

Using Patient Reported Outcomes to Identify Underperforming Patients for Notification Implementation

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INTRODUCTION: In orthopedics, patient reported outcome measurements (PROMs), such as HOOS-JR and KOOS-JR surveys measure pain and function of the hip and knee, respectively. PROMs are important for research but rarely utilized by clinicians to monitor patient recovery. With the increased interest in digital health monitoring, these scores may provide information to the clinician that can positively impact patient recovery. To characterize negative trends in recovery, we utilize prior literature to define patient-acceptable symptom states (PASS)¹. Given these metrics, we propose a novel concept to identify patients trending negatively during their recovery; this sets the foundation for a clinician notification system.

METHODS: Following IRB approval, PROMs for patients under the care of seven orthopedic clinicians from 2018-2022 were retrospectively analyzed. 1,484 patients completed preoperative, six month, and one year HOOS-JR, KOOS-JR, and expectation surveys. Patients were grouped based on their preoperative joint score. The mean change (6 months – preoperative score) was calculated for each group. Patients who were not seen in the clinic between 3 and 6 months and had a change below two standard deviations in their group qualified for a notification. Two modes of notification validation were implemented: 1) expectation data determined if patients were satisfied at one year, 2) and joint scores assessed functionality at one year. Density scatter plots were generated to visualize postoperative change by their preoperative joint scores. Statistical significance was determined by either a Chi-Square test or student’s t-test.

RESULTS SECTION: HOOS-JR and KOOS-JR mean preoperative scores were centered around 49.2 and 48.9, and the six-month change was +34.3 and +25.5, respectively (Figure 1A-B). In total, 23 patients qualified for a notification, composed of 11 hip and 12 knee patients. 91% of patients met at least one validation, and 70% met both. Regarding HOOS-JR patients, 82% did not meet their postoperative expectations and 64% did not recover after one year. For KOOS-JR patients, 92% did not meet postoperative expectations, and 83% did not recover after 1 year.

DISCUSSION: This study has identified generalized recovery trends based on patient outcome scores. These density plot results provide clinicians with information to set realistic patient expectations and, if not met, would trigger notifications allowing clinician intervention. Through this analysis, patients with subpar six month recovery were identified and validated based on satisfaction or recovery after one year. Negatively trending patients at 6 months were three times less likely to achieve acceptable clinical outcomes compared to those with satisfactory clinical outcomes. These identified patients would potentially benefit from a follow-up with their clinician between 3 and 6 months postoperatively which could positively impact patient reported outcomes.

SIGNIFICANCE/CLINICAL RELEVANCE: This analysis sets the foundation for a notification system to benefit patients not improving postoperatively. By integrating PROMs and technology, clinicians can better support the recovery needs of all patients.

REFERENCES:

1. Kunze KN, Fontana MA, MacLean CH, Lyman S, McLawhorn AS. Defining the Patient Acceptable Symptom State for the HOOS JR and KOOS JR After Primary Total Joint Arthroplasty. *Journal of Bone and Joint Surgery*. 2022;104(4):345-352. doi:10.2106/JBJS.21.00550

IMAGES AND TABLES:

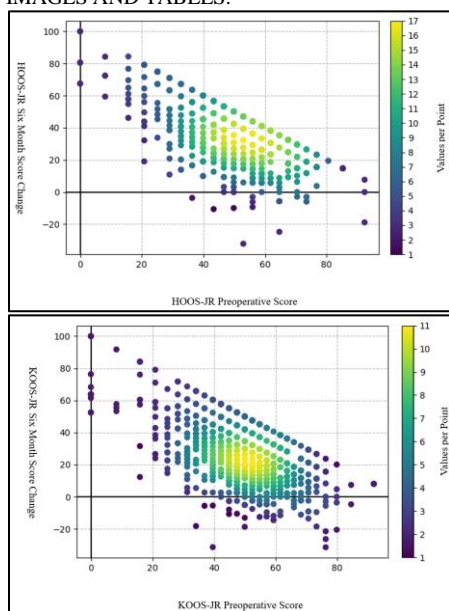


Figure 1A-B. (A) - HOOS-JR Six Month Density Plot; (B) - KOOS-JR Six Month Density Plot

Table 1 – Notification Group Six Month Score Change by Survey Type

Survey Type	Group	Average Δ Score	P Value
HOOS-JR n = 564	No Notification (n = 553)	34.92 \pm 1.3	< .001
	Notification (n = 11)	1.98 \pm 6.1	
KOOS-JR n = 920	No Notification (n = 908)	25.99 \pm 1.0	< .001
	Notification (n = 12)	-11.94 \pm .4	