TITLE: Using Wearable Technology to Assess Return to Function Following a Total Knee Arthroplasty: A Case Report

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Abstract

Background and Purpose: Osteoarthritis (OA) is a common pathology affecting adults globally with the knee joint being the most affected joint.[1] During the late stages of OA, many patients choose to undergo a total knee arthroplasty (TKA) to resolve their knee OA symptoms.[2] These patients are typically referred to physical therapy to address their post-operative symptoms. Walking is part of early rehabilitation following TKA and is often a main functional goal for treatment. With the increasing popularity of wearable fitness tracking devices, such as smart watches and Fitbits©, there is an opportunity for clinical professionals to utilize a patient's personal fitness device to track walking progress. However, there is little research into the use of this technology for this purpose. The purpose of this case report is to explore the use of personal fitness technology to measure the number of steps per day as an outcome following TKA.

Methods and Case Description: The patient was a 61-year-old female referred to outpatient physical therapy (PT) services following an elective right TKA. She did not receive pre-surgical rehab for her knee. Following surgery and a brief stay in acute care, the patient presented to outpatient physical therapy. Her goals included returning to work, returning to golfing, and improving functional mobility to enjoy time with family. The primary concerns at the time of examination included increased lethargy, pain management, and returning to work. The patient had a good prognosis of returning to her prior level of function including independent ambulation and recreational walking. Throughout treatment the patient was provided a home exercise program. Walking was highly encouraged as part of her plan of care, but no specific goal was set for steps per day.

Outcomes: The patient was seen for 21 visits over 11 weeks. The Knee Outcome Survey was administered 3 times during the plan of care. On the 15th visit she scored 71.43, on the 19th visit she scored 72.86, and on her final visit she scored 80.00. Five of seven goals set by the therapist were met prior to discharge. The patient's Fitbit© was used to track daily steps numbers beginning with the day of surgery and concluding with discharge. The step values were compared with normative data for the 6-Minute Walk Test to assess the patient's progress against standard and normative values. The patient improved from 33 steps per day on day of surgery to >8,000 steps per day on date of discharge. The difference between these values exceeded the meaningful change of 1,303 steps per day.

Discussion: The use of wearable technology, with proper compliance of wearing the device, may help to give therapists insights on how active a patient is truly being. This can be utilized for goal setting related to prior level of function if therapist has access to past data and continued tracking throughout rehabilitation. In this case, outcomes measured including strength testing, range of motion, KOS, and number of steps per day all improved over the course of care. However, the data is insufficient to determine how well correlated steps per day are with the other outcome measures. As wearable technology continues to evolve and becomes increasingly popular across all patient populations, its use by physical therapists may allow for more accurate tracking of patient activity outside of the clinic. Future research in physical therapy should be targeted at wearable fitness technologies as it may allow us to determine the strength of the relationship between steps per day and other functional outcomes.

References:

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KEYWORDS: Total Knee Arthroplasty, Total Knee Replacement, Fitbit©, Walking