



Five-repetition sit-to-stand

Description

The five-repetition sit-to-stand is commonly used to measure mobility and function in older adults. Sit-to-stand is a mechanically demanding task performed frequently each day,¹ yet many older adults have difficulty performing this task, for example, people with neurological impairment.² The five-repetition sit-to-stand may be used as an individual measure³ or as part of a standardised battery to assess physical function.⁴

The five-repetition sit-to-stand requires the individual to stand up and sit down five times as fast as possible without using their hands to push up from the chair. The time taken to perform the task is measured using a handheld stopwatch;⁵ increased time reflects poorer performance. A standard armless chair is used, usually 43–47 cm in height. The back of the chair should be stabilised against a wall to ensure safety and stability. The individual is instructed to fold his/her arms across his/her chest to avoid using the hands. The test commences upon the assessor instructing the individual to begin and ceases when the individual

sits back fully in the chair after the fifth repetition with his/her back coming to rest against the back of the chair.

Reliability, validity and responsiveness: The five-repetition sit-to-stand is highly reliable (intraclass correlation coefficients [ICCs] 0.76–0.99 for test-retest reliability and ICCs 0.97–1.00 for inter-rater reliability) in older adults.^{3,5,6} This includes those with musculoskeletal and neurological conditions such as osteoarthritis,⁷ Parkinson's disease,^{8,9} stroke¹⁰ and spinal cord injury.¹¹ The associated measurement error is also small (0.6–1.4 seconds).^{7,9} Validity of the five-repetition sit-to-stand has been reported in these populations, although the correlations with gait ($r = 0.4–0.7$),^{4,8,11–13} balance ($r = 0.3–0.7$)^{3,4,8} and knee extensor strength ($r = 0.3–0.5$)^{3,8} are variable. Additionally, increased time taken to perform this task discriminates between individuals with and without neurological impairment.^{10,12} A clinically relevant change of 2.3 seconds and moderate responsiveness have been reported for people with vestibular disorders.¹³

Commentary

The five-repetition sit-to-stand is a simple to use, reliable and valid measure of physical function in older people, including those with musculoskeletal or neurological conditions. Poor performance on this test highlights mobility problems and is associated with subsequent disability.¹⁴ While successful performance of the five-repetition sit-to-stand requires lower limb muscle strength,¹⁵ individuals who complete this task have met the minimum threshold for strength; this may explain why strength accounts for only a small proportion of the variance in this timed measure.³ Completing the five-repetition sit-to-stand requires considerable skill to generate sufficient speed of movement^{16,17} and co-ordinate multiple segments with correct timing^{16,18} in order to maintain balance. Hence, the time taken to complete this task is likely determined by factors such as co-ordination and disease-specific impairments.⁷

Apart from being a quick and valid measure of mobility, another advantage of the five-repetition sit-to-stand is its ability to predict fall risk.^{5,19} Cut-off scores of 12 to 16 seconds on the five-repetition sit-to-stand are associated with an increased risk of falls in the general older population and in people with Parkinson's disease, respectively.^{5,8} Further research to determine clinically relevant change and responsiveness of the five-repetition sit-to-stand in different population groups will assist clinicians to determine meaningful change in mobility and fall risk for diverse patient groups.

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