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Scientific/Clinical Article

Development of the modified simple test for evaluating hand function (modified STEF): Construct, reliability, validity, and responsiveness



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ABSTRACT

Study Design: Clinimetric evaluation study.

Introduction: Despite the availability of numerous performance tests to measure finger dexterity, there is no international consensus on hand function evaluation.

Purpose of the Study: To evaluate the reliability, validity, and responsiveness of the modified version of the simple test for evaluating hand function (STEF), which is widely used in Japan.

Methods: The intrarater ($n = 40$) and inter-rater ($n = 32$) reliability of the modified STEF was evaluated by calculating the intraclass correlation coefficient (ICC), models (1,1) and (2,1), respectively, in healthy individuals. The criterion validity of the modified STEF ($n = 50$) was evaluated by calculating the Pearson correlation coefficient relative to the STEF, the Purdue pegboard test (PPT), and the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire. The standardized response mean of the scores was calculated to determine responsiveness ($n = 35$). The modified STEF was used prospectively to measure the change in hand function in a cohort of patients with hand trauma injuries and inflammatory diseases ($n = 30$), as well as in a cohort of patients with cervical spondylosis ($n = 20$), from preoperative baseline to 1 and 3 months postoperatively.

Results: ICC_{1,1} and ICC_{2,1} values were ≥ 0.80 , indicative of high intrarater and inter-rater reliability. All correlation coefficients were significant ($P < .05$): STEF ($r = 0.89$), PPT ($r = 0.69$), and DASH ($r = -0.34$). The standardized response mean indicated greater responsiveness of the modified STEF (0.89) than the STEF (0.71) and PPT (0.68) but a lower responsiveness than the DASH (1.11).

Discussion: It must be mentioned that modified STEF and DASH cannot be compared without caution. The two types of tools should complement each other when measuring someone's activity and participation level.

Conclusions: The modified STEF is a reliable measurement tool, with a moderate positive correlation with the PPT and a greater responsiveness than the STEF and PPT.

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Introduction

The assessment of general hand function in patients having sustained hand trauma or in those with an inflammatory condition

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is complex. Many instruments have been developed to quantify general hand function, which is defined as the nature and extent of daily activities that an individual can perform using his or her hands.^{1,2} Traditionally, outcome assessments in hand therapy have focused on the structure and function of the hand, including range of motion, grip strength, and sensation. However, since the introduction of the International Classification of Functioning, Disability and Health by the World Health Organization in 2001, there has been a shift in clinical assessments, from a focus on disability to functioning and health, with assessment of activities and participation providing the primary clinical outcomes. Within this framework, activity is defined as the execution of a task or an action

by an individual, whereas participation is defined as a person's involvement in a life situation. Fine motor function of the hand is essential to the performance of meaningful activities, including the coordinated actions of handling objects, such as grasping, manipulation, and release.^{3,4} With the focus on activities and participation,^{5,6} hand therapists are increasingly using performance tests (such as the 9-hole peg test,⁷ Purdue pegboard test (PPT),⁸ Jebsen-Taylor hand function test⁹) to evaluate activity limitations and patient-reported outcomes (such as the Disabilities of the Arm, Shoulder and Hand [DASH] questionnaire¹⁰ and the Michigan Hand Outcomes Questionnaire¹¹) to evaluate participation restrictions.¹² However, van de Ven-Stevens et al¹³ reported that none of the existing measurement tools for the assessment of hand-related activities and participation satisfy all clinimetric properties (reliability, validity, and responsiveness) required for clinical application. Furthermore, previous studies have reported that the Jebsen-Taylor hand function test should not be used to evaluate the therapeutic effect of a surgical intervention due to concerns with its responsiveness and validity.¹⁴ As such, there is no international consensus regarding the appropriate tools to use in clinical practice for the assessment of hand activities.

In Japan, the simple test for evaluating hand function (STEF) is widely used to evaluate hand-related limitations in activities. The STEF was developed by an occupational therapist in 1969, with its rating system adapted for clinical practice in 1986.¹⁵ The STEF specifically assesses the accuracy, smoothness, speed, and dexterity of voluntary movements of the upper extremity and the hand more specifically. It is composed of 10 tasks, involving 58 objects, and includes the assessment of various grip patterns, including the precision grip and power grip. The STEF scores the time taken to move 10 objects, of different shapes and sizes, to predetermined locations, with scores from 1 to 10 used to quantify the time requirement, the time scores summed to provide a total test score.

The reliability of the STEF was established by Kaneko¹⁶ during its initial development. In terms of validity, the STEF has a high correlation with the action research arm test, which is widely used for the assessment of upper limb function in patients poststroke.¹⁷ With respect to hand therapy, the STEF correlates with the range of wrist motion and DASH in patients with a distal radius fracture or other wrist joint diseases.^{18,19} In our previous study, we determined that the responsiveness of the STEF was sufficient to support its use as a measure of clinical change after a therapeutic intervention.²⁰ However, the difficulty level and the evaluation criteria of the examination tasks may be limiting factors in patients with mild impairment in hand function. To address this issue, we developed the modified STEF to include assessment items requiring a higher degree of difficulty of hand function. Therefore, our aim in this study was to evaluate the reliability, criterion validity, and responsiveness of the modified STEF. We hypothesized that there would be a positive

Table 1

Assessment items for the right hand

Inspection items	Inspection contents
No. 1 (large ball)	Move 5 large balls in A-B
No. 2 (middle ball)	Move 6 middle balls in C-A
No. 3 (large rectangle)	Move 5 large rectangles in B-A
No. 4 (neutral direction)	Move 6 neutral directions in A-D
No. 5 (wooden disc)	Move 6 wooden discs in E-D
No. 6 (small cubic)	Move 6 cubic cubes in F-D
No. 7 (cloth)	Flip 6 cloths in the center of the table
No. 8 (gold disc)	Move 6 golden discs in C-G
No. 9 (small ball)	Move 6 small balls in G-D
No. 10 (pin)	Move 6 pins in C-H

correlation between the modified STEF and the PPT and that the responsiveness of the modified STEF would be greater than that of the STEF and PPT.

Materials and methods

Equipment construction standards

The STEF consists of a rectangular assessment board (40 × 80 cm; height, 3.5 cm) with 10 different tasks, using objects of different sizes and shapes: item 1 (large ball), item 2 (medium sphere), item 3 (large rectangle), item 4 (neutral direction), item 5 (wooden disc), item 6 (small cube), item 7 (cloth), item 8 (gold disc), item 9 (small ball), and item 10 (pin). The structure of the assessment board and the contents of the test are shown in Figure 1 and described in Table 1, with the various shapes and sizes of objects used shown in Figure 2.

Modified STEF

The modified STEF is a performance-based test for patients with hand trauma and inflammatory diseases. The differences in the assessment items between the STEF and the modified STEF are summarized in Table 2. The specific differences between the modified STEF and STEF were as follows (Fig. 3): item 3, increase in weight of object from 200 to 600 g; item 7, change in surface from vinyl to polypropylene; item 8, decrease in thickness of the object from 2.0 to 1.5 mm; item 9, decrease in the object diameter from 6.0 to 4.0 mm; and item 10, a decrease in diameter from 3.0 to 1.0 mm.

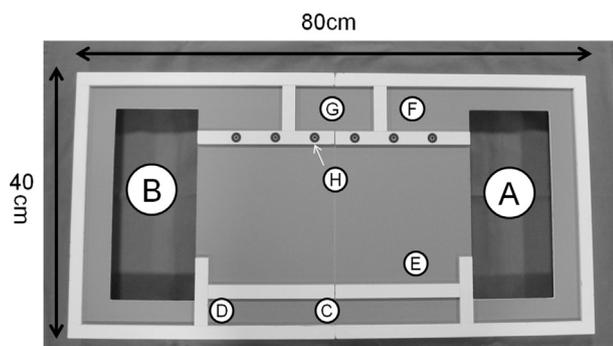


Fig. 1. Assessment board for the simple test for evaluating hand function. The test board has a diameter of 40 × 80 cm and a height of 3.5 cm.

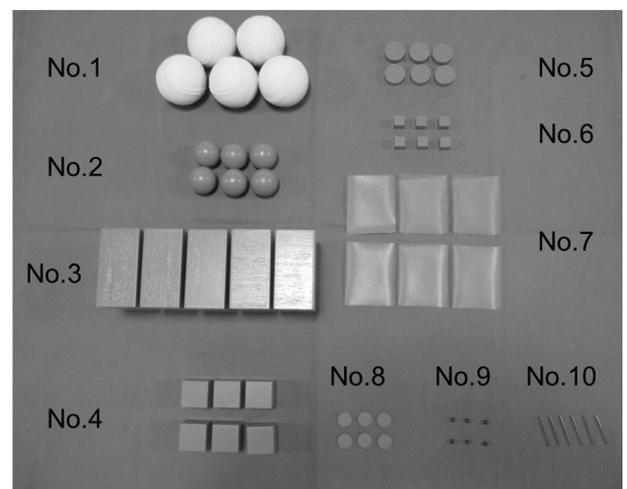


Fig. 2. The size and shapes of objects used in the simple test for evaluating hand function: no. 1 (large ball), no. 2 (middle sphere), no. 3 (large rectangle), no. 4 (neutral direction), no. 5 (wooden disc), no. 6 (small cube), no. 7 (cloth), no. 8 (gold disc), no. 9 (small ball), and no. 10 (pin).

Table 2
Detailed information on assessment items

STEF	Modified STEF
No. 1 (large ball); DIA, 6.8 cm, 80 g	No change
No. 2 (middle ball); DIA, 4.0 cm, 15 g	No change
No. 3 (large rectangle); 10 × 10 × 5 cm, 200 g	10 × 10 × 5 cm, 600 g
No. 4 (neutral direction); 3.5 × 3.5 × 3.5 cm, 15 g	No change
No. 5 (wooden disc); DIA, 3.1 cm, THK, 1.1 cm, 5 g	No change
No. 6 (small cubic); 1.5 × 1.5 × 1.5 cm, 2 g	No change
No. 7 (cloth); 9.0 × 7.0 cm vinyl cloth	9.0 × 7.0 cm polypropylene
No. 8 (gold disc); DIA, 2.0 cm; THK, 2.0 mm	DIA, 2.0 cm; THK, 1.5 mm
No. 9 (small ball); DIA, 6.0 mm	DIA, 4.0 mm
No. 10 (pin); DIA, 3.0 mm; LG, 4.2 cm	DIA, 1.0 mm; LG, 4.2 cm

STEF = simple test for evaluating hand function; DIA = diameter; THK = thickness; LG = length.

User's guide

The following materials are needed to perform the assessment: the modified STEF board and contents, a desk to place the board on, the examiner's handbook, a stopwatch, and a pen or pencil. The distance between the patient and the desk is adjusted such that the patient's hands are reasonably placed at the start position. The following instructions are given to the patient: "Please perform this test as quickly as you can, doing so in a comfortable manner." At the start of the test, the patient places his or her hand at the center of the board. Each subtest is started using the following instructions: "ready, go." The time is stopped when the object is placed in the intended position. All subtests have a time limit, after which point, the assessment is stopped. If the patient drops an object or places it in the wrong location on the board, that particular subtest is restarted. However, a maximum of 3 attempts for each subtest is allowed. If the patient fails on the third attempt, the item is recorded as incomplete.

Scoring

The time required to complete each subtest is measured using a stopwatch, from the go signal to the correct placement of the object on the board, and the time is recorded (Table 3). The time to completion for each item is then scored from 1 to 10, using the

cutoff times established for 100 healthy individuals, 50 males and 50 females, 18–24 years. The time scores for all items are summed to yield the total test score, with a maximum possible score of 100.

Reliability estimates

Reliability is defined as the ability to evaluate similar patient characteristics equally at different time points and is usually assessed using a test-retest analysis. The intraclass correlation coefficient (ICC) and its 95% confidence interval (CI) were used to evaluate inter- and intrarater reliability. Inter-rater reliability (ICC_{1,1}) was evaluated in 40 healthy adults (males, 23; females, 17; age, 20–30 years), using the total score of the modified STEF. Intrarater reliability (ICC_{2,1}) was evaluated in 32 healthy adults (males, 12; females, 20; age, 18–27 years), again using the total score of the modified STEF.

For absolute reliability, the standard error of mean (SEM) and minimal difference change (MDC) were calculated. The SEM is calculated as the square root of the within-participant variance: $SEM = \text{Standard deviation} \cdot \sqrt{1 - ICC}$. The MDC refers to the minimal change measured by an assessment that falls outside the measurement error of the instrument used and was calculated as follows: $MDC = SEM \times \sqrt{2} \times 1.96$.

Validity and responsiveness of the test

Validity is the ability to measure an outcome precisely by making a comparison to a reference, or gold, standard, usually an instrument that has been previously validated. Responsiveness is the ability of a test to detect clinical change, which is typically measured by calculating the effect size or standardized response mean (SRM). To measure the criterion validity and responsiveness of the modified STEF, we collected data from a prospective cohort of patients. The modified STEF was administered by 3 therapists, each having 4–10 years of experience in hand therapy. In addition, the study was supervised by a certified hand therapist from the Japan Hand Therapy Society.

Patients with cervical spondylosis myelopathy were evaluated from the preoperative stage up to discharge. Patients with hand trauma, such as fractures of the distal radius and fingers, were evaluated immediately after surgery and up to 3 months post-operatively. Patients older than 20 years and with no history of other surgical procedures were included. Patients were excluded

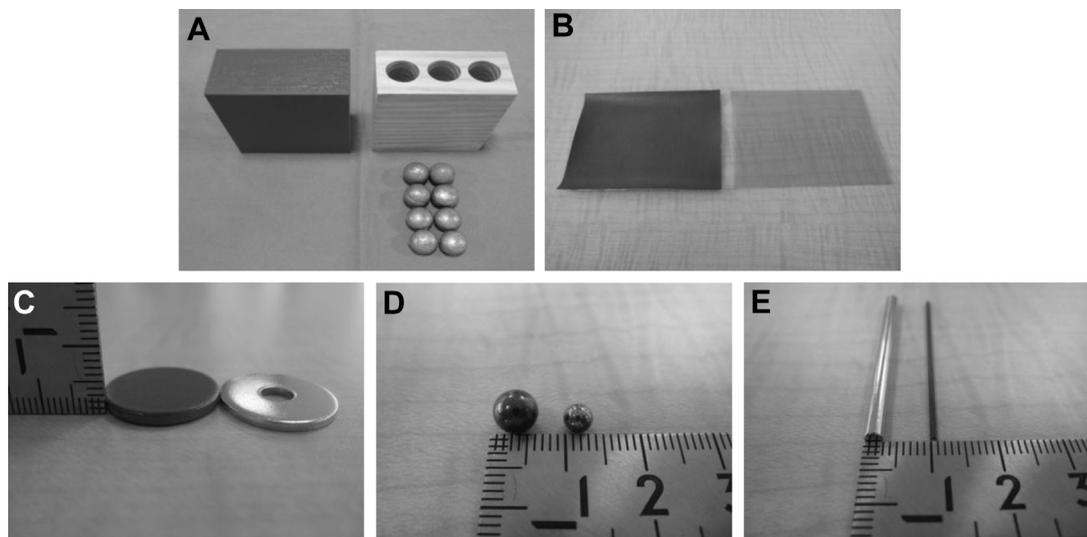


Fig. 3. Assessment items of the modified simple test for evaluating hand function (STEF), which are different from the STEF: (A) 3, (B) 7, (C) 8, (D) 9, and (E) 10.

Table 3

Cutoff times for each item, performed with the R and L hands, used to score each item from 1 to 10

Scoring profile field	Hands(R/L)	Time limit (s)	10	9	8	7	6	5	4	3	2	1
No. 1	R	30	5.3	6.5	7.7	8.9	10.1	11.3	12.5	13.7	14.9	30.0
	L	30	5.8	7.2	8.6	10.0	11.4	12.8	14.2	15.6	17.0	30.0
No. 2	R	30	4.7	5.9	7.1	8.3	9.5	10.7	11.9	13.1	15.3	30.0
	L	30	5.0	6.2	7.4	8.6	9.8	11.0	12.2	13.4	14.6	30.0
No. 3	R	30	8.9	10.5	12.1	13.7	15.3	16.9	18.5	20.1	21.7	30.0
	L	30	9.1	10.7	12.3	13.9	15.5	17.1	18.7	20.3	21.9	30.0
No. 4	R	30	7.5	9.1	10.7	12.3	13.9	15.5	17.1	18.7	20.3	30.0
	L	30	7.9	9.5	11.1	12.7	14.3	15.9	17.5	19.1	20.7	30.0
No. 5	R	30	5.6	7.0	8.4	9.8	11.2	12.6	14.0	15.4	16.8	30.0
	L	30	6.2	7.8	9.4	11.0	12.6	14.2	15.8	17.4	19.0	30.0
No. 6	R	30	6.5	7.9	9.3	10.7	12.1	13.5	14.9	16.3	17.7	30.0
	L	30	7.0	8.4	9.8	11.2	12.6	14.0	15.4	16.8	18.2	30.0
No. 7	R	30	7.4	9.2	11.0	12.8	14.6	16.4	18.2	20.0	21.8	30.0
	L	30	7.8	9.8	11.8	13.8	15.8	17.8	19.8	21.8	23.8	30.0
No. 8	R	60	11.5	13.5	15.5	17.5	19.5	21.5	23.5	25.5	27.5	60.0
	L	60	13.0	15.8	18.6	21.4	24.2	27.0	29.8	32.6	35.4	60.0
No. 9	R	60	14.2	18.0	21.8	25.6	29.4	33.2	37.0	40.8	44.6	60.0
	L	60	14.8	18.6	22.4	26.2	30.0	33.8	37.6	41.4	45.2	60.0
No. 10	R	70	16.0	20.0	24.0	28.0	32.0	36.0	40.0	44.0	48.0	70.0
	L	70	16.7	20.9	25.1	29.3	33.5	37.7	41.9	46.1	50.3	70.0

R = right; L = left.

As an example, performance of item 1 with the right hand in 8.6 seconds is given a score of 7 of 10.

from the analysis if they had a medical history of rheumatoid arthritis or osteoarthritis of the hands or other serious complications. After screening for the exclusion criteria, 50 patients were included in the evaluation of validity estimates (Table 4), with 35 included in the evaluation of responsiveness estimates (Table 5). Pearson correlation coefficient was used to evaluate the relationship between the total score of the modified STEF and that of the STEF, PPT, and DASH. Analyses were performed using the SPSS, version 18 (SPSS, Inc, Chicago, IL), and the significance level was set to 5%.

The SRM to clinical change in hand function as a result of an intervention was calculated as the mean change in score divided by the standard deviation of the score change and was used as the measure of responsiveness. We calculated the SRM for the modified STEF, as well as for the STEF, PPT, and DASH, using the change score from baseline to the final follow-up.

Ethical consideration

Verbal and written information was provided to all participants before enrollment, with all participants providing their consent. This study was approved by the Kanazawa Medical University Hospital Expert Committee on University Research Ethical Evaluation.

Table 4

Diagnosis of patients included in the estimates of validity

Diagnosis	Number of patients (n)	Age	Sex	Dominance
Distal radius fracture	10	66.3 ± 19.2	F: 8, M: 2	D: 4, N: 6
Cervical spondylosis	20	70.4 ± 6.6	F: 9, M: 11	D: 11, N: 9
Digit fracture	6	65.8 ± 12.8	F: 2, M: 4	D: 3, N: 3
Laceration	5	66.3 ± 13.8	F: 0, M: 5	D: 1, N: 4
Extensor tendon injury	4	47.5 ± 19.2	F: 1, M: 3	D: 1, N: 3
Carpal tunnel syndrome	2	68.0 ± 12.7	F: 1, M: 1	D: 2, N: 0
Cubital tunnel syndrome	2	65.5 ± 2.1	F: 0, M: 2	D: 1, N: 1
Flexor tendon injury	1	42	F: 0, M: 1	D: 1, N: 0
Total	50	65.4 ± 13.9	F: 21, M: 29	D: 24, N: 26

F = female; M = male; D = dominant hand; N = non-dominant hand.

Results

Reliability

The inter-rater reliability was high, with an ICC_{1,1} value of 0.89 (95% CI, 0.81–0.95) and the SEM and MDC of 0.26 and 0.72, respectively, for the right hand and of 0.94 (95% CI, 0.89–0.97) and the SEM and MDC of 0.12 and 0.33, respectively, for the left hand. The intrarater reliability was also high, with an ICC_{2,1} value of 0.95 (95% CI, 0.91–0.98) and the SEM and MDC of 0.28 and 0.78, respectively, for the right hand and of 0.86 (95% CI, 0.74–0.93) and the SEM and MDC of 0.39 and 1.08, respectively, for the left hand.

Validity

The average score for the modified STEF, STEF, PPT, and DASH was as follows: 85.3 ± 8.5, 92.1 ± 5.8, 8.7 ± 3.5, and 34.6 ± 17.9, respectively. The correlation (*r*) values between the modified STEF and the other assessments were as follows: STEF, *r* = 0.89, *P* < .05 (Fig. 4); PPT, *r* = 0.62, *P* < .05 (Fig. 5); and DASH, *r* = −0.34, *P* < .05 (Fig. 6).

Responsiveness

The mean total scores for the modified STEF, STEF, PPT, and DASH, with the associated SRM, for the affected hand are listed in Table 6. The SRM (to detect a meaningful clinical change) was higher for the modified STEF (0.89) than for the STEF (0.71) and PPT (0.68) but was lower than the SRM for the DASH (1.11).

Table 5

Diagnosis of patients included in the assessment of responsiveness

Diagnosis	No. of patients	Age	Sex	Dominance
Distal radius fracture	10	66.3 ± 19.2	F: 8, M: 2	D: 4, N: 6
Cervical spondylosis	20	70.4 ± 6.6	F: 9, M: 11	D: 11, N: 9
Digit fracture	5	61.4 ± 14.3	F: 2, M: 3	D: 2, N: 3
Total	35	67.9 ± 12.5	F: 19, M: 16	D: 17, N: 18

F = female; M = male; D = dominant hand; N = non-dominant hand.

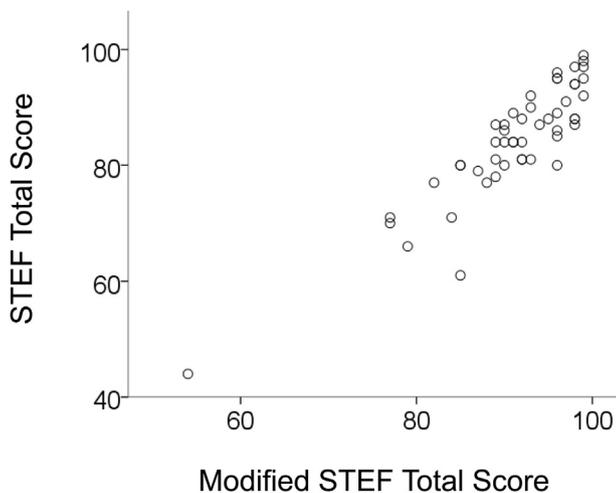


Fig. 4. Correlation between the modified simple test for evaluating hand function (STEF) and the STEF ($n = 50, P < .05$).

Discussion

Dexterity, defined as the skillful and controlled manipulation of a tool or an object by the fingers,^{21,22} is considered essential to the successful performance of tasks of daily living, work, school, play, and leisure^{23,24} and is an important component of a comprehensive assessment of upper extremity function. Despite the fact that many performance tests have been developed internationally, there is no consensus on the ideal test to assess hand function in clinical practice. The STEF is robust to effects of cultural background owing to the variety of assessment items and grasping styles that it incorporates, with few elements being linked to specific activities of daily living which, to a great extent, are culturally determined. However, previous studies have indicated the need to pay attention to the ceiling effect of the STEF in patients with mild impairment in hand function.¹⁹ In our previous study, the STEF score tended to be higher than the score in these previous studies, particularly among individuals with mild impairment in hand function.²⁰ On the basis of these results, we considered the possibility that the difficulty level and evaluation criteria of the test items might be limiting factors of the clinical utility of the STEF. To address this limitation of the STEF, we developed the modified STEF by increasing the difficulty of selected test items (3, 7, 8, 9, 10) to improve the discrimination of the

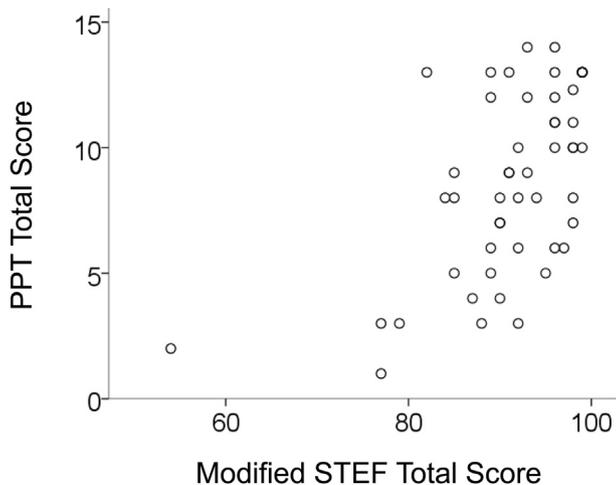


Fig. 5. Correlation between the modified simple test for evaluating hand function (STEF) and the Purdue pegboard test (PPT) ($n = 50, P < .05$).

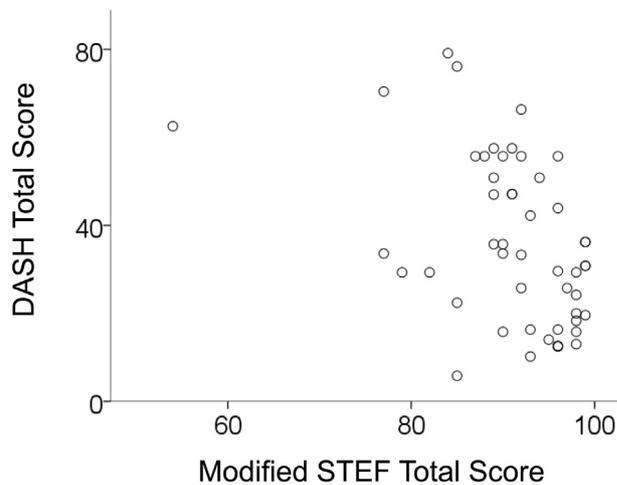


Fig. 6. Correlation between the modified simple test for evaluating hand function (STEF) and the Disabilities of the Arm, Shoulder and Hand (DASH) questionnaire ($n = 50, P < .05$).

evaluation criteria. In this study, we evaluated the clinimetric properties of the modified STEF by evaluating test scores across a larger group of patients who had undergone surgical treatment.

We determined that the reliability of the modified STEF is almost perfect when the test is performed by different evaluators within a short time frame and when repeated by the same evaluator within a 7-day time frame.²⁵ However, the 95% CI of the ICC_{2,1} ranged between 0.74 and 0.93, indicative of variation in the scoring of the modified STEF by different evaluators. This inter-rater variation in scoring can be explained by the absence of a clear indication for repeating a trial in the modified STEF. In the STEF, an assessment item is repeated when the test object is dropped. However, in the modified STEF, as individuals had better hand function, errors in performance were not due to dropping the test object but rather due to pushing the object to the correct location on the board. The extent to which pushing rather than placing the test object on the correct location was tolerated might have varied between examiners. Therefore, clarification of this criterion of the performance is needed to provide examiners direction as to when a test item should be repeated.

To evaluate validity, we chose to use the PPT and DASH as opposed to other hand-specific measures of disability for several reasons. First, the inter-rater reliability and construct validity of the PPT have been established.^{26,27} In addition, at present, the PPT is recommended in clinical practice because it includes both bilateral and unilateral hand use and has a broad age range of normative data available. The DASH also has demonstrated reliability, validity, and responsiveness.²⁸ It is the most extensively studied assessment tool of the upper limb, with large supporting evidence of its good clinimetric quality. We identified a moderate correlation between the modified STEF and PPT. This lower-than-expected correlation might be explained by differences in test items between these 2

Table 6
Responsiveness of the modified STEF, STEF, PPT, and DASH

Responsiveness of the each test	Average	SD	SRM
Modified STEF	6.9	7.7	0.89
STEF	3.3	4.7	0.71
PPT	2.0	3.0	0.68
DASH	15.0	13.6	1.11

STEF = simple test for evaluating hand function; PPT = Purdue pegboard test; DASH = Disabilities of the Arm, Shoulder and Hand questionnaire; SD = standard deviation; SRM = standardized response mean.

assessment tools. Similar to the PPT, the modified STEF includes the task of manipulating a pin with the thumb, index finger, and middle finger. However, the modified STEF also includes subtests with objects of different sizes and shapes, with these tasks requiring the use of different unilateral grasps that use all the digits of the hand, as well as incorporating tasks that require anterior and posterior rotations of the forearm. The PPT may be used for a patient with an occupation that requires integration of fine motor skills and bimanual activity. However, the modified STEF should be used for a patient who uses a variety of unilateral grips.

We also identified a low correlation between the modified STEF and the DASH. These 2 assessment tools are very different, with the modified STEF being a criterion-based standardized performance tool, whereas the DASH is a self-report questionnaire that evaluates an individual's perception of his or her capacity to perform an activity in a real-life environment.^{29,30} Because of these differences, the 2 types of tools should complement each other when measuring someone's activity and participation level^{30,31} but may not correlate as they are measuring different underlying constructs.

We used the SRM as an indicator of responsiveness. According to the evaluation criteria proposed by Cohen,³² an SRM >0.80 is indicative of a larger responsiveness. As such, an SRM of 0.89 indicates good responsiveness of the modified STEF, which was comparable to an SRM of 1.1 that we calculated for the DASH in our study, the latter value being comparable to previously reported values of 0.7–1.37 for the DASH.^{33,34}

The STEF is limited in its ability to detect subtle changes in performance among patients with sufficiently good hand function as the test items used can be performed with different grips. As such, impairments in one finger can be effectively compensated by the use of an alternate type of grip using uninvolved fingers. Therefore, the test items of the STEF may not be sufficiently sensitive to evaluate more subtle limitations in range of motion, sensation, and muscle strength. In contrast, the test items of the modified STEF cannot easily be compensated for by using an alternative grip and, therefore, subtle impairments will affect the test score. This differentiation is improved by the reference scores of more than 100 men and women, which are provided with the modified STEF.

Limitation

In this study, we evaluated the correlation and responsiveness of the modified STEF with established clinical tools, namely the STEF, PPT, and DASH, for patients in whom hand function was impaired by trauma, inflammatory disease, and cervical spondylosis myelopathy. However, the sample size was small and included a variety of etiologies. This may have influenced our evaluation of the correlation of the modified STEF to established assessment and of its responsiveness. Future studies are warranted to evaluate the responsiveness of the modified STEF for specific conditions, such as distal radius fracture and carpal tunnel syndrome.

Conclusion

The modified STEF is a reliable measurement tool, with a moderate positive correlation with the PPT and a greater responsiveness than the STEF and PPT. Based on our results, we propose that the modified STEF has sufficient reliability, criterion validity, and responsiveness for use in clinical practice.

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- # 1. The article is primarily targeted to therapists in
- the UK
 - Japan
 - the US
 - Latin America
- # 2. The purpose of the study was to test the _____ of the Modified STEF
- responsiveness
 - validity
 - reliability
 - all of the above
- # 3. Validity was tested using
- a unique method developed for this study
 - videography

- the Pearson correlation coefficient, PPT, and DASH
 - a combination of all of the above
- # 4. The subject population comprised
- all normal volunteers
 - a cohort of actual patients
 - an equal number of female and male patients
 - patients aged 14-20 years old
- # 5. The Modified STEF demonstrated greater responsiveness than the PPT and the STEF
- true
 - false

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