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Emotional Health and Level of Post-Total Knee Arthroplasty Exercise

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BACKGROUND: Total knee arthroplasty (TKA) surgery is an effective strategy to eliminate knee pain and to improve function among patients suffering from degenerative joint disease. One important factor for achieving optimal functional return post-TKA is participation in both patient-directed home exercise and physical therapy-supervised (PT) sessions. No consensus has been developed regarding the “dose” of physical rehab exercise regimes after TKA.

OBJECTIVES: We hypothesize that patients who traditionally demonstrate poorer physical outcomes after TKA (patients with pre-op mental composite scores <50 on SF-12) will have lower per day averages of post-operative exercise. This pilot study is designed to elucidate a possible relationship between several patient characteristics, including age, sex, BMI, pre-op MCS, and pre-op PCS, and subsequent daily repetitions of targeted lower extremity home and PT rehabilitation exercises.

METHODS: 46 adult patients scheduled to undergo elective, unilateral, primary total knee replacement at the UMass Total Joint and Arthritis Center were recruited for this study during a four month period. Of the 76 patients invited to participate, 12 did not meet the inclusion criteria and 18 could not commit to the time requirements. At a pre-operative information session, each patient completed a consent form, an SF-12v2 survey, and a demographic information form that included age, gender, height and weight. Each patient was given a log book to record their daily exercise regimen. Patients logged their exercises from the beginning of post-op week three through post-op week ten. The exercises of interest included glut tightening, isometric quadriceps strengthening, straight leg raises, sitting flexions and extensions, hip abduction/adduction, and sitting quadriceps stretches. Complications in the immediate post-op period or during the first ten post-operative rehabilitation weeks were screened for via reminder phone calls and were recorded in the database.

RESULTS: Of the 46 patients initially enrolled in the study, five patients (11%) disenrolled after it started. Three patients (7%) had their surgeries postponed (anemia, one; other reason, two). Five (11%) were excluded because of a post-op complication. Eleven patients (24%) who completed the study did not return their exercise logbooks. One of the subjects did not have complete data. Of the 21 patients who returned completed logbooks, 9 had MCS<50, 10 had MCS>50, and 2 had incomplete SF-12v2 data. The mean total repetitions per day were greater for the high pre-op MCS group compared to the low pre-op MCS group, although this difference was not statistically significant (Mean = 22.28 (Low MCS) vs. 29.80 (High MCS), SD=6.4 and 18.3 respectively; p= 0.10). For the sitting knee flexion/extensions exercise in particular, patients

reported a mean of 28 (SD=17 *between* patient variation; SD=13.8 *within* patient variation over time). Gender sub-group analysis showed male and females had similar mean daily repetitions and *within* patient variation. However, *between* patient variation was greater in females than males across exercises [i.e., mean= 28; SD=21 (female) vs 14 (male).] Graphical analyses suggest that in women, higher BMI and lower pre-TKR MCS (Mental health; SF-12) are associated with lower mean daily exercises; lower MCS is also associated with greater variation in number. Analyses of mean daily quadriceps, gluteus, and abductor/adductor strengthening repetitions and straight leg raises yielded similar patterns.

CONCLUSIONS: This study demonstrates that patients with lower MCS generally experience a lower “dose” of exercise post-operatively than their high MCS counterparts. A future study yielding larger sample sizes would likely generate a statistically significant difference between these two patient groups and suggest a reason for why patients with lower MCS have consistently poorer physical outcomes than controls. Women with higher BMI and low MCS are at risk for lower and more varied exercise levels, and should also be scrutinized carefully in a larger study. Important aspects of conducting a grant-funded study will include starting with a larger sample-size and retaining more patients. Multiple forms of incentives (money, token gifts, and expressions of appreciation) would all likely increase patient participation *and* the likelihood of returning the logbook. Unfortunately the use of email for data collection or correspondence will not currently be effective for this type of study given the lack of computer access among this patient population.