As determined by the International Hip Outcome Tool 12 score, 28 of 30 patients (93.3%) met the patient acceptable symptomatic state whereas 30 of 30 (100%) achieved substantial clinical benefit and exceeded the minimal clinically important difference for their operative hip. In addition, 23 of 30 patients (76.6%) met the patient acceptable symptomatic state whereas 30 of 30 (100%) achieved substantial clinical benefit and exceeded the minimal clinically important difference for the operative hip as determined by the visual analog scale pain score. Of 30 patients, 26 (86.7%) were able to return to play. The mean time to return to play was 6.6 months (standard deviation, 2.4 months).

Conclusions
Two-year outcomes in this population of athletes undergoing CLR for femoroacetabular impingement syndrome show a statistically and clinically significant improvement in patient-reported outcomes, a statistically and clinically significant decrease in pain, and an overall return-to-play rate of 86.7%.

Level of Evidence
Level IV, therapeutic case series.

BACK

Patients With a Hypotrophic Labrum Achieve Similar Outcomes After Primary Labral Repair Compared With Patients With a Normal-Sized Labrum: A Matched Cohort Analysis of 346 Patients With Femoroacetabular Impingement Syndrome

Justin Drager,Jonathan Rasio,Alexander Newhouse,Edward Beck,Jorge Chahla,Shane J. Nho

https://doi.org/10.1016/j.arthro.2020.05.039

Purpose
To compare patient functional scores and rates of achieving minimum clinically important differences (MCID) and patient acceptable symptomatic state (PASS) between patients with a hypotrophic labrum with those with a normal labrum width at a minimum 1-year follow-up from arthroscopic treatment of femoroacetabular impingement syndrome.

Methods
Data from consecutive patients who underwent primary hip arthroscopy between November 2015 and July 2018 for the treatment of femoroacetabular impingement syndrome were analyzed. Baseline demographic data, preoperative patient-reported outcome measures (PROMs), and minimum 1-year PROMs, including Hip Outcome Score-Activities of Daily Living, Hip Outcome Score-Sports Subscale, modified Harris Hip Score, international Hip Outcome Tool 12 questions, and visual analog scale for pain and satisfaction were recorded. The labrum size was determined using an arthroscopic probe at the 12- to 2-o'clock position with a hypotrophic labrum being defined as <4 mm and normal labrum defined as having a width between 4 and 7 mm on the articular side. Patients with hypotrophic labrum were matched 1:1 by age and body mass index to patients with normal labrum width.

Results
A total of 346 patients were included in the study with an average age of 31.4 ± 11.9 and a majority being female (72.0%). There were 173 in each of the normal and hypotrophic groups. There were no significant differences seen in 1-year PROMs between the 2 groups ($P > .05$ for all). The normal labrum group achieved MCID at a rate of 75% to 84% and PASS at a rate of 51% to 70%. The hypotrophic labrum group achieved MCID at a rate of 70% to 85% and PASS at a rate of 57% to 71%. There were no significant differences in rates between each group ($P > .05$ for all).

Conclusions
Patients with an intraoperative finding of labral hypotrophy achieve 1-year meaningful clinical outcome at the same rate as those with normal labral width following arthroscopic labral repair.

Level of Evidence
III, Case–control study

BACK

Preoperative Opioid Use Predicts Prolonged Postoperative Opioid Use and Inferior Patient Outcomes Following Anterior Cruciate Ligament Reconstruction

Forlenza, E. M., Lavoie-Gagne, O., Lu, Y., Cohn, M., Chang, E., Yanke, A. B., … Forsythe, B.

https://doi.org/10.1016/j.arthro.2020.06.014

Purpose
(1) To determine patient factors associated with prolonged opioid use following anterior cruciate ligament reconstruction (ACLR) and (2) to evaluate the influence of preoperative opioid use on patient-reported outcomes.

Methods
Patients who underwent ACLR and used opioids before the perioperative period, which was defined as the window 30 days before 15 days following the index surgery, were designated as preoperative opioid users. Patients who used opioids only in the perioperative period or post-operative period were designated as opioid-naïve. Predictors of opioid use at 6 and 12 months postoperatively and associations between preoperative opioid use and patient outcomes were assessed.

Results
After institutional review board approval, we identified 253 patients (225 opioid-naïve and 28 opioid users) who underwent ACLR from 2014 to 2018 at a single institution and had one year follow up (median: 11.6 months; interquartile range [8.9-14.3]). Patients with a history of preoperative opioid use (odds ratio [OR] 3.63, P = .034), greater preoperative visual analog scale pain scores (OR 1.32, 95% CI 1.04-1.67; P = .003), and greater body mass index (OR 1.09, P = .018) were significantly more likely to be taking opioids at 6 months postoperatively. Patients with a perioperative opioid intake of greater than 513 oral morphine equivalents were significantly more likely to continue taking opioids at the 6 month (OR 3.17, P = .024) and the 1 year (OR 3.34, P = .048) postoperative time points. Patients with preoperative opioid use were significantly less likely to achieve the patient acceptable symptomatic state (PASS) on the International Knee Documentation Committee, Knee Injury and Osteoarthritis Outcome Score (KOOS) Sport, KOOS Joint Replacement, KOOS Pain, KOOS Symptoms, KOOS Quality of Life, and KOOS Activities of Daily Living.

Conclusions
Preoperative opioid use, body mass index >30, and greater visual analog scale pain scores were predictors of continued opioid use at 6 months postoperatively. Preoperative opioid users were more likely to continue taking opioids, demonstrate significantly worse patient reported outcomes at baseline and 1-year postoperatively, and were less likely to achieve patient acceptable symptomatic state.

Level of Evidence
Level III, Retrospective Cohort Study

BACK

Resident Involvement Is Not Associated With Increased Risk of Postoperative Complications After Arthroscopic Knee Surgery: A Propensity-Matched Study

Khazi, Z. M., Gulbrandsen, T. R., Shamrock, A. G., An, Q., Duchman, K., Marsh, J. L., … Westermann, R. W.

https://doi.org/10.1016/j.arthro.2020.04.040

Purpose
To investigate whether resident involvement in knee arthroscopy procedures affects postoperative complications or operative times.

Methods
The American College of Surgeons National Surgical Quality Improvement Program registry was queried to identify patients who underwent common knee arthroscopy procedures between 2006 through 2012. Patients with a history of knee arthroplasty, septic arthritis or osteomyelitis of the knee, concomitant open or mini-open procedures, or without information on resident involvement were excluded. A 1:1 propensity score match was performed based on age, sex, obesity, smoking history, and American Society of Anesthesiologist classification to match cases with resident involved to nonresident cases. Fisher exact tests, Pearson's χ^2 tests, and Wilcoxon rank sum tests were used to compare patient demographics, comorbidities, and 30-day complications. Wilcoxon rank sum tests were used to compare operative time and length of hospital stay between the 2 groups, with statistical significance defined as $P < .05$.

Results
After matching, 2954 cases (50% resident involvement) were included in the study with no significant differences in demographics or comorbidities between the 2 cohorts. The overall rate of 30-day complications was 1.1% in the nonresident and resident involved group ($P = 1.000$). There was no significant difference in postoperative surgical (nonresident vs resident involved: 0.48% vs 0.83%, $P = .2498$) or medical (nonresident vs resident involved: 0.62% vs 0.83%, $P = .5111$) complications. However, knee arthroscopy cases that residents were involved with had significantly longer operative times (69.8 vs 66.8 minutes, $P = .0002$), and length of hospital stay (0.85 vs 0.21 days, $P = .0332$) when compared with cases performed without a resident.

Conclusions
Resident involvement in knee arthroscopy procedures is not a significant risk for medical or surgical 30-day postoperative complications. Resident participation in knee arthroscopy was associated with statistically significant but likely clinically insignificant increased operative time as well as length of hospital stay.

Level of Evidence
Level III: Retrospective Cohort Study.

BACK

Influence of Posterior Tibial Slope on Clinical Outcomes and Survivorship After Anterior Cruciate Ligament Reconstruction Using Hamstring Autografts: A Minimum of 10-Year Follow-Up

Yoon, K. H., Park, S. Y., Park, J.-Y., Kim, E. J., Kim, S. J., Kwon, Y. B., & Kim, S.-G.

https://doi.org/10.1016/j.arthro.2020.06.011

Purpose
To investigate the influence of medial and lateral posterior tibial slope (PTS) on long-term clinical outcomes and survivorship after anterior cruciate ligament (ACL) reconstruction using hamstring autografts.

Methods
A total of 232 patients (mean age, 28.2 ± 8.9 years) who underwent primary ACL reconstruction from October 2002 to July 2007 were retrospectively reviewed. Patients with multiple ligament reconstruction, total meniscectomy, contralateral knee surgery before ACL reconstruction, open growth plate, and less than 10-year follow-up were excluded in the study. The medial and lateral PTS were measured from preoperative magnetic resonance imaging. Based on Li et al.'s previous study, the patients were divided into 2 groups according to their medial PTS (≤5.6° vs >5.6°) and lateral PTS (≤3.8° vs >3.8°), respectively. Clinical outcomes (clinical scores, stability tests and failure rate) were compared between the groups at the last follow-up. Furthermore, survival analysis was performed using the Kaplan–Meier method.

Results
All clinical scores (International Knee Documentation Committee subjective, Lysholm, and Tegner activity scores) and stability tests (physical examinations and side-to-side difference in Telos stress radiographs) were insignificantly different between the 2 groups classified based on medial or lateral PTS. However, the failure rate was significantly higher in patients with medial PTS >5.6° (16.1% vs 5.1%, P = .01) or lateral PTS >3.8° (14.5% vs 4.7%; P = .01). The odds ratios of graft failure due to increased medial and lateral PTS were 3.18 (95% confidence interval, 1.22–8.28; P = .02) and 3.43 (95% confidence interval, 1.29–9.09; P = .01), respectively. In addition, the 10-year survivorship was significantly lower in patients with medial PTS >5.6° (83.9% vs 94.9%, P = .01) or lateral PTS >3.8° (85.5% vs 96.0%; P = .01).

Conclusions
Increased medial (>5.6°) and lateral (>3.8°) PTS were associated with higher failure rate and lower survivorship at a minimum of 10-year follow-up after primary ACL reconstruction using hamstring autografts.

Level of Evidence
Level III, retrospective comparative trial.

BACK

Reoperation Rates Following Meniscus Transplantation Using the Truven Database

Sochacki, K. R., Varshneya, K., Safran, M. R., Abrams, G. D., Donahue, J., Wang, T., & Sherman, S. L.

https://doi.org/10.1016/j.arthro.2020.06.031

Purpose
The purpose of this study was to determine the (1) reoperation rate and (2) 30-day complication rate in a large insurance database.

Methods
The Truven Database was queried for subjects that underwent meniscus allograft transplantation (Current Procedural Terminology code 29868) in the outpatient setting with minimal 2-year follow-up. Patients without confirmed laterality and patients that underwent concomitant ligament reconstruction were excluded. Reoperation was defined by ipsilateral knee procedure after the index surgery. The 30-day postoperative complication rates were assessed using International Classification of Diseases, 9th Revision, Clinical Modification codes.

Results
A total of 284 patients (mean age of 26.2 ± 10.4 years; 49.6% females) were included in this study with mean follow up of 43.2 ± 19.2 months. One hundred and sixty-seven subjects (58.8%) undergoing meniscus allograft transplantation underwent reoperation at an average of 11.9 ± 12.2 months postoperatively. There was a low number of subjects that required ipsilateral unicompartmental knee arthroplasty and total knee arthroplasty postoperatively (0.7% and 1.1%, respectively). The overall 30-day complication rate following meniscus allograft transplantation was 1.4%.

Conclusions
Patients undergoing meniscus allograft transplantation have a 58.8% reoperation rate at final follow up with low (1.4%) 30-day complication rates in a large insurance database.

Level of Evidence
Level IV, case series.

BACK

Arthroscopic Ankle Arthrodesis Provides Similarly Satisfactory Surgical Outcomes in Ankles With Severe Deformity Compared With Mild Deformity in Elderly Patients

Yang, T.-C., Tzeng, Y.-H., Wang, C.-S., Chang, M.-C., & Chiang, C.-C.

https://doi.org/10.1016/j.arthro.2020.05.036

Purpose
To evaluate the surgical outcome in terms of radiographic measurements, functional outcomes, and complications following arthroscopic ankle arthrodesis (AAA) in patients 60 years of age or older, and to compare the results of patients with mildly deformed ankle with those of patients with severely deformed ankle.

Methods
We retrospectively reviewed patients who underwent AAA with 3 cannulated screws between January 2008 and December 2017 and followed postoperatively for at least 24 months. All included patients were 60 years of age or older. Demographic data and radiographic and functional outcomes were compared between patients with coronal deformity of less than 15° (group I) and those with a deformity equal to or greater than 15 degrees (group II).

Results
A total of 41 patients with a mean age of 70.6 years were included (group I, n = 26; group II, n = 15) and mean follow-up was 51.4 months. Group II had significantly more severe preoperative coronal deformity of tibiotalar angle than group I (20.1 ± 2.9 vs 6.6 ± 4.1°, P < .01). Near-normal tibiotalar alignment was achieved postoperatively in both groups (group I, 3.4 ± 3.3 vs group II, 4.7 ± 3.1°, P = .227). Union was achieved in 39 (95.1%) patients with 2 cases in group I experiencing non-union. Union rate, mean American Orthopaedic Foot and Ankle Society ankle-hindfoot scale, and visual analog scale pain scores were not significantly different between the 2 groups at final follow-up.

Conclusions
AAA is a reliable procedure for end-stage ankle arthritis in patients 60 years of age or older resulting in a high union rate, encouraging radiographic and functional outcomes, and a low complication rate, even in cases with severe preoperative deformity. In addition, arthroscopic intra-articular malleolar osteotomy was a useful technique for correcting severe coronal deformity in our series.

Level of Evidence
Level III, retrospective comparative study

BACK

Knee Surgery, Sports Traumatology, Arthroscopy, September 2020, volume 28, issue 10, pages 3245-3257

Enhanced microfracture using acellular scaffolds improves results after treatment of symptomatic focal grade III/IV knee cartilage lesions but current clinical evidence does not allow unequivocal recommendation.

da Cunha, C.B., Andrade, R., Veloso, T.R. *et al.*

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-019-05832-5

Purpose
To systematically analyse post-operative outcomes following enhanced microfracture procedures in focal cartilage injuries of the knee.

Methods
Database searches were conducted in PubMed, EMBASE and Cochrane Library databases up to 30 November 2018, for clinical studies in humans that assessed surgical outcomes of enhanced microfracture procedures in focal cartilage injuries of the knee. The clinical, functional and imaging outcomes were assessed and summarized. The MINORS scale was used to assess the methodological quality of the studies included.

Results
Ten studies were included comprising a total of 331 patients (mean age of 37.0 ± 5.5 years, body mass 25.2 ± 1.7 kg m^2, 56% male and 42% left knee), 278 femoral condyle chondral defects (147 medial, 35 lateral and 78 undefined) and 43 chondral defects distributed by the tibial plateau, patella and femoral trochlea. The chondral defects were mostly Outerbridge grade III or IV and the mean defect size was 3.2 ± 0.6 cm^2. Studies consistently demonstrated significant improvement in the patient-reported outcome measures from baseline to final follow-up. Overall, imaging outcomes showed inconsistent results. Treatment-related adverse events were poorly reported.

Conclusion
Enhanced microfracture techniques significantly result in improved patient-reported outcome measures over the MCID, but provide inconsistent imaging results. Current clinical evidence does not allow for unequivocal recommendation of enhanced microfracture to treat symptomatic focal grade III/IV knee cartilage lesions.

Level of evidence
IV.

BACK

Endoscopic fasciotomy for plantar fasciitis provides superior results when compared to a controlled non-operative treatment protocol: a randomized controlled trial.

Johannsen, F., Konradsen, L., Herzog, R. *et al.*

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-05855-3

Purpose
Plantar fasciitis is a frequent and painful condition with a lifetime incidence of 10%. Good results have been reported for operative treatment of plantar fasciitis refractory to non-surgical interventions in uncontrolled studies. The aim of this study was to compare the results of operative treatment (endoscopic debridement, removal of the heel spur and partial resection of the plantar fascia) with those of a controlled and supervised non-operative rehabilitation program.

Methods
Thirty consecutive patients with plantar fasciitis during more than 3 months were randomized to either (1) non-operative treatment with corticosteroid injections and a controlled strength training program or (2) an endoscopic 2-incision operation with partial fasciotomy and heel spur removal followed by the same strength training program. Patients were evaluated at entry and 3, 6, 12 and 24 months post-operatively with the foot function index (FFI) and pain score during activity on a 100 mm VAS scale (VAS activity). FFI at 6 and 12 months was defined a priori as primary endpoint.

Results
Both groups improved significantly over time. The FFI score was significantly better in the operated group compared to the non-surgically treated group 12 months post-operatively ($p = 0.033$), at 24 months this was, however, not significant ($p = 0.06$). VAS activity at 24 months was significantly ($p = 0.001$) in favor of the operative group. More patients returned to running and jumping in the operative group ($p = 0.04$).

Conclusion
This randomized controlled trial found significant and clinically relevant superior results for the operative treatment of plantar fasciitis as measured by Foot Function Index at 1 year and by VAS activity at 2-year follow-up when compared to the results of a supervised rehabilitation program.

Level of evidence
I.

BACK

Tendoscopic peroneal retinaculum repair for recurrent peroneal tendon dislocation enables earlier return to sports than the open procedure.

Nishimura, A., Kato, K., Nakazora, S. *et al.*

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-05877-x

Purpose
The purpose of this study was to evaluate whether tendoscopic peroneal retinaculum repair for patients with recurrent peroneal tendon dislocation (RPTD) is more useful than an open procedure.

Methods
Twenty-five patients with RPTD were retrospectively reviewed. Twelve patients (13 ankles) with RPTD underwent the open procedure (Group A) between 2008 and 2014, and 13 patients (14 ankles) underwent the tendoscopic procedure (Group B) between 2014 and 2017. Evaluation parameters included clinical results [the Japanese Society for Surgery of the Foot (JSSF) ankle-hind foot scale], operation time, complications, return to sports, and recurrence.

Results
Postoperative JSSF ankle/hindfoot scale scores were significantly better than the pre-surgical scores in both groups. The mean operation time was significantly longer in Group B than in Group A (75.7 ± 20.5 vs 38.4 ± 10.5 min). There was one recurrence in Group A, but none in Group B. Group A had no complications, and Group B had one wound infection. Group B, excluding the case of infection, could return to sports earlier than Group A, excluding the recurrent case (13.4 ± 1.5 vs 12.2 ± 0.6 weeks).

Conclusions
This tendoscopic procedure needs longer operation time and is more technically demanding, but it is a useful procedure, because it is less invasive and can accelerate return to sports.

Level of evidence
III.

BACK

Patient-specific factors are associated with severity of chondrolabral injury in patients with femoroacetabular impingement.

Dumont, G.D., Ergen, T.J., Pacana, M.J. *et al.*

DOI: https://doi-org.eur.idm.oclc.org/10.1007/s00167-020-06001-9

Purpose
The purpose of this study was to evaluate the relationship between patient-specific factors, preoperative radiographic findings, and the presence and severity of chondrolabral damage identified during hip arthroscopy for femoroacetabular impingement.

Methods
Between 2014 and 2017, patients who underwent hip arthroscopy for FAI and labral tear were retrospectively reviewed. Patient-specific variables including age, gender, BMI, LCEA, and alpha angle were collected. Surgical reports were reviewed for labral tear position and size, as well as severity of acetabular and femoral chondromalacia.

Results
There were 205 patients who met inclusion criteria with a mean age of 33 years (range 15–66), BMI 26.5 (range 15.9–44.5), LCEA 32.2° (range 21.0°–56.0°) and alpha angle 59.1° (range 33.0°–86.0°). Greater age ($p = 0.023$), alpha angle ($p = 0.011$) and male gender ($p < 0.001$) significantly correlated with high-grade acetabular chondral damage. Increased LCEA ($p < 0.001$), increased alpha angle ($p = 0.012$), and greater age ($p = 0.002$) were significantly associated with increased labral tear size.

Conclusions
Greater age, male gender, increased BMI and increased alpha angle were associated with more advanced acetabular chondromalacia. Additionally, greater age, increased LCEA, and increased alpha angle was associated with larger labral tear size.

Level of evidence
IV.

BACK

American Journal of Sports Medicine (AJSM), Volume 48, Issue 12, p 2903–2909

Fast Starters and Slow Starters After Hip Arthroscopy for Femoroacetabular Impingement: Correlation of Early Postoperative Pain and 2-Year Outcomes

Thu Quynh Nguyen, BS, James M. Friedman, MD, Sergio E. Flores, MD, Alan L. Zhang, MD†

https://doi.org/10.1177/0363546520952406

Background: Patients experience varying degrees of pain and symptoms during the early recovery period after hip arthroscopy for femoroacetabular impingement (FAI). Some “fast starters” report minimal discomfort and are eager to advance activities, while “slow starters” describe severe pain and limitations. The relationship between these early postoperative symptoms and 2-year outcomes after hip arthroscopy is unknown.

Purpose: To analyze the relationship between early postoperative pain and 2-year patient-reported outcomes (PROs) after hip arthroscopy for FAI.

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

Methods: Patients without arthritis or dysplasia who were undergoing primary hip arthroscopy for FAI were prospectively enrolled and completed validated PROs. Scores for visual analog scale (VAS) for pain were collected preoperatively and at 1 week, 6 weeks, and 2 years postoperatively. Scores for the modified Harris Hip Score (mHHS), Hip disability and Osteoarthritis Outcome Score (HOOS), and 12-Item Short Form Health Survey (SF-12) were collected preoperatively and 2 years postoperatively. Paired t tests were used to evaluate PRO score changes, and correlation analyses were used to assess relationships between early postoperative pain and 2-year postoperative outcomes.

Results: A total of 166 patients were included (55% female; mean ± SD age, 35.29 ± 9.6 years; mean body mass index, 25.07 ± 3.98 kg/m2). Patients demonstrated significant improvements in PRO scores (VAS, SF-12 Physical Component Score, mHHS, and all HOOS subscales) at 2 years after hip arthroscopy for FAI ($P < .001$). There was a significant correlation between lower 1-week VAS pain level (fast starters) and lower 2-year VAS pain level ($R = 0.31$; $P < .001$) as well as higher 2-year PRO scores (SF-12 Physical Component Score, mHHS, and all HOOS subscales: $R = −0.21$ to $−0.3$; $P < .001$). There was no correlation between 1-week VAS pain and 2-year SF-12 Mental Component Score ($P = .17$). Preoperative VAS pain levels showed positive correlations with 1-week postoperative pain scores ($R = 0.39$; $P < .001$) and negative correlations with 2-year patient outcomes ($R = −0.15$ to $−0.33$, $P < .01$). There was no correlation between 6-week postoperative pain scores and 2-year PRO scores.

Conclusion: Fast starters after hip arthroscopy for FAI experience sustained improvements in outcomes at 2 years after surgery. Patient pain levels before surgery may delineate potential fast starters and slow starters.

BACK

Radiographic Indices Are Not Predictive of Clinical Outcomes Among 1735 Patients Indicated for Hip Arthroscopic Surgery: A Machine Learning Analysis

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https://doi.org/10.1177/0363546520950743

Background: The relationship between the preoperative radiographic indices for femoroacetabular impingement syndrome (FAIS) and postoperative patient-reported outcome measure (PROM) scores continues to be under investigation, with inconsistent findings reported.

Purpose: To apply a machine learning model to determine which preoperative radiographic indices, if any, among patients indicated for the arthroscopic correction of FAIS predict whether a patient will achieve the minimal clinically important difference (MCID) for 1- and 2-year PROM scores.

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

Methods: A total of 1735 consecutive patients undergoing primary hip arthroscopic surgery for FAIS were included from an institutional hip preservation registry. Patients underwent preoperative computed tomography of the hip, from which the following radiographic indices were calculated by a musculoskeletal radiologist: alpha angle, beta angle, sagittal center-edge angle, coronal center-edge angle, neck shaft angle, acetabular version angle, and femoral version angle. PROM scores were collected preoperatively, at 1 year postoperatively, and at 2 years postoperatively for the modified Harris Hip Score (mHHS), the Hip Outcome Score (HOS)–Activities of Daily Living (HOS-ADL) and –Sport Specific (HOS-SS), and the International Hip Outcome Tool (iHOT-33). Random forest models were created for each PROM at 1 and 2 years' follow-up, with each PROM's MCID used to establish clinical meaningfulness. Data inputted into the models included ethnicity, laterality, sex, age, body mass index, and radiographic indices. Comprehensive and separate models were built specifically to assess the association of the alpha angle, femoral version angle, coronal center-edge angle, McKibbin index, and hip impingement index with respect to each PROM.

Results: As evidenced by poor area under the curves and P values >.05 for each model created, no combination of radiographic indices or isolated index (alpha angle, coronal center-edge angle, femoral version angle, McKibbin index, hip impingement index) was a significant predictor of a clinically meaningful improvement in scores on the mHHS, HOS-ADL, HOS-SS, or iHOT-33. The mean difference between 1- and 2-year PROM scores compared with preoperative values exceeded the respective MCIDs for the cohort.

Conclusion: In patients appropriately indicated for FAIS corrective surgery, clinical improvements can be achieved, regardless of preoperative radiographic indices, such as the femoral version angle, coronal center-edge angle, and alpha angle. No specific radiographic parameter or combination of indices was found to be predictive of reaching the MCID for any of the 4 studied hip-specific PROMs at either 1 or 2 years' follow-up.

BACK

Arthroscopic Management of Subspinous Impingement in Borderline Hip Dysplasia and Outcomes Compared With a Matched Cohort With Nondysplastic Femoroacetabular Impingement

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Background: Arthroscopic management of femoroacetabular impingement (FAI) in the setting of borderline hip dysplasia is controversial. Recently, there has been increased awareness of a prominent anterior inferior iliac spine (AIIS) resulting in subspinous impingement.

Purpose/Hypothesis: The purpose was to report outcomes of arthroscopic subspinous decompression in patients with symptomatic hip impingement and borderline hip dysplasia compared with a matched cohort with nondysplastic FAI. Addressing a prominent subspinous region and cam/pincer lesion in the borderline dysplastic hip may lead to favorable outcomes comparable with those of patients undergoing arthroscopic management of nondysplastic FAI.

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

Methods: Patients with symptomatic hip impingement, borderline dysplasia (lateral center-edge angle [LCEA], 18°-24°), and prominent AIIS (BDSI group) whose nonoperative management failed and who subsequently underwent arthroscopic subspinous decompression were retrospectively identified. Three-dimensional computed tomography imaging was used to categorize AIIS morphology into type 1, 2, or 3 (Hetsroni classification). Patient-reported outcome (PRO) scores consisting of the modified Harris Hip Score (mHHS), Hip Outcome Score–Activities of Daily Living (HOS-ADL), and Hip Outcome Score–Sport-Specific Subscale (HOS-SSS) were obtained preoperatively and at an average of 44 months postoperatively (range, 23-61 months). Exclusion criteria were Tönnis osteoarthritis grade >1 and a history of previous hip procedures. An age-, sex-, and body mass index–matched cohort of patients without dysplasia (LCEA, >25°) who underwent arthroscopic FAI surgery with a minimum 2-year follow-up were selected to serve as the control group.

Results: Eighteen patients, 19 hips (14 women and 4 men; average age, 28 years) were included. Of the 19 hips in the BDSI group, the average LCEA and alpha angle were 21.8° and 66.2°, respectively; 14 hips were Hestroni type 2, and 5 hips were type 1. There were no postoperative complications or additional procedures performed since the last follow-up. Repeated-measures analysis of variance revealed a significant improvement in all PRO scores from preoperatively to the last follow-up: mHHS, 64.7 to 87.7 ($P < .001$); HOS-ADL, 62.1 to 92.1 ($P < .001$); HOS-SSS, 26.5 to 87.1 ($P < .001$). An analysis of covariance revealed that patients with type 2 AIIS had a significantly higher postoperative mHHS than those with a type 1 morphology (88.3 and 95.6, respectively; $P < .01$) The BDSI group had a significantly lower preoperative HOS-SSS (26.5; $P < .001$) in comparison with the control group. However, there was no significant difference in postoperative outcome scores between groups. The BDSI group underwent significantly more microfracture, capsular plication, and ligamentum teres debridement (15.8%; $P = .04$).

Conclusion: Arthroscopic AIIS decompression in patients with coexisting borderline dysplasia and subspinous impingement is a safe and effective method of treatment that produces outcomes comparable with those of a cohort with nondysplastic FAI.

BACK

Clinical and Radiographic Presentation of Capsular Iatrogenic Hip Instability After Previous Hip Arthroscopy

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Background: The clinical and radiographic features of iatrogenic hip instability following hip arthroscopy have been described. However, the prevalence of presenting symptoms and associated imaging findings in patients with hip instability has not been reported.

Purpose: To detail the prevalence of clinical and magnetic resonance arthrogram (MRA) findings in a cohort of patients with isolated hip instability and to determine midterm patient-reported outcomes in this patient population.

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

Methods: We retrospectively reviewed patients from 2014 to 2016 who underwent an isolated capsular repair in the revision hip arthroscopy setting. Patients were excluded if they underwent any concomitant procedures, such as labral repair, reconstruction, femoral osteoplasty, or any other related procedure. Several clinical data points were reviewed, including painful activities, mechanical symptoms, subjective instability, Beighton scores, axial distraction testing (pain, toggle, and apprehension), and distractibility under anesthesia. Patient-reported outcomes—including modified Harris Hip Score, Hip Outcome Score–Sports Subscale, Patient-Reported Outcome Measurement Information System (PROMIS) Physical Function Computer Adaptive Test, and a return patient hip questionnaire—were collected pre- and postoperatively. Pre-revision radiographs were obtained, and lateral center-edge angle and alpha angle were measured on anteroposterior and frog-leg lateral views, respectively. Pre-revision MRAs were reviewed and evaluated for capsular changes. Capsular changes were defined as follows: 0, normal; 1, capsular redundancy; 2, focal capsular rent; and 3, gross extravasation of fluid from the capsule.

Results: A total of 31 patients met inclusion criteria (5 male, 26 female; 14 right and 17 left hips). The mean age of patients was 36 years (range, 20-58 years). Overall, 27 (87%) reported hip pain with activities of daily living, and 31 (100%) experienced pain with sports or exercise. In addition, 24 (77%) had at least 1 positive finding on axial distraction testing. All patients had evidence of capsular changes on review of pre-revision MRAs. Out of 31 patients, 23 (74%) were available for follow-up at a minimum of 3.3 years and a mean ± SD of 4.6 ± 0.8 years. On average, modified Harris Hip Score improved by 20.3, Hip Outcome Score–Sports Subscale by 25.1, and PROMIS Physical Function Computer Adaptive Test by 6.4. Additionally, 20 (87%) patients reported improved or much improved physical ability, and 18 (78%) reported improved or much improved pain.

Conclusion: The current study suggests that patients with hip instability demonstrate high rates of pain with activities of daily living and exercise, positive findings on axial distraction testing, and evidence of capsular changes on magnetic resonance imaging. Furthermore, these patients improve with revision surgery for capsular repair at midterm follow-up.

BACK

Long-term Results of Arthroscopic Matrix-Assisted Autologous Chondrocyte Transplantation: A Prospective Follow-up at 15 Years

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Background: Matrix-assisted autologous chondrocyte transplantation (MACT) procedures have been developed to overcome some of the limits of first-generation autologous chondrocyte implantation. However, while good autologous chondrocyte implantation results have been documented over time, data are scarce on the long-term MACT results.

Purpose: To evaluate long-term clinical results of a large cohort of patients treated with hyaluronic acid–based MACT for articular cartilage defects of the knee.

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

Methods: A long-term evaluation of 113 patients was performed (91 men, 22 women; mean ± SD age, 29.0 ± 10.6 years) for 115 knees affected by chondral and osteochondral lesions of the femoral condyles and trochlea. Of these, 61 knees had undergone previous surgery, while other procedures were combined during the same operation in 48 knees. These patients were prospectively evaluated before surgery and at 2, 5, and 10 years after surgery, as well as at a final mean follow-up of 15 years (range, 12-18 years), with various clinical scores: International Knee Documentation Committee (IKDC), EuroQol visual analog scale (EQ-VAS), and Tegner. Both surgical and clinical failures were documented.

Results: The IKDC subjective score increased from the basal level of 39.9 ± 14.6 (mean ± SD) to 77.3 ± 20.5 ($P < .0005$) at 2 years; results remained stable up to the 15-year follow-up (76.9 ± 20.5). EQ-VAS and Tegner scores showed a statistically significant improvement up to 10 years, with a further significant improvement at the final follow-up. A failure rate of 15.0% was documented, which increased to 21.7% when clinical failures were also considered. A worse outcome was found for older age ($P < .0005$), female sex ($P = .002$), degenerative lesions ($P < .0005$), longer duration of symptoms ($P = .005$), and previous surgery ($P < .0005$).

Conclusion: Arthroscopic MACT offered good and long-lasting results that were stable over time and resulted in a limited number of failures and reinterventions for up to 15 years of follow-up. Several factors were identified as having a prognostic value: a worse outcome could be expected in older patients, female patients, those affected by lesions with a degenerative cause, those having a longer duration of symptoms, and patients who underwent previous surgery.

BACK

The Effect of Resection Size in the Treatment of Cam-Type Femoroacetabular Impingement in the Typical Patient With Hip Arthroscopy: A Biomechanical Analysis

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Background: Arthroscopic osteochondroplasty may improve range of motion and relieve pain in patients with symptomatic hip impingement. Femoral neck fracture is a risk of this procedure because of the weakening of the proximal femur. To our knowledge, there are no biomechanical studies in young human cadaveric bone evaluating the effect of osteochondroplasty on femoral neck strength.

Purpose/Hypothesis: The purpose was to evaluate loads to fracture in young human cadavers after resection depths of 25% and 40% at the head-neck junction. We hypothesized that both depths will maintain ultimate loads to failure above previously published loads, as well as above physiologic weightbearing loads.

Study Design: Descriptive laboratory study.

Methods: Cadaveric proximal femoral specimens (6 matched pairs, under the age of 47 years) were divided into 2 groups: 25% or 40% of the diameter at the head-neck junction was resected. The length of the resection was 2 cm and the width of the resection was determined by the length of the anterolateral quadrant at the head-neck junction in all cases. A compressive load was applied directly to the femoral head. Peak load, stiffness, and energy to fracture were compared between groups.

Results: The average peak load to fracture after 25% resection (7347 N) was significantly higher than after the 40% resection (5892 N) (P = .010). The average energy to fracture was also significantly higher in the 25% resection group (30.2 J vs 19.2 J; P = .007). The average stiffness was higher in the 25% group, although not statistically significant (P = .737).

Conclusion: Resection depths of 25% and 40% at the anterolateral quadrant of the femoral head-neck junction may be safe at previously described functional loads such as standing and walking in the age range more typically seen in patients undergoing hip arthroscopy. Loads to fracture were significantly higher than previously reported using older cadaveric specimens.

Clinical Relevance: Currently, most surgeons limit weightbearing after femoral osteochondroplasty in part because of risk of femoral neck fracture. Given the higher observed loads to fracture, young patients could possibly bear weight sooner after surgery, although postoperative protocols should be individualized based on patient age, weight, bone density, amount of bone resected, concomitant procedures, and potential compliance with activity restrictions

BACK

Prevalence of Gluteus Medius Pathology on Magnetic Resonance Imaging in Patients Undergoing Hip Arthroscopy for Femoroacetabular Impingement: Asymptomatic Tears Are Rare, Whereas Tendinosis Is Common

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Background: There is a paucity of literature on asymptomatic gluteus medius pathology. Moreover, no studies have examined the prevalence of asymptomatic gluteus medius pathology.

Purpose: To describe the prevalence of asymptomatic gluteus medius pathology in patients undergoing hip arthroscopy for femoroacetabular impingement.

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

Methods: A database search of our institution was performed for patients undergoing hip arthroscopy for labral treatment between February 2008 and January 2019. Patients were included if they had gluteus medius pathology identified through magnetic resonance imaging (MRI). Patients were deemed to be asymptomatic if they lacked greater trochanteric hip tenderness, abductor weakness, a positive Trendelenburg sign, or a positive Trendelenburg gait on physical examination. Patients were excluded if they were unwilling to participate or did not have a documented physical examination or MRI read in the database.

Results: A total of 2851 hips (2452 patients) met the inclusion/exclusion criteria. Gluteus medius pathology was found in 871 hips (30.6%) on MRI. Symptomatic gluteus medius pathology was observed in 414 (14.5%) hips, of which 305 (10.7%) had tendinosis, 99 (3.5%) had partial-thickness tears, and 10 (0.4%) had full-thickness tears. Asymptomatic gluteus medius pathology was observed in 457 (16.0%) hips, of which 408 (14.3%) had tendinosis and 49 (1.7%) had partial-thickness tears. No hips with full-thickness tears on MRI were asymptomatic. Patients with asymptomatic partial-thickness tears were significantly older than those with only tendinosis (45.3 vs 39.4 years, respectively; $P = .001$). Patients aged 40 years or older had a 2.11 (1.80-2.50) ($P < .001$) relative risk of asymptomatic pathology compared with patients younger than 40 years.

Conclusion: Although there is a meaningful prevalence of asymptomatic gluteus medius tendinosis, the prevalence of asymptomatic gluteus medius tears is low. Treatment of gluteus medius tendinosis should therefore be based not solely on MRI findings but rather on a complete clinical evaluation. In contrast, MRI findings of partial or full-thickness gluteus medius tears may be more likely to have clinical significance.

BACK

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What Is the Survivorship After Hip Arthroscopy for Femoroacetabular Impingement? A Large-database Study

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Background
Patients with femoroacetabular impingement (FAI) may experience lasting clinical improvement after hip arthroscopy; however, some patients will still eventually undergo early conversion to THA due to unresolved symptoms and progression of arthritis. However, the risk of this has been only incompletely characterized in prior studies.

Questions/purposes
Using a large healthcare claims database over a 5-year period (2011-2016), we asked: (1) What is the survivorship free from THA after arthroscopic osteoplasty performed for FAI? (2) What identifiable demographic factors and patient characteristics are associated with early conversion to THA after hip arthroscopy performed for FAI?

Methods
We included all patients who underwent hip arthroscopy for FAI, between the ages of 12 years and 63 years, with 3 months of claims data before hip arthroscopy and minimum 2-year follow-up. A total of 4730 hip arthroscopy patients from 2011 to 2014 were retrieved from a US commercial claims database. Hip arthroscopy incidence doubled over time from 1.2 to 2.1 persons per 100,000. Temporal trends, patient demographics, diagnoses at time of arthroscopy, and patient comorbidities were retrieved and logistic regression performed. Survivorship analysis on 11,323 patients (lifting the 2-year follow-up requirement) was also performed to identify independent variables associated with early risk of conversion to THA.

Results
In patients undergoing hip arthroscopy for FAI, the overall proportion of conversion to THA within 2 years after hip arthroscopy was 7% (338 of 4730). After controlling for confounding variables such as sex, obesity, and depression, we found the following were independently associated with increased odds of conversion to THA: older age (odds ratio 1.08 [95% CI 1.01 to 1.10]; $p < 0.001$), osteoarthritis (OR 2.91 [95% CI 2.27 to 3.77]; $p < 0.001$), joint inflammation (OR 1.89 [95% CI 1.16 to 3.09]; $p = 0.01$), and a history of opioid use (OR 2.17 [95% CI 1.69 to 2.79]; $p < 0.001$). Survivorship analysis similarly revealed that older age (hazard ratio 1.08 [95% CI 1.07 to 1.09]; $p < 0.001$), osteoarthritis (HR 2.53 [95% CI 2.13 to 3.01]; $p < 0.001$), joint inflammation (HR 1.53 [95% CI 1.10 to 2.11]; $p = 0.01$), a history of opioid use (HR 2.02 [95% CI 1.71 to 2.38]; $p < 0.001$), and smoking (HR 1.55 [95% CI 1.14 to 2.11]; $p = 0.005$), were independently associated with increased odds of conversion to THA within 2 years after hip arthroscopy for FAI.

Conclusions
Although the findings of this study are limited and should not be taken in isolation, patients with FAI who are older, carry diagnoses of inflammatory or degenerative articular disease, or who use opioids or smoke should be counseled about a potentially increased risk of undergoing early conversion to THA after hip arthroscopy. Future studies to further examine the effect of these diagnoses in prospectively collected cohorts, incorporating radiographic and patient-reported outcome measures, are needed.

Level of Evidence
Level III, prognostic study.

BACK