

Reliability and validity of four step tests in older adults with mild to moderate dementia: a preliminary report

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Objectives: To examine the test-retest and inter-rater reliability, and construct validity of 4 step tests in older adults with mild to moderate dementia (OwD).

Background: Several step tests have been developed to evaluate the stepping performance of healthy older adults. The psychometric properties of these step tests, however, have not been investigated in OwD.

Methods: Individuals who are (1) 65 years or older; (2) able to walk independently; and (3) diagnosed with dementia were recruited. Participants completed the Four Square Step Test (FSST), Choice Stepping Reaction Time Test (CSRTT), Maximum Step Length Test (MSLT) and Alternate Step Test (AST) on 3 testing occasions conducted by 2 assessors independently within 2 weeks. The 2-minute walk test (2MWT), 10-meter walk test (10mWT), 30-second sit-to-stand test (30sSTS) and Berg Balance Scale (BBS) were used to evaluate physical performance.

Results: Fifteen participants have been recruited until June 2021. Good to excellent test-retest [intra-class correlation coefficient (ICC) = 0.71 – 0.94] and inter-rater reliability (ICC = 0.76 – 0.95) were found in the FSST, CSRTT and MSLT. The AST showed moderate test-retest (ICC = 0.64) and low inter-rater reliability (ICC = 0.41). The MSLT was strongly correlated with the 2MWT, 30sSTS and BBS (Pearson's $r > 0.60$), and the AST was moderately correlated with the 2MWT ($0.30 \leq r \leq 0.60$).

Conclusion: The preliminary results show that the FSST, CSRTT and MSLT have good to excellent reliability in OwD. The MSLT also shows excellent construct validity with other physical performance measures in this population.