

## The Hip Arthroscopy Index Predictive Score: A Preoperative Tool for Predicting Postoperative Outcomes

Rachel L. Poutre, BS<sup>1</sup>, Jackson G. Woodrow, BS<sup>1,2</sup>, Brandon J. Allen, BA<sup>1</sup>, Rishi P. Earla, BA<sup>1</sup>, Jeffrey S. Mun, BA<sup>1,3</sup>, Stephen M. Gillinov, MD<sup>1,4</sup>, Bilal S. Siddiq, MD<sup>1</sup>, Scott D. Martin, MD<sup>1</sup>

<sup>1</sup> Sports Medicine Center, Department of Orthopaedics, Massachusetts General Hospital, Mass General Brigham, Boston, MA, USA

<sup>2</sup> University of Arizona College of Medicine – Phoenix, Phoenix, AZ, USA

<sup>3</sup> Geisinger Commonwealth School of Medicine, Scranton, PA, USA

<sup>4</sup> Yale School of Medicine, New Haven, CT, USA

Disclosures: Rachel L. Poutre (N), Jackson G. Woodrow (N), Brandon J. Allen (N), Rishi P. Earla (N), Jeffrey S. Mun (N), Stephen M. Gillinov (N), Bilal S. Siddiq (N), Scott D. Martin (N)

**Introduction:** Preoperative clinical factors influencing outcomes after hip arthroscopy are well established but have not yet been consolidated into a single predictive scoring system to estimate the likelihood of meaningful postoperative improvement. The purpose of this study was to develop an index score using readily available preoperative variables to predict the likelihood of achieving clinically significant improvement after hip arthroscopy.

**Methods:** This was approved by our IRB. A cohort of patients undergoing primary hip arthroscopy  $\geq 18$  years old was evaluated using readily available preoperative clinical variables including age group (categorized as youngest, ( $< 28$ ) middle (28 to 37), and oldest ( $> 37$ ) tertiles), Tönnis grade (grouped as 0, 1,  $\geq 2$ ), sex, BMI category (underweight, normal, overweight), symptom duration ( $< 6$  months, 6 months to 2 years,  $> 2$  years), enrollment iHOT score groups, and preoperative pain levels. Multivariable logistic regression models assessed these factors as independent predictors of achieving the minimal clinically important difference (MCID) and substantial clinical benefit (SCB) at one year postoperatively. Each variable's contribution was quantified by translating the logistic regression coefficients (log-odds) into a simplified point system. Odds ratios from the model were converted to relative weights, scaled against the smallest meaningful effect, and then rounded to whole numbers. The resulting scoring algorithm stratifies patients by their likelihood of achieving meaningful clinical improvement following hip arthroscopy.

**Results:** 135 patients were included in this study (47.4% female). In the univariate analysis, younger age, female sex, normal BMI, higher preoperative pain, and lower preoperative iHOT scores were associated with a higher likelihood of achieving the MCID. In the multivariable model for clinical improvement, age group (youngest: OR, 7.13 [95% CI, 1.87–36.08]; middle-aged: OR, 1.79 [95% CI, 0.60–5.58], compared with the oldest group), BMI category (normal BMI 18.5–24.99: OR, 3.57 [95% CI, 1.31–10.31], compared with overweight/obese), and enrollment iHOT score (score 0–39: OR, 5.90 [95% CI, 1.25–31.11]; score 40–59: OR, 1.75 [95% CI, 0.46–6.67], compared with score  $\geq 60$ ) were independent significant predictors for clinical improvement ( $P < 0.05$ ). The scoring algorithm demonstrated that a higher total score was associated with an increased likelihood of achieving the MCID. (Table 1). Patients with a total score of 0–2 had a 40.7% MCID achievement rate, those with scores of 3–4 had a 78.6% rate, scores of 5–8 had a 94.0% rate, and a score of 9 had the highest likelihood at 100.0%.

**Discussion:** Our scoring algorithm, based on preoperative factors such as age, BMI, and enrollment iHOT score, estimates the likelihood of patients achieving the Minimal Clinically Important Difference (MCID)—the smallest change in a patient-reported outcome that reflects a meaningful improvement in symptoms and function. Because the model relies entirely on readily accessible clinical and demographic information rather than imaging or advanced diagnostics, it can be applied broadly and readily across patient populations. Higher total scores were associated with increased odds of reaching this threshold, enabling clinicians to identify, early in the care process, those patients most likely to experience clinical benefit from treatment.

### Significance/Clinical Relevance

This preoperative scoring tool provides a practical approach to predict patient outcomes, facilitating shared decision-making and personalized treatment planning. By identifying patients more likely to benefit from intervention, healthcare providers can improve overall care quality.

Table 1: Index Score for Achieving MCID at one-year postoperatively		
Variable	Level	Points Assigned
Age Group	Youngest $< 28$	4
	Middle 28 to 37	1
	Oldest (Ref) $> 37$	0
BMI Category	Normal (18.5–24.99)	2
	Overweight/Obese (25+) (Ref)	0
Enrollment iHOT Score	0–39	3
	40–59	1
	$\geq 60$ (Ref)	0
Total Possible Points	–	9
Index Score	Likelihood of Achieving Clinically Meaningful Outcome	
0-2	40.7%	
3-4	78.6%	
5-8	94.0%	
9	100%	

