

Outcomes of Hip Arthroscopy After Femoral Neck Stress Fractures (FNSF)

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Introduction

Femoral neck stress fractures (FNSF) are an uncommon but serious injury that occurs more frequency in military recruits and long-distance runners.^{1,2,3} Other risk factors for FNSF include female sex, low bone mineral density, and older age.^{4,5} Anatomic abnormalities of the hip, including femoroacetabular impingement (FAI), are commonly found in patients with a FNSF.⁶ We currently do not know if a pre-existing FNSF leads to worse outcomes after treatment of FAI with hip arthroscopy.

Aims:

- 1) Retrospectively identify all patients at our institution with a history of FNSF who subsequently underwent ipsilateral hip arthroscopy for FAIS.
- 2) Assess post-operative outcomes through patient-reported outcome measurements (PROM)

Methods

Design/Setting: Retrospective chart and hip preservation database review performed at a single center academic institution (University of Wisconsin).

Participants:

- Radiologic database queried from July 2017 to July 2023 for all MRIs confirming the presence of a FNSF.
- All MRI reports were then reviewed to confirm description of either a discrete fracture line or bone marrow edema within the femoral neck.
- Patient medical record numbers were then cross-referenced with a list of all patients who underwent hip arthroscopy from October 2017 to May 2024 at our institution.

Data Acquisition:

- A retrospective chart review and database search was performed to obtain demographic, radiographic, PROM and surgical data
- PROMs included the international hip outcome tool-12 (iHOT-12), modified Harris hip score (mHHS), hip outcome activities of daily living (HOS-ADL) and sport (HOS-sport).

PROM Analysis:

- A control group of patients from the hip arthroscopy database was selected for 2:1 matching to the FNSF group.
- PROMs evaluated for achievement of patient acceptable symptomatic state (PASS) and minimal clinically important difference (MCID).

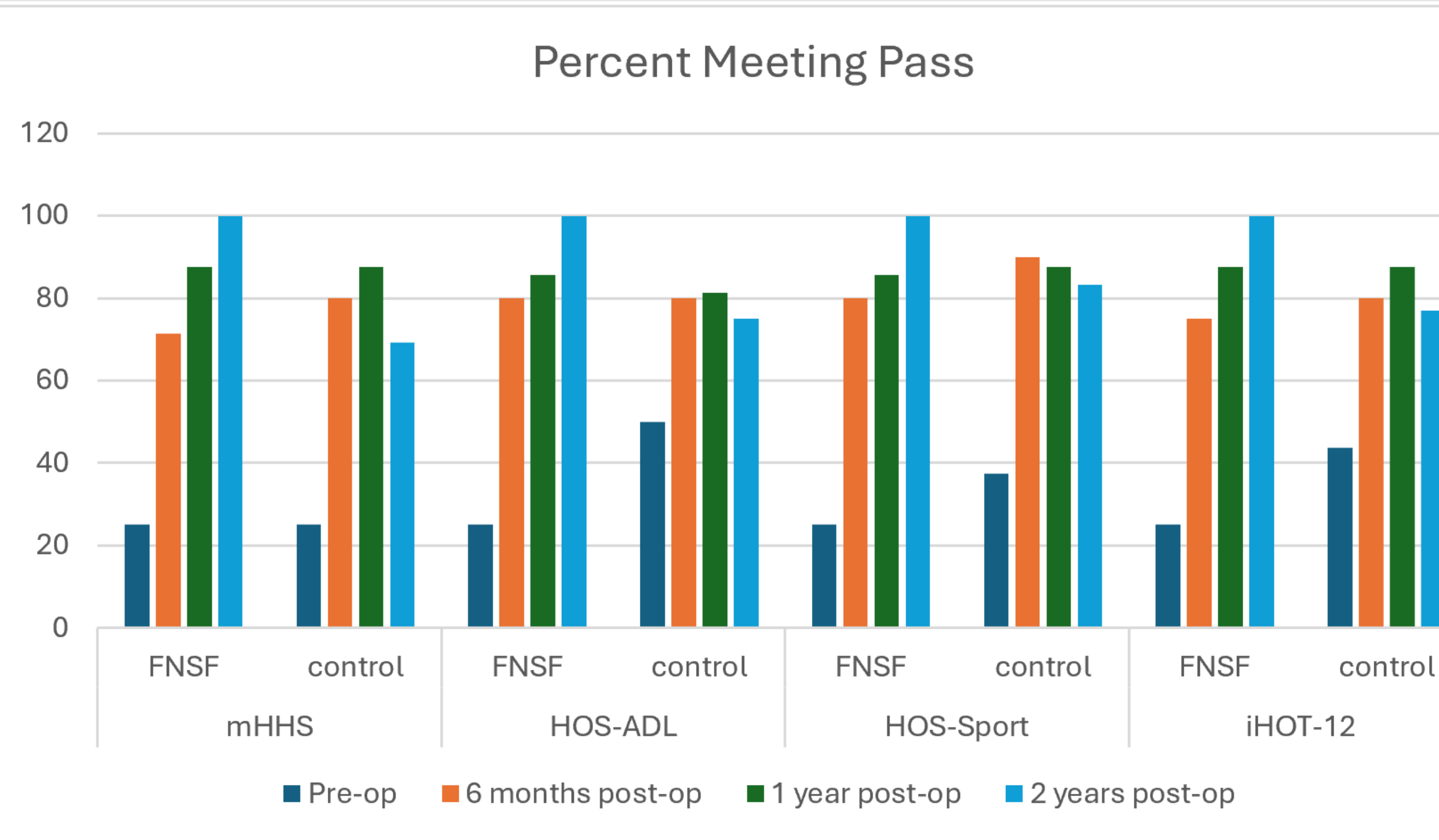
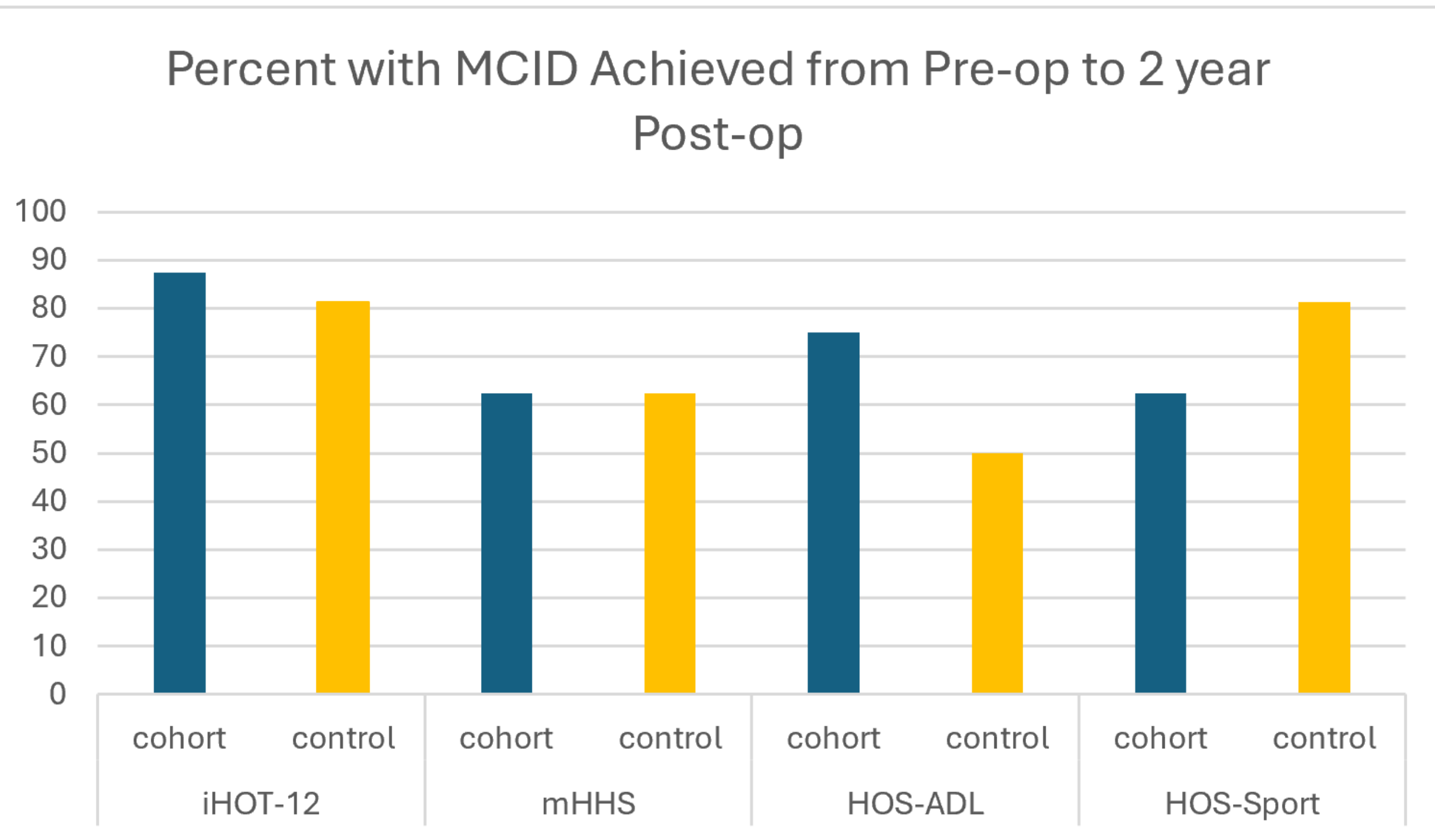
Results

Study Participants

- 85 patients with a FNSF were identified
 - 51 (60%) of these had a concurrent labral tear and 14 (16.5%) had an associated cartilage defect.
- 11 patients subsequently underwent ipsilateral hip arthroscopy for FAIS
 - 7 (64%) were female and mean age at time of surgery was 26.4 years (SD 10.0).
 - Pre-operative radiographic data included in table below
- None of the patients who underwent hip arthroscopy had a post-operative complication

PROM Scores in FNSF Group Before and After Hip Arthroscopy

- 25% (2/8) of hip arthroscopy patients with a FNSF met PASS for iHOT-12, mHHS, HOS-ADL, and HOS-Sport pre-operatively.
- At 1-year post-op, this increased to 87.5% (7/8) for iHOT-12 and mHHS, and 85.7% (6/7) for HOS-ADL and HOS-Sport
- All patients (100%) with data at 2-years post-op met PASS



Patient	Tönnis Grade	Mod Dunn Alpha Angle	LCEA	Crossover Sign	CCEA	Femoral Version	Radiographic Classification	Labral Tear	Cartilage Defect
1	0	46	30	negative	23	21	subspine alone	yes	no
2	0	50	38	positive	35	8	subspine + pincer	yes	yes
3	0	48	19	negative	25	5	cam + subspine	yes	no
4	0	72	37	positive	20	12	cam + pincer	yes	no
5	0	60.1	31	positive	35	2	cam + pincer + subspine	yes	yes
6	0	78	25	negative	28	12	cam + subspine	yes	no
7	0	64	30	positive	32	-9	cam + pincer	yes	no
8	1	68	33	positive	24	-11	cam + pincer	yes	no
9	1	78.5	32	negative	32	3	cam + subspine	yes	yes
10	0	51	27	negative	26	22	cam alone	yes	no
11	0	58	27	positive	31	4	cam + pincer + subspine	yes	no

PROMs		Timepoint			
		Pre-op	6 months post-op	1-year post-op	2-years post-op
iHOT-12	Mean	54.0 (n=8)	82.8 n=8)	85.0 (n=8)	88.4 (n=6)
	SD	19.5	21.1	24.4	12.4
mHHS	Mean	64.13 (n=8)	80.1 (n=7)	84.0 (n=8)	85.5 (n=6)
	SD	14.8	17.4	10.4	5.9
HOS-ADL	Mean	78.3 (n=8)	95.0 (n=5)	93.6 (n=7)	96.2 (n=5)
	SD	14	10.4	8.6	3.1
HOS-Sport	Mean	61.4 (n=8)	81.4 (n=5)	83.6 (n=7)	92.1 (n=5)
	SD	20.9	40	18	10

Comparison to Hip Registry Controls

- No significant difference in PROM scores between FNSF group and matched control at 1-year post-op for iHOT-12, mHHS, HOS-ADL, and HOS-sport (p=0.27, 0.23, 1.0, and 0.79, respectively)
- Logistic regression analysis of rates for achieving PASS and MCID found no significant differences between FNSF and matched control groups for all PROMs.

Conclusions

Patient outcomes after hip arthroscopy for FAIS, as defined by PROMs and clinical follow up for post-operative complications, do not appear to be impacted by a prior ipsilateral FNSF.

A theoretical concern after hip arthroscopy in patients with a prior FNSF is a post-operative fracture of the femoral neck.^{7,8} In our study, there were no post-operative complications at short term follow-up.

This study provided insight into the demographic and radiographic characteristics of these patients. Importantly, labral tears are present 60% of the time of FNSF diagnosis.

Lastly, FNSFs are rare injuries. Only 85 patients at our institution from July 2017 – July 2023 had a FNSF and 11 subsequently underwent ipsilateral hip arthroscopy. Further investigation could utilize patient information from multiple institutions is warranted to increase the number of patients included.

References

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Acknowledgments

We thank our institution's radiologic informatics team for their assistance with gathering MRI data.