

# OUTCOMES FOLLOWING HIP ARTHROSCOPY IN PATIENTS WITH GLOBAL ACETABULAR RETROVERSION

MALE GENDER AND COMPETITIVE ATHLETES ARE ASSOCIATED WITH BETTER OUTCOMES

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# DISCLOSURES

- No relevant disclosures.



# AIMS

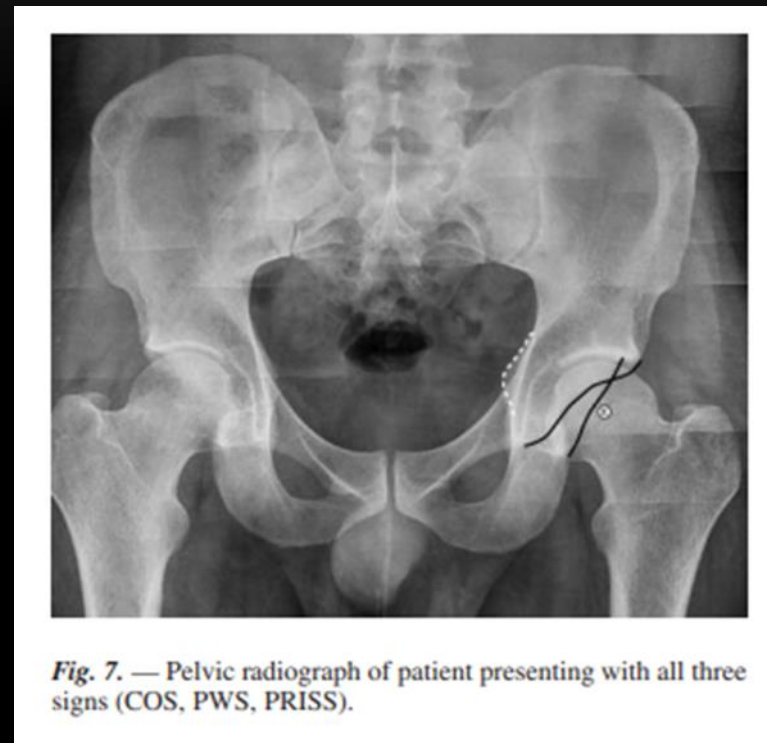
- ▶ Evaluate improvement in pain and outcomes in patients with global acetabular retroversion and FAI treated with hip arthroscopy
- ▶ Identify correlations between radiographic measurements, athlete status, and return to play with patient reported outcome measures (PROs)

***Hypothesis: Patients with global acetabular retroversion and femoroacetabular impingement improve after hip arthroscopy with low revision rates***



# METHODS

- ▶ Retrospective review, 2013-2019
  - ▶ Patients with global acetabular retroversion and FAI treated with primary hip arthroscopy
- ▶ Global acetabular retroversion: presence of all three radiographic signs –
  - ▶ Ischial spine sign
  - ▶ Crossover sign
  - ▶ Posterior wall sign
- ▶ Exclusion: < 3 radiographic signs, non-surgical patients, revision surgery on presentation, refusal to participate



Werner CM, Copeland CE, Ruckstuhl T, et al. Radiographic markers of acetabular retroversion: correlation of the cross-over sign, ischial spine sign and posterior wall sign. *Acta Orthop Belg.* 2010;76(2):166-173



# METHODS

- ▶ Radiographic measures: lateral center edge angle (LCEA), Tonnis grade, anterior wall index (AWI) and posterior wall index (PWI), alpha angle
- ▶ CT measures: femoral version
- ▶ Demographics: age, gender, height, weight, BMI, hip laterality, athlete status, return to play, revision/reoperation
- ▶ PROs: modified Harris Hip Score (mHHS), Hip Outcome Score (HOS), Hip Disability and Osteoarthritis Outcome Score (HOOS), visual analog scale (VAS) and quality of life with Veterans RAND-12 (VR-12)
  - ▶ Collected at 3 months, 6 months, 1 year, any additional visit after 1 year
- ▶ Spearman correlation, generalized estimating equations logistic regression

RESULTS



# DEMOGRAPHICS

- ▶ 148 patients, 160 hips
  - ▶ Female: 65.0% patients, 65.5% hips
- ▶ Males had significantly higher BMI than females
- ▶ No other demographic factor was statistically significant between groups
- ▶ 98.1% found to have labral tears, 92.5% found to have cam lesions

Demographics		p-value
Hips included in study	n (%)	
Total	160 (100%)	
Female	104 (65.00%)	
Male	56 (35.00%)	
Left	83 (51.88%)	
Right	77 (48.12%)	
Bilateral	12 (7.5%)	
Gender		
Female	97 (65.54%)	
Male	51 (34.46%)	
Age ± SD		0.0768
Female	26.93 ± 10.81	
Male	22.97 ± 8.01	
BMI ± SD		<0.0001
Female	22.96 ± 3.87	
Male	25.48 ± 4.07	
Follow up ± SD (months)		0.7975
Female	29.30 ± 20.67	
Male	29.97 ± 22.16	



# GENDER BASED OUTCOMES

- ▶ Significant improvement ( $p < 0.0001$ ) in all PROs postoperatively (avg. 30-month follow up) except VR-12 Mental
- ▶ Females scored significantly lower than males on almost all postoperative PROs
- ▶ 51.9% of females and 76.8% of males scored  $\geq 80$  on the mHHS (successful outcome)
- ▶ Females had higher pre- and postoperative VAS scores

Patient-Reported Outcome Measure	Female	Male	p-value
<b>Preoperative</b>			
MHHS	57.45 ± 14.65	62.22 ± 15.23	<b>0.0287</b>
HOS ADL	65.05 ± 18.68	67.71 ± 21.87	0.2431
HOS Sport	39.68 ± 23.11	45.98 ± 27.28	0.1729
HOOS Daily Living	68.91 ± 20.65	76.62 ± 21.81	<b>0.0121</b>
HOOS Sports	43.14 ± 23.39	47.76 ± 24.34	0.2391
VR-12 Physical	34.30 ± 9.61	37.98 ± 11.92	<b>0.0415</b>
VR- Mental	53.42 ± 12.47	56.85 ± 11.49	0.0968
VAS	6.63 ± 1.26	5.61 ± 2.25	<b>0.0013</b>
<b>Postoperative</b>			
MHHS	76.85 ± 19.52	88.02 ± 14.73	<b>0.0030</b>
HOS ADL	81.45 ± 19.13	91.36 ± 12.28	<b>0.0018</b>
HOS Sport	65.22 ± 29.01	77.35 ± 26.15	<b>0.0057</b>
HOOS Daily Living	85.56 ± 17.11	94.15 ± 11.75	<b>0.0002</b>
HOOS Sports	67.67 ± 27.36	79.50 ± 21.73	<b>0.0104</b>
VR-12 Physical	44.23 ± 12.24	48.72 ± 8.62	<b>0.0402</b>
VR-12 Mental	54.74 ± 10.82	56.96 ± 9.65	0.1345
VAS	3.51 ± 2.77	2.21 ± 2.37	<b>0.0042</b>





# RADIOGRAPHIC MEASURES

- ▶ Females had lower preoperative alpha angles, higher femoral version
- ▶ Femoral version  $< 5^\circ$  had significantly higher HOS, HOOS Sport scores
  - ▶ Low sample size (n = 8)
- ▶ No other radiographic measure correlated with significant improvement in patient reported outcomes, athlete status, or return to play

Radiographic Measure	Female	Male	p-value
Anterior wall index	0.58 ± 0.12	0.55 ± 0.10	.0575
Posterior wall index	0.81 ± 0.12	0.77 ± 0.11	.0875
Lateral center edge angle	28.66 ± 4.86	28.04 ± 4.52	.6204
Preoperative alpha angle, AP	60.74 ± 15.08	74.73 ± 14.19	<b>&lt;0.0001</b>
Preoperative alpha angle, lateral	67.10 ± 8.79	73.98 ± 11.45	<b>&lt;0.0001</b>
Postoperative alpha angle, AP	48.35 ± 3.70	51.62 ± 6.27	<b>0.0004</b>
Postoperative alpha angle, lateral	44.35 ± 3.70	44.85 ± 5.02	0.8005
Femoral version	16.90 ± 7.03	13.73 ± 7.65	<b>0.0106</b>

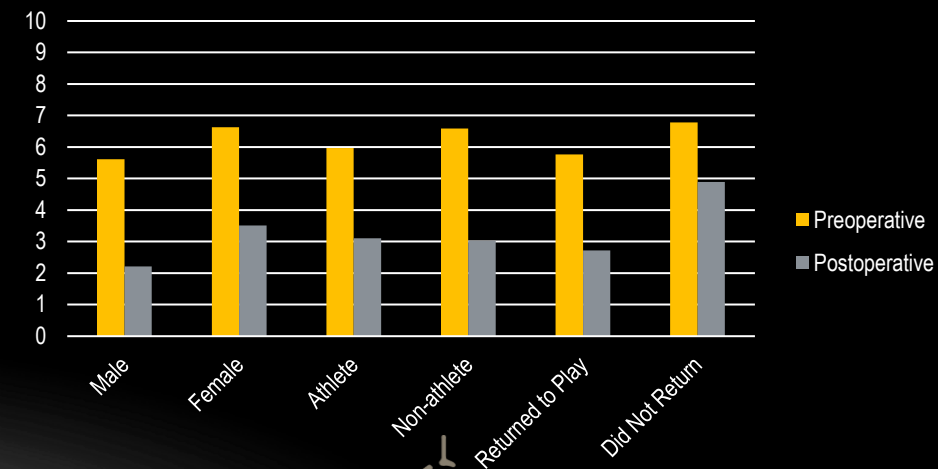
Patient-Reported Outcome Measure	Femoral Version			p-value
	$< 5^\circ$	5-10°	$> 10^\circ$	
N	8	93	53	
Postoperative				
MHHS	89.5 ± 18.27	82.10 ± 18.51	77.21 ± 19.51	0.0566
HOS ADL	93.63 ± 15.34	86.89 ± 16.31	80.45 ± 20.06	<b>0.0077</b>
HOS Sport	86.38 ± 24.30	72.24 ± 28.82	64.04 ± 27.09	<b>0.0135</b>
HOOS Daily Living	94.50 ± 9.89	89.92 ± 14.57	84.94 ± 12.19	0.0860
HOOS Sports	85.25 ± 16.83	75.67 ± 24.80	63.87 ± 28.17	<b>0.0177</b>
VR-12 Physical	47.93 ± 10.26	45.95 ± 11.08	45.18 ± 12.25	0.7037
VR-12 Mental	60.75 ± 5.60	56.34 ± 8.93	53.53 ± 12.97	0.1590
VAS	2.66 ± 3.67	2.85 ± 2.62	3.48 ± 2.75	0.3773

# ATHLETE STATUS AND RETURN TO PLAY

- ▶ 88/160 (55%) hips belonged to competitive athletes
- ▶ 72/88 (81.8%) returned to play
  - ▶ Lower VAS scores pre- and post-op than nonathletes
  - ▶ 10/16 that did not return cited a hip-related reason
- ▶ Athletes outscored nonathletes in multiple PROs postoperatively ( $p < 0.05$ )
  - ▶ mHHS, HOS Sport, HOOS Daily Living, VR-12 Physical, VAS
  - ▶ Higher proportion of athletes than nonathletes scored  $\geq 80$  on mHHS



VAS Scores in the Perioperative Period





# REVISION

- ▶ 9/160 (5.6%) hips underwent subsequent surgery after index arthroscopy
  - ▶ 55.6% athletes
  - ▶ Only one returned to play
  - ▶ All who did not return to play cited a hip-related reason
  - ▶ One athlete underwent two reoperations



# DISCUSSION

- ▶ Patients with global acetabular retroversion and FAI improve after hip arthroscopy
- ▶ Males have better outcomes
  - ▶ Gender is established risk factor
  - ▶ Previous study showed females with acetabular retroversion were more likely to score < 80 on mHHS after hip arthroscopy<sup>1</sup>
- ▶ Athletes have better outcomes
  - ▶ Previous studies showed athletes tend to have higher PROs after hip arthroscopy<sup>2,3</sup>
- ▶ **Consider alternative approach in female non-athletic population with global acetabular retroversion**



<sup>1</sup>Poshling-Monaghan KL, Knjch AJ, Levy BA, Trousdale RT, RJ S. Female sex is a risk factor for failure of hip arthroscopy performed for acetabular retroversion. *Orthop J Sports Med.* 2017;5(11):1-6

<sup>2</sup>Maliwa A, Stefford GH, RN V. Is hip arthroscopy for femoroacetabular impingement only for athletes? *Br J Sports Med.* 2012;46(14):1016-1018.

<sup>3</sup>Murata Y, Uchida S, Utsunomiya H, et al. A comparison of clinical outcome between athletes and Nonathletes undergoing hip arthroscopy for femoroacetabular impingement. *Clin J Sport Med.* 2017;27(4):349-356





# LIMITATIONS

- ▶ Length of follow up varied (5.98-88.9 months, average 29.6 months)
  - ▶ Cannot analyze “ceiling effect”
- ▶ “Athlete” and “return to play” definitions vary in the literature
- ▶ Patients missing PROs pre- or postoperatively
  - ▶ Limits MCID analysis, may be incompletely described





THANK YOU