Systematic Review and Meta-Analysis

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Arthroscopy versus nonoperative treatment of symptomatic femoroacetabular impingement syndrome

A systematic review and meta-analysis

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Abstract

Background: Presently, hip arthroscopy is a widely adopted surgical intervention for the treatment of femoroacetabular impingement (FAI). However, there is insufficient evidence regarding which between arthroscopy and nonoperative treatment is more optimal for symptomatic FAI.

Methods: MEDLINE, Embase, Web of Science, and the Cochrane Library were systematically searched for studies that compared arthroscopy and nonoperative interventions for FAI treatment from inception to August 4, 2020. We included studies that directly compared surgical and nonsurgical treatment for symptomatic FAI and excluded those that did not use arthroscopic treatment as a surgical technique and studies performed on patients with concomitant diagnoses instead of pure FAI. We compared the following clinical outcome scores at 6 and 12 months of follow-up: International Hip Outcome Tool 33 (iHOT-33), hip outcome score (HOS), EuroQol-visual analog scale (EQ-VAS), modified Harris hip score (mHHS), and nonarthritic hip score (NAHS).

Results: Five studies totaling 838 patients were included in the qualitative and quantitative synthesis; 382 patients underwent hip arthroscopy, and 456 patients were treated by nonoperative interventions. At 6 months of follow-up, there were no statistically significant differences in iHOT-33 ratings (mean difference [MD] = 7.92, $P = .15$), HOS (MD of HOS-ADL = 5.15, $P = .26$ and MD of HOS-Sports = 2.65, $P = .79$, respectively), and EQ-VAS (MD = 1.22, $P = .76$) between the 2 treatment strategies. At 12 months of follow-up, the arthroscopy group had a greater mean improvement in iHOT-33 score than the conservative treatment group (MD = 8.42, $P = .002$), but there was no difference between the groups in terms of mHHS rating (MD = −0.24, $P = .83$) and NAHS (MD = −2.08, $P = .09$).

Conclusion: Despite arthroscopy being associated with significantly superior iHOT-33 scores after 12 months of follow-up, we were unable to discern the difference between the treatment strategies using other scoring methods, such as HOS, EQ-VAS, mHHS, and NAHS. Further studies will be needed to conclusively determine if 1 strategy is superior to the other for treating FAI.

Abbreviations: CIs = confidence intervals, EQ-VAS = EuroQol-visual analog scale, FAI = femoroacetabular impingement, HOS = hip outcome score, iHOT-33 = international hip outcome tool 33, MD = mean difference, mHHS = modified Harris hip score, MINORS = methodological index for nonrandomized studies, NAHS = nonarthritic hip score, PROs = patient-reported outcomes, PT = physiotherapy, RCTs = randomized controlled trials.

Keywords: comparison, conservative treatment, femoroacetabular impingement, hip arthroscopy, physical therapy

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The data that support the findings of this study are available from a third party, but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are available from the authors upon reasonable request and with permission of the third party.

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All data generated or analyzed during this study are included in this published article [and its supplementary information files].

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1. Introduction

Femoroacetabular impingement (FAI) was first described in the early 2000s[1] as a cause of hip pain, particularly among young, active patients. Moreover, FAI is considered a cause of hip osteoarthritis.[2,3]

However, the optimal treatment of symptomatic FAI is still controversial. There are 2 broad treatment strategies for symptomatic FAI: surgical and nonsurgical interventions. Even though nonsurgical treatment—such as physiotherapy (PT), activity modification, or pain medication—represents the initial treatment choice for symptomatic FAI,[4] for patients without symptom improvement, physicians must determine whether to convert to surgical treatment or continue nonsurgical treatment. There are various protocols of PT for symptomatic FAI, but basically all strategies try to correct hip muscle weakness, lower trunk strength, dynamic single-leg balance, and dysfunctional muscular impairments.[5]

Surgical treatment has become an established choice for FAI. The aim of surgery is to reshape the hip joint to resolve impingement, reduce hip pain, and improve hip function.[6] Initially, open surgery was used to treat FAI, but arthroscopy is currently used more frequently.[1,7] To date, a number of studies have reported excellent outcomes, in terms of efficacy and safety, associated hip arthroscopy for FAI. The application of hip arthroscopy has increased over 4-fold in the past 2 decades in the USA.[8] However, there is insufficient evidence supporting either arthroscopy or nonsurgical treatment as the superior option for treating symptomatic FAI. Some reports have suggested that surgical intervention is not superior to nonsurgical treatment for FAI.[9,10] Moreover, the cost-effectiveness of hip arthroscopy for FAI is controversial.[7] The Australian government removed arthroscopic treatment for FAI as a covered procedure in the 2016 to 2017 Medicare budget.[9]

Only a few studies have made a direct comparison between arthroscopic surgery and nonsurgical treatment for symptomatic FAI. Furthermore, to the best of our knowledge, there has been limited qualitative or quantitative analysis of this topic. In 2014, Wall et al conducted a systematic review comparing hip arthroscopy to nonoperative treatment for hip impingement,[11] but they did not make solid conclusions due to the relatively small number of included studies, and also the other few previous synthetic reports were also enrolled only 2 or 3 studies.[5,12]

Therefore, we aimed to compare the clinical outcomes of FAI patients who underwent hip arthroscopy with those who underwent nonoperative treatment in this systematic review and meta-analysis.

2. Materials and methods

This study was conducted in accordance with the Revised Assessment of Multiple Systematic Reviews and Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines.[13,14] Although the present study involved human participants, ethical approval or informed consent from the participants was not required because all the data were based on previously published studies and analyzed anonymously without any potential harm to the participants.

2.1. Literature search

Based on the referenced guidelines, multiple comprehensive literature databases, including MEDLINE, Embase, Web of Science, and the Cochrane Library were searched for studies that compared arthroscopy with nonoperative interventions for FAI. The search was performed for articles from inception to August 4, 2020, using an a priori search strategy. Search terms included synonyms and related terms for arthroscopy, nonoperative treatment, and FAI as follows: ("arthroscopy" OR "arthroscopic surgery" OR "arthroscopic hip surgery") AND ("nonoperative" OR "conservative" OR "physiotherapy" OR "physical therapy") AND ("FAI" OR "femoroacetabular impingement"). There were no restrictions on language or publication year. Additionally, after the initial electronic search, relevant articles and their bibliographies were manually searched.

2.2. Study selection

Two board-certified orthopedic surgeons specializing in hip surgery independently selected the studies for full-text reviews based on the titles and abstracts. If there was insufficient information in the abstract to determine whether the study should be included, the full article was reviewed. At each stage of study selection, kappa values were calculated to determine the inter-reviewer agreement regarding study selection. Agreement between reviewers was correlated with kappa values a priori: $\kappa=1$ corresponded to "perfect" agreement; $1.0 > \kappa \geq 0.8$, "almost perfect" agreement; $0.8 > \kappa \geq 0.6$, "substantial" agreement; $0.6 > \kappa \geq 0.4$, "moderate" agreement; $0.4 > \kappa \geq 0.2$, "fair" agreement; and $\kappa < 0.2$, "slight" agreement. Disagreements at each stage were resolved through discussions between the 2 investigators.

We included studies in the systematic review if they

(1) directly compared surgical and nonsurgical treatment for FAI,
(2) included only symptomatic FAI, and
(3) reported complete data, including means, standard deviations, and sample sizes of each variable of treatment outcomes.

We did not restrict the patient age, sex, or the cause of FAI. We included original research articles without restrictions in terms of study design and excluded technical notes, letters to the editor, expert opinions, review articles, meta-analyses, conference abstracts, and case reports. We also excluded

(1) studies that did not use arthroscopic treatment as a surgical technique (eg, open surgery or mini-open/combined surgery);
(2) studies that included patients with concomitant diagnoses, such as trochanteric bursitis and gluteus muscle injuries, not pure FAI; and
(3) studies that investigated the same patient groups used in previously published studies (ie, a participant cohort could only be included once in this systematic review).

2.3. Data extraction

For the qualitative data synthesis, the following information and variables were extracted from the selected articles using a standardized form:

(1) study design and demographic data (number of hips included in each study, mean age, and follow-up duration);
(2) study details (proportion of each deformity type included in the study, symptom duration, duration of conservative treatment before intervention, and kind of outcome scores investigated); and

(3) details of each treatment.

For the pooled analysis, we extracted the following clinical outcome scores: International Hip Outcome Tool 33 (iHOT-33),[15] hip outcome score (HOS),[16] EuroQol-visual analog scale (EQ-VAS),[17,18] modified Harris hip score (mHHS),[19] and non-arthritic hip score (NAHS).[20,21]

In all analyses, 2 investigators independently extracted the data, and all disagreements were resolved through discussion. For meta-analyses with insufficient data, we contacted the study authors by e-mail to request the missing or unclear details.

2.4. Risk of bias assessment

The methodological quality of the included studies was assessed using the Methodological Index for Nonrandomized Studies (MINORS),[22] which is a valid tool for assessing the quality of randomized controlled trials (RCTs) and nonrandomized studies. According to the MINORS checklist, the maximum score for comparative studies is 24. Two independent reviewers performed a quality assessment and resolved disagreements through discussion.

2.5. Data synthesis and statistical analysis

We classified the clinical outcome scores at 6 and 12 months of follow-up. The meta-analyses were performed using information on sample size, mean score, and standard deviation of various outcome scores. All pooled studies were conducted using unadjusted mean differences (MDs) with 95% confidence intervals (CIs) to avoid bias from the adjustment discordance of each series. For the study[4] that did not provide original unadjusted data, we contacted the authors by e-mail and obtained the original data. Heterogeneity was assessed using the I^2 statistic, in which 25%, 50%, and 75% were considered low, moderate, and high heterogeneity, respectively. Forest plots were used to show the outcomes, pooled estimate of effects, and overall summary effect of each study. Statistical significance was set at $P < .05$. All data were pooled using a random effects model following previous research findings.[23]

We did not perform the test for publication bias because the evaluation is typically performed only when at least 10 studies are included in the meta-analysis.[24] All statistical analyses were performed using Review Manager (RevMan), version 5.3 (Copenhagen, Denmark; The Nordic Cochrane Centre, The Cochrane Collaboration, 2014).

3. Results

3.1. Study identification

The details of the study identification and selection process are summarized in Figure 1. The initial electronic literature search yielded 725 articles, and after removing 295 duplicates, 430 studies were screened; 408 studies were excluded after their titles and abstracts were reviewed, and an additional 17 studies were excluded after full-text review. Thus, 5 studies were finally included in the qualitative and quantitative study.

Agreement between the reviewers on study selection was “almost perfect” at the title review stage ($\kappa = 0.802$) and “substantial” at the abstract review stage ($\kappa = 0.671$). The kappa value between reviewers at the full-text review stage was 0.879, signifying “almost perfect” agreement.

3.2. Study characteristics

Of the 5 included studies,[4,7,9,10,25] 3 studies[4,7,9] were RCTs, one[10] was a prospective cohort study, and the other one[25] was a retrospective cohort study. A total of 838 patients were included in the studies selected: 382 patients underwent arthroscopic treatment, and 456 patients were treated by nonsurgical intervention. The mean ages among the study samples ranged from 15.3 to 45.1 years, and the mean follow-up durations ranged from 8 to 26.8 months. Three[9,10,25] of the 5 studies reported 2-year follow-up results. The details are shown in Table 1. All of the included studies reported well-balanced demographic characteristics and pre-treatment clinical conditions between both treatment groups. Notably, all of the included non-randomized cohort studies revealed no statistical differences in pre-intervention patient-reported outcomes (PROs).[10,25]

3.3. Risk of bias assessment of the included studies

The mean MINORS score for methodological quality assessment was 20.8/24 (range, 18–23) (Table 1). With consideration of the 8 main evaluation variables, 1 study[25] received a point deduction for its retrospective study design, and 4 studies[7,9,10,25] received point deductions because they lacked blinded evaluation of endpoints. Three studies[4,7,10] received point deductions because at least 5% of the initially included patients were lost to follow-up. Two articles[10,25] lost points because they did not mention sample size calculations. There were no point deductions resulting from assessments of the additional criteria domains.

3.4. Qualitative synthesis

Four articles[4,7,10,25] revealed the types of FAI-associated deformities captured in their respective studies. The cam-type deformity was the most common, followed by mixed- and pincer-type deformities. Even though all of included studies did not classify the patients according to the severity of FAI, all except one[7] analyzed data of symptomatic FAI patients, and the other 4 studies[4,9,10,25] analyzed data of patients with complaints of continued pain over 6 weeks of conservative treatment (>6 weeks to 18 weeks). In all included articles, at least 2 clinical outcome scoring tools were used to compare surgical with nonsurgical treatment for FAI syndrome (Table 2). The protocols of both arthroscopic and nonsurgical treatment are described in Table 3. All studies that described surgical details mentioned labral/chondral procedures, if possible, and acetabuloplasty and femoroplasty. There was variation among the nonsurgical treatment protocols, but in all studies, PT was performed using standardized protocols and assisted by a trained physiotherapist, in 6 to 12 sessions. The surgical and nonsurgical treatment details for each study are described in Table 3.

3.5. Quantitative synthesis

3.5.1. Clinical outcomes at 6 months post-intervention: iHOT-33, HOS, and EQ-VAS.

Data on the following 3 outcome measurement scores could be assessed at the 6-month post-intervention point: iHOT-33, HOS, and EQ-VAS. Three RCTs[4,7,9] described the iHOT-33 as an outcome measure, and 2 RCTs described the HOS,[4,9] and EQ-VAS.[4,7] All data were collected 6 months after the investigated interventions were applied.

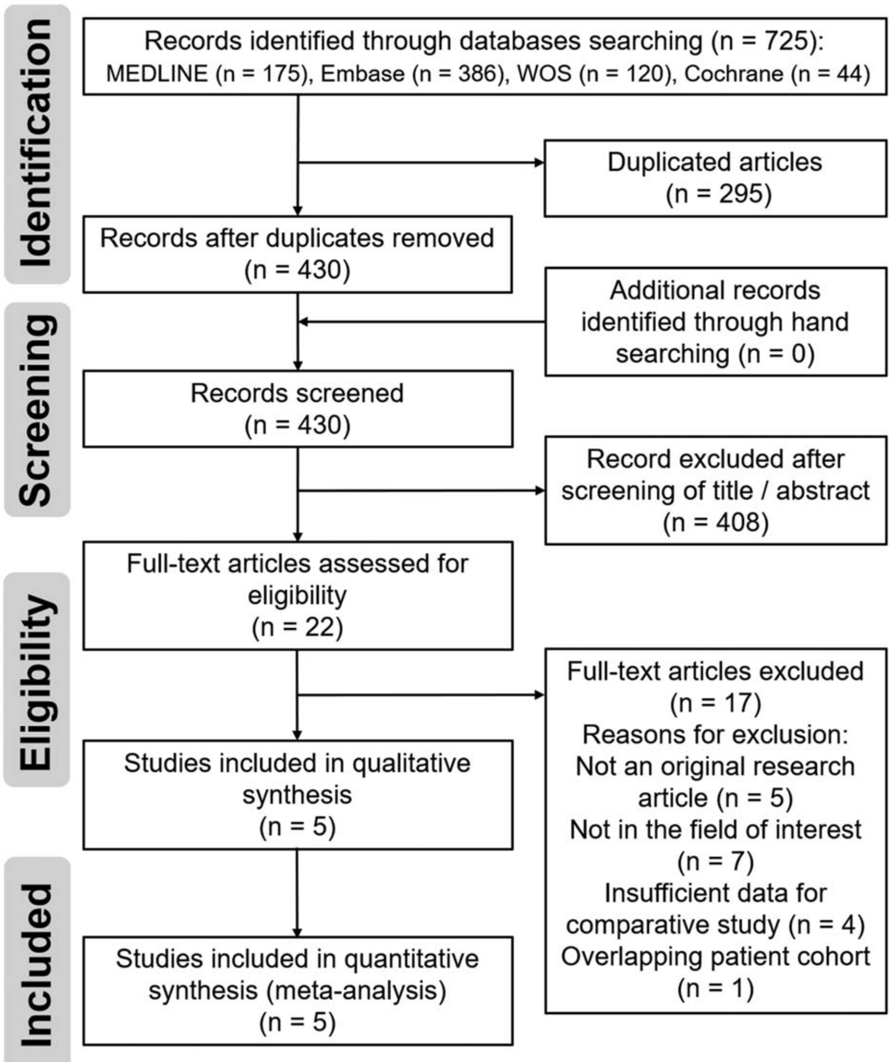

Figure 1. Preferred reporting items for systematic reviews and meta-analyses (PRISMA) flow diagram for the identification and selection of studies to be included in the meta-analysis.

In our pooled analyses, we could not find any statistically significant differences in iHOT-33, HOS, and EQ-VAS ratings between arthroscopy and nonsurgical treatment (iHOT-33, MD = 7.92, 95% CI, −2.85 to 18.69, $P = .15$; HOS-ADL, MD = 5.15, 95% CI, −3.72 to 14.01, $P = .26$; HOS-sports, MD = 2.65, 95% CI, −16.82 to 22.11, $P = .79$; EQ-VAS, MD = 1.22, 95% CI, −6.69 to 9.13, $P = .76$). The details are shown in Figure 2.

3.5.2. Clinical outcomes over 12 months post-intervention: iHOT-33, mHHS, and NAHS. We could synthesize data of the following 3 scores at the 12-month follow-up point: iHOT-33, mHHS, and NAHS. We could extract the iHOT-33 scores from 2 RCTs,[7,9] and both of them included evaluations at the 12-month follow-up point. The meta-analysis for the mHHS and NAHS were performed based on data from 2 studies,[10,25] which

Table 1

Study design, demographic data, and MINORS scores of included studies.

Author (yr)	Study design	Number of sample size: Arthroscopy	Number of sample size: Nonoperative	Mean age (yr)	Follow-up duration (mo)	MINORS score
Griffin et al (2018)	RCT	171	177	35.3	12.0	21
Kekatpure et al (2017)	RCS	44	53	45.1	26.5	18
Mansell et al (2018)	RCT	38	40	30.1	24.0	22
Palmer et al (2019)	RCT	112	110	36.2	8.0	23
Pennock et al (2018)	PCS	17	76	15.3	26.8	20

Non-OP = nonoperative treatment, PCS = prospective cohort study, RCS = retrospective cohort study, RCT = randomized controlled trial.

Table 2

Summary of study details.

Author (yr)	Type of deformity in the included study	Symptom duration (mo)	Duration of conservative treatment before intervention (mo)	Compared outcome scores between groups
Griffin et al (2018)	Cam 75%, Pincer 8%, Mixed 17%	38.5	N/A	iHOT-33, EQ-5D-5L, SF-12
Kekatpure et al (2017)	Cam 50%, Pincer 14%, Mixed 36%	6.3	3	mHHS, NAHS, WOMAC
Mansell et al (2018)	N/A	>48 (in 53.8%)	>1.5	HOS, iHOT-33
Palmer et al (2019)	Cam 94%, Pincer 0.5%, Mixed 6%	N/A	2	HOS, OHS, NAHS, iHOT-33, HAGOS, UCLA, PDS, HADS, EQ-5D-3L
Pennock et al (2018)	Cam 29%, Pincer 32%, Mixed 39%	10.7	>1.5	mHHS, NAHS

EQ-5D-3L = European quality of life descriptive system, EQ-5D-5L = EuroQol health-related quality of life scale, HADS = hospital anxiety and depression score, HAGOS = Copenhagen hip and groin outcome score, HOS = hip outcome score, iHOT = international hip outcome tool, mHHS = modified Harris hip score, N/A = not available, NAHS = non-arthritic hip score, OHS = Oxford hip score, PDS = painDETECT score, SF-12 = 12-item short form health survey, UCLA = UCLA activity scale, WOMAC = Western Ontario and McMaster Universities Arthritis Index.

evaluated the scores at the end of follow-up of each study, which was at least 12 months after the investigated interventions.

The pooled analyses showed more improvement in terms of the i-HOT-33 score in the arthroscopy group compared with the nonsurgical treatment group (MD = 8.42, 95% CI, 3.22–13.63, P = .002), but there were no differences in mHHS (MD = −0.24, 95% CI, −2.38 to 1.91, P = .83) and NAHS (MD = −2.08, 95% CI, −4.51 to 0.36, P = .09) between the 2 treatments strategies. The details are shown in Figure 3.

4. Discussion

The principal finding of this pooled study was that, despite the arthroscopic treatment showing superior iHOT-33 scores compared with nonoperative treatment 12 months after the respective interventions, we were unable to discern differences in other PRO ratings at the 6- and 12-month follow-up points after symptomatic FAI treatment, including the 6-month iHOT-33 score.

There were several studies[26–28] that reported short-term PROs after hip arthroscopy for FAI, which described a maximum score improvement achieved within 12 postoperative months, with the trend plateauing after 12 months. Our pooled results seem comparable with those of previous studies. The studies reported that most of the clinical outcome improvements occurred earlier than 1 year after surgery. Flores et al[28] reported maximal improvement in PROs within 3 months after surgery in their prospective cohort study that included 129 hips, and Cooper et al[26] reported the highest mHHS and NAHS ratings 6 months after hip arthroscopy in their prospective analysis of 94 hips with symptomatic FAI that continued to 12 months of postoperative follow-up. However, our meta-analysis revealed that arthroscopy was associated with superior iHOT-33 scores only at the 12-month follow-up point, and not at the 6-month point. In our opinion, further larger and extended trials are warranted.

One recent review[12] conducted a pooled analysis of iHOT-33 scores to compare operative versus nonoperative treatment of FAI. They included 3 RCTs, the same as our present study, but the statistical methods were different. They pooled the unadjusted and adjusted data simultaneously as input values for the MDs and did not consider matching the follow-up periods. Adjusted and standardized MDs were also used indiscriminately. For our analysis, we requested the original data from the authors who conducted the included studies, so we could avoid bias from the adjustment discordances of each series. Moreover, we analyzed the scores at 6 and 12 months post-intervention separately to minimize bias from the different estimated time points. In this respect, this analysis is meaningfully different from the previous one, even though we have shown

Table 3

Treatment details.

Author (yr)	Treatment details	
	Arthroscopy	Nonoperative
Griffin et al (2018)	Shape abnormalities and consequent labral and cartilage pathology were treated by experienced hip arthroscopy surgeons	Trained physiotherapist-led rehabilitation for FAI (including IA-steroid injection if needed) 6–10 contacts with the physiotherapist over 12–24 wk
Kekatpure et al (2017)	N/A	Activity modification (position training) and treatment with NSAIDs initially twice a day for 6 wk and thereafter as requested
Mansell et al (2018)	Acetabuloplasty, labral repair/debridement, and femoroplasty as indicated	Supervised physical therapy program was provided twice a week for 12 sessions
Palmer et al (2019)	Osteochondroplasty in both femoral and acetabular sides, and labral tear was repaired if possible. Cartilage debridement or microfracture	Standardized protocol led by a physiotherapist was provided—a maximum of 8 sessions in 5 mo
Pennock et al (2018)	Osteochondroplasty was performed in alpha angle > 50° or dynamic impingement (+) Labral repair was performed if needed A rim resection LCEA > 40°	Physical therapy following a standardized protocol All sporting activities were discontinued for 6 wk, and physical therapy for 2–6 wk was ordered

FAI = femoroacetabular impingement, IA = intra-articular, LCEA = lateral center edge angle, N/A = not available, NSAIDs = nonsteroidal anti-inflammatory drugs.

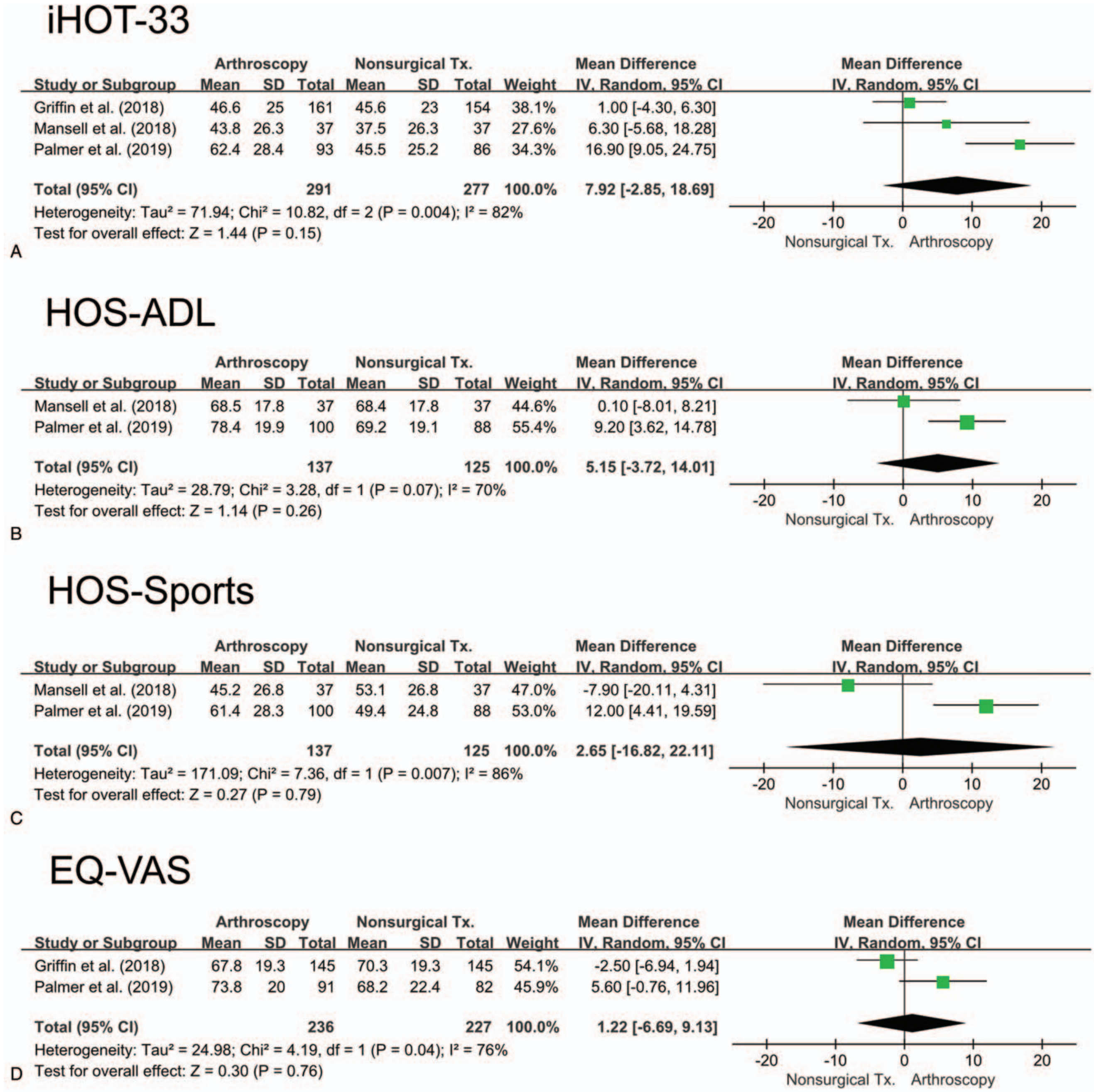

Figure 2. Forest plots of 6-mo post-intervention clinical outcomes of arthroscopic and nonsurgical treatment of symptomatic femoroacetabular impingement. The forest plots for the International Hip Outcome Tool 33 (iHOT-33) score (A), hip outcome score-activities of daily living (HOS-ADL) (B), HOS-sports subscale (C), and EuroQol-visual analog scale (EQ-VAS) (D) are shown.

superior iHOT-33 scores after hip arthroscopy compared with nonoperative treatment at 12 months post-intervention.

Except the iHOT-33 score, the clinical outcome scores investigated in the pooled studies revealed no differences between surgical and nonsurgical treatment of FAI. In particular, we detected no differences in mHHS and NAHS ratings between the 2 treatment strategies at 12 months' follow-up. The synthetic results showed no difference in iHOT-33 scores at 6-months' follow-up, but there was a significant difference at 12 months' follow-up between 2 treatment modalities; therefore, we could hypothesize the postoperative recovery period after hip arthroscopy could affect the synthetic results, or that the effect of nonoperative treatment on symptomatic FAI is temporary. Indeed, several previous studies have reported that about 4 to 6 months are required for full recovery and unrestricted activity.[29,30] However, in our opinion, there is also a risk of bias when interpreting these synthetic results. First, the various trial designs and relatively small number of included studies might bias these synthetic results. Second, the synthetic results of 6-month follow-up outcomes showed moderate to high heterogeneity, even though the 12-month follow-up outcomes showed low heterogeneity, and this could be another source of bias.

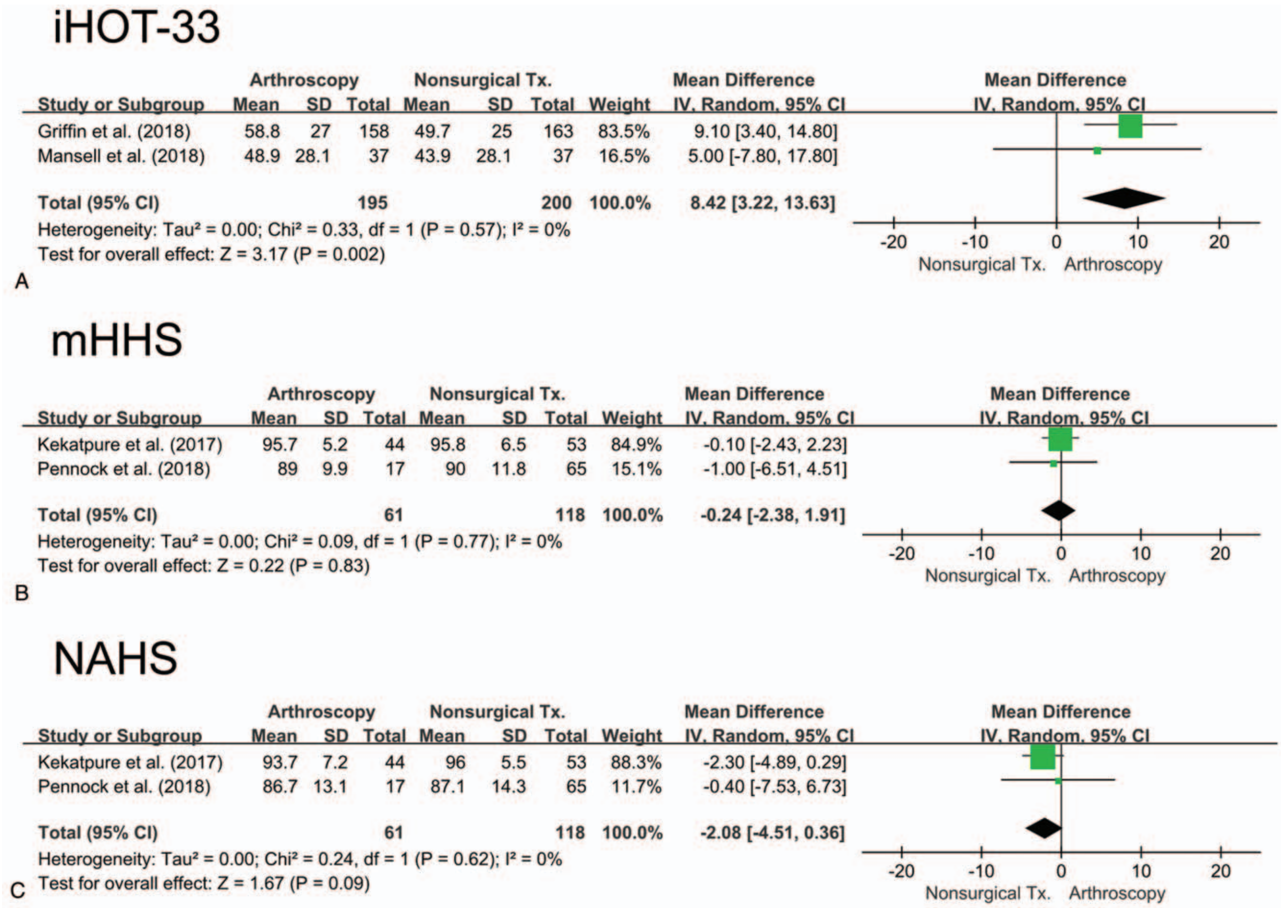

Figure 3. Forest plots of 12-mo post-intervention clinical outcomes of arthroscopic and nonsurgical treatment of symptomatic femoroacetabular impingement. The forest plots for iHOT-33 (A), modified Harris Hip Score (mHHS) (B), and non-arthritic hip score (NAHS) (C) are shown.

For the present study, we did not perform a synthetic analysis of the complications associated with either of the 2 treatment modalities; due to the different natures of surgical and conservative treatment, it is hard to compare both treatments using the same indices. Common sense dictates that surgical treatment has a higher risk of complications, but considering that only about 1% of postsurgical complications were reported in the included studies (4 of 382 hips treated by hip arthroscopy[4,7]; 2 with superficial infection[4,7] and 2 with lateral femoral cutaneous nerve injuries[4]), and the previous quantitative studies that reported on the safety of hip arthroscopy procedures for symptomatic FAI,[31,32] hip arthroscopy surgery is a safe option for treating symptomatic FAI.

The strengths of this meta-analysis include its solid statistical methods and relatively large number of included studies compared with previous meta-analyses. Indeed, 2 previous meta-analyses on this topic have been published[5,12]; however, both of them were not only conducted using pooled data indiscriminately with unadjusted MDs, they also used fixed-effect modeling and did not recommended treatments due to the risk of overestimation.[23] These 2 reviews also only included 3 quantitative studies.

This present analysis also had several limitations. First, the number of included studies was relatively small, and particularly for each sub-outcome of the pooled analysis, only a couple of studies dictated the majority of results. Also, we could not include all of the studies as RCTs, which might have led to overestimation of the outcomes. Moreover, each included study has its own associated limitations; for example, the RCT conducted by Mansell et al[9] had a high crossover rate between the surgical and nonsurgical treatment groups, which could have affected the synthetic results. However, considering that a well-structured study on this topic is hard to conduct due to the difficulty involved in equalizing surgical and nonsurgical treatment protocols, and considering that meta-analysis is an appropriate method for generating higher levels of evidence for rare conditions, our pooled results could have value for predicting PROs after surgical or nonsurgical treatment of symptomatic FAI in the short term. Furthermore, as mentioned above, owing to the characteristics of the study materials, it is difficult to unify the treatment protocols. Most studies adopted different physical therapy protocols, and some studies even combined injection therapy with nonsurgical treatment. However, the results are interesting despite these possible biases that could lead to overestimations of the effectiveness of nonsurgical treatment, and the pooled analysis favored arthroscopy over nonsurgical treatment. Lastly, the main weakness of this analysis was that we could not investigate longer-term outcomes. There were a few studies[9,25] that evaluated clinical outcomes 2 years after the intervention, but data were insufficient to perform a pooled analysis. Moreover, technically speaking, we could not find previous studies that compared the results of surgical and nonsurgical FAI treatment over the long term. Further long-term follow-up studies are needed because the rationale supporting surgical FAI correction is not only instant symptom alleviation but also meaningful delayed joint degeneration.[33]

5. Conclusion

Despite arthroscopy being associated with significantly superior iHOT-33 scores after 12 months of follow-up, we were unable to discern the difference between the treatment strategies using other scoring methods, such as HOS, EQ-VAS, mHHS, and NAHS. Further studies will be needed to conclusively determine if one strategy is superior to the other for treating FAI.

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