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Functional Fitness In Older Healthy Individuals And Those Who Suffered A Stroke: A Prospective Observational Study

Diane E. Adamo
MS, PhD, Associate Professor
Physical Therapy Program, Eugene Applebaum College of Pharmacy and Health Sciences, Institute of Gerontology, Wayne State University, Detroit, MI 48202

Alicia Jones
MOT, OTR/L, Graduate Student
Occupational Therapy Program, Eugene Applebaum College of Pharmacy and Health Sciences, Wayne State University, Detroit, MI 48202

ABSTRACT

Question: What is the risk for loss of functional independence in individuals who suffered a stroke and healthy older adults? What physical performance measures indicate the greatest loss of functional independence for both groups? Design: Prospective, observational study. Participants: Fourteen individuals who suffered a stroke and 14 age-matched healthy controls. Outcome measures: Six performance measures (chair stand, arm curl, chair sit and reach, back scratch, 6-minute walk/2-minute march-in-place and 8-foot up and go) that comprise the Senior Fitness Test (SFT). Results: Individuals who suffered a stroke showed reduced lower body flexibility (CI [1.2 – 9.1]; $p < 0.05$) and took longer to perform the timed up and go task than healthy controls (CI [.18 - 11.5]; $p < 0.05$). Upper and lower body strength, endurance and upper body flexibility were similar between groups. However, 91% of individuals with a stroke and 71% of the healthy controls were at risk for functional loss on at least 4 / 6 SFT items. Conclusions: To delay the progressive loss of independence and eventual placement in residential care or assisted living facilities, both groups would benefit from understanding the physical attributes that place them at risk for functional loss. Thus, we propose the use of the Senior Fitness Test to identify physical attributes that place individuals at risk for loss of independence that, in turn, will help them to develop task-specific fitness goals.

Keywords: functional fitness, cerebrovascular accident, quality of life

INTRODUCTION

Approximately 800,000 people in the United States experience a stroke and nearly 25% of strokes are recurrent. [1] Although participation in physical activity reduces first and subsequent strokes[2], current data suggests that most people are reluctant to engage in regular exercise programs even though most understand it is good for their health. [3,4] Less than 25% of stroke survivors participate in physical activity and self-reports regarding sedentary behaviors has raised concerns at state and national levels [1] and worldwide. [5,6] As a consequence, sedentary behavior is a well-known contributor to declines in functional performance specifically as it relates to activities of daily living tasks which are needed for ones' independence.

Increased dependency in Activities of Daily Living (ADLs) is one of the primary reasons individuals seek alternative housing at assisted living residential facilities, and eventually to nursing homes. [7, 8] Specific ADL performance and survey-based measures are valuable when

assessing ones' level of ADL care but they are not adequate for identifying the physical attributes which underlie functional limitations that contribute to disability and loss of functional independence. Alternatively, physical performance measures, such as grip strength and walking speed, are good predictors of disability and assess an individual's risk for loss of functional independence. [9]

Similar to findings in older individuals [10], fatigue in a person with a stroke contributes to difficulty performing ADL tasks. [11, 12] In this study, the Senior Fitness Test (SFT) was administered to people who had a stroke and their age matched healthy counterparts to determine level of functional fitness and risk for loss of functional independence. The Senior Fitness Test (SFT) quantifies physical attributes related functional fitness which refers to the ability to perform normal everyday activities safely and independently without undue fatigue. [10] The SFT includes clinical measures that have high reliability and validity in stroke populations making it well suited to test functional fitness in individuals who suffered a stroke. The research questions are the following: 1) What is the risk for loss of functional independence in individuals who suffered a stroke and healthy older adults? 2) What physical performance measures indicate the greatest loss of functional independence in both groups?

METHOD

Design

A prospective, observational study was the study design used to determine differences in physical performance measures for individuals who suffered a stroke and healthy adults. Data from both groups was collected by the principal investigator. This study was carried out in accordance with the recommendations of Wayne State University Human Investigation Committee with written informed consent from all participants.

Participants

Individuals who suffered a stroke and healthy controls participated in this study (see details, Table 1A. & B). All individuals responded to flyers posted in the community. Phone interviews were conducted to screen individuals to ensure they were between the ages of 60 – 90 years, able to walk continuously for at least 6 minutes at a comfortable pace and for those who had a stroke, to report having had their first ever stroke more than 6 months ago. [13, 14] If they agreed to participate and met the inclusion criteria, they were scheduled for an appointment in the laboratory within 2 weeks of the initial phone interview. Upon arrival to the testing laboratory participants were further screened to determine if they met the inclusion criteria for cognitive and motor abilities. Participants were required to obtain a Mini Mental State Exam (MMSE) score of 24/30 or greater to screen for cognitive abilities and a total Fugl Meyer motor score of 68/100 or higher: 44 for upper extremity[15] and 24 for lower extremity[16] to screen for motor abilities. Participants were excluded if they did not meet the inclusion criteria and/or if they reported a new cardiovascular event such as chest pain, dizziness, exertional angina, musculoskeletal difficulties or other physical difficulties since the time of their initial phone screening. Following the screening process, individuals who met all the inclusion criteria were administered the SFT items in the standardized manner. All testing took place at the Movement Analysis and Sciences Performance Laboratory at Wayne State University.

Table 1. **A**. Demographics corresponding the stroke and healthy control groups for M/F, age and MMSE scores (mean ± SD). Age and MMSE scores were similar between groups ($p > 0.05$). **B.** The side, time since stroke (mean ± SD) and number of strokes (mean ± SD) and UE and LE FM (mean ± SD) scores for the stroke group.

A. Participants	Individuals with a Stroke n=14	Healthy controls n=14
Gender, M/F	2/12	14
Age, (Mean ± SD)	73.43 ± 6.22	72.93 ± 5.58
MMSE, (Mean ± SD)	27.78 ± 1.72	27.78 ± 1.85

MMSE – Mini Mental State Exam; UE Upper Extremity; LE Lower Extremity;
FM –Fugl Meyer

B. Individuals with a Stroke	
Side of stroke R/L	6/8
Time since stroke, mths (mean ± SD)	86.25 ± 56.5
Number of strokes, (mean ± SD)	1.28 ± .61
Fugl Meyer, (Mean ± SD), UE	61.07 ± 5.17
Fugl Meyer, (Mean ± SD), LE	29.43 ± 2.12

Table 2. Senior Fitness Test items. The physical attribute tested and the outcome measure for each item. Each participant completed the test item using standardized protocol. The six minute walk test and 2 minute step test are both used to test endurance.

Test item	Physical attribute	Outcome measure
Chair stand	lower body strength	No. of full stands completed in 30s. Arms crossed at wrists, held against the chest
Arm curl	upper body strength	No. biceps curls completed in 30 s. women 5lb weight; men 8lb weight
6-minute walk test	endurance	The total distance walked in 6 min is recorded.
2-minute step test	endurance	No. full steps completed in 2 min is recorded; knee must be lifted to mid-thigh height
Chair sit-and-reach test	lower body flexibility	With participant seated on the edge of a chair with a preferred leg extended forward and the other leg bent and resting on the floor, they are asked to overlap their hands with arms outstretched and lean forward towards or past their toes. The furthest distance reached in two trials was recorded. A plus score indicated they reached past the toes; a negative value indicated the reach was short of reaching the toes.
Back Scratch	upper body flexibility	With participant standing, they are asked to place their preferred hand over the same shoulder with fingers extended and place the other hand behind the back with fingers extended. Then participants were asked to reach the middle of their back with both hands as far as possible. The closest distance reached of two trials was recorded.
8-foot get up and go	dynamic agility and balance	With participant seated in the middle of a chair with their hands on their thighs, they are asked to get up from the chair and walk 8 feet around a cone and return to the start position. They are asked to return to a seated position and complete the task as safely and quickly as possible. Participants were given two trials, and the best time was recorded.

Clinical assessment/ outcome measures

The SFT was administered to the participants to quantify physical attributes related functional fitness. (See Table 2) The SFT is considered a functional fitness test as opposed to a health-related fitness test because its purpose is to assess the physical characteristics needed for functional mobility in older adults. [10] The SFT has been shown to be a valid and reliable measure in older [17] and clinical[18] populations. The SFT has established normative standards and, for some test items, criterion-referenced standards which allow the individual to compare their performance with a larger age, gender matched population. When interpreting test scores, higher scores mean better performance for all test items except the 8- foot-up and go test for which a lower score indicates better performance. The SFT provides continuous scale measures on all test items which minimizes the potential for ceiling and floor effects. The SFT has five-year age group percentile norms for independent-living men and women aged 60-94 years. Criterion – referenced (CR) standards were also developed for upper and lower body strength, endurance (2 min step test and 6 MWT) and agility/dynamic ability (TUG). [19] CR fitness standards were developed from a subset of fitness scores obtained by 2,140 participants from the original sample of 7, 183 older adults who were tested in the development of normative standards[20] and who met the age-adjusted criteria for having moderate functional ability as defined by the Composite Physical Function (CPF) scale. [20]

Statistical Analysis

Estimates of effect size based on Cohen's *d* were calculated using t-tests and corresponding standard deviations from published data investigating some components of functional fitness in stroke populations. Effect sizes for 2-independent samples ranged from 0.63-0.75 with 10-18 participants per group. Descriptive statistics were used to report demographics of the tested groups. Mean (SD) and confidence intervals were reported for clinical data. One-way ANOVA between subjects (control, stroke) was conducted to determine group differences in SFT performance measures. A p value <0.05 was considered statistically significant.

RESULTS

For SFT items, individuals who suffered a stroke completed fewer chair stands, arm curls and showed less upper body flexibility than healthy controls; however statistically significant differences were not found ($p > 0.05$). All individuals who suffered a stroke and 83% controls fell below the threshold value for number of chair stands (13.5) indicating a potential risk of loss of functional independence. [19, 20] For arm curls, 85% of stroke and 75 % of controls performed below the threshold (15.5) indicating a potential risk of loss of functional independence. [19, 20] The arm selected by the stroke group was the less impaired. For the 8-foot up-and-go test, the time taken to complete the task was longer for the stroke compared to the healthy control ($p < 0.05$). Ninety-three percent participants in the stroke group and 65% of the healthy controls performed above the threshold (5.8s) indicating a potential risk of loss of functional independence. For lower extremity flexibility, the distance reached was less for the stroke compared to the healthy control ($p < 0.05$). Fifty-five percent of individuals with stroke and 14 % of healthy controls showed a reach distance that was below normal range of - 3in. Criterion standards for upper and lower body flexibility are not available to assess risk for loss of functional independence. (See Table 3 for details). For the 6 MWT, where walking longer distances indicates better performance, individuals who suffered a stroke walked a mean ± SD distance of 279± 111 yds. Sixty-four percent of individuals who suffered a stroke were below the SFT CR threshold 350 yds. [20] and 50 % were below the normative value 422 yds.[21] The healthy older adults did not complete the 6MWT.

Table 3. Mean ± SD for Senior Fitness Test item for Healthy Controls and Individuals with a Stroke showing group differences from independent t tests and reporting CI and *p* values.

SFT item (mean ± SD)	Healthy Control	Individuals with a Stroke	Level of significance
No. Chair stand	9.8 ± 3.1	8.1 ± 2.6	*t* (28) = 1.1, p>0.05, CI [-.74-4.1]
No. Arm Curl (used of preferred arm)	13.6 ± 2.3	12.5 ± 5.5	*t* (28) = 1.441, p>0.05, CI [-2.4 - 4.3].
Upper body flexibility (in)	-3.6 ± 5.0	-3.0 ± 8.2	*t* (28) = -1.0 , p>0.05, CI [-5.9 – 4.9]
Lower body flexibility (in)	1.35 ± 4.1	-3.8 ± 4.9	*t* (28) = 2.392, p<0.05*, CI [1.2 – 9.1]
8-foot up-and-go test (s)	6.6 ± 1.3	12.4 ± 10.2	t (28) = -2.12; *p*<0.05 CI [.18 - 11.5]

DISCUSSION

Upper and lower body strength, endurance and upper body flexibility were similar between groups. However, 91% of individuals with a stroke and 71% of the healthy controls were at risk for functional loss on at least 4 / 6 SFT items. Findings here, highlight the significant contribution of individual's physical measures to performance on ADL tasks. Over time, older individuals and older individuals who suffered a stroke may require more assistance as their ability to perform ADLs declines which may lead to placement in a nursing home. Progression of functional loss has been reported in assisted living facilities compared to independent community dwellers where slower walking speeds have been associated with increased risk of adverse outcomes. [22, 23, 24]

Slower walking speeds have served as an independent predictor for change in health status, decline in function, falls, nursing home placement and prolonged disability. Pellicer et al., 2017 et al found that walking distance was associated with higher scores on a self-report ADL survey, served as a measure of exercise tolerance, and correlated was with aerobic capacity and muscle strength. [25] About 50% of stroke survivors are affected by hemiparesis which impacts their ability to walk. [26] Walking velocity may be half the normal speed and require 2-3x more energy for individuals with a stroke that, in turn, significantly affects their level of activity. Walking speed less than 0.6m/second is a strong predictor of decline in physical function and increased difficulty in ADLs. [27]

Further, reduced ability to rise from a chair as seen in the current study and others [28, 29] has significant implications for functional independence as it is associated with ones' ability to walk, transfer and perform other mobility skills. The ability to rise from a chair at least once is considered as a measure of transfer ability whereas the ability to rise from a chair repeatedly is a measure of lower limb strength. [30] Chair rise ability is a sub-component of the TUG which is a measure of dynamic balance and agility. Specifically, lower limb extensor power of the affected and unaffected limb was associated with better performance of the TUG, higher function and found to be independent of the severity of any residual asymmetry in lower limb strength.[31] Findings here support the notion that the TUG is a complex functional activity and together with its sub-components associated with chair rise ability (lower limb strength) help to identify the extent of limitations in ADL performance. Further, 68.2% of the variance in performance of ADLs was identified by 4 domains of physical function to include mobility / fall risk = 26.5%; coordination = 15%; fitness = 14.7% and flexibility = 12 % .[26]

Although most ADL recovery occurs by 3months post stroke, residual deficits may remain for the rest of the person's life and impact their ability to progress to a level of independence. A study [32] found that some ADL tasks are easier to perform by others and the rate of recovery varies significantly for each task in a stroke population. For example, feeding and grooming was the least difficulty to perform while bathing and stair climbing were the most difficult to perform. Bathing and stair climbing require many of the physical performance measures tested

in the present study. Decreased lower limb strength, chair rise ability and dynamic agility compromise the ability to safely perform many ADL tasks and increase the risk for falls. For individuals who suffered a stroke, studies have focused on changes in ADLs or changes in physical performances. In this study, using SFT measures as an indicator of potential risk associated with loss functional abilities addresses some of the gaps in understanding the relationship between physical attributes and self-management of ADLs in both a stroke population and healthy adults.

To delay the progression of a loss of independence and placement in residential care or assisted living facilities, both groups would benefit from understanding the physical attributes that place them at risk for functional loss. Thus, we propose the use of the Senior Fitness Test to identify physical attributes that place individuals at risk for loss of independence that, in turn, will help them to develop task-specific fitness goals. Individuals who suffered a stroke when compared to healthy age matched controls showed limitations lower body flexibility and dynamic balance and agility.

There is currently a lack of clinical guidelines to identify the contribution of specific physical deficits to functional fitness or the ability to perform functional tasks. [19,20] Continued participation in physical activity helps to maintain gains obtained during therapy and promotes functional independence. Although the purpose of the present study was to compare SFT measures between groups, we found that individuals in both groups scored below normative and CR data for select tasks despite one group performing better than another. Further, an individual may perform within normative values for one task and not another which highlights the importance of referring to performance based task-specific threshold standards rather than a single global marker such as walking speed to understand the relationship between ADL function and physical attributes.

The current study had limitations. First, this was a cross-sectional study and the sample size was too small to generalize across older individuals and individuals who suffered a stroke whose demographics, cognitive status and FM scores differed from the tested population. Secondly, there were presence of outliers, but they are often found in clinical studies. Future studies are needed to assess the use of SFT in a clinical setting as a tool for clinicians to use in formulating a discharge plan of care unique to each individuals' physical attributes. A follow up study to assess the integration of information learned from feedback of SFT and its effect on changes in levels of physical activity, functional performance and perception of health is also needed.

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Compliance with ethical standards

Conflict of Interest: The authors declare that they have no conflict of interests

Ethical Standards: The study was approved by the ethics committee at Wayne State

University and therefore have been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Informed Consent: All participants signed an informed consent form.

Declaration of interest

The authors report no conflicts of interest

References

Roger VL, Go AS, Lloyd-Jones DM, et al. Heart disease and stroke statistics-2012 update: A report from the American Heart Association. *Circ.* 2012; 125(1): e2-e220

Hackam DG, Spence JD. Combining multiple approaches for the secondary prevention of vascular events after stroke: a quantitative modeling study. *Stroke.* 2007; 38(6):1881-1885.

Jennings G, Nelson L, Nestel P. The effects of changes in physical activity on major cardiovascular risk factors, hemodynamics, sympathetic function, and glucose utilization in man: a controlled study of four levels of activity. *Circ.* 1986; 730(1): 30-40.

Lindahl M, Hansen L, Pedersen A, et al. Self-reported physical activity after ischemic stroke correlates with physical capacity. *Adv in Physiother.* 2008; 10(5): 188-194.

Van der Ploeg HP, Banks E, Bauman A. Is sitting harmful to health? It is too early to say-reply. *Arch Intern Med.* 2012; 172(16):1272-1273.

Joseph P, Yusuf S, Lee SF et al. Prognostic validation of a non-laboratory and a laboratory based cardiovascular disease risk score in multiple regions of the world. *Heart.* 2019; 104(7): 581-587.

Aud MA, Rantz MJ. Admissions to skilled nursing facilities from assisted living facilities. *J of Nurs Care Qual*. 2005: 20:16-25.

Golant SM. Do impaired older persons with health care needs occupy U.S. assisted living facilities? An analysis of six national sites*. J Gerontol: Soc Sci*. 2004; 59B:S68-S79.

Amiard V, Libert JP, Descatha, A. Is there an accurate relationship between simple self-reported functional limitations and the assessment of physical capacity in early old age? *Plos One.* 2019; 14(3): 1-12.

Rikli RE, Jones CJ. (2001) Senior Fitness Test Manual. Human Kinetics.

Flansbjer UB, Holmback AM, Downham D, Patten C, Lexell, J. Reliability of gait performance tests in men and women with hemiparesis after stroke. *J Rehabil Med.* 2005 37(2), 75–82.

Fulk GD, Echternach JL, Nof L, O'Sullivan S. Clinometric properties of the six-minute walk test in individuals undergoing rehabilitation poststroke. *Physiother theory and pract.* 2008; 24(3), 195-204.

Purath J, Buchholz SW, Kark DL. Physical fitness assessment of older adults in the primary care setting. *J Am Acad of Nurse Practitioners.* 2009; 21(2), 101-107.

Hiengkaew V, Jitaree, K, Chaiyawat P. Minimal detectable changes of the Berg Balance Scale, Fugl-Meyer Assessment Scale, Timed "Up & Go" Test, gait speeds, and 2-minute walk test in individuals with chronic stroke with different degrees of ankle plantarflexor tone. *Arch Phys Med Rehabil.* 2012; 93(7), 1201-1208.

Adamo DE, Talley SA, Goldberg A. Age and task differences in functional fitness in older women: comparisons with Senior Fitness Test normative and criterion-referenced data. *J Aging Phys Act.* 2015; 23(1), 47-54.

Sanford J, Moreland J, Swanson LR, Stratford PW, Gowland C. Reliability of the Fugl- Meyer assessment for testing motor performance in patients following stroke. *Phys Ther.* 1993; 73(7), 447-454.

Liu JD, Quach B, Chung, PK. Further understanding of the Senior Fitness Test: Evidence from community dwelling high function older adults in Hong Kong. *Arch. Gerontol Geriatr.* 2019; 82; 286-292.

Hesseberg K, Bentzen H, Berland A. Reliability of the Senior Fitness Test in Community-dwelling older people with cognitive impairment. *Physiother. Res. Int.* 2015; (20)37-44.

Rikli, R. E., & Jones, C. J. (2013). *Senior fitness test manual*. Human Kinetics.

Rikli RE, Jones CJ. Functional fitness normative scores for community-residing older adults, ages 60-94. *J Aging Phys Act.* 1999; 7(2): 162-181.

Wevers LE, Kwakkel G., et al. Is outdoor use of the six-minute walk test with a global positioning system in stroke patients' own neighbourhoods reproducible and valid? *J Rehabil Med. 2011; 43*(11): 1027-1031.

Guralnik JM, Ferrucci L, Pieper CF, Leveille SG, Markides KS, Ostir GV et al. Lower extremity function and subsequent disability: consistency across studies, predictive models and value of gait speed alone with the short physical performance battery. *J Gerontol A Biol Sci Med Sci*. 2000; 55(4): M221-M231.

Onder G, Penninx BW, Lapuerta P, Fried LP, Ostir GV, Gurlanik JM, et al. Change in physical performance over time in older women: the Women's Health and Aging Study. *J Gerontol A Biol Sci Med Sci.*2002; 57(5):M289-M293.

Studenski S, Perera S, Wallace D, Chandler JM, Duncan PW, Rooney E et al., Physical performance measures in the clinical setting. *J Am Geriatr Soc.* 2003; 51(3): 314-322.

Pellicer MG, Lusar AC, Casanovas JM, Ferrer BS. Effectiveness of a multimodal exercise rehabilitation program on walking capacity and functionality after a stroke. *J. Exerc Rehabil.* 2017; 13(6): 666-675.

Kelly-Hayes M, Beiser A, Kase CS, Scaramucci A, D'Agostino RB, Wolf PA. The influence of gender and age on disability following ischemic stroke: the Framingham study. *J Stroke.* Cerebrovasc Dis. 2003; 12(3): 119-126.

Guralnik JM, Ferrucci L. Underestimation of a disability occurrence in epidemiological studies of older people: is research on disability still alive? *J Am Geriatr Soc.* 2002; 50(9): 1599-1601.

Alexander NB, Galecki AT, Grenier ML, Nyquist LV, Hofmeyer ML, Grunawalt JR et al. Task-specific training to improve the ability of activities of daily living-impaired older adults to rise from a bed and chair. *J Am Geriatr Soc.* 2001; 49:1418-1427.

Ostir GV, Markides KS, Black SA, Goodwin JS. Lower body functioning as a predictor of subsequent disability among older Mexican Americans. *J Gerontol A Biol Sci Med Sci.* 1998; 53(6): M491-M495.

Simonsick EM, Maffeo CE, Rodgers SK, Skinner EA, Davis D, Guralnik JM et al. Methodology and feasibility of a home based examination in disabled older women: the Women's Health and Aging Study. *J Gerontol A Biol Sci Med Sci.* 1997; 52(5):M 264-M274.

Saunders DH, Greig CA, Young A, Mead GE. Association of activity limitations and lower-limb explosive extensor power in ambulatory people with stroke. *Arch Phys Med Rehabil.* 2008; 89, 677–683.

Kong KH, Lee J. Temporal recovery of activities of daily living in the first year after ischemic stroke: A prospective study of patients admitted to a rehabilitation unit. *NeuroRehabilitation.* 2014; 35: 221-226.

Fig. 1 Number of chair stands: All individuals who suffered a stroke and 83% of healthy controls fell below the CR threshold represented by the horizontal line (13.5) completed chair stands) indicating risk for loss of functional independence

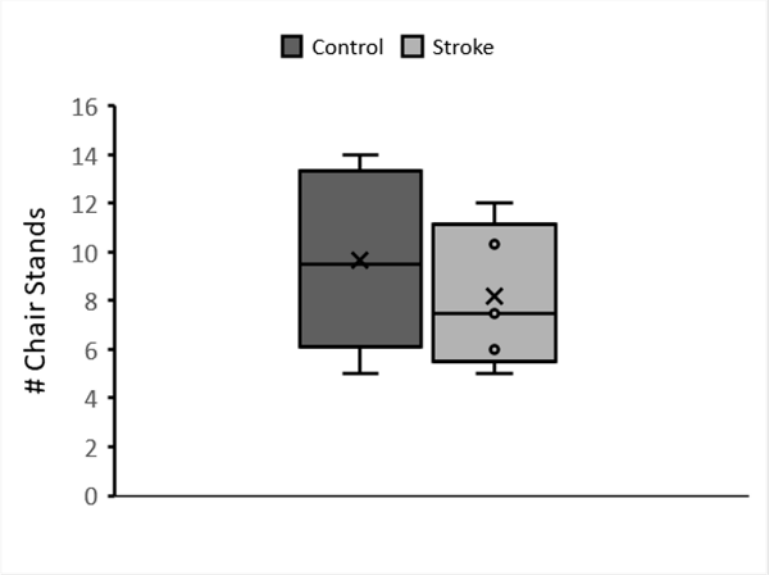

Fig 2 Number of arm curls: 75% of the stroke group and 85% of the control group performed below the CR threshold represented by the horizontal line (15.5 completed arm curls) indicating risk for loss of functional independence.

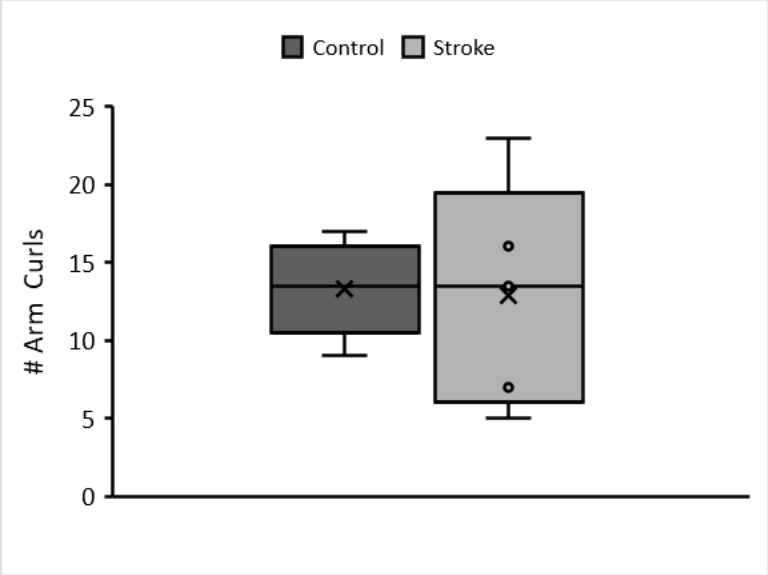

Fig 3 Sit and reach mean ± SD (in): 55% of participants in the stroke group and 14% of the healthy control group performed below normal range (-3.0).

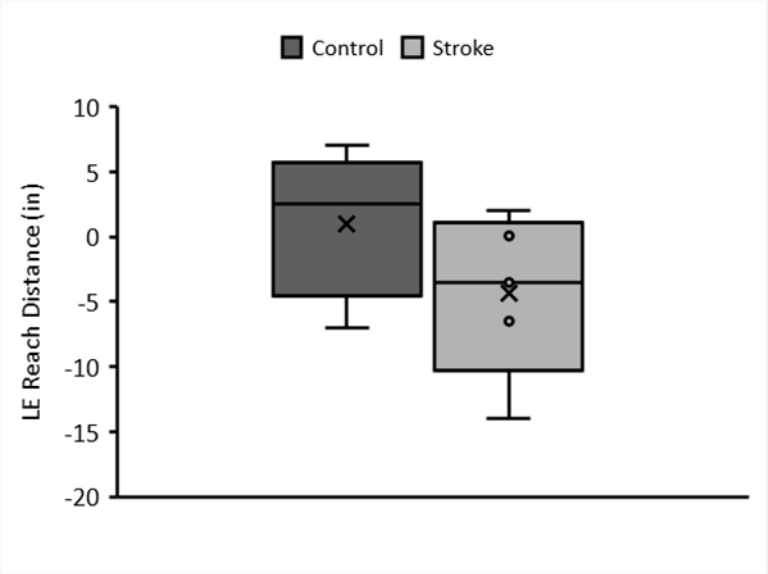

Fig 4 Back Scratch mean ± SD (in.): Distance between fingers when reaching to the middle of the upper back was less for the stroke (-3.1 ± 8.3) compared to healthy control group (-3.3 ± 4.9).

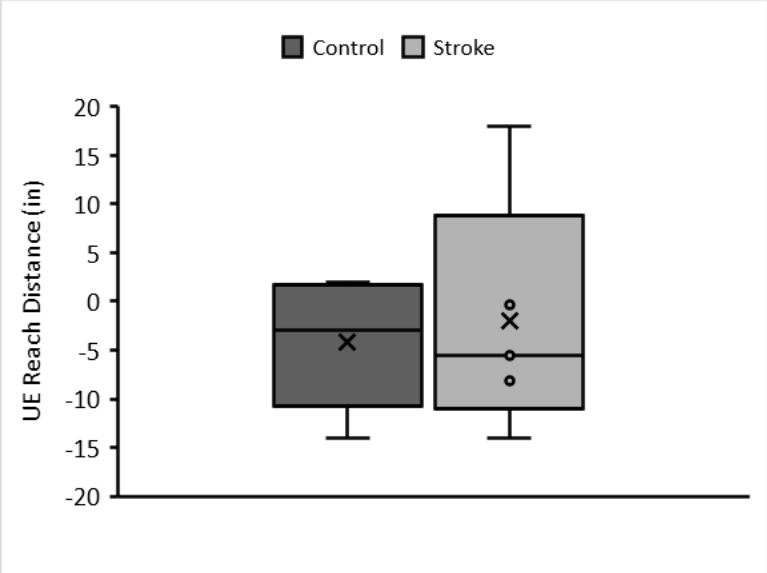

Fig 5 8ft Up and Go: mean ± SD time (s): 93% of stroke group and 65% of the control group performed below the threshold represented by the horizontal line (5.8 s) indicating risk for loss of functional independence