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The Parallel Walk Test: Its Correlation with Balance and Motor Functions in People with Chronic Stroke

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Declaration of Interest

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ABSTRACT

Objectives: To investigate (1) the intra-rater, inter-rater and test-retest reliability of the times and scores generated in the parallel walk test (PWT); (2) their correlations with other stroke specific impairments; and (3) the cut-off times that best discriminate individuals with stroke from healthy elderly subjects.

Design: Cross sectional study.

Setting: University-based rehabilitation center.

Subjects: Thirty-seven individuals with stroke and 35 healthy individuals

Methods: The PWT was administered along with the Fugl-Meyer lower extremity assessment (FMA-LE), hand-held dynamometer measurements of ankle dorsiflexor and plantarflexor muscle strength, the 5 times sit-to-stand test (FTSTST), assessment using the Berg Balance Scale (BBS), a limits of stability test (LOS), the 10-meter walk test (10MWT) and the Timed "Up and Go" test (TUG).

Results: The PWT times and scores showed good to excellent intra-rater, inter-rater and test-retest reliability with individuals with stroke. The PWT times using paths of 3 different widths significantly correlated with FMA-LE scores, FTSTS times, BBS scores, some LOS results, 10-MWT gait speed and TUG times. PWT times of 6.30 to 7.48 seconds, depending on the path width, were shown reliably to discriminate individuals with stroke from healthy individuals.

Conclusion: The PWT is recommended as a reliable, easy-to-administer clinical tool for assessing dynamic walking balance in individuals with chronic stroke.

List of abbreviations:

10-MWT	**10-metre walk test**
AUC	**Area under the Curve**
BBS	**Berg Balance Scale**
COG	**Center of Gravity**
FMA-LE	**Fugl-Meyer Motor Assessment of the Lower Extremities**
FTSTST	**Five-Times-Sit-to-Stand Test**
ICC	**Intra-class Correlation Coefficient**
LOS	**Limits of Stability Test**
ROC	**Receiver Operating Characteristics**
RT	**Reaction Time**
MVL	**Maximum Velocity**
MXE	**Maximum Excursion**
PWT	**Parallel Walk Test**
TUG	**Timed “Up and Go” Test**

INTRODUCTION

Impaired balance is common after stroke, and it could affect functional activity and participation.[1] Disturbed balance during walking is one of the most important risk factors for falls among stroke survivors.[2] Improving dynamic walking balance is usually an important goal in stroke rehabilitation. However, the commonly used dynamic walking balance tests, including the Dynamic Gait Index,[3] Functional Gait Assessment,[4] and the Tinetti Performance-Oriented Mobility Assessment[5] are generally time-consuming[3-5] and/or do not provide a quantitative measure of dynamic walking balance during ambulation.[3,5] Clinicians need a more reliable, valid and easy-to-administer tool for measuring the dynamic walking balance of stroke patients which properly reflects changes in performance during the stroke rehabilitation process.

The parallel walk test (PWT) was developed to assess dynamic walking balance safely, quickly and simply.[6] In the PWT the subject is required to walk between 2 parallel lines 6 metres long with 3 different widths (20cm, 30.5cm, 38cm). Subjects walk with their usual gait pattern at a comfortable speed. The times taken to complete the test and the accuracy of foot placement within or outside the lines are recorded as PWT times and PWT scores respectively.

The PWT has been shown to have high degree of test-retest reliability with intra-class correlation coefficients (ICCs) ranging from .63 to .90, and inter-rater reliability coefficients ranging from .93 to .99 with elderly fallers.[7] The PWT times with the 25cm and 30.5cm widths have also been found to correlate well with functional mobility as measured by the Timed "Up and Go" test with older adults.[8] However, there has been no study investigating the PWT's intra-rater, inter-rater and test-retest reliabilities with stroke survivors. In addition, no systematic study of the relationships among PWT times, PWT scores and stroke-specific impairments has been published, nor has any published study established the best cut-off times for discriminating individuals with chronic stroke from the healthy older adults.

The objectives of this study were: (1) to establish the intra-rater, inter-rater and test-retest reliabilities of PWT times and scores with stroke survivors and (2) to explore any correlation between PWT times and scores and other measures of stroke-specific impairment including the Fugl-Meyer Lower Extremity Assessment (FMA-LE), lower limb muscle strength, Five Times Sit-to-Stand Test (FTSTST) times, Berg Balance Scale (BBS) scores, limits of stability (LOS), time and speed in the 10-metre walk test (10-MWT), and Timed "Up and Go" test (TUG) times. It was also designed (3) to determine the cut-off PWT times which best discriminate stroke survivors from other healthy elderly subjects.

METHODS

Subjects

This study was a cross-sectional clinical trial. A group led by Lark had previously demonstrated a high degree of inter-rater reliability (ICC range: .93–.99) and test-retest reliability (ICC range: .63–.90) for the PWT times and scores of elderly fallers.[7] This study was therefore designed on the assumption that the ICC values of stroke survivors would be about .90. That called for a required sample size of 30 in order to achieve 90% power to detect an ICC of .90 with a confidence level of .05.

Stroke survivors were included if they (i) were at least 55 years old, (ii) had suffered single stroke at least 1 year previously, (iii) were able to walk 10m with no physical assistance with or without a walking aid, (iv) had an Abbreviated Mental Test[9] score of 7 or higher and (v) had a stable general medical condition to allow participation in the testing protocol. Individuals were excluded if they experienced neurological disorders other than stroke or if they had other co-morbid disability that would hinder proper assessment.

Healthy individuals were recruited from the local community using poster advertising if they were more than 50 years old to serve as controls. Control candidates were excluded if they had any unstable medical condition, were known to have any pre-existing neurological disorder or had any severe musculoskeletal condition.

The study was approved by the ethics committee of the Hong Kong Polytechnic University and was conducted according to the guidelines of the Declaration of Helsinki. All the participants were informed about the testing procedures and written consent was obtained prior the start of the study.

Outcome measurements

Parallel Walk Test

All subjects were asked to walk at their comfortable walking speed for 6 metres between parallel lines wearing their usual footwear and with any usual walking aids if required. There were three sets of lines installed 20cm, 30.5cm and 38cm apart.[6] The time taken to complete each walk was recorded as a PWT time. The PWT scores were calculated based on the accuracy of foot placement. No marks were awarded if the foot placement was always completely between the lines. Stepping on a line earned one point, stepping outside the lines or maintaining balance by grasping something scored two points.[6] Two trials were recorded for each width. The testing order for the different widths was randomized by drawing lots. A 2-minute rest was enforced between trials and between widths.

Fugl-Meyer Lower Extremity Assessment

The FMA-LE quantifies motor impairment following stroke using 17 items assessing the reflexes, movement and coordination. Each item is scored on a 0–2 ordinal scale, adding up to a maximum possible score of 34.[10] A lower score indicates greater motor impairment. The FMA-LE is well known to have high inter-rater (ICC=.89-.95) and intra-rater reliability (ICC=.96) when used with individuals with chronic stroke.[11]

Lower limb muscles strength

The muscle strength of the subjects' ankle dorsiflexors and plantarflexors was measured using a Nicholas hand-held dynamometer (model 01160).[a] Such dynamometry has demonstrated high test-retest reliability (ICC=.98)[12] and inter-rater reliability (ICC=.91)[13] in measuring ankle dorsiflexors' strength after stroke. The subjects were positioned in supine lying and were asked to produce a sustained maximum isometric contraction against the examiner's resistance for 3 seconds. The dynamometer was placed across the mid-shafts of first to fifth metatarsal bones, anteriorly for testing the dorsiflexors and posteriorly for the plantarflexors. Each muscle group was tested 3 times, alternating between the feet and with a 1-minute rest between trials.

Five-Time-Sit-to-Stand Test

The FTSTST measures the functional strength of the lower extremitiesy.[14] It has shown excellent intra-rater reliability (ICC=.97–.98), inter-rater realibility (ICC=1.00) and test-retest realiability (ICC=.99-1.00) with chronic stroke subjects.[15] The subjects were instructed to stand up fully and sit down in a chair 43cm high chair with their back against the rest 5 times as fast as possible with their arms crossed over their chest throughout. Timing began when the examiner said "go" and stopped when the subject's back touched the chair the fifth time.

Berg Balance Scale

The BBS assesses balance in the performance of 14 functional tasks, rating it on a 5-point scale (0-4), giving a maximum score of 56.[16] The assessment has demonstrated excellent intra-rater reliability (ICC=.97) and inter-rater reliability (ICC=.98) with individuals after stroke.[16]

Limit of Stability Test

A Smart Balance Master system[b] can quantify the maximum distance that a person can shift their center of gravity (COG) without losing their balance, stepping or reaching for assistance. A dual force platform detects the position of the COG, displayed as a cursor on an eye-level computer screen. An overhead harness is worn to ensure subject's safety. The system then measures

1. Reaction Time (RT), measured in seconds, the time between the start signal and the subject's first movement. [17]
2. Movement Velocity (MVL), measured in degrees per second, refers to the average speed of shifting the COG toward the target. [17]
3. Maximum Excursion (MXE), expressed as a percentage of the distance to the target, is the maximum distance of COG movement away from the start point in each trial. [17]

These measurements have moderate to high test-retest reliabilities (ICC=.78-.91) in measuring the performance of stroke survivors.[18,19]

10-Metre Walk Test

The 10-MWT is commonly used to measure the gait velocity. Subjects are timed as they walk at their normal speed along a 10-metre walkway with an extra 2 metres for acceleration and deceleration. High test-retest reliability (ICC=.94) has been demonstrated with individuals with chronic stroke.[20]

Timed "Up and Go" Test

The TUG assesses the functional mobility of frail elderly persons. The subject stands up from a chair, walks 3 metres forward, turns around, walks back and sits down again. The time to complete the test is recorded. The TUG has excellent test-retest reliability (ICC=.95) for individuals with chronic stroke.[21,22]

Testing Procedures

To establish the reliability of the PWT for assessing individuals with stroke, the PWT was conducted on 2 separate days 7 to 10 days apart, within 2 weeks. The PWT times and scores were recorded by two trained raters simultaneously. The testing procedures are illustrated in fig 1.

Apart from the PWT, the stroke subjects completed the FMA-LE, the lower limb muscle strength measurement, FTSTST, BBS, LOS, 10-MWT and TUG in random order to establish the correlations between the PWT and those other assessments. A two-minute rest was given between measurements and between trials to minimize the effect of fatigue. The mean values of the replicate trials were computed for analysis. The healthy controls completed the PWT in one session. Their data were used to determine the cut-off PWT times distinguishing individuals with stroke from healthy individuals.

Statistical Analysis

All the data analysis was done with the help of SPSS software (version 20).[c] Intra-class correlation coefficients (ICCs) were computed to measure the intra-rater reliability ($ICC_{3,1}$), inter-rater reliability ($ICC_{2,2}$) and test-retest reliability ($ICC_{3,2}$).

The normality of the data and the homogeneity of the variances were checked by applying the Shapiro-Wilk test and Levene's test. The significance level was defined as $p \leq .05$ for all analyses. For assessing the significance of the differences observed between individuals with stroke and healthy individuals, independent t-tests were used for the parametric data, and the Mann-Whitney U test was used for those data which were non-parametric. Correlations between the results of the PWT and the other assessments were quantified using Pearson's r if the data was normally distributed and homogeneous; otherwise, Spearmen's rho was used. Eight primary outcomes were chosen (FMA-LE and BBS scores; RT, MVL and MXE in the LOS test; and 10-MWT, FTSTST and TUG times), and the *p* value for significant correlation was adjusted to .00625 (.05/8) after Bonferroni adjustment. The strength of correlation was classified into little or none (r<.25), fair (r=.25–.49), moderate to good (r=.5–.75) and good to excellent (r>.75).[23]

Receiver operating characteristics (ROC) curves were plotted to determine the cut-off PWT times best distinguishing stroke survivors from healthy individuals. ROC curves are plots of sensitivity on the y-axis against (1-specificity) on the x-axis for different possible PWT cut-off times.[24] The area under an ROC curve (AUC) can be used to estimate the discriminating ability of the PWT, with greater AUC indicating more reliable discrimination.

RESULTS

Thirty-seven stroke survivors were recruited (26 males and 11 females; mean age ± SD, 62.0 ± 6.2 years; mean years since stroke ± SD, 7.8 ± 3.0). There were thirty-five healthy individuals (11 males and 24 females; mean age ± SD, 64.3 ± 7.8 years). Their demographics are summarized in table 1.

The mean PWT times and scores of the stroke group are shown in table 2. Generally, the PWT times increased as the path width decreased, while the PWT scores were smaller with the wider paths. The stroke group of course had significantly higher PWT times and scores with all 3 path widths than the healthy controls ($p \leq .001$ in all cases) (table 3). The mean values of all the other outcome measures are shown in table 4.

Reliability

The PWT times and scores demonstrated moderate to excellent intra-rater reliabilities with ICCs ranging from .784 to .962 (table 5). Good to excellent inter-rater reliabilities and test-retest reliabilities were found with all 3 walkway widths, with the ICCs ranging from .846 to 1.000 (table 6 and 7).

Sensitivity and Specificity

For the 20cm, 30.5 cm and 38 cm path widths the PWT cut-off times were 7.48 seconds, 6.30 seconds, and 6.34 seconds respectively (sensitivity: 84–89%, specificity: 71–80%, AUC: .885–.894, $p \leq .001$). Details of the AUC analysis are shown in fig 2, 3 and 4.

Correlation of PWT Times and Scores with Other Outcome Measures

The details of the correlations are summarized in table 8. The PWT times with all 3 path widths demonstrated significant correlations with the FMA-LE scores, FTSTST times, BBS scores, affected side MXE in the LOS, 10-MWT gait speed, and the TUG times. And with all 3 path widths the PWT scores demonstrated significant correlations with the BBS scores and TUG times.

With the 20cm and 30.5cm wide paths, the PWT scores demonstrated significant correlation with forward MVL in the LOS (20 cm: r_s=-.528, $p \leq .006$; 30.5 cm: r_s=-.497, $p \leq .006$) and gait speed in the 10-MWT (20 cm: r=-.614, $p \leq .006$; 30.5 cm: r_s=-.607, $p \leq .006$). The affected side MXE in the LOS was significantly correlated only with the PWT scores on the 20cm wide path (r=-.476, $p \leq .006$).

DISCUSSION

This was the first study designed to investigate the reliabilities and concurrent validity of the PWT for individuals with stroke. It was also the first to determine the cut-off times best discriminating stroke survivors from healthy elderly individuals.

Reliability of the PWT

As Lark's group found with elderly fallers,[7] the PWT times and scores showed good to excellent intra-rater (ICC=.784–.962), inter-rater (ICC=.973–1.000) and test–retest (.864–.976) reliabilities. The standardized testing protocol may have contributed to the high inter-rater reliability, as Ng's group has demonstrated in their study of the TUG among individuals with stroke.[22]

Performance of the PWT

The mean PWT times of the stroke subjects were approximately double the healthy controls with all three walkways (table 3). Stroke-specific impairments including weakness of the lower limb muscles and impaired balance of course reduce walking speed after stroke.[25-28]

The PWT scores of the stroke group were also higher than those of the healthy controls, and the difference increased with a narrower path, as would be expected. Impaired dynamic balance is a typical stroke sequella, and survivors need a wider base of support to maintain their balance while walking.[29-31]

Correlations of PWT Times and Scores with Other Outcome Measures

Lower Limb Motor Function

In this study, only the PWT times demonstrated useful correlations with the FMA-LE scores (r_s= -.455 to -.508), but not the PWT scores. The muscle strength and motor control components of the FMA-LE has shown a significant correlation (r=.66) with walking velocity among individuals with hemiplegia,[32] so the correlation between FMA-LE scores and PWT times is not unexpected. The poor correlation with PWT scores might be explained by the fact that most of the tasks in the FMA-LE are performed lying or sitting rather than upright as in walking.

It is reasonable that the PWT times showed a significant positive correlation with FTSTST times (r_s=.0445 to .576). The FTSTST measures functional muscle strength, and previous studies have shown that lower limb strength correlates with gait velocity.[33-36]

Balance

The PWT times and scores were found to have significant moderate to good negative correlations with BBS scores (PWT times r_s= -.527 to -.617; PWT scores r_s= -.560 to -.682). Stronger correlations with PWT times were found with increasing path width. That could be explained by the fact that a narrow path demands that the subject walk cautiously, which deviates from the usual gait.

A larger MXE towards the affected side in the LOS indicates a better ability to maintain balance when shifting of center of gravity laterally but those values showed only fair negative correlations with the PWT times (r_s= -.480 to -.522). Several reasons might account for this result. Firstly, the MXE was measured with both feet on the Balance Master platform, while lateral stability is challenged during walking in the PWT. Secondly, an overhead harness was worn to ensure safety during the LOS measurements, but not in the PWT. This may have affected the subjects' subjective balance confidence, which could explain the discrepancy in performance. Thirdly, the subjects were required to shift their COG without moving their feet in the LOS testing, while the PWT demands rapid change in the base of support during walking.

Functional Mobility

The PWT times with all 3 path widths showed good to excellent correlations with 10-MWT gait speed (r_s= -.795 to -.855). The results were as expected because both the PWT and 10-MWT times reflect gait velocity.

It is also to be expected that both the PWT times and scores would show significant positive correlations with TUG times, as the TUG combines the functional tasks of standing up from sitting, walking forward, and turning. All those functional tasks depend on lower limb muscle strength, balance and walking speed.

Cut-off Times and Sensitivity

This has been the first study to systematically investigate the best PWT cut-off times to distinguish between individuals with chronic stroke and healthy older adults. The best cut-off times were determined from three ROC curves for the different path widths. The PWT times for all 3 widths discriminated well, with the AUC ranging from .885 to .894.

Study Limitations

This study focused on the time taken to complete the test and the accuracy of foot placement; gait quality in performing the PWT was not considered. Also, PWT performance involves multiple determinants, some of which were not measured in this study, such as the base of support and proprioception in the lower limbs.

The results reported here can only be generalized with full confidence to subjects fulfilling the same selection criteria. They should not be too readily generalized to a general stroke population due to the relatively small sample size. Most of the stroke subjects recruited were men (70.3%) while most of the healthy controls were women (68.6%), as convenience sampling was used in the recruitment. That gender difference might have affected the results, especially the recommended cut-off times identified.

Each subject was required to complete six trials when performing the PWT. This may have induced fatigue, learning effects, or both, although the two-minute rest between trials and randomizing the testing order were intended to minimize such problems.

And of course this study could not establish any causal relationships among the variables because of its cross-sectional design.

CONCLUSION

PWT times and scores show good to excellent intra-rater, inter-rater and test-retest reliabilities with individuals with stroke. The PWT times with all 3 path widths significantly correlated with FMA-LE scores, FTSTST times, BBS score, affected side MXE, 10-MWT gait speed and TUG times. The PWT scores on the 20cm wide path significantly correlated with BBS scores, affected side MXE, 10-MWT gait speed and TUG times.

PWT times can discriminate between individuals with stroke and other healthy elderly persons, with the cut-off times ranging from 6.30 seconds to 7.48 seconds depending on the path width used. Thus, the PWT is recommended as a reliable, easy-to-administer clinical tool for assessing dynamic walking balance after stroke.

Suppliers

a. Lafayette Instrument Company, PO BOX 5729, Lafayette, IN 47903.
b. NeuroCom International Inc, 9570 SE Lawnfield Rd, Clackamas, OR 97015.
c. IBM Corp, 1 New Orchard Rd, Armonk, NY 10604-1722.

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Table 1 Demographics of the 2 Subject Groups

Descriptor	Stroke (n=37)	Healthy (n=35)	*p*
Age (y)	62.0 ± 6.2	64.3 ± 7.8	.172
Sex (M/F)	26/11	11/24	.001*
Height (cm)	164.1 ± 7.7	160.6 ± 9.2	.086
Weight (kg)	67.5 ± 9.0	58.5 ± 10.9	<.001*
Body mass index (kg/m^2)	25.1 ± 2.7	22.6 ± 3.7	<.001*
Years since stroke	7.8 ± 3.0	NA	NA

NOTE. Values are mean ± SD or as otherwise noted.
Abbreviations: F, female; M, male; NA, not applicable.
*Indicates a difference significant at the $p \leq .05$ level of confidence.

Table 2 Mean PWT Times and Scores of the Stroke Group

Path width / Rater	Day 1		Day 2	
	Time (s)	Score	Time (s)	Score
20 cm				
Rater 1	14.7 ± 9.5	11.4 ± 5.7	12.7 ± 6.0	11.0 ± 5.4
Rater 2	14.5 ± 9.5	12.1 ± 5.7	12.6 ± 6.1	11.9 ± 5.6
30.5 cm				
Rater 1	11.8 ± 6.3	5.6 ± 4.8	10.5 ± 4.0	5.1 ± 4.5
Rater 2	11.7 ± 6.2	6.3 ± 5.2	10.5 ± 4.1	5.8 ± 5.0
38 cm				
Rater 1	10.4 ± 4.4	1.6 ± 3.0	9.8 ± 3.5	1.5 ± 2.7
Rater 2	10.3 ± 4.4	1.7 ± 3.1	9.8 ± 3.6	1.7 ± 2.9

NOTE. Values are mean ± SD.

Table 3 Mean PWT Times and Scores of the 2 Subject Groups

Path width	Stroke (n=37)	Healthy (n=35)
20 cm		
Time (s)	13.6 ± 7.5	6.3 ± 1.8
Score	11.6 ± 5.5	2.1 ± 2.2
30.5 cm		
Time (s)	11.1 ± 5.0	5.7 ± 1.6
Score	5.7 ± 4.7	.43 ± .88
38 cm		
Time (s)	10.1 ± 3.8	5.5 ± 1.5
Score	1.6 ± 2.8	.07 ± .42

NOTE. Values are mean ± SD.
These mean values were calculated from all the observations, including those from rater 1 and rater 2, day 1 and day 2.
All the inter-group differences are significant at the $p \leq .05$ level of confidence

Table 4 Mean Values of Other Outcome Measures for the Stroke Group

Assessment	Mean Value
FMA-LE	25.9 ± 4.7
Affected side strength (kg)	
Ankle Dorsiflexors	9.6 ± 4.5
Ankle Plantarflexors	10.5 ± 6.4
Unaffected side strength (kg)	
Ankle Dorsiflexors	14.3 ± 3.5
Ankle Plantarflexors	14.1 ± 5.4
FTSTST (s)	19.1 ± 6.4
BBS	53.2 ± 2.4
LOS Forward	
RT (s)	1.4 ± .59
MVL	2.3 ± 1.4
MXE	54.9 ± 15.9
LOS Affected side	
RT (s)	1.3 ± .68
MVL	3.7 ± 1.8
MXE	73.5 ± 16.2
LOS Unaffected side	
RT (s)	1.2 ± .47
MVL	4.7 ± 3.7
MXE	80.1 ± 12.3
10-MWT gait speed (m/s)	.93 ± .26
TUG (s)	15.6 ± 4.9

NOTE. Values are mean ± SD.

Table 5 Intra-rater Reliability of the PWT Times and Scores of Individuals with Stroke

Path width / Rater	Day 1		Day 2	
	Time	Score	Time	Score
20 cm				
Rater 1	.916 (.840-.956)	.804 (.605-.902)	.945 (.891-.972)	.913 (.837-.954)
Rater 2	.917 (.843-.957)	.830 (.670-.912)	.946 (.891-.973)	.908 (.829-.952)
30.5 cm				
Rater 1	.700 (.484-.835)	.849 (.728-.919)	.935 (.878-.966)	.846 (.723-.917)
Rater 2	.720 (.516-.846)	.873 (.768-.932)	.944 (.894-.971)	.842 (.713-.916)
38 cm				
Rater 1	.925 (.849-.962)	.817 (.675-.901)	.961 (.926-.980)	.828 (.690-.908)
Rater 2	.916 (.840-.956)	.745 (.559-.860)	.962 (.927-.980)	.784 (.620-.883)

NOTE. Values are $ICC_{3,1}$ (95% CI).

Abbreviation: CI, confidence interval.

Table 6 Inter-rater Reliability of the PWT Times and Scores of Individuals with Stroke

Path width	Day 1		Day 2	
	Time	Score	Time	Score
20 cm	1.000 (.999-1.000)	.983 (.953-.993)	1.000 (.999-1.000)	.973 (.927-.988)
30.5 cm	.999 (.999-1.000)	.980 (.949-.991)	.999 (.999-1.000)	.977 (.940-.990)
38 cm	.999 (.998-1.000)	.993 (.987-.997)	.999 (.998-1.000)	.979 (.959-.990)

NOTE. Values are $ICC_{2,2}$ (95% CI).

Abbreviation: CI, confidence interval.

Table 7 Test-retest Reliability of the PWT Time and Scores of Individuals with Stroke

Path width / Rater	Time	Score
20 cm		
Rater 1	.864 (.724-.931)	.934 (.872-.966)
Rater 2	.868 (.738-.933)	.976 (.953-.987)
30.5 cm		
Rater 1	.880 (.756-.940)	.912 (.831-.955)
Rater 2	.894 (.785-.947)	.899 (.806-.948)
38 cm		
Rater 1	.909 (.823-.953)	.914 (.832-.955)
Rater 2	.909 (.824-.953)	.937 (.878-.968)

NOTE. Values are $ICC_{3,2}$ (95% CI).

Abbreviation: CI, confidence interval.

Table 8 Correlations Relating PWT Times and Scores With Other Outcome Measures

Path width	20 cm		30.5 cm		38 cm	
	Time	Score	Time	Score	Time	Score
FMA-LE	-.508*	r=-.382	-.455*	-.340	-.503*	-.224
Affected side strength (kg)						
Ankle Dorsiflexors	-.358	r=-.377	-.313	-.316	-.406	-.269
Ankle Plantarflexors	-.392	r=-.412	-.369	-.286	-.408	-.358
Unaffected side strength (kg)						
Ankle Dorsiflexors	-.163	r=-.107	-.151	-.104	-.165	.110
Ankle Plantarflexors	-.331	r=-.366	-.347	-.239	-.355	-.183
FTSTST (s)	.445*	.338	.504*	.396	.576*	.253
BBS	-.527*	-.646*	-.535*	-.682*	-.617*	-.560*
LOS Forward						
RT (s)	.117	r=-.013	.147	-.033	.042	-.231
MVL	-.423	-.528*	-.405	-.497*	-.338	-.310
MXE	-.216	r=-.438	-.272	-.355	-.285	-.093
LOS Affected side						
RT (s)	.192	.414	.238	.365	.245	.351
MVL	-.396	-.261	-.403	-.218	-.404	-.034
MXE	-.482*	r=-.476*	-.480*	-.406	-.522*	-.210
LOS Unaffected side						
RT (s)	.024	r=.302	.113	.304	.213	.185
MVL	.090	.178	.105	.106	.079	.158
MXE	-.211	-.336	-.270	-.264	-.303	-.211
10-MWT gait speed (m/s)	-.795*	r=-.614*	-.821*	-.607*	-.855*	-.393
TUG (s)	.792*	.658*	.813*	.631*	.842*	.466*

NOTE. Values are Spearman's rho (r_s) unless otherwise specified as r, which are Pearson's correlation coefficients.

Abbreviation: RT, reaction time; MVL, movement velocity; MXE, maximum excursion.

*Significant correlation after Bonferroni adjustment at a *p* value of .05/8 ($p \leq .006$)

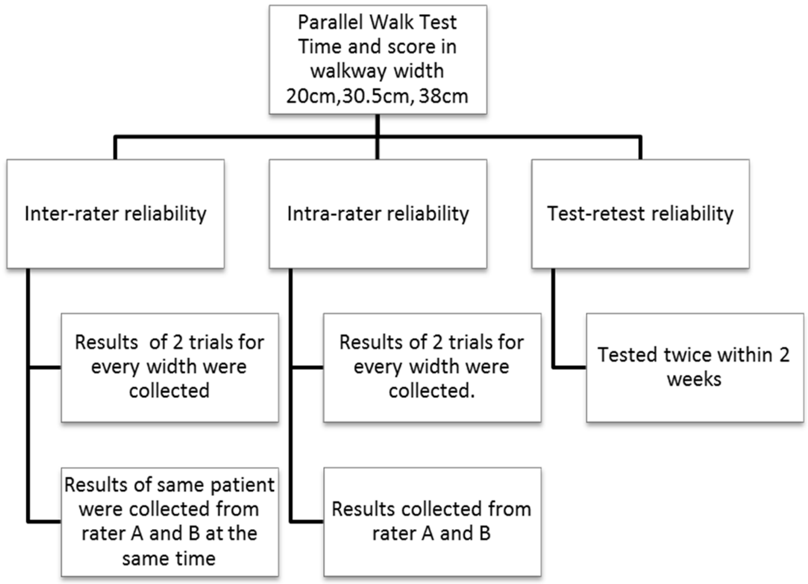

Fig 1 Procedures for investigating the reliability of the PWT.

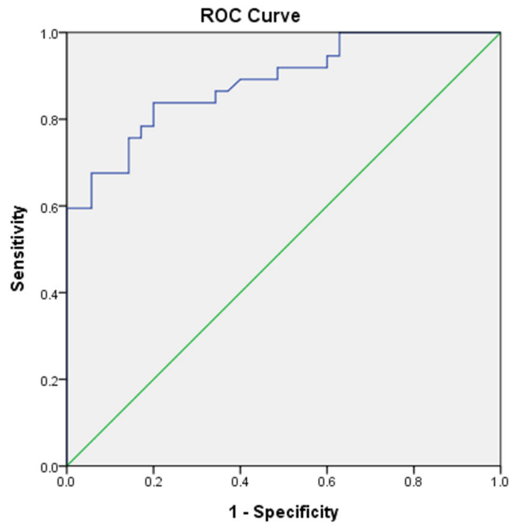

Fig 2 Receiver operating characteristic curves for PWT Time (Path width = 20cm) between healthy individuals and individuals with stroke (AUC=.885).

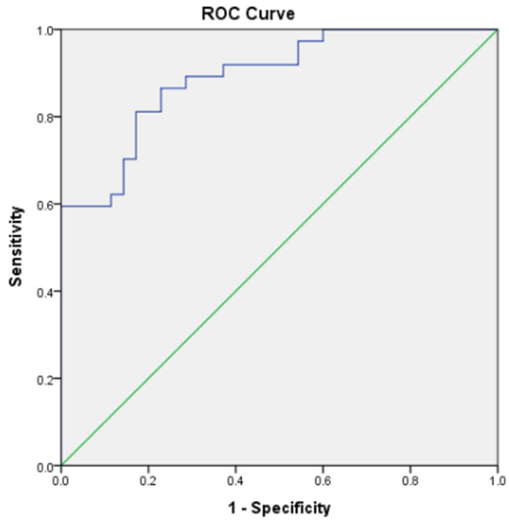

Fig 3 Receiver operating characteristic curves for PWT Time (Path width = 30.5cm) between healthy individuals and individuals with stroke (AUC=.891).

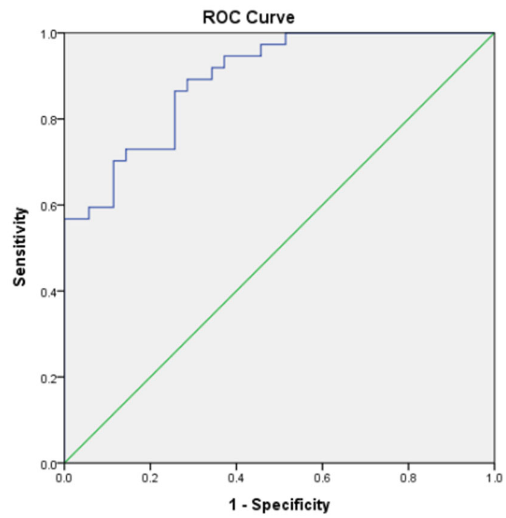

Fig 4 Receiver operating characteristic curves for PWT Time (Path width = 38cm) between healthy individuals and individuals with stroke (AUC=.894).