Bilateral Hip Arthroscopy: Direct Comparison of Primary Acetabular Labral Repair and Primary Acetabular Labral Reconstruction

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Purpose: Directly compare primary acetabular labral repair versus primary acetabular labral reconstruction using a self-controlled cohort study design. **Methods:** Patients who underwent primary labral repair in one hip and primary labral reconstruction using iliotibial band allograft in the other hip by a single surgeon between August 2009 and November 2014 were identified. One patient with inflammatory arthritis was excluded. Patient-reported outcome data included change in Modified Harris Hip Score (MHHS), Lower Extremity Functional Scale (LEFS), average pain using a 10-point visual analog scale (VAS), and patient satisfaction (1: very dissatisfied, 10: very satisfied). Failure was defined as subsequent intra-articular hip surgery. Data were analyzed using McNemar's and Wilcoxon Signed Rank tests. **Results:** Overall, 29 patients (58 hips) were included in the analysis. There were 23 females and 6 males. The average age at time of surgery was 32.6 years (range: 14.9-51.6 years). Follow-up was obtained from all 29 patients (100%) at a mean of 56 months (range = 27-85 months) postoperative for repaired hips and 40 months (range = 22-61 months) postoperative for reconstructed hips. No labral reconstruction hips failed, and 9 (31%) labral repair hips failed ($P < .01$). Among those that did not fail treatment, there was no difference in MHHS change (32.2 ± 15.4 vs 29.6 ± 15.4; $P = .63$), LEFS change (26.6 ± 16.5 vs 23.9 ± 17.8; $P = .61$), VAS pain change (−3.2 ± 2.4 vs −3.6 ± 2.1; $P = .47$), or satisfaction (8.6 ± 2.0 vs 8.7 ± 2.4; $P = .59$) between the repair and reconstruction groups, respectively. **Conclusions:** In this cohort of patients, hips that underwent primary labral repair were more likely to fail treatment than hips that underwent labral reconstruction (31% vs 0%, respectively). Among hips that did not fail treatment, patient-reported outcome scores were similar between groups. Excellent clinical results can be obtained with both forms of labral-preserving treatment but were more predictably observed with primary labral reconstruction in this cohort. **Level of Evidence:** Level III, retrospective comparative study.

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In recent years, hip arthroscopy has evolved to include several labral-preserving treatment options for patients with labral pathology, including labral repair[1] and labral reconstruction.[2,3] Results of these procedures are promising, with low revision rates, high patient satisfaction, and improved patient-reported outcome scores.[4-10] Subsequently, labral-preserving procedures are increasingly available in the United States and are considered a viable treatment option for patients with recalcitrant hip pain.[11]

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Although hip arthroscopy has gradually become the standard of care for patients with labral pathology who have failed conservative treatment, this subspecialty in orthopaedics is still in its infancy.[11] Recent studies have reported patient-reported outcomes and failure rates among case series of patients who have undergone hip arthroscopy,[4-6,8,9] and new procedures that address labral pathology have been developed and improved[1-3,12]; however, few comparative studies exist that directly compare different labral treatment options.

Among the comparative studies that do exist, there remains skepticism regarding potential confounding, or influence of variables that affect both the treatment choice and the outcome, between treatment groups. Some of the primary concerns for confounding stem from patient characteristics such as gender, physical activity level, socioeconomic status, and hip anatomy, which could affect both the patient's and/or physician's choice of procedure as well as the patient's outcome. Although some of these characteristics can be adjusted using study design or analytic methods, these types of adjustments are often imperfect, and the results include an acknowledgment of remaining limitations associated with unmeasured confounding.

Randomized controlled trials are considered a gold standard for control of confounding owing to their ability to randomize patients to each treatment arm, resulting in expected balance of patient characteristics between treatment groups; however, randomized controlled trials also have limitations. Among these limitations are high cost, increased time for study completion, and lack of generalizability. Furthermore, undertaking a randomized controlled trial requires equipoise, which is increasingly difficult to obtain given the immense progress currently occurring within the field and the continuous availability of data supporting or contesting one procedure over the other.

A self-controlled cohort study, or case-crossover study, is another potential study design option that accounts for confounding by patient characteristics. In this study design, the same patient undergoes both procedures, removing differences in innate patient characteristics because the procedures are directly compared within the same patient. This observational study took advantage of a unique phenomenon where a cohort of patients underwent labral repair in one hip and labral reconstruction in the other hip by the same surgeon. This phenomenon occurred in this patient population as a result of evolving surgical techniques for hip arthroscopy. Patients included in this study were treated for labral pathology at a time when arthroscopic labral repair was the standard treatment technique, but arthroscopic labral reconstruction was emerging as an alternative treatment option. The purpose of this study was to directly compare primary acetabular labral repair versus primary acetabular labral reconstruction using a self-controlled cohort study design. Our hypothesis was that hips that underwent labral reconstruction would have a lower failure rate and higher patient-reported outcome scores postoperatively than hips that underwent labral repair.

Methods

Participant Selection

Patients who underwent primary arthroscopic labral repair in one hip and primary arthroscopic labral reconstruction in the other hip were prospectively enrolled in a single surgeon's hip registry and were identified for this Institutional Review Board-approved research study. All patients underwent surgery by the lead author between August 2009 and November 2014. All patients who underwent a primary labral repair in one hip and a primary labral reconstruction in the other hip during this time period were included in the study (n = 30 patients, 60 hips). One patient was excluded from the analysis because of inflammatory arthritis (n = 29 patients, 58 hips).

Clinical examination and magnetic resonance imaging were performed in all cases prior to arthroscopy. Hip arthroscopy was indicated if the magnetic resonance imaging and clinical examination suggested a symptomatic labral tear and the hip had a well-preserved joint space (Tonnis grade 0 or 1). A diagnostic injection was used in some circumstances to confirm that the labral tear was the cause of the patient's symptoms. All hips failed conservative treatment, including physical therapy, and the patient elected to move forward with hip arthroscopy.

The senior author, a fellowship-trained hip arthroscopist, evaluated all hips. Hips that met these indications were treated with either arthroscopic labral repair or labral reconstruction using iliotibial band allograft. Although the senior author performed both procedures within his practice during the study period, the choice of labral procedure among this cohort was generally made based on a shift in surgical practice over time. All hips treated by the lead author from August 2009 to April 2011 underwent labral repair (n = 11), whereas all hips treated from September 2013 to November 2014 underwent labral reconstruction (n = 10). The shift in surgical practice occurred between April 2011 and August 2013 because of an unacceptable failure rate among hips that underwent labral repair and notable improvement in patient-reported outcomes among hips that underwent labral reconstruction observed by the senior author. During that time, hips with labral tissue >8 mm or <2 to 3 mm or an irreparable labral tear generally underwent labral reconstruction (n = 19) whereas those considered to have viable labral tissue underwent labral repair (n = 18). Two

patients underwent labral reconstruction prior to labral repair, while the remaining 27 underwent labral repair first.

Data Collection

Patients were given a preoperative subjective questionnaire prior to each procedure, and follow-up questionnaires were obtained by a research assistant at the 3-month, 6-month, 9-month, and 1-year follow-up visits for each hip. The questionnaires included the Modified Harris Hip Score (MHHS),[13] the Lower Extremity Function Scale (LEFS),[14] a visual analog scale (VAS) for average pain at rest, average pain with activities of daily living, and average pain with athletic activities. The MHHS has been extensively studied and used as a patient-reported outcome tool in this population.[8,13,15,16] The LEFS, on the other hand, has not been validated for assessment of non-arthritic hip conditions. However, its validity, reliability, and responsiveness have been shown to be high in patients with hip arthritis,[17] and it has been used for the assessment of patient-reported outcomes in other studies of hip arthroscopy.[18,19] Patient-rated satisfaction on a scale from 1 (very dissatisfied) to 10 (very satisfied) was also obtained from the follow-up questionnaires. Outcome scores were only calculated if completed in entirety. If more than 1 outcome score (MHHS, LEFS, or VAS) was missing, the patient was considered to have incomplete follow-up. Failure was defined as subsequent intra-articular hip surgery. Indications for revision intra-articular hip surgery were recurrence of hip pain, pain with the anterior impingement maneuver, preserved joint space on radiographs, magnetic resonance imaging indicative of recurrent labral pathology, and improvement of symptoms with an intra-articular hip injection. The decision to have a subsequent intra-articular hip surgery was an elective decision made by the patient. If the hip failed surgery, collection of subjective questionnaires was terminated and outcome scores were not calculated.

In addition, patients included in this research study were sent an additional questionnaire between May and September 2016 to obtain recent follow-up data for each hip. This questionnaire incorporated additional questions, including "Which hip do you like more?" "Which hip feels more natural?" "Which hip surgery was easier to recover from?" "Does your Right hip feel normal?" "Does your Left hip feel normal?" "Do you feel better than before surgery on your Right hip?" "Do you feel better than before surgery on your Left hip?" "Are you happy you had surgery on your Right hip?" and "Are you happy you had surgery on your Left hip?" The available responses for these questions were "Right," "Left," or "Both were the same," or "Yes" or "No."

Surgical Technique

Arthroscopic labral repair[1] and arthroscopic labral reconstruction[3] techniques used for this patient population have been previously described. The labral repair technique involved simple dissection of the labrum to expose the acetabular rim, burr it, and then repair the labrum with circumferential sutures from anchors placed in the acetabulum (Fig 1). The labral reconstruction has been discussed in previous studies and utilized the "Front-to-Back" technique to fix a labral graft around the entire acetabular rim to reconstruct the labrum[3] (Fig 2). A freeze-dried or frozen iliotibial band allograft was used and the final secured graft provided a perfect seal between the reconstructed labrum and the femoral head. For both procedures, correction of femoroacetabular impingement and concomitant procedures to address additional intra-articular pathology were performed when necessary.

Postoperative Management

Supervised physical therapy for both procedures started during the week following surgery. Hips were limited to 30% weight bearing for 4 weeks following each procedure. If concomitant microfracture was performed, patients were instructed to limit weight bearing to 20% for an additional 2 weeks postoperatively.

Statistical Analysis

Descriptive statistics, including means, standard deviations, counts, and percentages, for patient characteristics and concomitant pathology were calculated stratified by group. For all comparisons, data were analyzed using McNemar and Wilcoxon signed rank tests because of correlation between hips within each subject. Two-sided tests and a 95% significance level were used for all comparisons. All analyses were

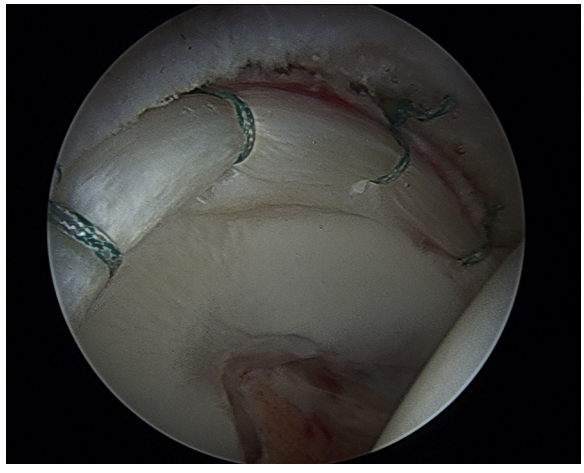

Fig 1. Right hip viewed in traction from the anterolateral portal after a 4-anchor labral repair with circumferential sutures.

Fig 2. Left hip viewed in traction from the anterolateral portal following a complete labral reconstruction with a 10.5-cm iliotibial band allograft fixed with 7 anchors.

performed using Statistical Analysis Software (SAS) 9.4 (SAS Institute, Cary, NC).

Acknowledging that the results of this study could be influenced by changes in surgical practice, surgeon learning curve, and differing follow-up times, we performed a sensitivity analysis restricting the study period to only the years of overlap between the labral repair and labral reconstruction procedures (between April 2011 and August 2013). The primary focus of this manuscript is the total study population (58 hips), but we also present these findings restricting to the 38 hips that underwent surgery during the transition period.

Results

Overall, 29 patients (58 hips) were included in the analysis. There were 23 females and 6 males. The average age at time of surgery was 32.6 years (range: 14.9-51.6 years). Patients were approximately the same age at the time of labral reconstruction and at the time of labral repair (33.3 ± 11.0 vs 32.0 ± 11.4, respectively; $P = .55$). No patient had a previous hip surgery.

At the time of arthroscopy, all hips were found to have a labral tear. Table 1 describes the preoperative radiographic findings, pathology appreciated, and concomitant procedures performed at the time of arthroscopy. Both groups had a similar center edge angle, alpha angle, and joint space prior to surgery. Hips in the labral repair group were noted to have normal labral tissue quality more frequently than hips in the labral reconstruction group. More hips in the reconstruction group had chondral pathology of the acetabulum, and all hips in the reconstruction group underwent rim trimming, whereas 6 hips (21%) in the repair group did not have significant rim trimming. Of the 29 hips that were reconstructed, 21 hips had a frozen allograft and 8 had freeze-dried. On average, 6 anchors were used for the reconstruction (range: 5-7). No operative or postoperative complications were reported among this cohort.

Follow-up was obtained from all 29 patients (100%) at a mean of 56 months (range = 27-85 months) postoperative for repaired hips and 40 months (range = 22-61 months) postoperative for reconstructed hips. No labral reconstruction hips failed, and 9 hips (31%) that underwent primary labral repair failed ($P < .01$). All hips that failed labral repair underwent revision arthroscopic treatment with labral reconstruction; one hip that failed had a revision labral repair followed by a revision labral reconstruction. The mean time to failure was 14 months (standard deviation = 7.3 months; range = 4.0, 24.1 months) postoperatively. Three hips underwent revision prior to contralateral labral reconstruction and 6 hips underwent revision following contralateral labral reconstruction. Hips that failed treatment reported an average MHHS of 62.2 ± 5.9, LEFS of 47.3 ± 10.3, average VAS of 5.7 ± 1.4, and average patient satisfaction of 2.6 ± 2.5 prior to revision. Among those that did not fail treatment, there was no difference in patient-reported outcome scores between the repair and reconstruction groups (Table 2).

The results of our sensitivity analysis that restricted to the 38 hips that underwent surgery during the transition period (between April 2011 and August 2013) were consistent with the overall findings. No labral reconstruction hips failed, and 5 hips (26%) that underwent primary labral repair failed ($P < .01$). Among those that did not fail treatment, there was no difference in patient-reported outcome scores between the repair and reconstruction groups (Table 3).

Discussion

Our results suggest that hips that underwent primary labral repair were more likely to fail treatment than hips that underwent labral reconstruction (31% vs 0%, respectively). Among hips that did not fail treatment, there was no difference in patient-reported outcome scores between groups. These results suggest that labral reconstruction provides a more consistent outcome among hips, with no failures appreciated in this group and high patient-reported outcome scores. Labral repair, on the other hand, also resulted in improved patient-reported outcome scores among hips that were successful, but there was a notable failure rate of 31% among labral repair hips. Of note, all hips that failed labral repair in this study chose to undergo arthroscopic labral reconstruction for the revision procedure. Given the still early stages of this subspecialty in orthopaedics, we believe these results are important for improving techniques and patient outcomes.

Few comparative studies exist that directly assess the outcomes of different labral-preserving primary

Table 1. Radiographic and Operative Information for Hips That Underwent Arthroscopic Labral Repair Versus Arthroscopic Labral Reconstruction, 2009-2014 (N = 58)

	Labral Repair (n = 29)	Labral Reconstruction (n = 29)	*P* Value
Center edge angle	32.3° ± 5.4°	33.2° ± 4.7°	.36
Alpha angle	63.8° ± 7.0°	66.7° ± 2.9°	.20
Lateral joint space, mm	4.4 ± 0.6	4.4 ± 0.5	.93
Medial joint space, mm	4.2 ± 0.6	4.2 ± 0.6	.69
Labral quality, n (%)			<.01
Normal	18 (62)	3 (10)	
Hypertrophic	5 (17)	16 (55)	
Deficient/degenerative	6 (21)	10 (35)	
Labral width (mm)	5.3 ± 1.6	6.3 ± 2.9	.33
Acetabular cartilage status, n (%)			<.01
Normal	15 (52)	3 (10)	
Grade 1	0 (0)	0 (0)	
Grade 2	3 (10)	9 (31)	
Grade 3	10 (35)	9 (31)	
Grade 4	1 (4)	5 (17)	
Femoral head cartilage status, n (%)			.66
Normal	22 (76)	25 (86)	
Grade 1	4 (14)	3 (10)	
Grade 2	1 (4)	0 (0)	
Grade 3	2 (7)	1 (4)	
Grade 4	0 (0)	0 (0)	
Concomitant procedures, n (%)			
Femoral osteoplasty for cam	29 (100)	29 (100)	>.99
Acetabular rim trimming for pincer	23 (79)	29 (100)	.02
Psoas release	3 (10)	7 (24)	.30

NOTE. Values are mean ± standard deviation unless otherwise noted.

treatment options. However, these results are similar to a previous study comparing revision labral repair to revision labral reconstruction. In that study, a higher failure rate following revision labral repair (50%) compared with revision labral reconstruction (12%) was also noted.[20] Similar to the present study, the

Table 2. Patient-Reported Outcomes for Hips That Underwent Labral Repair Compared With Those That Underwent Labral Reconstruction From 2009 to 2014 and Did Not Fail Treatment (n = 49)

	Labral Repair (n = 20)	Labral Reconstruction (n = 29)	*P* Value
MHHS			
Preoperative	54.3 ± 12.8	58.2 ± 11.3	.21
Postoperative	86.5 ± 15.6	87.8 ± 16.3	.50
Change	32.2 ± 15.4	29.6 ± 15.4	.63
LEFS			
Preoperative	41.8 ± 14.1	45.5 ± 14.6	.39
Postoperative	68.4 ± 17.3	69.4 ± 17.8	.91
Change	26.6 ± 16.5	23.9 ± 17.8	.61
VAS			
Preoperative	6.0 ± 1.9	6.0 ± 1.0	.96
Postoperative	2.8 ± 2.4	2.4 ± 2.1	.73
Change	−3.2 ± 2.4	−3.6 ± 2.1	.47
Patient satisfaction	8.6 ± 2.0	8.7 ± 2.4	.59
Additional subjective questions, n (%)			
"Which hip do you like more?"*	5 (25)	15 (52)	.12
"Which hip feels more natural?"*	4 (20)	12 (41)	.35
"Which hip surgery was easier to recover from?"*	6 (30)	13 (45)	.76
"Does your hip feel normal?"†	14 (69)	20 (70)	>.99
"Do you feel better than before surgery?"†	19 (95)	25 (86)	.38
"Are you happy you had surgery?"†	18 (90)	25 (86)	.65

LEFS, Lower Extremity Functional Scale; MHHS, Modified Harris Hip Score; VAS, visual analog scale.

*Counts and percentages represent the number of patients who chose the hip that underwent that procedure for each question. The remaining patients felt that both hips were equal.

†Counts and percentages represent the number of patients who answer "yes" for the hip that underwent that procedure for each question.

Table 3. Sensitivity Analysis Results of Patient-Reported Outcomes Comparing Hips That Underwent Labral Repair to Those That Underwent Labral Reconstruction Between April 2011 and August 2013 and Did Not Fail Treatment (n = 33)

	Labral Repair (n = 14)	Labral Reconstruction (n = 19)	*P* Value
MHHS			
Preoperative	57.2 ± 14.2	59.2 ± 12.4	.67
Postoperative	84.5 ± 17.9	90.4 ± 15.4	.26
Change	27.3 ± 14.7	31.3 ± 14.8	.43
LEFS			
Preoperative	41.9 ± 15.9	42.8 ± 13.4	.84
Postoperative	66.5 ± 19.7	70.6 ± 16.9	.44
Change	24.6 ± 17.2	27.8 ± 14.8	.70
VAS			
Preoperative	5.9 ± 2.2	6.1 ± 2.1	.73
Postoperative	3.1 ± 2.8	2.0 ± 2.0	.35
Change	−2.7 ± 2.4	−4.2 ± 2.3	.20
Patient satisfaction	8.2 ± 2.3	8.8 ± 2.6	.34

LEFS, Lower Extremity Functional Scale; MHHS, Modified Harris Hip Score; VAS, visual analog scale.

authors also found comparable patient-reported outcome scores between groups for hips that did not fail treatment, but with a trend toward better results in the reconstruction group.[20]

Given these results, it is possible that important pathological or anatomical characteristics exist that may determine whether a labral repair will be successful. Previous research has noted the importance of obtaining an adequate intra-articular pressure seal in the hip.[21,22] It is possible that a labral repair is able to restore the diminished intra-articular pressure seal following labral tear if the labral tissue is of adequate quality and size; however, if the labral tissue is not of sufficient quality or size, the labral repair may not be able to satisfactorily reduce pain or restore normal biomechanical function, which may lead to failure of the procedure. Unfortunately, the small sample size in this study did not allow for analysis of predictors of failure to be able to formally assess this hypothesis. Further research is necessary to determine if patient predictors of ideal labral-preserving treatment option can be determined as pathology (i.e., labral quality, concomitant pathology) and other patient characteristics may influence the outcome of the procedure.

Complete labral reconstruction, on the other hand, offers the advantage of restoring the labral tissue to a consistent size and quality, regardless of existing labral characteristics. The surgeon is able to create a graft of adequate size and length to completely restore and maintain the intra-articular pressure seal, particularly when using allograft tissue for the reconstruction.[3] A recent review of labral reconstruction procedures also noted that labral reconstruction has the ability to completely restore the intra-articular hip seal by improving the hip's resistance to distraction.[10] Previous studies of outcomes following labral reconstruction have noted improved outcomes following the procedure.[2,4,10,23,24] One study in particular found improved outcomes among hips that underwent complete labral reconstruction following labral tear compared with segmental resection,[24] which supports the notion that benefits of the complete labral reconstruction may include the ability to restore the intra-articular labral seal. For these reasons, we believe a more consistent positive outcome can be obtained after primary acetabular labral reconstruction than after primary labral repair. Additionally, we believe that complete reconstruction is superior to segmental reconstruction because of the ability to completely remove pain-generating tissue and create a longer graft with a stronger construct.

Interestingly, all hips that failed labral repair in this study chose to either undergo arthroscopic labral reconstruction for the revision procedure following a previous labral reconstruction on the contralateral hip (n = 3) or chose to undergo contralateral primary labral reconstruction following the revision procedure (n = 6). This suggests that patients were pleased with the outcome of the reconstructed hip and felt that the reconstruction would be beneficial for the revised hip or were pleased with the outcome of the revision procedure and felt that a primary reconstruction would be beneficial for the contralateral hip.

Limitations

It is important to acknowledge limitations of our study. Because of this unique study design, patient characteristics such as gender, physical activity level, socioeconomic status, and anatomy are balanced between groups in expectation. Although this study design reduces the influence of some confounding variables in expectation, there is still potential for remaining unmeasured confounding, including differences in hip pathology, concomitant procedures, mechanism of injury, and improvements in the procedures and outcomes over time. Importantly, our study did note differences in concomitant pathology

and procedures between the 2 treatment groups, and it is possible that these differences between the 2 groups could bias the results. However, the results suggest that hips that underwent labral reconstruction actually had lower-quality labral tissue and more cartilage damage than hips that underwent labral repair. It is expected that these characteristics would result in worse outcomes in the labral reconstruction group than the labral repair group, which were not identified in this study. Additionally, the difference in pincer resection between groups may not represent a difference in pathology, but rather a difference in surgical technique, with the labral reconstruction allowing for improved exposure to the acetabular rim. Studies of surgical outcomes also present a unique challenge as compared with other field of research due to the potential influence of a surgical learning curve. It is important to acknowledge that the hips in this study may not be directly comparable because the outcomes may be influenced by improvements in surgical technique over the course of the surgeon's career. In particular, the labral repair procedures were typically performed earlier in the surgeon's career than the labral reconstruction procedure, and assessment of labral quality over time may have been influenced by previous experience. However, the technical demand required for a labral reconstruction necessitates comfort and mastery of the labral repair procedure. Subsequently, we believe that if the learning curve phenomenon were to influence our outcomes, it is more likely to influence labral reconstruction outcomes than labral repair outcomes. Similarly, another limitation is the fact that the labral repair procedure generally occurred before the labral reconstruction procedure, resulting in slightly different follow-up between the 2 groups. Our sensitivity analysis where we restricted the study to the transition period allowing for comparison of procedures during a similar time period led to consistent results, suggesting minimal influence of these variables. In addition, in a previous study we analyzed the influence of calendar time on our patient-reported outcomes and noted little influence of calendar time (which is associated with both the surgeon's learning curve and time to follow-up in theory) on the outcomes of interest.[20] It is also important to note that this study presents early outcomes of these labral-preserving procedures. Hip arthroscopy failure has typically been noted within the first 2 years postoperatively,[10,20] so we do not expect this to greatly influence these results of early outcomes. Another limitation is the small sample size available for this study, which limits the power to detect differences between groups and also precludes more in-depth analyses of predictors of failure and multivariable modeling. It is possible that with a larger study population, differences in patient-reported outcome scores may have become more apparent. However, given this unique phenomenon of a self-controlled cohort, we believe the results are valuable even with limited sample size. Furthermore, this study does not present a cost-benefit comparison of the 2 labral-preserving procedures. Finally, a single, high-volume hip arthroscopist at a single institution treated all patients included in this study. The results of this study may not be generalizable to other surgeons or other patient populations. In addition, there is potential for personal bias toward one procedure versus the other on the part of the surgeon that cannot be measured.

Conclusions

In this cohort of patients, hips that underwent primary labral repair were more likely to fail treatment than hips that underwent labral reconstruction (31% vs 0%, respectively). Among hips that did not fail treatment, patient-reported outcome scores were similar between groups. Excellent clinical results can be obtained with both forms of labral-preserving treatment but were more predictably observed with primary labral reconstruction in this cohort.

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