



Original research

Physical therapists collect different outcome measures after total joint arthroplasty as compared to most orthopaedic surgeons: a New England study

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ABSTRACT

Background: Following total knee and hip arthroplasty, patient progress can be assessed with patient-reported outcome measures (PROMs) and performance-based outcome measures (PBOMs). The American Joint Replacement Registry 2016 guide recommends collecting several measures, including Patient Reported Outcome Measure Information System Global, Knee Injury and Osteoarthritis Outcome Score Jr, and Hip Injury and Osteoarthritis Outcome Score Jr. This study aimed to assess the current and anticipated use of PROMs and PBOMs by New England physical therapists.

Methods: An online survey was conducted in July and August of 2015 asking physical therapists in New England to rate their current and anticipated future use of PROMs and PBOMs in terms of clinical decision making associated with the treatment and care of patients after total hip and knee replacement.

Results: There were 122 responses. The most often used and recommended PROMS were the Numeric Pain Rating Scale (99.2% and 97.5%, respectively) and Lower Extremity Function Scale (76.2% and 77.0%). There was significant variability in the use of different PBOMs, but the most often used and recommended were the Timed Up and Go (93.4% and 85.2%) and the Single Leg Balance Test (90.2% and 87.7%).

Conclusions: This study suggests that orthopaedic surgeons and physical therapists use different PROMs and PBOMs for postoperative assessment of total joint patients and highlights the need for more collaboration and consistency between these disciplines.

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Introduction

In the United States, the prevalence of hip and knee osteoarthritis has increased substantially over the last 20 years and is the greatest cause of chronic disability in older adults [1,2]. Although there are measures to slow the progression of the disease, elective total joint arthroplasty (TJA) is the recommended treatment after

non-surgical measures have failed [3,4]. TJA is a major surgical procedure, and recovery time can vary between patients with the most improvement in health-related quality of life quantified by the Quality of Wellbeing Index between 3 and 6 months post-operatively [5]. Physical therapists play an important role in treating patients before and after TJA [6]. The main goals of rehabilitation post-TJA are to maximize functional independence and to minimize complications [7].

There are 2 common ways of assessing outcomes after TJA: the patient's assessment of his/her own function (patient-reported outcome measures or PROMs) and observed physical performance (performance-based outcome measures or PBOMs). Common PROMs include the Knee Injury and Osteoarthritis Outcome Score (KOOS), Hip Injury and Osteoarthritis Outcome Score (HOOS), and the Lower Extremity Function Scale (LEFS) [8,9]. Examples of PBOMs include the Timed Up and Go (TUG), 6-Minute Walk Test,

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Table 1
Outcome measures used in cross-sectional survey of New England physical therapists.

PROMs	PBOMs
Numeric Pain Rating Scale	Sit to Stand Test
LEFS	Walking Speed
OXS	6-Minute walk test
OHS	TUG
EQ-5D	Timed Stair Climb
KOOS	Tinetti Mobility Test
HOOS	Single Leg Balance
WOMAC	Functional Reach Test

EQ-5D, Euro-Quality of Life; OHS, Oxford Hip Score; OXS, Oxford Knee Score.

and the Stair Climbing Test [10,11]. Currently, there is no absolute consensus in the literature on the appropriate PROMs and PBOMs following total hip or knee arthroplasty (THA or TKA) [12–14]. However, the American Joint Replacement Registry (AJRR) 2016 guide recommends collection of PROMs including Veterans RAND 12 Item Health Survey or Patient Reported Outcome Measure Information System Global and HOOS or KOOS Jr [15]. Also in a recent American Academy of Hip and Knee Surgeon symposium, the HOOS Jr and KOOS Jr were recommended for quality assessment in TJA [16].

Both PROMs and PBOMs are useful and provide different clinical data. PROMs do not require a clinical visit, and therefore might be easier to collect than PBOMs especially when following a large number of patients [17]. To utilize a more patient centered approach to medicine, the Center for Medicaid and Medicare Services has recently highly valued the use of PROMs based on goals stated by the National Quality Strategy and Institute of Medicine due to the Affordable Care Act [18,19]. PROMs provide useful information about patients' perceptions of physical function but are highly influenced by pain [20]. However, patient perception may not correlate well with actual functional performance and may overstate functional improvement especially in the early postoperative period [10,11]. PBOMs on the other hand can be harder to collect, but may provide important objective information about functional performance and progress through rehabilitation [11,20]. Recent studies have recommended the use of both PROMs and PBOMs for evaluating patient progress after THA/TKA [10]. McAuley et al [21] found that physical therapists use a wide range of outcome measures when evaluating THA and TKA patients in Canada.

The aim of this study is to assess current and anticipated use of PROMs and PBOMs of physical therapists practicing in New England. There is very little known about outcome measures that therapists use pre-TJA and post-TJA. This information is important because orthopaedic surgeons and physical therapists work toward the same goal of optimizing patient recovery. The motivation for this study is to establish a foundation of current practice from which to develop standardized sets of outcome measures for orthopaedic surgeons and physical therapists to collect pre-TJA and post-TJA.

Material and methods

The study was cross-sectional in design. It was executed as an online questionnaire requiring 10–15 minutes to complete distributed via email to licensed physical therapists practicing in New England (Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, and Connecticut). A cover letter of instructions was developed, and reminder emails were sent 12, 21, and 36 days after the initial correspondence on July 15, 2015. Physical therapists who treated patients undergoing THA and/or TKA in the last 5 years were invited to complete the survey and those who had not were asked to decline. The online survey platform LimeSurvey was used

and anonymity was ensured by assigning each response a random numeric code. The study was approved by the Committee on Human Subjects.

The survey had 4 sections consisting of a modified version of the survey developed by McAuley et al [21] obtained with permission from the lead author. The first section documented location of practice, education background, and demographic characteristics of the therapist. The second and third sections evaluated the use of PROMs and PBOMs (Table 1). These measures were queried specifically in terms of clinical decision making (day-to-day thinking and reasoning that clinicians execute to plan, administer, modify, and evaluate a therapeutic intervention for a given patient after THA or TKA). These specific PROMs and PBOMs were chosen based on the work of McAuley et al and the Osteoarthritis Research Society International (OARSI) advisory group recommendations [21,22]. Responders were asked to rate their current use of each measure on a 4-point scale (0 = not familiar, 1 = familiar no experience, 2 = some experience, 3 = considerable experience). The third section asked about anticipated future use of specific measures using a modified scale (0 = unable to rate, 1 = unlikely to use, 2 = likely to use, 3 = will use and recommend) (Fig. 1). The fourth section asked for their opinions about most valuable measures outright, other modalities used, and number of postoperative treatment sessions patient receive.

Initially, the survey was sent to 14 physical therapists in various practices throughout New England for feedback on language clarity and organization. Based on their comments the survey was modified.

Data were exported into an Excel spreadsheet and converted into SPSS. Analyses of responses were reported in frequencies and percentages and visualized with graphs for comparison (Figs. 2 and 3). Following the approach used by McAuley et al [21] variables were dichotomized from the ordinal 4-point scales to used/familiar (3, 2) and not used/unfamiliar (1, 0). Paired sample t-tests were used to compare the use of each outcome measure for current and future use. Significance was set at $P < .05$.

Results

Seven hundred twenty-four emails were sent. Of the 724 emails, 95 failed to be transmitted. Therefore 629 surveys were successfully sent. Of those, 168 responses were received, and of those, 19 responses were not interested in completing the survey and 27 of them did not treat patients who had undergone TJA. Therefore, this produced 122 complete responses.

Table 2 shows the demographic data of the physical therapists who completed the survey (Table 2). Physical therapists reported treating patients on average for 13.5 ± 0.5 sessions post-TKA and 11.2 ± 0.4 sessions post-THA.

Regarding current and future use of PROMs for clinical decision making, responders most commonly use and recommend the Numeric Pain Rating Scale and the LEFS (Fig. 2a). More specifically, in relation to the Numeric Pain Rating Scale, 99.2% reported current considerable experience and 97.5% would use and recommend it in the future. In relation to the LEFS, 76.2% reported considerable experience and 77.0% would use and recommend it in the future. Therapists were more likely to use and recommend the Oxford Hip Score and Oxford Knee Score in the future than in the past for clinical decision making (t-test, $P < .05$).

Among PBOMs used for clinical decision making, responders most commonly use and recommend the Single Leg Balance Test and the TUG (Fig. 2b). More specifically, in relation to the Single Leg Balance Test, 90.2% reported current considerable experience and 87.7% would use and recommend it in the future. In relation to the TUG, 93.4% reported considerable experience and 85.2% would use and recommend it in the future. Therapists were less likely to use and recommend the 6-

[]

Numeric Pain Rating Scale - Current Use (within past 5 years)

What: Pain intensity (current)

Who: All phases of continuum

How: Multiple options (e.g. paper, sliding scale), 0-10 or 0-100 scale. Less than 2 minutes to complete

Scoring: Higher score = greater pain intensity

*

Please choose the appropriate response for each item:

0 = Not familiar 1 = Familiar, no experience 2 = Some experience 3 = Considerable experience

Clinical decisions

[] Numeric Pain Rating Scale - Future Use *

Please choose the appropriate response for each item:

0 = Unable to rate 1 = Unlikely to use 2 = Likely to use 3 = Will use it & recommend it

Clinical decisions

Figure 1. Example from Section 2 of questionnaire. *P < .05.

Minute Walk Test, TUG, Tinetti Mobility Test, and the Functional Reach Test for future clinical decision making (t-test, P < .05).

When respondents were asked to identify the most valuable PROMS, 70.5% recommended the LEFS and 68.0% the Numeric Pain Rating Scale (Fig. 3a). In regards to performance measures, 63.1% selected the TUG as the most valuable, along with 59.0% and 42.6% rating the Sit to Stand and the Single Leg Balance Test, respectively, as most valuable (Fig. 3b).

Discussion

To our knowledge, this is the first description of practice patterns of a large number of physical therapists in the New England region. The results demonstrate that physical therapists use LEFS and

Numeric Pain Rating Scale more than any other PROM for clinical decision making and program evaluation. Currently, physical therapists are often using PBOMs, and a large percentage are likely to use and recommend the Single Leg Balance Test, TUG, and Sit to Stand Test for use in the future. Physical therapists in the New England region use very similar tests independent of their clinical practice settings or level of training.

In contrast, the AJRR recommends general health-related quality of life measures like the Veterans RAND 12 or PROMIS 10 Global and joint-specific measures including the HOOS, KOOS, Oxford Knee, and Oxford Hip Scores, none of which were most valuable to therapists in this study [15]. It is difficult to explain why they prefer the LEFS. LEFS is easy to implement and broadly applicable to all lower extremity sites in various stages of disability, but is not

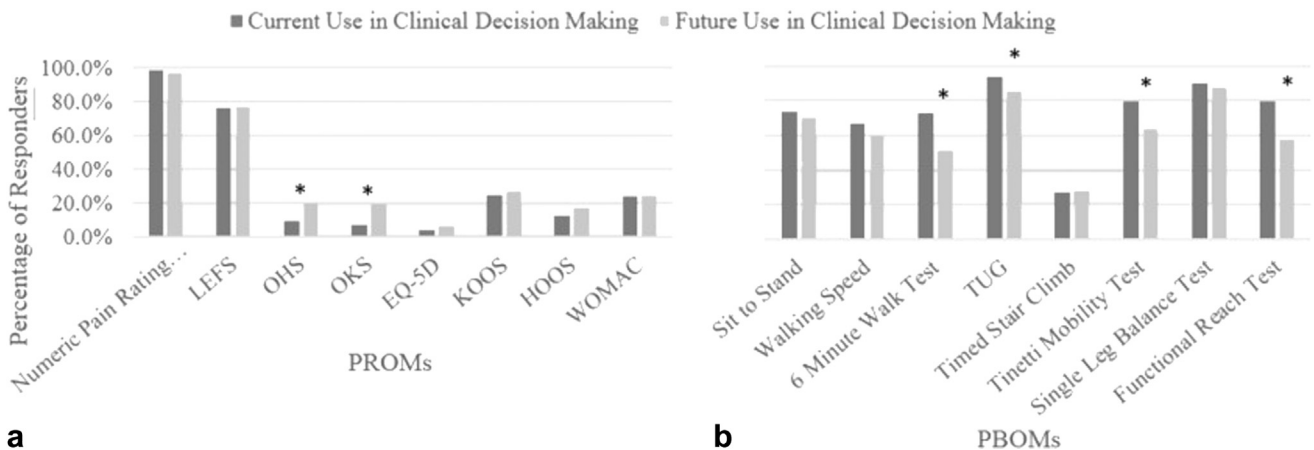


Figure 2. Comparison of responders' current and future use of PROMs (a) and PBOMs (b) for clinical decision making (t-test, P < .05). *P < .05. EQ-5D, Euro-Quality of Life; OHS, Oxford Hip Score; OKS, Oxford Knee Score; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index.

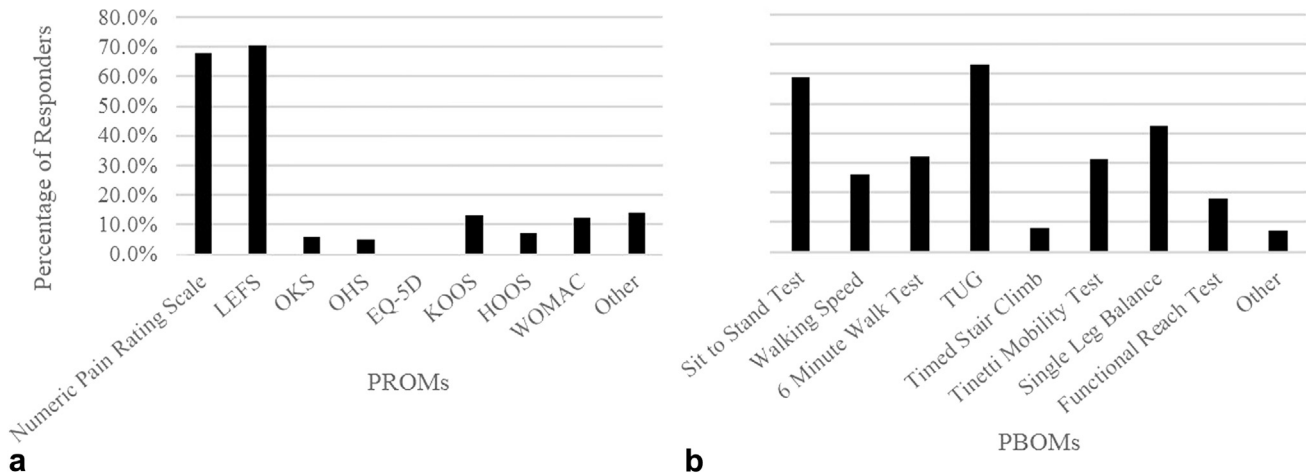


Figure 3. Physical therapists' overall rating of most valuable PROMs (a) and PBOMs (b). EQ-5D, Euro-Quality of Life; OHS, Oxford Hip Score; OXS, Oxford Knee Score; WOMAC, Western Ontario and McMaster Universities Osteoarthritis Index.

specific to hip and knee osteoarthritis [23]. The HOOS and KOOS are joint specific, including the Western Ontario and McMaster Universities Osteoarthritis Index score, and have been shown to be more sensitive and responsive than the LEFS in total joint replacement [24,25]. However, they take longer to administer. Pua et al [26] did not find a significant difference in the absolute reliability of the LEFS when compared to the Western Ontario and McMaster Universities Osteoarthritis Index in patients with hip osteoarthritis and stated that the LEFS may be a good alternative.

All the PBOMs except for the Timed Stair Climb were used by a majority of responders, and the TUG and Single Leg Balance Test were recommended by a majority for future use. PROMs may overestimate patient mobility, especially in the immediate postoperative phase after both TKA and THA [10]. Because therapists evaluate TJA patients multiple times in the early postoperative period, they may utilize PBOM more frequently to avoid overestimation of function during the early phase of rehabilitation [11,14,20,27]. In fact, osteoarthritis Research Society International recommends that in addition to PROMs, the following PBOMs be used to assist in clinical decision making post-TJA: the Sit to Stand Test, Walking Speed Test, Timed Stair Climb, TUG, and 6-Minute Walk Test [22]. It would be ideal if a single or small set of measures could assess function at all levels of rehabilitation, but perhaps no single test is able to assess all aspects and phases of recovery. PROMs and PBOMs also assess different time periods of recovery. PROMs generally assess a period of weeks of overall symptoms and function while PBOMs objectively measure function at a particular point in time. Both types of information are valuable in assessing patient recovery [28].

Physical therapists and surgeons appear to utilize different tools to assess recovery after TJA with AJRR recommending that surgeons report only PROMs to the national registry. PROMs have the advantage of being patient centered and are consistent with performance-based initiatives [4]. Although PROMs may not accurately assess early postoperative function, they are more responsive in the long term compared to PBOMs in measuring functional improvement after TKA [10]. As physicians and therapists strive to provide patient-centered care, the patient perception of the outcome is important [29,30]. This study showed that of the 16 outcome measures queried for clinical decision making, therapists indicated that they were less likely to use 4 of them in the future, all them PBOMs, and more likely to use 2 in the future, both

Table 2
Demographics of responding physical therapists in percentages.

Population setting	
Rural	21.3
Mixed	62.3
Urban	16.4
Years since graduation (y)	
<5	13.4
5-9	12.3
10-14	17.2
15-19	13.9
20-24	9.8
>25	32.8
Working status	
Full time	88.5
Part time	8.2
Per diem	4.9
Clinical setting	
Private practice clinic	53.3
Private practice clinic associated with large organization	10.7
Home/community care (eg, VNA)	15.6
Outpatient clinic associated with academic hospital/medical center	18.0
Inpatient acute care hospital	5.7
Non-hospital inpatient rehabilitation facility	2.5
Other	8.2
Continuum	
Pre-operative phase	74.6
Immediate post-operative phase (first few wk)	83.6
Sub-acute rehabilitation (wk to mo)	89.3
Post-rehabilitation (mo to y)	82.0
Number of TJA patients treated/year	
<25	42.6
25-49	38.5
50-74	13.9
75-99	4.1
Gender	
Female	56.6
Male	43.4
Age (y)	
<30	11.5
30-39	29.5
40-49	29.5
50-59	23.0
≥60	6.6
Professional degree	
Bachelor of Science	23.8
Master of Science in Physical Therapy	30.3
Doctor of Physical Therapy	40.2

VNA, Visiting Nurses Association.

PROMs (Fig. 2a and b). This may indicate dissatisfaction with therapist's current usage of PBOMs and interest in using PROMs more in the future. As surgeons and therapists work more closely, developing better understanding and consensus in the use of PROM and PBOM between surgeons and physical therapists will allow for improved assessment of TJA patient outcomes.

There were some potential limitations associated with this study. This study does have a low response rate of 20%, which may represent underlying biases. Another limitation is that the questionnaire did not ask about the timing of evaluation of PROMs and PBOMs. Outcome measures recorded at 2 weeks cannot be compared to one at 12 months. Timing is an important factor that may also be considered and evaluated in future studies. An adequate population of physical therapists in New England may not have been assessed to make generalizations about practice patterns. The HOOS and KOOS Jr are recommended by Medicaid and Medicare and might have been included; however, these shorter surveys did not have published information on scoring and were too new for many therapists to be familiar with at the time of this study [16]. Certified Athletic Trainers, nurses, or occupational therapists who also treat this patient population were not included. "Some" or "considerable" experience was not defined, which is why the results were dichotomized. Another limitation is that 42.6% of the total cohort surveyed treat less than 25 joints/y, which might not be consistent with high volume centers.

Conclusions

This article is the first to describe practice patterns of a large number of physical therapists treating knee and hip arthroplasty patients in the New England area. It demonstrates that therapists use and recommend the Numeric Pain Rating Scale and the LEFS for clinical decision making and program evaluation. Most are unfamiliar with the PROMs that surgeons more commonly use. While the use of PBOMs was more varied, therapists are likely to use and recommend the TUG and Single Leg Balance Test. As surgeons and therapists work more closely in a value-based system, coordination in the use of PROMs and PBOMs is needed for the assessment of TJA patient outcomes. This study highlights the need for more collaboration and consistency between the disciplines.

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