4Arthroscopy | JSES KSSTA Arthroscopy 4B journals

Issue 61.3, Arthroscopy, September 2019

Website www.4b.4abstracts.nl

Part of www.4abstracts.com

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

Contact 4@erasmusmc.nl

Manual The titles in the contents are hyperlinks. Use these hyperlinks and the back button underneath every abstract to navigate more easily through the document. All abstracts have a hyperlink to the website of the article. Use this hyperlink to view the article in full-text. Articles can only be accessed in full-text through a personal account or the account of an institution.

Content
September 2019

Upper extremity

Arthroscopy
Volume 35, issue 9

- Orthopaedic Shoulder Surgery in the Ambulatory Surgical Center: Safety and Outcomes
- The Effectiveness of Using the Critical Shoulder Angle and Acromion Index for Predicting Rotator Cuff Tears: Accurate Diagnosis Based on Standard and Nonstandard Anteroposterior Radiographs
- Impact of Diaphyseal Cortical Thickness on Functional Outcomes After Arthroscopic Rotator Cuff Repair
- Diagnostic Arthroscopy for Detection of Periprosthetic Infection in Painful Shoulder Arthroplasty
- The Role of Arthroscopic Soft Tissue Reconstruction for Failed Bristow-Latarjet Procedure
- The Effect of Psychosocial Factors on Outcomes in Patients With Rotator Cuff Tears: A Systematic Review

Journal of Shoulder and Elbow Surgery (JSES)
Volume 28, issue 9

- Does arthroscopic preemptive extensive rotator interval release reduce postoperative stiffness after arthroscopic rotator cuff repair?: a prospective randomized clinical trial
- Tendon stump type on magnetic resonance imaging is a predictive factor for retear after arthroscopic rotator cuff repair
- Curved-guide system is useful in achieving optimized trajectory for the most inferior suture anchor during arthroscopic Bankart repair
- Does use of the 70° arthroscope improve the outcomes of arthroscopic débridement for chronic recalcitrant tennis elbow?

American Journal of Sports Medicine (AJSM)
Volume 47, Issue 11

- Long-term Results of Arthroscopic Rotator Cuff Repair: Initial Tear Size Matters: A Prospective Study on Clinical and Radiological Results at a Minimum Follow-up of 10 Years
- Factors Predicting the Outcome After Arthroscopically Assisted Stabilization of Acute
- The Incidence of Traumatic Posterior and Combined Labral Tears in Patients Undergoing Arthroscopic Shoulder Stabilization

Lower extremity

Arthroscopy
Volume 35, issue 9

- Radiographic Prevalence of Sacroiliac Joint Abnormalities and Clinical Outcomes in Patients With Femoroacetabular Impingement Syndrome
- Fascia Iliaca Blockade With the Addition of Liposomal Bupivacaine Versus Plain Bupivacaine for Perioperative Pain Management During Hip Arthroscopy: A Double-Blinded Prospective Randomized Control Trial
- Effectiveness of Adhering Adipose-Derived Stem Cells to Defective Cartilage in Promoting Cartilage Regeneration in a Rabbit Model

BACK

- Radiologic and Clinical Outcomes After Hamstring Anterior Cruciate Ligament Reconstruction Using an Adjustable-Loop Cortical Suspension Device With Retensioning and Knot Tying
- Clinical Outcomes of Revision Osteochondral Allograft Transplantation
- Combined Reconstruction of the Anterolateral Ligament in Patients With Anterior Cruciate Ligament Injury and Ligamentous Hyperlaxity Leads to Better Clinical Stability and a Lower Failure Rate Than Isolated Anterior Cruciate Ligament Reconstruction
- Return to Sports and Clinical Outcomes After Arthroscopic Anatomic Posterior Cruciate Ligament Reconstruction With Remnant Preservation
- Arthroscopic Reduction and Minimally Invasive Surgery in Supination–External Rotation Ankle Fractures: A Comparative Study With Open Reduction
- A Sport-specific Analysis of the Epidemiology of Hip Injuries in National Collegiate Athletic Association Athletes From 2009 to 2014
- Hip Arthroplasty After Hip Arthroscopy: Are Short-term Outcomes Affected? A Systematic Review of the Literature

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA)
Volume 27, Issue 9

- Arthroscopic microfracture vs. arthroscopic autologous matrix-induced chondrogenesis for the treatment of articular cartilage defects of the talus
- Stress fractures of the medial malleolus in the professional soccer player demonstrate excellent outcomes when treated with open reduction internal fixation and arthroscopic spur debridement
- Vancomycin pre-soaking of the graft reduces postoperative infection rate without increasing risk of graft failure and arthrofibrosis in ACL reconstruction
- Using chloroprocaine for spinal anaesthesia in outpatient knee-arthroscopy results in earlier discharge and improved operating room efficiency compared to mepivacaine and prilocaine

American Journal of Sports Medicine (AJSM)
Volume 47, Issue 11

- Demographic and Radiographic Factors Associated With Intra-articular Hip Cartilage Injury: A Cross-sectional Study of 1511 Hip Arthroscopy Procedures
- Prevalence and Clinical Implications of Chondral Injuries After Hip Arthroscopic Surgery for Femoroacetabular Impingement Syndrome
- Patients With Borderline Hip Dysplasia Achieve Clinically Significant Outcome After Arthroscopic Femoroacetabular Impingement Surgery: A Case-Control Study With
- Correlation of Single Assessment Numerical Evaluation Score for Sport and Activities of Daily Living to Modified Harris Hip Score and Hip Outcome Score in Patients Undergoing Arthroscopic Hip Surgery

Miscellaneous
Arthroscopy
Volume 35, issue 9

- Should We Question the External Validity of Database Studies? A Comparative Analysis of Demographics
- In-Office Needle Arthroscopy: A Systematic Review of Indications and Clinical Utility

BACK

Upper extremity

Arthroscopy, Volume 35, Issue 9

Orthopaedic Shoulder Surgery in the Ambulatory Surgical Center: Safety and Outcomes

Charles Qin, M.D., Daniel M. Curtis, M.D., Bruce Reider, M.D., Lewis L. Shi, M.D., Michael J. Lee, M.D., Aravind Athiviraham, M.D.

Arthroscopy, Volume 35, Issue 9, Received: November 9, 2018; Accepted: March 11, 2019

https://doi.org/10.1016/j.arthro.2019.03.031

Purpose
To determine whether the risk of adverse events and readmission after non-arthroplasty shoulder surgery is influenced by the outpatient setting of surgical care and to identify risk factors associated with these adverse events.

Methods
The Humana Claims Database was queried for all patients undergoing arthroscopic shoulder surgery and related open procedures in the hospital-based outpatient department (HOPD) or ambulatory surgical center (ASC) setting, using the PearlDiver supercomputer. Arthroplasty procedures were excluded because they carry a risk profile different from that of other outpatient surgical procedures. Outcome variables included unanticipated admission after surgery, readmission, deep vein thrombosis, pulmonary embolism, and wound infection within 90 days of surgery. The ASC and HOPD cohorts were propensity score matched, and outcomes were compared between them. Finally, logistic regression models were created to identify risk factors associated with unplanned admission after surgery.

Results
A total of 84,658 patients met the inclusion criteria for the study: 28,730 in the ASC cohort and 56,819 in the HOPD cohort. The rates of all queried outcomes were greater in the HOPD cohort and achieved statistical significance. Sex, region, race, insurance status, comorbidity burden, anesthesia type, and procedural type were included in the regression analysis of unplanned admission. Factors associated with unplanned admission included increasing Charlson Comorbidity Index (odds ratio [OR], 1.16; 95% confidence interval [CI], 1.12-1.17; P < .001); HOPD service location (OR, 2.37; 95% CI, 2.18-2.58; P < .001); general anesthesia (OR, 1.34; 95% CI, 1.08-1.59; P = .008); male sex (OR, 2.58; 95% CI, 2.17-3.15; P = .007); and open surgery (OR, 2.35; 95% CI, 1.90-2.61; P < .001).

Conclusions
The lower rates of perioperative morbidity in the ASC cohort suggest that proper patient selection is taking place and lends reassurance to surgeons who are practicing or are considering practicing in an ASC. Patients to whom some or all the risk factors for unplanned admission apply (male sex, higher comorbidity burden, open surgery) may be more suitable for HOPDs because admission from an ASC can be difficult and potentially unsafe.

Level of Evidence
Level III, comparative study.

BACK

The Effectiveness of Using the Critical Shoulder Angle and Acromion Index for Predicting Rotator Cuff Tears: Accurate Diagnosis Based on Standard and Nonstandard Anteroposterior Radiographs

Yiyong Tang, M.D., Jingyi Hou, M.D., Qingyue Li, M.D., Fangqi Li, M.D., Congda Zhang, M.D., Weiping Li, M.D.∗,'Correspondence information about the author M.D. Weiping LiEmail the author M.D. Weiping Li, Rui Yang, M.D.

Arthroscopy, Volume 35, Issue 9, Received: November 18, 2018; Accepted: March 22, 2019

https://doi.org/10.1016/j.arthro.2019.03.050

Purpose
To explore whether the critical shoulder angle (CSA) and acromion index (AI) on nonstandard anteroposterior (AP) radiographs could be used as parameters for rotator cuff tear (RCT) diagnosis and to determine the optimized parameters.

Methods
This study included 174 patients with RCTs or intact rotator cuffs in whom AP radiographs were obtained at our hospital. The radiographs were assessed by 2 independent radiologists and were grouped according to the Suter-Henninger criteria. The CSA and AI were measured on all films. We performed receiver operating characteristic curve analysis by calculating the area under the curve (AUC) to compare the sensitivity and accuracy of both parameters.

Results
Of the 174 enrolled patients, only 47 (27%) met the requirements for standard AP films (types A1 and C1). On standard AP films, both the CSA and AI were significantly different between the RCT and control groups ($P < .001$ for CSA and $P < .001$ for AI), with AUCs of 0.86 and 0.80 for the CSA and AI, respectively. On nonstandard AP films (other radiograph types), the mean CSA value was not significantly different between the RCT and control groups ($P = .536$) whereas the AI showed a significant difference ($P = .024$). The AUCs were 0.57 for the CSA and 0.64 for the AI.

Conclusions
On standard AP films, both the CSA and AI could predict rotator cuff disorders, and the CSA had a higher diagnostic accuracy than the AI. In contrast, on nonstandard AP films, the diagnostic efficacy of the AI was better than that of the CSA. On the basis of this study, we suggest an evaluation of the AP films of patients before diagnosis to confirm whether the AP films meet the criteria for standard AP films.

Level of Evidence
Level I, diagnostic study.

BACK

Impact of Diaphyseal Cortical Thickness on Functional Outcomes After Arthroscopic Rotator Cuff Repair

Merrill Lee, M.B.B.S., M.R.C.S., Jerry Chen, M.B.B.S., M.R.C.S. (Edin), M.Med. (Ortho), F.R.C.S. (Orth)a,b, Hao Ying, Ph.D., Denny Lie, M.B.B.S., F.R.C.S. (Edin), F.A.M.S.

Arthroscopy, Volume 35, Issue 9, Received: October 31, 2018; Accepted: April 1, 2019

https://doi.org/10.1016/j.arthro.2019.04.004

Purpose
To study the influence of combined cortical thickness (CCT) of the proximal humerus on arthroscopic rotator cuff tear repair outcomes.

Methods
The study included 210 patients who underwent arthroscopic repair of full-thickness supraspinatus tears. An independent reviewer measured CCT on preoperative radiographs, and patients were evaluated postoperatively at 3, 6, 12, and 24 months. Functional outcome was assessed with the Constant shoulder score (CSS), Oxford shoulder score (OSS), and University of California at Los Angeles Shoulder rating scale (UCLASS). The patients were divided based on CCT: ≥4 mm (higher CCT) and <4 mm (lower CCT). Univariate analysis and multivariate linear regressions were applied to study the effect of higher CCT on functional scores.

Results
At 6 months' follow-up, CSS and UCLASS were higher in the patients with higher CCT (mean ± standard deviation, 59 ± 17 vs 54 ± 14, P = .020; and 30 ± 5 vs 28 ± 5, P = .020, respectively). At 12 months' follow-up, CSS, UCLASS, and OSS were higher in the patients with higher CCT (71 ± 13 vs 65 ± 14, P = .002; 30 ± 5 vs 28 ± 5, P = .009; and 15 ± 6 vs 18 ± 7, P = .001, respectively). At 24 months' follow-up, CSS and OSS were higher in the patients with higher CCT (74 ± 11 vs 69 ± 13, P = .006; and 14 ± 4 vs 16 ± 8, P = .041, respectively).

Conclusion
We conclude that although a higher CCT is not associated with clinically significant differences in functional outcomes, further studies examining postoperative imaging as well as perioperative optimization of bone mineral density may yield valuable results regarding the impact of CCT on cuff healing and functional outcomes.

Level of Evidence
III (retrospective comparative therapeutic trial).

BACK

Diagnostic Arthroscopy for Detection of Periprosthetic Infection in Painful Shoulder Arthroplasty

Doruk Akgün, M.D, Nina Maziak, M.D., Fabian Plachel, M.D., Marvin Minkus, M.D., Markus Scheibel, M.D., Carsten Perka, M.D., Philipp Moroder, M.D.

Arthroscopy, Volume 35, Issue 9, Received: December 24, 2018; Accepted: March 29, 2019

https://doi.org/10.1016/j.arthro.2019.03.058

Purpose
To analyze the utility of arthroscopic biopsies for detection of periprosthetic infection in painful shoulder arthroplasty without objective signs of infection.

Methods
A retrospective analysis of all patients who underwent a diagnostic arthroscopy for painful shoulder arthroplasty from June 2012 through July 2018 was performed. Patients with a subsequent revision shoulder arthroplasty after diagnostic arthroscopy were included. Arthroscopic tissue culture results were compared with the culture results of intraoperative tissue samples obtained at the time of open revision surgery. A minimum of 3 tissue samples from synovia and bone-prosthesis interface with signs of synovitis or abnormal appearance was routinely collected. Cases with 2 or more positive cultures for the same microorganism obtained at open revision surgery were considered as true presence of infection. The study protocol was reviewed and approved by the institutional ethics committee.

Results
Twenty-three cases in 22 patients were included in this study. Five of these 23 cases were classified as true infection based on the samples obtained during open revision surgery, and 16 cases had a positive culture in diagnostic arthroscopy. Cutibacterium acnes was isolated in each case. Classifying any microbiologic growth in the arthroscopic biopsies as positive resulted in a sensitivity and negative predictive value of 100%, specificity of 39%, and positive predictive value of 31.3% for the detection of a periprosthetic shoulder infection (PPSI). If at least 2 positive samples with the same microbiologic growth in the arthroscopic biopsies were considered as positive, sensitivity and negative predictive value dropped to 80% and 94.4%, respectively, but the specificity and positive predictive value increased to 94.4% and 80%, respectively.

Conclusions
Diagnostic arthroscopy is a useful diagnostic tool in patients with suspicion but no clear evidence of PPSI. Arthroscopically obtained tissue biopsies for culture offer a high sensitivity and specificity in the diagnosis of PPSI if at least 2 cultures positive for the same microorganism are considered as infection.

Level of Evidence
Level III.

BACK

The Role of Arthroscopic Soft Tissue Reconstruction for Failed Bristow-Latarjet Procedure

Vincent Lavoué, M.D., Patrick Gendre, M.D., David Saliken, M.D., F.R.C.S.C., Alexandra Brassac, M.D., Pascal Boileau, M.D.

Arthroscopy, Volume 35, Issue 9

https://doi.org/10.1016/j.arthro.2019.05.010

Purpose
To analyze the functional results after unipolar or bipolar arthroscopic soft tissue stabilization in the treatment of recurrent anterior instability after a coracoid bone block procedure.

Methods
We studied a retrospective series of 41 patients (33 male, 8 female) with recurrent anterior shoulder instability after Bristow (n = 7) or Latarjet (n = 34) coracoid bone block treated with unipolar (isolated Bankart, n = 22) or bipolar (Bankart + Hill-Sachs remplissage, n = 19) arthroscopic stabilization.

Results
The mean follow-up was 72 (25-208) months. Severe glenoid erosion (>25%) was found in 17 patients, and a medium or deep Hill-Sachs lesion (Calandra 2 and 3) was found in 24 patients. A radiographic control was available in 28 patients at final follow-up. Five patients (12%) presented a recurrence of instability (4 subluxations, 1 dislocation). Two patients required revision surgery, 1 in each group. At final follow-up, persistent anterior apprehension was more frequent in patients presenting with severe glenoid bone loss (P = .04) and in patients with medium or deep Hill-Sachs lesions who were treated with unipolar stabilization (P = .04). Return to sports was achieved in 81% of cases. Visual analog scale was 1.3 ± 2, subjective shoulder value was 83% ± 18%, Rowe score was 78 ± 24, and Walch-Duplay score was 76 ± 28. No patients developed severe glenohumeral arthritis (Samilson 4).

Conclusions
Arthroscopic soft tissue stabilization provides good functional results after failed coracoid bone block with an acceptable rate of recurrence and a return to sports in most cases. Patients with significant Hill-Sachs lesions showed better results when treated with combined Bankart repair and Hill-Sachs remplissage. Severe glenoid bone loss was associated with poorer functional results.

Level of Evidence
Level IV, case series.

BACK

The Effect of Psychosocial Factors on Outcomes in Patients With Rotator Cuff Tears: A Systematic Review

Patrick Kennedy, M.D., D.P.T., Rajat Joshi, B.S., Aman Dhawan, M.D.

Arthroscopy, Volume 35, Issue 9

https://doi.org/10.1016/j.arthro.2019.03.043

Purpose
To determine whether psychosocial factors affect patient-reported outcomes in individuals with rotator cuff tears or after rotator cuff repair.

Methods
A systematic review was conducted using a computerized search of the PubMed and Web of Science electronic databases in adherence with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) guidelines. Articles were then evaluated based on inclusion and exclusion criteria. The Newcastle-Ottawa Scale was used to assess study quality and risk of bias. Because of study heterogeneity and varied levels of evidence, meta-analysis was not possible.

Results
Of 980 identified articles, 15 met the inclusion and exclusion criteria. In those reported, the visual analog scale correlation with distress scales ranged from –0.476 to 0.334, depending on outcome, with a trend toward increased pain in patients with distress. The depression subscale of the Hospital Anxiety and Depression Scale was negatively correlated with the American Shoulder and Elbow Surgeons score in 2 of 3 studies (–0.309 to 0.235). Six studies evaluated the presence of psychosocial factors and their correlation with patient-reported outcomes prior to surgery. These showed a significant correlation between rotator cuff pathology and psychological distress (i.e., depression or anxiety) as identified on standardized patient-reported outcome measures. Nine studies evaluated psychosocial factors either before and after surgery or only postoperatively. Of these 9 studies, 3 found no statistically significant differences in outcomes as related to psychosocial factors. In contrast, 6 of 9 reported an association between outcomes and psychosocial factors. Moreover, 2 of these 6 studies reported a direct relationship between patient expectations and outcomes, with 1 of these 2 studies finding that higher expectations improved baseline scores on the mental component summary of the Short Form 36 (r = 0.307). One study found significant differences in mental status in patients with rotator cuff tears based on age and sex.

Conclusions
This review found that most studies support that psychosocial factors do significantly influence the level of disability and pain experienced by patients preoperatively; however, 3 of 9 studies showed significant improvements in postoperative pain and function even with significant psychosocial confounders. These studies, however, do support that there is a direct relation between patient expectations and outcomes in rotator cuff surgery.

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

BACK

Journal of Shoulder and Elbow Surgery (JSES), Volume 28, issue 9

Does arthroscopic preemptive extensive rotator interval release reduce postoperative stiffness after arthroscopic rotator cuff repair?: a prospective randomized clinical trial

Jong-Ho Kim, Dae-Ho Ha, Seung-Min Kim, Ki-Won Kim, Sang-Yup Han, Yang-Soo Kim, Yang-Soo Kim

DOI: https://doi.org/10.1016/j.jse.2019.05.021

Background
To investigate whether preemptive extensive rotator interval (RI) release during arthroscopic rotator cuff repair (ARCR) would reduce postoperative stiffness.

Methods
From July 2015 to September 2016, a total of 80 patients who were scheduled for ARCR were enrolled and randomly allocated into 2 groups: the preemptive extensive RI release group (group 1, n=40) and the RI nonrelease group (group 2, n=40). The American Shoulder and Elbow Surgeons scale, Constant score, Korean Shoulder Scale (KSS), visual analog scale (VAS) pain score, and range of motion (ROM) were evaluated before surgery; 3, 6, and 12 months after surgery; and at last follow-up. Magnetic resonance imaging was performed at postoperative 12 months.

Results
The mean follow-up period was 26.5 months. The functional and pain scores in both groups were significantly improved at the last follow-up ($P < .05$). Group 1 showed a significantly higher sum of ROM with a difference of 27° and 1.6 vertebral level of internal rotation compared to group 2 at postoperative 3 months ($P < .05$). Constant score and KSS were significantly higher in group 1 than in group 2 at this time point ($P < .05$). Functional scores and ROM were not significantly different between 2 groups at postoperative 6 or 12 months or at the last follow-up ($P > .05$). The retear rate and pathologic change of the long head of the biceps tendon during follow-up were not significantly different between the 2 groups ($P > .05$).

Conclusion
Arthroscopic preemptive extensive RI release can reduce early postoperative shoulder stiffness after ARCR but does not significantly change the overall clinical outcome after surgery.

Level of evidence:
Level I, Randomized Controlled Trial, Treatment Study

BACK

Tendon stump type on magnetic resonance imaging is a predictive factor for retear after arthroscopic rotator cuff repair

Eiichi Ishitani, Eiichi Ishitani, Nobuya Harada, Yasuo Sonoda, Fumi Okada, Takahiro Yara, Ichiro Katsuki

DOI: https://doi.org/10.1016/j.jse.2019.05.012

Background
Fatty infiltration of the rotator cuff musculature increases in larger tears and is a factor in retearing. However, tearing may recur even in patients with small original tears and little fatty infiltration of the rotator cuff musculature. We devised a system to classify the rotator cuff tendon stump by magnetic resonance imaging (MRI) signal intensity and investigated prognosis-related factors associated with retear based on other MRI findings.

Methods
We analyzed and compared the signal intensity of the rotator cuff tendon stump and deltoid on preoperative T2-weighted fat-suppressed MRI in 305 patients who underwent primary arthroscopic rotator cuff repair. We also investigated the tear size, Goutallier stage, and global fatty degeneration index.

Results
In a type 1 stump, the tendon stump had a lower (darker) signal intensity than the deltoid. In type 2, the signal intensities of the tendon stump and deltoid were equivalent. In type 3, the signal intensity of the tendon stump was higher (whiter) than that of the deltoid. Multiple regression analysis of the association between retear and other parameters identified stump type (odds ratio [OR], 4.28), global fatty degeneration index (OR, 2.99), and anteroposterior tear size (OR, 1.06) as significant factors. The retear rates were 3.4% for type 1 stumps, 4.9% for type 2, and 17.7% for type 3.

Conclusions
Type 3 stumps had a significantly higher retear rate, suggesting that stump signal intensity may be an important indicator for assessing the stump's condition. Our stump classification may be useful in choosing suture techniques and postoperative therapies.

Level of evidence:
Level II, Retrospective Design, Prognosis Study

BACK

Curved-guide system is useful in achieving optimized trajectory for the most inferior suture anchor during arthroscopic Bankart repair

Tong Liu, Nobuyuki Yamamoto, Kiyotsugu Shinagawa, Taku Hatta, Eiji Itoi

DOI: https://doi.org/10.1016/j.jse.2019.03.031

Background
A curved–drill guide system was recently introduced to achieve a better trajectory for a low anteroinferior anchor during arthroscopic Bankart repair. However, the clinical performance of such a device remains unclear. The purpose of this study was to evaluate the trajectory and position of the low anteroinferior suture anchor with use of the curved-guide system in clinical cases.

Methods
We enrolled 41 cases of arthroscopic Bankart repair in this study. Of these cases, 9 were repaired using the curved drill guide whereas 32 were repaired using a conventional straight guide. Postoperative computed tomography scans were obtained, and 3-dimensional models of the scapula were reconstructed. Notable perforations of the opposite cortex by the most inferior anchors were recorded. The clock-face angle, insertion angle, and insertion distance were measured.

Results
The anchor perforation rate in the curved-guide group (11%) was significantly lower than that in the straight-guide group (56%) ($P = .02$). The insertion distance in the curved-guide group was significantly shorter than that in the straight-guide group (4.0 ± 1.6 mm vs. 7.0 ± 2.4 mm, $P < .01$). The clock-face angle and insertion angle were significantly greater in the perforated straight-guide group than in the nonperforated groups. The percentage of anchors in the absolute safe zone (clock-face angle > 135° and < 165° and insertion angle < 100°), where no anchors perforated, was greater in the curved-guide group than the straight-guide group.

Conclusion
Compared with the conventional straight guide, the curved-guide system provides better placement of the most inferior suture anchor during arthroscopic Bankart repair.

Level of evidence:
Level III, Retrospective Cohort Design, Treatment Study

BACK

Does use of the 70° arthroscope improve the outcomes of arthroscopic débridement for chronic recalcitrant tennis elbow?

Bong Cheol Kwon, Joon-Kyu Lee, Suk Yoon Lee, Jae-Yeon Hwang

DOI: https://doi.org/10.1016/j.jse.2019.04.056

Background
The use of a 70° arthroscope has been reported to provide better visualization of the extensor carpi radialis brevis origin at the lateral epicondyle. We aimed to compare the surgical outcomes of arthroscopic débridement using an additional 70° arthroscope with those using a 30° arthroscope alone in the treatment of chronic recalcitrant tennis elbow.

Methods
A total of 68 consecutive patients who received arthroscopic débridement for chronic recalcitrant tennis elbow were retrospectively reviewed. A 30° scope was used in 41 patients (mean age, 47 years; range, 26-61 years), whereas an additional 70° scope was used in 27 patients (mean age, 50 years; range, 34-61 years). Outcomes were assessed using a visual analog scale for pain and the Quick Disabilities of the Arm, Shoulder and Hand questionnaire at the preoperative visit and at 3 months, 6 months, and 12 or more months after surgery.

Results
Both groups showed significant and progressive improvements in visual analog scale pain scores and Quick Disabilities of the Arm, Shoulder and Hand scores at 3 months, 6 months, and final follow-up ($P < .05$). However, no significant differences were found between the groups at all time points of measurement regarding those outcome measures ($P > .05$). In addition, the proportions of patients with excellent outcomes and those with clinically meaningful improvements were comparable between the groups ($P = .397$ and $P = .558$, respectively).

Conclusion
The use of an additional 70° arthroscope did not provide a significant improvement in the outcomes of arthroscopic débridement for chronic recalcitrant tennis elbow.

Level of evidence:
Level III, Retrospective Cohort Design, Treatment Study

BACK

American Journal of Sports Medicine (AJSM), Volume 47, Issue 11

Long-term Results of Arthroscopic Rotator Cuff Repair: Initial Tear Size Matters: A Prospective Study on Clinical and Radiological Results at a Minimum Follow-up of 10 Years

Pietro Simone Randelli, MD, Alessandra Menon, PhD, Elisabetta Nocerino, MD, Alberto Aliprandi, MD, Francesca Maria Feroldi, MD, Manuel Giovanni Mazzoleni, MD, Sara Boveri, MSc, Federico Ambrogi, PhD, Davide Cucchi, MD

First Published August 14, 2019; pp. 2659–2669

https://doi.org/10.1177/0363546519865529

Background Arthroscopic techniques are now considered the gold standard for treatment of most rotator cuff (RC) tears; however, no consensus exists on the maintenance of results over time, and long-term follow-up data have been reported for few cohorts of patients.

Purpose To present the long-term results associated with the arthroscopic treatment of RC tears and to evaluate associations between preoperative factors and RC integrity at final follow-up.

Study Design Cohort study; Level of evidence, 3.

Methods A total of 169 patients were contacted at least 10 years after arthroscopic RC surgery and were invited to a clinical evaluation. Information on preoperative conditions, tear size, subjective satisfaction, and functional scores was collected; isometric strength and range of motion were also measured; and each patient underwent an ultrasound examination to evaluate supraspinatus integrity and a shoulder radiograph to evaluate osteoarthritis.

Results A total of 149 patients (88.2% of the eligible patients) were available for a complete telephonic interview, and 102 patients were available for the final evaluation. Ultrasound revealed an intact supraspinatus in 54 patients (53.47%). By adding the 10 patients who underwent revision surgery to the nonintact group, this percentage would drop to 48.65%. Tear size was associated with supraspinatus integrity in univariate analysis (hazard ratio, 3.04; 95% CI, 1.63-5.69; P = .001) and multivariable analysis (hazard ratio, 2.18; 95% CI, 1.03-4.62; P = .04). However, no significant differences were encountered in the subjective and functional scores collected, with the exception of the Constant-Murley Score, which was significantly higher in patients with smaller tears at the index procedure. Strength testing also revealed significantly superior abduction and flexion strength in this group, and radiographs showed a significantly higher acromion-humeral distance and lower grades of osteoarthritis. Patients with an intact supraspinatus at final follow-up showed superior results in all functional scores, greater satisfaction, superior abduction and flexion strength, higher acromion-humeral distance, and lower grades of osteoarthritis.

Conclusion RC tear size at the time of surgery significantly affects supraspinatus integrity at a minimum follow-up of 10 years. However, a larger tear is not associated with an inferior subjective result, although it negatively influences abduction and flexion strength, range of motion, and osteoarthritis progression. Intraoperative efforts to obtain a durable RC repair are encouraged, since supraspinatus integrity at final follow-up influences clinical and functional outcomes, patient satisfaction, and osteoarthritis progression.

BACK

Factors Predicting the Outcome After Arthroscopically Assisted Stabilization of Acute High-Grade Acromioclavicular Joint Dislocations

Nina Maziak, MD, Laurent Audige, PhD, Carmen Hann, MD, Marvin Minkus, MD, Markus Scheibel, MD

First Published August 2, 2019; pp. 2670–2677

https://doi.org/10.1177/0363546519862850

Background Factors influencing the outcome after arthroscopically assisted stabilization of acute high-grade acromioclavicular (AC) joint dislocations remain poorly investigated.

Purpose To identify determinants of the radiological outcome and investigate associations between radiological and clinical outcome parameters.

Study Design Cohort study; Level of evidence, 3.

Methods The authors performed a retrospective analysis of patients who underwent arthroscopically assisted stabilization for acute high-grade AC joint dislocations. The following potential determinants of the radiological outcome were examined using univariable and multivariable regression analyses: timing of surgery, initial AC joint reduction, isolated coracoclavicular (CC) versus combined CC and AC stabilization, ossification of the CC ligaments, age, and overweight status. In addition, associations between radiological (ie, CC difference, dynamic posterior translation [DPT]) and clinical outcome parameters (Subjective Shoulder Value, Taft score [TS] subjective subcategory, and Acromioclavicular Joint Instability Score [ACJI] pain subitem) were evaluated using univariable analysis.

Results One hundred four patients with a mean (±SD) age of 38.1 ± 11.5 years were included in this study. The mean postoperative follow-up was 2.2 ± 0.9 years. Compared with patients with an overreduced AC joint after surgery, the CC difference was 4.3 mm (95% CI, 1.3-7.3; P = .006) higher in patients with incomplete reduction. Patients with anatomic reduction were 3.1 times (95% CI, 1.2-7.9; P = .017) more likely to develop DPT than those with an overreduced AC joint. An incompletely reduced AC joint was 5.3 times (95% CI, 2.1-13.4; P < .001) more likely to develop DPT versus an overreduced AC joint. Patients who underwent isolated CC stabilization were 4.8 times (95% CI, 1.1-21.0; P = .039) more likely to develop complete DPT than patients with additional AC stabilization. Significantly higher CC difference values were noted for patients who reported pain on the subjective TS (P = .025). Pain was encountered more commonly in patients with DPT (PTS = .049; PACJI = .038).

Conclusion Clinicians should consider overreduction of the AC joint because it may lead to favorable radiological results. Because of its association with superior radiographic outcomes, consideration should also be given to the use of additional AC cerclage.

BACK

The Incidence of Traumatic Posterior and Combined Labral Tears in Patients Undergoing Arthroscopic Shoulder Stabilization

Saqib Javed, FRCS (T&O), Daniel Gheorghiu, FRCS (T&O), Emma Torrance, BSc (Hons), PhD, Puneet Monga, FRCS (T&O), MD, Lennard Funk, FRCS (T&O), FFSEM (UK), Michael Walton, FRCS (T&O)

First Published August 8, 2019; pp. 2686–2690

https://doi.org/10.1177/0363546519865910

Background Posterior and combined shoulder instabilities have been reported as accounting for only 2% to 5% of cases. More recently, an increased incidence of posterior capsulolabral tear has been reported.

Purpose To assess the incidence of posterior and combined labral tears in a large cohort of patients with surgically treated shoulder labral tears.

Study Design Case series; Level of evidence, 4.

Methods This was a retrospective study that evaluated 442 patients who underwent an arthroscopic capsulolabral repair over a 3-year period. Patients were categorized according to the location of their labral tear and whether their injury was sustained during sporting or nonsporting activity. Proportions of labral tears between sporting and nonsporting populations were compared using the chi-square test.

Results Patients had a mean age of 25.9 years and 89.6% were male. Isolated anterior labral tears occurred in 52.9%, with posterior and combined anteroposterior labral tears accounting for 16.3% and 30.8%, respectively. The frequency of posterior and combined lesions was greater in the sporting population compared with the nonsporting population (P = .013).

Conclusion Posterior and combined labral tears are more prevalent than previously reported, particularly in the sporting population.

BACK

Lower Extremity

Arthroscopy, Volume 35, Issue 9

Radiographic Prevalence of Sacroiliac Joint Abnormalities and Clinical Outcomes in Patients With Femoroacetabular Impingement Syndrome

Vignesh P. Krishnamoorthy, M.D., Edward C. Beck, M.D., M.P.H., Kyle N. Kunze, B.S., Jourdan M. Cancienne, M.D., Laura M. Krivicich, B.S., Sunikom Suppauksorn, M.D., Olufemi R. Ayeni, M.D., Shane J. Nho, M.D., M.S.

Arthroscopy, Volume 35, Issue 9

https://doi.org/10.1016/j.arthro.2019.03.030

Purpose
To quantify the prevalence of sacroiliac joint (SIJ) abnormalities in patients undergoing hip arthroscopy for femoroacetabular impingement syndrome (FAIS) by use of various imaging modalities and to compare outcomes based on SIJ abnormalities.

Methods
Plain radiographs, computed tomography (CT) scans, and magnetic resonance imaging (MRI) scans of patients who underwent primary hip arthroscopy for FAIS from January 2012 to January 2016 were identified. The exclusion criteria included patients undergoing bilateral or revision surgery, those with a history of dysplasia, and those with less than 2 years' follow-up. On radiographs, the SIJs were graded using modified New York criteria for spondyloarthropathy. CT and MRI scans were reviewed for joint surface erosion, subchondral sclerosis, joint space narrowing, pseudo-widening, bone marrow edema, and ankylosis. Patients with SIJ abnormalities were matched to patients without SIJ abnormalities in a 1:2 ratio by age and body mass index. Outcomes included the Hip Outcome Score–Activities of Daily Living (HOS-ADL), Hip Outcome Score–Sports Subscale (HOS-SS), modified Harris Hip Score (mHHS), visual analog scale (VAS) for pain, and VAS for satisfaction.

Results
Of 1,009 consecutive patients, 743 (73.6%) were included; 187 (25.2%) showed SIJ changes. Of these 187 patients, 164 (87.7%) had changes on plain radiographs, 88 (47.1%) had changes on CT, and 125 (66.8%) had changes on MRI. SIJ changes on any imaging modality were weakly correlated with pain to palpation of the SIJ ($r = 0.11$, $P = .004$) on physical examination. Pain to palpation of the SIJ on physical examination (odds ratio [OR], 1.12; $P = .031$) and a history of SIJ pain (OR, 1.93; $P = .018$) increased the odds of having an SIJ abnormality on any imaging modality. After matching, patients without SIJ abnormalities had a significantly greater HOS-ADL (95.4 vs 90.6, $P = .001$), HOS-SS (91.1 vs 77.5, $P < .001$), and mHHS (91.3 vs 84.5, $P < .001$) and a significantly lower VAS pain score (10.9 vs 25.7, $P < .001$) than patients with abnormalities at a mean follow-up of 34.1 ± 9.7 months (range, 24-54 months). Patients without SIJ abnormalities had greater odds of achieving the minimal clinically important difference for the HOS-ADL (OR, 2.91; $P = .001$) and for the HOS-SS (OR, 2.83; $P < .001$) but not for the mHHS (OR, 1.73; $P = .081$).

BACK

Conclusions
A high prevalence of SIJ abnormalities (25.2%) is seen on imaging in FAIS patients. These patients may show significantly inferior clinical outcomes and persistent postoperative pain after FAIS treatment. The results of this study may allow treating orthopaedic surgeons to better inform patients with SIJ abnormalities that they may not achieve clinically significant outcome improvement after hip arthroscopy.

Level of Evidence
Level III, retrospective comparative study.

BACK

Fascia Iliaca Blockade With the Addition of Liposomal Bupivacaine Versus Plain Bupivacaine for Perioperative Pain Management During Hip Arthroscopy: A Double-Blinded Prospective Randomized Control Trial

Richard L. Purcell, M.D., Daniel I. Brooks, Ph.D., Theodore J. Steelman, M.D., Daniel L. Christensen, M.D., Jonathan F. Dickens, M.D., Michael L. Kent, M.D., Michael P. McCabe, M.D., Terrence D. Anderson, M.D.

Arthroscopy, Volume 35, Issue 9, Received: November 1, 2018; Accepted: March 24, 2019

https://doi.org/10.1016/j.arthro.2019.03.056

Purpose
To determine in a prospective, randomized fashion whether liposomal bupivacaine extends the effectiveness of decreased pain scores and reduces narcotic requirements following hip arthroscopy when used in addition to a fascia iliaca blockade with plain bupivacaine alone.

Methods
Double-blinded prospective randomized controlled trial of participants undergoing hip arthroscopy. Randomized to receive a fascia iliaca blockade with 40 mL 0.25% plain bupivacaine (100 mg; control group) or 20 mL 0.5% plain bupivacaine (100 mg) plus 20 mL liposomal bupivacaine (266 mg; study group). The primary outcome was Defense and Veterans Pain Rating Scale (DVPRS) scores in the postanesthesia care unit and on postoperative days (POD) 1, 2, 3, and 14. Secondary outcomes included postoperative opioid consumption and subjective loss of anterior thigh sensation.

Results
Seventy-four patients were enrolled, and 70 completed the study; 37 were randomized to the control group and 33 to the study group. There was no significant difference in postoperative DVPRS scores at any time point. There was no significant difference in total postoperative opioid use during any postoperative time points. While most patients reported anterior thigh numbness at discharge, significantly more patients in the study group reported anterior thigh numbness at POD2 (control, 19/37 numb vs study, 32/33 numb; $P < .0001$) and at POD3 (control, 8/37 numb vs study, 26/33 numb; $P < .0001$).

Conclusions
In this prospective evaluation comparing plain bupivacaine versus the liposomal formulation administered via a fascia iliaca blockade there were no significant differences in postoperative pain scores and narcotic pill usage. Given the highly significant findings of prolonged anterior thigh numbness out to POD3 in patients who received liposomal bupivacaine, this formulation did exhibit prolonged effects; however, it did not provide improved pain control when used in this surgical population, likely due to the innervation of the hip capsule from differential nerve plexi. Given the 6-fold increased cost of using the liposomal formulation, we are unable to recommend its use via a fascia iliaca blockade for hip arthroscopy.

Level of Evidence
Level I, therapeutic study.

BACK

Effectiveness of Adhering Adipose-Derived Stem Cells to Defective Cartilage in Promoting Cartilage Regeneration in a Rabbit Model

Hitoaki Numata, M.D., Junsuke Nakase, M.D., Ph.D, Takeshi Oshima, M.D., Ph.D., Hiroyuki Tsuchiya, M.D., Ph.D.

Arthroscopy, Volume 35, Issue 9, Received: October 5, 2018; Accepted: March 4, 2019

https://doi.org/10.1016/j.arthro.2019.03.018

Purpose
To evaluate the therapeutic effect of using a local adherent technique to transplant adipose-derived stem cells (ADSCs) for cartilage regeneration in a rabbit model for patients with traumatic damage or osteochondritis dissecans.

Methods
Cartilage defects were created in the trochlear groove of 60 adult white rabbit knees. The rabbits were either left untreated (control group), treated with intra-articularly injected ADSCs (injected group), or treated by adhering ADSCs (adherent group). The 3 groups were compared at 4, 12, and 24 weeks postoperatively using the International Cartilage Repair Society macroscopic scoring system and a modified Wakitani histologic grading system to quantitatively evaluate the regenerated cartilage. The degree of defect repair, integration to the border zone, macroscopic appearance, cell morphology, matrix staining, surface regularity, cartilage thickness, and integration of the donor with the host were evaluated.

Results
The mean International Cartilage Repair Society scores in the control, injected, and adherent groups were 6.4 ± 2.9, 7.6 ± 0.8, and 7.6 ± 1.4, respectively, at 4 weeks; 6.2 ± 2.4, 8.2 ± 1.5, and 9.6 ± 1.0, respectively, at 8 weeks; and 7.6 ± 1.0, 8.4 ± 1.4, and 10.2 ± 1.7, respectively, at 24 weeks. Although the scores were higher in the adherent group, no significant difference was noted. The mean modified Wakitani scores in the control, injected, and adherent groups were 3.8 ± 2.0, 5.1 ± 1.8, and 7.8 ± 1.3, respectively, at 4 weeks (P = .041); 5.1 ± 1.0, 5.4 ± 2.7, and 9.6 ± 1.4, respectively, at 12 weeks (P = .016); and 5.4 ± 1.0, 5.9 ± 1.5, and 9.8 ± 1.8, respectively, at 24 weeks (P = .007).

Conclusions
The histologic modified Wakitani scores showed that adhering ADSCs to osteochondral cartilage defects was more effective than intra-articular injection for promoting cartilage regeneration.

Clinical Relevance
Local adhesion of ADSCs can promote cartilage regeneration and may be a treatment option for cartilage repair.

BACK

Radiologic and Clinical Outcomes After Hamstring Anterior Cruciate Ligament Reconstruction Using an Adjustable-Loop Cortical Suspension Device With Retensioning and Knot Tying

Nam-Hong Choi, M.D., Tae-Hoon Park, M.D., Whang-Kyun Oh, M.D., Brian N. Victoroff, M.D.

Arthroscopy, Volume 35, Issue 9, Received: September 4, 2018; Accepted: March 11, 2019

https://doi.org/10.1016/j.arthro.2019.03.029

Purpose
To report magnetic resonance imaging (MRI) findings and clinical outcomes after anterior cruciate ligament reconstruction using an adjustable-loop device (ALD) with retensioning and knot tying.

Methods
The inclusion criteria were patients who underwent hamstring anterior cruciate ligament reconstruction using an ALD with retensioning and knot tying between May and December 2015 and were followed up for a minimum of 2 years. The exclusion criteria were patients with combined ligament injury, revision surgery, or reinjury after reconstruction. After initial tightening of the adjustable loop, retensioning and knot tying were performed and the graft was fixed at the tibia. Multiplanar reformatted images of 3-T MRI scans were obtained on the immediate postoperative day and at 6 months after surgery to measure the gap between the top of the graft and the top of the femoral tunnel (i.e., tunnel-graft gap). Differences in the tunnel-graft gap between the immediate postoperative day and 6 months after surgery (i.e., gap difference) were calculated and correlated with knee stability and functional outcomes.

Results
Thirty-six patients were enrolled in this study. The mean tunnel-graft gap was 2.1 ± 2.8 mm on the immediate postoperative day and 4.6 ± 3.5 mm at 6 months after surgery ($P < .001$). The mean gap difference was 2.5 ± 2.0 mm. The mean KT-1000 measurement was 1.5 ± 2.2 mm, and mean Lysholm score and Tegner activity scale score were 93.6 ± 5.5 and 5.6 ± 1.5, respectively. The gap difference correlated negatively with the follow-up Lysholm score ($P = .004$); however, knee stability and the Tegner activity scale score were not correlated.

Conclusions
Although the ALD was secured by retensioning and knot tying, MRI showed that the graft was not fully inserted in some patients and the tunnel-graft gap increased at 6 months' follow-up. The increase in the tunnel-graft gap did not correlate with knee stability or the Tegner activity scale score but correlated negatively with the Lysholm score.

Level of Evidence
Level IV, therapeutic case series.

BACK

Clinical Outcomes of Revision Osteochondral Allograft Transplantation

Annabelle Davey, B.S., Rachel M. Frank, M.D.b, Kevin C. Wang, M.D., Taylor M. Southworth, B.S., Brian J. Cole, M.D., M.B.A.

Arthroscopy, Volume 35, Issue 9

https://doi.org/10.1016/j.arthro.2019.03.055

Purpose
To assess the survivorship, clinical outcomes, and radiographic outcomes of patients who have undergone revision osteochondral allograft (OCA) to the knee in a retrospective case series.

Methods
Nine patients who underwent revision OCA by the senior author between January 2003 and December 2015 with a minimum follow up of 2 years were reviewed retrospectively. Patients completed patient-reported outcome surveys containing the visual analog scale, the International Knee Documentation Committee, the Knee injury and Osteoarthritis Outcome Score, Lysholm score, and the Short-Form 12. Radiographic analysis included anteroposterior view graded via the Kellgren and Lawrence scale. Complications and reoperations were analyzed, with failure defined as conversion to arthroplasty. (Institutional review board 15050301.)

Results
One of 10 consecutive patients was lost to follow up, for an overall follow-up rate of 90% (5 males, 4 females); mean follow up, 4.53 ± 3.17 years. The median patient age at the time of revision OCA was 33 years (interquartile range [IQR], 8.6), the median defect size was 4.0 cm2 (IQR, 0), and the median time from index OCA to revision OCA was 2.9 years (IQR, 1.9). Five patients (50%) underwent subsequent surgery at a median of 1.92 years (IQR, 7.25), with 1 progressing to arthroplasty at 23 months after revision OCA, for an overall failure rate of 11%. There were no significant differences in any of the patient-reported outcome assessments compared with prerevision OCA (postindex OCA) values at final follow up ($P > .05$ for all). Similarly, there were no significant differences in Kellgren and Lawrence score before and after surgery ($P = .1$).

Conclusions
At a mean 4.5 years following revision OCA, there was an 89% graft survivorship rate in a series of 9 patients, with no statistical changes in the radiographic progression of arthritis.

Level of Evidence
Level IV, case series.

BACK

Combined Reconstruction of the Anterolateral Ligament in Patients With Anterior Cruciate Ligament Injury and Ligamentous Hyperlaxity Leads to Better Clinical Stability and a Lower Failure Rate Than Isolated Anterior Cruciate Ligament Reconstruction

Camilo Partezani Helito, M.D. Ph.D., Marcel Faraco Sobrado, M.D., Pedro Nogueira Giglio, M.D., Marcelo Batista Bonadio, M.D., José Ricardo Pécora, M.D., Ph.D., Gilberto Luis Camanho, M.D., Ph.D., Marco Kawamura Demange, M.D., Ph.D.

Arthroscopy, Volume 35, Issue 9, Received: December 22, 2018; Accepted: March 30, 2019

https://doi.org/10.1016/j.arthro.2019.03.059

Purpose
To compare functional outcomes, residual instability, and rupture rates in patients with ligamentous hyperlaxity undergoing isolated anterior cruciate ligament (ACL) reconstruction or combined ACL and anterolateral ligament (ALL) reconstruction.

Methods
Two groups of patients were evaluated and compared retrospectively. Both groups consisted of patients with ACL injuries and associated ligamentous hyperlaxity, defined based on the modified Beighton scale with a minimum score of 5. Group 1 patients underwent anatomical ACL reconstruction, and group 2 patients underwent anatomical ACL reconstruction combined with ALL reconstruction. Group 1 consisted of historical controls. The presence of associated meniscal injury, subjective International Knee Documentation Committee and Lysholm functional scores, KT-1000 measurements, the presence of a residual pivot-shift, and the graft rupture rate were evaluated. The study was performed at University of São Paulo in Brazil.

Results
Ninety patients undergoing ACL reconstruction with ligamentous hyperlaxity were evaluated. The mean follow up was 29.6 ± 6.2 months for group 1 and 28.1 ± 4.2 months for group 2 (P = .51). No significant differences were found between the groups regarding Beighton scale, gender, the duration of injury before reconstruction, follow-up time, preoperative instability, or associated meniscal injuries. The mean age was 29.9 ± 8.1 years in group 1 and 27.0 ± 9.1 years in group 2 (P = .017). In the final evaluation, group 2 patients showed better anteroposterior clinical stability as evaluated by KT-1000 arthrometry (P = .02), better rotational stability as evaluated by the pivot-shift test (P = .03) and a lower reconstruction failure rate (21.7% [group 1] vs 3.3% [group 2]; P = .03). Clinical evaluations of postoperative functional scales showed no differences between the 2 groups (P = .27 for International Knee Documentation Committee; P = .41 for Lysholm).

Conclusions
Combined ACL and ALL reconstruction in patients with ligamentous hyperlaxity resulted in a lower failure rate and improved knee stability parameters compared to isolated ACL reconstruction. No differences were found in the functional scales.

Level of evidence
Level III, case control study.

BACK

Return to Sports and Clinical Outcomes After Arthroscopic Anatomic Posterior Cruciate Ligament Reconstruction With Remnant Preservation

Dhong Won Lee, M.D., Jin Goo Kim, M.D., Ph.D., Sang Jin Yang, M.S., Ph.D., Seung Ik Cho, M.S.

Arthroscopy, Volume 35, Issue 9, Received: November 13, 2018; Accepted: March 30, 2019

https://doi.org/10.1016/j.arthro.2019.03.061

Purpose
To evaluate the clinical outcomes of transtibial posterior cruciate ligament reconstruction (PCLR) with remnant preservation in highly active patients and to investigate the rate of return to sports (RTS), quality of sports activities, and patient satisfaction.

Methods
Patients with a Tegner activity scale of >5 who underwent isolated PCLR from 2013 to 2016 with minimum 2-year follow-up were retrospectively reviewed. Single-bundle PCLR was performed using fresh frozen allograft irradiated with 50 kGy. Subjective assessments included the Lysholm score, subjective International Knee Documentation Committee score, and Tegner activity scale. A questionnaire elicited information associated with RTS and satisfaction. Functional tests included isokinetic muscle strength and single-leg hop tests.

Results
We evaluated 52 patients, with a mean (± standard deviation) follow-up duration of 29.5 ± 8.6 months. The subjective assessments and functional tests significantly improved postoperatively (all $P < .001$). Mean time to return to full sports activity was 9.7 ± 5.1 months. Thirty-eight (73.1%) and 45 (86.5%) patients could return to previous sports activities at 9 and 24 months, respectively. A sports-experience questionnaire indicated that 48% and 69.2% of the patients were participating with unlimited effort and performance, respectively, and no pain at 9 and 24 months. Multivariate analysis indicated that extensor deficit (odds ratio [OR] 4.2, 95% confidence interval [CI] 1.342 to 17.839), flexor deficit at 60°/s (OR 3.8, 95% CI 1.081 to 14.476), Limb Symmetry Index (%) for the single-leg vertical jump test (OR 2.2, 95% CI 1.212 to 9.227), and satisfaction (OR 2.8, 95% CI 1.186 to 10.281) were significantly associated with failure of not returning to preinjury sports activity levels at the 9-month follow-up.

Conclusions
Arthroscopic anatomic PCLR with remnant preservation showed high rates of RTS and high patient satisfaction, as well as satisfactory clinical results in highly active patients. This surgical technique could be an effective treatment for grade III posterior cruciate ligament injury in highly active patients.

Level of Evidence
Level IV, therapeutic case series

BACK

Arthroscopic Reduction and Minimally Invasive Surgery in Supination–External Rotation Ankle Fractures: A Comparative Study With Open Reduction

Chao-Ching Chiang, M.D., Yun-Hsuan Tzeng, M.D., Chien-Fu Jeff Lin, M.D., Ph.D., Chien-Shun Wang, M.D., Chun-Cheng Lin, M.D., Ming-Chau Chang, M.D.

Arthroscopy, Volume 35, Issue 9

https://doi.org/10.1016/j.arthro.2019.03.051

Purpose
To describe an algorithm for arthroscopic reduction and minimally invasive surgery (ARMIS) and compare the surgical outcomes with standard open reduction–internal fixation (ORIF) for the treatment of supination–external rotation (SER) ankle fractures.

Methods
The inclusion criteria for this study were patients aged 16 years or older, the presence of a unilateral SER fracture, and injuries less than 2 weeks old. We retrospectively identified patients with SER fractures who underwent ORIF from January 2008 to December 2011 or ARMIS from January 2012 to December 2015. Data collected in December 2013 for the ORIF group and in December 2017 for the ARMIS group were compared. The algorithm for ARMIS was minimally invasive plating for lateral malleolar fractures first, followed by ankle arthroscopy for detection of syndesmotic injuries and then arthroscopic reduction of medial malleolar fractures or mini-open repair of the deltoid ligament. The talocrural angle, fibular length, tibiomedial malleolar angle, medial clear space, and tibiofibular clear space were measured radiographically. Functional evaluations included the visual analog scale pain score, American Orthopaedic Foot & Ankle Society ankle-hindfoot scales, and range of motion of bilateral ankles. Complications and reoperations were recorded for comparison.

Results
A total of 105 patients with SER fractures, 65 in the ARMIS group and 40 in the ORIF group, were included. Significantly lower incidences of complications (7.7% vs 27.5%, P = .006) and reoperations (1.5% vs 12.5%, P = .029) were found in the ARMIS group than in the ORIF group. More syndesmotic injuries were detected in the ARMIS group than in the ORIS group (80% vs 57.5%, P = .021). The visual analog scale pain score was significantly lower on day 3 postoperatively in the ARMIS group than in the ORIS group (1.96 ± 1.18 vs 2.83 ± 1.07, P = .027). The postoperative stay was shorter in the ARMIS group than in the ORIF group (3.66 ± 1.39 days vs 4.46 ± 2.23 days, P = .024). The operative time was longer in the ARMIS group than in the ORIS group (105.22 ± 27.13 minutes vs 93.59 ± 22.79 minutes, P = .038). A longer fluoroscopic time (0.43 ± 0.25 minutes vs 0.17 ± 0.07 minutes, P < .001) and a higher dose of irradiation (1,216.46 ± 603.99 μGy vs 389.38 ± 217.89 μGy, P < .001) were observed in the ARMIS group. No significant differences in radiographic measurements were found between the operative and nonoperative ankles in both groups.

Conclusions
Our algorithm and the ARMIS techniques may be a safe, reliable, and effective option in the treatment of SER fractures. ARMIS achieves promising surgical outcomes with less early postoperative pain, a shorter postoperative stay, and lower incidences of complications and reoperations compared with ORIF. However, the operative time is longer and the irradiation dose is higher with the ARMIS techniques.

Level of Evidence
Level III, retrospective comparative study.

BACK

A Sport-specific Analysis of the Epidemiology of Hip Injuries in National Collegiate Athletic Association Athletes From 2009 to 2014

Christian A. Cruz, M.D., Yehuda Kerbel, M.D., Christopher M. Smith, M.D., John Prodromo, M.D., Jeffrey D. Trojan, M.S., Mary K. Mulcahey, M.D.

Arthroscopy, Volume 35, Issue 9

https://doi.org/10.1016/j.arthro.2019.03.044

Purpose
To describe the injury rates, mechanisms, time loss, and rates of surgery for hip/groin injuries in National Collegiate Athletic Association (NCAA) athletes across 25 collegiate sports during the 2009/10 to 2013/14 academic years.

Methods
Data from the 2009/10 to 2013/14 academic years were obtained from the NCAA Injury Surveillance Program (ISP). Rates of hip/groin injuries, mechanism of injury, time lost from competition, and surgical treatment were calculated. Differences between sex-comparable sports were quantified using rate ratios and injury proportion ratios. A sport-specific biomechanical classification system, which included cutting, impingement, overhead/asymmetric, endurance, and flexibility sports, was applied for subgroup analysis.

Results
In total, 1,984 hip injuries were reported in 25 NCAA sports, including 9 male and female sports, 3 male-only sports, and 4 female-only sports between the years 2009/10 and 2013/14, resulting in an overall hip injury rate of 53.1/100,000 athletic exposures (AEs). In sex-comparable sports, (basketball, cross-country, lacrosse, ice hockey, indoor track, outdoor track, soccer, swimming, and tennis), men were more commonly affected than women (59.53 vs 42.27 per 100,000 AEs respectively; rate ratio, 1.41; 95% confidence interval, 1.28-1.55). Subgroup analysis demonstrated that the highest rate of hip injuries per 100,000 AEs occurred in impingement sports (96.9). Endurance sports had the highest proportion of injured athletes with time lost >14 days (9.5%). For impingement-type sports, the most common mechanism of injury was no apparent contact (48.2%). The rate of athletes undergoing surgery per 100,000 AEs was highest in impingement-type sports (2.0).

Conclusions
We have identified that impingement-type sports are most frequently associated with hip injuries. Additionally, this study demonstrates that hip injuries sustained in athletes who played impingement-type sports had a significantly higher rate of surgical intervention than other sport classifications.

Level of Evidence
Level III, prognostic study.

BACK

Hip Arthroplasty After Hip Arthroscopy: Are Short-term Outcomes Affected? A Systematic Review of the Literature

Philip J. Rosinsky, M.D., Cynthia Kyin, B.A., Jacob Shapira, M.D., David R. Maldonado, M.D., Ajay C. Lall, M.D., M.S., Benjamin G. Domb, M.D.

Arthroscopy, Volume 35, Issue 9

https://doi.org/10.1016/j.arthro.2019.03.057

Purpose
To systematically review the published literature regarding intraoperative measures, patient-reported outcomes, and complications of total hip arthroplasty (THA) in patients with or without a history of prior hip arthroscopy.

Methods
PubMed and Cochrane Library databases were searched for all publications regarding patients who had undergone a THA after a prior ipsilateral hip arthroscopy. Included studies were comparative in nature and included postoperative outcome measures. Excluded studies were opinion articles, review articles, cadaveric studies, case reports, or technique articles. Patient demographics, surgical outcomes, complications, and patient-reported outcome measures (PROMs) were recorded. This study was performed at the American Hip Institute.

Results
Eight studies were included in this systematic review. These included 305 hips with a THA following a prior hip arthroscopy, with 502 matched control hips. Mean time for conversion from prior hip arthroscopy was 23 months and mean follow up was 35.9 versus 36.1, for the prior arthroscopy and control groups respectively. No significant differences were found regarding intraoperative measures and PROMs. There was no difference in rate of revisions at latest follow up. However, there was a trend toward higher rates of dislocations and infections in the prior hip arthroscopy group.

Conclusion
The short-term PROMs of those who underwent total hip arthroplasty with a prior history of an ipsilateral hip arthroscopy are comparable to those of patients undergoing primary THA. Although a conclusion could not be made regarding differences in complication rates between patients with a history of prior arthroscopy and patients undergoing primary THA, it is still imperative to consider the possible implications of a prior hip procedure on postoperative stability and infection rates. In summary, hip arthroplasty following a prior hip arthroscopy is a safe procedure with comparable short-term outcomes to primary arthroplasty.

Level of Evidence
Level III, systematic review.

BACK

Knee Surgery, Sports Traumatology, Arthroscopy (KSSTA), Volume 27, Issue 9

Arthroscopic microfracture vs. arthroscopic autologous matrix-induced chondrogenesis for the treatment of articular cartilage defects of the talus

Christoph Becher, Michael Alexander Malahias, Moataz Mahmoud Ali, Nicola Maffulli, Hajo Thermann

DOI
https://doi.org/10.1007/s00167-018-5278-7

Purpose
Microfracture is an established method to treat osteochondral defects of the talus. The value of the addition of an acellular matrix is still under debate. This study compared the results of arthroscopic microfracture vs. arthroscopic autologous matrix-induced chondrogenesis using a collagen I/III matrix (AMIC) in the management of articular cartilage defects of the talus.

Methods
Patients with a minimum follow-up of 5 years after arthroscopic management for an articular cartilage defect of the talus with either microfracture alone or an additional acellular matrix were matched according to age, sex and BMI. The Hannover Scoring System for the ankle (HSS) and a Visual analog scale (VAS) for pain, function and satisfaction were used to evaluate the clinical outcome. Postoperative MRI was used to assess cartilage repair tissue based on the degree of defect repair and filling of the defect, integration to border zone, surface of the repair tissue, structure of the repair tissue, and subchondral bone alterations.

Results
Thirty-two patients (16 microfracture, 16 AMIC) were included. No significant between-group differences were observed in demographic data and preoperative score values. Both groups showed statistically significant improvement when comparing the pre- and postoperative score values. No statistically significant differences were identified between the median values of the groups with the HSS (microfracture: 82 (range 71–96) points; AMIC 88 (range 40–98) points). Accordingly, no significant differences were observed for the VAS pain (microfracture: 0.95 (range 0–3.8); AMIC: 1.0 (range 0–8.5)), VAS function (microfracture: 8.4 (range 3.5–10); AMIC: 9.0 (range 1.5–10)) and VAS satisfaction (microfracture: 8.9 (range 2.8–10); AMIC: 9.45 (range 1.5–10)). MRI showed regeneration of tissue in the treated area without differences between the two groups.

Conclusion
Good clinical results were observed for arthroscopic microfracture with or without an additional acellular collagen I/III matrix in the treatment for articular cartilage defects of the talus. It appears that for defects as treated in this study, it is not worthwhile adding the collagen I/III matrix to the microfractures.

Level of evidence
III.

BACK

Stress fractures of the medial malleolus in the professional soccer player demonstrate excellent outcomes when treated with open reduction internal fixation and arthroscopic spur debridement

Anthony Nguyen, Ian Beasley, James Calder

DOI
https://doi.org/10.1007/s00167-019-05483-6

Purpose
Despite a debilitating effect on athletic performance and an incidence of up to 4% of all stress fractures, there have been only 31 documented cases of medial malleolus stress fractures (MMSF) to our knowledge in the literature. The largest series to date is presented in this study, of 16 professional soccer players undergoing uniform operative treatment. The authors attempt to justify their preferred treatment of MMSFs in the professional soccer player, with an emphasis on patient satisfaction, clinical and radiographic union, and return to high level sport. The authors aim to prove an association between lower limb varus alignment and the development of MMSFs.

Method
Sixteen professional soccer players of mean age 23.6 years were analysed. A biomechanic assessment was performed. Preoperative CT+-MRI scan were performed to assess fracture lines and the presence of anteromedial tibial and/or talar spurs; which are the likely pathognomic lesion in the development of MMSFs. All patients underwent open reduction and internal fixation with three screws, as well as arthroscopic debridement of impringement spurs, and concentrated bone marrow aspirate into the fracture site. Patients completed the Ogilvie–Harris score, and all patients had CT scans at 3 months and until union.

Results
All the patients in this cohort had causative bony spurs that were debrided at surgery. All of the cohort achieved clinical union. All patients were able to return to professional football; at the same level as prior to the injury. There was complete cohort follow up; and 81% of patients were graded as excellent and 19% as good by the Ogilvie–Harris score. We noted 50% of our cohort demonstrated varus malalignment, either genu varum or hindfoot varus.

Conclusions
The authors conclude that open reduction and internal fixation of MMSFs with screws combined with arthroscopic spur debridement results in excellent clinical outcomes. It can be concluded that varus lower limb malalignment is a risk factor for MMSFs. Given the treatment controversy for these injuries, the results herein demonstrate that aggressive multimodal operative treatment produces excellent outcomes in high demand professional footballers. This study is the first to report a biomechanic association, which can alert the clinician to preventative measures; such as hindfoot orthoses.

Level of evidence
IV.

BACK

Vancomycin pre-soaking of the graft reduces postoperative infection rate without increasing risk of graft failure and arthrofibrosis in ACL reconstruction

Christoph Offerhaus, Maurice Balke, Juliane Hente, Mats Gehling, Simon Blend, lJürgen Höher

DOI
https://doi.org/10.1007/s00167-018-5323-6

Purpose
To investigate whether pre-soaking the graft in vancomycin during anterior cruciate ligament reconstruction (ACLR) reduces the postoperative infection rate and if this technique is associated with an increased rate of complications, including graft failure or arthrofibrosis.

Methods
A retrospective review of a prospective database was performed in 1779 patients who underwent ACLR over a period of 5 years, analysing the rate of postoperative deep knee infection. Group 1 and 2 both received perioperative IV antibiotics, while only group 2 underwent ACLR with grafts pre-soaked in a 5 mg/ml vancomycin solution. To analyse possible side effects associated with vancomycin use, 500 patients out of the overall study population (100 patients per year) were randomly selected and retrospectively interviewed for further postoperative complications including graft failure and arthrofibrosis as well as subjective evaluation of their knee by completing the IKDC form with a minimum mean follow-up of 37 months.

Results
In group 1, 22 out of 926 (2%) patients suffered a postoperative deep knee infection. In contrast, there were no postoperative infections in the second group of 853 patients (0%). 16 of 22 infections (73%) were caused by coagulase-negative Staphylococcus. Statistical analysis revealed a significantly reduced postoperative infection rate when bathing the autograft in vancomycin ($p < 0.01$). Analysis of the random sample revealed a significant decrease of graft failure with 8 reruptures in 257 patients (3%) in the vancomycin group compared to 16 cases of graft failure in 167 patients (10%) in the control group ($p < 0.05$). No differences were found in the rate of postoperative arthrofibrosis, Tegner or subjective outcome scores.

Conclusion
Prophylactic vancomycin pre-soaking of autografts during ACLR appears to be a viable, cost-effective and safe option to reduce the rate of deep infection compared to systemic antibiotics alone.

Level of evidence
III.

BACK

Using chloroprocaine for spinal anaesthesia in outpatient knee-arthroscopy results in earlier discharge and improved operating room efficiency compared to mepivacaine and prilocaine

Volker Gebhardt, Sebastian Hausen, Christel Weiss, Marc D. Schmittner

DOI
https://doi.org/10.1007/s00167-018-5327-2

Purpose
Knee arthroscopies are regularly carried out in an outpatient setting. The purpose of this retrospective analysis was to investigate the impact of different local anaesthetics for spinal anaesthesia on operating room efficiency (perioperative process times) and postoperative recovery. This study aims to determine the optimal LA for SPA in patients undergoing knee arthroscopy at a day-surgery centre.

Methods
Anaesthesia records of all patients undergoing knee arthroscopy under spinal anaesthesia from 2010 until 2017 were analysed. Patients were categorised as having received spinal anaesthesia with prilocaine, mepivacaine or chloroprocaine.

Results
Three-hundred and nine patients were included. Postoperative recovery was significantly faster for chloroprocaine 1% compared with both other local anaesthetics regarding all stages of recovery until discharge. Perioperative processes and surgery time were significantly shorter when chloroprocaine was used. Early postoperative pain occurred more frequently and earlier after spinal anaesthesia with chloroprocaine. Nevertheless, pain intensity did not differ between groups.

Conclusion
Spinal anaesthesia provides reliable blocks for outpatient knee arthroscopy. Considerations on the choice of local anaesthetic for spinal anaesthesia must include not only the recovery profile, but also the impact on operating room efficiency. Due to a superior recovery profile, low incidences of adverse side effects and raised operating room efficiency, chloroprocaine is the recommendable local anaesthetic for spinal anaesthesia in patients undergoing knee arthroscopy in an ambulatory setting. Since the frequency of SPA in patients undergoing outpatient knee arthroscopy is rising yearly, the results of this study are of high clinical relevance. The use of chloroprocaine leads to improved recovery, optimized perioperative processes and consecutively to a raised OR efficiency.

Level of evidence
III.

BACK

American Journal of Sports Medicine (AJSM), Volume 47, Issue 11

Demographic and Radiographic Factors Associated With Intra-articular Hip Cartilage Injury: A Cross-sectional Study of 1511 Hip Arthroscopy Procedures

Lasse Ishøi, PT, MSc, Kristian Thorborg, PT, MSportsPT, PhD, Otto Kraemer, MD, Bent Lund, MD, Bjarne Mygind-Klavsen, MD, Per Hölmich, MD, DMSc

First Published July 26, 2019; pp. 2617–2625

https://doi.org/10.1177/0363546519861088

Background Moderate to severe (grade 3-4) hip joint cartilage injury seems to impair function in patients with femoroacetabular impingement syndrome.

Purpose To investigate whether demographic and radiographic factors were associated with moderate to severe hip joint cartilage injury.

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

Methods Patients were identified in the Danish Hip Arthroscopy Registry. The outcome variables were acetabular cartilage injury (modified Beck grade 0-2 vs 3-4) and femoral head cartilage injury (International Cartilage Repair Society grade 0-2 vs 3-4). Logistic regressions assessed the association with the following: age (<30 vs 30-50 years); sex; sport activity level (Hip Sports Activity Scale); alpha angle (AA) assessed as normal (AA <55°), cam (55°≤ AA <78°), or severe cam (AA ≥78°); lateral center-edge angle (LCEA) assessed as normal (25°≤ LCEA ≤ 39°), pincer (LCEA >39°), or borderline dysplasia (LCEA <25°); joint space width (JSW) assessed as normal (JSW >4.0 mm), mild reduction (3.1 mm ≤ JSW ≤ 4.0 mm), or severe reduction (2.1 mm ≤ JSW ≤ 3.0 mm).

Results A total of 1511 patients were included (mean ± SD age: 34.9 ± 9.8 years). Male sex (odds ratio [OR], 4.42), higher age (OR, 1.70), increased AA (cam: OR, 2.23; severe cam: OR, 4.82), and reduced JSW (mild: OR, 2.04; severe: OR, 3.19) were associated ($P < .05$) with Beck grade 3-4. Higher age (OR, 1.92), increased Hip Sports Activity Scale (OR, 1.13), borderline dysplasia (OR, 3.08), and reduced JSW (mild: OR, 2.63; severe: OR, 3.04) were associated ($P < .05$) with International Cartilage Repair Society grade 3-4.

Conclusion Several demographic and radiographic factors were associated with moderate to severe hip joint cartilage injury. Most notably, increased cam severity and borderline dysplasia substantially increased the risk of grade 3-4 acetabular and femoral head cartilage injury, respectively, indicating that specific deformity may drive specific cartilage injury patterns in the hip joint.

BACK

Prevalence and Clinical Implications of Chondral Injuries After Hip Arthroscopic Surgery for Femoroacetabular Impingement Syndrome

Jorge Chahla, MD, PhD, Edward C. Beck, MPH, Kelechi Okoroha, MD, Jourdan M. Cancienne, MD, Kyle N. Kunze, BS, Shane J. Nho, MD, MS

First Published August 14, 2019; pp. 2626–2635

https://doi.org/10.1177/0363546519865912

Background Studies on the effect of partial- and full-thickness chondral damage of the hip on outcomes and the ability to achieve meaningful clinical outcomes are limited.

Purpose To determine the effect of full- and partial-thickness chondral injuries on 2-year outcomes in patients undergoing hip arthroscopic surgery for femoroacetabular impingement syndrome (FAIS) compared with patients without chondral damage, and to identify significant predictors of achieving the patient acceptable symptomatic state (PASS) and minimal clinically important difference (MCID).

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

Methods Data from consecutive patients with evidence of chondromalacia at the time of primary hip arthroscopic surgery with routine capsular closure for the treatment of FAIS by a single fellowship-trained surgeon between January 2012 and September 2016 were reviewed. Patients were divided into groups with partial-thickness (grade I-III) or full-thickness (grade IV) chondral defects and matched by age and body mass index (BMI) to patients without chondral injuries. Preoperative and postoperative outcomes were compared among the 3 groups, and a binary logistic regression analysis was utilized to identify significant predictors of achieving the MCID and PASS.

Results There were 634 patients included in the analysis, with a mean age of 34.5 ± 10.9 years and a mean BMI of 25.2 ± 4.7 kg/m2. A total of 493 (77.8%) patients had no evidence of chondral damage, 92 (14.5%) patients had partial-thickness chondral defects, and 49 (7.7%) patients had full-thickness chondral defects. There were statistically significant differences in the Hip Outcome Score (HOS)–Activities of Daily Living, HOS–Sports Subscale, modified Harris Hip Score, pain, and satisfaction ($P < .01$) among the 3 groups. Patients with grade IV chondromalacia experienced the poorest outcomes and lowest percentage of achieving the PASS. Predictors for achieving any PASS threshold included preoperative alpha angle (odds ratio [OR], 0.96; $P = .016$), absence of preoperative limping (OR, 7.25; $P = .002$), absence of preoperative chronic pain (OR, 5.83; $P = .019$), primary hip arthroscopic surgery (OR, 0.17; $P = .050$), patients who self-identified as runners (OR, 2.27; $P = .037$), and Tönnis grade 0 (OR, 2.86; $P = .032$). Male sex (OR, 2.49; $P = .015$) was the only predictor of achieving any MCID threshold.

Conclusion Patients with grade IV chondral defects experienced worse functional outcomes, lower satisfaction, and increased pain when compared with both patients without chondral damage or grade I-III chondromalacia at 2-year follow-up. Several predictors were associated with achieving clinically significant function in patients undergoing hip arthroscopic surgery for FAIS.

BACK

Patients With Borderline Hip Dysplasia Achieve Clinically Significant Outcome After Arthroscopic Femoroacetabular Impingement Surgery: A Case-Control Study With Minimum 2-Year Follow-up

Edward C. Beck, MPH, Benedict U. Nwachukwu, MD, MBA, Jorge Chahla, MD, PhD, Kyleen Jan, BS, Timothy C. Keating, MD, Sunikom Suppauksorn, MD, Shane J. Nho, MD,MS
First Published August 16, 2019; pp. 2636–2645

https://doi.org/10.1177/0363546519865919

Background There is a growing trend for hip arthroscopists to treat patients with borderline hip dysplasia (BHD) for femoroacetabular impingement syndrome (FAIS) without addressing the acetabular coverage. However, the literature of outcomes and failure rates for these patients is conflicting.

Purpose (1) To identify whether patients with BHD achieved 2-year similar patient-reported outcome, minimal clinically important difference (MCID), and patient acceptable symptomatic state (PASS) when compared with patients without BHD and (2) to identify predictors for achieving the MCID and PASS among patients with BHD who are undergoing hip arthroscopy for FAIS.

Study Design Cohort study; Level of evidence, 3.

Methods Data from consecutive patients who underwent primary hip arthroscopy with routine capsular closure for the treatment of FAIS between January 2012 and January 2017 were collected and retrospectively analyzed. Patients with BHD (lateral center-edge angle [LCEA], 20°-25°) were matched 2:1 by age, sex, and body mass index (BMI) to control patients with normal acetabular coverage (LCEA, >25°-40°). Patient-reported outcome, MCID, and PASS were compared between the groups. Multivariate logistic regression analysis identified significant predictors of achieving the MCID and PASS in the BHD group.

Results The MCID in the BHD group was defined as 9.2, 13.7, 8.5, and 15.2 for the Hip Outcome Score–Activities of Daily Living, Hip Outcome Score–Sport Specific, modified Harris Hip Score, and iHOT-12, respectively. Threshold scores for achieving the PASS in both groups were 87.9, 76.4, 78.1, and 60.0. A total of 112 patients were identified as having BHD (LCEA, 20°-25°) and were matched to 224 controls. Both groups saw statistically significant increases in score averages over the 2-year period; however, the differences between them were not statistically significant ($P > .05$ for all). There was no statistical difference in the frequency of the BHD and non-BHD cohorts achieving the MCID on at least 1 threshold score (86.6% vs 85.6%, $P = .837$) and the PASS (78.6% vs 79.8%, $P = .79$). There was, however, a statistically significant difference between the rates of patients with and without BHD achieving the PASS on the modified Harris Hip Score threshold (62.5% vs 74.5%, $P = .028$). The final logistic models demonstrated that lower BMI (odds ratio [OR], 0.872; $P = .029$), lower preoperative alpha angle (OR, 0.965; $P = .014$), and female sex (OR, 3.647; $P = .03$) are independent preoperative predictors of achieving the MCID, while lower preoperative alpha angle (OR, 0.943; $P = .018$) and self-reported limp (OR, 18.53; $P = .007$) are independent preoperative predictors of achieving the PASS.

Conclusion Outcome improvements in patients with BHD who are undergoing arthroscopic treatment with capsular closure for FAIS are not significantly different from patients with normal acetabular coverage. Lower BMI, lower alpha angle, absence of limp, and female sex are preoperative predictors of achieving meaningful clinically significant outcome improvements in patients with BHD.

BACK

Correlation of Single Assessment Numerical Evaluation Score for Sport and Activities of Daily Living to Modified Harris Hip Score and Hip Outcome Score in Patients Undergoing Arthroscopic Hip Surgery

Brian C. Lau, MD, Melissa Scribani, MPH, Tally Lassiter, MD, MHA, Jocelyn Wittstein, MD
First Published July 26, 2019; pp. 2646–2650

https://doi.org/10.1177/0363546519863411

Background The Single Assessment Numerical Evaluation (SANE) is a single-question outcome score that has been shown to be a reliable measure of outcomes for shoulder and knee injuries but has not been compared with other validated outcome scores in hip pathology managed arthroscopically.

Purpose To correlate SANE Activities of Daily Living (ADL) and Sport subscales with the modified Harris Hip Score (mHHS) and Hip Outcome Score (HOS) ADL and Sport subscales before and after arthroscopic hip surgery.

Study Design Cohort study (diagnosis); Level of evidence, 3.

Methods A retrospective review of a prospectively filled database of patients undergoing arthroscopic hip surgery by a single surgeon was conducted. Inclusion criteria included patients scheduled for arthroscopic hip surgery for femoroacetabular impingement, labral tear, or gluteus medius tear. Exclusion criteria included previous surgery to the hip. Outcome scores, including the mHHS, HOS ADL and Sport, and SANE ADL and Sport, were measured preoperatively and postoperatively at 3 months, 1 year, and then annually. Pearson correlation coefficients between preoperative SANE ADL and Sport and the mHHS, HOS ADL, and HOS Sport were calculated. Pearson correlation coefficients between postoperative SANE ADL and Sport and the mHHS, HOS ADL, and HOS Sport were also calculated.

Results Eighty-five patients (mean age, 37.9 years; range, 14-66 years; 57 females, 28 males) underwent arthroscopic hip surgery for assorted pathology. Mean follow-up was 8 months (range, 3-64 months). Based on the Pearson correlation coefficient, preoperative SANE ADL and Sport had a moderate correlation with the mHHS ($r = 0.66$; 95% CI, 0.47-0.79; $P < .0001$; $r = 0.54$; 95% CI, 0.31-0.71; $P < .0001$, respectively). Preoperative SANE ADL and Sport had a moderate correlation with HOS ADL ($r = 0.60$; 95% CI, 0.39-0.75; $P < .0001$) and HOS Sport ($r = 0.65$; 95% CI, 0.45-0.79; $P < .0001$). Postoperative SANE ADL and Sport had a strong correlation with the mHHS ($r = 0.69$; 95% CI, 0.50-0.82; $P < .0001$; $r = 0.78$; 95% CI, 0.61-0.88; $P < .0001$). Postoperative SANE ADL and Sport had a strong correlation with HOS ADL ($r = 0.79$; 95% CI, 0.65-0.88; $P < .0001$) and HOS Sport ($r = 0.88$; 95% CI, 0.78-0.94; $P < .0001$).

Conclusion This study showed a significant correlation between SANE and mHHS in patients undergoing arthroscopic hip surgery both pre- and postoperatively. SANE ADL and Sport had a strong correlation with HOS ADL and Sport preoperatively and short-term postoperatively. SANE scores are more highly correlated with traditional subjective outcome measures during the short-term postoperative period than they are preoperatively. The SANE score provides an efficient method of assessing outcomes after hip arthroscopy.

BACK

Miscellaneous

Arthroscopy, Volume 35, Issue 9

Should We Question the External Validity of Database Studies? A Comparative Analysis of Demographics

Alexander Beletsky, B.A., Yining Lu, B.A., Bhavik H. Patel, B.S., B.A., Jorge Chahla, M.D., Ph.D., Gregory L. Cvetanovich, M.D., Brian Forsythe, M.D., Brian J. Cole, M.D., Nikhil Verma, M.D.

Arthroscopy, Volume 35, Issue 9

https://doi.org/10.1016/j.arthro.2019.05.020

Purpose
To define the external validity of national and institutional databases for common sports medicine procedures.

Methods
Patient demographic data including age, sex, body mass index (BMI), and 4 racial categories were aggregated between 2007 and 2016 across 2 databases for 4 common sports medicine procedures: anterior cruciate ligament reconstruction, arthroscopic rotator cuff repair (RCR), partial meniscectomy (PMx), and both arthroscopic and open shoulder stabilization. The first database of interest was a prospectively collected institutional database. The second was the National Surgical Quality Improvement Program (NSQIP) database. Two-sample t tests were performed to examine mean differences (MDs) in age and BMI, and $\chi 2$ testing was used to test differences in sex and race.

Results
A total of 7,019 institutional and 108,881 NSQIP patients were examined. The NSQIP cohort was significantly older (MD, 1.40 years), included more female patients (42.60% female patients vs 35.67% female patients), and showed a different racial distribution compared with the institutional data (all $P < .0001$). The NSQIP PMx cohort (MD, 7.38 years) was significantly older and the NSQIP RCR cohort (MD, 1.97 years) was significantly younger than their institutional counterparts (all $P < .0001$). The NSQIP anterior cruciate ligament reconstruction cohort (MD, 2.53) showed a greater average BMI ($P < .0001$). The NSQIP RCR cohort (41.8% female patients vs 33.3% female patients) and PMx cohort (46.0% female patients vs 37.9% female patients) also included more female patients. Race was distributed variably between databases for each procedure code (all $P < .0001$).

Conclusions
Significant differences in age, BMI, sex, and race distributions were observed between an institutional database and the NSQIP database. This study underlines the importance of defining the generalizability of database research, particularly when significant demographic differences between databases may underlie differences in postoperative outcomes.

Level of Evidence
Level III, cross-sectional study.

BACK

In-Office Needle Arthroscopy: A Systematic Review of Indications and Clinical Utility

Kailai Zhang, B.H.Sc., Raphael J. Crum, B.Sc., Kristian Samuelsson, M.D., Ph.D., M.Sc., Edwin Cadet, M.D., Olufemi Rolland Ayeni, M.D., Ph.D., M.Sc., Darren de SA, M.D.

Arthroscopy, Volume 35, Issue 9, Received: December 14, 2018; Accepted: March 16, 2019

https://doi.org/10.1016/j.arthro.2019.03.045

Purpose
This review explores the current literature regarding both the clinical indications and utility of minimally invasive in-office needle arthroscopy (IONA) relative to conventional imaging modalities.

Methods
In compliance with R-AMSTAR (Revised Assessment of Multiple Systematic Reviews) and PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) guidelines, 3 databases (MEDLINE, Embase, and PubMed) were searched in July 2018, in addition to the conference abstract databases of 5 prominent meetings between 2013 and 2018, for studies using IONA for diagnostic purposes. Study quality was assessed with the Methodological Index for Non-Randomized Studies (MINORS) criteria.

Results
Among 932 conference abstracts and 369 studies identified, 11 publications involving 404 patients (395 knees and 9 shoulders) were included, with 9 clinical studies and 2 cost analyses. The median Methodological Index for Non-Randomized Studies (MINORS) score was 9 for noncomparative and 23 for comparative studies. Among the 9 clinical studies, IONA had a superior sensitivity, specificity, positive predictive value, and negative predictive value to magnetic resonance imaging (MRI) in the evaluation of knee osteoarthritis, anterior cruciate ligament insufficiency, and meniscal tears. IONA was comparable or inferior to MRI in the same parameters for the diagnosis of osteochondral defects and rotator cuff tears. In the 2 cost analyses, IONA had lower costs when used in place of MRI for treatment algorithms involving medial meniscal tears and rotator cuff tears but not lateral meniscal tears.

Conclusions
IONA holds potential for cost savings and improved diagnostic accuracy relative to MRI, primarily for intra-articular meniscal, ligamentous, and chondral defects of the knee. However, its current indications for use in other joints are limited to rotator cuff tears in the shoulder, making its diagnostic value in other joints much more limited. The current quality and breadth of evidence are significantly lacking, with numerous practical shortcomings. To improve acceptance of IONA, priority should be placed on establishing defined protocols, indications, contraindications, and patient perspectives for the procedure.

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

BACK