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*At-home Gait-cadence Functional Assessment and Recovery Trajectory for Older Adults Undergoing
Major Abdominal Surgery*

Abstract

Over 100,000 older adults undergo elective major abdominal surgeries in the US each year and many experience loss of mobility after surgery. Risk of mobility loss is greater for older adults unable to engage in moderate-intensity physical activity before surgery. Identifying at risk older adults pre-operatively is critical as functional status is modifiable before surgery through multimodal pre-habilitation. However, objective functional assessments of older adults are not routinely performed before surgery in part due to time. Gait-cadence is directly associated with activity-intensity and can be quickly and easily measured by smartphone accelerometers, making it a novel measure to remotely assess preoperative functional status. Our central hypothesis is that gait-cadence during usual and fast pace walks at-home will 1) provide an accurate and easy to use functional assessment 2) identify patients at-risk of mobility loss as compared to the currently used 6- minute walk test (6MWT) and overall daily active time and 3) determine walking recovery trajectories for older adults after surgery. The overall objective of this proposal is to validate the accuracy and usability of at-home gait-cadence assessment using patient owned smartphones before surgery and determine recovery trajectories after surgery in older adults. We will achieve this objective with the following three aims: 1) Determine the accuracy and usability of at-home gait cadence assessment. We will compare at-home gaitcadence during usual and fast pace brief walks performed remotely and independently at-home to in-clinic equivalents. Gait-cadence will be measured using open-source accelerometer analysis software which represents a significant innovation from traditional approaches that use native software from commercial wearable devices. 2) Determine the association between at-home gait-cadence, in-clinic 6MWT distance, and daily active time. We will compare at-home gait-cadence to 6MWT distance which is currently used to identify older adults at high perioperative risk. Actigraph accelerometers will be worn for 7-days prior to surgery to identify patients that engage in moderate-activity intensity. 3) Determine walking recovery trajectories for older adults after surgery. Patients will perform the usual and fast pace walk using Step Test weekly for two months after discharge and evaluate trajectories of walking recovery after surgery. The professional development plan combined with the completion of these aims is the necessary first study for further research (K awards) that identify high-risk patients for mobility loss using gait-cadence and test a walking pre-habilitation program to improve mobility after surgery for older adults.