Improvements After Arthroscopic Treatment for Femoroacetabular Impingement Syndrome in High-Level Ice Hockey Players

2-Year Outcomes by Player Position

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Background: Ice hockey players often undergo arthroscopic treatment for femoroacetabular impingement syndrome (FAIS); however, only a few studies have reported postoperative patient-reported outcomes. It has been debated whether player position is related to FAIS.

Purpose: To evaluate the change in patient-reported outcome measures (PROMs) in high-level ice hockey players from presurgery to 2 years after arthroscopic treatment for FAIS. The secondary aim was to evaluate differences in outcomes among player positions and whether stick handedness is related to the side of the symptomatic hip.

Study Design: Case series; Level of evidence, 4.

Methods: Ice hockey players undergoing treatment for FAIS between 2011 and 2019 were prospectively included. Preoperative and 2-year follow-up scores were collected for the following PROMs: HAGOS (Copenhagen Hip and Groin Outcome Score), iHOT-12 (12-item International Hip Outcome Tool), EQ-5D (EuroQol–5 Dimensions) and EQ-VAS (EuroQol–Visual Analog Scale), Hip Sports Activity Scale, and visual analog scale for overall hip function. Player position and stick handedness were collected from public sources. Preoperative and follow-up outcomes were compared for the entire cohort and among player positions.

Results: The cohort included 172 ice hockey players with a mean age of 28 years, a mean body mass index of 25.6, and a mean symptom duration of 46.3 months. In the 120 players with 2-year follow-up data, there was significant improvement in all PROMs as compared with presurgery: HAGOS subscales (symptoms, 47.5 vs 68.0; pain, 57.0 vs 75.8; activities of daily living, 62.5 vs 81.0; sports, 40.0 vs 64.7; physical activity, 30.9 vs 57.2; quality of life, 32.5 vs 57.8), iHOT-12 (45.2 vs 66.7), EQ-5D (0.59 vs 0.75), EQ-VAS (68.3 vs 73.2), and visual analog scale for overall hip function (49.6 vs 69.2) ($P < .0001$ for all). At 2-year follow-up, 83% reported satisfaction with the procedure. There was no difference in the improvement in PROMs among player positions. Further, there was no significant relationship between stick handedness and side of symptomatic hip; however, because of the number of bilateral procedures and large number of left-handed shooters, no conclusions could be drawn.

Conclusion: High-level ice hockey players undergoing arthroscopic treatment for FAIS reported improvements in PROMs 2 years after surgery, regardless of player position.

Keywords: femoroacetabular impingement syndrome; ice hockey player; hip arthroscopy; ice hockey injury; patient-reported outcome measures

Femoroacetabular impingement syndrome (FAIS) is a common cause of hip pain in athletes and ice hockey players in particular.[4,5,13] Arthroscopic treatment for FAIS is associated with decreased pain and improved function for athletes in general,[6,28,29,31] and a large number of ice hockey players undergo arthroscopic treatment for FAIS.[21] However, little is known about self-reported hip function after arthroscopic treatment for FAIS in ice hockey players and whether ice hockey–related demographics are related to self-reported outcomes or side of symptoms.

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Variations in hip morphology with a bony overgrowth of the femoral head-neck junction (cam) and/or the acetabular rim (pincer) can result in reduced hip joint range of motion and increased pain, leading to FAIS.[8] It has been suggested that the morphology of cam develops because of the high demands and overuse of the hip during adolescence.[32] Ice hockey requires flexion as well as internal and external rotation during abduction, and as a result, ice hockey players may be prone to developing FAIS.[3,5,34] Studies have reported a higher prevalence of radiographic findings of cam morphology among ice hockey players than among matched controls, such as skiers and nonathletes.[14,19,24,33] In fact, many ice hockey players with cam morphology are asymptomatic.[14,19,24,33] Yet, with continued exposure to ice hockey play, there is a risk of developing FAIS and it possibly leading to osteoarthritis.[1,2,4]

Previous studies of arthroscopic surgery for FAIS in ice hockey players have commonly reported on the rate of return to sports or on player performance status.[3,18,19] High rates of return to sports have been reported.[17,31] However, studies have shown a decrease in length of career and fewer games played per season among players in the National Hockey League (NHL) who had undergone arthroscopic treatment for FAIS when compared with matched control players.[10,31] Only a few studies have reported on the self-reported outcomes after arthroscopic treatment for FAIS in ice hockey players.[25]

The question of whether player position affects the risk of developing FAIS in ice hockey players has been the subject of debate. Studies have suggested that goalkeepers run a greater risk of developing FAIS as compared with defenders and forwards—theoretically, because of their use of the butterfly technique during a save, with internal rotation and concurrent deep hip flexion.[8,39] Goalkeepers also run a higher risk of intra-articular hip injuries than players in other positions.[8]

In particular, one study showed that goalkeepers have a higher prevalence of cam deformity than do players in other positions.[14] Moreover, goalkeepers in the NHL have been reported to have a resultant decrease in performance after hip arthroscopy for FAIS as compared with their preoperative performance.[10] That said, little is known about whether patient-reported outcomes after arthroscopic treatment differ among player positions.

A previous study showed a relationship between limb dominance (the preferred kicking leg) and the symptomatic hip for FAIS.[23] It is yet to be determined whether the right or left shooting side in ice hockey is related to the hip that develops FAIS. Stick handedness leads to asymmetrical joint mechanics with dissimilar angles of flexion and internal rotation in the hips as well as shifted weight transfer to one side, causing different biomechanical load on the 2 hips. This could theoretically contribute to cam morphology or development of FAIS. More information on the relationship between stick handedness and FAIS may therefore guide prevention strategies for ice hockey players with FAIS.

The primary aim of this study was to evaluate the change in patient-reported outcome measures (PROMs) after arthroscopic treatment for FAIS among high-level ice hockey players with a 2-year follow-up. The secondary aim was to determine whether the change in PROMs differs among player positions and whether stick handedness is related to the side of the symptomatic hip.

METHODS

In this cohort study, all consecutive high-level ice hockey players who had undergone arthroscopic treatment for FAIS were prospectively included. The procedures were performed between 2011 and 2019 by 5 high-volume surgeons (including M.S.) in Gothenburg, Sweden. The ice hockey players were identified from a hip arthroscopy registry containing PROMs as well as surgical and demographic data.[30] Approval for this study was obtained from the regional ethical review board.

The inclusion criteria were high-level ice hockey players with registered preoperative PROMs and arthroscopic treatment for FAIS. A high-level ice hockey player was defined as a patient with a self-reported sport of ice hockey and a Hip Sports Activity Scale (HSAS) of 7 or 8 before onset of symptoms or in the adolescence. An HSAS of 7 corresponds to ice hockey players at a competitive level in minor leagues or college, and an HSAS of 8 corresponds to ice hockey players at a competitive elite level.[20] The diagnosis of FAIS was a combination of symptoms, physical examination, and radiological findings consistent with cam, pincer, or both. The exclusion criteria were missing data on preoperative PROMs, including HSAS preinjury score, and a conversion to a total hip arthroplasty during the follow-up period.

Before arthroscopic treatment for FAIS, ice hockey players completed PROMs using a web-based questionnaire. The following PROMs were used: the HSAS[20]; the Copenhagen Hip and Groin Outcome Score (HAGOS) with its 6 subscales covering symptoms, pain, activities of daily living, function in sports and recreation, participation in physical activities, and hip- or groin-related quality of life[36]; the 12-item International Hip Outcome Tool (iHOT-12) to measure

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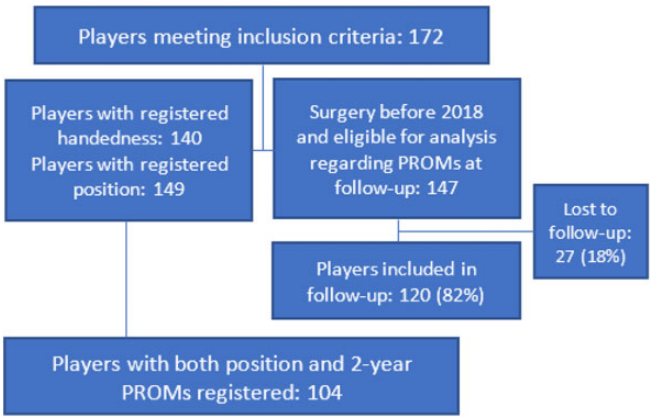

Figure 1. Flowchart presenting the players included in the different categories. PROM, patient-reported outcome measure.

hip-related quality of life[9]; the EQ-5D (EuroQol–5 Dimensions)[27] and EQ-VAS (EuroQol–Visual Analog Scale); and a visual analog scale covering hip function. The HSAS, HAGOS, and iHOT-12 have been translated into Swedish and validated. Two years after arthroscopic treatment, researchers followed up with the ice hockey players with the same PROMs. Players also answered a single question in terms of satisfaction with surgery (yes/no).

At the time of surgery, demographic data were recorded, including age, duration of symptoms, sports activity, sex, and body mass index. Ice hockey–specific data, such as player position and stick handedness, were collected using a systematic methodology based on public sources. Player positions were categorized as defender, forward, and goalkeeper and stick handedness as either right shooter (holding one's left hand on top of the stick) or left shooter (holding one's right hand on top of the stick).

A total of 172 ice hockey players were eligible for inclusion in this study. All players undergoing surgery prior to 2018 who had completed the 2-year follow-up (n = 147) were eligible for the analysis of change in PROMs from presurgery to follow-up; of these players, 27 (18%) were lost to follow-up, leaving 120 for analysis. Players with completed PROMs at 2-year follow-up and recorded player position (n = 104) were included in the comparison among player positions. All players with recorded stick handedness (n = 140) were included in the analysis regarding it and the affected hip. The flowchart in Figure 1 describes the number of players included in each analysis.

Surgical Technique

The surgical technique used for ice hockey players with FAIS in this study has been described.[15] The surgeon used an anterolateral and midanterior portal with the patient supine in a traction table. The first step in the arthroscopic treatment was to evaluate the central compartment; axial traction was therefore used. The second step was to evaluate the peripheral compartment; a longitudinal cleavage of the capsular ligament in direction of the fibers was used. Capsular closure was therefore not performed, as no transverse capsulotomy was performed.

An over-the-top technique was used to address pincer morphologies, in which the burr was placed in the perilabral sulcus and the bone resected. The labrum is left in situ after smaller pincer resections. The labrum was detached and later reattached with suture anchors in the event of larger pincer resections or in cases of chondrolabral separation.

All femoral deformities were resected at the accessible parts of the femoral neck. Resection of pistol-grip deformities was performed far posterior to the lateral retinacular fold while taking account of the lateral retinacular vessels to avoid osteonecrosis of the femoral head. Perioperative fluoroscopy and a dynamic assessment of the femoral head were used throughout to evaluate the amount of bone resection.

Postoperative Rehabilitation

For 3 weeks after the surgery, all players were prescribed nonsteroidal anti-inflammatory drugs to prevent heterotopic ossification. Immediately after the surgery, players were allowed free weightbearing range of motion. However, crutches were suggested for outdoor walking the following 4 weeks after surgery. Rehabilitation was started directly after surgery, and the intensity of training was gradually increased, depending on hip-related symptoms. The rehabilitation program consisted of exercises for strength, dynamic stability, coordination, and range of motion.

Statistical Analysis

For demographic data, categorical variables are presented as numbers and percentages. The within-group changes in PROMs between presurgery and 2-year follow-up were evaluated using the Wilcoxon signed-rank test. The Kruskal-Wallis test was used to compare the change in PROMs from presurgery to follow-up among player positions. Despite skewed distributions of preoperative and 2-year follow-up PROM data, there were no extreme outliers that affected the mean values, and median and mean values were approximately equal. Descriptive statistics are therefore presented as means and standard deviations. The change in scores (from presurgery to 2-year follow-up) had more symmetric distributions, and for this reason, descriptive statistics (mean and standard deviation) and 95% confidence intervals are presented. Answers to the single question regarding patient satisfaction with surgery are presented in percentages. The relationship between stick handedness and side of arthroscopic treatment (right or left) was analyzed using the chi-square test. $P = .05$ was considered statistically significant. All data analyses were performed with the Statistical Analysis Software for Windows (Version 9.4; SAS Institute).

To evaluate the clinical relevance of changes in PROMs, the minimal important change (MIC) and the patient acceptable symptomatic state (PASS) were used for the iHOT-12. The MIC for the iHOT-12 has been described as 9.0 and the PASS as 63.0 points, which were used in this

TABLE 1
Patient Characteristics (N = 172 players)[a]

Demographic data	
Age at surgery, y	28 ± 10
Sex	
Female	3 (2)
Male	169 (98)
Body mass index	25.6 ± 2.4
Handedness [b]	
Left	115 (82)
Right	25 (18)
Symptom duration, mo	46.3 ± 45.8
Position	
Defender	52 (34.9)
Forward	59 (39.6)
Goalkeeper	38 (25.5)
Missing	23
Surgery side	
Right	25 (14.5)
Left	37 (21.5)
Bilateral	110 (64)

[a] Data are reported as mean ± SD or No. of players (%).
[b] n = 140 players.

study.[11,22] For HAGOS, the MIC was used as previously described: 9.3 for symptoms, 9.7 for pain, 11.8 for function in daily living, 10.8 for sports, 13.1 for physical activity, and 8.8 for quality of life.[35]

A power analysis regarding the analysis of the PROMs was based on previous results of arthroscopic hip preservation surgery.[11] It was estimated that 75 patients were required for 90% power to detect an effect size corresponding to the MIC for the iHOT-12 (α level = 0.05).

RESULTS

Among the 172 study players, 35% were defenders, 40% forwards, and 25% goalkeepers. The left hip underwent surgery in 22% of the players and the right hip in 14% of the players. Moreover, simultaneous bilateral surgery was performed in 110 (64%) players, and 15 (9%) had staged bilateral surgery (Table 1). Twenty-one players (12%) underwent a reoperation during the follow-up period.

Change in PROMs (n = 120 Players)

PROMs improved significantly between presurgery and the 2-year follow-up (Table 2). The improvement in the iHOT-12 exceeded the MIC value in 77% of the players, while the mean value exceeded the PASS value in 57%. The mean improvement exceeded the MIC for all HAGOS subscales, and 70% of the players exceeded the MIC for symptoms, 65% for pain, 63% for activity in daily living, 68% for sports, 56% for physical activity, and 71% for quality of life.

At the 2-year follow-up, 24% of the players were at an HSAS level of 7 or 8, and 53% were at a competitive level of sports (HSAS >5).

TABLE 2
Patient-Reported Outcome Scores and Change From Presurgery to 2-Year Follow-up (n = 120 Players) [a]

	Mean ± SD (95% CI)		
	Preoperative	2-y Follow-up	Change in Score [b]
HAGOS			
Symptoms	47.5 ± 17.2	68.0 ± 21.2	21.6 ± 21.9 (17.7-25.6)
Pain	57.0 ± 17.0	75.8 ± 20.9	19.4 ± 20.0 (15.7-23.0)
Activities of daily living	62.5 ± 22.5	81.0 ± 20.1	19.0 ± 23.7 (14.8-23.3)
Sports	40.0 ± 20.6	64.7 ± 27.2	26.1 ± 26.9 (21.2-31.0)
Physical activity	30.9 ± 26.0	57.2 ± 33.8	27.7 ± 34.8 (21.3-34.1)
Quality of life	32.5 ± 16.8	57.8 ± 28.2	26.2 ± 26.4 (21.4-31.1)
iHOT-12	45.2 ± 17.4	66.7 ± 25.1	22.8 ± 23.2 (18.3-27.2)
EQ-5D	0.59 ± 0.26	0.75 ± 0.26	0.15 ± 0.28 (0.10-0.20)
EQ-VAS	68.3 ± 16.9	73.2 ± 21.4	4.43 ± 21.9 (0.39-8.48)
VAS for hip function	49.6 ± 22.8	69.2 ± 21.6	20.4 ± 26.7 (15.4-25.4)
Satisfied with surgery, yes:no		83:17 [c]	

[a] EQ-5D, EuroQol–5 Dimensions; EQ-VAS, EuroQol–Visual Analog Scale; HAGOS, Copenhagen Hip and Groin Outcome Score; iHOT-12, 12-item International Hip Outcome Tool; VAS, visual analog scale.
[b] Each change, $P < .0001$.
[c] Percentage.

TABLE 3
Relationship Between Surgery Side and Stick Handedness (n = 140 Players) [a]

	Operated Hip, No. (%)			
Stick Handedness	Left	Right	Bilateral	Total
Left-hand shooters	28 (24)	13 (12)	74 (64)	115 (100)
Right-hand shooters	4 (16)	3 (12)	18 (72)	25 (100)

[a] There was no statistically significant difference in affected hip between left- and right-handed shooters ($P = .66$).

Analysis of Handedness (n = 140 Players)

The majority of the players (82%) were left-handed shooters. Because of the small number of unilateral surgical procedures, no conclusions could be drawn regarding affected hip and stick handedness, yet no significant relationship was found ($P = .66$) (Table 3).

Change in PROMs by Player Position (n = 104 Players)

There were no significant differences among player positions with regard to any of the PROMs at baseline or

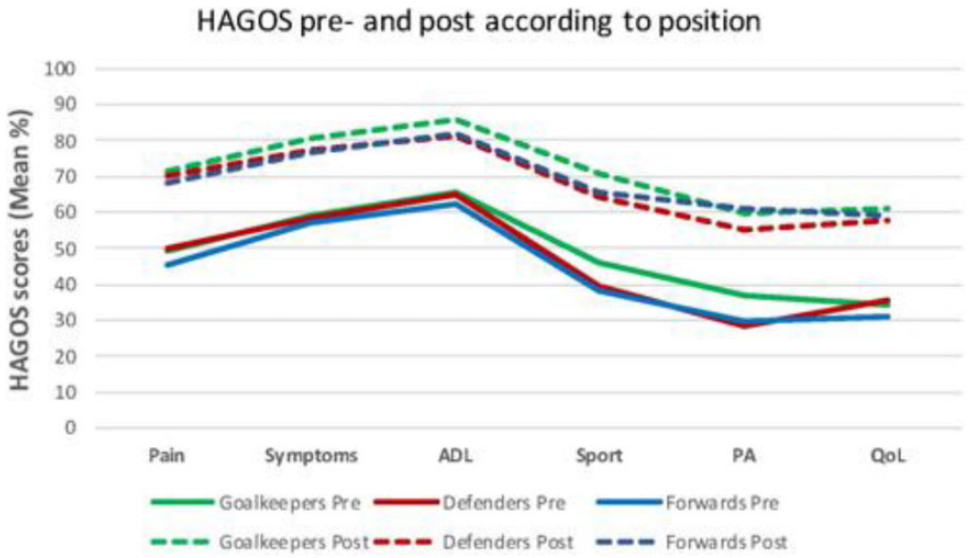

Figure 2. Pre- and 2-year postoperative HAGOS scores according to player position (n = 104 players). ADL, activities of daily living; HAGOS, Copenhagen Hip and Groin Outcome Score; PA, physical activity; post, postoperatively; pre, preoperatively; QoL, quality of life. Scale range: 0-100.

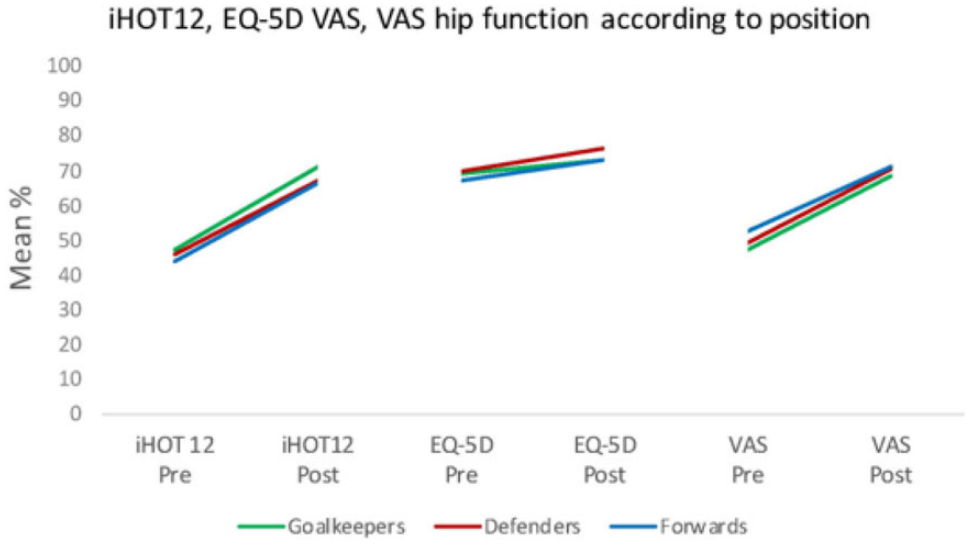

Figure 3. Pre- and 2-year postoperative iHOT, EQ-5D VAS, and VAS hip function scores according to player position (n = 104 players). EQ-5D, EuroQol–5 Dimensions; iHOT-12, 12-item International Hip Outcome Tool; post, postoperatively; pre, preoperatively; VAS, visual analog scale.

follow-up (Figures 2 and 3) or in the change between presurgery and 2-year follow-up (Table 4).

DISCUSSION

The primary aim of this study was to evaluate patient-reported outcomes after hip arthroscopy for FAIS 2 years postsurgically in high-level ice hockey players. The most important finding was that the majority of the players reported acceptable hip function and clinically relevant improvements between presurgery and 2 years after arthroscopic surgery in terms of PASS and MIC values for the iHOT-12 and MIC values for HAGOS. Furthermore, 83% of players indicated satisfaction with surgery. Only 24% of players returned to the same level of activity (HSAS of 7 or 8).

The improvements in PROMs in this study are in accordance with previous literature on athletes undergoing hip arthroscopy, although most studies include athletes in general and not only ice hockey players.[6,15,28,29] However, a previous study of 28 professional ice hockey players

TABLE 4
Change in Patient-Reported Outcome Measures From Presurgery to 2-Year Follow-up by Position (n = 104 Players) [a]

Measure	Change in Score, Mean ± SD (95% CI)			*P* Value
	Defender	Forward	Goalkeeper	
HAGOS				
Symptoms	19.9 ± 18.4 (14.0 to 25.6)	16.8 ± 20.1 (10.7 to 22.7)	22.8 ± 18.4 (15.4 to 30.0)	.50
Pain	22.2 ± 20.5 (15.8 to 28.7)	20.8 ± 20.7 (14.6 to 27.0)	24.4 ± 25.0 (14.1 to 33.8)	.54
Activities of daily living	17.1 ± 23.1 (10.1 to 24.5)	16.5 ± 24.0 (9.4 to 23.7)	21.5 ± 21.5 (12.9 to 30.0)	.55
Sports	26.8 ± 27.2 (18.3 to 35.4)	26.5 ± 25.9 (18.8 to 34.5)	24.7 ± 27.1 (13.7 to 35.3)	.99
Physical activity	24.0 ± 30.8 (14.2 to 34.1)	33.1 ± 33.8 (22.9 to 43.8)	25.5 ± 36.6 (10.7 to 39.6)	.50
Quality of life	23.6 ± 26.4 (15.3 to 32.3)	28.5 ± 24.5 (21.1 to 36.1)	26.5 ± 27.9 (15.2 to 37.5)	.76
iHOT-12	22.3 ± 22.3 (14.9 to 29.8)	22.5 ± 22.2 (15.4 to 29.6)	24.7 ± 23.7 (15.1 to 34.2)	.91
EQ-5D	0.10 ± 0.31 (–0.002 to 0.2)	0.20 ± 0.25 (0.12 to 0.27)	0.16 ± 0.24 (0.08 to 0.26)	.23
EQ-VAS	6.19 ± 19.94 (–0.3 to 12.6)	4.28 ± 23.01 (–2.8 to 11.3)	6.29 ± 22.48 (–2.7 to 15.2)	.96
VAS hip function	21.9 ± 26.8 (13.2 to 30.8)	19.8 ± 26.2 (11.5 to 27.8)	20.7 ± 26.6 (10.2 to 31.3)	.96

[a] EQ-5D, EuroQol–5 Dimensions; EQ-VAS, EuroQol–Visual Analog Scale; HAGOS, Copenhagen Hip and Groin Outcome Score; iHOT-12, 12-item International Hip Outcome Tool; VAS, visual analog scale.

reported improved outcomes in the modified Harris Hip Score and high patient satisfaction postoperatively after arthroscopic treatment for FAIS.[25] Furthermore, Schallmo et al[31] noted high rates of return to the NHL and significantly higher return to sport (91%) as compared with professional basketball, baseball, and American football players. Yet, Jack et al[10] cited a decrease in performance in ice hockey players after hip arthroscopy as compared with preoperative performance. Although the players in this study showed significant improvements in self-reported hip function after surgery, they still have marked impairments as compared with healthy athletes.[37] Two years after surgery, only 24% of the players in the current study were at an HSAS level of 7 or 8, and 54% were at a competitive level (HSAS >5). However, the comparison of HSAS was between "before onset of symptoms" or "in adolescence" and 2 years after surgery. Previous studies have reported high rates of return to sport after hip arthroscopy for ice hockey players.[25] That said, the return-to-sport criteria after FAIS have been debated and are multifactorial.[38] Given that the mean age in this study was 28 years of age and the mean symptom duration was 46 months, the change in HSAS 2 years after surgery may reflect the natural transitioning to lower levels of sport. Furthermore, persistent symptoms during play may be a further explanation to the lower level of activity after surgery. While this study shows significantly improved hip function after hip arthroscopy, ice hockey players might not achieve full recovery and normalized hip function as compared with healthy athletes.

The second aim of this study was to compare PROMs among player positions. This study had a similar distribution of player positions of goalkeepers, defenders, and forwards. An ice hockey team generally has 2 goalkeepers among approximately 20 players (10%); hence, 1 in 4 players being goalkeepers, the rate present in this study, might be higher than expected. Whether goalkeepers have higher rates of FAIS than defenders and forwards in ice hockey has been discussed.[39,40] The idea of goalkeepers running a higher risk of developing FAIS is mostly due to their butterfly technique, with extreme internal rotation and flexion. However, Whiteside et al[39] found the largest magnitude of internal rotation during skating, especially in deceleration, when analyzing on-ice movements in goalkeepers. Skating is an athletic requirement for all players, which may be an explanation as to why similar impairments were found for all players regardless of position. Furthermore, no differences were found among goalkeepers, defenders, and forwards regarding the change in any of the PROMs, suggesting similar outcomes of hip arthroscopic surgery for FAIS regardless of player position. It is important to increase the knowledge of the impact of ice hockey on the hip joint to implement injury prevention programs designed to reduce the risk of developing FAIS. It is yet to be determined how exposure to ice hockey load and hip joint positions while playing ice hockey affects the hips and whether this contributes to the development of FAIS.

There was a large proportion of bilateral surgery in this study (64%) as compared with other studies, presenting prevalence between 4% and 20%.[12] However, Nawabi et al[21] reported a higher prevalence of bilateral surgery in high-level versus recreational athletes (28% vs 16%). Lerebours et al[14] presented radiographic cam morphology in hockey players, where 61% of the included players demonstrated bilateral morphology. A previous study cited improved results in the iHOT-12 at 1- and 2-year follow-up for patients undergoing simultaneous bilateral surgery.[16] Simultaneous bilateral surgery has been shown to be safe, with outcomes similar to those of unilateral surgery.[7]

Because of the large proportion of bilateral surgery in this study, it was difficult to draw any strong conclusions about whether stick handedness is related to the side of FAIS in ice hockey players. However, no significant relationship was found between stick handedness and side of treated hip. The majority of the players in this study were left-handed shooters (82%). This prevalence is in accordance with other European hockey leagues, where a larger

proportion of ice hockey players are left-handed shooters. However, in the United States, the prevalence of right-handed shooters is higher.[26] Regardless of the prevalence of shooting side, a fairly equal number of right and left hips underwent surgery, and most players underwent bilateral surgery. Since the majority of the hockey players underwent bilateral surgery, and based on the small number of ice hockey players with unilateral surgery, no conclusions about handedness could be drawn. The present study suggests that stick handedness is not a major contributor to the development of FAIS, and the majority of the hockey players appear to be symptomatic in both hips, regardless of how they are holding the stick.

The current study included a large cohort of ice hockey players and the longitudinal prospective collection of validated PROMs as well as ice hockey–specific data. The response rate at the 2-year follow-up was 82%, which is acceptable. The lack of a control group is a limitation. It would be of interest to compare the postsurgical outcomes in ice hockey players with those of nonathletes or elite athletes in other sports. Participation in ice hockey and level of playing were self-reported, which is a possible reporting error. Another limitation is the wide range of age in the patients and the different durations of symptoms, possibly affecting the level of activity at follow-up. Because the power analysis was based on the analysis of PROMs and not on the analysis of stick handedness, and given the sparse number of right shooters and the large amount of bilateral surgery in this study, there is a risk of type 2 errors in this analysis.

CONCLUSION

In this study, high-level ice hockey players undergoing arthroscopic treatment for FAIS reported improvements in PROMs at 2 years after surgery, regardless of player position.

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