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Research Paper

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KEYWORDS : STROKES, FUNCTIONAL MOBILITY, L TEST.

Measurement Properties of L Test for Functional Mobility in Stroke Patient

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ABSTRACT

PURPOSE:*To assess the reliability and validity of L test in a group of stroke patients*

STUDY DESIGN: *Test -retest design*
SETTING: *Outpatient department of various hospitals, N.delhi*
SUBJECT: *Randomly selected 30 stroke patient aged 55-75*
MATERIAL:*Arm chair, Tape measure, Stop watch, Timed up & go test. Berg balance scale, MMSE.*
METHOD: *A total of 30 subjects were selected randomly for the study, on the basis of inclusion and exclusion criteria. Two raters were present to collect data for the assessment of L test interrater reliability. Each rater recorded their times separately by stopwatch that records times to the nearest second. To assess L test intrarater reliability, one of the raters collected data at the second test session conducted after four hours in the 2nd sitting on the same day. Only L test was performed on second test session.*
OUTCOME MEASURES:L test, Time up and go test, Berg balance scale.
RESULT:*The results were significant (r- value = .9225** p-value =.000) between two variables. It indicated that the L Test has interrater reliability at p-value of .oo1 and Intrarater reliability of L test was done by paired t test but there was no significant difference (t-value - 1.50 NS) between two variables. The results proved that the L Test has intrarater reliability. In terms of validity, the L Test was correlated with the time up and go test (in positive direction) and berg balance scale (in negative direction) r-value .8285 p-value .000,r-value -.8198 p-value .000, respectively*
CONCLUSION: *The L test provides reliable, valid data when assessing basic walking skills among stroke patient. The L test is potentially an important clinical and research tool to assess the mobility function of stroke patient as they transition back to the community.*

INTRODUCTION:

The L test is more comprehensive and demanding than timed up and go test, requiring that individuals walk greater distances and perform more turns, in both directions.The test assesses dynamic balance indirectly during transfers turns, and walking. L test is modified version of the timed up and go test. The walking pathway is representing an "L" configuration. In the L test subject have to rise from the chair and walk three meter perform a right angle turn and continue walking seven meter before turning around and walking back along same pathway and sitting down.[11] Subject cover 20 meters and perform four turns. L test assess the essential component of functional mobility such as balance, transfer, walking, and turning, of stroke patient. Activities such as walking and functional balance ability influence a person's participation or ability to partake fully in life situations in the complete environment. The essential psychometric properties are reliability, validity, responsiveness to change, sensibility[2]

L test measure the functional mobility at the activity level of the International classification of the functional disability and health.[11] But reliability and validity of L test has not been proved for stroke patient.[1, 2, 3] So this study focuses to assess reliability and validity of L test in stroke.

METHOD

A total of 30 subjects were selected randomly for the study, on the basis of inclusion and exclusion criteria.

INCLUSION CRITERIA: Subjects having first episode of stroke, who were medically stable.Male/Female aged between 55 to 75 years. Having ability to walk 20 meters independently & were able to understand, cooperate and perform the test. Mini mental state examination scores 23 or above. EXCLUSION CRITERIA: Subjects with history of orthopedics, vestibular dysfunction and other neurological complication or having uncorrected Visual problems.DESIGN Test -retest design study.EQUIPMENT\ MEASURING TOOL:Arm chair,Tape measure,Stop watch, Timed up go test. [TUG] [9,10,12,14] Berg balance scale [BBS] [13], Mini mental state examination score [MMSE].PROCEDURE:On the first visit, a complete physiotherapy assessment was done to find suitability of the subjects on the basis of inclusion and exclusion criteria. To participate in the study subject requested to go through the consent form. The patient had asked to sign the consent form, seeking their willingness to participate in the study. The first test session was conducted for interrater reliability by two raters. In the second session conducted for intrarater reliability four hours after first session. PROTOCAL:Therapist first explained and instructed the procedure. All subjects were made to performed the L test and TUG once before final recording\ evaluation for the purpose of practice.FIRST TEST SESSION:Two raters were present to collect data for the assessment of L test interrater reliability. Subjects performance on Timed up and go test and Berg balance scale, randomly before L test. Subjects were instructed to walk at a comfortable pace when performing the TUG and L test. Each rater recorded their times separately by stopwatch that record times to the nearest second, and raters were blind to the times record by other rater. SECOND TEST SESSION:To assess L test intrarater reliability, one of the raters collected data at the second test session which was conducted after four hours in the 2nd sitting on the same day. Only L test was performed on second test session. In the L test, Subjects were asked to rise from a chair, walk three meters, perform a right angle turn and continue walk for seven meters, before turning around and walking back along same pathway and sitting down. Subject walked total twenty meters distance. The time was measured in seconds using stopwatch from the moment of giving the command to start until the moment the subject sat down on the chair with their back against the chair. DATA ANALYSIS The outcome variable i.e. time was measured and stored for each session. The data was collected on forms and transferred in the form of master chart. The data was analyzed using SPSS (Statistical package for social sciences) 14.00 software package. Dependent variables were analyzed using parametric test like independent t test and paired t test. A 0.001 level of significance was used for all conclusions.RESULTS: Inter-rater Reliability: On the Karl Pearson Coefficient analysis between L1 time (mean 47.20±4.51) and L2 time (mean 49.75±4.89) was

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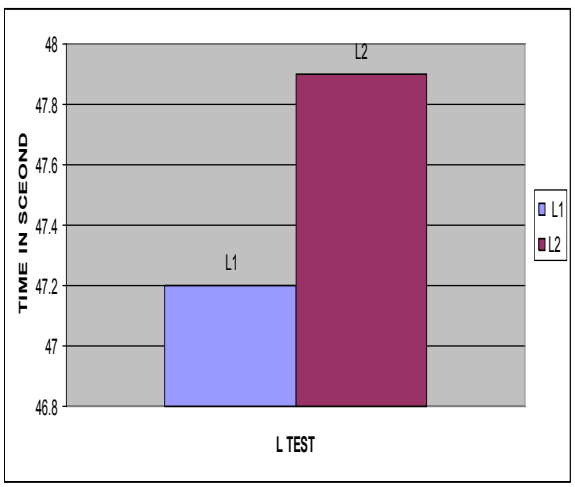
significant between (r- value = .9225** p-value =.000). The results indicated that the L Test has got interrater reliability at p-value of .oo1. As given in table1 and graph 1.

Table 1

Variable	L1 Time
L2 Time	r-value=0.9225** p-value=0.000

Graph 1



(Relationship between L_2 Time with L_1 Time.L_1 Time: L test time taken by 1st rater. L_2 Time: L test time taken by 2nd rater)

Intrarater reliability:

The analysis of L_1 time (mean 47.20±4.51) with L_3 time (mean 47.84±5.03) was done by paired t test. It was not significant (t-value - 1.50 NS) between two variables. As given below in table 2 and graph 2.

Table 2

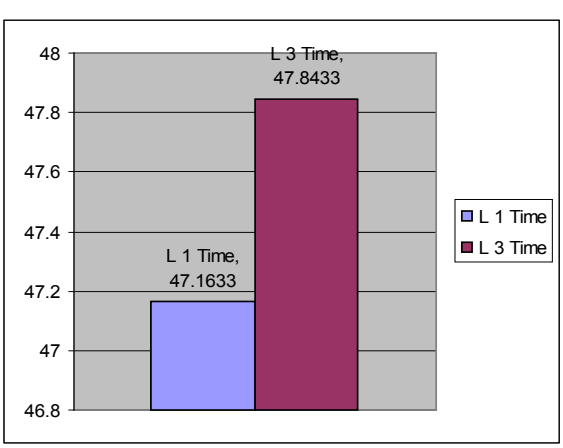
L test time	Mean	Std dev	t-value
L_1 Time	47.16	4.51	
L_3 Time	47.80	5.04	1.50 NS

NS –Not significant.

L_1 Time: L test time taken by 1st rater.

L_3 Time: L test time taken by 1st rater after 4 hr.

GRAPH 2



Relationship between L_3 Time with L_1 Time.

L_1 Time: L test time taken by 1st rater.

L_3 Time: L test time taken by 1st rater after 4 hr.

VALIDITY

L TEST AND TIME UP AND GO TEST

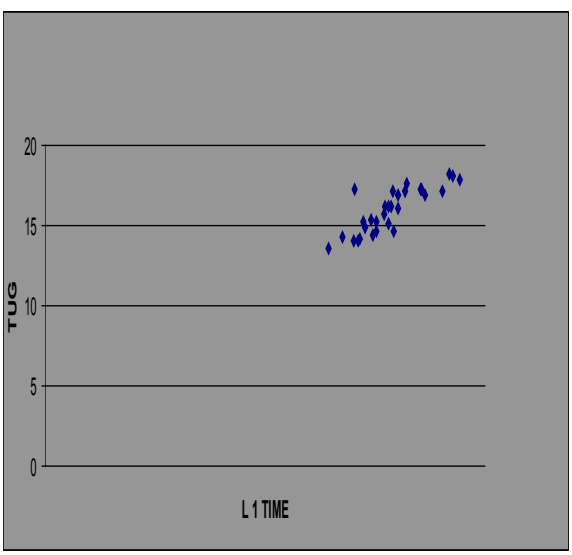
The Karl Pearson Coefficient analysis between L Test and Time up and go test was significant (r-value .8285**, p-value .000) between two variables. The result indicating that positive correlation between L Test and TUG. As given below in table 3 and graph 3.

TABLE 3

Variable	L_1 Time.
Time up and go test	r-value .8285** p-value .000

** Significant at level .001

GRAPH 3



RELATIONSHIP BETWEEN L TEST AND TUG(Time up and go test)

L_1 Time: L test time taken by 1st rater.

L TEST AND BERG BALANCE SCORE

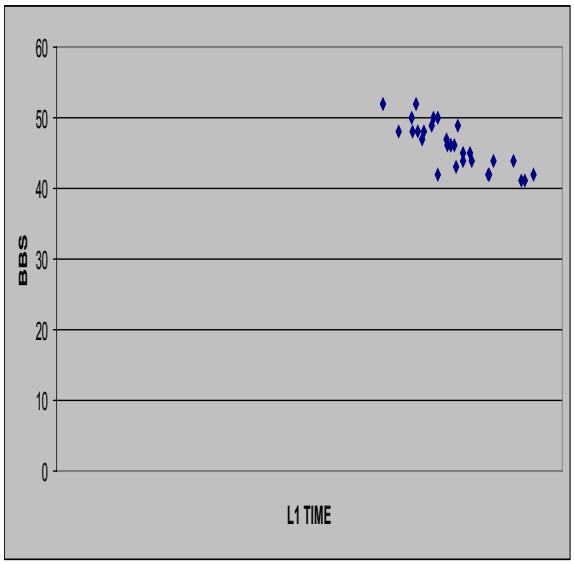
The Karl Pearson Coefficient analysis between L Test and berg balance was significant (r-value -.8198** p-value .000) between two variables. The result indicated that negative correlation between L test and BBS. As given in table 4 and graph 4.

TABLE 4

VARIABLE	L TEST
Berg balance score	r-value -.8198** p-value .000

** Significant at level .001

GRAPH 4



RELATIONSHIP BETWEEN BBS AND L TEST.

BBS- Berg balance scale

L_1 Time: L test time taken by 1st rater.

DISCUSSION: The results indicated that the L Test has inter-rater reliability at p-value of .oo1.Concurrent and criterion validity of L test is correlated with the TUG and BBS balance scale.A strong positive correlation was found between L Test and TUG. The L test requires a higher level of skill with turns to both the left and right as well as sit to stand transfer.[11]This activity enables the clinician to visually assess the biomechanics of functional mobility. The 20m distance covered by the L test is twice that of the 10 meter walking test, and 3 times that of the TUG. [4,5]The distance increased with L test would be more responsive than the other test and therefore, more useful when used with stroke patient. The L test allows clinicians to direct care toward preventing decline, promoting recovery and measuring the quality of care at transition in care, such as from acute care back to the community.[7,8,11]

The L test correlated well with measures of mobility and balance in the TUG and BBS. The BBS and L test assess functional mobility in similar but not identical ways. Where as the BBS is direct measure of static balance, the L test assesses dynamic balance indirectly during transfers, turns and walking, therefore, the L test does directly measure standing balance and indirectly measure static balance during sit to stand, turning.

The L test can be used as an objective measure to aid therapist in the categorization of stroke patient into different functional groups.[6] L test requires a higher level of skill with turns to both the left and right as well a sit to stand transfer which helps in assessing functional mobility. Advantage of the L test can be conducted easily in a variety of clinical settings. The L test's design provides a realistic simulation of the mobility for stroke patient. The main limitation of study is use of small sample size, inclusion of only literate subjects in the study. Further studies are needed to determine that L test is more sensitive and specific measure for identifying stroke patients who are at risk for fall and further testing with various subgroups of the stroke population. Further evidence need to support the L test's validity with berg balance test.

CONCLUSION:

The L test provides reliable, valid data when assessing basic walking skills among stroke patient. The L test is potentially an important clinical and research tool to assess the mobility function of stroke patient as they transition back to the community.

REFERENCE

1.Anne Tiedewmai, Hiroyuki s Cheng PT, Liaw , Wong, et al. The sit-to-stand movement in stroke patients and its correlation with falling. Arch Phys Med Rehabil. 1998; 79:1043–1046. | 2. Bohannon RW, Horton MG, Wikholm JB. Importance of four variables of walking to patients with stroke. Int J Rehabil Res 1991; 14:246-250. | 3.Bujanda ED, Nadeau S, Bourbonnais D, Dickstein R. Associations between lower limb impairments, locomotor capacities and kinematics variables in the frontal plane during walking in adults with chronic stroke. J Rehabil Med 2003; 35:259-64. | 4.Chiu AYY, Au-Yenung SSY, and L SK: A comparison of four functional tests in discriminating fallers from non- fallers in older people. Disabil rehabil 2003; 25:626-635. | 5.Datta D, Ariyaratnam R, Hilton S: Timed walking test- an all-embracing outcome measure for lower limb amputees? Clin rehabil 1996; 10:227-32 | 6.Deathe AB Miller WC: The L test of functional mobility measurement properties of a modified version of the timed up and go test designed for the lower limb amputation Phys Ther 2005; 85:625-635. | 7.Haart de M, Geurts A, Huidekoper SC, Fasotti L, Limbeek J. Recovery of standing balance in postacute stroke patients: a rehabilitation cohort study. Arch Phys Med Rehabil 2004; 85:886-95. | 8.James E. Graham, Glenn V. Ostir,Steven R. Fisher, , and Kenneth J. Ottenbacher, Assessing walking speed in clinical research: a systematic review J Eval Clin Pract. 2008 August ; 14(4): 552–562. | 9.Kosak M, Smith T. Comparison of the 2-, 6-, and 12-minute walk tests in patients with stroke. J Rehabil Res Dev 2005; 42:103–107. | 10.Mudge S, Stott NS. Timed walking tests correlate with daily step activity in persons with stroke. Arch Phys Med Rehabil 2009;90:296-301. | 11.Nguyen VC, Miller WC, Asano M, and Wong RY: Measurement properties of the L test for gait in hospitalized elderly .Am J Phy Rehabil 2007; 86:463-468 | 12.Podsiadlo D,Richarsion S. The timed up and go a test of basic functional mobility for frail elderly persons. J Am Geriatr Soc.1991; 39:142-148 | 13.Sharon Barak Pamela W. Duncan Issues in Selecting Outcome Measures to Assess Functional Recovery After Stroke The Journal of the American Society for Experimental2006 Vol. 3, 505–524. | 14.Wall JC Bell C Campbell S et al: The Timed gets up and go test revised: measurement of the component tasks. J Rehabil Res Dev 2000; 37:109-114.