Revision Hip Arthroscopy: A Systematic Review of Diagnoses, Operative Findings, and Outcomes

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Purpose: To determine indications for, operative findings of, and outcomes of revision hip arthroscopy. Methods: A systematic review was registered with PROSPERO and performed based on PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines. Therapeutic clinical outcome studies reporting the indications for, operative findings of, and outcomes of revision hip arthroscopy were eligible for inclusion. All study-, patient-, and hip-specific data were extracted and analyzed. The Modified Coleman Methodology Score was used to assess study quality. Results: Five studies were included (348 revision hip arthroscopies; 333 patients; mean age, 31.4 ± 4.2 years; 60% female patients). All 5 studies were either Level III or IV evidence. The surgeon performing revision hip arthroscopy was the same as the primary hip surgeon in only 25% of cases. The mean time between primary and revision hip arthroscopy was 27.8 ± 7.0 months (range, 2 to 193 months). Residual femoroacetabular impingement was the most common indication for and operative finding of revision hip arthroscopy (81% of cases). The most commonly reported revision procedures were femoral osteochondroplasty (24%) and acetabuloplasty (18%). The modified Harris Hip Score was used in all 5 analyzed studies, with significant (P < .05) improvements observed in all 5 studies (weighted mean, 56.8 ± 3.6 preoperatively vs 72.0 ± 8.3 at final follow-up [22.4 ± 9.8 months]; P = .01). Other patient-reported outcomes (Non-Arthritic Hip Score, Hip Outcome Score, 33-item International Hip Outcome Tool, Short Form 12) showed significant improvements but were not used in all 5 analyzed studies. After revision hip arthroscopy, subsequent reported operations were hip arthroplasty in 11 patients and re-revision hip arthroscopy in 8 patients (5% total reoperation rate). Conclusions: Revision hip arthroscopy is most commonly performed for residual femoroacetabular impingement, with statistically significant and clinically relevant improvements shown in multiple patient-reported clinical outcome scores at short-term follow-up. The reoperation rate after revision hip arthroscopy is 5% within 2 years, including further arthroscopy or conversion to hip arthroplasty. Level of Evidence: Level IV, systematic review of Level III and IV studies.

Hip arthroscopy use has grown rapidly in recent years for hip conditions including acetabular labral tears and femoroacetabular impingement (FAI).1-3 FAI is an increasingly recognized cause of hip pain in young patients and may be a precipitating factor in the development of hip osteoarthritis.4 Patients undergoing hip arthroscopy for FAI and labral injuries have excellent short-term clinical outcomes, high return-to-sport rates, and low complication and reoperation rates.5-10 The limited reports of long-term hip arthroscopy outcomes to date indicate durable results, with hip arthritis at the time of the index procedure being a poor prognostic sign.11-16 Nevertheless, with the rapidly increasing number of primary procedures being performed, surgeons are increasingly encountering patients with recurrent or persistent pain after hip arthroscopy, prompting evolution of indications for revision hip arthroscopy. A recent large systematic review addressing reoperations after primary hip arthroscopy found a 1.9% rate of revision hip arthroscopy, second only to conversion to total hip arthroplasty (THA).17 The initial reports of revision hip arthroscopy noted high rates of residual, under-resected FAI as a common cause of failure,18 but relatively few
studies have addressed the indications for clinical outcomes of revision hip arthroscopy.

The purpose of this study was to perform a systematic review to determine the indications for, operative findings of, and outcomes of revision hip arthroscopy. We hypothesized that residual FAI would be the most common indication for and the most common operative finding during revision hip arthroscopy and that clinical outcome scores would improve at short-term follow-up.

Methods

Search Strategy
A systematic review of the Scopus and Medline databases was performed by 2 independent reviewers (G.L.C., J.D.H.) based on the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines and after PROSPERO registration (registration No. CRD42014014206; date of registration, November 12, 2014). The search was performed on September 30, 2014, and the included date range was from the inception of the databases to September 30, 2014. The search algorithm was as follows: (revision [title/abstract] OR failed[title/abstract] OR fail[title/abstract] OR failure[title/abstract] OR reoperation[title/abstract]) AND hip[title/abstract] AND arthroscopy[title/abstract]. Therapeutic clinical outcome studies with Level I through IV evidence reporting the indications for, operative findings of, and outcomes of revision hip arthroscopy with any length of follow-up were eligible for inclusion. We excluded diagnostic, prognostic, and economic studies; conference proceeding abstracts; studies with Level V evidence; letters to the editor; editorials; review articles; technique articles; basic science articles; studies of open procedures; studies of primary hip arthroscopy; articles without clinical outcomes; and articles not in English. Studies with duplicate populations were reported only once, with the most recent available clinical outcomes. Subsequently, the reviewers performed a manual search of the reference sections of the included studies to identify any additional potentially relevant articles. After application of this search strategy, 5 studies were eligible for final analysis (Fig 1).

Data Extraction
Data were extracted by 2 reviewers (G.L.C., J.D.H.) for study-specific characteristics, patient-specific characteristics, primary surgery variables, revision hip arthroscopy variables, and clinical outcomes of revision hip arthroscopy. The data extracted are shown in Table 1.

Assessment of Study Quality
The Modified Coleman Methodology Score (MCMS) was used to assess the quality of the included studies on revision hip arthroscopy. This 15-item score is used for assessment of study quality of nonrandomized studies, with scores ranging from 0 to 100.20,21 Studies with an MCMS under 55 are considered poor quality.

Statistical Analysis
Descriptive statistics were calculated for each study and parameter analyzed. Continuous variables were reported as mean ± standard deviation (with weighted means where applicable). Categorical data were reported as frequencies with percentages. For homogeneous outcome measures used in all studies, we used weighted mean difference comparisons of preoperative and postoperative outcome scores using a free online statistical calculator (http://www.healthstrategy.com/meta/meta.pl). For statistical analyses, $P < .05$ was deemed statistically significant.

Results

Search Results and Included Studies
Five studies were selected for analysis (Table 2), which included 379 hips in 364 patients (Table 3). Of these studies 3 were Level IV (60%) and
<table>
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<th>Study-Specific Variables</th>
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<th>Revision Surgery—Specific Variables</th>
<th>Revision Hip Arthroscopy Outcomes</th>
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<tbody>
<tr>
<td>Authors</td>
<td>Age</td>
<td>No. of prior operations</td>
<td>Surgeon same as or different from primary</td>
<td>Preoperative hip functional scores</td>
</tr>
<tr>
<td>Publication year</td>
<td>No. of patients</td>
<td>Supine/lateral positioning</td>
<td>Osteoplasty for isolated cam, isolated pincer, or combined FAI</td>
<td>Time to follow-up</td>
</tr>
<tr>
<td>Journal</td>
<td>No. of hips</td>
<td>Heterotopic ossification prophylaxis</td>
<td>Labral repair, debridement, or reconstruction</td>
<td>Reoperation and procedures performed</td>
</tr>
<tr>
<td>Conflict of interest</td>
<td>Gender</td>
<td>DVT prophylaxis</td>
<td>Chondroplasty or microfracture of femoral head and acetabulum decompression</td>
<td>Time to reoperation</td>
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<tr>
<td>Institution</td>
<td>Body mass index</td>
<td>Weight-bearing restrictions</td>
<td>Anterior inferior iliac spine subspine decompression</td>
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<td>Single center or multicenter</td>
<td>Time from primary surgery to revision</td>
<td>Derotational boots</td>
<td>Capsular repair or plication or thermal capsulorraphy</td>
<td>mHHS</td>
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<tr>
<td>Level of evidence</td>
<td>Traumatic or atraumatic mechanism of recurrent pain</td>
<td>Procedures performed</td>
<td>Capsular repair or plication or thermal capsulorraphy</td>
<td>Tegner activity level</td>
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<td>Dates of enrollment</td>
<td>Beighton criteria</td>
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<td>Loose body removal</td>
<td>SF-36</td>
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<tr>
<td>Inclusion criteria</td>
<td>Presence/absence of iliopsoas internal coxa salts</td>
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<td>Iliopsoas release or lengthening</td>
<td>SF-12</td>
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<tr>
<td>Exclusion criteria</td>
<td>Preoperative imaging with MRI, MR arthrography, and CT</td>
<td>Trochanteric bursectomy and iliobibial band release</td>
<td>Trochanteric bursectomy and iliobibial band release</td>
<td>HOS ADL and sport-specific subscales</td>
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<td>Failed nonoperative modalities including injections, therapy, and bracing</td>
<td>Synovecetomy</td>
<td>Synovecetomy</td>
<td>NAHS</td>
</tr>
<tr>
<td></td>
<td>Alpha angle and head-neck offset ratio</td>
<td>Gluteus medius or minimus repair</td>
<td>Gluteus medius or minimus repair</td>
<td>HOOS</td>
</tr>
<tr>
<td></td>
<td>Tönnis grade, Kellgren-Lawrence grade, and amount of joint space (in millimeters)</td>
<td>Removal of heterotopic ossification</td>
<td>Removal of heterotopic ossification</td>
<td>VAS</td>
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<td></td>
<td>Ischial spine sign, posterior wall sign, crossover sign, femoral version, acetabular version, McKibbin index, coxa profunda, and protrusio acetabuli</td>
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<td></td>
<td>Anterior center-edge angle, lateral center-edge angle, and Tönnis angle</td>
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ADL, activities of daily living; CT, computed tomography; DVT, deep venous thrombosis; FAI, femoroacetabular impingement; HOOS, Hip Injury and Osteoarthritis Outcome Score; HOS, Hip Outcome Score; iHOT-12, 12-item International Hip Outcome Tool; iHOT-33, 33-item International Hip Outcome Tool; mHHS, modified Harris Hip Score; MR, magnetic resonance; MRI, magnetic resonance imaging; NAHS, Non-Arthritic Hip Score; SF-12, Short Form 12; SF-36, Short Form 36; VAS, visual analog scale.
were Level III (40%). No Level I or II studies were identified. The MCMS was under 55 for all 5 included studies, and the mean MCMS was 38.2/5.4. Most reported patients were female patients (60%), and the mean age at revision was 31.4/4.2 years. The surgeon performing revision hip arthroscopy was the same as the primary hip surgeon in only 25% of cases. The mean time between primary surgery and revision hip arthroscopy was 27.8/7.0 months (range, 2 to 193 months).

**Revision Hip Arthroscopy Diagnoses and Procedures Performed**

A total of 348 revision hip arthroscopies were reported in 333 patients. The predominant diagnosis in patients undergoing revision hip arthroscopy was residual FAI (282 cases, 81%), which involved combined cam and pincer lesions in 157 cases, isolated cam lesions in 95, and isolated pincer lesions in 30 (Table 4). The next most common diagnoses were labral pathology (185 cases, 53%), cartilage pathology (125 cases, 36%), and adhesions (84 cases, 24%). The other diagnoses were ligamentum teres pathology (51 cases, 15%), capsular pathology including instability and capsular laxity (50 cases, 14%), psoas pathology (44 cases, 13%), loose bodies (22 cases, 6%), trochanteric bursitis (13 cases, 4%), gluteus medius tear (2 cases, 1%), and heterotopic ossification (3 cases, 1%). Examples of common radiographic and intraoperative findings in revision hip arthroscopy cases are shown in Figure 2.

A total of 1,018 procedures were performed during the 348 revision hip arthroscopies, resulting in an average of 2.9 procedures per revision hip arthroscopy (Table 4). The most commonly reported revision procedures were femoral osteoplasty (25%), acetabuloplasty (18%), cartilage procedures including chondroplasty or microfracture (12%), labral debridement (9%), labral repair (8%), and lysis of adhesions (8%) (Table 4). Other procedures reported included ligamentum teres debridement or reconstruction (5%), capsular plication or capsulorrhaphy (5%), loose body removal (2%), psoas release or lengthening (4%), trochanteric bursectomy (1%), gluteus medius repair (<1%), and removal of heterotopic ossification (<1%).

**Outcomes and Reoperations After Revision Hip Arthroscopy**

The modified Harris Hip Score (mHHS) was used in all 5 analyzed studies, with significant (P < .05) improvements observed in all 5 studies. The weighted mean preoperative mHHS of 56.8 ± 3.6 improved to...
72.0 ± 8.3 at final follow-up (22.4 ± 9.8 months). The weighted mean difference in the mHHS from preoperatively to final follow-up was 15.2 (95% confidence interval, 13.3 to 17.6; \( P = .01 \)). All studies reported improved outcomes of revision hip arthroscopy using a variety of other clinical scores, as well as good patient satisfaction (Table 5).

After revision hip arthroscopy, 11 patients went on to hip arthroplasty (THA in 10 and hip resurfacing in 1) for osteoarthritis at a mean of 14.9 months after revision hip arthroscopy. In addition, re-revision hip arthroscopy was reported in 8 patients at a mean of 28 months after revision hip arthroscopy for new injuries (2 cases), adhesions (2 cases), an acetabular chondral defect (1 case), heterotopic ossification (1 case), and instability (1 case) (Table 5). Overall, there was a 5% total reoperation rate.

### Discussion

Revision hip arthroscopy is most commonly performed for residual FAI (>80% of cases). The most common intraoperative findings include residual FAI and chondrolabral damage. Statistically significant and clinically relevant short-term improvements in multiple patient-reported outcomes were shown in 5 studies of over 300 patients. All 3 study hypotheses were confirmed in addressing the study purposes. In addition, we found that the revision surgical procedure was performed, on average, 28 months after the primary surgical procedure and that the reoperation rate after the revision was 5%, including further arthroscopy or conversion to hip arthroplasty. Residual FAI was the most common diagnosis at revision hip arthroscopy—present in 81% of cases—and femoral osteoplasty and acetabuloplasty were the most common procedures performed.
commonly performed procedures. In the first published clinical series of revision hip arthroscopy, Philippon et al.\textsuperscript{17} reported a 95% rate of residual FAI. More recent series have reported lower but still considerable rates of missed or inadequately treated FAI for patients undergoing revision hip arthroscopy or other hip-preservation surgical procedures, ranging from 31% to 93%.\textsuperscript{17,18,22-27} This is despite improved techniques for visualizing and arthroscopically addressing the typical cam deformity located from the 11:45 to 2:45 clock-face position.\textsuperscript{28,29} Gupta et al.\textsuperscript{30} reported that cam lesion regrowth does not occur after prior adequate femoral osteoplasty. Although combined and cam lesions are most commonly encountered, revision hip arthroscopy frequently addresses pincer or subspine (anterior inferior iliac spine) impingement that was inadequately treated by primary hip arthroscopy.\textsuperscript{22,24,25} Therefore the continued high rate of FAI found at revision hip arthroscopy in this review highlights the importance of preoperative planning with 3-dimensional (3D) imaging to evaluate the precise FAI pathology present, as well as arthroscopic techniques and intraoperative fluoroscopic imaging to ensure complete resection of all impingement lesions.

Heyworth et al.\textsuperscript{18} demonstrated the use of preoperative 3D computed tomography (CT) in characterizing the morphology of bony lesions in FAI. Similarly, Kang et al.\textsuperscript{31} found that preoperative 3D CT scans allow proper classification of a cam lesion’s location and size. Ross et al.\textsuperscript{28} further validated this finding by correlating the preoperative 3D CT scan with specific intraoperative fluoroscopic images to fully characterize the cam deformity, specifically in the 11:45 to 2:45 clock-face region. They stated that this correlation between the 6 specific fluoroscopic images and the CT scan may allow surgeons to accurately localize the cam lesion in the event that a preoperative CT scan is unavailable because they will be able to replicate those 6 specific images.

Several studies indicate that residual FAI is a positive predictive factor for success of revision hip arthroscopy. Domb et al.\textsuperscript{24} found that pincer impingement and cam

Table 5. Outcomes and Reoperations after Revision Hip Arthroscopy

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<tr>
<th>Data</th>
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<tr>
<td>mHHS (5 studies)</td>
<td>Preoperative 56.8 ± 3.6</td>
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<td></td>
<td>Final follow-up 72.0 ± 8.3</td>
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<td></td>
<td>% with good or excellent results (2 studies) 62.3%</td>
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<tr>
<td>HOS ADL subscale (2 studies)</td>
<td>Preoperative 64.7 ± 7.1</td>
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<tr>
<td></td>
<td>Final follow-up 78.0 ± 5.5</td>
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<tr>
<td>HOS sport-specific subscale (2 studies)</td>
<td>Preoperative 43.3 ± 7.6</td>
</tr>
<tr>
<td></td>
<td>Final follow-up 59.8 ± 6.2</td>
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<tr>
<td>VAS (2 studies)</td>
<td>Preoperative 5.4 ± 2.1</td>
</tr>
<tr>
<td></td>
<td>Final follow-up 3.3 ± 0.6</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>% satisfaction (1 study) 65%</td>
</tr>
<tr>
<td></td>
<td>Satisfaction score (2 studies) (0-10 scale) 7.8 ± 0.3</td>
</tr>
<tr>
<td>Reoperations, n (% of total revision hip arthroscopies)</td>
<td>Total hip arthroplasty 11 (3%)</td>
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<tr>
<td></td>
<td>Re-revision hip arthroscopy 8 (2%)</td>
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<tr>
<td></td>
<td>Total reoperations 19 (5%)</td>
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</tbody>
</table>

**NOTE.** Data are presented as mean ± SD unless otherwise indicated. Data include outcomes reported in at least 2 studies.

ADL, activities of daily living; HOS, Hip Outcome Score; mHHS, modified Harris Hip Score; VAS, visual analog scale.
impingement were associated on multivariate analysis with improved patient-reported outcome measures, along with previous open surgery, symptomatic heterotopic ossification, and labral reconstruction for segmental labral defects. Larson et al.\textsuperscript{22} found that greater postoperative head-neck offset and decompression of the subspine/anterior inferior iliac spine impingement were associated with improved outcomes. In contrast, Aprato et al.\textsuperscript{23} did not find an association of a diagnosis of residual FAI with revision hip arthroscopy outcome, which could relate to a smaller percentage of residual FAI diagnoses, at 31%, in their case series than in other series of revision hip arthroscopy. The association of a diagnosis of residual FAI with improved outcome likely relates to the identification of a discrete anatomic pathology causing pain that can be reliably addressed with revision hip arthroscopy.

Other common pathologies identified in our systematic review include chondrolabral pathology and capsular laxity. Larson et al.\textsuperscript{22} found that labral repair and reconstruction were associated with improved outcome compared with labral debridement in revision hip arthroscopy. Similarly, Domb et al.\textsuperscript{24,32} found that labral reconstruction of a segmental labral defect encountered at revision arthroscopy was associated with improved outcome. This may reflect clinical application of biomechanical findings that labral repair or reconstruction is able to improve hip biomechanics and the suction-seal mechanism from the labral-deficient state to those of the intact labrum.\textsuperscript{33-35} Patients with chondral damage or osteoarthritis, however, had worse outcomes after revision hip arthroscopy,\textsuperscript{17,23} consistent with the literature from primary hip arthroscopy showing that patients with osteoarthritic changes in the hip have inferior short-term and midterm clinical outcomes with a high rate of short-term conversion to arthroplasty.\textsuperscript{11-16} Larson et al.\textsuperscript{22} found that patients treated with capsular plication had improved outcome scores compared with patients not treated with capsular plication, indicating that capsular management with plication to address instability or capsular insufficiency may be particularly important in the revision hip arthroscopy setting. A recent study of magnetic resonance arthograms of patients undergoing revision hip arthroscopy showed that 78% had capsular defects on imaging,\textsuperscript{36} highlighting the importance of addressing hip instability with meticulous capsular management during primary and especially revision hip arthroscopy.\textsuperscript{37} Furthermore, Frank et al.\textsuperscript{35} recently evaluated 64 patients who underwent hip arthroscopy with a T-capsulotomy and underwent closure with either a partial capsular repair or complete repair; they found that 13% of patients in the partial repair group required revision versus 0% in the complete repair group. All 5 studies included in this review showed significantly improved clinical outcomes when comparing preoperative functional scores with those obtained at a mean follow-up of 22.4 $\pm$ 9.8 months after revision hip arthroscopy.\textsuperscript{17,22-25} Our meta-analysis comparing mHHS values showed an overall significant improvement from 56.8 $\pm$ 3.6 preoperatively to 72.0 $\pm$ 8.3 at final follow-up $(P = .01)$. Although both primary and revision hip arthroscopies reliably improve functional outcomes, the outcomes of revision hip arthroscopy are inferior to those of primary hip arthroscopy. Larson et al.\textsuperscript{22} reported a matched cohort of revision and primary hip arthroscopy patients, showing significantly greater improvement in mHHS values, Short Form 12 scores, and visual analog scale scores for the primary hip arthroscopy patients. However, despite reported improvements in the mHHS and other outcome scores, it is unclear whether these improvements are clinically significant. As such, the minimal clinically important difference (MCID) and patient acceptable symptomatic state should be calculated for the mHHS. Chahal et al.\textsuperscript{39} determined the MCID for the mHHS to be 13, 9, and 20 at 3, 6, and 12 months after surgery, respectively, whereas the patient acceptable symptomatic state at 1 year after surgery was 84 for the mHHS, 98 for the Hip Outcome Score (HOS) activities—of—daily living subscale, and 94 for the HOS sport-specific subscale. Hence, when one is evaluating differences in functional outcome scores, the MCID should be taken into consideration.

A comprehensive systematic review of 6,334 primary hip arthroscopies was recently performed, showing an overall reoperation rate of 6.3% at a mean of 16 months.\textsuperscript{7} Among reoperations, revision hip arthroscopy was performed in 30% of cases, THA was performed in 46% of cases, periacetabular osteotomy was performed in 11% of cases, and other open procedures accounted for the remaining 13% of cases. Arthroscopic revision procedures reported by Harris et al.\textsuperscript{7} were most commonly loose body removal (33 cases), lysis of adhesions (30 cases), and revision osteochondroplasty (21 cases). Our results for revision hip arthroscopy show a 5% overall reoperation rate, which is similar to primary hip arthroscopy, with hip arthroplasty accounting for 58% of revisions at a mean of 14.9 months and revision hip arthroscopy accounting for 42% of revisions at a mean of 19.4 months. This finding further highlights that preoperative evaluation of patients considering revision hip arthroscopy should carefully assess for evidence of joint space narrowing and chondral damage because these patients will tend to have poorer outcomes and higher rates of revision to THA, similar to the primary hip arthroscopy literature.\textsuperscript{11-17,23} The outcomes of patients undergoing a second revision hip arthroscopy are not known, and whether outcomes of THA after prior hip arthroscopy...
are inferior to those of primary THA is also a subject for future study. Moreover, indications for open versus arthroscopic revision of failed prior hip arthroscopy are evolving.22

Finally, the available outcomes data for revision hip arthroscopy reflect only short-term follow-up, with a mean of 22.4 ± 9.8 months. Future studies should address longer-term follow-up of revision hip arthroscopy because the longest available follow-up to date, reported by Aprato et al.23 shows that patient satisfaction and mHHS may begin to decline at 3 years. Domb et al.24 found decreases in the HOS activities—of—daily living and sport-specific subscales between 2 and 3 years’ follow-up, although they did not note a similar decrease in other hip functional outcome scores. Future studies should address midterm and long-term outcomes of revision hip arthroscopy and aim to predict which patients are likely to derive durable benefit from this procedure.

Limitations
The limitations of this systematic review stem primarily from the limited available literature regarding revision hip arthroscopy. Only 5 studies were available for analysis, with only Level III and IV evidence, short-term follow-up, and a low MCMS (<55) for all 5 included studies. Moreover, the available studies were heterogeneous in reporting of preoperative, intraoperative, and postoperative findings. In part, this is a result of the fact that revision hip arthroscopy is a growing procedure for which outcomes were first reported in 2007.17 Four of the five included studies had a small number of patients for whom prior open rather than arthroscopic surgery was performed (overall, for the included studies, a total of 92% of prior procedures were arthroscopic, 4% were open, and 4% were unknown). This is a limitation of the available literature on revision hip arthroscopy and introduces more variation in interpreting our results. In addition, anterior inferior iliac spine/subspine impingement was only reported as a separate diagnosis in 2 of the included studies.22,25 Ricciardi et al.25 reported a 9.5% rate of extra-articular impingement including subspine impingement and addressed this through open surgery, and these patients were excluded from our systematic review. Larson et al.22 reported a prominent anterior inferior iliac spine contributing to impingement in 45.9% of hips, which they addressed arthroscopically, and found that addressing anterior inferior iliac spine/ subspine impingement was associated with better outcomes of revision hip arthroscopy.

In addition, the available clinical series reporting revision hip arthroscopy reflect the experience of a small number of high-volume hip arthroscopy subspecialists. Most of the revision hip arthroscopies were performed by a surgeon other than the primary surgeon, with only 25% of primary and revision procedures performed by the same surgeon. It is therefore unclear to what extent the high rates of residual FAI identified represent the learning curve of hip arthroscopy and to what extent the outcomes of revision hip arthroscopy generalize to surgeons with lower clinical volumes of challenging revision cases.

Conclusions
Revision hip arthroscopy is most commonly performed for residual FAI, with statistically significant and clinically relevant improvements shown in multiple patient-reported clinical outcome scores at short-term follow-up. The reoperation rate after revision hip arthroscopy is 5%, including further arthroscopy or conversion to hip arthroplasty.

References