Outcomes of Isolated Endoscopic Gluteal Tendon Repair Compared With Concomitant Endoscopic Gluteal Tendon Repair and Arthroscopic Hip Labral Repair

A Propensity-Matched Analysis With Minimum 2-Year Follow-up

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Background: Both gluteal and labral tears are common sources of hip pain, but no studies have evaluated how concomitant arthroscopic labral repair and correction of femoroacetabular impingement syndrome (FAIS) affect outcomes after endoscopic gluteus/minimus repair.

Purpose: (1) To compare patient-reported outcomes (PROs) and clinically significant outcomes achievements between patients who underwent endoscopic gluteus medius/minimus and arthroscopic hip labral repair with correction of FAIS versus endoscopic gluteus medius/minimus repair without labral repair and (2) to define threshold scores required to achieve the minimal clinically important difference (MCID) and the Patient Acceptable Symptom State (PASS) for the Hip Outcome Score–Activities of Daily Living, Hip Outcome Score–Sports Specific, modified Harris Hip Score (mHHS), 12-item international Hip Outcome Tool, and visual analog scale for pain in these patients.

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

Methods: Patients who underwent primary endoscopic gluteus medius/minimus repair between 2012 and 2020 were identified. Those who underwent concomitant arthroscopic labral repair and correction of FAIS with femoroplasty or acetabuloplasty as indicated were propensity matched in a 1 to 1 ratio by sex, age, and body mass index to patients who underwent gluteus medius/minimus repair without labral repair. Patients who completed the study PROs were assessed preoperatively and at 2 years postoperatively. Threshold scores required to achieve the MCID and PASS thresholds were calculated.

Results: A total of 32 patients who underwent simultaneous gluteal and labral repair (G + L) were matched to 32 patients who underwent gluteal repair without labral repair (G); 75% of patients in the G cohort underwent labral debridement, while 25% in this cohort received no labral treatment. A significant difference was observed between groups in preoperative mHHS scores (G + L, 54.4 ± 12.9 vs G, 46.3 ± 14; $P = .048$) but no differences in any other PRO scores ($P \geq .207$). The MCID/PASS thresholds were as follows: Hip Outcome Score–Activities of Daily Living (11.14/83.82), Hip Outcome Score–Sports Specific (16.07/59.72), mHHS (11.47/70.95), 12-item international Hip Outcome Tool (13.73/45.49), and visual analog scale for pain (14.30/22). There were no significant differences in MCID or PASS achievement rates between the 2 groups ($P \geq .108$).

Conclusion: Patients who underwent combined G + L demonstrated comparable PROs and clinically significant outcomes achievement rates to patients who underwent G, highlighting sustained successful outcomes for patients with gluteal tendon pathology and concomitant FAIS and labral tears.

Keywords: gluteus medius repair; hip; hip arthroscopy; lateral hip pain

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Gluteal tendinopathy is an increasingly recognized source of lateral hip pain and encompasses a progressive spectrum of pathologies, from tendinosis to partial- and full-thickness tears.[4] Injury of the gluteus medius/minimus tendons near their insertions on the greater trochanter may occur in isolation or combination with other hip pathologies, such as femoroacetabular impingement syndrome (FAIS) and tears of the acetabular labrum.[8,24] Gluteal tendinopathy is more commonly found in patients with advancing age,[4] likely due to muscle atrophy and age-related tendinous degeneration,[8] and has been found in up to 10% of middle-aged men and 25% of middle-aged women.[7] Conversely, FAIS and labral tears are much more common diagnoses in younger, active patients,[2] with prevalence rates of up to 62% of symptomatic patients.[11] Labral tears can be seen in both older and younger patients, with many being caused by FAIS but others being secondary to age-related degenerative tearing.[15] When both gluteal and labral pathologies occur simultaneously, they can lead to an overlapping pain pattern or 2 distinct patterns of hip-related pain.[8] Furthermore, a recent systematic review of patients undergoing gluteus medius/minimus repairs by Yee et al[37] demonstrates the high incidence of overlap in these pathologies. Across 4 studies included in their review, a mean of 85% of patients with gluteus medius/minimus tears undergoing repair had mild-to-moderate accompanying labral damage (acetabular labral articular disruption score of 1 or 2), and 71% of patients had accompanying mild-to-moderate acetabular cartilage damage (acetabular Outerbridge score of 1 or 2).

Surgical correction of FAIS—including labral debridement or repair—results in significant improvements in symptoms, with labral repair demonstrating superior patient-reported outcomes (PROs) and higher survivorship rates than debridement.[1,12,16,32,36,38] Endoscopic surgical repair of gluteus medius/minimus tears results in favorable postoperative outcomes with high patient satisfaction.[3,6,19-21,28,31,35] Many clinical outcomes studies examining gluteal repair have included patients who underwent concomitant labral treatment; however, they uniformly have pooled results from patients who underwent a variety of labral procedures, including debridement, repair, and reconstruction, as well as those who had no labral treatment at all.[3,6,18-20,28,31,35] While Horner et al[13] recently investigated the relationship between patients undergoing combined labral and gluteal repair (G + L) versus those undergoing labral repair and demonstrated comparable outcomes between the groups, there are limited data on the corollary comparing patients undergoing combined G + L versus those undergoing endoscopic gluteus medius/minimus repair without labral repair (G).

Given the high prevalence of both gluteus medius/minimus and acetabular labral tears in older patients, as well as their nonspecific or overlapping presentations in patients with both conditions, it is important to understand how patient outcomes may differ when undergoing combined G + L versus G. The purposes of this study were (1) to compare PROs and clinically significant outcomes (CSOs) achievement rates between patients who underwent combined endoscopic gluteus medius/minimus repair and arthroscopic hip labral repair versus endoscopic gluteus medius/minimus repair without labral repair and (2) to define threshold scores required to achieve the minimal clinically important difference (MCID) and Patient Acceptable Symptom State (PASS) thresholds on the Hip Outcome Score–Activities of Daily Living (HOS-ADL) subscale, Hip Outcome Score–Sports Specific (HOS-SS) subscale, modified Harris Hip Score (mHHS), 12-item international Hip Outcome Tool (iHOT-12), and visual analog scale (VAS) for pain among patients undergoing endoscopic gluteus medius/minimus repair with or without labral repair. We hypothesized that PROs and CSOs achievement rates would be comparable between the cohorts with labral repair versus without labral repair.

METHODS

Patient Selection

The protocol for this study received institutional review board approval, and all included patients provided written informed consent. A retrospective review of a prospectively maintained single-institutional clinical database was conducted by the senior author (S.J.N.) to identify patients who underwent gluteus medius/minimus repair between January 2012 and December 2020. Patients were required to have failed nonoperative management (eg, oral anti-inflammatory drugs, physical therapy, and cortisone injections), have a minimum 2-year follow-up, and have an operative report available for review. Patients were excluded if they had undergone open or revision surgery, had moderate-to-severe osteoarthritis—Tönnis grade $\geq$2 or previous total hip arthroplasty (THA), or had a history

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Ethical approval for this study was obtained from Rush University Medical Center (ref No. 12022108-IRB01-AM16).

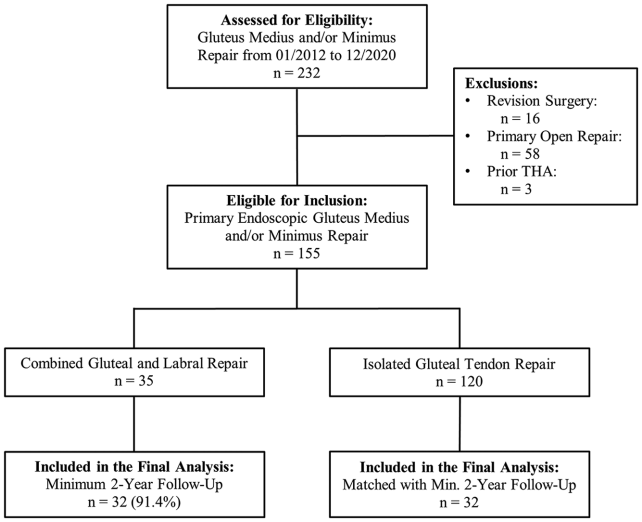

Figure 1. CONSORT flowchart for patient selection. CONSORT, Consolidated Standards of Reporting Trials; Min, minimum; THA, total hip arthroplasty.

of the pediatric hip disorder—eg, Legg-Calve-Perthes disease or slipped capital femoral epiphysis.

A total of 232 patients who underwent gluteus medius/minimus repair during the study period were assessed for eligibility, of whom 16 had undergone revision surgery and an additional 58 had undergone primary open repair. Three patients were excluded for previous ipsilateral THA. Of the remaining 155 patients, 35 were identified who underwent combined G + L, of whom 32 had minimum 2-year follow-up and were included in the final analysis (91.4% compliance) (Figure 1). These 32 patients were propensity-matched in a 1 to 1 ratio based on sex, age, and body mass index (BMI) to 32 patients who underwent gluteus medius/minimus repair without labral repair.

Preoperative and Intraoperative Data Collection

Patient characteristics—including sex, age, and BMI—were prospectively collected in a secure repository. Additional preoperative characteristics were documented, including physical activity level (ie, engagement in sports and/or other recreational activities), smoking status, history of low back pain, psychiatric history, and workers' compensation status. The presence of preoperative chronic pain >2 years was also documented. Preoperative radiographs were evaluated for standard measurements, and intraoperative findings and procedures were recorded.

Surgical Technique

The surgical techniques used were consistent throughout the study period and have been described previously.[17,27] Briefly, with the patient positioned supine and the operative hip under traction using a well-padded post, an anterolateral (AL) portal was established under fluoroscopic guidance by penetrating the capsule with a spinal needle at the 12-o'clock position. Under direct visualization from the AL portal, a modified or mid-anterior (MA) portal was placed using needle localization, penetrating the capsule at the 2-o'clock position. The status of the labrum was assessed in all patients, and the labrum was debrided or repaired as appropriate.

In cases of labral repair, the interportal portion of a T-capsulotomy was first created to establish access to the central compartment, connecting the MA and AL portals. With access established, acetabuloplasty, chondral lesion debridement to stable margins, and labral repair/refixation were performed as appropriate using published techniques.[9,10] The vertical portion of the T-capsulotomy was then created for the treatment of cam deformity. Cam resection was performed to address abnormal femoral bony morphology, followed by dynamic examination under direct arthroscopic visualization and fluoroscopic guidance to confirm complete resection of bony impingement. Both the vertical and horizontal limbs of the T-capsulotomy were repaired using a suture-shuttling device, starting at the base of the vertical portion.[9,10]

After addressing any concomitant intra-articular pathology, traction was released, and the hip was abducted 15° to 20° to relieve gluteal tension. Under fluoroscopic guidance, a 5.0-mm metal cannula was introduced through the MA portal into the peritrochanteric space between the iliotibial band and greater trochanter, followed by the arthroscope. An arthroscopic shaver was then introduced into the AL portal through a metal cannula and used to perform a trochanteric bursectomy. The muscular and tendinous aspects of the gluteus medius and the gluteus minimus were identified. Any mucoid degeneration of the tendons was removed.

For partial-thickness tears not readily visualized, the bursal side of the tendon was explored using a probe to locate the tear better. For articular-sided partial tears, the bursal surface of the torn tendon was incised in line with its fibers to visualize the extent of the tear and the tendon footprint. Radiofrequency ablation was used to prepare the footprint bed, followed by decortication with a bur. A single-row suture anchor technique was used for most repairs, as described by Levy et al.[17] One 5.5-mm triple-loaded suture anchor was used for each involved tendon. A double-row suture anchor technique was utilized for large tears with significant retraction or diffuse fatty degeneration requiring extensive debridement.[17,31]

Rehabilitation Protocol

Postoperative rehabilitation followed a standardized 3-phase protocol for patients in both study groups.[13,28,31,33] In phase 1—the initial postoperative period (0-6 weeks)—rehabilitation consists of full-time hip bracing to limit active hip abduction, toe-touch weightbearing using a walker or crutches, and light passive range of motion. For the combined procedure, patients' physical therapy is initiated by week 4. Phase 2 takes place 6 to 12 weeks postoperatively, progressing to full weightbearing and

TABLE 1
Patient Demographic and Preoperative Characteristics[a]

Characteristic	Gluteal Tendon and Labral Repair	Isolated Gluteal Tendon Repair	*P*
Sex			.613
Female	29 (90.6)	31 (96.9)	
Male	3 (9.4)	1 (3.1)	
Age, y	50.6 ± 8	52.7 ± 8.9	.322
BMI, kg/m^2	27.8 ± 6.2	28.9 ± 6.8	.500
Physical activity	59.4	31	**.040**
Smoking, current or former	9.7	16.7	.686
Back pain	19.4	37.5	.222
Psychiatric history	22.6	29.6	.564
Workers' compensation	6.5	7.1	>.999
Preoperative chronic pain >2 y	43.8	58.3	.418

[a]Data are reported as mean ± SD, n (%), or %. The bold *P* value indicates a statistically significant difference between groups ($P < .05$). BMI, body mass index.

initiating hip-strengthening exercises while discontinuing the hip abduction brace. Finally, phase 3 takes place beyond 12 weeks, concluding with unassisted ambulation and a gradual return to general activity as tolerated. The conclusion of formal physical therapy is expected by 24 weeks postoperatively.

Postoperative Outcomes

PROs were prospectively collected preoperatively and 2 years postoperatively using secure electronic data collection platforms. The PRO measures included the HOS-ADL, HOS-SS, mHHS, iHOT-12, and VAS pain.

CSOs were defined as achieving the MCID and PASS thresholds. MCID thresholds were calculated using the distribution method, which involved taking one-half of the standard deviation of the difference between preoperative and 2-year postoperative PRO scores for each measure. PASS thresholds were calculated using receiver operating characteristic (ROC) curve analysis, which involved creating a ROC curve for each PRO measure at a 2-year follow-up and identifying the point closest to the top-left corner of each graph, with the top-left corner representing a perfect true-positive rate (sensitivity) of 1 and false-positive rate (1 − specificity) of 0. Expressed differently, the point nearest to the top-left corner can be considered the cutoff value that best maximizes the true-positive rate while minimizing the false-positive rate.[34] For the entire graph, an area under the curve (AUC) $\geq$0.7 was considered acceptable discrimination of cases (achievement of PASS) versus controls (nonachievement).[14] Both MCID and PASS thresholds were calculated using the full 64-patient cohort, including patients who underwent combined G + L and those who underwent G. Thus, they represent MCID and PASS thresholds for patients undergoing endoscopic gluteus medius and/or minimus repair with or without labral repair.

Statistical Analyses

Continuous variables were reported as mean and standard deviation. Categorical variables were reported as percentages of all respondents for each group. Continuous variables were compared between groups using a 2-sided independent-sample *t* test. Preoperative and 2-year postoperative PROs were compared using a 2-sided paired-samples *t* test for all patients. Categorical variables were compared between groups using the Fisher exact test. An a priori α of .05 was used to determine statistical significance for all tests, and an a priori power analysis determined that 26 patients would be required in each group to detect a large difference in mHHS scores, defined as a Cohen $d \geq 0.8$ or a difference of approximately 15 points,[5,28] with a power of 80%. All analyses were performed using R statistical software Version 4.2.2 (R Core Team).[30]

RESULTS

Demographic and Preoperative Characteristics

A total of 32 patients (29 women; mean age, 50.6 ± 8 years; mean BMI, 27.8 ± 6.2 kg/m^2) who underwent primary combined endoscopic gluteus medius/minimus and arthroscopic hip labral repair (G + L cohort) were propensity-matched in a 1 to 1 ratio ($P \geq .322$) to 32 patients (31 women; mean age, 52.7 ± 8.9 years; mean BMI, 28.9 ± 6.8 kg/m^2) who underwent primary endoscopic gluteus medius/minimus repair without labral repair (G cohort). The cohort that did not undergo labral repair reported a significantly lower participation rate in sports or recreational activity than the combined G + L cohort (G + L, 59.4% vs G, 31%; $P = .040$). There were no other significant differences in patient demographic or preoperative characteristics between groups (Table 1).

TABLE 2
Preoperative Radiographic Characteristics[a]

Characteristic	Gluteal Tendon and Labral Repair	Isolated Gluteal Tendon Repair	*P*
Dunn alpha angle, deg	55.2 ± 10.7	49 ± 10	**.042**
LCEA, deg	31.9 ± 5.5	29.9 ± 5.7	.184
ACEA, deg	33.6 ± 6.9	29.9 ± 5.5	.199
Tönnis angle, deg	6.6 ± 5	8.4 ± 4.9	.170
Tönnis grade			>.999
0	87.1	84	
1	12.9	16	
Crossover sign	6.5	8	>.999
Ischial spine sign	19.4	16	>.999
Posterior wall sign	25.8	24	>.999
Coxa profunda	38.7	56	.282

[a]Data are reported as mean ± SD or %. The bold *P* value indicates a statistically significant difference between groups ($P < .05$). ACEA, anterior center-edge angle; LCEA, lateral center-edge angle.

Preoperative Imaging

Patients who underwent combined G + L demonstrated significantly higher preoperative alpha angles on Dunn lateral radiographs (G + L, 55.2° ± 10.7° vs G, 49° ± 10°; $P = .042$). There were no other statistically significant differences in preoperative radiographic characteristics (Table 2).

Intraoperative Findings and Procedures

There were no significant differences between groups in the frequency of tendon involvement or the extent of gluteus medius/minimus tearing (ie, frequency of partial- vs full-thickness tears). However, there was a statistically significant difference in the number of anchors required to achieve successful gluteal repair, with the nonlabral repair cohort requiring more anchors despite having tears of statistically similar severity (G + L, 1.8 ± 0.9 vs G, 2.4 ± 1.2; $P = .035$) (Table 3). Although statistically significant, the clinical relevance of the difference was unclear given that both group means round to 2, and the standard deviations are each equal to one-half of their respective means. Patients undergoing the combined procedure underwent correction of FAIS morphology as indicated, with 90.6% undergoing femoroplasty and 93.8% undergoing acetabuloplasty/rim preparation. In contrast, no patients in the G group underwent FAIS correction.

Postoperative Outcomes

The cohort that underwent gluteus medius/minimus repair without labral repair demonstrated significantly lower preoperative mHHS scores ($P = .048$). Still, there were no other significant differences in preoperative, 2-year postoperative, or magnitude of improvement in PRO scores between the 2 groups (Table 4). Both groups demonstrated significant improvements in PROs between the preoperative and 2-year postoperative time points ($P < .001$ for all).

The MCID/PASS thresholds were as follows: HOS-ADL (11.14/83.82), HOS-SS (16.07/59.72), mHHS (11.47/70.95), iHOT-12 (13.73/45.49), and VAS pain (14.30/22). All ROC curves achieved an AUC ≥0.7 (Figure 2). There were no significant differences in MCID or PASS achievement rates between the 2 groups ($P \geq .108$ for all) (Figure 3) .

DISCUSSION

In this comparison of PROs and CSOs achievements in patients who underwent endoscopic gluteus medius/minimus repair with versus without concomitant arthroscopic hip labral repair, both patient cohorts demonstrated statistically and clinically significant improvements in all PROs at 2 years postoperatively. This study also defined MCID and PASS thresholds for endoscopic gluteal tendon repair, including patients who underwent gluteus minimus and labral repair. Furthermore, we defined endoscopic gluteal tendon repair MCID and PASS thresholds for the iHOT-12 and VAS pain, regardless of which tendons were involved or how the labrum was treated. The primary finding of our study was that patients who underwent combined G + L achieved comparable MCID and PASS achievement rates to those who underwent gluteus medius/minimus repair without labral repair.

Endoscopic gluteus medius/minimus repair has previously demonstrated excellent results, improving pain and function at short- to midterm follow-up.[3,6,19-21,28,31,35] Okoroha et al[28] defined MCID and PASS thresholds for endoscopic gluteus medius repair at minimum 2-year follow-up and found that >75% of patients achieved a CSO. These previously established thresholds were derived from a patient cohort that underwent primarily gluteus medius repair, with either no treatment of the labrum or simple debridement. Unique to the present study is the establishment of CSO thresholds for a cohort that also included patients who underwent gluteus minimus and labral repair, in addition to patients similar to those examined by Okoroha et al. Applying these more tailored criteria for surgical success across both patient

TABLE 3
Intraoperative Findings and Procedures[a]

Finding/Procedure	Gluteal Tendon and Labral Repair	Isolated Gluteal Tendon Repair	*P*
Gluteal tendons involved			.573
Minimus alone	6.2	6.2	
Medius alone	40.6	28.1	
Both	53.1	65.6	
Tear thickness			.459
Partial	100	94.1	
Full	0	5.9	
Labral treatment			**<.001**
None	0	25	
Debridement	0	75	
Repair	100	0	
No. of anchors			
Gluteal repair	1.8 ± 0.9	2.4 ± 1.2	**.035**
Labral repair	2.1 ± 0.8	—	
Trochanteric bursectomy	100	100	>.99
Femoroplasty	90.6	0	**<.001**
Acetabuloplasty/rim preparation	93.8	0	**<.001**
Platelet-rich plasma	3.4	0	>.99

[a]Data are reported as mean ± SD or %. Bold *P* values indicate statistically significant differences between groups ($P < .05$). Dash indicates the procedure was not performed in this subset of patients.

TABLE 4
Preoperative, 2-Year Postoperative, and Change in PRO Scores[a]

PRO	Gluteal Tendon and Labral Repair	Isolated Gluteal Tendon Repair	*P*
Preoperative			
HOS-ADL	52.8 ± 17.3	46.3 ± 18.8	.207
HOS-SS	27.5 ± 22.9	26.4 ± 21.4	.860
mHHS	54.4 ± 12.9	46.3 ± 14	**.048**
iHOT-12	26.9 ± 15.3	21.3 ± 14.4	.223
VAS pain	55.8 ± 23.9	64.2 ± 22.3	.250
2-y postoperative			
HOS-ADL	80.6 ± 17.8	76.2 ± 22.5	.416
HOS-SS	67.6 ± 28.3	64.3 ± 33.5	.695
mHHS	77.1 ± 18.6	70.8 ± 23.3	.266
iHOT-12	62 ± 25.9	61 ± 33.4	.898
VAS pain	22.7 ± 22.7	30.5 ± 29.7	.268
Δ[b]			
HOS-ADL	28.7 ± 17.6	30.9 ± 26.4	.738
HOS-SS	43.1 ± 27.5	42.3 ± 36.3	.935
mHHS	22.5 ± 18.4	24.9 ± 27.1	.730
iHOT-12	32.9 ± 20.2	42.7 ± 32.7	.254
VAS pain	–30.2 ± 27.4	–30.4 ± 30.5	.982

[a]Data are reported as mean ± SD. The boldface *P* value indicates a statistically significant difference between groups ($P < .05$). HOS-ADL, Hip Outcome Score–Activities of Daily Living subscale; HOS-SS, Hip Outcome Score–Sports Specific subscale; iHOT-12, 12-item international Hip Outcome Tool; mHHS, modified Harris Hip Score; PRO, patient-reported outcome; VAS, visual analog scale.
[b]Postoperative score – preoperative score.

cohorts, the current study found that patients with concomitant gluteal and intra-articular pathology can achieve outcomes comparable to those of patients with isolated gluteus medius/minimus tears. Further studies focused on this unique population of patients with concomitant gluteal and intra-articular pathology are warranted and may employ the metrics for clinical success developed in the present investigation.

Similar to endoscopic gluteus medius/minimus repair, arthroscopic treatment of acetabular labral tears in the setting of FAIS has been well established in the literature, demonstrating improvements in pain and function over 10

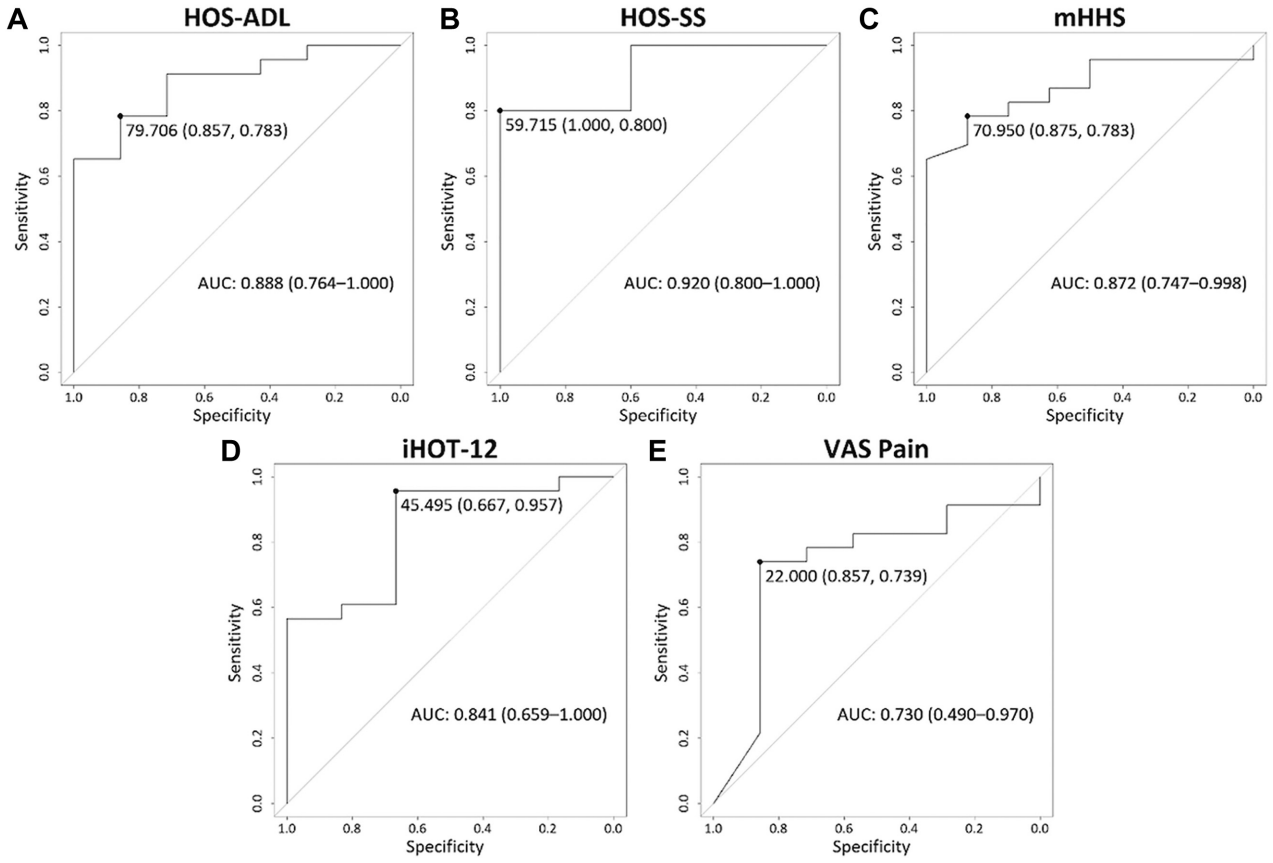

Figure 2. PASS ROC curves for (A) the HOS-ADL subscale, (B) the HOS-SS subscale, (C) the mHHS, (D) the iHOT-12, and (E) the VAS for pain. AUC, area under the curve; HOS-ADL, Hip Outcome Score–Activities of Daily Living subscale; HOS-SS, Hip Outcome Score–Sports Specific subscale; iHOT-12, 12-item international Hip Outcome Tool; mHHS, modified Harris Hip Score; PASS, Patient Acceptable Symptom State; ROC, receiver operating characteristic; VAS, visual analog scale.

years postoperatively.[22,23] Despite excellent overall results, patients with advanced age and degenerative joint changes have demonstrated inferior outcomes after surgical treatment and labral repair.[12,25] A multicenter study by Hevesi et al[12] found that patients with Tönnis grade $\geq$2, BMI >30 kg/m^2, and age >35 years demonstrated significantly decreased improvements in PROs at short- to mid-term follow-ups. Relatedly, a systematic review of 68 studies involving hip arthroscopy for treating FAIS by Riff et al[32] concluded that labral repair, capsular repair, >2-mm joint space width, and age <50 years significantly decreased the risk of conversion to THA.[32] In the present study, patients were matched according to sex, age, and BMI to limit age- or weight-related bias. This was particularly important given that patients undergoing labral repair are typically younger and less overweight than those undergoing isolated gluteal tendon repair. After matching, there were no differences in these demographic characteristics or postoperative outcomes between the 2 groups. Similar to the findings of Horner et al,[13] who found successful results for patients with simultaneous labral and gluteal repairs compared with those undergoing isolated labral repairs, the present study highlights similarly successful outcomes of patients with gluteal pathology who undergo concomitant intra-articular intervention for FAIS and labral tear along with gluteal tendon repair when compared with a well-matched cohort undergoing isolated gluteal repair.

Delineating the predominant pathology in patients with combined FAIS and gluteus medius/minimus tendinopathy remains a clinical challenge. Gluteus medius/minimus tendinopathy typically presents with lateral hip pain and dysfunction that is worsened by ascending stairs and sleeping on the affected side.[29] Although FAIS traditionally presents with groin pain that is worsened by activity, especially deep flexion, patients with FAIS may also present with lateral hip pain and generalized hip weakness.[26] The decision to treat 1 or both of these distinct pathologies remains an area of clinical uncertainty and a focus of ongoing clinical research efforts. The findings of the recent systematic review by Yee et al[37] further emphasize the common coexistence of gluteal pathologies and intra-articular pathology in the form of labral tears and acetabular cartilage defects. Meghpara et al[19] previously compared patients who underwent endoscopic gluteus medius repair with labral treatment (76% debridement,

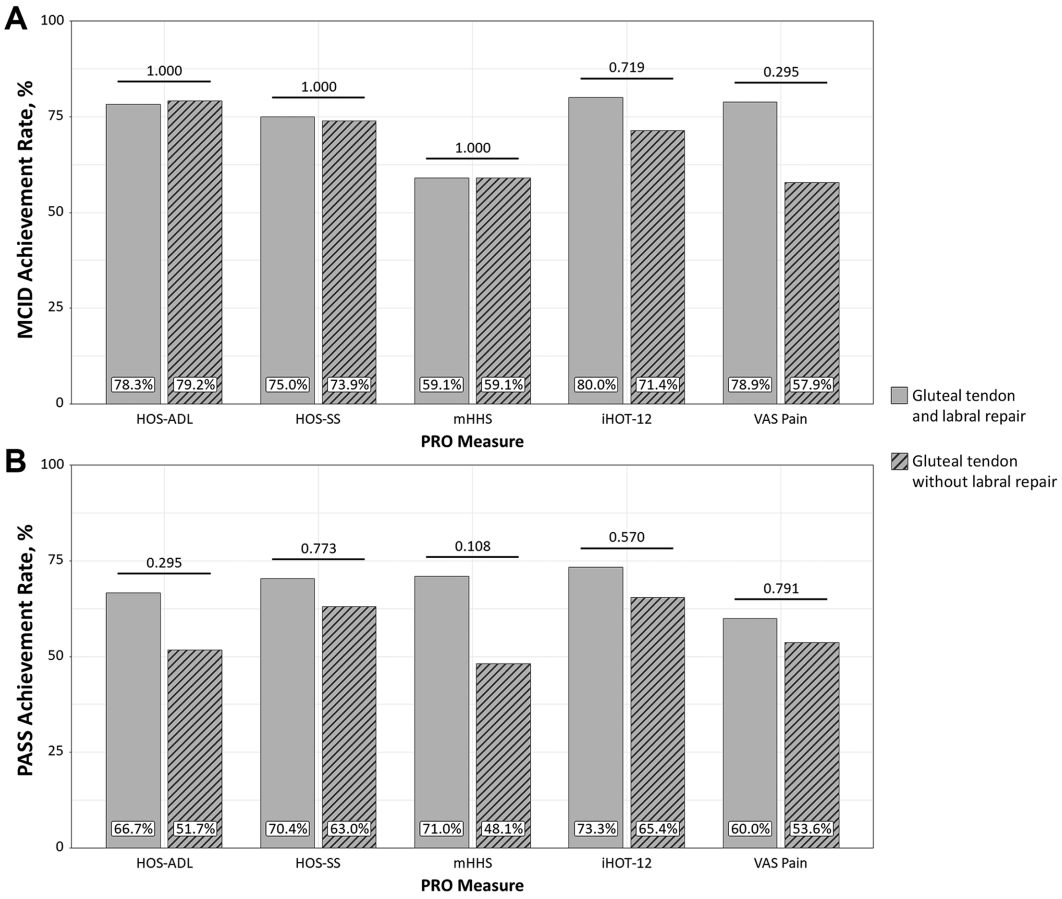

Figure 3. Comparison of (A) the MCID and (B) PASS achievement rates for each PRO measure in patients who underwent endoscopic gluteus medius/minimus with versus without labral repair. HOS-ADL, Hip Outcome Score–Activities of Daily Living subscale; HOS-SS, Hip Outcome Score–Sports Specific subscale; iHOT-12, 12-item international Hip Outcome Tool; MCID, minimal clinically important difference; mHHS, modified Harris Hip Score; PASS, Patient Acceptable Symptom State; PRO, patient-reported outcome; VAS, visual analog scale.

24% repair) to those who underwent isolated labral treatment (55% debridement, 8% reconstruction, and 37% repair) and found that the 2 groups achieved CSOs at a similar rate for the mHHS, HOS-SS, iHOT-12, and Nonarthritic Hip Score at 5 years postoperatively. Similarly, Horner et al[13] found that a cohort of patients who underwent combined labral and gluteal tendon repair achieved similar PROs and CSOs achievement rates compared with a propensity-matched cohort of patients who underwent isolated labral repair. With a focus on gluteal tendon repair rather than labral treatment, the present study is the first to compare outcomes between patients who underwent concomitant endoscopic gluteus medius/minimus repair and arthroscopic hip labral repair and correction of FAIS versus those who underwent isolated endoscopic gluteus medius/minimus repair. The combined findings of the present study and the studies by Meghpara et al[19,20,21] and Horner et al[13] provide strong evidence that patients achieve excellent short-term outcomes even in overlapping gluteal, labral, and FAIS pathology. Based on these data, one can conclude that, in appropriately indicated patients, performing combined endoscopic gluteus medius/minimus and arthroscopic hip labral repair and correction of FAIS should not be expected to affect outcomes relative to either procedure alone. Therefore, gluteal, labral, and FAIS pathology may be addressed simultaneously with reliable improvements in PROs, if appropriate. While most patients included in the present study had a labral intervention along with gluteus medius/minimus repair, a small cohort did not. This highlights the importance of careful diagnostic evaluation and decision-making while demonstrating that operative labral treatment may not be indicated in all patients, specifically those with a preserved labrum .

Limitations

The present study has several limitations. First, it was a retrospective review of consecutive patients who underwent surgery based on the senior author's clinical algorithm, and it, therefore, was subject to selection bias. A

prospective, randomized trial may be better suited to determine whether both interventions are necessary in patients with comorbid intra-articular and gluteal tendon pathology. The senior author is also a single, high-volume, fellowship-trained hip arthroscopist at a tertiary-care academic medical center, which may have limited the study's generalizability to other practice settings. Although the present study is 1 of the largest to date assessing outcomes after endoscopic gluteus medius/minimus repair and the first to compare outcomes in patients who underwent combined gluteus medius/minimus and labral repair versus those who underwent gluteus medius/minimus repair without labral repair, it was still limited by sample size. As a result, observed differences between the 2 patient cohorts that did not achieve statistical significance may be subject to type II error. Future prospective studies with larger sample sizes are necessary to further assess whether there are differences in outcomes after endoscopic gluteus medius/minimus repair with versus without labral repair. In addition, 2 years postoperatively may not be sufficient to fully evaluate the consequences of labral debridement alone in patients who did not undergo labral repair. Finally, while the primary focus of the present study was to compare patients undergoing combined G + L to those undergoing G, most patients in the nonlabral repair cohort underwent labral debridement, which may have led to different results than if they had received no labral treatment at all.

CONCLUSION

Patients who underwent combined G + L demonstrated comparable PROs and CSO achievement rates to patients who underwent G, highlighting preserved successful outcomes for patients with gluteal tendon pathology and concomitant FAIS and labral tears.

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