

# Return to Sport After Primary Hip Arthroscopy and Labral Repair in Female Athletes with Femoroacetabular Impingement: Minimum 5-Year Follow-Up

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**INTRODUCTION:** Femoroacetabular impingement (FAI) is a common cause of hip pain in female athletes. Mid-term postoperative outcomes have yet to be evaluated in female athletes undergoing arthroscopic hip surgery. Therefore, the purpose of our study was to evaluate return to sport (RTS), clinical outcomes, and sport continuation in female athletes with FAI after primary hip arthroscopy. We hypothesized that hip arthroscopy with labral repair and femoroplasty would produce satisfactory clinical outcomes, high RTS and sport continuation rates among female athletes.

## METHODS:

A retrospective analysis of a single institution's database was performed to identify female athlete patients who underwent primary hip arthroscopy with labral repair and femoral osteochondroplasty from July 2011 to October 2019 with minimum 5-year follow-up. Preoperative radiographs were evaluated for lateral center-edge angles, Tonnis angles, Tonnis grading, and alpha angles. Patient-reported outcome measures, including Modified Harris Hip Score, Hip Outcome Score (including Activities of Daily Living and Sports-Specific Subscale), Tegner Activity Scores, and Visual Analogue Scale for pain, and patient surgical satisfaction were collected and analyzed postoperatively. Statistical analyses were performed using Student t-tests or Wilcoxon rank-sum test (Mann Whitney *U*), after testing for normality, to compare preoperative and postoperative PROMs, as well as evaluate patients who returned to sport participation. Continuous variables were reported as mean ± standard deviation and *p* values were reported under a 95% confidence interval where < 0.05 were considered significant. Statistical analyses were conducted in R version 4.4.1 (RStudio).

**RESULTS:** Sixty-three hips (27 left, 36 right) in 56 female patients (mean age 21.6 ± 8.0 years; body mass index 24.7 ± 4.8) were included and followed for an average of 8.4 ± 2.1 years postoperatively (range 5.0-13.2). Preoperatively, patients participated in basketball (n=18), dance (n=22), hockey (n=8), and soccer (n=12). The mean preoperative radiographic measures were LCEA of 30.9° ± 5.4°, Tonnis angle of 4.8° ± 4.3°, and alpha angle of 58.3° ± 9.3°. Tonnis grades were 0 in 36 (64%), 1 in 18 (32%), and 2 in 2 athletes (4%) (**Table 1**). When excluding athletes who did not RTS due to non-hip related factors, 28/41 (68%) female athletes returned to sport (**Table 2**). The level of competition among those who returned to sport was 10 (71%) recreational, 14 (67%) high school, 2 (50%) collegiate, and 2 (100%) professional athletes. Twenty-three out of the 28 athletes (82%) who returned to sport returned at the same or higher level of competition. Postoperative outcomes measures improved significantly (*p* ≤ 0.015) for all clinical outcomes compared to preoperatively (**Table 3**). Those who returned to sport had significantly improved (*p* ≤ 0.010) Hip Outcome Scores and Tegner Activity Scales compared to those who did not return to sport (**Table 4**).

**DISCUSSION AND CONCLUSION:** Female athletes who undergo primary hip arthroscopy for femoroacetabular impingement have significant improvements in patient reported outcome scores, but moderate return to sports rates at minimum 5-year follow-up. Most athletes discontinued sports due to non-hip related factors, although hip-related issues were also cited. Our analysis highlights the need for thorough perioperative counseling and establishing appropriate patient expectations for female athletes prior to hip arthroscopy.

**Table 1.** Demographics and preoperative characteristics for female athletes at minimum 5-year follow-up.\*

Variable	Value
Age at surgery, y, mean ± standard deviation	21.6 ± 8.0
Body mass index, kg/m <sup>2</sup> , mean ± standard deviation	24.7 ± 4.8
Follow-up, y (range)	8.4 (5.0-13.2)
Female, n	56
Basketball	18 (32)
Dance	22 (39)
Hockey	8 (14)
Soccer	12 (21)
Preoperative Level of Sport	
Recreational	23 (41)
High School	27 (48)
Collegiate	4 (7)
Professional	2 (4)
	Tonnis Grade (%)
	0
	1
	2
	Alpha
All sports	30.9 ± 5.4
Basketball	30.7 ± 4.1
Dance	30.9 ± 6.8
Hockey	30.0 ± 5.4
Soccer	30.6 ± 6.1

**Table 2.** Return to sport and current sport activity for female athletes at minimum 5-year follow-up.

Variable	Returned, n (%)	Did Not Return, n (%)
Return to Sports**	28 (88%)	13 (22%)
Basketball	6 (67%)	3 (25%)
Dance	15 (27%)	5 (23%)
Hockey	4 (57%)	3 (43%)
Soccer	5 (71%)	2 (29%)
Return to Sports Level		
Recreational	10 (71%)	4 (29%)
High School	14 (67%)	7 (33%)
Collegiate	2 (50%)	2 (50%)
Professional	2 (100%)	0 (0%)
	Value, n (%)	
Currently Active	13 (23%)	
Discontinued for Hip Related Reasons	20 (38%)	
Discontinued for Non-Hip Related Reasons	21 (38%)	
Not having time	8 (38%)	
Lost interest	4 (19%)	
Sustained additional non-hip related injuries	3 (14%)	
Other	6 (28%)	

\*Some patients played up to two sports.

\*\*Excluding patients who did not return for non-hip related reasons.

**Table 3.** Female athlete preoperative vs postoperative patient reported outcomes measures. \*\*

Variable	Preoperative	N*	Postoperative	N	<i>p</i> Value†
Tegner Activity Score	4.7 ± 2.6	20	5.11 ± 2.1	52	<b>0.002</b>
mHHS-ADL	58.2 ± 12.7	22	64.4 ± 35.5	54	<b>0.002</b>
mHHS Gait	25.0 ± 4.7	23	60.1 ± 32.9	54	<b>&lt;0.001</b>
mHHS Pain	15.7 ± 6.6	23	50.0 ± 26.3	54	<b>&lt;0.001</b>
mHHS Total	59.5 ± 11.6	23	81.9 ± 13.8	54	<b>&lt;0.001</b>
HOS-ADL	65.3 ± 16.1	29	86.4 ± 18.1	54	<b>&lt;0.001</b>
HOS-SSS	50.4 ± 19.0	28	72.7 ± 25.2	54	<b>0.001</b>
VAS Pain with Use	5.3 ± 2.5	17	2.0 ± 2.3	52	<b>&lt;0.001</b>

\*Number of patients with pre-operative postoperative data available for comparison on given variable

†Values are provided as mean ± standard deviation.

\*\*P values bolded if significant.

**Table 4.** Female athlete patient reported outcome measures vs return to sport at final follow-up.

Variable	RTS	Did Not RTS	<i>p</i> Value†
Tegner Activity Score Postoperatively	5.8 ± 2.0	4.3 ± 1.8	<b>0.006</b>
mHHS-ADL	64.9 ± 34.4	50.0 ± 35.5	0.176
mHHS Gait	60.8 ± 30.9	65.2 ± 32.8	0.259
mHHS Pain	47.5 ± 28.7	49.8 ± 26.7	0.702
mHHS Total	61.7 ± 13.8	77.2 ± 15.4	0.063
HOS-ADL**	81.0 ± 13.6	83.9 ± 13.7	<b>0.010</b>
HOS-SSS**	81.2 ± 23.5	67.3 ± 21.8	<b>0.006</b>
HOS Total	87.6 ± 16.5	78.3 ± 15.7	<b>0.008</b>
Surgery Satisfaction**	7.9 ± 2.5	6.8 ± 2.9	0.154
VAS Pain with Regt†	5.9 ± 2.4	3.3 ± 2.1	0.610
VAS Pain with Use	2.1 ± 2.5	2.0 ± 2.2	0.976
VAS Five-Point Scale, No. of Responses			
Much better than before surgery	15	12	
Slightly better than before surgery	8	7	
No change	1	2	
Slightly worse than before surgery	2	3	
Much worse than before surgery	0	0	

†Values are provided as mean ± standard deviation unless otherwise specified.

\*\*P values bolded if significant.

mHHS-ADL, modified Harris Hip Score Activities of Daily Living

HOS, Hip Outcome Score

SSS, Sport Specific Score

†On a scale of 0 to 10.

\*\*VAS, Visual Analogue Scale.