Original Article

Depression Scores Decrease After Hip Arthroscopy for Femoroacetabular Impingement Syndrome

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Purpose: To evaluate clinical depression scores and functional outcomes following arthroscopic treatment of femoroacetabular impingement syndrome in patients with elevated preoperative depressive symptoms as defined by Patient-Reported Outcomes Measurement Information System for Depression (PROMIS-D). **Methods:** Patients with femoroacetabular impingement syndrome completed the PROMIS-D Computer Adaptive Test and additional patient-reported outcome (PRO) measures preoperatively and at the time of postoperative visits. Patients were categorized into preoperative clinically depressed (CD) and nonclinically depressed (NCD) groups based on preoperative PROMIS-D scores. Scores $\geq$55 correlate to mild clinical depression, and this cutoff was used to determine preoperative depression status. PROMIS-D scores and functional outcome scores were assessed at 6 months and a minimum of 1-year postoperatively. **Results:** In total, 100 patients were included with complete PROs at a minimum of 1-year follow-up. Of those included, 21 (21%) were categorized with preoperative CD. There were no differences in demographic or radiographic variables between the preoperative CD and NCD groups. At 6 months and 12 months postoperatively, the percentage of patients in the preoperative CD group with continued depression was 33.3% and 23.8%, respectively. Overall, 1-year change in PROMIS-D score for the CD group was −9.1 versus −0.8 in the NCD group ($P = .001$). There was no significant difference in rates of patients achieving patient acceptable symptom state between the preoperative CD and NCD groups. **Conclusions:** Patients with symptoms of preoperative CD, as defined by the PROMIS-D score, demonstrated significant improvement in depressive symptoms following hip arthroscopy. In addition, patients with CD preoperatively did not show decreased rates of achieving minimum clinically important difference or patient acceptable symptom state on postoperative PROs compared with patients with NCD. **Level of Evidence:** Level IV, therapeutic case series.

Data from the 2020 National Survey of Drug Use and Health have demonstrated 17% of individuals aged 18 to 25 years and 7.1% of individuals older than age 25 years had experienced a major depressive episode.[1] Greater rates of mental health disorders have been observed in patients undergoing hip arthroscopy, with reports from 39% to 45% of patients undergoing hip arthroscopy having mental health disorders.[2-4] This prevalence is more than twice that of matched patients undergoing knee arthroscopy.[2] In addition, Jacobs et al.[5] found that in patients with comorbid depression or anxiety who undergo hip arthroscopy, health care costs as well as opioid use are significantly greater. To date, much of the research on mental health and hip arthroscopy for femoroacetabular impingement syndrome (FAIS) has assessed the interaction of preoperative mental health and preoperative and postoperative pain and functional patient-reported outcomes (PROs).[3,4,6-9] These data have largely shown a negative correlation between preoperative mental health disorder and postoperative PROs. However, in a study using the 12-item Short Form Health Survey to compare preoperatively distressed and nondistressed patients, the authors found no differences in postoperative PROs based on preoperative mental health.[6]

The change in mental health symptoms following hip arthroscopy remains unclear. In a study assessing patients with rotator cuff tears, a reduction in the number

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of patients categorized with clinical depression, assessed by Patient-Reported Outcomes Measurement Information System (PROMIS) Computer Adaptive Test (CAT) health domains depression score (PROMIS-D) occurred following rotator cuff repair.[10] In addition, in a population of patients with hip osteoarthrosis, a significant decrease in depression score was identified following treatment.[11] A large claims database study of patients undergoing hip arthroscopy found a reduction in the use of mental health resources after hip arthroscopy.[12] The authors of this study hypothesized that the treatment of the hip pathology resulted in an improvement in pain and thus contributed to improvement in patients' overall mental health status. Yet uncertainty remains regarding depression symptomatology following hip arthroscopy and how this component of the patient's overall health status is impacted by surgical treatment of FAIS.

The purpose of this study was to evaluate clinical depression symptoms and functional outcomes following arthroscopic treatment of FAIS in patients with elevated preoperative depressive symptoms as defined by PROMIS-D. We hypothesized patients with preoperative depression would demonstrate a reduction in depressive symptoms (as defined by the PROMIS-D) following hip arthroscopy, with no change in PROMIS-D scores in those without preoperative depressive symptoms.

Methods

Following institutional review board approval, a retrospective study was conducted using data from a prospectively collected hip arthroscopy registry from October 2017 through July of 2021. The surgeon/senior author (A.M.S.) is a board-certified, dual fellowship-trained (1-year sports medicine plus additional 1-year hip preservation) surgeon. Study inclusion criteria included patients who underwent primary hip arthroscopy for FAIS with minimum of 1-year clinical follow up. Hip arthroscopy was used for labral repair and to perform acetabuloplasty and femoroplasty as indicated based on radiographic measurements. Capsular closure was performed in all hip arthroscopies. Exclusion criteria included hip arthroscopy in the setting of concurrent open procedures (e.g., periacetabular or femoral osteotomy) or revision hip arthroscopy. No patients had simultaneous bilateral hip arthroscopies, but in those with staged hip arthroscopies, only the second hip was included if it was greater than 6 months removed from the previous hip arthroscopy on the contralateral side. Six months was chosen to give ample time for patients to recover from the initial hip arthroscopy out of concern that recovering from a recent hip arthroscopy would impact PROs. Patients with incomplete 6-month and 1-year PROs were also excluded from analysis. Hips with Tönnis grade >1 were not offered hip arthroscopy. Radiographic measurements on all preoperative radiographs were performed by the senior author.

Patients were then categorized as clinically depressed (CD) or nonclinically depressed (NCD) using preoperative PROMIS CAT health domains scores. Preoperative CD was defined as a PROMIS-D score of 55 or greater, which has previously been shown to correlate with mild clinical depression.[10,13] For the diagnosis of anxiety, a score of >62 was used from preoperative Patient-Reported Outcomes Measurement Information System (PROMIS) Anxiety questionnaires. Within the PROMIS CAT form, a score of 50 represents the reference patient population. One standard deviation is set at a 10-point differential, i.e., a score of 55 would be ½ a standard deviation above the reference population. Additional PROs included PROMIS Global Mental Health score, PROMIS Global Physical Health score, PROMIS Pain Interference, PROMIS Physical Function, Hip Outcome Score-Sports Subscale (HOS-SS), Hip Outcome Score-Activities of Daily Living (HOS-ADL), International Hip Outcome Tool-12 (iHOT-12), Single-Assessment Numeric Evaluation (SANE) Sport Subscore and Activities of Daily Living (SANE SS and SANE ADL), and the Modified Harris Hip Score (mHHS). Patients received the aforementioned questionnaires preoperatively and postoperatively at the 6-month and 1-year time intervals. PROs were administered through a web-based application service (REDCap; Vanderbilt University, Nashville, TN).

At each postoperative time frame, the proportion of patients designated as preoperative CD or NCD were evaluated for depression (PROMIS-D score ≥55). Previous studies have assessed the minimum clinically important difference (MCID) and the patient acceptable symptomatic state (PASS) for the collected PROs using anchor-based methodologies.[10,14-16] Both were included in this study, as the MCID is a measurement of symptom improvement, whereas PASS measures symptom resolution.[10] Specific MCID values for the mHHS, HOS-SS, and IHOT-12 were 8, 6, and 13, respectively. Scores used to assess PASS for mHHS, HOS-SS, and IHOT-12 were 74, 87, and 75.2, respectively. Using these values, the proportion of patients meeting MCID and PASS after hip arthroscopy could be calculated for the preoperative CD and NCD groups. These specific PROs were chosen for MCID analysis based on previous publications' usage of these PROs for MCID analysis.

Hip Arthroscopy

Patients received preoperative spinal anesthesia with sedation versus general anesthesia per patient preference. Hip arthroscopy was performed supine on a

traction table. Early in the study a perineal post was used; however, the senior author transitioned to exclusively postless traction over the course of the study. Three portals were typically used: a lateral portal for initial access, a modified mid-anterior portal created under direct visualization, and a distal anterolateral portal for anchor placement and peripheral compartment work. A small interportal capsulotomy was created for central compartment work.

Peripheral compartment work was performed off traction with hip flexion. A limited T-capsulotomy or peripheral capsule suspension sutures were used for visualization and decompression of the cam deformity. The capsulotomy was closed completely using suture tape sutures. The skin incision was closed with a nylon suture. After closure, 20 cc of 0.25% bupivacaine was injected into the pericapsular space.

Following surgery, patients were 20% weight-bearing on the operative extremity for 2 to 3 weeks. Patients began physical therapy within 1 to 3 days after surgery to initiate mobilization exercises to limit risk of capsulolabral adhesions. Heterotopic ossification prophylaxis consisted of 75 mg of indomethacin daily for the first 4 days after surgery, paired with pantoprazole 40 mg daily for gastrointestinal protection. Naproxen 500 mg was taken twice a day for 4 weeks beginning after the 4 days of indomethacin. At 6 weeks' postoperatively, patients were released from hip range of motion restrictions (no external rotation past 30° and no hip hyperextension). Impact activities were allowed at 3 months with progression back to full activity, with full unrestricted clearance typically occuring between 4 and 6 months after hip arthroscopy.

Statistical Analysis

PROMIS-D scores were categorized into preoperative CD (PROMIS-D score $\geq$55) and NCD (PROMIS-D score $<$55) at preoperative, 6 months postoperatively, and 1-year postoperatively. Basic descriptive statistics were gathered and differences between continuous scores (between CD and NCD groups) were analyzed using Wilcoxon rank sum test. In instances in which data were categorical, the χ^2 test or test for equality of proportions was used. All statistical analysis was completed using SAS, version 9.4 (SAS Institute, Cary, NC).

Results

When reviewing all hip arthroscopies during the study period, 81 patients were excluded for concomitant periacetabular osteotomy, 22 for previous hip arthroscopy, 70 for having hip arthroscopy on the contralateral side within 6 months, and 496 had either not reached 1-year follow up or did not have complete PROs at each time interval. From this, the final sample consisted of 100 patients. In total, 100 patients were included in the final analysis. Preoperative PROMIS-D scores categorized 21 (21%) patients as preoperative CD and 79 (79%) as NCD. No differences were identified between the groups based on sex, age, body mass index, alpha angle, lateral center edge angle, minimum joint space, or Tönnis grade. The preoperative CD group did have significantly worse preoperative IHOT-12, HOS-ADL, HOS-SS, PROMIS-Physical Function, and PROMIS Pain Interference scores. Preoperatively, patients with CD had a greater proportion of preoperative anxiety, as defined by the PROMIS Anxiety score (33% vs 8.9%, respectively $P = .009$). No preoperative differences were noted in mHHS, SANE ADL, or SANE SS (Table 1).

Of those categorized as preoperative CD, the number of patients with continued CD at the 6-month and 1-year postoperative time points significantly decreased

Table 1. Demographics and Preoperative Patient-Reported Outcome Scores

Variable	CD (n = 21)	NCD (n = 79)	*P* Value
Sex			.576
Male	8 (38.1%)	25 (31.7%)	
Female	13 (61.9%)	54 (68.4%)	
Age, y	35.6 ± 12.1	34.2 ± 9.3	.713
BMI	24.0 ± 3.7	25.8 ± 4.0	.074
Alpha angle	58.4 ± 9.2	57.2 ± 8.6	.611
LCEA	29.5 ± 5.0	30.3 ± 7.0	.497
Minimum joint space (mm)	3.4 ± 0.8	3.2 ± 0.6	.553
Tönnis grade			.988
1	9 (42.9%)	34 (43.0%)	
0	12 (57.1%)	45 (57.0%)	
iHOT-12	35.9 ± 16.8	46.5 ± 18.0	**.016**
HOS-ADL	69.5 ± 12.8	75.9 ± 14.2	**.040**
HOS-SS	42.3 ± 21.3	52.7 ± 24.0	**.042**
Global MHS	43.6 ± 7.3	50.8 ± 6.3	**.001**
Global Phys	41.3 ± 7.3	47.6 ± 6.9	**.005**
mHHS	62.1 ± 14.9	69.3 ± 14.6	.062
PF	38.6 ± 7.5	42.8 ± 9.4	**.015**
PI	61.2 ± 6.5	57.4 ± 5.3	**.002**
SANE ADL	59.5 ± 25.1	69.4 ± 23.0	.076
SANE SS	35.2 ± 26.2	44.5 ± 27.7	.175
PROMIS-D	59.0 ± 5.8	45.3 ± 6.0	**<.001**
Anxiety*			**.009**
Yes	7 (33.3%)	7 (8.9%)	
No	14 (66.7%)	72 (91.1%)	

NOTE. *P* values <.05 are noted in bold. BMI, body mass index; CD, clinically depressed group; Global MHS, PROMIS Global Mental Health Score; Global Phys, PROMIS Global Physical Health Score; HOS-ADL, Hip Outcome Score-Activities of Daily Living; HOS-SSS, Hip Outcome Score-Sports Subscale; iHOT, International Hip Outcome Tool; LCEA, lateral center edge angle; mHHS, Modified Harris Hip Score; NCD, nonclinically depressed group; PF, PROMIS Physical Function; PI, PROMIS pain interference; PROMIS, Patient-Reported Outcomes Measurement Information System; PROMIS-A, Patient-Reported Outcomes Measurement Information System Anxiety; SANE ADL, Single-Assessment Numeric Evaluation Activities of Daily Living; SANE SSS, Single-Assessment Numeric Evaluation Sport Subscale.

*Anxiety defined as PROMIS-A score >62.

Table 2. Change in Preoperative Patient-Reported Outcomes at 6-Month and 1-Year Follow-up

	Change in Scores From Baseline to 6 Months			Change in Scores From Baseline to 1 Year		
Variable	CD	NCD	*P* Value	CD	NCD	*P* Value
iHOT	34.1 ± 29.3	31.7 ± 19.9	.688	39.5 ± 253	25.2 ± 25.6	**.019**
HOS-ADL	18.8 ± 14.0	15.9 ± 13.0	.380	21.0 ± 15.0	12.1 ± 14.7	**.012**
HOS-SS	28.6 ± 27.7	26.9 ± 23.7	.882	40.1 ± 25.3	21.7 ± 27.9	**.006**
Global MHS	4.2 ± 4.9	0.73 ± 5.6	**.034**	4.1 ± 7.1	1.3 ± 5.7	.125
Global Phys	8.3 ± 8.4	4.0 ± 6.3	**.047**	8.9 ± 8.5	3.0 ± 7.0	**.016**
mHHS	21.9 ± 20.0	17.0 ± 16.1	.432	23.7 ± 20.1	13.5 ± 16.1	**.007**
PF	8.6 ± 7.7	7.7 ± 7.9	.694	10.7 ±8.5	7.1 ± 9.5	.069
PI	-6.8 ± 10.7	-6.3 ± 9.0	.400	-9.4 ± 10.1	-5.5 ± 8.3	**.018**
SANE ADL	28.1 ± 32.3	15.5 ± 23.1	.245	28.1 ± 32.3	15.5 ± 23.1	**.014**
SANE SS	28.5 ± 38.6	26.9 ± 27.4	.922	46.0 ± 33.5	27.2 ± 32.8	**.012**
PROMIS-D	-6.9 ± 6.8	-0.1 ± 7.6	**.001**	-9.1 ± 7.5	-0.8 ± 8.2	**.001**
Anxiety*			.673			.159
Yes	2 (9.5%)	6 (7.6%)		3 (14.3%)	4 (5.1%)	
No	19 (90.5%)	73 (92.4%)		18 (85.7%)	75 (94.9%)	

NOTE. *P* values <.05 are noted in bold. BMI, body mass index; CD, clinically depressed group; Global MHS, PROMIS Global Mental Health Score; Global Phys, PROMIS Global Physical Health Score; HOS-ADL, Hip Outcome Score-Activities of Daily Living; HOS-SSS, Hip Outcome Score-Sports Subscale; iHOT, International Hip Outcome Tool; LCEA, lateral center edge angle; mHHS, Modified Harris Hip Score; NCD, non-clinically depressed group; PF, PROMIS physical function; PI, PROMIS pain interference; PROMIS, Patient-Reported Outcomes Measurement Information System; PROMIS-A, Patient-Reported Outcomes Measurement Information System Anxiety; SANE ADL, Single-Assessment Numeric Evaluation Activities of Daily Living; SANE SSS, Single-Assessment Numeric Evaluation Sport Subscale.

*Anxiety defined as PROMIS-A score >62.

to 7 (33.3%, $P < .001$) and 5 (23.8%, $P < .001$), respectively. There was a significant decrease in postoperative PROMIS-D scores (indicating improvement in depressive symptoms) in the preoperative CD versus the NCD group at the 6-month time point (−6.9 ± 6.8 vs −0.1 ± 7.6, respectively, $P = .001$) and the 1-year time point (−9.1 ± 7.5 vs −0.8 ± 8.2, respectively, $P = .001$). (Table 2). At final follow-up, 12/100 patients scored above the threshold for CD on postoperative PROMIS-D. Raw scores for preoperative, 6-month postoperative, and 1-year postoperative PROs for the entire patient population are shown in Table 3. With all patient scores combined together, at the 1-year postoperative time point there was a significant improvement in anxiety and depression scores in addition to a significant improvement in all other PROs measured.

Patients with preoperative CD demonstrated no significant difference from those with NCD in regards to percentage of patients meeting MCID for mHHS, HOS-SS, or IHOT-12 at 6 months (Table 4). A significantly greater percentage of patients with preoperative CD met MCID for mHHS and IHOT-12 at 1 year compared with those with NCD ($P < .05$). No difference was seen in the achievement of MCID between the groups at 1 year for HOS-SS. The percentage of patients achieving PASS at 6 months and 1 year was not significantly different between the groups for mHHS, HOS-SS, or IHOT-12.

Discussion

The results of this study demonstrate that in those patients with preoperative clinical depression, as defined by PROMIS-D scores, there was a reduction in the proportion of patients with PROMIS-D defined clinical depression at both the 6-month and 1-year time points following hip arthroscopy. In addition, patients with preoperative CD were able to achieve MCID and PASS at 6-months and 1-year for the HOS-SS at the same rates as the NCD group. There were also no differences seen between the groups for MCID or PASS at 6 months for mHHS and iHOT-12. The CD group, in fact, had greater rates of achieving MCID for mHHS and iHOT-12 at 1 year after hip arthroscopy.

Symptom severity in patients presenting for evaluation of hip pain is likely multifactorial with an interplay of hip pathology, mental health, duration of symptoms, and pain coping mechanisms. In a previous study using preoperative hip dysfunction and an osteoarthritis outcome score, Jacobs et al.[4] found that lower preoperative mental component scores were correlated to lower hip dysfunction. The authors also found that symptom severity was more related to patient's mental health than to hip pathology. Similar to this study, we identified no differences between groups in preoperative demographics or severity of hip pathology as defined by radiographic and advanced imaging measures. Despite no significant differences found in hip radiographic markers of severity of hip pathology, lower preoperative patient reported outcomes (PROs) existed for the preoperative CD group in all PROs with the exception of the mHHS, SANE ADL, and SANE SS.

Many previous studies have sought to identify factors that may affect patient success after hip arthroscopy. Previous analyses have looked at the association of

Table 3. Raw PRO Values at Preoperative, Postoperative, and at 1-Year Variables

	Preoperative	6 Weeks	*P* Value	1 Year	*P* Value
Anxiety	53.72 ± 9.03	50.85 ± 10.25	**.002**	48.3 ± 9.71	**<.001**
Depression	48.16 ± 8.17	48.58 ± 8.78	.785	45.65 ± 8.82	**.005**
Global MHS	49.23 ± 7.13	49.89 ± 7.95	.231	50.93 ± 7.95	**.006**
Global Phys	46.29 ± 7.39	47.49 ± 6.85	.206	50.27 ± 8.43	**<.001**
HOS-ADL	74.56 ± 14.07	77.53 ± 14.34	.159	88.55 ± 14.16	**<.001**
HOS-SSS	50.52 ± 23.76	42.38 ± 29.61	.067	76.24 ± 25.23	**<.001**
IHOT-12	44.27 ± 18.22	60.46 ± 18.23	**<.001**	72.46 ± 25.78	**<.001**
mHHS	67.71 ± 14.89	74.4 ± 15.38	**.007**	83.42 ± 16.77	**<.001**
PF	41.88 ± 9.16	41.81 ± 8.07	.311	49.77 ± 11.52	**<.001**
PI	58.21 ± 5.73	56.61 ± 6.49	.064	51.86 ± 8.68	**<.001**
SANE ADL	67.36 ± 23.68	67.45 ± 22.04	.418	85.36 ± 17.02	**<.001**
SANE SSS	42.53 ± 27.52	28.35 ± 26.76	**<.001**	73.69 ± 27.98	**<.001**

NOTE. *P* values <.05 are noted in bold. Global MHS, PROMIS Global Mental Health Score; Global Phys, PROMIS Global Physical Health Score; HOS-ADL, Hip Outcome Score-Activities of Daily Living; iHOT-12, International Hip Outcome Tool; HOS-SSS, Hip Outcome Score-Sports Subscale; mHHS, Modified Harris Hip Score; PF, PROMIS physical function; PI, PROMIS pain interference; PRO, patient-reported outcome; PROMIS, Patient-Reported Outcomes Measurement Information System; SANE ADL, Single-Assessment Numeric Evaluation Activities of Daily Living; SANE SSS, Single-Assessment Numeric Evaluation Sport Subscale.

depression and mental health with postoperative PROs, showing mixed results on the association of mental health with postoperative outcomes.[3,6,8,9] In a study by Saks et al.,[6] patients were categorized as distressed or nondistressed using the 12-item Short Form Health Survey. Propensity matching was performed to match patients based on age, sex, and body mass index, with postoperative outcomes at a minimum of 5-year follow-up showing no difference between distressed and nondistressed groups. Another study by Martin et al.[3] demonstrated that patients with depression, based on the 12-item Short Form Survey Mental Component Summary, had lower preoperative and postoperative scores with less overall satisfaction at 2 years' postoperatively. Despite this, those with depressive symptoms demonstrated an absolute improvement of PROs from preoperative to postoperative comparable with those without depressive symptoms.[3] Although the current study similarly demonstrated that patients who were preoperatively CD had lower initial preoperative PROs, our results contrasted those of the study by Martin et al.[3] in that our patients with preoperative CD had a greater magnitude of improvement in some PROs and achieved MCID or PASS at similar rates as the NCD groups. The greater rates of achieving MCID in patients with CD compared with patients with NCD for mHHS and iHOT-12 are likely due to the lower preoperative scores in patients with preoperative CD. Reasons for contrasting findings related to improvement after hip arthroscopy could be multifactorial, with differences in outcome measures, patient population, postoperative rehabilitation protocols, and/or surgical techniques existing between studies.

Despite research demonstrating an association of preoperative depression with postoperative PROs, we still do not completely understand how depressive symptoms change after surgery for musculoskeletal conditions. In a study by Hessburg et al.[10] assessing PROMIS-D scores after rotator cuff surgery, only 5.6% of patients with CD as defined PROMIS-D still had CD

Table 4. MCID and PASS at 6 Months and 1 Year for CD and NCD

Variable	N	MCID	MCID 6 Months	MCID 1 Year	PASS	PASS 6 Months	PASS 1 Year
% of group with preoperative CD that PASS or MCID at 6 mo and 1 y							
mHHS	20	8	16 (80%)	18 (90%)*	74	15 (75%)	16 (80%)
HOS-SS	17	6	13 (76.5%)	15 (88.2%)	87	7 (41.2%)	11 (64.7%)
IHOT-12	20	13	15 (75%)	18 (90%)*	75.2	11 (55%)	12 (60%)
% of group with preoperative NCD that met PASS or MCID at 6 mo and 1 y							
mHHS	75	8	58 (77.3%)	48 (64%)	74	65 (86.7%)	53 (70.7%)
HOS-SS	75	6	61 (81.3%)	54 (72%)	87	31 (41.3%)	46 (61.3%)
IHOT-12	77	13	63 (81.8%)	50 (64.9%)	75.2	49 (63.6%)	44 (57.1%)

CD, clinically depressed group; HOS-SSS, Hip Outcome Score-Sports Subscale; iHOT-12, International Hip Outcome Tool; MCID, minimum clinically important difference; mHHS, Modified Harris Hip Score; NCD, nonclinically depressed group; PASS, patient acceptable symptomatic state.

*$P < .05$.

≥1 year after surgery. The authors also found that, preoperatively, patients with CD had an improvement in PROMIS-D scores of 8.9 after rotator cuff surgery. In a study by Gruskay et al.,[17] improvement in the 12-Item Short Form Health Survey was seen where 73% of those preoperatively classified as low mental health improved to high mental health at mean follow-up of 4 years following hip arthroscopy. Similar to these publications, our study noted an improvement of 9.1 in PROMS-D scores ≥1 year after surgery. This translated to 86.2% of patients with preoperative depressive symptoms, as defined by the PROMIS-D, who no longer reported high levels of depressive symptoms (PROMIS-D score ≥55) after hip arthroscopy. Thus, in the current study an association was identified between improvement of functional outcomes and improvement of depressive symptoms in those with significant preoperative depressive symptoms. Future studies could aim to assess whether intervention strategies targeted toward improving mental health could be used perioperatively to further improve outcomes after hip arthroscopy.

Limitations

The current study is not without limitations. This was a retrospective study and limited sample size of 100 patients, thus potentially resulting in beta-error. The use of mental health resources including medications, therapy, counseling, and other treatment modalities was not captured and thus could not be assessed during postoperative follow-up to determine whether these could have confounded results. Previous diagnosis of depression from another provider was not utilized in the current study; however, PROMIS-D scores have been previously validated for depression screening.[10,13] We chose not to include previous clinical diagnoses of depression and/or anxiety, as previous studies have found this to be underreported on orthopaedic intake forms.[18] We recognize that improvement in the PROMIS-D score does not necessarily equate to resolution of clinical depression, but based on previous research that recognizes PROMIS-D as a validated tool for depression screening, it can act as a marker of the degree of depressive symptoms. In addition, Kaveeshwar et al.[19] found that PROMIS metrics are superior to a clinical diagnosis of anxiety and depression in identifying potentially modifiable mental health concerns which could result in worse postoperative outcomes. And finally, this was a single-surgeon study within a high-volume hip preservation practice, which limits generalizability.

Conclusions

Patients with symptoms of preoperative CD, as defined by the PROMIS-D score, demonstrated significant improvement in depressive symptoms following hip arthroscopy. In addition, patients with CD preoperatively did not show decreased rates of achieving MCID or PASS on postoperative PROs compared with patients with NCD.

Disclosure

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: A.J.Z. reports other from Smith & Nephew, outside the submitted work. A.M.S. reports other from Stryker, outside the submitted work. All other authors (M.D., S.M.) declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper. Full ICMJE author disclosure forms are available for this article online, as supplementary material.

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