



# Patient Reported Outcomes Associated With "Completely Better" Status After Hip Arthroscopy

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# Disclosures

I (and/or my coauthors) have something to disclose

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No disclosures are relevant to the content of this presentation.





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## INTRODUCTION

- Hip arthroscopy has grown dramatically in recent years as a result of increased understanding of hip pathologies and improvements in operative techniques and training.
- Contextualizing patient-reported outcomes (PROs) is vital as it can help to differentiate meaningful outcomes.
- Measures such as patient acceptable symptom state and minimum clinically important difference have been investigated in recent years.
- However, Assessment of patients' perception of being "completely better" (CB) after hip arthroscopy has not been investigated and may be of particular value.

## OBJECTIVES

1. **Determine the prevalence and characteristics of patients who report being CB at 2 years after hip arthroscopy**
2. **Determine whether PROs measuring function, pain, and mental health are associated with achieving CB status**
3. **Determine threshold values of preoperative, two-year, and change in PROs predictive of achieving CB status.**

## Acknowledgements

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### METHODS

- Of the 92 hip arthroscopy patients were enrolled in the Maryland Orthopaedic Registry (MOR) from 2015 to 2020, 62 completed both baseline and two-year postoperative questionnaires.
- Participant sociodemographic information was self-reported preoperatively through an electronic survey system and operative and medical information was gathered through electronic chart review
- Each patient completed the following questionnaires preoperatively:
  - 6 Patient-Reported Outcomes Measurement Information System (PROMIS) Domains
  - Musculoskeletal Outcomes Data Evaluation and Management System (MODEMS) preoperative expectations questionnaire
  - Numeric Pain Score (NPS) for operative hip and whole body
  - Surgical Satisfaction Questionnaire (SSQ8)

### METHODS

- **At the end of the postoperative surveys, patients answered either “yes” or “no” to an anchoring question asking, ““Is the condition for which you underwent surgery completely better now?” --> "CB" Status**
- Bivariate analysis was performed via Pearson Chi-Square or Wilcoxon Rank Sum tests
- PRO score thresholds for responding “yes” to CB were calculated via a receiver operating characteristic (ROC) curve, with values chosen as thresholds at approximately 90% specificity.
- ROC curves were tested for reliability through an area under the curve (AUC) analysis, with AUCs of 0.7 and 0.8 deemed acceptable and excellent, respectively.
- Variables were selected for inclusion into the multivariate logistic regression based off AUC greater than 0.80 on a ROC curve to identify independent predictors of CB status.

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### RESULTS

- Of the 62 study participants, 29 (46.8%) responded "Yes" (CB group) and 33 (53.2%) responded "No" (Non-CB group) to the CB anchor question.
- There were no other significant differences in demographics including age, sex, BMI, race, prior hip surgery, pre-op narcotic use, or smoking status between the CB and non-CB groups
- There were no differences in preoperative patient-reported outcome scores or pre-treatment expectations between CB and non-CB groups.
- Two-year and change in PRO scores were significantly better in the CB group for all PROs except PROMIS Depression and Numeric Pain Score – Whole Body (Table 1).

**Table 1 Patient-Reported Outcomes Scores by CB status Bivariate Correlations**

Outcome Measure	Total n = 62 Mean ± SD	"Yes" n=29 Mean ± SD	"No" n=33 Mean ± SD	p-value
PROMIS Physical Function				
Pre-operative	40.7 ± 5.3	39.7 ± 6.4	41.6 ± 4.0	0.29
2 y	50.7 ± 9.0	56.3 ± 8.5	45.7 ± 6.1	<0.0001
Change	9.9 ± 10.2	16.6 ± 9.9	4.1 ± 5.9	<0.0001
PROMIS Pain Interference				
Pre-operative	61.0 ± 6.1	62.1 ± 6.5	60.0 ± 5.6	0.20
2 y	50.7 ± 8.8	44.8 ± 7.2	55.9 ± 6.7	<0.0001
Change	-10.4 ± 10.8	-17.2 ± 10.8	-4.2 ± 6.2	<0.0001
PROMIS Fatigue				
Pre-operative	53.3 ± 9.6	53.2 ± 10.1	53.3 ± 9.3	0.99
2 y	46.7 ± 9.6	42.6 ± 9.3	50.3 ± 8.4	0.001
Change	-6.9 ± 9.3	-11.0 ± 9.5	-3.3 ± 7.6	0.002
PROMIS Social Satisfaction				
Pre-operative	42.1 ± 6.8	42.4 ± 7.0	41.9 ± 6.7	0.95
2 y	52.4 ± 11.2	57.9 ± 11.0	47.5 ± 8.9	<0.0001
Change	10.3 ± 12.3	15.5 ± 13.1	5.8 ± 9.7	0.002
PROMIS Anxiety				
Pre-operative	55.5 ± 9.0	55.3 ± 9.2	55.6 ± 9.2	0.94
2 y	50.5 ± 9.7	47.2 ± 10.5	53.4 ± 8.0	0.01
Change	-5.3 ± 10.0	-8.7 ± 9.3	-2.3 ± 9.6	0.009
PROMIS Depression				
Pre-operative	50.6 ± 8.3	50.4 ± 8.5	50.9 ± 8.2	0.87
2 y	48.5 ± 9.5	46.5 ± 9.7	50.2 ± 9.1	0.10
Change	-2.3 ± 8.4	-3.8 ± 8.1	-1.0 ± 8.5	0.25
Numeric Pain Score - Operative Hip				
Pre-operative	4.8 ± 2.5	4.4 ± 2.7	5.1 ± 2.3	0.34
2 y	2.7 ± 2.6	1.1 ± 1.6	4.1 ± 2.4	<0.0001
Numeric Pain Score – Whole Body				
Pre-operative	1.6 ± 2.0	1.5 ± 1.9	1.6 ± 2.2	0.89
2 y	2.4 ± 2.3	1.8 ± 1.5	3.0 ± 2.7	0.17
MARS				
Pre-operative	42.4 ± 37.8	40.0 ± 36.3	44.5 ± 39.4	0.77
2 y	36.6 ± 31.0	44.4 ± 27.2	29.5 ± 32.8	0.02
Tegner				
Pre-operative	4.9 ± 2.6	4.2 ± 2.5	5.5 ± 2.6	0.11
Post-operative	4.3 ± 2.5	5.1 ± 2.3	3.6 ± 2.5	0.02
Pretreatment Expectations Total	89.8 ± 13.8	90.1 ± 12.3	89.5 ± 15.2	0.79
MODEMS Postop Total	70.6 ± 27.5	87.6 ± 17.2	54.8 ± 25.9	<0.0001
SSQ8	76.8 ± 20.8	88.6 ± 15.3	66.5 ± 19.5	<0.0001

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### RESULTS

- Two-year and Change score thresholds for predicting CB status with approximately 90% specificity were calculated for multiple PROs (Table 2).
- **Thresholds for PROMIS Physical Function and Pain Interference 2 year and Change, 2-year Numeric Pain Score Operative Hip, MODEMS Postoperative Total, and SSQ8 had excellent predictive value** (PROMIS PF: 2y – 0.87, Change – 0.86; PI: 2y – 0.85, Change – 0.85; 2 y Numeric Pain Score Operative Hip – 0.88; MODEMS postop Total – 0.87; SSQ8 – 0.86).
- All other thresholds for predicting CB were acceptable at AUC >0.7, except 2-year PROMIS Anxiety, 2-year MARS, and Tegner Activity Scale, with AUC <0.7.

**Table 2 Patient-Reported Outcome Thresholds Predictive of “Yes” for Completely Better**

Measure	Threshold*	Sensitivity	Specificity	AUC
PROMIS PF				
2 y	≥51.3	0.69	0.91	<b>0.87</b>
Change	≥12.0	0.69	0.91	<b>0.86</b>
PROMIS PI				
2 y	≤46.6	0.62	0.91	<b>0.85</b>
Change	≤-12.2	0.76	0.91	<b>0.85</b>
PROMIS Fatigue				
2 y	≤37.8	0.31	0.91	0.74
Change	≤-13.1	0.43	0.91	0.73
PROMIS SS				
2 y	≥60.0	0.48	0.91	0.79
Change	≥17.8	0.46	0.91	0.74
PROMIS Anxiety				
2 y	≤40.9	0.31	0.91	0.69
Change	≤-16.1	0.25	0.91	0.79
Numeric Pain Score - Operative Hip				
2y	≤1.0	0.79	0.84	<b>0.88</b>
MARX				
2y	≥80.0	0.11	0.90	0.67
Tegner				
Post-operative	≥8.0	0.14	0.90	0.68
MODEMS	≥95.0	0.62	0.90	<b>0.87</b>
Met Expectations				
SSQ8	≥87.5	0.66	0.91	<b>0.86</b>

\*All threshold values were chosen with approximately 90% specificity. Bolded values signify AUC>0.8

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### RESULTS

- Outcome score thresholds with excellent predictive value (AUC>0.8) were included in logistic regression for predicting CB status.
- **Both SSQ8 and PROMIS Physical Function Change were independently predictive of CB status at 2 years, when controlling for potential confounding variables (Table 3).**

**Table 3 Logistic Regression Model for "Completely Better" Status**

	Estimate*	Standard Error	P-value
SSQ8	-0.08	0.029	0.004
PROMIS Physical Function 2-year change	-0.19	0.057	0.001

Variables with AUC>0.8 in Table 1 included in logistic regression:  
PROMIS Physical Function 2 year and Change, PROMIS Pain Interference 2 year and Change, Numeric Pain Score – Operative Hip 2 year, MODEMS Postop total, SSQ8

\*Log odds of "Yes" compared to "No" for "Completely Better" Status





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### DISCUSSION

- The results supported partially supported our hypothesis that patients reporting CB at two years after hip arthroscopy would have greater postoperative PROs.
  - There were no differences in sociodemographic, medical, or operative factors between groups
- 47% of patients reported being “completely better” at two years following hip arthroscopy**
- Various PRO threshold associated with CB status were established with 90% specificity
- Improvement in function from baseline (PROMIS Physical Function) and two-year postoperative surgical satisfaction (SSQ8) were independently predictive of CB status**

### CONCLUSION

- This is the first study to assess CB status 2 years after hip arthroscopy and provides clinical contextualization of PROs for orthopaedic surgeons and researchers.

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