Functional Recovery Following Total Knee Arthroplasty: A Prospective Apple Health Kit Study

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INTRODUCTION:
Osteoarthritis is a leading cause of pain and disability, particularly affecting the knees. Total knee arthroplasty (TKA) is a common procedure to alleviate pain and improve function. However, the impact of TKA on specific aspects of functional recovery, particularly daily physical activity, remains a topic of ongoing research. Wearable technologies like the Apple Watch offer new possibilities for collecting objective data on physical activity post-TKA. This study aims to describe changes in daily physical activity levels using objective metrics over different time points following TKA.
METHODS:
This study analyzed data from a prospective cohort of 152 patients undergoing a unilateral TKA. Patients wore an Apple Watch and used a digital care management application for data collection. Daily activity and gait parameters were collected from Apple HealthKit and averaged over the week. Statistical analyses were performed using R software, including descriptive statistics and paired t-tests to compare outcomes at different time points post-TKA.
RESULTS:
Participants demonstrated significant improvements in daily physical activity levels over the course of 12-months post-TKA. At 6 months post-TKA, participants showed the highest average daily step count (mean ± SD: 5293 ± 236 steps; $p < 0.001$), with improvements persisting at 12 months postoperative (5180 ± 260 steps; $p < 0.001$) compared to preoperative values. Gait speed increased from 0.88 ± 0.01 m/s preoperatively to 1.01 ± 0.01 m/s ($p = 0.006$) at 12 months post-TKA. Standing hours increased from 9.99 ± 0.30 hours to 11.47 ± 0.31 hours at 6 months postoperative and persisted. Steadiness and the estimated six-minute walk test recovered to preoperative levels at 12 months post-TKA.
DISCUSSION AND CONCLUSION:
This study utilizing Apple Health Kit to assess functional recovery following TKA provides valuable insights into the nuanced trajectory of recovery. These findings highlight the value of wearable technology in postoperative monitoring.