

# Postoperative Outcomes for Total Hip Arthroplasty with And Without Simultaneous Hip Abductor Repair: A Matched Pair Analysis

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**Abstract**

**Purpose:** The purpose of this study was to compare outcomes and improvement in self-reported functional status between patients undergoing total hip arthroplasty (THA) with abductor repair (AR) to a matched cohort of patients undergoing isolated THA.

**Methods:** A retrospective review of prospectively collected data was performed of patients who had undergone THA with abductor repair at a single institution. Ten patients were identified as having undergone both THA + AR, and they were matched in a 1:2 ratio with patients who had undergone THA alone. Patients were contacted at a minimum of 18 months after surgery and the following outcomes measures were obtained: the hip outcome score – activities of daily living and HOS ADL+SS (HOS-ADL, HOS), international hip outcome tool -12 (iHOT-12) and the patient's self-reported change in pre- and post-surgical functional status.

**Results:** Patients undergoing THA+AR had significantly worse self-reported outcomes as measured by HOS, HOS-ADL and iHOT-12 ( $P < .05$ ). All of the patients in the THA cohort reported being "Much Improved" or "Improved" compared to 80% of patients in the THA+AR cohort.

**Conclusions:** Patients undergoing THA with concomitant abductor repair demonstrated significantly worse post-operative outcomes than a matched THA alone cohort. These findings indicate that abductor pathology is a risk factor for inferior outcomes irrespective of repair in the setting of THA.

**Level of Evidence:** Level III, retrospective cohort study

**Keywords:** Total Hip Arthroplasty, Abductor Pathology, Abductor Repair, Gluteus Medius, Gluteus Minimus

**1. Introduction**

Gluteus medius and minimus or hip abductor (HA) tendon tears are increasingly recognized as causes for lateral sided hip pain and have been likened to shoulder rotator cuff tears [1-3]. Similar to the rotator cuff, hip stability is conferred, at least in part, by the hip abductors through compressive effects in addition to playing a role in rotation and hip abduction [4]. Advances in magnetic resonance imaging (MRI) and clinician recognition have allowed us to further classify lateral hip pain by degree of abductor pathology in patients who were previously given the catch all term "trochanteric bursitis" as a diagnosis [5,6]. While often observed in native hips, abductor tendon tears are also prevalent in patients undergoing total hip arthroplasty (THA) with most series reporting a prevalence of 20-25% in

those undergoing the procedure for osteoarthritis and some authors reporting rates as high as 70% in a subset of female patients [1,7,11].

Despite the frequency of concomitant abductor tendon tears, there is a paucity of data discussing the necessity or effects of their repair on outcomes of total hip arthroplasty, with some studies reporting high failure rates and some with no benefit of repair at all [10,12,13]. A subset of authors have found durable success with abductor tendon repair augmented with gluteus maximus transfer to the trochanter both in the native hip and in the setting of primary THA [12, 14-16]. The purpose of this study was to analyze patient reported outcomes (PROs) in patients undergoing primary THA without hip abductor pathology compared to a

cohort undergoing simultaneous gluteus medius/minimus repair and primary THA. Our hypothesis was that patients without concomitant gluteal pathology would demonstrate superior outcomes compared to patients undergoing both abductor repair and THA.

2. Methods

After institutional review board approval, a retrospective review of prospectively collected cases was conducted on patients that underwent simultaneous THA and gluteus medius/minimus repair (THA+AR) at a single institution. Patients identified between February 2016 and August 2019 were included in this study. Exclusion criteria consisted of patients undergoing concomitant procedures at the time of the procedure in question and prior history of arthroplasty or repair on the ipsilateral hip. This ultimately resulted in 10 total patients, this cohort was matched in a 1:2 ratio of patients who underwent primary THA alone by age, sex, laterality and surgical date. There was a total of 16 different surgeons who performed the operations via different approaches including: anterior, anterolateral and posterior. All repairs were performed either through a trans-osseous technique with drill holes or with varied numbers of suture anchors. Patients were contacted at a minimum of 18 months after surgery and the following outcomes measures were obtained: the hip outcome score – activities of daily living and HOS ADL+SS (HOS-ADL, HOS), international hip outcome

tool -12 (iHOT-12) and the anchor question: How would you rate your level of function after surgery compared to before surgery? “Much Improved”, “Improved”, “Slightly Improved”, “No Change”, “Slightly Worse”, “Worse” or “Much Worse”.

2.1 Statistics

Data were analyzed using the statistical software package SPSS version 25.0 (Chicago, IL). Parametric continuous variables were reported as mean with SD and ranges and were statistically analyzed with independent T-test. Non-parametric continuous variables were reported as median with IQR and ranges and were statistically analyzed with Mann-Whitney-U test. Categorical variables were reported as frequencies with percentages and were statistically analyzed with Chi-square test. A P value of less than 0.05 was considered statistically significant.

3. Results

A total of 10 patients underwent THA+AR, 9 (90%) were female and 1 (10%) was male. The comparison cohort consisted of 20 THA only patients matched for age, sex, laterality and timing of surgery. There were no significant demographic differences in age, sex or BMI between groups (Table 1). Median follow-up time in months was not significantly different for the THA+AR (39.0) and THA group (38.0), p=0.948. Median operative time in the THA+AR was significantly longer on average than the THA group (110.0 vs 75.0, p<0.001).

	Primary THA (N=20)	Primary THA + AR (N=10)	
	Baseline Mean (SD)	Baseline Mean (SD)	P-value
Age (Years)	71.1 (9.3)	71.1 (9.5)	0.704
Females (N, %)	17 (85%)	9 (90%)	1.000
BMI	27.1 (5.0)	29.7 (5.4)	0.204
	Median (Range)	Median (Range)	
Operation time (min)	75.0 (49.0-94.0)	110.0 (83.0-157.0)	<0.001
Follow-up (months)	38.0 (18.0-50.0)	39.0 (19.0-49.0)	0.948

Table 1: Analysis of Cohort Demographics

Parametric continuous variables were reported as mean with SD and ranges and were statistically analyzed with independent T-test. Non-parametric continuous variables were reported as median with IQR and ranges and were statistically analyzed with Mann-Whitney-U test.

Patients in the THA+AR group demonstrated significantly worse post-operative PROs as measured by HOS-ADL (74.2 vs 91.9,

p=0.010), HOS (74.2 vs 91.9, p=0.010) and iHOT-12 (76.6 vs 91.5, p=0.017) than the THA cohort (Table 2). Similarly, 100% of patients in the THA cohort reported being “Much Improved” or “Improved” compared to 80% of patients in the THA+AR cohort, this was not significantly different however p=0.113, the last two patients (20%) reported only “Slightly Improved” in the THA+AR cohort.

Instrument	Scale	Primary THA Median (N=20)	Primary THA + AR Median (N=10)	P-value
HOS	4-20	91.9 (35.0-100.0)	74.2 (48.3-91.7)	0.010
ADL	4-20	91.9 (35.0-100.0)	74.2 (48.3-91.7)	0.010
iHOT-12	0-100	91.5 (72.5-99.8)	76.6 (39.5-96.1)	0.017
Subjective Improvement	0-100	41.2(17.1)	69.0 (22.3)	<.0001
Much Improved	16 (80%)	6 (60%)	0.113	
Improved	4 (20%)	2 (20%)		

Slightly Improved		0	0	
No Change		0	0	
Slightly Worse		0	0	
Worse		0	0	
Much Worse		0	0	

**Table 2: Analysis of Post-operative Reported Outcomes**

*HOS, Hip Outcome Score, iHOT-12, International Hip Outcome Tool-12, PASS, Patient Acceptable Symptom State reported as a count for each population and the total percentage of that population.*

#### 4. Discussion

This study sought to determine if patients who had abductor tendon pathology diagnosed and repaired at the time of THA would demonstrate non-inferior outcomes to those without abductor tendon pathology. Patients in this THA+AR cohort demonstrated worse outcomes compared to their THA alone counterparts. Patients in both cohorts improved post-operatively, however THA+AR had significantly lower post-operative PROs than the THA alone cohort. Lastly, when subjective measure of improvement were graded 100% of patients without abductor pathology reported being “Much Improved” or “Improved” compared to 80% of patients in the THA+AR cohort.

The effects of abductor tendon pathology +/- primary repair on THA outcomes have not been well studied in the literature. prospectively studied 46 patients undergoing THA with ultrasound preoperatively along with intraoperative examination from a lateral approach to quantify abductor tendon pathology and subsequent effect on post-operative outcomes [17]. They reported a negative effect of abductor tendon pathology on clinical outcomes, however do not compare their cohort to a control group without abductor pathology. reported outcomes for patients undergoing anterior THA with asymptomatic abductor pathology previously diagnosed on MRI [18]. They compared their patients to a matched cohort without abductor pathology and noted significantly worse outcomes in the primary cohort in terms of 2-year HHS, VAS pain scores and patient satisfaction. Further, patients with abductor pathology had significantly higher rates of lateral hip pain after surgery compared to their matched counterparts. The authors report on the ability to repair abductor tendons in this group of patients through an anterior approach though did not do so as the patients were previously asymptomatic.

Several other studies have looked at the effect on outcomes of abductor repair at the time of primary THA [13]. compared a cohort of 20 patients without abductor tendon pathology who underwent direct anterior THA to 20 patients with pathology, 8 of which underwent direct anterior THA and 12 of which underwent trans gluteal THA + AR. They found that patients in all groups improved significantly after surgery as measured by WOMAC and HHS, the patients in the direct anterior group improved significantly more post-operatively in terms of the HHS than the abductor tendon pathology group regardless of repair. They found no significant differences between patients who had abductor tendon pathology regardless of whether or not

they underwent repair.

Reviewed a series of 525 THA, 54 of which required THA+AR for mild chronic tendon damage and 41 who underwent THA+AR with the addition of gluteus maximus flap transfer for severe chronic tendon damage [12]. All of their patients at two years post-operatively had statistically significant, and equally meaningful improvements in the HHS except for 6 patients with severe abductor fatty atrophy at the time of THA+AR and gluteus maximus transfer. These patients had significant improvement but lower HHS than their counterparts, they did however have a durable outcome from 2 to 5 years post-operatively. For the remaining 35 patients who underwent THA+AR and gluteus maximus transfer, they achieved similar durable results to the abductor intact cohort at 2 and 5 years. Interestingly, the cohort of patients with mild pathology who underwent THA+AR alone demonstrated equal HHS function at 2 years as the intact cohort, however by 5 years this significantly decreased. These findings in conjunction with our own suggest that abductor repair alone may not provide durable outcomes in the setting of THA and patients may require gluteus maximus transfer to achieve a more desirable long-term outcome.

#### 5. Limitations

This study has several limitations, first due to heterogeneity among surgeon practices not all patients had preoperative outcomes scores. It is possible differences in outcomes could be due to baseline preoperative differences that we were unable to elucidate in this study. Secondly, no pre-operative quantification of abductor pathology was reported as MRI data was not obtained. This may represent a heterogenous group of pathology as tears could vary from partial thickness to complete tears and lack of characterization may result in loss of granular details between outcomes in separate cohorts. Further, this is a retrospective study of prospectively collected data and is subjected to all inherent biases present in this research design. Lastly, the short-term nature of this study prohibits us from detecting long term important outcomes such as dislocations, fractures and revision surgery.

#### 6. Conclusion

Patients undergoing THA+AR report improvement in symptoms post-operatively, however they do not achieve the same outcomes as patients undergoing THA without abductor deficiency. In this cohort, the repair of the abductor mechanism does not return patients to the same level of post-operative function as their abductor intact counterparts. Given the high prevalence of abductor tears in THA patients, this warrants additional investigation in both pre-operatively identifying and optimizing outcomes for this cohort of patients which may

include the addition of gluteus maximus transfer in those with abductor deficiency.

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