

Review Article

Hip Arthroscopy for Femoroacetabular Impingement in Athletes: Return to Sport Outcomes

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Abstract

Background: Femoroacetabular impingement (FAI) syndrome is a leading cause of hip and groin pain in athletes, and hip arthroscopy is now the dominant surgical treatment.

Objective: To synthesise evidence on labral management, osteoplasty, return-to-sport (RTS) rates, comparison with structured physiotherapy, and predictors of successful RTS after arthroscopy for FAI in athletes.

Methods: Narrative review of randomised trials, comparative cohorts, and meta-analyses.

Findings: Pooled RTS after arthroscopy ranges from roughly 75-90% across sports, but return to prior performance is substantially lower (37-49% in soccer). Labral repair and capsular closure outperform debridement and unrepaired capsulotomy. Randomised trials (UK FASHIoN, Mansell) show arthroscopy gives modestly superior early functional gains over personalised hip therapy. Younger age, smaller postoperative alpha angle, and cutting/contact sport participation predict better RTS.

Conclusions: Arthroscopic FAI correction reliably returns most athletes to sport, though restoring pre-injury performance remains inconsistent and warrants standardised reporting.

Keywords: Femoroacetabular impingement; Hip arthroscopy; Return to sport; Labral repair; Athletic performance

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Introduction

Femoroacetabular impingement (FAI) syndrome, characterised by abnormal contact between the proximal femur and acetabular rim during hip motion, has emerged over the past two decades as a principal structural cause of hip and groin pain in young, physically active patients [1]. Cam-type morphology is particularly prevalent among athletes who repetitively load the hip in flexion and rotation, such as ice hockey, soccer, and combat-sport participants, and symptomatic FAI is increasingly recognised as a leading source of missed playing time in collegiate and professional sport [1]. Hip arthroscopy,

which permits femoral osteoplasty, acetabular rim trimming (acetabuloplasty), labral repair or debridement, and capsular management through a minimally invasive approach, has become the dominant surgical strategy for athletes who fail conservative care, with utilisation rising sharply over the past fifteen years [1]. This trajectory mirrors improved recognition of cam and pincer morphology on plain radiography and magnetic resonance imaging, refinement of arthroscopic instrumentation and traction technique, and a growing surgeon and patient expectation that hip preservation surgery, rather than symptomatic management alone, should be pursued in athletes with structurally correctable impingement.

For competitive and professional athletes, the outcome of greatest interest is not merely symptomatic relief but return to sport (RTS) and, more exactly, return to a comparable level of competitive performance. These two endpoints are frequently conflated in the literature despite representing materially different thresholds of recovery [2]. Outcome reporting in this field relies heavily on validated hip-specific patient-reported instruments, most notably the International Hip Outcome Tool (iHOT-33) [3] and the Copenhagen Hip and Groin Outcome Score (HAGOS) [4], both used extensively in the comparative trials discussed below. This review synthesises the published evidence on surgical technique (labral repair versus debridement, capsular management, osteoplasty), RTS and return-to-performance rates across sports, comparative outcomes of arthroscopy versus structured physiotherapy, and factors that predict a successful athletic return.

Search Strategy

Relevant randomised trials, comparative cohort studies, and systematic reviews/meta-analyses addressing hip arthroscopy for FAI in athletic populations were identified through PubMed, Embase, and manual reference review,

restricted to English-language reports in orthopaedic and sports medicine journals. Priority was given to level I-II comparative evidence and pooled analyses reporting quantitative RTS or performance outcomes.

Labral Management, Capsular Closure, and Osteoplasty

Correction of cam and pincer morphology via femoral osteoplasty and acetabuloplasty addresses the structural driver of impingement, but labral and capsular management materially influence functional recovery. A prospective randomised trial in female patients found that labral repair produced superior modified Harris Hip Score outcomes compared with selective labral debridement at two-year follow-up, establishing repair as the preferred strategy where the labral tissue is reparable [5]. Long-term follow-up data corroborate this survivorship advantage, with labral repair outperforming debridement on durability and patient-reported outcome measures at extended follow-up [6]. A systematic review pooling comparative and prospective series identified labral repair and complete capsular closure as the two technical factors most consistently associated with superior clinical outcomes and lower revision rates after arthroscopic FAI correction [7]. A dedicated meta-analysis of capsular closure similarly found that patients undergoing complete capsular repair were more likely to achieve clinically meaningful outcome thresholds than those left with an unrepaired capsulotomy [8]. Isolated acetabuloplasty with labral repair, reserved for pincer-predominant morphology, has demonstrated favourable patient-reported outcomes and survivorship sustained to a minimum of five years [9], while combined femoral and acetabular correction with capsular closure and labral preservation now represents the technical standard for most athletic patients (Table 1). Adequate femoral osteoplasty is itself technically demanding; under-resection risks residual impingement and early

symptom recurrence, whereas over-resection can compromise femoral neck integrity and predispose to fracture, so intraoperative dynamic assessment of impingement-free range of motion is routinely used to confirm adequate bony correction before capsular closure.

Table 1: Selected comparative studies of hip arthroscopy for femoroacetabular impingement in athletic populations reviewed here [5,21,23,13,14,17,11,9].				
Study	Population/Comparison	Design	Follow-up	Key outcome
Krych 2013	Labral repair vs debridement (female patients)	Prospective RCT	2 years	Repair superior on mHHS
Griffin 2018 (UK FASHIoN)	Arthroscopy vs personalised hip therapy	Multicentre RCT	12 months	iHOT-33 +6.8 points favouring surgery
Mansell 2018	Arthroscopy vs physical therapy (military)	RCT	2 years	No significant between-group difference
Marom 2023	Competitive soccer players	Retrospective cohort	Minimum 2 years	74.7% RTS; 49% to pre-injury level
Sjovall Anari 2023	High-level soccer players	Retrospective cohort	Season-based	85.5% RTS; 37.3% to pre-injury performance
Nwachukwu 2019	Professional athletes, North America	Retrospective registry	1999-2016	Majority RTS; performance varies by sport
Menge 2021	Meta-analysis by sport category	Systematic review/meta-analysis	Pooled	RTS varies by cutting/contact/flexibility type
Hartwell 2021	Isolated acetabuloplasty with labral repair	Retrospective cohort	Minimum 5 years	Favourable PROs and sustained survivorship

Return to Sport Across Athletic Populations

Pooled RTS rates after arthroscopic FAI surgery are generally favourable but vary by sport category and by how "return" is defined. Early systematic review of return-to-preinjury activity level found the majority of

athletes across sports resumed some level of competitive participation [10]. A systematic review and meta-analysis stratifying by sport type (cutting, contact, endurance, flexibility, and asymmetric/overhead sports) found RTS rates were generally high across categories but with meaningful heterogeneity, with contact- and cutting-sport athletes achieving relatively higher pooled RTS than flexibility-sport athletes [11], a finding echoed in a dedicated systematic review of flexibility-sport athletes reporting comparatively lower and more variable RTS rates [12]. Competitive soccer players demonstrate RTS rates around 75-86%, but return to a comparable competitive performance level is markedly lower (Figure 1): one cohort found 74.7% returned to soccer but only 49% to pre-injury level [13], while a separate high-level cohort found 85.5% achieved RTS but only 37.3% returned to their pre-onset performance level when objectively benchmarked against season statistics [14]. Basketball players undergoing arthroscopy achieve midterm outcomes and RTS rates comparable to other cutting-sport athletes despite higher baseline rates of acetabular cartilage damage [15]. Among elite military "tactical athletes," most return to full or limited duty, though a substantial minority retain activity restrictions [16]. In professional North American athletes across multiple leagues, most return to play, though performance metrics after return vary meaningfully by sport and position [17], and National Hockey League cohorts confirm high RTS rates with variable effects on measured performance and career longevity [18]. Elite athletes undergoing microfracture for concomitant chondral lesions alongside FAI correction still achieve reasonable, if somewhat lower, RTS rates [19], and coexisting low back pain does not appear to meaningfully compromise RTS after arthroscopy in elite cohorts [20] (Table 1).

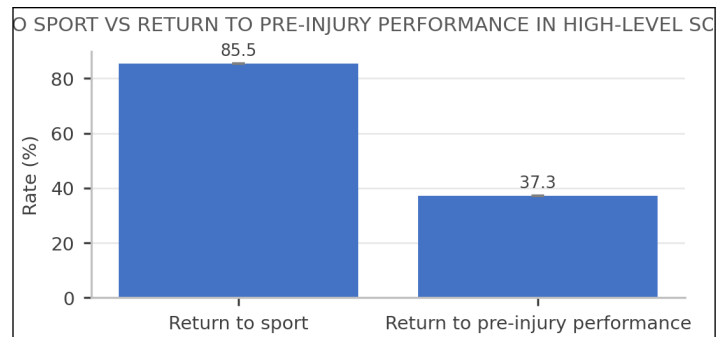


Figure 1: Return to sport (85.5%) versus return to pre-injury performance level (37.3%) in high-level competitive soccer players after hip arthroscopy for femoroacetabular impingement syndrome [14].

Comparison with Structured Physiotherapy

Two pragmatic multicentre randomised trials have directly compared arthroscopy with structured, physiotherapist-led rehabilitation. The UK FASHIoN trial randomised 348 patients with FAI syndrome to hip arthroscopy (n=171) or personalised hip therapy (n=177); at 12 months, iHOT-33 scores improved from 39.2 to 58.8 points with arthroscopy versus 35.6 to 49.7 points with therapy, an adjusted treatment effect of 6.8 points favouring surgery (95% CI 1.7-12.0; p=0.009) that narrowly exceeded the instrument's minimum clinically important difference (Figure 2) [21]. The companion Australian FASHIoN trial similarly randomised patients to arthroscopy versus physiotherapist-led care, incorporating hip cartilage metabolism biomarkers alongside clinical outcomes [22]. A United States military-population randomised trial found no significant between-group difference in Hip Outcome Score or global rating of change at two years, tempering expectations of a uniform surgical advantage across populations and rehabilitation protocols [23]. A systematic review and meta-analysis pooling these and other randomised trials concluded that hip arthroscopy produces modestly better early patient-reported outcomes than targeted physiotherapy, while acknowledging that neither the magnitude nor durability of this advantage is uniform

across trials [24]. None of these trials was designed or powered around athletic RTS as a primary endpoint, underscoring a persistent gap between the RCT and athlete-cohort literatures (Table 1).

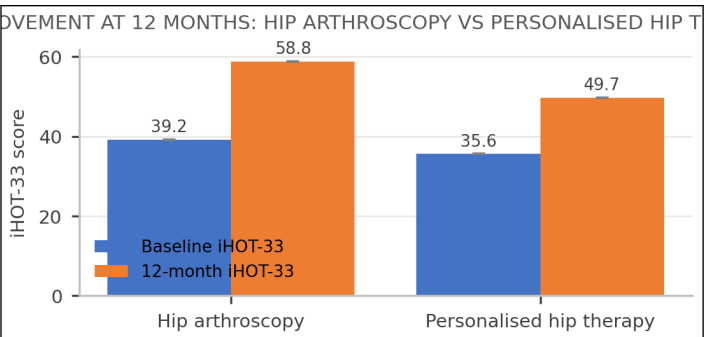


Figure 2: International Hip Outcome Tool (iHOT-33) scores at baseline and 12 months for hip arthroscopy versus personalised hip therapy in the UK FASHIoN randomised controlled trial [21].

Predictors of Return to Sport

Across athlete cohorts, younger age at surgery, shorter symptom duration, and participation in cutting or contact sports (relative to flexibility or endurance sports) are the most consistently reported predictors of successful RTS [10,11]. Radiographic correction adequacy also matters: postoperative alpha angle has been shown to independently predict RTS in athletes, with residual cam deformity beyond a threshold value associated with lower odds of returning to competition [25]. Sex and age jointly influence outcome in some cohorts, with older and female soccer players demonstrating lower RTS rates than younger male counterparts [13]. Surgical technique factors reviewed above, namely labral repair over debridement and complete capsular closure, are themselves predictors of both symptomatic and sport-specific recovery [5,8] (Table 2).

Long-Term Outcomes and Failure

Long-term follow-up tempers optimism in patients with pre-existing osteoarthritic change: ten-year outcomes after arthroscopy in patients with concomitant osteoarthritis show sustained functional benefit but a high

cumulative rate of conversion to total hip arthroplasty [26]. A validated ten-year risk score for conversion to arthroplasty after contemporary arthroscopic technique has recently been described, intended to support preoperative counselling in older or borderline athletic candidates [27]. These findings suggest that while short- and mid-term RTS outcomes are favourable in appropriately selected athletes, patient selection—particularly exclusion of advanced chondral disease and joint-space narrowing—remains critical to long-term joint preservation and sustained sporting participation. For the sports medicine physician counselling an athlete preoperatively, this evidence supports framing arthroscopy as a reliable route back to competitive activity in the short and mid term, while setting realistic expectations that objective performance metrics may not fully normalise even when subjective return is achieved.

Table 2: Factors associated with successful return to sport after hip arthroscopy for femoroacetabular impingement, drawn from the comparative and predictor literature reviewed here [10,11,25,13,5,8].

Factor	Association with return to sport
Younger age at surgery	Favourable
Shorter symptom duration before surgery	Favourable
Cutting/contact sport (vs flexibility/endurance)	Favourable
Smaller postoperative alpha angle	Favourable
Female sex and older age (soccer cohorts)	Unfavourable
Labral repair (vs debridement)	Favourable
Complete capsular closure (vs unrepaired capsulotomy)	Favourable

Conclusion

Hip arthroscopy for femoroacetabular impingement reliably returns most athletes to some level of sport, with pooled RTS rates generally in the 75-90% range, but return to prior competitive performance is achieved by a smaller and more variable proportion of patients, particularly in

soccer and flexibility sports. Labral repair, complete capsular closure, and adequate correction of cam morphology are consistently associated with better outcomes than debridement, unrepaired capsulotomy, or residual deformity. Randomised comparisons with structured physiotherapy show a modest early advantage for surgery without resolving which athletes are best served by which pathway. Standardising RTS and return-to-performance definitions across future cohorts and trials should be a priority for the field.

References

1. Hale, R.F., Melugin, H.P., Zhou, J., LaPrade, M.D., Bernard, C., Leland, D., Levy, B.A., Krych, A.J. (2021) Incidence of femoroacetabular impingement and surgical management trends over time. *American Journal of Sports Medicine*, 49(1): 35-41.
2. Girardi, N., et al. (2026) Return to sport in elite-level athletes undergoing hip arthroscopy varies based on return-to-sport definition: a systematic review. *Arthroscopy*, in press.
3. Mohtadi, N.G., Griffin, D.R., Pedersen, M.E., Chan, D., Safran, M.R., Parsons, N., Sekiya, J.K., Martin, H.D., Byrd, J.W.T., Kelly, B.T., Lee, J.B.L., Ayeni, O.R., Clohisy, J.C., Leunig, M. (2012) The development and validation of a self-administered quality-of-life outcome measure for young, active patients with symptomatic hip disease: the International Hip Outcome Tool (iHOT-33). *Arthroscopy*, 28(4): 595-605.
4. Thorborg, K., Holmich, P., Christensen, R., Petersen, J., Roos, E.M. (2011) The Copenhagen Hip and Groin Outcome Score (HAGOS): development and validation according to the COSMIN checklist. *British Journal of Sports Medicine*, 45(6): 478-491.
5. Krych, A.J., Thompson, M., Larson, C.M., Byrd, J.W.T., Kelly, B.T. (2013) Arthroscopic labral repair versus selective labral debridement in female patients with femoroacetabular impingement: a prospective randomized study. *Arthroscopy*, 29(1): 46-54.
6. Kucharik, M.P., Abraham, P.F., Nazal, M.R., Varady, N.H., Eberlin, C.T., Meek, W.M., Martin, S.D. (2022) Arthroscopic acetabular labral repair versus labral debridement: long-term survivorship and functional outcomes. *Orthopaedic Journal of Sports Medicine*, 10(6): 23259671221109012.
7. Riff, A.J., Kunze, K.N., Movassaghi, K., Hijji, F., Beck, E.C., Nho, S.J., Chahla, J. (2019) Systematic review of hip arthroscopy for femoroacetabular impingement: the importance of labral repair and capsular closure. *Arthroscopy*, 35(2): 646-661.e3.
8. Kunze, K.N., Vadhera, A., Devinney, A., Nwachukwu, B.U., Kelly, B.T., Nho, S.J., Chahla, J. (2021) Effect of capsular closure after hip arthroscopy for femoroacetabular impingement syndrome on achieving clinically meaningful outcomes: a meta-analysis of prospective and comparative studies. *Orthopaedic Journal of Sports Medicine*, 9(7): 23259671211017467.
9. Hartwell, M.J., Morgan, A.M., Nemsick, M., Fenn, T.W., Gerhardt, M.B., Gursay, S., Chahla, J., Nho, S.J. (2021) Isolated acetabuloplasty for femoroacetabular impingement: favorable patient-reported outcomes and sustained survivorship at minimum 5-year follow-up. *Arthroscopy*, 37(9): 2818-2826.
10. Alradwan, H., Philippon, M.J., Farrokhyar, F., Chu, R., Whelan, D., Bhandari, M., Ayeni, O.R. (2012) Return to preinjury activity level after surgical management of femoroacetabular impingement in athletes. *Arthroscopy*, 28(10): 1567-1576.
11. Menge, T.J., Briggs, K.K., Rasmussen, M.T., Philippon, M.J. (2021) Cutting, impingement, contact, endurance, flexibility, and asymmetric/overhead sports: is there a difference in return-to-sport rate after arthroscopic femoroacetabular impingement surgery? A systematic review and

- meta-analysis. *American Journal of Sports Medicine*, 49(9): 2497-2507.
12. Ifabiyi, M., Patel, M., Cohen, D., Simunovic, N., Ayeni, O.R. (2024) Return-to-sport rates after hip arthroscopy for femoroacetabular impingement syndrome in flexibility sports athletes: a systematic review. *Sports Health*, 16(6): 940-948.
 13. Marom, N., Olsen, R., Burger, J.A., Dooley, M.S., Coleman, S.H., Ranawat, A.S., Kelly, B.T., Nawabi, D.H. (2023) Majority of competitive soccer players return to soccer following hip arthroscopy for femoroacetabular impingement: female and older aged players are less likely to return to soccer. *Knee Surgery, Sports Traumatology, Arthroscopy*, 31(7): 2721-2729.
 14. Sjøvall Anari, S., Olsson, A., Ohlin, A., Desai, N., Hamrin Senorski, E., Sansone, M., Lindman, I. (2023) High-level soccer players have a low rate of return to performance after hip arthroscopy for femoroacetabular impingement syndrome. *Knee Surgery, Sports Traumatology, Arthroscopy*, 31(6): 2071-2078.
 15. Owens, J.S., Jimenez, A.E., Lee, M.S., Hawkins, G.C., Maldonado, D.R., Domb, B.G. (2022) Basketball players undergoing primary hip arthroscopy exhibit higher grades of acetabular cartilage damage but achieve favorable midterm outcomes and return to sports rates comparable with a propensity-matched group of other cutting sports athletes. *American Journal of Sports Medicine*, 50(9): 2429-2438.
 16. Reiman, M.P., Rhon, D.I., Fraser, J.J., Wilkinson, D.P., Kolber, M.J., Goode, A.P. (2018) Most military service members return to activity duty with limitations after surgery for femoroacetabular impingement syndrome: a systematic review. *Arthroscopy*, 34(6): 1833-1841.
 17. Nwachukwu, B.U., Fields, K., Yeom, J., Rasio, J., Nawabi, D.H., Kelly, B.T., Ranawat, A.S. (2019) Return-to-play and performance outcomes of professional athletes in North America after hip arthroscopy from 1999 to 2016. *American Journal of Sports Medicine*, 47(6): 1488-1495.
 18. Slawaska-Eng, D., Jamieson, N., de Sa, D., Simunovic, N., Ayeni, O.R. (2025) Performance and return to sport outcomes following hip arthroscopy in National Hockey League players. *Knee Surgery, Sports Traumatology, Arthroscopy*, 33(6): 2110-2118.
 19. McDonald, J.E., Herzog, M.M., Philippon, M.J. (2013) Return to play after hip arthroscopy with microfracture in elite athletes. *Arthroscopy*, 29(2): 330-335.
 20. Jimenez, A.E., Owens, J.S., Monahan, P.F., Maldonado, D.R., Saks, B.R., Sabetian, P.W., Ankem, H.K., Lall, A.C., Domb, B.G. (2022) Return to sports and minimum 2-year outcomes of hip arthroscopy in elite athletes with and without coexisting low back pain: a propensity-matched comparison. *American Journal of Sports Medicine*, 50(4): 976-985.
 21. Griffin, D.R., Dickenson, E.J., Wall, P.D.H., Achana, F., Donovan, J.L., Griffin, J., Hobson, R., Hutchinson, C.E., Jepson, M., Parsons, N.R., Petrou, S., Realpe, A., Smith, J., Foster, N.E. (2018) Hip arthroscopy versus best conservative care for the treatment of femoroacetabular impingement syndrome (UK FASHIoN): a multicentre randomised controlled trial. *Lancet*, 391(10136): 2225-2235.
 22. Kemp, J.L., Mosler, A.B., Hunt, M.A., Rio, E., Semciw, A.I., Girdwood, M., King, M.G., Fransen, M., Bruns, E., Crossley, K.M. (2021) Multi-centre randomised controlled trial comparing arthroscopic hip surgery to physiotherapist-led care for femoroacetabular impingement (FAI) syndrome on hip cartilage metabolism: the Australian FASHIoN trial. *BMC Musculoskeletal Disorders*, 22: 685.
 23. Mansell, N.S., Rhon, D.I., Meyer, J., Slevin, J.M., Marchant, B.G. (2018) Arthroscopic surgery or physical therapy for patients with femoroacetabular impingement syndrome: a randomized controlled trial with 2-year follow-up. *American Journal of Sports Medicine*, 46(6): 1306-1314.

24. Schwabe, M.T., Clohisy, J.C., Cheng, A.L., Pascual-Garrido, C., Harris-Hayes, M., Hunt, D.M., Harris, M.D., Prather, H., Nepple, J.J. (2020) Short-term clinical outcomes of hip arthroscopy versus physical therapy in patients with femoroacetabular impingement: a systematic review and meta-analysis of randomized controlled trials. *Orthopaedic Journal of Sports Medicine*, 8(11): 2325967120968490.
25. Monahan, P.F., Maldonado, D.R., Owens, J.S., Ankem, H.K., Saks, B.R., Jimenez, A.E., Lall, A.C., Domb, B.G. (2022) Postoperative alpha angle is predictive of return to sport in athletes undergoing hip arthroscopy for femoroacetabular impingement. *Arthroscopy*, 38(3): 810-818.
26. Nikou, S., et al. (2025) Ten-year outcomes of hip arthroscopy for femoroacetabular impingement with osteoarthritis: sustained functional benefits but high conversion to total hip arthroplasty. *Knee Surgery, Sports Traumatology, Arthroscopy*, 33(6): 2050-2059.
27. Gilat, R., Vogel, M.J., Alvero, A.B., Jan, K., Kazi, O., Danilkowicz, R.M., Nho, S.J. (2025) The THA-10 score for predicting conversion to total hip arthroplasty after contemporary hip arthroscopy for femoroacetabular impingement syndrome at a minimum 10-year follow-up. *American Journal of Sports Medicine*, 53(8): 1826-1835.