

## **Smartphone-based gait assessment for better quality of life**

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This study used smartphones for gait assessment and analysis. Two hundred and twenty-eight older Chinese (mean age  $69.3 \pm 7.5$  years) participated in this study. Participants wore a smartphone on their lower back while performing the gait test. They walked at a comfortable speed, at a comfortable speed and serially subtracting by three, and at a fast speed. This study measured gait parameters including speed, step frequency, acceleration root mean square, step regularity, symmetry and variability. Participants were classified into pre-frail and non-frail groups based on the FRAIL SCALE. We interviewed twenty-eight participants and three medical professionals and developed a smart app for gait assessment.

The average speed (1.27m/s) of older Chinese seemed faster compared with older adults from literatures. Acceleration RMS was correlated with speed (Pearson  $r = .65-.76$ ,  $p < .001$ ) and could be a proxy of speed. Pre-frail older adults had significantly decreased speed, RMS, and step regularity compared with non-frail counterparts; step frequency, RMS, regularity, symmetry and variability were significantly different between walking types. The smart app records gait data of 30 seconds and generate a real-time gait assessment report including step frequency, RMS, regularity, symmetry and variability after the gait test. Overall, the acceptability from older adults is positive with participants indicating the app was easy to use and useful. The application is a useful tool for older Chinese to track their gait quality in home care.