Standardizing Floor Transfers: The Importance in Physical Therapy

Erin Wallach, SPT; Jennifer Bazan-Wigle, PT, DPT; Becky Farley, PhD, MS, PT

Human aging results in progressive decreases in skeletal muscle mass and strength with both factors contributing to overall physical frailty.[1] Physical frailty is often related to functional decline, increased disability, and increased risk for single and recurrent falls.[2] One in three community-dwelling adults aged 65 years or older suffer a fall each year with a majority of those adults experiencing multiple falls.[2,3] The inability to rise from the floor is one of the most common reasons older adults experience complications after a fall, and this inability is not always a consequence of injury.[3,4] One study reports that only 47% of older adults are able to rise from the floor without assistance.[3] The inability to rise unassisted increases the likelihood of suffering from functional decline or expiring in the following year.[3] Given this correlation between ability to get up off the floor and physical frailty, floor transfers "may represent a major factor that contributes to independent living status".[5]

Until now, little research has been done to standardize a method to assess patients' ability to perform a floor transfer. Ardali et al. studied the reliability and validity of a floor transfer test and its ability to assess physical disability, frailty, and functional mobility.[5] This study found that a floor transfer test could accurately assess those variables against a self-reported floor transfer ability questionnaire, Physical Functioning Scale, Phenotype of Physical Frailty, and the Short Physical Performance Battery.[5] The authors argued that a floor transfer test is a quick and practical alternative to other measures, and may serve as an indicator of safety within the community and ability to live independently.[5] Their floor transfer test was administered in the following manner. Participants (all aged 65 years or older) first watched a video explaining the task and demonstrating an efficient floor transfer.[5] Participants were prompted to transfer from standing to supine to standing with erect posture, without any support or time restriction.[5] One trial was performed to prevent fatigue.[5] Performance was deemed "successful" if they could perform this transfer without support and without stumbling.[5] Participants who "failed" under these conditions performed the transfer under modified conditions where they could use a standard chair without armrests for support.[5] Participants were scored as independent (successful under normal conditions), assisted (successful under modified conditions), and dependent (unsuccessful under both conditions).[5] Though this study found good reliability and validity to other measures, their floor transfer test does not assess participants' quality of movement, movement strategies, or time to complete transfer.

A study by Nagrajan and D'Souza developed a "floor-sitting movement analysis proforma" to assess the different movement patterns utilized when performing floor-sitting between younger and older Indian adults.[6] They found that older adults used "more number of movement components, asymmetrical patterns, more support, and more time" as compared to the movements of younger adults.[6] These differences in movement patterns support the concept of "developmental regression", where older adults resort to using lower developmental movement patterns to adapt to age-related sensorimotor changes.[6,7] Similar differences in movement patterns are observed between younger children and older children.[7] While not assessing a true floor transfer (as is experienced after a fall), this study shows that analyzing the quality of movement provides insight into participants' strength, balance, sensory processing, and motor planning.

Because of the negative consequences of the inability to rise from the floor without assistance, a study by Hofmeyer et al assessed the effects of floor-rise strategy training in a group of disabled older adults.[8] They hypothesized that compared to controls, those participants receiving training would be able to perform the transfer more quickly, with less difficulty, and without aggravation of symptoms.[8] Participants practiced transferring from standing to supine to standing again with integration of various other positions, such as side-lying, quadruped, and plantigrade.[8] In addition to participating in training of effective floor-rise movement strategies, this study assessed participants' self-rated performance of the task, such as how much difficulty they may have performing the transfer, how quickly they can perform it, whether or not they need external support, and if they have any conditions that limit their transfer ability (strength and balance impairments or pain).[8] Participants who completed the floor-rise training showed modest improvements in floor-rise ability with a few participants being able to perform the task without support, compared to the control group who showed no improvements in ability.[8] In addition to physical improvements with training, several studies note that fear of falling is an important factor in ability to rise from the floor and training may reduce this fear.[9,10] For this reason, it is important to not only measure participants' ability to perform the transfer but also their perception or self-efficacy in completing the task.

Wang et al studied several physical performance tests to evaluate mobility in community-dwelling elders.[11] Participants were classified as "able", "decreased", or "disabled" according to their self-reported ability to walk several blocks and climb stairs.[11] A set of physical performance measures were then used to confirm these classifications, including a timed floor transfer.[11] Participants in this study were asked to transfer from an upright standing position, sit down on the floor, and rise to a standing position as quickly as possible as time was recorded.[11] The time taken to complete the task was standardized by participants' body height and converted to meters per second.[11] Out of the 203 participants in the study, 22 participants were unable to complete the timed floor transfer (4 in the able group, 5 in the decreased group, and 13 in the disabled group), even though they could complete the other measures (such as functional reach, timed 5-foot walk, timed 5-step, and 5-min-walk endurance test).[11] No significant differences on timed floor transfer were found between the decreased and disabled group, and the timed floor transfer demonstrated 87.5% specificity in discriminating the able group from the decreased group.[11] Therefore, this study postulates that a floor transfer test may identify early decline in otherwise high-functioning individuals.[11]

Given what is known about floor transfer ability, its correlation with physical frailty, and the reviews of the above studies, we have created a standardized floor transfer measure to better assess this task (Figure 1 and Figure 2). In our measure, we are assessing patients' ability to transfer from a standing position to prone on a mat to an upright standing posture. Murphy et al used a timed floor transfer to screen for fall risk and found that it predicted falls in community-dwelling elders with 95.5% accuracy, proving to be an important discriminative measure.[12] Therefore, we believe including time to complete transfer is a key component of this test (Figure 2, Item 1). Several of the studies used chairs, either in modified conditions or with all participants performing the task, and we believe this is important in helping patients be as successful as possible.[5,6,8] Hofmeyer et al placed this chair on the participant's dominant side, and we have replicated that set-up in our measure (Figure 1).[8] Because of the wide variety of ability levels amongst older adults, we included a section to quantify the amount of assistance needed throughout the transfer, ranging from no physical assistance and no chair to

use of chair and total physical assistance (Figure 2, Item 2). We believe this is an important aspect to document for baseline assessment and potential goal-writing. Nagrajan and D'Souza explain the movement strategies and deficits seen during floor-sitting as people age.[6] Declining movement quality and increased deficits are factors to consider with all ages and diagnoses, so we included these items in our measure (Figure 2, Item 3). The fear of falling and participants' self-assessment of the task are important considerations as they both correlate with fall risk and self-effiacy.[9,10] Hofmeyer et al included a performance questionnaire prior to administering the task, and the study by Ardali et al also included a self-reported floor transfer ability questionnaire.[5,8] Therefore we included the following question to be asked prior to performing the transfer: "How confident are you that you will be able to perform this transfer?" We also included the following question to be answered after the transfer is performed: "How difficult was it for you to perform this transfer"? Both questions have corresponding visual analog scales (Figure 2). We believe these subjective measures can also be utilized in goal-writing and assessment of patient progress and quality of life. Lastly, because participants' physiological signs and symptoms may affect performance on the floor transfer, we included a section to denote if and what signs or symptoms were aggravated by the transfer (Figure 1).[8]

Given the complexity of the aging process and the diversity of movement strategies used during floor transfers, we have created a simple measure that both quantitatively and qualitatively analyzes and scores patient performance. Being able to get off the floor unassisted is crucial to decreasing fall risk, preventing secondary consequences from falls, and continued independent living and functional mobility.[2,4,5] As physical therapists, we are uniquely qualified to improve patients' floor transfer ability and confidence. This standardized floor measure will assist therapists in holistically viewing a patient's floor transfer ability, identifying deficits, and setting goals for improved performance and independence.

Bibliography

1. Clark C, Manini M. Functional consequences of sarcopenia and dynapenia in the elderly. Curr Opin Clin Nutr Metab Care. 2010;13(3):271-276.
2. Smee D, Anson J, Waddington G, Berry H. Association between physical functionality and falls risk in community-living older adults. Curr Gerontol Geriart Res. 2012;2012(6):864516.
3. Tinetti M, Liu W, Claus E. Predictors and prognosis of inability to get up after falls among elderly persons. JAMA. 1993;269(1):65-70.
4. Gurley R, Lum N, Sande M et al. Persons found in their homes helpess or dead. N Engl J Med. 1996;334:1710-1716.
5. Ardali G, Brody LT, States RA, Godwin EM. Reliability and Validity of the Floor Transfer Test as a Measure of Readiness for Independent Living Among Older Adults. J Geriatr Phys Ther. 2017;0(0):1-12. doi:10.1519/JPT.0000000000000142.
6. Nagrajan A, D'Souza SA. Using the Newly Developed Floor-Sitting Movement Analysis Proforma to Study the Effect of Age and Activity on Floor-Sitting in Indian Adults. J Cross Cult Gerontol. 2017;32:71-93. doi:10.1007/s10823-9310-4.
7. VanSant AF. Rising from a supine position to erect stance. Description of adult movement and a developmental hypothesis. Phys Ther. 1988;68(2):185-192. doi:10.1093/ptj/68.2.185
8. Hofmeyer MR, Alexander NB, Nyquist L V, Medell JL, Koreishi A. Floor Rise Strategy Training in Older Adults. JAGS. 2002;50(10):1702-1706. doi:0002-8614/02/$15.00.
9. Tinetti M, Richman D, Powell L. Falls efficacy as a measure of fear of falling. J Gerontol. 1990;45:239-243.
10. Tennstedt S, Howland J, Lachman M et al. A randomized, controlled trial of a group intervention to reduce fear of falling and associated activity restrictions in older adults. J Gerontol B Psychol Sci Soc Sci. 1998;53:384-392.
11. Wang C-Y, Olson SL, Protas EJ. Physical-Performance Tests to Evaluate Mobility Disability in Community-Dwelling Elders. J Aging Phys Act. 2005;13:184-197.
12. Murphy M, Olson S, Protas E, Overby R. Screening for falls in community-dwelling elderly. J Aging Phys Act. 2003;11(1):66-80.