

Increased Socioeconomic Deprivation is Associated with Inferior Outcomes at 5-Years Following Hip Arthroscopy for Femoroacetabular Impingement Syndrome

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INTRODUCTION: Social determinants of health (SDOH) are comprised of the socioeconomic environment in which patients live, work, and interact with the world. SDOH can lead to deteriorating overall health, reduced utilization of healthcare resources, and inferior outcomes following treatment.^{1,2} Statistical tools such as the area deprivation index (ADI) and social deprivation index (SDI) have been widely used in the medical field, with groups of greater social deprivation consistently demonstrating decreased healthcare utilization, increased rates of complications and readmission, with worse overall outcomes following medical or surgical intervention.^{3,4} Across the various subspecialties of orthopedics, the use of these indices have similarly illustrated that those in more socially deprived communities often have poorer postoperative clinical improvement.^{5,6}

Hip arthroscopy (HA) has emerged as a valuable treatment modality to improve patient function and delay the development of osteoarthritis, particularly for those with femoroacetabular impingement syndrome (FAIS). Considerable focus has been placed on identifying contributors to poor outcomes following treatment of FAIS via HA. However, few studies have explored the influence of SDI on HA outcomes. The purpose of our study was to compare patient reported outcome measures (PROs), achievement of Clinically Significant Outcomes (CSOs), and incidence of secondary surgery at minimum 5-year follow-up following HA for femoroacetabular impingement syndrome (FAIS) for those in the highest and lowest quartiles of social deprivation. We hypothesized that patients living in areas of greater social deprivation will demonstrate poorer functional outcomes, decreased achievement of CSOs, and increased incidence of secondary surgery.

METHODS: Demographic, radiographic, and intraoperative information were retrospectively collected for patients who underwent primary HA for FAIS. The social deprivation index (SDI) provides a composite score to quantify the level of disadvantage of a geographic area, with higher scores indicating greater deprivation. SDI scores were assigned in groups of quartiles to patients based on zip code at time of registration. Differences were sought between the top and bottom national quartiles of social deprivation. PROs at preoperative, 2 and 5+ years postoperative time-points were recorded, including: Hip Outcome Score-Activities of Daily Living/Sports Subscale (HOS-ADL/SS), modified Harris Hip Score (mHHS), international Hip Outcome Tool-12 item questionnaire (iHOT-12), Visual Analog System (VAS) – Pain, and VAS - Satisfaction. Cohort specific Minimal Clinically Important Difference (MCID) and Patient Acceptable Symptomatic State (PASS) thresholds were calculated, and CSO achievement was determined. Incidence of postoperative complications, revision surgery, and conversion to total hip arthroplasty (THA) were recorded. Significance level was set at $p < 0.05$.

RESULTS: A total of 703 hips were eligible for inclusion, with 316 in the lowest and 82 in the highest SDI quartiles. There was a different ethnic/racial distribution between groups (SDI_{High}: 92.4% Caucasian, 1.3% African American, 3.5% Hispanic, 2.8% Other, SDI_{Low}: 68.3% Caucasian, 14.6% African American, 17.1% Hispanic, 0.0% Other $p < 0.001$). Both groups had significant improvement preoperatively to postoperatively for all PROs recorded ($p < 0.001$). SDI_{Low} patients had decreased scores for all PROs measured at minimum 5-year follow-up ($p < 0.001$). The less socially deprived group had lower achievement of MCID for HOS-SS, iHOT-12, VAS-Pain, and achievement of any MCID ($p \leq 0.039$, for all); they also had lower achievement of PASS for HOS-ADL, HOS-SS, VAS-Pain, and achievement of any PASS ($p \leq 0.032$). Both groups had similar incidence of complications, revision surgery, and conversion to THA ($p \geq 0.188$).

DISCUSSION: The most important finding from this study, which confirms our hypothesis, is that patients from the most socially deprived communities, as measured by the SDI, reported worse outcomes at minimum 5-year follow-up after primary HA for FAIS. Compared to the lowest SDI cohort, a significantly lower proportion of patients achieved MCID (72.6% vs 89.7%, $p < 0.001$) and PASS (73.2% vs. 85.6%, $p = 0.008$) for any PRO in the highest SDI cohort. The differential outcomes between these cohorts are likely multifactorial and cannot be explained by a single patient characteristic. SDOH encompasses the community in which patients live, their education level, income, access to health insurance, and other demographic variables such as race and ethnicity. SDI scores quantify these disparities and the results of our study provide insight into the role that socioeconomic factors play in outcomes following HA.

SIGNIFICANCE/CLINICAL RELEVANCE: SDOH is a growing area of interest within orthopedics and its effect on outcomes after HA have not been investigated fully. The results of our study provide practitioners with additional context regarding the impact of healthcare inequalities; identifying these disparities is a key first step to identify at risk groups in order to maximize clinical improvement for all patients undergoing HA.

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Figure 1. Achievement rate of Minimal Important Clinical Difference (MCID) and Patient Acceptable Symptomatic State (PASS).

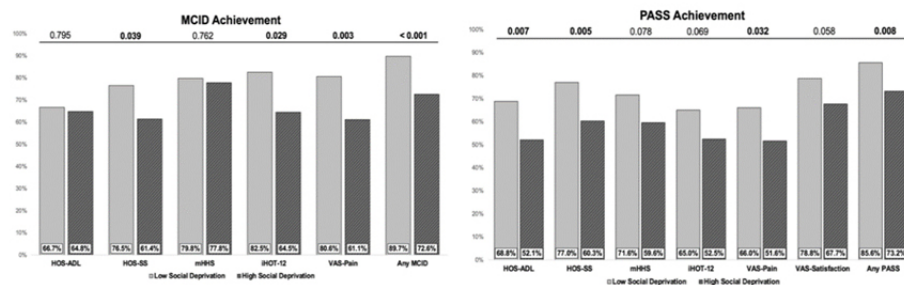


Table 1. Patient Reported Outcomes Measurements across groups.

	SDI _{Low}	SDI _{High}	p-value
	Preoperative		
HOS-ADL	66.8 ± 17.7	59.3 ± 23.6	0.005*
HOS-SS	44.5 ± 21.9	38.6 ± 25.1	0.079
mHHS	58.2 ± 13.2	53.6 ± 17.8	0.022*
iHOT-12	35.3 ± 15.6	33.7 ± 17.9	0.570
VAS-Pain	65.5 ± 21.3	66.5 ± 21.8	0.736
	2 Years Postoperative		
HOS-ADL	87.5 ± 14.8	80.6 ± 20.8	0.009*
HOS-SS	75.9 ± 24.7	65.6 ± 27.3	0.006*
mHHS	80.9 ± 15.8	76.6 ± 20.3	0.106
iHOT-12	72.0 ± 25.8	64.9 ± 29.5	0.136
VAS-Pain	18.5 ± 21.1	27.5 ± 29.8	0.021*
VAS-Satisfaction	82.6 ± 23.2	72.6 ± 33.1	0.022*
	5+ Years Postoperative		
HOS-ADL	86.6 ± 18.0	79.0 ± 24.9	0.003*
HOS-SS	78.7 ± 25.4	65.7 ± 36.1	< 0.001*
mHHS	81.6 ± 17.2	76.1 ± 21.4	0.040*
iHOT-12	75.2 ± 26.4	65.6 ± 29.6	0.014*
VAS-Pain	23.5 ± 25.4	30.8 ± 28.6	0.044*
VAS-Satisfaction	83.0 ± 25.5	75.4 ± 31.2	0.039*
	Delta		
HOS-ADL	18.7 ± 20.5	20.6 ± 24.0	0.556
HOS-SS	33.7 ± 27.3	27.3 ± 32.6	0.173
mHHS	22.3 ± 17.3	22.1 ± 22.7	0.928
iHOT-12	37.5 ± 26.5	29.5 ± 28.9	0.146
VAS-Pain	-42.1 ± 29.5	-33.1 ± 33.5	0.052