

Optimal timing of hip arthroscopy for femoroacetabular impingement in adolescents: The relationship between symptom duration and outcomes

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Disclosures

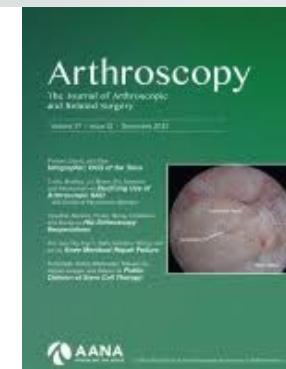
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Background

- Optimal timeline for when to proceed with surgery in relation to onset of symptoms is still debated, but has been shown to play a role in patient outcomes
- Kunze et al. reported that in adult patients with FAI, surgical intervention earlier than two years after onset of symptoms was associated with superior postoperative PROs and better clinically significant levels of improvement

Preoperative Duration of Symptoms Is Associated With Outcomes 5 Years After Hip Arthroscopy for Femoroacetabular Impingement Syndrome

Kyle N Kunze ¹, Benedict U Nwachukwu ¹, Edward C Beck ¹, Jorge Chahla ¹, Anirudh K Gowd ², Jonathan Rasio ¹, Shane J Nho ³



Importance of Secondary Prevention: Duration of Symptoms Predict Outcomes

	Pain <2 years			Pain >2 years			P Value (Comparing postoperative scores between 2 groups)
	Pre-op	Follow-up	Δ	Pre-op	Follow-up	Δ	
N		389			235		
mHHS score	57.9 ± 14.2	79.1 ± 16.6	21.3 ± 18.2	56.1 ± 14.3	74 ± 18.8	18.2 ± 19.5	<0.001
HOS-ADL	65.9 ± 18.9	86.3 ± 16.4	20.8 ± 19.9	63.7 ± 19.9	80.3 ± 19.9	17.3 ± 22.0	<0.001
HOS-Sport	44 ± 22.3	75.0 ± 25.3	31.1 ± 28.8	46.4 ± 23.6	65.1 ± 29.0	21.9 ± 31.5	<0.001
VAS- Pain	7.4 ± 1.6	2.6 ± 2.3	-4.6 ± 2.8	7.4 ± 1.7	3.5 ± 2.6	-3.8 ± 3.1	<0.001

Am J Sports Med. 2019 Jan;47(1):131-137. doi: 10.1177/0363546518808046. Epub 2018 Nov 28.

Preoperative Symptom Duration Is Associated With Outcomes After Hip Arthroscopy.

Basques BA¹, Waterman BR², Ukwuani G¹, Beck EC¹, Neal WH¹, Friel NA³, Stone AV¹, Nho SJ¹.



Symptom Duration Critical

Return to Play

- 28 male professional hockey players
- Average time from date of onset of symptoms to surgery = 19 months (range: 1-99 months)
 - Faster return to play in players who had surgery within **one year of symptom onset** and those who did not: **3 months** vs. **4.1 months**
 - Longer duration of symptoms → increased risk of chondral damage

Career Length

- 60 male professional hockey players
- Average age = 27 years (range: 17-38 years)
- Significant difference in duration of symptoms between players that played >5 years and those who did not: **9.3 months** vs. **20.2 months**

Am J Sports Med. 2010 Jan;38(1):99-104. doi: 10.1177/0363546509346393. Epub 2009 Dec 4.

Arthroscopic labral repair and treatment of femoroacetabular impingement in professional hockey players.

Philippon MJ¹, Weiss DR, Kuppersmith DA, Briggs KK, Hay CJ.



Am J Sports Med. 2016 Sep;44(9):2286-91. doi: 10.1177/0363546516650649. Epub 2016 Jul 11.

Predictors of Length of Career After Hip Arthroscopy for Femoroacetabular Impingement in Professional Hockey Players.

Menge TJ¹, Briggs KK¹, Philippon MJ².



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Background

- While excellent patient-reported outcomes and satisfaction at minimum 10-year follow-up have been reported in the adolescent population, there is a **paucity of literature on optimal timing** after symptom onset and its correlation with clinical results



Purpose

- To evaluate symptom duration and its relationship to PROs and survivorship following hip arthroscopy in adolescents

Hypothesis

- It is hypothesized that adolescent patients improved PROs and lower rates of failure than patient with delayed surgical timing (>12 months of symptom duration)

Methods

- Adolescent patients who underwent primary hip arthroscopy with the senior surgeon (M.J.P.) for symptomatic FAI between January 2011 and September 2018 were identified from a prospectively collected database

Inclusion Criteria

- Age ≤ 18 at time of surgery
- Diagnosis of FAI

Exclusion Criteria

- Prior ipsilateral hip surgery
- Presence of osteoarthritis (Tonnis grade >1 or joint space $<2\text{mm}$)
- Evidence of dysplasia on preoperative radiographs (LCEA <20 degrees)
- Previous hip fracture
- History of slipped capital femoral epiphysis (SCFE) or Legg-Calve Perthes disease

STUDY MEASUREMENTS

- ❖ Demographics (age, gender, BMI)
- ❖ Symptom duration – self-reported on intake form
- ❖ Preoperative exam findings
- ❖ Intraoperative findings and procedures
- ❖ Patient reported outcomes
 - Hip Outcome Score – Activities of Daily Living (HOS-ADL)
 - Hip Outcome Score-Sport Specific Subscale (HOS-SSS)
 - modified Harris Hip Score (mHHS)
 - 12-Item Short Form Health Survey (SF-12) Physical Component Summary (PCS) and Mental Component Summary (MCS)
- ❖ Endpoint - revision surgery

Results

Patient Population

- 111/138 patients (134/167 hips) (80%) were available for follow-up
 - 74/111 female (67%)
- Mean age: **16.4 years old**
- Average symptom duration: **17.2±15.2 months**
- Femoral physis was closed for **90% of hips** (n=121) on preoperative radiographs
- No difference in mean symptom duration between patients with open or closed physis (14.5 versus 17.5 months, p=.43)

Intraoperative Findings/Procedures	0-12 month group	>12 month group	p value
Number of hips, n (% of total hips)	64 (48)	70 (52)	
Age, mean±SD	16.3±1.0	16.5±1.1	.33
Symptom duration (months), mean±SD	6.4±3.1	27.1±15.1	<.001
<u>Intraoperative Findings, n (% of total in group)</u>			
Femoroacetabular Impingement			
Cam lesion only	4 (6)	4 (6)	.89
Pincer lesion only	2 (3)	2 (3)	.93
Combined	58 (91)	64 (91)	.22
Labral Tear	82 (100)	85 (100)	
Outerbridge Grade 3/4 Chondral Lesion			
Femoral head	3 (5)	0	
Acetabulum	1 (4)	2 (3)	.61
Both	1 (2)	0	
Ligamentous Teres			
Tear	46 (72)	46 (66)	.17
Synovitis	57 (89)	65 (93)	.44
<u>Procedures Performed, n (% of total in group)</u>			
FAI treatment			
Femoral osteoplasty	4 (6)	4 (6)	.93
Rim Trimming	2 (3)	2 (3)	.92
Combined	58 (91)	64 (91)	.87
Labral Treatment			
Debridement	1 (2)	0	
Repair	62 (96)	69 (99)	.44
Reconstruction	1 (2)	0	
Chondral lesion (Grade 3/4) treatment			
Chondroplasty	4 (6)	2 (3)	.34
Ligamentous teres debridement	62 (96)	68 (97)	.93
Iliopsoas release	4(6)	8(11)	.29

Results

Revisions

- 8.2% (11 hips) required revision surgery at an average of 2.3 years
- Most common indication for revision was capsulolabral adhesions
- No significant difference in rate of revision between 0-12 month and >12 month symptom duration groups
- Age, gender, physis status, or symptom duration were not predictors of requiring revision surgery (95% CI crosses 1 for all)
- No patients required subsequent revision surgery
- Of the 8 patients with 2-year follow-up scores after revision surgery, 6 (75%) reached MCID and PASS for HOS-ADL

Patient	Gender	Injured Hip	Age of Index Surgery	Years from Index Surgery to Revision	Indication
1	F	R	16.7	1.0	Adhesions
2	M	R	16.1	2.2	Adhesions, FAI recurrence, Labral tear
3	F	L	15.7	1.7	Adhesions
4	F	L	16.1	3.5	Adhesions, FAI recurrence, Labral deficiency
5	M	R	15.9	1.8	Adhesions, FAI recurrence, Labral tear
6	M	L	17.7	1.8	Adhesions, FAI recurrence
7	F	L	17.1	2.3	Adhesions
8	F	R	14.7	0.9	Adhesions
9	M	L	17.1	4.3	Adhesions, FAI recurrence
10	F	L	15.6	3.0	Adhesions, Labral deficiency
10	F	R	15.8	2.5	Adhesions

Results

- At mean f/u of 4.8±2.2 years -> statistically significant improvements in HOS-ADL, HOS-SSS, mHHS, SF-12 PCS and MCS
- Mean satisfaction = 8.5
- No significant difference in post-operative scores or patient satisfaction between ≤12 and >12 month symptom duration groups
- Trend in consistently decreasing passing rates for HOS-SSS as symptom duration increased

Patient-reported outcome score, mean±SD	Total hips n=123	≤12 mon symptom duration group n=58	>12 mon symptom duration group n=65	P-value*
Follow-up time (years)	4.8±2.2	4.7±2.1	4.9±2.3	.51
HOS-ADL				
Preoperative	68±16	67±17	70±15	.38
Postoperative	94±9	94±10	93±9	.37
HOS-SSS				
Preoperative	50±21	48±21	52±20	.48
Postoperative	87±20	90±16	86±19	.12
mHHS				
Preoperative	59±15	56±14	63±15	.01
Postoperative	90±13	91±14	89±13	.29
SF-PCS				
Preoperative	41.8±8.8	40.9±9.1	42.7±8.5	.25
Postoperative	55.1±5.7	55.3±5.9	54.4±6.0	.36
SF-MCS				
Preoperative	54.4±8.9	55.0±9.3	53.8±8.6	.52
Postoperative	53.2±7.7	54.4±5.4	51.4±10.2	.34
Satisfaction	8.5	8.8	8.3	.11

	0-6 mo, n=24	>6-12 mo n=34	>12-24 mo n=39	>24 mo n=26	P-value
MCID^a					
HOS-ADL	91.7	79.4	71.8	80.8	0.44
HOS-SSS	95.8	88.2	87.2	73.1	0.14
mHHS	100	82.4	82.1	84.6	0.22
PASS^b					
HOS-ADL	91.7	82.4	69.2	88.5	0.10
HOS-SSS	91.7	79.4	69.2	84.6	0.16
mHHS	100	76.5	79.5	88.5	0.18

Results

- No significant correlation was detected between symptom duration and post-operative outcome scores ($p > .05$ for all)

PRO Score	Spearman Coefficient
HOS-ADL	-.137
HOS-SSS	-.182
mHSS	-.153
SF-12 PCS	-.149
SF-12 MCS	-.100
Patient Satisfaction	-.159

- When symptom duration was treated as a binary variable with the ≤ 12 month group versus > 12 month group, there was also no significant difference in likelihood of achieving MCID or PASS for all scores

Score	Odds Ratio	95% CI
MCID		
HOS-ADL	1.4	.57-3.69
HOS-SSS	1.8	.57-5.73
mHSS	1.2	.42-3.96
PASS		
HOS-ADL	1.9	.73-4.82
HOS-SSS	1.8	.72-4.41
mHSS	1.1	.42-2.90

	Odds Ratio	95% CI
MCID HOS-ADL		
Age	0.9	.55-1.44
Gender (M vs F)	1.7	.57-5.04
Symptom duration	1.0	.99-1.02
Physis (open vs closed)	0.8	.15-4.91
PASS HOS-ADL		
Age	0.9	.55-1.40
Gender (M vs F)	1.5	.52-4.31
Symptom duration	1.0	.99-1.01
Physis (open vs closed)	0.1	.01-1.10

- Age, gender, physis status, or symptom duration as a continuous variable were not predictors of achieving MCID or PASS for HOS-ADL

Discussion

- An adolescent cohort undergoing hip arthroscopy for FAI demonstrated no significant difference in PROs, achievement of MCID or PASS, or rate of revision based on symptom duration
- However, there was a **trend in decreasing** MCID and PASS rates for **HOS-SSS** as symptom duration increased
- Not as strong evidence as observed in adult timing investigations
- HOS is tailored for athletes and other high demand individuals -> very relevant PRO for adolescent patient population
- Trend observed of decreasing PROs with increasing symptom duration in the setting of FAI parallels adult adult literature.
- Further, larger investigations are critical, especially powered for differences in the HOS-SSS

Limitations

- Large series of adolescent patients, but a **sample size of convenience** and not specifically powered to detect differences in HOS
- Symptom duration was subjectively reported and not always an easily modifiable risk factor
 - exhaustion of conservative measures, insurance authorization, surgical scheduling, etc.
- Data collected over a 7+ year period and the surgical technique and rehabilitation concepts slightly evolved over the course of the catchment duration

Conclusions

- In an adolescent cohort of symptomatic FAI patients who underwent hip arthroscopy, there is no difference in PROs when analyzing symptom duration by arbitrary time intervals or as a continuous variable
- Trend towards decreasing HOS-SSS scores with increasing symptom duration
- Further investigations are needed powered for differences in HOS before definitive recommendations regarding hip arthroscopy timing can be made

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Thank You!!

