Systematic Review

Hip Arthroscopy Outcomes With Respect to Patient Acceptable Symptomatic State and Minimal Clinically Important Difference

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Purpose: To determine whether the hip arthroscopy literature to date has shown outcomes consistent with published patient acceptable symptomatic state (PASS) and minimal clinically important difference (MCID) estimates. **Methods:** All clinical investigations of hip arthroscopy using modified Harris Hip Score (mHHS) and/or Hip Outcome Score (HOS) outcomes with at least 1 year of follow-up were reviewed. Ninety-one studies (9,746 hips) were included for review. Eighty-one studies (9,317 hips) contained only primary hip arthroscopies and were the primary focus of this review. The remaining studies (429 hips) did not exclude patients with prior surgical history and were thus considered separately. Mean mHHS, HOS-ADL (Activities of Daily Living) and HOS-SS (Sports-Specific) scores were compared with previously published PASS and MCID values. **Results:** After 31 ± 20 months, 5.8% of study populations required revision arthroscopy and 5.5% total hip arthroplasty. A total of 88%, 25%, and 30% of study populations met PASS for mHHS, HOS-ADL, and HOS-SS, respectively, and 97%, 90%, and 93% met MCID. On bivariate analysis, increasing age was associated with significantly worse postoperative mHHS ($P < .01$, $R^2 = 0.14$), HOS-SS ($P = .05$, $R^2 = 0.12$), and rates of reoperation ($P = .02$, $R^2 = 0.08$). Increasing body mass index was associated with significantly worse HOS-ADL ($P = .02$, $R^2 = 0.35$) and HOS-SS ($P = .03$, $R^2 = 0.30$). **Conclusions:** In this meta-analysis of 81 studies of primary hip arthroscopy, we have found that more than 90% of study populations meet MCID standards for the most commonly used patient-reported outcomes measures in hip arthroscopy literature, mHHS and HOS. Eighty-eight percent meet PASS standards for the mHHS, but PASS standards are far more difficult to achieve for HOS-ADL (25%) and HOS-SS (30%) subscales. Differences in psychometric properties of the mHHS and HOS likely account for the discrepancies in PASS. **Level of Evidence:** Level IV, systematic review of Level I to IV studies.

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Hip arthroscopy is one of the most rapidly developing orthopaedic procedures, increasing at an annual rate of 15% internationally.[1] Initially used as a diagnostic tool to facilitate loose body removal, hip arthroscopy indications have evolved for increasingly complex cases. Femoroacetabular impingement (FAI) is now the most common indication. The instrumentation and surgical techniques have advanced over the past decade to provide more reliable treatment of chondrolabral pathology and FAI.

Many studies have shown significant improvements in pain and function after hip arthroscopy. Gupta et al.[2] reported statistically significant improvements in clinical survey scores after 2 years in 595 patients undergoing primary hip arthroscopy at a single institution. A 2007 systematic review comparing arthroscopy with open and mini-open procedures found the former to be equally efficacious with a lower rate of complications,[3] and Byrd et al.[4] have shown continued improvements through 10-year follow-up.

However, although there is an abundance of literature supporting statistically significant improvements after hip arthroscopy, there is a paucity of literature speaking to the clinical significance of these improvements. Patient-reported outcomes (PROs) are the most commonly used tools to assess symptomatic and functional changes after orthopaedic surgery. The most commonly used PROs in hip arthroscopy include the modified Harris Hip Score (mHHS) and the Hip Outcome Score (HOS).[5] For this particular patient population, the mHHS has shown high construct validity and responsiveness, whereas the HOS has been shown to have high internal consistency, reliability, and responsiveness.[1,5-7]

Statistical significance of PROs does not necessarily equate to clinical significance,[8] so 2 metrics have been developed to assess the clinical importance of post-intervention scores in PROs. The minimal clinically important difference (MCID) represents the "smallest difference that patients perceive as beneficial."[9] In the operative setting, MCID represents the smallest difference between pre- and postoperative PRO measurements that signifies an important improvement or worsening of symptoms. In addition to the MCID, other authors have defined clinical significance as achieving a certain patient acceptable symptomatic state (PASS). Tubach et al.[10] have argued that although it is important to improve after surgery, it is "more important to assess the chance of…achiev[ing] an acceptable symptom state." Unlike MCID, PASS is an absolute value, not a change in value, so a predetermined PASS standard may be compared with PRO measurements at any given time point.

Both PASS and MCID represent a tangible and clinically relevant treatment target. The previous literature has determined PASS and MCID standards for the mHHS and HOS surveys.[1,7,11] The purpose of this study was to evaluate the proportion of all hip arthroscopy literature that satisfies PASS and MCID measures for these 2 commonly used hip clinical outcomes instruments. A secondary objective was to correlate these measures with demographic, diagnostic, and operative details as well as other clinical outcomes. No studies to date have answered whether the current hip arthroscopy literature is meeting such standards of clinical significance.

Methods

Search Strategy and Study Selection

We conducted a systematic review of the available literature according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses checklist.[12] The goal of our search was to identify all studies of hip arthroscopy that reported mHHS or HOS scores. We included Level I to IV evidence-based English-language studies. Previously published PASS standards correspond to 1 year after surgery,[11] so we required a minimum 1-year follow-up. Studies were excluded if they reported neither mHHS nor HOS scores. Other exclusion criteria consisted of cadaveric, biomechanical, histologic, and kinematic studies as well as analyses of nonoperative management, open, or mini-open procedures. Case reports and techniques-only papers were also excluded. Studies meeting these exclusion criteria were not immediately excluded but rather reviewed for any differentiation of patient populations. For instance, if a study reported outcomes of both open and arthroscopic procedures, clinical data were retrieved for the arthroscopic population alone. If a study could not be deconstructed to isolate such populations, that study was excluded from our review. To ensure that no patients were counted twice, each study's authors and data collection period were reviewed and compared. If there was overlap in authorship and period, only the study with the most comprehensive data was included.

Searches were completed in April 2015 using the PubMed Medline database and the Cochrane Central Register of Clinical Trials. The search employed specific keywords and a series of "NOT" phrases designed to exclude arthroscopy of other joints.[1] Two reviewers (D.M.L., B.D.K.) independently conducted this search and assessed the eligibility of all relevant studies. Disagreements between reviewers were resolved by discussion.

The initial search yielded 208 results (Fig 1). A review of all titles and abstracts identified 73 studies that were excluded for a variety of reasons: reporting exclusively on unrelated topics (arthroplasty, periacetabular osteotomies); basic science papers; case reports as listed in the manuscript title; non-English text. The complete text was reviewed for each of the remaining 135 studies. Of these, 41 studies were further excluded (11 with neither mHHS nor HOS data, 11 with insufficient follow-up duration, 8 open or mini-open techniques, 7 systematic reviews, and 4 case reports). Five duplicate populations were identified and excluded. We cross-referenced the bibliography of all articles and were able to include an additional 2 studies. This left 91 studies with 9,538 patients (9,746 hips).

Many studies categorized their patients into groups, so, whenever possible, each study was divided into different populations. In total, 122 study populations were identified from 91 studies. The main focus of this review is primary hip arthroscopy, so we isolated study populations that reported no prior history of ipsilateral hip surgery. This left 81 studies with 110 study populations (9,130 patients; 9,317 hips). These studies represent the main group for whom we have performed statistical analysis.