OE ORIGINAL

Hip arthroscopy versus physical therapy for femoroacetabular impingement: OE M.I.N.D. Analytics Report

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Highlights

- Despite the increasing interest in hip arthroscopy for a wide range of indications, there are a few studies available for this therapeutic option.
- OE M.I.N.D. identified 1 systematic review comparing hip arthroscopy to physical therapy for femoroacetabular impingement.
- The findings of this systematic review show superior function and quality of life outcomes among patients who received hip arthroscopy; however, the quality of evidence is very low according to the GRADE assessment.
- OE M.I.N.D. identified 7 ongoing studies on hip arthroscopy on different conditions, although the projected sample size of these studies is small.
- There is a need for methodologically rigorous and large studies on hip arthroscopy to inform future clinical decisions.

Over the last two decades, hip arthroscopy has been increasingly used both as a diagnostic and therapeutic tool to treat hip disease (Bozic et al. 2013). This procedure has been described for a wide range of conditions, including femoroacetabular impingement (FAI), labral tear, snapping iliopsoas tendon, snapping iliotibial band, septic arthritis, fracture of the femoral head, instability, chondral lesion, synovial chondromatosis, loose or foreign body, as well as gluteus medius tendon tear (Colvin et al. 2012). Despite the growing uptake of this procedure, there is still much debate regarding the role of hip arthroscopy for the management of hip disease.

In this OE Original, we present the current evidence on effectiveness of hip arthroscopy, a profile of ongoing trials, characteristics of previous trials, and market analytic features for this clinical topic using some of the key functions and features of OE M.I.N.D. (Machine Learning Insights Database) tools. The OE M.I.N.D. platform is powered by big data [over 75 million data points] and machine learning technologies that leverage automation to produce results efficiently.

The OE M.I.N.D. tools provide a platform of high quality, comprehensive and timely data analytics, evidence generation and knowledge translation dedicated to better serving orthopaedic and relevant fields. OE M.I.N.D. updates the data on a daily basis, with new trials and data being constantly added. The results in this OE Original were based on the operation conducted on February 8, 2021.

1. OE M.I.N.D. Literature Scoping Tool

1.1 Overview of the available evidence

In order to examine the current evidence on effectiveness of hip arthroscopy, we used the OE M.I.N.D. Literature Scoping Tool. This tool gives access to thousands of randomized controlled trials (RCTs) and meta-analyses to help you scope the landscape of evidence. OE M.I.N.D.'s extensive tagging system makes filtering, sorting, and searching for studies and outcomes related to a given intervention, device or comparison fast and effortless. The Literature Scoping Tool provides extensive information on the inclusion/exclusion criteria (e.g., eligible condition and anatomical region), patient demographics, outcome measures, follow-up period, as well as the countries in which the studies are conducted.

We used the OE M.I.N.D. Literature Scoping Tool to search for RCTs and meta-analyses published in English on hip arthroscopy. We did not limit our search by any specific comparator treatment, condition, patient outcome, follow-up period, or country to identify all relevant studies on hip arthroscopy.

In total, 3 RCTs (Griffin et al. 2018, Mansell et al. 2018, Palmer et al. 2019) and 1 systematic review (Gatz et al. 2020) published between 2018 and 2020 were retrieved and eligible. The 3 RCTs were included in the systematic review, thus we will examine the evidence synthesized in this review.

Table 1 shows the characteristics of the 3 included RCTs. All studies focused on FAI and compared hip arthroscopy to physical therapy. The mean follow-up across these RCTs was 14.67 ± 8.3 months. Unpaired t tests found no significant differences between the arthroscopy and physical therapy groups in terms of side, gender, age, duration of symptoms, and BMI (p=0.08–0.9). In our previous OE Original "**Is surgery for FAI better than physiotherapy?**", we provided a detailed assessment of the risk of bias of these three studies. Overall, each of these three studies have several serious methodological limitations. None of these studies blinded treatment providers or patients, and also had small study size. These present a high risk of bias for all 3 RCTs.

Table 1: Characteristics of included RCTs

Study	Country	Sample SIze	Condition	Mean (Age)	Intervention	Comparator	Mean follow up (months)
Mansell et al. 2018	United States	80	FAI	30.3	Hip arthroscopy and post operative physiotherapy	Physiotherapy programme customized to individual patient needs. Physiotherapy sessions were delivered twice a week for 6 weeks.	24
Griffin et al. 2018	United Kingdom	348	FAI	35.4	Hip arthroscopy and post operative physiotherapy	Physiotherapy programme customized to individual patient needs, with emphasis on progression, supervision, and pain relief. Between 6 to 10 physiotherapy sessions were delivered over 12-24 weeks.	12
Palmer et al. 2019	United Kingdom	222	FAI	36.4	Hip arthroscopy and post operative physiotherapy	Physiotherapy programme customized to individual patient needs, with emphasis on improving core stability and movement control. A maximum of 8 physiotherapy sessions were delivered over 5 months.	8

1.2 Effectiveness of hip arthroscopy for FAI

The systematic review (Gatz et al. 2020) provides meta-analyses of patient reported function and quality of life outcomes, as well incidence of adverse events. These include the Hip Outcome Score (HOS) (activities of daily living (ADL) and sport subscales), International Hip Outcome Tool (iHOT-33) score, the VAS subscale of the score EQ-5D, as well as the risk of incurring in further total hip arthroplasty. Table 2 shows results of these meta-analyses, conducted at 14.67 ± 8.3 months, which indicate that hip arthroscopy is associated with higher scores on all function and quality of life outcome measures compared to physical therapy.

Table 2: Summary of meta-analyses from Gatz et al. 2020

	Outcomes	Studies included in analysis	Point Estmate Favors	Statistical significance	Quality of evidence
Function	HOS-ADL subscale score	Mansell et al. 2018 Palmer et al. 2019	Hip arthroscopy (MD 10.42; 95% CI 5.45–15.39)	Yes	Very low
	HOS sport subscale score	Mansell et al. 2018 Palmer et al. 2019	Hip arthroscopy (MD 11.94; 95% CI 5.41–18.46)	Yes	Very low
	iHOT-33 score	Griffin et al. 2018 Mansell et al. 2018 Palmer et al. 2019	Hip arthroscopy (MD 11.72; 95% CI 7.53–15.90)	Yes	Very low
Quality of life	VAS subscale of the score EQ-5D	Griffin et al. 2018 Palmer et al. 2019	Hip arthroscopy (MD 3.75; 95% CI 0.39–7.12)	Yes	Very low
Adverse events	Rate of further total hip arthroplasty	Griffin et al. 2018 Mansell et al. 2018	Hip arthroscopy (OR 1.51; 95% CI 0.16–14.57)	No	Very low

**MD: Mean Difference*

We rate the quality of evidence presented by Gatz et al. (2020) to be very low using the **GRADE** assessment, due to serious risk of bias, imprecision, and publication bias. Given the small sample size of the RCTs in the meta-analyses, imprecision is an issue due to not meeting optimal information size (OIS). The OIS is the number of patients required for an adequately powered individual trial (Guyatt et al., 2011). For continuous outcomes in meta-analyses, Guyatt et al. (2011) recommended that precision of a summary estimate should be rated down when the sample size is less than 400. This is the case for the HOS-ADL and sport subscale scores, as the sample size included in the meta-analysis for these outcomes were less than 400. Even though the effect estimates for HOS-ADL subscale scores and the iHOT-33 score exceed the **MID**, the lower bound of the 95% CI is smaller than the MID. The systematic review was comprehensive in scope as several electronic databases were searched (Pubmed, Embase, Google Scholar, Scopus) and articles in several languages were considered including English, Italian, German, Spanish, Portuguese, and French.

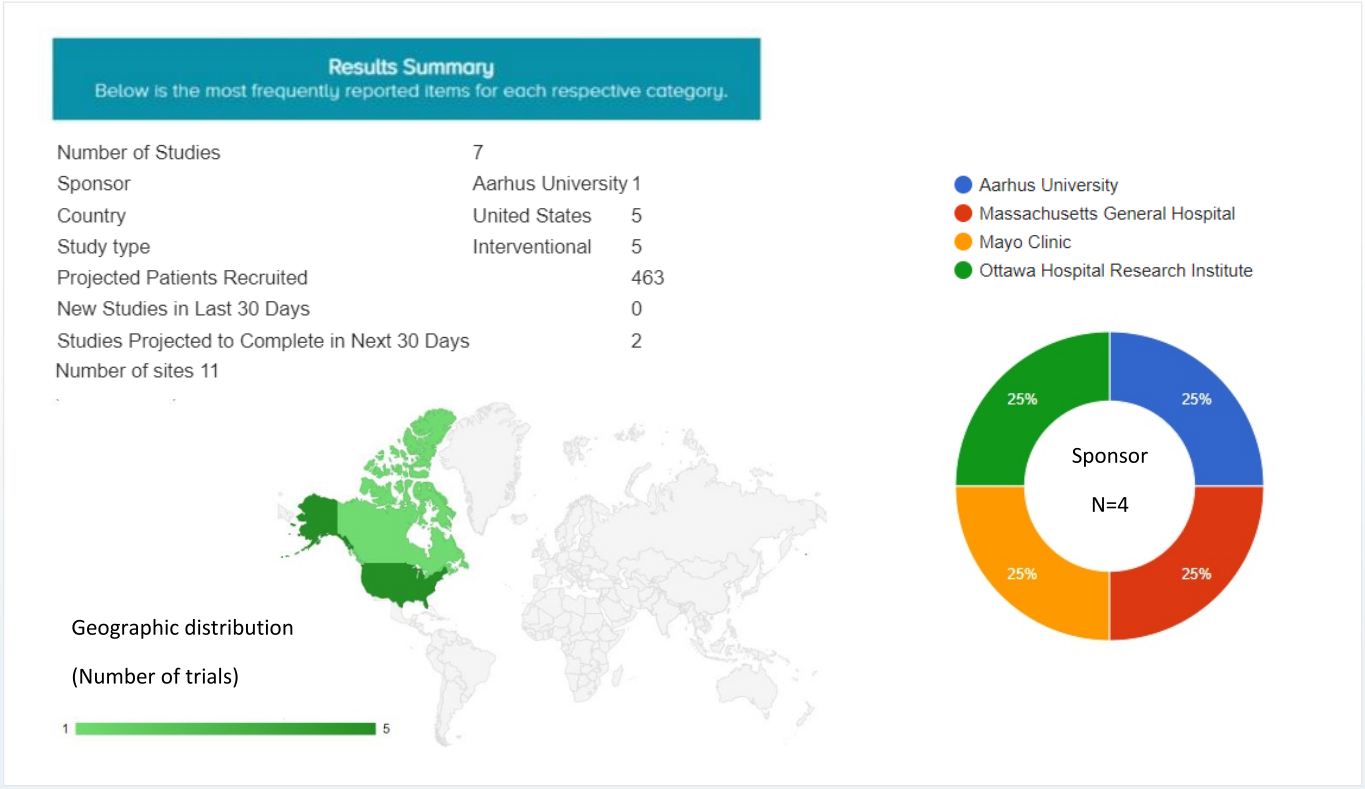
The systematic review concludes there is acceptable risk of publication bias given the symmetry observed in the funnel plot. However, given there are only 3 RCTs in this meta-analysis, it is not appropriate to examine publication bias using funnel plots, as they require at least 10 studies to be included in a meta-analysis – otherwise there is a lack of statistical power to distinguish chance from real asymmetry (The Cochrane Handbook, 2011). Given the small sample size of all 3 RCTs, we downgrade the quality of evidence for publication bias.

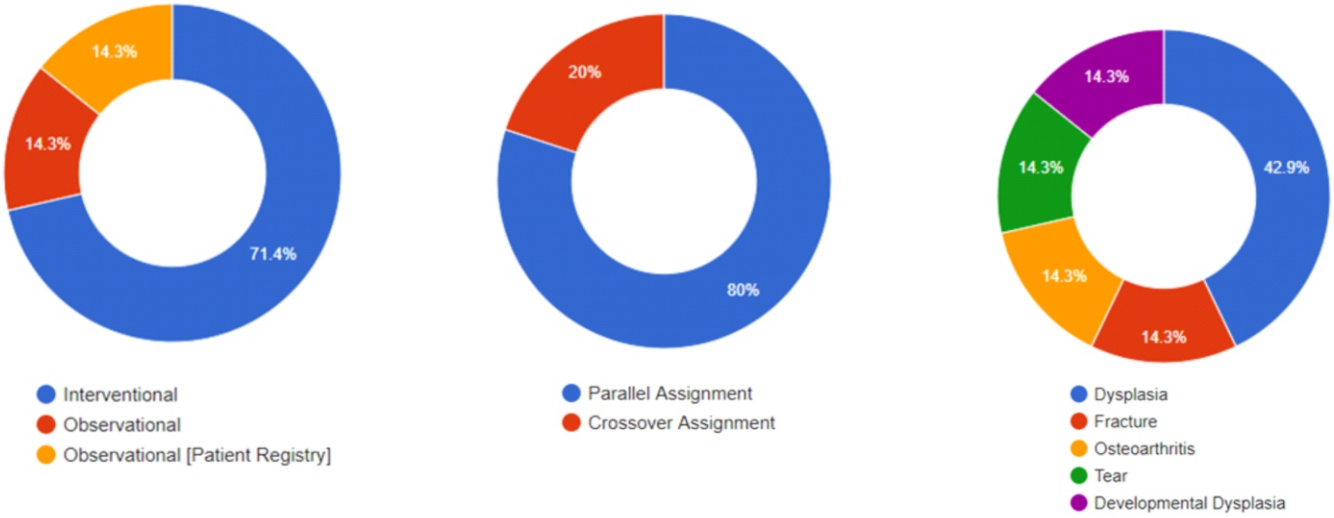
2. Ongoing Trials Tool

To identify ongoing trials in hip arthroscopy, we used our in-house Ongoing Trials Tool. This tool uses a unique interface to harness data from the clinicaltrials.gov registry and can filter the search for trials according to condition type, anatomical region, intervention, and sponsor. We searched for trials in hip arthroscopy and did not limit our search by condition type and sponsor to identify all relevant studies on hip arthroscopy.

We found there are currently 7 ongoing studies on this topic that are aiming to recruit 463 patients (Figure 1). Most of the studies are being conducted in the United States and are interventional in design. The conditions that are covered in these studies include dysplasia, fracture, osteoarthritis, tear, and developmental dysplasia.

Figure 1: Profile of ongoing trials on hip arthroscopy



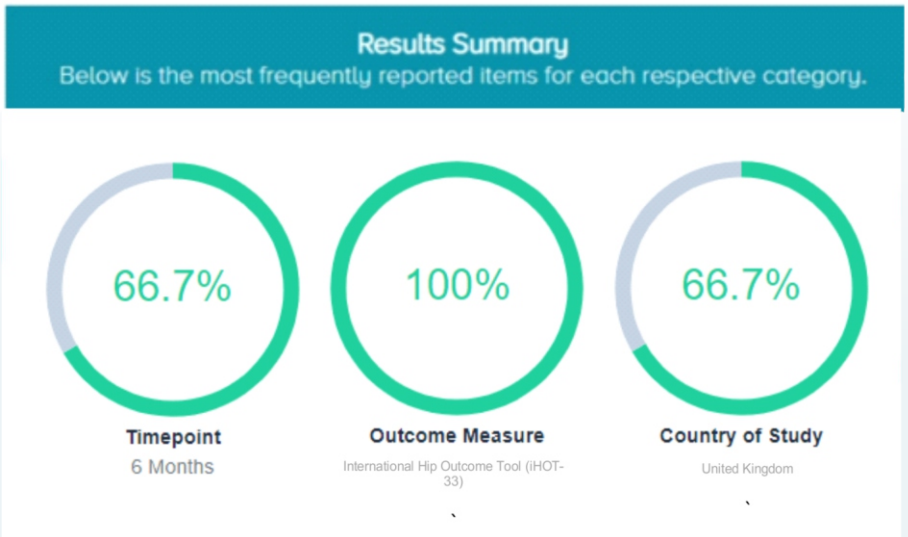


3. Research Planning Tool

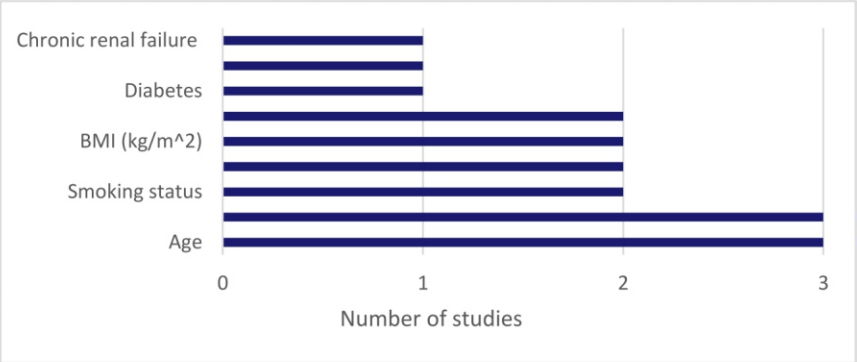
To identify characteristics of previous trials in hip arthroscopy, we used our in-house Research Planning Tool. It takes knowledge of completed studies to assist in the planning of our own research. The Research Planning Tool helps determine the optimal comparators, demographics, outcome measures, follow-ups, and sample size for future trials. This tool supports informed decision making for the study design process by providing the most relevant components for any treatment comparison. This tool can filter search for previous trials according to treatment category, intervention treatment, condition, and anatomical region.

We searched for trials in hip arthroscopy and did not limit our search by condition type. This provided a detailed overview of the 3 RCTs (Griffin et al. 2018, Mansell et al. 2018, Palmer et al. 2019) discussed above. Two of these RCTs were multicentered. In addition to age and gender, the most reported demographic characteristics included smoking status, duration of disease, BMI, and condition type (Figure 2). The most reported outcome measure was the iHOT-33.

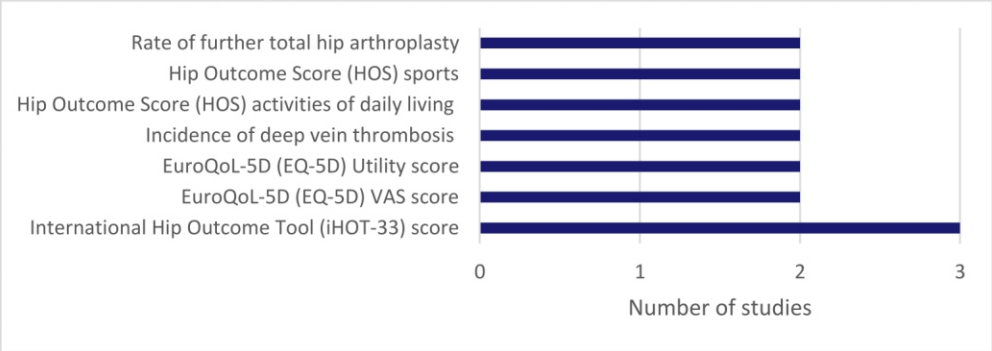
Figure 2: Profile of previous trials on hip arthroscopy



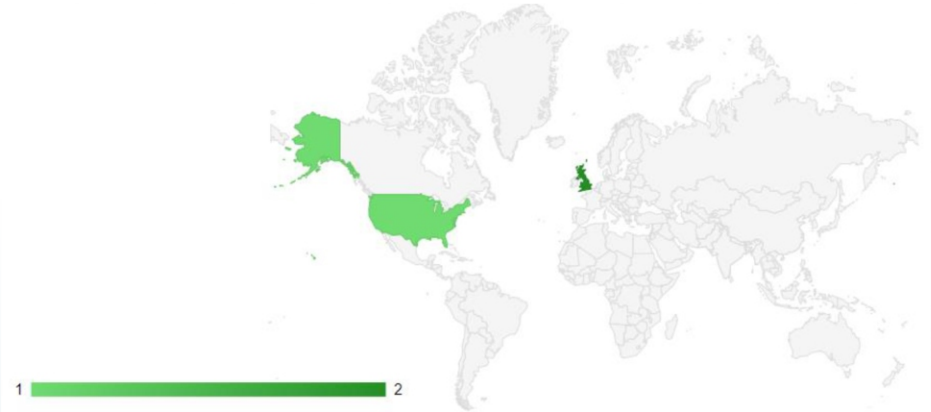
Most reported demographic characteristics



Most reported outcome measures



Geographic distribution of trials



4. Market Analysis Tool

To identify who has sponsored previous trials on hip arthroscopy, we used our in-house Market Analysis Tool. With the reported data on manufactures of orthopaedic devices or therapeutics used in the clinical studies, this tool provides the number of studies and patients, geographical information, and list of their publications for a certain research topic. None of the 3 previous RCTs (Griffin et al. 2018, Mansell et al. 2018, Palmer et al. 2019) were sponsored by industry.

Discussion

Despite the applicability of hip arthroscopy for a wide range of conditions, research on this procedure thus far has largely focused on FAI. The insights generated from OE MIND highlight the superior effectiveness of hip arthroscopy compared to physical therapy for FAI. Even though hip arthroscopy appears to be a more favourable option for FAI, Palmer et al. (2019) highlighted the importance of informing patients about the potential risks and benefits of surgery, which includes the risk of no improvement. They noted that up to half of the patients may not achieve clinically important improvement after surgery – thus it is important to select patients appropriately to optimize treatment outcomes. Findings from cohort studies show factors including increasing patient age, higher preoperative patients reported scores, and presence of osteoarthritis have negative impact on patients with hip arthroscopy (Bryan et al. 2016; Cvetanovich et al. 2018; Degen et al. 2017; Nwachukwu et al. 2017).

It is important to note that the follow up period of the 3 RCTs range from 8 to 24 months, which limits the ability to assess long term outcomes. Additionally, given the nature of the surgical treatment in the 3 available RCTs, there may be significant placebo effect (Gatz et al. 2020). Furthermore, in all 3 RCTs, patients in the hip arthroscopy group also received postoperative physical therapy, which may have played a role in improving functional impairments. Thus, it is not clear whether the surgery itself, the placebo-effect, or the post-operative rehabilitation is the most crucial factor for improved outcomes (Gatz et al. 2020). However, sham surgeries are difficult to conduct and post-operative rehabilitation is a routine clinical practice. Given this context, combined with the small sample size and methodological limitations of the current RCTs discussed above, there is a need for bigger and more methodologically rigorous RCTs with longer follow up to inform future clinical decisions regarding the use of hip arthroscopy and physical therapy for FAI.

The focus on FAI when examining the effectiveness of hip arthroscopy may be explained by the recent uptake of this procedure for FAI at unprecedented rates. For example, in the U.K., there was a 700% increase in the number of hip arthroscopies conducted between 2002 and 2003 (Kremers et al. 2017). Our OE MIND insights show the ongoing trials focus on a wide range of indications that does not include FAI. However, the number of projected patients recruited for these trials still remain small (n=463), highlighting the need for additional future research with larger sample size to comprehensively study the efficacy and safety of hip arthroscopy for different indications.

Bottom line

Meta-analyses of a limited number of RCTs show that patients who underwent hip arthroscopy have superior function (HOS-ADL subscale score; HOS sport subscale score; iHOT-33 score) and quality of life (ED-5D -VAS subscale score) outcomes compared to patient who receive physical therapy for FAI. However, these RCTs have several methodological limitations. Further high-quality research on hip arthroscopy focusing on diverse indications is needed to inform future clinical decisions.

References

Bozic KJ, Chan V, Valone III FH, Feeley BT, Vail TP. Trends in hip arthroscopy utilization in the United States. Journal of Arthroplasty. 2013 Aug 1;28(8 Suppl):140-3.

Bryan AJ, Krych AJ, Pareek A, Reardon PJ, Berardelli R, Levy BA. Are short-term outcomes of hip arthroscopy in patients 55 years and older inferior to those in younger patients? American Journal of Sports Medicine. 2016 Oct;44(10):2526-2530.

Colvin A, Harrast J, Harner C. Trends in hip arthroscopy. Journal of Bone and Joint Surgery. 2012 Feb 15; 94(4):e23.

Cvetanovich GL, Weber AE, Kuhns BD, et al. Hip arthroscopic surgery for femoroacetabular impingement with capsular management: Factors associated with achieving clinically significant outcomes. American Journal of Sports Medicine. 2018 Feb;46(2):288-296.

Degen RM, Nawabi DH, Bedi A, Kelly BT. Radiographic predictors of femoroacetabular impingement treatment outcomes. Knee Surgery, Sports Traumatology, Arthroscopy. 2017 Jan;25(1):36-44.

Gatz M, Driessen A, Eschweiler J, Tingart M, Migliorini F. Arthroscopic surgery versus physiotherapy for femoroacetabular impingement: a meta-analysis study. European Journal of Orthopaedic Surgery & Traumatology. 2020 May 7;2020(30):1151–1162

Griffin DR, Dickenson EJ, Wall PDH, Achana F, Donovan JL, Griffin J et al. Hip arthroscopy versus best conservative care for the treatment of femoroacetabular impingement syndrome (UK FASHIoN): A multicentre randomised controlled trial. The Lancet. 2018 June 2;391(10136): P2225-2235.

Guyatt GH, Oxman AD, Kunz R, Brozek J, Alonso-Coello P, Rind D et al. GRADE guidelines 6. Rating the quality of evidence—imprecision. Journal of Clinical Epidemiology. 2011 December;64(12):1283-1293.

Kremers HM, Schilz SR, Van Houten HK, Herrin J, Koenig KM, Bozic KJ, Berry DJ. Trends in utilization and outcomes of hip arthroscopy in the United States between 2005 and 2013. Journal of Arthroplasty. 2017 March;32(3):750–755.

Mansell NS, Rhon DI, Meyer J, Slevin JM, Marchant BG. Arthroscopic surgery or physical therapy for patients with femoroacetabular impingement syndrome: A randomized controlled trial with 2-year follow-up. The American Journal of Sports Medicine. 2018 Feb 14;46(6):1306-1314.

Nwachukwu BU, Fields K, Chang B, Nawabi DH, Kelly BT, Ranawat AS. Preoperative outcome scores are predictive of achieving the minimal clinically important difference after arthroscopic treatment of femoroacetabular impingement. American Journal of Sports Medicine. 2017 March;45(3):612-619.

Palmer AJR, Gupta VA, Fernquest S, Romback I, Dutton SJ, Mansour R et al. Arthroscopic hip surgery compared with physiotherapy and activity modification for the treatment of symptomatic femoroacetabular impingement: Multicentre randomized controlled trial. BMJ. 2019 Feb 7;364:l185.

The Cochrane Handbook. Recommendations on testing for funnel plot asymmetry. 2011 March. Retrieved from https://handbook-5-1.cochrane.org/chapter_10/10_4_3_1_recommendations_on_testing_for_funnel_plot_asymmetry.htm#:~:text=As%20a%20rule%20of%20thumb,distinguish%20chance%20from%20real%20asymmetry