

00541 Instrumented Gait Variables Predict Falls After Stroke: a Prospective Cohort Study

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Aims: Gait speed and standard clinical balance assessments are known predictors of falls after stroke. However, measures of quality of gait may increase accuracy of prediction. This study aims to investigate the predictive ability of gait and balance variables, using innovative technology, to evaluate post-stroke falls risk in the community.

Methodology: A consecutive sample of 81 stroke survivors were recruited from two inpatient rehabilitation units in Australia and Singapore. Standard clinical assessments for gait and balance such as self-selected gait speed, step test, timed up and go (TUG) and dual-task TUG were completed at discharge from the unit. In addition, a depth-sensing camera (Kinect) was used to obtain fast-paced gait speed, stride length, step width, step length asymmetry, gait speed variability, medio-lateral and vertical pelvic displacement. The Wii Balance Board was also used to derive the centre of pressure velocity. Falls data was monitored for 12 months post-discharge using monthly calendars.

Result: 28% of individuals fell at least once over the 12 months. Fallers had reduced stride length, gait speed variability, medio-lateral and vertical pelvic displacement, and step test scores and higher TUG scores ($p \leq 0.001-0.048$). Stride length, step length asymmetry, medio-lateral pelvic displacement, step test and TUG scores ($p = 0.044$; IQR-odds ratio (OR)=1.60-7.85) (adjusted for country, prior falls, and assistance) significantly predicted falls. In regression models that also included gait speed as a covariate, mediolateral pelvic displacement remained significant ($p \leq 0.001$), with a reduction in displacement indicating a 6.75 times greater likelihood of falling.

Conclusion: Reduced displacement of the pelvis in the medio-lateral direction during walking, measured using the Kinect, was the strongest predictor of post-stroke falls compared with other gait variables and was superior to a standard clinical measure of gait speed. Portable technology to assess gait quality can enhance assessment and enable early intervention to prevent post-stroke falls.