An Outpatient Total Knee Protocol for Optimizing Outcomes and Reducing Variability of Care

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Purpose

To describe how data analytics can impact the development of an updated protocol for patients undergoing total joint replacement to optimize patient outcomes and reduce variability of care throughout a large hospital-based network.

Description

A retrospective chart review of all patients who were status post total knee replacement in year A was performed. Performance by facility was determined based upon a specialized statistic (Scaled, Weighted, Relative Performance: SWRP) that incorporates average Knee Injury and Osteoarthritis Outcome Score for Joint Replacement (KOOS, JR) improvement, facility volume of patients, and the minimal clinically important difference (MCID) of the KOOS, JR. The SWRP score was scaled so that a site meeting the MCID would receive a score of 50 while consistently higher performing sites would receive a higher score while consistently lower performing sites would receive a lower score (Figure 1). A coefficient of variation of this statistic was used to determine the variability of outcomes across the network. High, average, and low performing sites were identified, and qualitative analysis of practice patterns was performed (Figure 2). In year B, a protocol was developed based upon the practice patterns of the highest performing sites and monthly statistical updates were provided to the staff with recommendations to improve effectiveness of care. The new protocol was distributed to all therapists and assistants within the network midyear. Retrospective analysis of each patient's data was performed throughout the year and analyzed at the end of the year.

FIGURE 1

SWRP Score	Interpretation
75+	Highest Performance
65-74	High Performance
55-64	Above Average Performance
45-54	Average Performance
35-44	Below Average Performance
25-34	Low Performance
<25	Lowest Performance

Scaled, Weighted Relative Performance Formula

$SWRP = 50 + N(x - 0.151 * 16.603)$

Where:

N=Number of patients seen by the site

x=Average KOOS, JR improvement by site

0.151=MCID of KOOS, JR

16.603=Constant multiplier

FIGURE 2

Intervention	Low Performers	High Performers	Average Performers
Aerobic Exercise	NuStep	Bicycle, Elliptical, Treadmill	NuStep, some bicycle
Manual Therapy	PROM rare, use of patellar mobilizations	PROM every visit	Inconsistent PROM
Functional Exercises	None	Squats, lunges, step ups	Inconsistent squats, step ups
Strengthening	Table exercises, 1 lb. ankle weights	Table exercises, standing exercises, LAQ, 5 lb. ankle weights, dumbbells for squats, resistance machines when available	Table exercises, some standing exercises, 2 lb. ankle weights
ROM Exercises	Heel slides x15 repetitions	Heel slides x30 repetitions, knee flexion on stairs, knee extension with self overpressure	Heel slides x20
Balance/ Proprioception	None	Early weight shifting, lateral stepping, cone taping, single leg stance	Inconsistent balance exercises
Stretching	Hamstring and gastroc stretching every visit	Rare stretching	Inconsistent stretching
Other Exercises	Clamshells, IT band rolling, terminal knee extension	Did not perform these	Inconsistent performance
Average Number of Visits	15-20	15-20	Fewer than 10

Summary of Use

A total of 1,636 patients' charts across 37 facilities were reviewed over the course of 2 years with 1,056 total patients having complete data. Average KOOS, JRΔ improved from 15.3 percentage points in year A to 17.7 percentage points in year B, p = 0.007 (Figure 3). The coefficient of variation of outcomes in individual facilities improved from 28.96 in year A to 1.79 in year B (Figure 5). Furthermore, in year B, after implementation of a revised standardized protocol, average KOOS, JRΔ improved from 15.8 percentage points to 19.3 percentage points, p = 0.001. The coefficient of variation improved in year B from 7.92 before implementation of the protocol to 1.24 after implementation. A secondary outcome of the study demonstrated that between years A and B the average number of visits per episode decreased from 15.7 in year A to 14.6 in year B, p = 0.003 (Figure 4). In year B, this difference in visits per episode saved a calculated total of 808 visits.

FIGURE 3

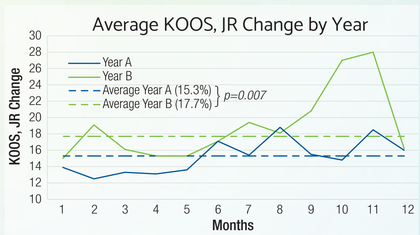


FIGURE 4

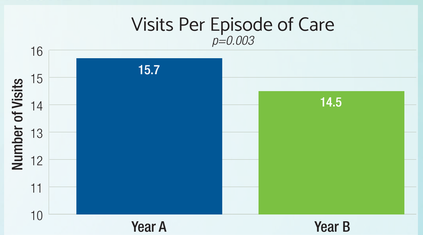
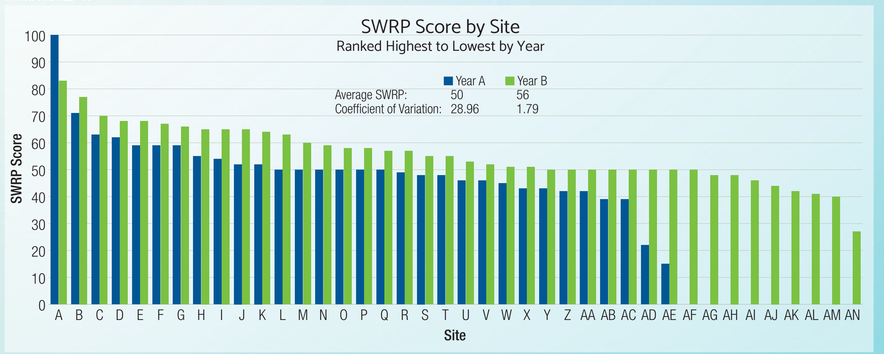


FIGURE 5



Importance to Members

Statistical analysis of outcomes data can be utilized to analyze practice patterns and develop updated clinical protocols for physical therapy intervention for patients following total knee replacement to optimize outcomes, decrease variability of care, and improve efficiency of care. By improving outcomes, reducing number of visits per episode, and creating a contemporary protocol, the cost to the patient and the burden on the health care system is reduced while the value of physical therapy is substantiated. As the health care system transitions to value-based care models, studies such as these are necessary to maximize the benefit of physical therapy to the patients.

Benefits

- Development of total knee protocol based upon clinical data Improved patient outcomes
- Improved consistency of outcomes throughout the network
- Reduced number of visits per episode

Opportunities for Further Study

- Quantitative analysis of practice patterns
- Comparison of outcomes for protocol adherent vs protocol nonadherent sites
- Determination of additional factors predictive of success or nonsuccess

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