Timed Up-And-Go Scores are Associated with Balance but not Lower-Extremity Force Production in Elderly Skilled Nursing Facility Patients

CHRISTOPHER BARNETT,[1] KAI WILLIAMS,[2] CHRIS GOLDSTRAW,[3] SHEILA KELLAGHER,[2] STEVEN THAM,[3] and WILLIAM E. AMONETTE[1]

[1]Human Performance Laboratory; University of Houston-Clear Lake; Houston, TX
[2]TruCare Solutions, Inc.; Houston, TX
[3]Legend Healthcare; Houston, TX

Category: Masters

ABSTRACT

Aging is associated with numerous deleterious muscular, skeletal, and neurologic adaptations that may result in functional performance decrements. These decrements are accelerated during periods of unplanned physical inactivity (e.g. hospitalization). Reductions in gait velocity are well documented in the elderly and may result from fear of falling, poor balance, or inability to accelerate because of reduced ground reaction force capabilities. **Purpose:** To determine if timed up-and-go scores were related to balance or lower extremity force production in skilled nursing facility patients. **Methods:** Data were collected on 40 patients (77.1±1.4y; 164.2±1.7cm; 75.3±3.3 kg) in an inpatient skilled nursing facility. The 15 males and 25 female patients had a mini mental exam score of >20, and provided informed consent. Each patient completed a timed up-and-go (TUG) test where they stood from a 40cm chair and walked 3 meters before circling a cone and returning to the chair. Total time from the initiation of movement until patients regained the seated position was recorded and used for analysis. The Berg Balance Test was also completed by each patient; only composite scores were used for comparison. Manual muscle tests were completed on the hip, knee, and ankle using a hand-held dynamometer that provided isometric peak force. Isometric force tests were completed for hip flexion (HF), hip abduction (HA), knee extension (KE), knee flexion (KF), plantar flexion (PF), and dorsi-flexion (DF). Pearson's correlation coefficients were calculated between TUG and Berg composite score and isometric force production at each joint. A multiple regression model was determined using backward elimination. For each comparison, an alpha of $p \leq 0.05$ was used to determine statistical significance. **Results:** Independently, TUG times were significantly associated with Berg (r=-0.61; p <0.001), but not age (r=0.24), height (r=0.22), weight (r=0.00), or force production in HF (r=-0.04), HA (r=0.06), KE (r=0.07), KF (r=0.07), DF (r=0.07), or PF (r=-0.11). The final multiple regression model derived via backward elimination explained 53% of the variance in TUG (r=-0.74) and included Berg (p<0.001), HA (p=0.001) and KF (p=0.02) scores. **Conclusions**: These data suggest that decrements in gait performance with an agility component (TUG) are associated with balance, but poorly associated with single-joint measurements of lower extremity force production. Experimental studies are needed to determine if therapeutic interventions improving balance result in improved gait performance or if multi-joint force production tests better predict gait velocity.