Patients Undergoing Revision Hip Arthroscopy Demonstrate Worse Postoperative Outcomes but Achieve Clinically Significant Outcomes at Similar Rates Compared to Patients Undergoing Primary Hip Arthroscopy: A Propensity Matched Study with Minimum 5-Year Follow Up

Reagan Chapman[1], Thomas W Fenn, Mario Hevesi, Shane Jay Nho[1]
[1]Midwest Orthopaedics at Rush

INTRODUCTION: This propensity matched retrospective cohort study sought to determine differences in mid-term clinical outcomes at 5-years between patients undergoing primary hip arthroscopy (HA) vs. revision hip arthroscopy (RHA) for femoroacetabular impingement syndrome (FAIS).

METHODS: A retrospective cohort study was conducted on patients who underwent revision hip arthroscopy for FAIS from January 2012 to April 2017. These patients were matched using propensity score analysis in a 1:4 ratio by age, sex, and body mass index (BMI) to patients who underwent primary HA. Preoperative and postoperative radiographs were assessed. Patient-reported outcomes (PROs) preoperatively and at 5-years including the Hip Outcome Score Activities of Daily Living subscale (HOS-ADL) and Sport-Specific subscale (HOS-SS), modified Harris Hip Score (mHHS), international Hip Outcome Tool (iHOT-12), and Visual Analog Scale (VAS) for Pain and Satisfaction were compared between groups using an independent t-test with an a priori significance level of 0.05. Minimally clinically important difference (MCID) and patient acceptable symptomatic state (PASS) were calculated using previously published thresholds for HOS-ADL, HOS-SS, mHHS, iHOT-12, and VAS Pain.

RESULTS:

Fifty-one patients who underwent revision HA (35 female, 16 male, age: 32.6 ± 10.2 years; BMI: 26.5 ± 5.9kg/m2) were propensity matched by age, gender, and BMI to 204 patients who underwent primary HA (140 female, 64 male, age: 33.3 ± 11 years; BMI: 25.1 ± 4.8 kg/m2). There were no significant differences in sex ($p > 0.99$), age ($p = 0.714$), and BMI ($p = 0.069$) between groups, supporting satisfactory matching. There were no significant differences in Lateral Center Edge Angle (LCEA), Tonnis Angle, or Alpha Angle on preoperative radiographs. There was a significant difference in LCEA (RHA: 27.5 ± 6.6 vs HA 30.0 ± 5.8, $p=0.023$) on postoperative radiographs.

Both groups demonstrated significant postoperative improvements in all outcome scores measured ($p \leq 0.001$).There were no significant differences in preoperative or Delta PROs for patients undergoing revision HA compared to primary HA. There were significant differences in outcomes at 5-years for HOS-SS (RHA: 64.9 ± 32.5 vs. HA: 75.3 ± 26.2, $p=0.044$), mHHS (RHA: 72.2 ± 22.4 vs. HA: 80.1 ± 18.1, $p=0.039$), iHOT-12 (RHA: 61.4 ± 29.3 vs. HA: 71 ± 27.6, $p=0.043$), and VAS Satisfaction (RHA: 63 ± 34.9 vs. HA: 77.7 ± 29.6, $p=0.013$) for patients undergoing revision HA compared to primary HA patients. There were no significant differences in achieving MCID ($p \geq 0.431$)or PASS ($p \geq 0.071$) for HOS-ADL, HOS-SS, mHHS, or iHOT-12.

DISCUSSION AND CONCLUSION: Patients undergoing revision hip arthroscopy experience significantly worse outcomes overall compared to those undergoing primary hip arthroscopy for FAIS but meet thresholds for clinically significant outcomes at similar rates.

Table 1. Demographics

	WC	Controls	P-Value
N	38	152	
Age	40.3 ± 9.3	40.4 ± 10.5	0.947
Gender			1
Male	13	52	
Female	25	100	
BMI	29.1 ± 6	28.1 ± 6.6	0.397

Table 3. Achievement of MCID and PASS for Workers' Compensation patients compared to controls.

	MCID		
	WC	Controls	P-Value
N	38	152	
HOS-ADL	81.0%	68.4%	0.251
HOS-SS	66.7%	71.3%	0.676
mHHS	84.2%	65.6%	0.111
iHOT-12	57.1%	76.1%	0.135
	PASS		
	WC	**Controls**	**P-Value**
N	38	152	
HOS-ADL	26.7%	48.2%	0.031*
HOS-SS	30.0%	52.5%	0.025*
mHHS	44.4%	48.1%	0.725
iHOT-12	39.3%	50.0%	0.301

*Indicates statistical significance based upon a predetermined significance level of 0.05.

Table 2. Patient reported outcome scores at baseline and 5-years postoperatively.

	Preoperative		
	WC	Controls	P-Value
N	38	152	
HOS-ADL	41.8 ± 19.2	61.7 ± 17.5	<0.001*
HOS-SS	25.8 ± 26.9	39.6 ± 20.6	0.005*
mHHS	43.2 ± 14.6	56.8 ± 15.1	<0.001*
iHOT-12	18.4 ± 15.6	32.4 ± 17.4	0.006*
VAS Pain	71.1 ± 21	58.7 ± 21.4	0.005*
	5-Year		
	WC	**Controls**	**P-Value**
N	38	152	
HOS-ADL	72.1 ± 24.9	83.1 ± 19.6	0.009*
HOS-SS	57.6 ± 31.4	71.6 ± 28.5	0.017*
mHHS	70.1 ± 22.5	75.4 ± 19.4	0.211
iHOT-12	57.8 ± 35	64.8 ± 29.2	0.264
VAS Pain	41.9 ± 34.3	27 ± 27.4	0.025*
VAS Satisfaction	72.9 ± 38.4	77.8 ± 31.1	0.475
	Delta PROs		
	WC	**Controls**	**P-Value**
N	38	152	
HOS-ADL	33.2 ± 22.9	21.5 ± 26	0.060
HOS-SS	32.7 ± 30.8	33.8 ± 34.5	0.890
mHHS	24.3 ± 15.3	19.1 ± 24.5	0.374
iHOT-12	36.5 ± 31.9	34.8 ± 30.5	0.849
VAS Pain	29.1 ± 33.1	31.6 ± 32.3	0.727

*Indicates statistical significance based upon a predetermined significance level of 0.05.

Table 4. Preoperative and Postoperative Radiographic Measurements

	Preoperative Radiographs		
	WC	Controls	P-Value
N	38	152	
LCEA	34.4 ± 9.6	32 ± 6.2	0.158
Tonnis	5.7 ± 5	6.2 ± 4.3	0.623
Alpha Angle	63.6 ± 14.2	58.2 ± 12.2	0.029*
	Postoperative Radiographs		
	WC	**Controls**	**P-Value**
N	38	152	
LCEA	31 ± 6.1	30.3 ± 6.1	0.542
Tonnis	7 ± 4.7	6.5 ± 4.3	0.564
Alpha Angle	37.2 ± 4.9	39.6 ± 9.3	0.131

*Indicates statistical significance based upon a predetermined significance level of 0.05.