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Issue 7, Arthroscopy, October - November 2017

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Content
October - November

Upper extremity

Arthroscopy
Volume 33, issue 10 & 11

- Bipolar Bone Loss in Patients With Anterior Shoulder Dislocation: A Comparison of Adolescents Versus Adult Patients
- Arthroscopic Versus Open Rotator Cuff Repair: Which Has a Better Complication and 30-Day Readmission Profile?
- Preoperative Performance of the Patient-Reported Outcomes Measurement Information System in Patients With Rotator Cuff Pathology
- How Satisfied Are Patients with Arthroscopic Bankart Repair? A 2-Year Follow-up on Quality-of-Life Outcome
- Isolated Biceps Reflection Pulley Tears Treated With Subpectoral Biceps Tenodesis: Minimum 2-Year Outcomes
- Arthroscopic Joint Preservation in Severe Glenohumeral Arthritis Using Interpositional Human Dermal Allograft
- Comparison of Outcomes 1 Year After Rotator Cuff Repair With and Without Concomitant Biceps Surgery
- Patient Compliance With Electronic Patient Reported Outcomes Following Shoulder Arthroscopy
- Arthroscopic Partial Repair of Irreparable Rotator Cuff Tears: Factors Related to Greater Degree of Clinical Improvement at 2 Years of Follow-Up
- Arthroscopic Sternoclavicular Joint Diskectomy for Acute and Chronic Tears
- Long Head of Biceps Tendon Pathology and Results of Tenotomy in Full-Thickness Reparable Rotator Cuff Tear
- Modified Anterolateral Portals in Elbow Arthroscopy: A Cadaveric Study on Safety
- Recurrent Instability After Arthroscopic Bankart Reconstruction: A Systematic Review of Surgical Technical Factors

JSES
Volume 26, Issue 10 & 11

- Subacromial corticosteroid injections transiently decrease suture anchor pullout strength: biomechanical studies in rats
- Acromioplasty in patients selected for operation by national guidelines
- Pediatric elbow arthroscopy: indications and safety
- Open versus arthroscopic surgical treatment for anterior shoulder dislocation: a comparative systematic review and meta-analysis over the past 20 years
- Surgical treatment of shoulder infections: a comparison between arthroscopy and arthrotomy
- The timing of retears after arthroscopic rotator cuff repair

AJSM
Volume 45, Issue 12 & 13

- Postoperative Recurrence of Instability Due to New Anterior Glenoid Rim Fractures After Arthroscopic Bankart Repair

BACK

JBJS
Volume 99, issue 19-22

- No Upper Extremity abstracts available

CORR
Volume 475, Issue 10 & 11

- No Upper Extremity abstracts available

BJJ
Volume 99-B, Issue 10 & 11

- No Upper Extremity abstracts available

Lower extremity

Arthroscopy
Volume 33, issue 10 & 11

- Fluoroscopy Learning Curve in Hip Arthroscopy—A Single Surgeon's Experience
- Arthroscopic Treatment of Femoroacetabular Impingement in Adolescents Provides Clinically Significant Outcome Improvement
- Patellofemoral Osteoarthritis Progression and Alignment Changes after Open-Wedge High Tibial Osteotomy Do Not Affect Clinical Outcomes at Mid-term Follow-up
- Generalized Hypermobility, Knee Hyperextension, and Outcomes After Anterior Cruciate Ligament Reconstruction: Prospective, Case-Control Study With Mean 6 Years Follow-up
- Systematic Review of the Long-term Surgical Outcomes of Discoid Lateral Meniscus
- The Timing of Hip Arthroscopy After Intra-articular Hip Injection Affects Postoperative Infection Risk
- Variability and Comprehensiveness of North American Online Available Physical Therapy Protocols Following Hip Arthroscopy for Femoroacetabular Impingement and Labral Repair
- Change in Anterior Cruciate Ligament Graft Choice and Outcomes Over Time
- The Effect of Body Mass Index on Clinical Outcomes in Patients Without Radiographic Evidence of Degenerative Joint Disease After Arthroscopic Partial Meniscectomy
- Single-Bundle and Double-Bundle Posterior Cruciate Ligament Reconstructions: A Systematic Review and Meta-analysis of 441 Patients at a Minimum 2 Years' Follow-up

AJSM
Volume 45, Issue 12 & 13

- Arthroscopic Labral Base Repair in the Hip: 5-Year Minimum Clinical Outcomes
- A Traffic Light Grading System of Hip Dysplasia to Predict the Success of Arthroscopic Hip Surgery

JBJS
Volume 99, issue 19-22

- No Lower Extremity abstracts available

CORR
Volume 475, Issue 10 & 11

- What Factors Predict Conversion to THA After Arthroscopy?

BJJ
Volume 99-B, issue 10 & 11

- No Lower Extremity abstracts available

BACK

Miscellaneous
Arthroscopy
Volume 33, issue 10 & 11

- No Miscellanaeous abstracts available

JSES
Volume 26, Issue 10 & 11

- No Miscellanaeous abstracts available

AJSM
Volume 45, Issue 12 & 13

- No Miscellanaeous abstracts available

JBJS
Volume 99, issue 19-22

- No Miscellanaeous abstracts available

CORR
Volume 475, Issue 10&11

- No Miscellanaeous abstracts available

BJJ
Volume 99-B, Issue 10 & 11

- No Miscellanaeous abstracts available

BACK

Upper extremity

Arthroscopy, volume 33, issue 10 & 11

Bipolar Bone Loss in Patients With Anterior Shoulder Dislocation: A Comparison of Adolescents Versus Adult Patients

Brian C. Lau, M.D., Devin Conway, B.S., Patrick F. Curran, M.D., Brian T. Feeley, M.D., Nirav K. Pandya, M.D.

Arthroscopy, October 2017, Volume 33, Issue 10, Pages 1755–1761

http://dx.doi.org/10.1016/j.arthro.2017.04.004

Purpose
To compare bipolar bone loss by evaluating the degree of glenoid bone loss, Hill-Sachs lesion size, and glenoid track in adolescents and adults with shoulder dislocations.

Methods
We performed a retrospective review between 2012 and 2016 of surgical and nonsurgical patients with a history of anterior shoulder dislocations (primary or recurrent) who underwent magnetic resonance imaging of the affected shoulder. The exclusion criteria included multidirectional instability, prior surgery, and posterior dislocation. Patients were grouped into 2 groups: adolescents (aged 10-19 years) and adults (aged ≥20 years). The groups were compared regarding measures of glenoid bone loss (best-fit circle technique) and Hill-Sachs lesion size (medial margin of rotator cuff footprint to medial margin of Hill-Sachs lesion). If the medial margin of a Hill-Sachs lesion was within the glenoid track, it was defined as on track; if it was more medial than the glenoid track, it was defined as off track.

Results
We identified 45 adolescents (mean age, 16.1 years) and 30 adults (mean age, 28.9 years) with anterior shoulder dislocations. There was no significant difference in percentage of bone loss between adolescents (mean, 8.4%) and adults (mean, 9.9%; P = .23). There was no significant difference in Hill-Sachs lesion size between adolescents (mean, 12.7 mm) and adults (mean, 9.9 mm; P = .12). There were 12 patients with off-track lesions. Off-track lesions were present in 11 of 45 adolescents (24.4%) and 1 of 30 adults (3.3%). Adolescents had an increased risk of having an off-track lesion (odds ratio, 9.38; 95% confidence interval, 1.14-77.1). A subgroup analysis identified multiple dislocations as an independent risk factor for an off-track lesion (odds ratio, 4.15; 95% confidence interval, 0.85-20.23).

Conclusions
This study shows that adolescence and a history of multiple dislocations are independent risk factors for a greater likelihood of glenoid off-track lesions. The findings support the use of bipolar assessment of shoulder dislocators, especially in adolescents and multiple dislocators.

Level of Evidence
Level III, retrospective comparative study.

BACK

Arthroscopic Versus Open Rotator Cuff Repair: Which Has a Better Complication and 30-Day Readmission Profile?

Dustin K. Baker, M.D., Jorge L. Perez, M.D., Shawna L. Watson, B.A., Gerald McGwin, M.S., Ph.D., Eugene W. Brabston, M.D., Parke W. Hudson, B.S., Brent A. Ponce, M.D.

Arthroscopy, October 2017, Volume 33, Issue 10, Pages 1764–1769

http://dx.doi.org/10.1016/j.arthro.2017.04.019

Purpose
To provide a comparative 30-day postoperative analysis of complications and unplanned readmission rates, using the National Surgical Quality Improvement Program database, after open or arthroscopic rotator cuff repair (RCR).

Methods
The American College of Surgeons National Surgical Quality Improvement Program database was reviewed for postoperative complications after open or arthroscopic RCR over an 8-year period, from 2007 through 2014. Patients were identified by use of Current Procedural Terminology codes. The open group contained 3,590 cases (21.8%) and the arthroscopic group had 12,882 cases (78.2%), for a total of 16,472 patients undergoing RCR. The risk of complications was compared between the 2 groups, along with patient demographic characteristics, operative time, length of stay, and unplanned readmission within 30 days. We compared dichotomous variables using the Fisher exact test and continuous variables with 1-way analysis of variance. Relative risks (RRs) and 95% confidence intervals (CIs) were calculated when appropriate.

Results
The open RCR group had a higher prevalence of patients aged 65 years or older and comorbidities such as hypertension, diabetes, chronic obstructive pulmonary disease, smoking, and alcoholism ($P < .05$). Patients undergoing open RCR had a higher risk of any adverse event when compared with arthroscopic RCR patients (1.48% vs 0.84%; RR, 1.17; 95% CI, 1.05-1.30; $P = .0010$). They were also at higher risk of return to the operating room within 30 days (0.70% vs 0.26%; RR, 1.36; 95% CI, 1.09-1.69; $P = .0004$). Open RCR was associated with a longer average hospital stay (0.48 ± 2.7 days vs 0.23 ± 4.2 days, $P = .0007$), whereas arthroscopic RCR had a longer average operative time (90 ± 45 minutes vs 79 ± 45 minutes, $P < .0001$).

Conclusions
Although both open and arthroscopic approaches to RCR had low morbidity, arthroscopy was associated with lower risks of any adverse event and return to the operating room during the initial 30-day postoperative period.

Level of Evidence
Level III, retrospective comparative study.

BACK

Preoperative Performance of the Patient-Reported Outcomes Measurement Information System in Patients With Rotator Cuff Pathology

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Arthroscopy, October 2017, Volume 33, Issue 10, Pages 1770–1774.e1
http://dx.doi.org/10.1016/j.arthro.2017.04.018

Purpose
To evaluate the Patient-Reported Outcomes Measurement Information System upper extremity item bank (PROMIS UE) and physical function computerized adaptive test (PROMIS PF CAT) in patients with rotator cuff (RC) pathology at their preoperative clinic visit.

Methods
Patient data were collected from January 2015 to September 2015. Patients with a preoperative diagnosis of RC pathology were prospectively enrolled at the time of their surgical indication for RC repair. Each patient was asked to fill out the Western Ontario Rotator Cuff Index (WORC), American Shoulder and Elbow Surgeons Shoulder Assessment Form, Marx Shoulder Activity Scale, Short Form 36 Health Survey Physical Function and General Health (SF-36 PF and GH), EuroQol-5 Dimension (EQ-5D), PROMIS PF CAT, and PROMIS UE. Correlation was defined as excellent (>0.7), excellent-good (0.61-0.7), good (0.4-0.6), and poor (0.2-0.3).

Results
Patient data were collected from January 2015 to September 2015. No patients were excluded from participation in the study. In 82 patients with preoperative RC pathology, the PROMIS UE showed excellent correlation with American Shoulder and Elbow Surgeons Shoulder Assessment Form ($r = 0.77$, $P < .01$), WORC ($r = 0.73$, $P < .01$), and the EQ-5D ($r = 0.73$, $P < .01$); there was excellent-good correlation with the SF-36 PF ($r = .66$, $P < .01$) and PROMIS PF CAT ($r = .70$, $P < .01$). The PROMIS PF CAT showed excellent correlation with the SF-36 PF ($r = 0.77$, $P < .01$); there was excellent-good correlation with EQ-5D ($r = 0.65$, $P < .01$) and WORC ($r = 0.61$, $P < .01$). There were no significant floor or ceiling effects using the PROMIS UE item bank or PROMIS PF CAT.

Conclusions
We report that in a patient population with preoperative RC pathology, the PROMIS UE and PROMIS CAT are valid patient-reported outcome alternatives that have high correlation with traditional shoulder and upper extremity patient-reported outcomes. We find a decreased question burden using the PROMIS PF CAT. We find no significant floor or ceiling effects present in the PROMIS UE or PROMIS PF CAT.

Level of Evidence
Level II, prospective diagnostic study.

BACK

How Satisfied Are Patients with Arthroscopic Bankart Repair? A 2-Year Follow-up on Quality-of-Life Outcome

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Arthroscopy, October 2017, Volume 33, Issue 10, Pages 1777–1785

http://dx.doi.org/10.1016/j.arthro.2017.04.017

Purpose
To report general life and health satisfaction after arthroscopic Bankart repair in patients with post-traumatic recurrent anterior glenohumeral instability and to investigate postoperative time lost to return to work at 2-year follow-up.

Methods
Between 2011 and 2013 patients treated with arthroscopic Bankart repair in the beach chair position for acute shoulder instability were included in this study. Questions on Life Satisfaction Modules (FLZ^M) and the Short Form 12 (SF-12) were used as quality-of-life outcome scales. Oxford Instability Score (OIS), Quick Disabilities of the Arm, Shoulder and Hand questionnaire (QuickDASH), and self-reported American Shoulder and Elbow Surgeons (ASES) shoulder index were used as functional outcome scales. Return to work (months) was monitored and analyzed depending on physical workload. Data were assessed the day before surgery and prospectively monitored until 24 months postoperatively. Quality-of-life outcome was correlated with functional shoulder outcome and compared with normative age-adjusted data. Paired *t*-test, Wilcoxon test, Mann-Whitney *U*-Test, and Spearman's correlation coefficient were used for statistical analysis.

Results
Fifty-three patients were prospectively included. The mean age at surgery was 29.4 years. Satisfaction with general life and satisfaction with health (FLZ^M) as well as physical component scale (SF-12) improved significantly to values above normative data within 6 to 12 months after surgery (each $P < .001$). OIS, QuickDASH, and ASES improved significantly from baseline until 24 months after surgery (each $P < .001$). For ASES, improvement above minimal clinically important difference was shown. There was a positive correlation between quality of life and functional outcome scores ($P < .05$; rho, 0.3-0.4). Mean time to return to work was 2 months (range, 0-10; standard deviation, 1.9), with significantly longer time intervals observed in patients with heavy physical workload (3.1 months; range, 0 to 10; standard deviation, 2.4; $P = .002$).

Conclusions
Following arthroscopic Bankart repair, quality of life was impaired during early course after surgery and increased significantly above preoperative levels within 6 to 12 months after the procedure. A steady state of excellent quality-of-life and functional outcomes was noted after 12 months of follow-up. Quality-of-life outcome scales correlated significantly with the functional outcome. Heavy physical workload must be considered as a risk factor for prolonged time lost to return to work.

Level of Evidence
Level III, prospective noncomparative therapeutic case series.

BACK

Isolated Biceps Reflection Pulley Tears Treated With Subpectoral Biceps Tenodesis: Minimum 2-Year Outcomes

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Arthroscopy, October 2017, Volume 33, Issue 10, Pages 1788–1794

http://dx.doi.org/10.1016/j.arthro.2017.04.021

Purpose
To investigate if patients younger than 50 years old had improved functional outcomes after subpectoral biceps tenodesis (BT) for the treatment of biceps reflection pulley (BRP) lesions at minimum 2-year postoperative follow-up.

Methods
Patients who had arthroscopically confirmed BRP tears that were treated with subpectoral BT and were at least 2 years out from surgery were included; patients were excluded if they had concomitant reconstructive or reparative procedures at index surgery. Patient-centered outcomes including return to activity, American Shoulder and Elbow Surgeons (ASES), Quick Disabilities of the Arm, Shoulder and Hand (QuickDASH), and Short Form-12 Physical Component Summary (SF-12 PCS) scores, and patient satisfaction were collected. The pre- and postoperative scores were compared with a Wilcoxon test. Failure was defined as revision BT.

Results
Between January 2006 and July 2014, of 1,184 patients who underwent open subpectoral BT, 14 patients (6 male, 8 female) with mean age 37 (range, 16-49 years) met the inclusion criteria. Minimum 2-year outcomes data were available for all 14 patients (100% follow-up). The mean follow-up was 3.6 ± 1.3 years. There were significant improvements postoperatively for all outcome scores (P = .017 ASES, P = .002 QuickDASH, P = .003 SF-12 PCS). There was no correlation between age and outcome scores (P > .05). Median patient satisfaction was 9 of 10. Five patients (36%) reported return to recreational activity with no modifications; 9 (64%) indicated a return to activity with modifications. The 5 patients who returned to recreational activity with no modification had significantly less time from initial injury/onset of symptoms until surgery in comparison with the 9 patients who modified their activity (P = .028). No complications or reoperations were reported.

Conclusions
Patients younger than 50 years old with a symptomatic isolated BRP lesion experienced excellent results, high return to recreational activity, little postoperative pain, and high degrees of satisfaction when treated with subpectoral BT.

Level of Evidence
Level IV, therapeutic case series.

BACK

Arthroscopic Joint Preservation in Severe Glenohumeral Arthritis Using Interpositional Human Dermal Allograft

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Arthroscopy, November 2017, Volume 33, Issue 11, Pages 1920–1925

http://dx.doi.org/10.1016/j.arthro.2017.04.005

Purpose
To investigate the outcomes of arthroscopic glenoid resurfacing (AGR) for severe glenohumeral arthritis at short- to medium-term follow-up.

Methods
We performed a multicenter retrospective review of consecutive patients undergoing AGR (2005-2013) with a minimum of 2 years' follow-up or until revision. Patients lost to follow-up and those included in a prior study were excluded. The indications for AGR were severe primary shoulder osteoarthritis without significant bone loss in younger, higher-demand patients. Outcome measures included revision, pain and American Shoulder and Elbow Surgeons (ASES) scores, and range of motion. Exact logistic regression was used to assess preoperative risk factors for revision.

Results
Forty-three shoulders with an average of 60 months' clinical follow-up underwent AGR. The rate of revision to prosthetic arthroplasty was 23% (95% confidence interval [CI], 12%-39%) after a mean of 45 months. The visual analog scale pain score (0-10) improved from a median of 7 to 2 (median difference [Δ], 4 [95% CI, 3-6]; $P < .0001$), representing pain relief similar to total shoulder arthroplasty in young patients. Improvements in the median ASES score (from 47 to 76; Δ, 28 [95% CI, 17-40]; $P < .0001$), active forward elevation (from 110° to 140°; Δ, 20° [95% CI, 10°-35°]; $P < .0001$), and active external rotation (from 0° to 20°; Δ, 10° [95% CI, 5°-20°]; $P < .0001$) were noted. The mean age of revised shoulders (60 years [95% CI, 54-66 years]) was higher than that of surviving shoulders (53 years [95% CI, 50-57 years], $P = .005$). The preoperative ASES score of revised shoulders (34 [95% CI, 27-42]) was lower than that of surviving shoulders (47 [95% CI, 43-51], $P = .006$). No complications were noted.

Conclusions
AGR with dermal allograft is a safe option for joint preservation in selected patients, provides pain relief, and has an acceptable rate of revision to prosthetic arthroplasty at short-term to midterm follow-up. Increased age and lower preoperative ASES score were risk factors for failure of AGR.

Level of Evidence
Level IV, therapeutic case series.

BACK

Comparison of Outcomes 1 Year After Rotator Cuff Repair With and Without Concomitant Biceps Surgery

Scott T. Watson, M.D., Christopher B. Robbins, Ph.D., M.P.A., Asheesh Bedi, M.D., James E. Carpenter, M.D., Joel J. Gagnier, N.D., M.Sc., Ph.D., Bruce S. Miller, M.D., M.S.

Arthroscopy, November 2017, Volume 33, Issue 11, Pages 1928–1936

http://dx.doi.org/10.1016/j.arthro.2017.05.009

Purpose
To compare the outcomes of patients who undergo a long head of the biceps (LHB) procedure (tenotomy or tenodesis) concomitant with rotator cuff repair (RCR) to those of patients who undergo isolated RCR.

Methods
Prospectively collected data were retrospectively reviewed on 80 patients, >18 years old, who underwent repair of a full-thickness rotator cuff tear and with 1-year patient-reported outcome scores collected June 2012 to March 2015. The exclusion criteria were concomitant procedures other than LHB tenotomy, tenodesis, or subacromial decompression; prior shoulder surgery; or other shoulder pathology. The 3 patient groups are as follows: RCR + tenotomy, RCR + tenodesis, and isolated RCR. The primary outcome measures were American Shoulder and Elbow Surgeons (ASES) score, Western Ontario Rotator Cuff (WORC) index, and visual analog scale (VAS) for pain. A *t*-test measured the mean improvement in LHB patients compared with isolated RCR patients and compared the LHB tenotomy and tenodesis groups. Stepwise linear progression used LHB tenotomy or tenodesis as the primary predictor.

Results
The biceps procedure group had more female patients (22 vs 7, $P = .01$); otherwise there were no significant baseline differences. The LHB procedure group had significantly worse baseline ASES scores (mean, 48.9 vs 58.7; $P = .032$). All RCR patients showed significant improvement in all 3 outcome measures. Patients who had either LHB tenotomy or tenodesis ($n = 45$) demonstrated significantly greater mean improvement in ASES (mean, 42.7 vs 23.8; $P = .002$), VAS (mean, 49.2 vs 35.7; $P = .020$), and WORC scores (mean, 928 vs 743; $P = .029$) at 1-year follow-up compared with patients who had isolated RCR. ASES scores at 1 year were significantly better in the biceps group (91.6 vs 82.5; $P = .023$). Linear regression found a biceps procedure to be predictive of a significantly greater improvement in ASES score ($P = .01$). Analysis of variance revealed that both the LHB tenotomy ($P = .04$) and tenodesis ($P = .01$) groups demonstrated more favorable improvement in ASES when compared with RCR alone.

Conclusions
Patients who underwent a concomitant biceps procedure when indicated at the time of RCR demonstrated inferior baseline patient-reported outcome measures and greater improvement after 1 year, as well as more favorable ASES scores at 1 year compared with isolated RCR patients.

Level of Evidence
Level III, retrospective comparative study.

BACK

Patient Compliance With Electronic Patient Reported Outcomes Following Shoulder Arthroscopy

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Arthroscopy, November 2017, Volume 33, Issue 11, Pages 1940–1946

http://dx.doi.org/10.1016/j.arthro.2017.06.016

Purpose
To determine the patient compliance in completing electronically administered patient-reported outcome (PRO) scores following shoulder arthroscopy, and to determine if dedicated research assistants improve patient compliance.

Methods
Patients undergoing arthroscopic shoulder surgery from January 1, 2014, to December 31, 2014, were prospectively enrolled into an electronic data collection system with retrospective review of compliance data. A total of 143 patients were included in this study; 406 patients were excluded (for any or all of the following reasons, such as incomplete follow-up, inaccessibility to the order sets, and inability to complete the order sets). All patients were assigned an order set of PROs through an electronic reporting system, with order sets to be completed prior to surgery, as well as 6 and 12 months postoperatively. Compliance rates of form completion were documented. Patients who underwent arthroscopic anterior and/or posterior stabilization were excluded.

Results
The average age of the patients was 53.1 years, ranging from 20 to 83. Compliance of form completion was highest preoperatively (76%), and then dropped subsequently at 6 months postoperatively (57%) and 12 months postoperatively (45%). Use of research assistants improved compliance by approximately 20% at each time point. No differences were found according to patient gender and age group. Of those completing forms, a majority completed forms at home or elsewhere prior to returning to the office for the clinic visit.

Conclusions
Electronic administration of PRO may decrease the amount of time required in the office setting for PRO completion by patients. This may be mutually beneficial to providers and patients. It is unclear if an electronic system improves patient compliance in voluntary completion PRO. Compliance rates at final follow-up remain a concern if data are to be used for establishing quality or outcome metrics.

Level of Evidence
Level IV, case series.

BACK

Arthroscopic Partial Repair of Irreparable Rotator Cuff Tears: Factors Related to Greater Degree of Clinical Improvement at 2 Years of Follow-Up

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Arthroscopy, November 2017, Volume 33, Issue 11, Pages 1949–1955

http://dx.doi.org/10.1016/j.arthro.2017.06.047

Purpose
This study aimed to evaluate the clinical outcomes of irreparable rotator cuff tears (RCT) treated with an arthroscopic partial repair, as well as the preoperative factors that may be related to greater improvement of clinical outcomes at short-term follow-up.

Methods
We retrospectively reviewed patients with irreparable RCT who underwent arthroscopic partial rotator cuff repair between January 2011 and April 2014. Minimal follow-up of 24 months was required. Partial repair was defined as repairing the less retracted posterosuperior rotator cuff with a residual defect of the tendon-footprint junction. Tearing involving the subscapularis tendon was excluded. Factors collected included age, sex, diabetes, smoking, night pain, duration of symptoms, pain visual analog scale (VAS) score, acromiohumeral distance (AHD), and American Shoulder and Elbow Surgeons (ASES) score. Magnetic resonance images without intra-articular contrast were assessed for healing 6 months after surgery for all patients. Functional outcome was evaluated with ASES score. Degree of functional improvement was defined as the difference of ASES scores pre- and postoperatively (d-ASES). Paired *t*-test and simple linear analysis were used for statistical analysis.

Results
Thirty-seven patients were included with a mean follow-up period of 29.6 ± 6.6 months. VAS score improved from 5.22 to 1.51 ($P < .001$). ASES score improved from 46.0 to 78.6 ($P < .001$). The incidence of night pain improved from 70.3% to 8.1% ($P < .001$). Only a preoperative lower ASES score, higher VAS score, and night pain were related to the higher d-ASES score ($P < .001$, $P = .005$, $P = .017$, respectively). The rate of repair failure was 41.6% at a mean follow-up of 6.4 months.

Conclusions
Arthroscopic partial repair of irreparable RCTs is an effective treatment to improve the shoulder function and decrease the pain, despite the high repair failure rate of 41.6%. Patients with preoperative lower functional score, higher VAS score, or night pain experienced a greater degree of functional improvement from the surgery.

Level of Evidence
Level IV, therapeutic case series.

BACK

Arthroscopic Sternoclavicular Joint Diskectomy for Acute and Chronic Tears

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Arthroscopy, November 2017, Volume 33, Issue 11, Pages 1965–1970

http://dx.doi.org/10.1016/j.arthro.2017.06.033

Purpose
To describe the results and functional scores in a group of patients who underwent arthroscopic excision of a symptomatic sternoclavicular joint (SCJ) disk tear with a minimum follow-up period of 2 years.

Methods
Between April 2010 and December 2014, 14 patients underwent arthroscopic excision of a torn SCJ disk. Patients whose intended surgery was an isolated diskectomy and underwent that surgery only, with no additional procedure, were included. The minimum follow-up period was 24 months. All patients underwent an arthroscopic SCJ diskectomy. Postoperatively, no immobilization was required, and the patients were encouraged to mobilize as pain permitted. The patients were assessed preoperatively and at final follow-up with the visual analog scale score for pain, Rockwood score, and QuickDASH (short version of the Disabilities of the Arm, Shoulder and Hand questionnaire) score.

Results
The average age at surgery was 29.4 years (range, 19-39 years). Ten of the patients had been symptom free before a specific incident, after which SCJ symptoms developed. The other 4 patients reported a gradual onset of symptoms and were considered to have chronic tears. The average duration of symptoms was 22.8 months (range, 6-48 months). At a mean follow-up of 33.4 months (range, 24-59 months), a significant improvement in the Rockwood score was noted, from 7 (range, 5-9; standard deviation [SD], 1.4) to 13.6 (range, 9-15; SD, 1.9) (P = .001) (minimal clinically important difference not described). The mean QuickDASH score improved from 23.7 points (range, 6.8-40.9 points; SD, 11.8 points) to 8 points (range, 0-29.5 points; SD, 9 points) (P = .0024) (minimal clinically important difference, 13.4 points). There were no reported complications and specifically no instability.

Conclusions
The results of this series suggest that arthroscopic SCJ diskectomy is a safe and reproducible procedure for the treatment of patients with symptomatic SCJ disk tears.

Level of Evidence
Level IV, therapeutic case series.

BACK

Long Head of Biceps Tendon Pathology and Results of Tenotomy in Full-Thickness Reparable Rotator Cuff Tear

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Arthroscopy, November 2017, Volume 33, Issue 11, Pages 1971–1976

http://dx.doi.org/10.1016/j.arthro.2017.06.018

Purpose
To document the incidence of long head of the biceps tendon (LHBT) pathology in full-thickness reparable rotator cuff tears and report the clinical results of arthroscopic LHBT tenotomy combined with rotator cuff repair.

Methods
Between January 2012 and January 2014, 141 shoulders with full-thickness rotator cuff tears that had undergone arthroscopic repair were included for the analysis. The LHBT was thoroughly examined during arthroscopy, and tenotomy was performed in all patients with a pathologic LHBT. Shoulder range of movement and the Constant score were recorded at an average follow-up of 2.2 years (range, 24-40 months).

Results
The overall incidence of LHBT pathology was 36.1% (51 of 141 shoulders). The increase in LHBT pathology with the increase in the size of the rotator cuff tear was statistically significant (*P* = .001). Tears involving the subscapularis had a statistically significantly higher incidence of LHBT pathology (*P* = .001). The duration of the rotator cuff tear showed no statistical significance regarding the incidence of LHBT pathology (*P* = .598). Of 141 patients with full-thickness rotator cuff tears, 89 had tears due to trauma and 52 had atraumatic tears. The difference in the incidence of LHBT pathology between the traumatic and atraumatic groups was not statistically significant (*P* = .412). The average Constant score in the patients who had undergone LHBT tenotomy was 82 (range, 70-90), and in those with normal tendons, it was 84 (range, 72-92). The difference was not statistically significant (*P* = .423).

Conclusions
About one-third of patients with full-thickness reparable rotator cuff tears are likely to have LHBT pathology. Large and massive rotator cuff tears and tears involving the subscapularis are more likely to have LHBT pathology. Tenotomy of the pathologic LHBT as an adjunct to rotator cuff repair produces satisfactory results.

Level of Evidence
Level IV, therapeutic case series.

BACK

Modified Anterolateral Portals in Elbow Arthroscopy: A Cadaveric Study on Safety

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Arthroscopy, November 2017, Volume 33, Issue 11, Pages 1981–1985

http://dx.doi.org/10.1016/j.arthro.2017.06.012

Purpose
To evaluate the proximity to the radial nerve on cadaveric specimens of 2 modified anterolateral portals used for elbow arthroscopy.

Methods
Ten fresh cadaveric elbow specimens were prepared. Four-millimeter Steinman pins were inserted into 3 anterolateral portal sites in relation to the lateral epicondyle: (1) the standard distal anterolateral portal, (2) a modified direct anterolateral portal, and (3) a modified proximal anterolateral portal. These were defined as follows: direct portals 2 cm directly anterior to the lateral epicondyle, and proximal portals 2 cm proximal and 2 cm directly anterior to the lateral epicondyle. Each elbow was then dissected to reveal the course of the radial nerve. Digital photographs were taken of each specimen, and the distance from the Steinman pin to the radial nerve was measured.

Results
The modified proximal anterolateral and direct anterolateral portals were found to be a statistically significant distance from the radial nerve compare to the distal portal site (P = .011 and P = .0011, respectively). No significant difference was found in the proximity of the radial nerve between the modified proximal and direct anterolateral portals (P = .25). Inadequate imaging was found at a single portal site for the proximal site; 9 specimens were used for analysis of this portal with 10 complete specimens for the other 2 sites.

Conclusions
In cadaveric analysis, both the modified proximal and direct lateral portals provide adequate distance from the radial nerve and may be safe for clinical use. In this study, the distal anterolateral portal was in close proximity of the radial nerve and may result in iatrogenic injury in the clinical setting.

BACK

Recurrent Instability After Arthroscopic Bankart Reconstruction: A Systematic Review of Surgical Technical Factors

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Arthroscopy, November 2017, Volume 33, Issue 11, Pages 2081–2092

http://dx.doi.org/10.1016/j.arthro.2017.06.038

Purpose
Recurrent instability remains of concern after arthroscopic Bankart reconstruction. We evaluated various technical factors including anchor design, anchor material, number of anchors used, and interval closure on risk of recurrent instability after arthroscopic Bankart reconstruction.

Methods
A systematic review of MEDLINE and Cochrane databases was conducted, following PRISMA guidelines. Extracted data were recorded on a standardized form. Methodological index for non-randomized studies (MINORS) and Newcastle-Ottawa Scale (NOS) were used to assess study quality and risk bias. Because of study heterogeneity and low levels of evidence, meta-analysis was not possible. Pooled weighted means were calculated and individual study evaluation and comparisons (qualitative analysis) were performed for systematic review.

Results
Of 2097 studies identified, 26 met criteria for systematic review. Pooled weighted means revealed 11.4% versus 15% recurrent instability with 3 or more suture anchors versus fewer than 3 anchors, 10.1% versus 7.8% with absorbable versus nonabsorbable suture anchors, respectively, and 8.0% versus 9.4% with knotless versus standard anchors, respectively. Interval closure did not qualitatively decrease recurrent instability or decrease range of motion.

Conclusions
Our systematic review reveals that despite individual study, and previous systematic reviews pointing to the contrary, the composite contemporary published literature would support no difference in the risk of recurrent instability after arthroscopic Bankart reconstruction with rotator interval closure, differing numbers of anchors used for the repair, use of knotless versus standard anchors, or use of bioabsorbable versus nonabsorbable anchors. We recommend surgeons focus on factors that have been shown to modify the risk factors after arthroscopic Bankart reconstruction, such as patient selection.

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

BACK

Journal of Shoulder and Elbow Surgery, volume 26, issue 10 & 11

Subacromial corticosteroid injections transiently decrease suture anchor pullout strength: biomechanical studies in rats

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Journal of Shoulder and Elbow Surgery, Volume 26, Issue 10

DOI: http://dx.doi.org/10.1016/j.jse.2017.05.013

Background
Arthroscopic rotator cuff (RC) repair incorporates suture anchors to secure torn RC tendons to the greater tuberosity (GT) bone. RC repair strength depends on the anchor-bone interface and on the quality of the GT. We evaluated the effect of single and multiple corticosteroid injections on the pullout strength of suture anchors.

Methods
Fifty rats were divided into those receiving saline solution injection (control group), a single methylprednisolone acetate (MTA) injection (MTA1 group), or 3 once-weekly MTA injections (MTA3 group). Rats were killed humanely at 1 or 4 weeks after the last injection. A mini–suture anchor was inserted into the humeral head through the GT. Specimens were tested biomechanically.

Results
At 1 week after the last injection, the mean maximal pullout strength was significantly reduced in the MTA1 group (63.5%) and MTA3 group (56%) compared with the control group ($P < .05$ for both). Mean stiffness decreased significantly in both treatment groups compared with controls ($P < .05$). At 4 weeks after the last injection, there was a significant increase in the mean maximal pullout strength after single and triple MTA injections compared with values recorded at the 1-week time point ($P < .05$). At 4 weeks, the mean maximal pullout strength after a single MTA injection was 92.8% of the pullout strength measured in the control group.

Conclusions
We showed a significant detrimental effect of corticosteroid exposure on the pullout strength of a suture anchor at 1 week. However, this effect was transient and resolved within a relatively short period. These findings indicate that a waiting period is required between subacromial corticosteroid injection and RC repair surgery that involves the use of suture anchors.

BACK

Acromioplasty in patients selected for operation by national guidelines

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Journal of Shoulder and Elbow Surgery, Volume 26, Issue 10

DOI: http://dx.doi.org/10.1016/j.jse.2017.03.028

Background
Shoulder impingement syndrome is the most common shoulder disorder. Even though conservative treatment is the primary treatment of choice, surgery has increased substantially in several countries during the last 20 years. This has resulted in recommended clinical guidelines for treatment of shoulder impingement syndrome in countries such as The Netherlands and Denmark during recent years. The aim of this study was to investigate the effectiveness of an arthroscopic subacromial decompression in 244 patients selected for surgery according to national clinical guidelines.

Materials and Methods
Patients were included from an Internet-based shoulder and elbow database. They were asked to complete 2 questionnaires consisting of the Oxford Shoulder Score (OSS) and the EuroQol 5-Dimension 3-Level and visual analog scale preoperatively and at 6-month follow-up. All patients were carefully selected for surgery according to the national guidelines, with symptoms persisting for at least 6 months. Furthermore, subgroups related to the OSS were formed to assess the clinical outcome according to preoperative status and age.

Results
For the complete study group, an OSS change of 10 (8.8-11.2; $P = .0001$) was found at 6-month follow-up. No significant difference was found between the genders ($P = .17$). The largest clinical effect from the intervention was found in the low preoperative OSS (pre-OSS) group, in which a mean change of 17 was found. The moderate and high pre-OSS groups had mean changes of 13 and 5, respectively. Similarly, according to the EuroQol 5-Dimension 3-Level and visual analog scale, the largest improvements were seen in the low and moderate pre-OSS groups.

Conclusion
Arthroscopic subacromial decompression is a valid treatment, reducing pain and improving quality of life for patients selected for surgery according to the Danish national guidelines.

BACK

Pediatric elbow arthroscopy: indications and safety

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Journal of Shoulder and Elbow Surgery, Volume 26, Issue 10

DOI: http://dx.doi.org/10.1016/j.jse.2017.07.005

Background
Elbow arthroscopy is a minimally invasive means by which to treat a variety of acute and chronic elbow conditions. Although the safety and efficacy is well documented in the adult population, comparatively little information is available about the role of elbow arthroscopy in the pediatric population. This study reports the indications for and safety of elbow arthroscopy in a series of pediatric patients.

Methods
A retrospective review was performed from 2001 to 2015 of a surgical database at a single institution. All elbow arthroscopies performed in patients aged 18 years and younger were reviewed. Indications for surgery, perioperative and postoperative complications, further surgical intervention, and descriptive demographic information were recorded.

Results
We identified 64 elbow arthroscopic procedures in 59 patients. The average age at the time of surgery was 11.8 years. Indications for the arthroscopic surgery included contracture release (45.3%), closed reduction and fixation for fracture (20.3%), treatment of osteochondritis dissecans (20.3%), diagnostic arthroscopy (7.8%), and débridement (6.3%). The overall complication rate was 17.2%, with a major and minor complication rate of 6.3% and 10.9%, respectively.

Conclusion
Elbow arthroscopy has applications in the pediatric population with an acceptable safety profile. The techniques and indications continue to evolve.

BACK

Open versus arthroscopic surgical treatment for anterior shoulder dislocation: a comparative systematic review and meta-analysis over the past 20 years

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Journal of Shoulder and Elbow Surgery, Volume 26, Issue 10

DOI: http://dx.doi.org/10.1016/j.jse.2017.04.009 |

Background:
The purpose of this study was to perform a meta-analysis comparing open and arthroscopic surgery for the treatment of anterior shoulder instability by analyzing comparative studies during 2 different time intervals during the last 20 years.

Methods
We conducted a systematic review of MEDLINE, Embase, Scopus, and Google Scholar. Two groups were created by dividing studies according to the year of publication, those published from 1995 to 2004 or from 2005 to 2015. Publication bias and risk of bias were assessed using the Cochrane Collaboration's tools. Heterogeneity was assessed using the I2 statistics.

Results
A total of 22 studies (n = 1633) met the eligibility criteria. Comparison of the pooled estimate for all of these studies demonstrated no significant differences (P = .64) in clinical outcomes between open and arthroscopic shoulder stabilization. However, studies published from 1995 through 2004 demonstrated significant differences (P = .015) in recurrence rates favoring open surgery. In contrast, no significant differences (P = .09) in recurrence rates were observed for studies published from 2005 through 2015. The pooled estimate for all studies in both groups demonstrated significant differences (P = .001) in external rotation deficits between open and arthroscopic shoulder stabilization favoring arthroscopic surgery.

Conclusion
Despite advances in surgical techniques and devices during the last 20 years, either open or arthroscopic surgical treatment of anterior shoulder dislocation results in similar clinical outcomes. The recurrence rate for arthroscopic surgical stabilization has only marginally decreased, from 16.8% to 14.2%. However, during the earlier decade from 1995 through 2004, patients treated with arthroscopic surgery had twice the risk of recurrence compared with an open procedure.

BACK

Surgical treatment of shoulder infections: a comparison between arthroscopy and arthrotomy

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Journal of Shoulder and Elbow Surgery, Volume 26, Issue 11

DOI: http://dx.doi.org/10.1016/j.jse.2017.04.001 |

Background
Management of bacterial shoulder infections includes antibiotic therapy and surgical joint decompression. Arthroscopy and open arthrotomy are recommended treatment options. Whether 1 of the 2 surgical options is superior remains unclear. The present study aimed (1) to compare the reinfection rates after arthroscopy and open arthrotomy and (2) to identify risk factors of reinfection after surgical intervention.

Materials and methods
The data of 59 consecutive patients were available for final analysis. All patients received arthroscopy or open arthrotomy at our institution between 2001 and 2015. The reinfection rates between the 2 distinct interventions were compared. We also evaluated the influence of potential confounders, such as age, sex, comorbidities, microbiological findings, duration of symptoms, osteoarthritis, Gächter score, and preoperative inflammatory parameters, on the recurrence of infections and compared the functional outcome between the 2 surgery groups.

Results
From 59 included patients, 38 (64.4%) underwent open arthrotomy, and 21 (35.6%) were treated arthroscopically. Reinfection was documented in 18 patients (30.5%). The reinfection rate was significantly higher in arthroscopically treated patients (11 [52.4%]) than in patients who underwent open arthrotomy (7 [18.4%]; $P = .007$). An infection with *Staphylococcus aureus* negatively influenced the treatment success ($P = .034$).

Conclusion
According to our data, open arthrotomy is the more effective treatment method in septic arthritis of the shoulder, with lower reinfection rates and a comparable functional outcome. Furthermore, we could identify *Staphylococcus aureus* as an independent risk factor for the recurrence of infections.

BACK

The timing of retears after arthroscopic rotator cuff repair

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Journal of Shoulder and Elbow Surgery, Volume 26, Issue 11

DOI: http://dx.doi.org/10.1016/j.jse.2017.07.015 |

Background

Little is known about the time dependence of the failure rate of surgically repaired rotator cuffs. Retears are significant, as they are common and may lead to less satisfactory outcomes and additional operations. Their timing is critical foundational information for understanding failure mechanisms. However, this remains unclear. Currently, there exist a number of studies that have reported retear rates at specific time points. Combining data from these publications can reveal when cuffs retear, which will help inform expectations and guidelines for progression of activity after surgery.

Methods

PubMed, Medline, and Embase were searched for studies relating to rotator cuff repair. Abstracts and articles were evaluated on the basis of predefined inclusion and exclusion criteria. Data were extracted from those publications that satisfied all requirements, and regression analysis was performed.

Results

Thirteen articles were included in the final meta-analysis. Retear rates for medium tears increased for approximately 15 months and leveled off at approximately 20%. Retear rates for large tears progressed steadily for about 12 months and approached an upper limit of approximately 40%. Retear rates for massive tears ranged from 20% to 60%, but the distribution of retear rate over time for these cuff tears is not clear from these data.

Conclusion

Retear rates for medium and large tears generally increase until at least 10-15 months after surgery, after which they are likely to level off. Retear rates for massive tears are variable and may follow a time course different from that of other tear sizes. Retear rates depend on size of the original tear.

BACK

The American journal of Sports Medicine - Volume 45, Issue 12 & 13

Postoperative Recurrence of Instability Due to New Anterior Glenoid Rim Fractures After Arthroscopic Bankart Repair

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The American Journal of Sports Medicine Vol 45, Issue 12, 2017; pp. 2840–2848

http://journals.sagepub.com/doi/full/10.1177/0363546517714476

Background:
Computed tomography (CT) sometimes reveals a new fracture of the anterior glenoid rim in patients with postoperative recurrence of instability after arthroscopic Bankart repair using suture anchors, but there have been few previous reports about such fractures.

Hypothesis:
The placement of a large number of suture anchors during arthroscopic Bankart repair might be associated with a new glenoid rim fracture.

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

Methods:
Screw-in metal suture anchors were used until June 2011 and suture-based soft anchors from July 2011. A follow-up of at least 2 years was conducted for 128 shoulders treated using metal anchors (metal anchor group) and 129 shoulders treated using soft anchors (soft anchor group). The frequency and features of new glenoid rim fractures were investigated, and the influence of the number of suture anchors and other factors on fractures was also assessed.

Results:
There were 19 shoulders (14.8%) with postoperative recurrence in the metal anchor group and 23 shoulders (17.8%) in the soft anchor group. Among 37 shoulders evaluated by CT at recurrence, a new glenoid rim fracture was detected in 13 shoulders (35.1%; 5 shoulders in the metal anchor group and 8 shoulders in the soft anchor group). A fracture at the anchor insertion site was recognized in 4 shoulders from the metal anchor group and 6 shoulders from the soft anchor group, although linear fractures connecting several anchor holes were only seen in the soft anchor group. While new glenoid fractures occurred regardless of the number of suture anchors used, new fractures were significantly more frequent in teenagers at surgery and in junior high school or high school athletes. Such fractures did not only occur in contact athletes but were also found in overhead athletes.

Conclusion:
Postoperative recurrence of instability associated with a new glenoid rim fracture along the suture anchor insertion site was frequent after arthroscopic Bankart repair. These fractures might be related to placing multiple soft suture anchors in a linear arrangement.

BACK

Lower Extremity

Fluoroscopy Learning Curve in Hip Arthroscopy—A Single Surgeon's Experience

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Arthroscopy, October 2017, Volume 33, Issue 10, Pages 1804–1809

http://dx.doi.org/10.1016/j.arthro.2017.03.026

Purpose
To determine if (1) absorbed radiation dose and (2) fluoroscopy time decreased with experience over the first 100 cases of a single surgeon's hip arthroscopy practice.

Methods
Subjects who underwent hip arthroscopy for symptomatic femoroacetabular impingement and labral injury were eligible for analysis. Inclusion criteria included the first 100 subjects who underwent hip arthroscopy by a single surgeon (December 2013 to December 2014). Subject demographics, procedure details, fluoroscopy absorbed dose (milligray [mGy]), and time were recorded. Subjects were categorized by date of surgery to one of 4 possible groups (25 per group). One-way analysis of variance was used to determine if a significant difference in dose (mGy) or time was present between groups. Simple linear regression analysis was performed to determine the relation between case number and both radiation dose and fluoroscopy time.

Results
Subjects underwent labral repair (n = 93), cam osteoplasty (n = 90), and pincer acetabuloplasty (n = 65). There was a significant ($P < .001$ for both) linear regression between case number and both radiation dose and fluoroscopy time. A significant difference in mGy was observed between groups, group 1 the highest and group 4 the lowest amounts of radiation ($P = .003$). Comparing individual groups, group 4 was found to have a significantly lower amount of radiation than group 1 ($P = .002$), though it was not significantly lower than that of group 2 ($P = .09$) or group 3 ($P = .08$). A significant difference in fluoroscopy time was observed between groups, group 1 the highest and group 4 the lowest times ($P = .05$). Comparing individual groups, group 4 was found to have a significantly lower fluoroscopy time than group 1 ($P = .039$). Correction for weight, height, and body mass index all revealed the same findings: significant ($P < .05$) differences in both dose and time across groups.

Conclusions
The absorbed dose of radiation and fluoroscopy time decreased significantly over the first 100 cases of a single surgeon's hip arthroscopy practice learning curve.

Level of Evidence
Level IV, therapeutic, retrospective, noncomparative case series.

BACK

Arthroscopic Treatment of Femoroacetabular Impingement in Adolescents Provides Clinically Significant Outcome Improvement

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Arthroscopy, October 2017, Volume 33, Issue 10, Pages 1812–1818

http://dx.doi.org/10.1016/j.arthro.2017.04.008

Purpose
To define minimal clinically important difference (MCID) and substantial clinical benefit (SCB) for adolescents undergoing arthroscopic femoroacetabular impingement (FAI) surgery.

Methods
A prospective institutional hip preservation registry was reviewed to identify hip arthroscopies performed for FAI. Patients with pre-existing hip conditions such as slipped capital femoral epiphysis and Legg-Calve-Perthese were excluded. Included patients were 18 years and younger. The modified Harris Hip Score (mHHS), the Hip Outcome Score (HOS), and the international Hip Outcome Tool (iHOT-33) were administered as part of the registry. MCID was calculated using a distribution-based method, and SCB was calculated using a physical function anchor question. Receiver operating characteristic analysis with area under the curve (AUC) was used for psychometric analyses.

Results
Forty-seven adolescents were identified. The majority of patients were female (n = 32, 68.1%) with a mean age of 16.5 (±1.1) years. The MCID (% achieving) for the mHHS, HOS activities of daily living (ADL), HOS Sport, and iHOT-33 was 9.5 (85%), 9.8 (79%), 12.1 (85%), and 10.7 (94%), respectively. Ninety-two percent of adolescents reported some form of improved hip physical ability on the anchor question. The following 1-year absolute outcome scores were significantly representative of an SCB state on the mHHS, HOS ADL, HOS Sport, and mHHS, respectively (AUC): 93.5 (0.79), 98.5 (0.84), 96.9 (0.81), and 85.9 (0.76).

Conclusions
Adolescents undergoing arthroscopic FAI surgery achieve clinically significant outcome improvement. We found that the vast majority of adolescents achieve MCID on hip-specific patient-reported outcome tools. However, although adolescents readily achieve MCID, a considerable improvement in postoperative outcome score is often needed to perceive a substantial benefit (SCB). The available hip outcome tools may be subject to ceiling effects for measuring clinically significant outcome improvement in adolescents.

Level of Evidence
Level IV, case series.

BACK

Patellofemoral Osteoarthritis Progression and Alignment Changes after Open-Wedge High Tibial Osteotomy Do Not Affect Clinical Outcomes at Mid-term Follow-up

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Arthroscopy, October 2017, Volume 33, Issue 10, Pages 1832–1839

http://dx.doi.org/10.1016/j.arthro.2017.04.007

Purpose
To evaluate the clinical and radiological outcomes of open-wedge high tibial osteotomy (OWHTO) with respect to the patellofemoral joint and to assess whether patellofemoral osteoarthritis (OA) progression and alignment changes after OWHTO affect clinical outcomes.

Methods
Inclusion criteria were consecutive patients who underwent OWHTO from March 2005 to September 2013. Exclusion criteria were loss to follow-up within 2 years and absence of second-look arthroscopy findings at the time of plate removal. The clinical parameters, including anterior knee pain while climbing stairs, Japanese Orthopedic Association score, and Oxford Knee Score, were evaluated. Radiological outcomes, including weight-bearing line ratio, modified Blackburne-Peel ratio, posterior tibial slope, tilting angle, lateral shift ratio, and patellofemoral OA (Kellgren-Lawrence grade), were evaluated preoperatively and at the final follow-up. Cartilage status (International Cartilage Repair Society grade) was evaluated at the initial HTO and at plate removal.

Results
Fifty-three patients (60 knees) were included in this study. The mean follow-up was 58.2 ± 22.4 months. Two knees (3%) presented with mild anterior knee pain after OWHTO. The mean Japanese Orthopedic Association score (66.9 ± 11.2 to 91.2 ± 9.7) significantly improved (P < .001), and the mean Oxford Knee Score at the final follow-up was 42.0 ± 5.3. The mean modified Blackburne-Peel ratio (0.9 ± 0.1 to 0.7 ± 0.1, P < .001) and tilting angle (6.8 ± 3.7 to 5.6 ± 3.4, P = .033) significantly decreased after OWHTO, whereas no significant changes in posterior tibial slope (P = .511) and lateral shift ratio (P = .522) were observed. Radiologically, patellofemoral OA had progressed in 15 knees (27%), and arthroscopically patellofemoral cartilage degeneration had progressed in 27 knees (45%). However, there was no significant correlation between changes in patellofemoral alignment and clinical outcomes.

Conclusions
Changes in patellofemoral alignment and patellofemoral OA progression did not affect the clinical outcomes of OWHTO at mid-term follow-up.

Level of Evidence
Level IV, therapeutic case series.

BACK

Generalized Hypermobility, Knee Hyperextension, and Outcomes After Anterior Cruciate Ligament Reconstruction: Prospective, Case-Control Study With Mean 6 Years Follow-up

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Arthroscopy, October 2017, Volume 33, Issue 10, Pages 1852–1858

http://dx.doi.org/10.1016/j.arthro.2017.04.012

Purpose
To determine whether generalized hypermobility and contralateral knee hyperextension affect failure rates and patient-related outcomes after anterior cruciate ligament reconstruction (ACLR).

Methods
A total of 226 consecutive patients presenting with acute ACL tears were prospectively evaluated for generalized hypermobility by a modified Beighton criteria. Minimum 2-year follow-up was achieved for 183 knees (81%). Patients underwent ACLR with either bone–patellar–tendon (BPTB) autograft (n = 46), quadrupled hamstring (HT) autograft (n = 85), or allograft tissue (n = 52). KT-1000 measurements, International Knee Documentation Committee (IKDC), Cincinnati, and Lysholm scores were obtained.

Results
Forty-one of 183 consecutive patients were categorized as hypermobile. At mean 6 years' follow-up (range 2-12.5 years), IKDC (P = .003), Cincinnati (P = .001), and Lysholm scores (P < .001) were significantly better in the Non-Hypermobile group for patients with an intact graft. The failure rate was higher in the Hypermobile group (10 knees, 24.4% failure rate) compared with the Nonhypermobile group (11 knees, 7.7% failure rate) (P = .006). The overall ACL injury rate (ACL graft injury, excessive graft laxity, plus contralateral ACL tear) was higher in the Hypermobile group (34.1%) compared with the Nonhypermobile group (12.0%) (P = .002). Heel height >5 cm (P = .009) and fifth metacarpophalangeal (MCP) extension >90° (P = .006) were independently predictive of failure for the entire study population.

Conclusions
Graft failure rates were higher and inferior subjective outcomes were observed after ACLR in patients with generalized hypermobility. Heel height and fifth MCP hyperextension were most predictive of ACL injury/reinjury and poorer outcome scores. Nearly one-third of hypermobile patients sustained a contralateral ACL tear, ipsilateral graft failure, or had excessive graft laxity.

Level of Evidence
Level III, case control study.

BACK

Systematic Review of the Long-term Surgical Outcomes of Discoid Lateral Meniscus

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Arthroscopy, October 2017, Volume 33, Issue 10, Pages 1884–1895

http://dx.doi.org/10.1016/j.arthro.2017.04.006

Purpose
To evaluate the surgical treatment of the discoid lateral meniscus (DLM) with long-term follow-up and to search which factors are related to good clinical or radiological outcomes.

Methods
Search was performed using a MEDLINE, EMBASE, and Cochrane database, and each of the selected studies was evaluated for methodological quality using a risk of bias (ROB) covering 7 criteria. Clinical and radiological outcomes with more than 5 years of follow-up were evaluated after surgical treatment of DLM. They were analyzed according to the age, follow-up period, kind of surgery, DLM type, and alignment.

Results
Eleven articles (422 DLM cases) were included in the final analysis. Among 7 criteria, 3 criteria showed little ROB in all studies. However, 4 criteria showed some ROB ("Yes" in 63.6% to 81.8%). The minimal follow-up period was 5.5 years (weighted mean follow-up: 9.1 years). Surgical procedures were performed with open or arthroscopic partial central meniscectomy, subtotal meniscectomy, total meniscectomy, or partial meniscectomy with repair. The majority of the studies showed good clinical results. Mild joint space narrowing was reported in the lateral compartment, but none of the knees demonstrated moderate or advanced degenerative changes. Increased age at surgery, longer follow-up period, and subtotal or total meniscectomy could be related to degenerative change. The majority of the complications was osteochondritis dissecans at the lateral femoral condyle (13 cases) and reoperation was performed by osteochondritis dissecans (4 cases), recurrent swelling (2 cases), residual symptom (1 case), stiffness (1 case), and popliteal stenosis (1 case).

Conclusions
Good clinical results were obtained with surgical treatment of symptomatic DLM. The progression of degenerative change was minimal and none of the knees demonstrated moderate or advanced degenerative changes. Increased age at surgery, longer follow-up period, and subtotal or total meniscectomy were possible risk factors for degenerative changes.

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

BACK

The Timing of Hip Arthroscopy After Intra-articular Hip Injection Affects Postoperative Infection Risk

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Arthroscopy, November 2017, Volume 33, Issue 11, Pages 1988–1994.e1
http://dx.doi.org/10.1016/j.arthro.2017.06.037

Purpose
To evaluate the association of preoperative intra-articular hip injection with surgical site infection after hip arthroscopy.

Methods
A large administrative database was used to identify all patients undergoing hip arthroscopy from 2007 to 2015 within a single private insurer and from 2005 to 2012 within Medicare in the United States. Those that received an ipsilateral preoperative intra-articular hip injection were identified. The patients were then divided into the following groups based on the interval between preoperative injection and ipsilateral hip arthroscopy: (1) <3 months, (2) 3 to 6 months, and (3) 6 to 12 months. These groups were compared to a control group composed of patients with no history or a remote history (>12 months) of preoperative hip injection. Patients developing a surgical site infection within 6 months following hip arthroscopy were identified using International Classification of Diseases, Ninth Revision, and Current Procedural Terminology codes associated with infection. Groups were compared using a multivariate logistic regression analysis to control for age, gender, body mass index, smoking status, alcohol usage, and multiple medical comorbidities including diabetes mellitus, hemodialysis use, inflammatory arthritis, and peripheral vascular disease.

Results
In total, 19% of privately insured and 6% of Medicare patients received a hip injection within 12 months of hip arthroscopy. The overall infection rate in privately insured and Medicare patients was 1.19% and 1.10%, respectively. Preoperative hip injection within 3 months of surgery was associated with a significantly higher risk of postoperative infection versus controls (2.16%, odds ratio [OR] 6.1, $P < .001$, for privately insured group; 2.80%, OR 1.99, $P = .037$, for Medicare group). In contrast, preoperative hip injection given after more than 3 months of surgery was not associated with an increased risk of postoperative infection versus controls.

Conclusions
Risk of infection after hip arthroscopy increased when preoperative intra-articular hip injections were given within 3 months of surgery.

Level of Evidence
Level III, retrospective comparative study.

BACK

Variability and Comprehensiveness of North American Online Available Physical Therapy Protocols Following Hip Arthroscopy for Femoroacetabular Impingement and Labral Repair

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Arthroscopy, November 2017, Volume 33, Issue 11, Pages 1998–2005

http://dx.doi.org/10.1016/j.arthro.2017.06.045

Purpose
To assess comprehensiveness and variability of postoperative physical therapy protocols published online following hip arthroscopy for femoroacetabular impingement (FAI) and/or labral repair.

Methods
Surgeons were identified by the International Society for Hip Arthroscopy “Find a Surgeon” feature in North America (http://www.isha.net/members/, search August 10, 2016). Exclusion criteria included nonsurgeons and protocols for conditions other than hip arthroscopy for FAI and/or labral tear. Protocols were identified by review of surgeons' personal and departmental websites and evaluated for postoperative restrictions, rehabilitation components, and the time points for ending restrictions and initiating activities.

Results
Of 111 surgeons available online, 31 (27.9%) had postoperative hip arthroscopy physical therapy protocols available online. Bracing was used in 54.8% (17/31) of protocols for median 2-week duration (range, 1-6 weeks). Most protocols specified the initial postoperative weight-bearing status (29/31, 93.5%), most frequently partial weight-bearing with 20 pounds foot flat (20/29, 69.0%). The duration of weight-bearing restriction was median 3 weeks (range, 2-6) for FAI and median 6 weeks (range, 3-8) for microfracture. The majority of protocols specified initial range of motion limitations (26/31, 83.9%) for median 3 weeks (range, 1.5-12). There was substantial variation in the rehabilitation activities and time points for initiating activities. Time to return to running was specified by 20/31 (64.5%) protocols at median 12 weeks (range, 6-19), and return to sport timing was specified by 13/31 (41.9%) protocols at median 15.5 weeks (range, 9-23).

Conclusions
There is considerable variability in postoperative physical therapy protocols available online following hip arthroscopy for FAI, including postoperative restrictions, rehabilitation activities, and time points for activities.

Clinical Relevance
This information offers residents, fellows, and established hip arthroscopists a centralized comparison of publicly available physical therapy protocols following hip arthroscopy. Practicing arthroscopists might find this analysis useful to compare various therapy strategies to their own recommendations. The variability we report can also provide inspiration for future efficacy research toward a more standard rehabilitation.

BACK

Change in Anterior Cruciate Ligament Graft Choice and Outcomes Over Time

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Arthroscopy, November 2017, Volume 33, Issue 11, Pages 2007–2014

http://dx.doi.org/10.1016/j.arthro.2017.06.019

Purpose
To analyze failure rate in 2-year increments to determine if graft choice changed over time and graft failure rate.

Methods
A prospective 2002-2008 database was used to identify risk factors for anterior cruciate ligament (ACL) retear. Subjects who had primary ACL retear with no history of contralateral surgery and 2-year follow-up were included. Subjects who underwent a multiligament reconstruction were excluded. Graft type, age, sex, smoking status, body mass index, Marx activity level at index surgery, medial and lateral meniscus status at time of ACL retear, sport played after ACL reconstruction, and clinical site were evaluated. Analysis was repeated using 2002-2003 (early) and 2007-2008 (late) 2-year databases. Analysis of variance with post hoc analysis was performed to detect significant differences in age and Marx score by graft type over time.

Results
Two-year follow-up for graft failure was obtained on 2,497 of 2,692 (93%) subjects. There were 112 of 2,497 (4.5%) ACL retears identified at 2-year follow-up. The only predictor that changed between early/late periods was allograft use. Allograft odds ratio decreased from 13.1 to 9.5 ($P <$ .01). Allografts were used in older patients (31-40 years) and with lower Marx scores (10-8) from early to late periods. The mean age of subjects who received bone–patellar tendon–bone autografts did not significantly change over time (22.8-23.5). The mean age of subjects who received hamstring autografts fell (27.9-25.5). The mean age of subjects who received allografts rose significantly (31.3-39.8, $P <$ .01). The mean Marx score of subjects who received bone–patellar tendon–bone and hamstring autografts did not significantly change over time. The mean Marx score of subjects who received allografts decreased significantly ($P <$ .01).

Conclusions
After early recognition, allograft use in young active patients was a risk factor for retear; graft choice by surgeons changed in the late period to use of allografts in older and less-active patients, which correlated with a significant decrease in retear risk.

Level of Evidence
Level III, case control study.

BACK

The Effect of Body Mass Index on Clinical Outcomes in Patients Without Radiographic Evidence of Degenerative Joint Disease After Arthroscopic Partial Meniscectomy

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Arthroscopy, November 2017, Volume 33, Issue 11, Pages 2054–2063.e10

http://dx.doi.org/10.1016/j.arthro.2017.06.021

Purpose
To examine the effect of obesity on clinical outcomes at 1 year after arthroscopic partial meniscectomy.

Methods
We conducted a secondary analysis of the ChAMP (Chondral Lesions and Meniscus Procedures) randomized controlled trial (N = 256). The visual analog scale for pain, Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC), Knee Injury and Osteoarthritis Outcome Score (KOOS), range of motion, and presence of effusion were assessed preoperatively and at 1 year after arthroscopic partial meniscectomy. Body mass index was categorized as normal weight, 24.99 or less; overweight, 25 to 29.99; or obese, 30 or greater. Analysis of variance or the Cochran-Mantel-Haenszel test was used to examine differences in clinical outcomes between body mass index categories, and mean ± standard deviation or number (percentage) is reported.

Results
Preoperatively, obese patients had worse WOMAC pain (56.2 ± 17.2 vs 61.3 ± 17.2, *P* = .02), WOMAC physical function (55.8 ± 17.1 vs 62.8 ± 17.1, *P* = .004), pain visual analog scale (4.9 ± 2.1 vs 4.2 ± 1.9, *P* = .01), KOOS pain (49.5 ± 14.9 vs 54.0 ± 15.1, *P* = .02), and KOOS quality-of-life (27.9 ± 18.3 vs 36.9 ± 17.0, *P* = .001) scores, as well as decreased flexion (121.8° ± 22.6° vs 132.3° ± 16.5°, *P* = .003), compared with normal-weight patients. Overweight patients (n = 51 [51.5%], *P* = .03) and obese patients (n = 56 [52.8%], *P* = .002) were more likely to have knee effusion before surgery than normal-weight patients (n = 17 [34%]). At 1 year after surgery, overweight (130.2° ± 7.7°, *P* = .03) and obese (128.1° ± 7.1°, *P* = .003) patients had decreased flexion compared with normal-weight patients (134.5° ± 8.3°).

Conclusions
Obese patients had worse pain, physical functioning, and quality-of-life scores, as well as decreased flexion, compared with normal-weight patients before arthroscopic partial meniscectomy. At 1 year after arthroscopic partial meniscectomy, there were no statistically significant differences in clinical outcomes but obesity was associated with decreased knee flexion.

Level of Evidence
Level II, prospective comparative trial.

BACK

Single-Bundle and Double-Bundle Posterior Cruciate Ligament Reconstructions: A Systematic Review and Meta-analysis of 441 Patients at a Minimum 2 Years' Follow-up

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Arthroscopy, November 2017, Volume 33, Issue 11, Pages 2066–2080

http://dx.doi.org/10.1016/j.arthro.2017.06.049

Purpose
To perform a systematic review on the techniques and a meta-analysis on the functional and objective outcomes after single-bundle (SB) versus double-bundle (DB) posterior cruciate ligament (PCL) reconstructions.

Methods
A systematic review of the techniques, as well as functional and objective outcomes of clinical studies comparing SB versus DB PCL reconstruction with a mean follow-up of at least 24 months and minimum level of evidence of III were performed. After review of the literature, a quality analysis of the studies (Detsky score) and a meta-analysis comparing raw mean differences in data between SB and DB PCL groups were performed. Clinical outcome measures included in the meta-analysis were functional outcomes (Lysholm, Tegner, and objective International Knee Documentation Committee [IKDC] scores) and objective measurements (arthrometer and stress radiographs).

Results
The systematic search identified 11 studies (441 patients). Three studies were prospective randomized controlled trials and the other 8 studies were case-control studies. Two hundred thirty-two patients were treated with SB PCL reconstruction, whereas 209 were treated with DB PCL reconstruction. Only 4 studies satisfied the threshold for a satisfactory level of methodologic quality (>75%). There were no significant differences between SB and DB PCL reconstructions in postoperative Lysholm (P = .6, 95% confidence interval [CI], –0.98, 2.18) or Tegner scores (P = .37, 95% CI, −0.19, 0.92). DB PCL reconstruction provided significantly better objective posterior tibial translation stability than the SB technique using the Telos technique at 90° (P = −.58, 95% CI, −1.06, −0.10).

Conclusions
Improved patient-reported outcomes and knee stability were achieved with both SB and DB PCL reconstruction surgery. DB PCL reconstruction provided significantly improved objective posterior tibial stability and objective IKDC scores when compared with SB PCL reconstruction in randomized clinical trials. No significant difference was found for the other patient-reported outcomes.

Level of Evidence
Level III, systematic review and meta-analysis of Level II and III studies.

BACK

The American journal of Sports Medicine (AJSM) - Volume 45, Issue 12 & 13

Arthroscopic Labral Base Repair in the Hip: 5-Year Minimum Clinical Outcomes

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The American Journal of Sports Medicine Vol 45, Issue 12, 2017; pp. 2882–2890

http://journals.sagepub.com/doi/full/10.1177/0363546517713731

Background:
Arthroscopic labral base repair (LBR) in the hip is a previously described technique designed to restore the native functional anatomy of the labrum by reproducing its seal against the femoral head. LBR has been shown to have good short-term outcomes.

Hypothesis/Purpose:
The purpose was to evaluate clinical outcomes of an LBR cohort with a minimum 5-year follow-up. It was hypothesized that patients who underwent LBR would continue to have significant improvement from their preoperative scores and maintain scores similar to their 2-year outcomes.

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

Methods:
Data for patients undergoing primary hip arthroscopic surgery with LBR from February 2008 to May 2011 with a minimum 5-year follow-up were prospectively collected and retrospectively reviewed. Patients with preoperative Tonnis osteoarthritis grade ≥2, previous hip conditions (slipped capital femoral epiphysis, avascular necrosis, Legg-Calv-Perthes disease), severe dysplasia (lateral center-edge angle <18°), or previous ipsilateral hip surgery were excluded. Statistical equivalence tests evaluated patient-reported outcomes (PROs) including the modified Harris Hip Score (mHHS), Non-Arthritic Hip Score (NAHS), Hip Outcome Score–Sport-Specific Subscale (HOS-SSS), visual analog scale (VAS) for pain, and patient satisfaction (0-10 scale; 10 = very satisfied).

Results:
Of the 70 patients (74 hips) who met inclusion and exclusion criteria, 60 (85.7%) patients (64 hips) were available at a minimum 5-year follow-up. All PRO scores significantly improved from preoperative values with a mean follow-up of 67.8 ± 7.4 months (range, 60.0-89.7 months). The mean mHHS increased from 64.4 ±13.8 to 85.3 ± 17.7 ($P < .001$), the mean NAHS from 63.7 ± 17.0 to 87.0 ± 14.7 ($P < .001$), and the mean HOS-SSS from 47.1 ± 23.2 to 76.5 ± 25.9 ($P < .001$). The mean VAS score decreased from 5.9 ± 2.4 to 2.0 ± 2.1 ($P < .001$). The mean patient satisfaction score was 8.1 ± 2.0. The improvement in PRO scores was sustained from 2- to 5-year follow-up. At 2 and 5 years, survivorship rates were 96.9% and 90.6%, respectively, and the respective secondary arthroscopic surgery rates were 10.9% (7/64) and 17.2% (11/64).

Conclusion:
At a minimum 5-year follow-up, arthroscopic LBR continued to be a successful procedure and valid technique based on 3 PROs, the VAS, patient satisfaction, and survivorship. Significantly improved outcome scores were maintained compared with preoperative values and showed no signs of deterioration from the 2-year scores. The long-term survivorship of hip arthroscopic

BACK

surgery has yet to be determined; however, these midterm results demonstrate the rates of additional procedures (both secondary arthroscopic surgery and conversion to total hip arthroplasty), that may be necessary after 2 years.

BACK

A Traffic Light Grading System of Hip Dysplasia to Predict the Success of Arthroscopic Hip Surgery

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The American Journal of Sports Medicine Vol 45, Issue 12, 2017; pp. 2891–2900

http://journals.sagepub.com/doi/full/10.1177/0363546517713176

Background:
The role of hip arthroscopic surgery in dysplasia is controversial.

Purpose:
To determine the 7-year joint preservation rate after hip arthroscopic surgery in hip dysplasia and identify anatomic and intraoperative features that predict the success of hip preservation with arthroscopic surgery, allowing the formulation of an evidence-based classification system.

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

Methods:
Between 2008 and 2013, 111 hips with dysplastic features (acetabular index [AI] >10° and/or lateral center-edge angle [LCEA] <25°) that underwent arthroscopic surgery were identified. Clinical, radiological, and operative findings and the type of procedure performed were reviewed. Radiographic evaluations of the operated hip (AI, LCEA, extrusion index) were performed. Outcome measures included whether the hip was preserved (ie, did not require arthroplasty) at follow-up and the preoperative and postoperative Non-Arthritic Hip Score (NAHS) and Hip disability and Osteoarthritis Outcome Score (HOOS). The AI and LCEA were calculated, factored by a measure of articular wear (AIf and LCEAf, respectively), according to the University College Hospital, London (UCL) grading system as follows:
AIf = AI × (number of UCL wear zones + 1), and LCEAf = LCEA / (number of UCL wear zones + 1). A contour plot of the resulting probability value of failure for every combination of AIf and LCEAf allowed for the determination of the zones with the lowest and highest incidences of failure to preserve the hip.

Results:
The mean AI and LCEA were 9.8° and 18.0°, respectively. At a mean follow-up of 4.5 years (range, 0.4-8.3 years), 33 hips had failed, requiring hip arthroplasty. The 7-year joint survival rate was 68%. The mean improvements in the NAHS and HOOS were 11 ($P = .001$) and 22.8 ($P < .001$) points, respectively. The zone with the greatest chance of joint preservation (odds ratio, 10; $P < .001$) was the green zone, with an AIf of 0° to 15° and an LCEAfof 15° to 25°; in contrast, the zone with the greatest chance of failure (odds ratio, 10; $P < .001$) was the red zone, with an AIf of 20° to 100° and an LCEAfof 0° to 10°.

Conclusion:
Overall, the 7-year hip survival rate in hip dysplasia appears inferior compared with that reported in femoroacetabular impingement (78%). Hip arthroscopic surgery is associated with an excellent chance of hip preservation in mild dysplasia (green zone: AI = 0°-15°, LCEA = 15°-25°) and no articular wear. The authors advise that the greatest caution should be used when considering arthroscopic options in cases of severe dysplasia (red zone: AI >20° and/or LCEA <10°).

BACK

Clinical Orthopaedic Related Research journal, Volume 475, Issue 10

What Factors Predict Conversion to THA After Arthroscopy?

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Clin Orthop Relat Res 2017, Volume 475, Issue 10

http://www.clinorthop.org/articles/10.1007/s11999-017-5437-z

Background: Failure of hip preservation to alleviate symptoms potentially subjects the patient to reoperation or conversion surgery to THA, adding recovery time, risk, and cost. A risk calculator using an algorithm that can predict the likelihood that a patient who undergoes arthroscopic hip surgery will undergo THA within 2 years would be helpful, but to our knowledge, no such tool exists.Questions: (1) Are there preoperative and intraoperative variables at the time of hip arthroscopy associated with subsequent conversion to THA? (2) Can these variables be used to develop a predictive tool for conversion to THA?

Materials and Methods: All patients undergoing arthroscopy from January 2009 through December 2011 were registered in our longitudinal database. Inclusion criteria for the study group were patients undergoing hip arthroscopy for a labral tear, who eventually had conversion surgery to THA. Patients were compared with a control group of patients who underwent hip arthroscopy for a labral tear but who did not undergo conversion surgery to THA during the same study period. Of the 893 who underwent surgery during that time, 792 (88.7%) were available for followup at a minimum of 2 years (mean, 31.1 ± 8.1 years) and so were considered in this analysis. Multivariate regression analyses of 41 preoperative and intraoperative variables were performed. Using the results of the multivariate regression, we developed a simplified calculator that may be helpful in counseling a patient regarding the risk of conversion to THA after hip arthroscopy.

Results: Variables simultaneously associated with conversion to THA in this model were older age (rate ratio, 1.06; 95% CI, 1.03–1.08; $p < 0.0001$), lower preoperative modified Harris hip score (rate ratio [RR], 0.98; 95% CI, 0.96–0.99; $p = 0.0003$), decreased femoral anteversion (RR, 0.97; 95% CI, 0.94–0.99; $p = 0.0111$), revision surgery (RR, 2.4; 95% CI, 1.15–5.01; $p = 0.0193$), femoral Outerbridge Grades II to IV (Grade II: RR, 2.23 [95% CI, 1.11–4.46], $p = 0.023$; Grade III: RR, 2.17, [95% CI, 1.11–4.23], $p = 0.024$; Grade IV: RR, 2.96 [95% CI, 1.34–6.52], $p = 0.007$), performance of acetabuloplasty (RR, 1.83; 95% CI, 1.03–3.24; $p = 0.038$), and lack of performance of femoral osteoplasty (RR, 0.62; 95% CI, 0.36–1.06; $p = 0.081$). Using the results of the multivariate regression, we developed a simplified calculator that may be helpful in counseling a patient regarding the risk of conversion surgery to THA after hip arthroscopy.

Conclusion: Multiple risk factors have been identified as possible risk factors for conversion to THA after hip arthroscopy. A weighted calculator based on our data is presented here and may be useful for predicting failure after hip arthroscopy for labral treatment. Determining the best candidates for hip preservation remains challenging; careful attention to long-term followup and identifying characteristics associated with successful outcomes should be the focus of further study.

Level of Evidence: Level III, therapeutic study

BACK