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Reliability of the translation and adaptation of the Test d'Évaluation des Membres Supérieurs des Personnes Âgées (TEMPA) to the Portuguese language and validation for adults with hemiparesis

Confiabilidade da tradução e adaptação do Test d'Évaluation des Membres Supérieurs de Personnes Âgées (TEMPA) para o português e validação para adultos com hemiparesia

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Abstract

Introduction: The Test d'Évaluation des Membres Supérieurs de Personnes Âgées (TEMPA) is composed of standardized tasks that represent activities of daily living. This test evaluates upper limb function in individuals with motor deficits. In addition to measuring time and functional level, this instrument also provides analysis of the tasks performed. **Objective:** The aims were: to translate and to adapt the TEMPA form and administration manual to the Portuguese language; and to assess interrater and test-retest reliability and the validity of TEMPA for patients with hemiparesis. **Methods:** Twenty-three patients (61±13 years) with hemiparesis (30±29 months) and 23 controls (60±12 years) participated in this study. The interrater reliability was tested by comparing the results from two examiners, in evaluations on the same day. The test-retest reliability was tested by comparing the results from evaluations repeated within a one-week interval. The validity of TEMPA for hemiparetics was assessed by correlation with the Fugl-Meyer scale (FMS). **Results:** The results showed adequate interrater reliability (intraclass correlation coefficient - ICC=0.93) and test-retest reliability (ICC=0.99) for the total scores. In patients with moderate to severe motor deficits (FMS<50), all the items showed adequate test-retest and interrater reliability (ICC between 0.70 and 1.00). In patients with mild motor deficits (FMS≥50), the reliability regarding speed of execution and total functional score (interrater, ICC=0.79 and test-retest, ICC=0.78) was adequate. The correlation of TEMPA with FMS was r=-0.85 (p=0.001). **Conclusions:** The results suggest that the Brazilian version of TEMPA is reliable and that it is valid for patients with hemiparesis.

Key words: translations/adaptation; upper limb function; hemiparesis; reliability.

Resumo

Introdução: O Test d'Évaluation des Membres Supérieurs de Personnes Âgées (TEMPA) é composto por tarefas padronizadas, representando atividades da vida diária e avalia a função do membro superior (MS) de pessoas com alteração motora. Além da medida do tempo e da graduação funcional, o instrumento propõe uma análise das tarefas executadas. **Objetivo:** Os objetivos do estudo foram: traduzir e adaptar para a língua portuguesa o formulário e o manual de administração do TEMPA; avaliar a confiabilidade teste reteste e interobservadores e a validade para pacientes com hemiparesia. **Métodos:** Participaram deste estudo 23 pacientes (61±13 anos) com hemiparesia (30±29 meses) e 23 controles (60±12 anos). A confiabilidade interobservadores foi testada comparando o resultado de dois observadores, em avaliações realizadas no mesmo dia. A confiabilidade teste reteste foi testada comparando o resultado das avaliações, repetidas no intervalo de uma semana. A validade para hemiparéticos foi avaliada por meio da correlação com a escala de Fugl-Meyer (EFM). **Resultados:** Os resultados mostram adequada confiabilidade interobservadores (coeficiente de correlação intraclasse - CCI=0,93) e teste reteste (CCI=0,99) para os escores totais. Nos pacientes com comprometimento motor moderado a grave (EFM<50), todos os itens mostraram adequada confiabilidade teste reteste e interobservadores (CCI entre 0,70 e 1,00). Nos pacientes com comprometimento motor leve (EFM≥50), a confiabilidade para a velocidade na execução assim como para o escore funcional total (interobservadores, ICC=0,79 e teste-reteste, ICC=0,78), foi adequada. A correlação do TEMPA com a EFM foi de r=-0,85 (p=0,001). **Conclusões:** Os resultados sugerem adequada confiabilidade para a versão brasileira do TEMPA e validade para pacientes com hemiparesia.

Palavras-chave: tradução/adaptação; função do membro superior; hemiparesia; confiabilidade.

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Introduction

Stroke is the greatest cause of morbidity in the adult population, and a significant percentage (50 to 60%) of survivors is left with hemiparesis as a motor sequela[1]. With regard to the upper limbs (ULs), only 12% of the patients with initial palsy will fully overcome that condition within the first six months[2]. The efficacy of the physical therapy treatment for the motor and functional recovery of the ULs of hemiparetic patients is still open to debate in the literature[3]. The choice of the appropriate result measure is critical to evaluate the effect of the treatment[4], and therefore it is crucial to have an assessment method to measure the UL recovery after stroke in a precise and rigorous way. To this end, there are reliable and valid measures, however most of these are in French or in English. Translated from English and validated in Brazil, the Arm Motor Ability Test (AMAT)[5] essentially evaluates activities associated with eating and getting dressed, although it does not use standardized tasks[6]. Aimed at a high level of standardization of the tasks that represent the activities of daily living (ADLs), the Test d'Évaluation des Membres Supérieurs des Personnes Âgées (TEMPA)[7] is carried out on a platform with defined measures (Figure 1A), and all of the materials used are located in precise and predetermined places. Available in French and in English, the TEMPA also quantifies the difficulties faced by the examinee in each of the performed tasks.

Although originally created with the older population in mind, the test is also used to evaluate UL function in patients with multiple sclerosis[8], traumatic brain injury[9], ataxia[10] and in burns victims[11]. From its inception, the scale was used in several studies involving patients with stroke sequelae[12-16], and the specific evaluation of the psychometric properties of the English version of the test for the hemiparetic population was done by Richards et al.[17].

The aims of this study were: to translate and adapt the TEMPA form and administration manual to Brazilian Portuguese; to evaluate the test-retest and interrater reliability and to determine the validity of the Brazilian version for patients with hemiparesis.

Methods

Translation and adaptation of the test

The TEMPA was developed in (Canadian) French and received an additional manual[18] describing the test procedures, as well as the graphics, in order to facilitate its application. The Canadian version was validated[7] and the normative data for the older population were published by Desrosiers et al.[19]. In the present study, the items of the TEMPA form and manual were translated separately into Portuguese by two Brazilian physical therapists. The translations were compared and, when there was a discrepancy, changes were made in order to reach a consensus.

The original version of the TEMPA comprises five bilateral tasks:

- to open a jar and take out a spoonful of coffee;
- to undo a lock, pick up and open a bottle of pills;
- to write on an envelope and stick a stamp on it;
- to wrap a scarf around one's own neck;
- to shuffle and deal playing cards.

It also comprises four unilateral tasks:

- to pick up and move a jar, as in Figure 1B;
- to lift a pitcher and pour water into a glass;
- to handle coins;
- to take and move small objects, as seen in Figure 1C.

In the translation, the item "To wrap a scarf around one's own neck" was left out, considering the weather differences between Brazil and the country where the instrument was created (i.e. Canada). The authors also opted to preserve the name of the test as TEMPA in the Portuguese version, due to the fact that it is internationally known as such, even in English-speaking countries[8,9,19].

TEMPA scores

The scores obtained by the TEMPA rater are based on the performance speed, functional rating, and analysis of the performed tasks. To evaluate the performance speed, the tasks are timed from the moment the participant releases the handle (lower platform) until the moment the task is completed (keeping in mind that the tasks must be performed as quickly as possible). The time taken to perform the unilateral tasks is recorded only if the examinee is able to accomplish the task. The functional rating refers to the individual's independence in each task, according to a four-level scale:

- (0) the task was successfully completed, without hesitation or difficulty;
- (-1) the task is executed thoroughly, but with some degree of difficulty;
- (-2) the task is partially executed, or certain steps are performed with significant difficulty (one part of the task may have been changed, or the participant may have needed the rater's assistance);
- (-3) the participant cannot accomplish the task, even if assisted.

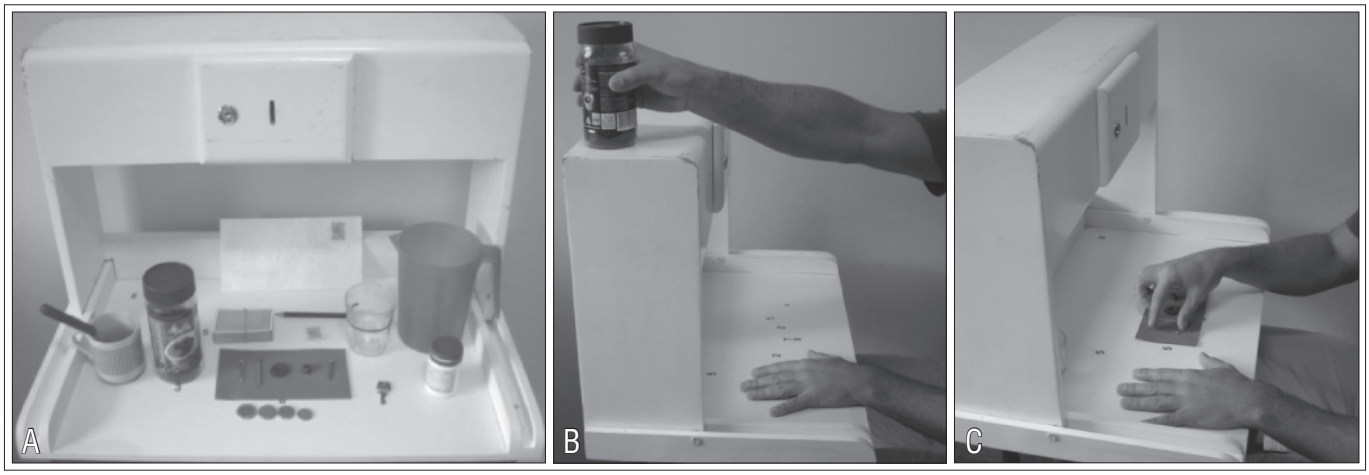

Figure 1. A. Shelf for TEMPA material with objects used for task performance; **B.** Example of gross motor movement; **C.** Example of fine motor movement.

The analysis of the performed task quantifies the difficulty encountered by the participant, according to five items related to the UL sensorimotor skills:

- 1: strength;
- 2: range of motion (ROM);
- 3: precision of gross movements;
- 4: prehension;
- 5: precision of fine movements.

When the eight tasks are completed and rated, the observer adds the total scores of the right-side unilateral tasks (0 to -12), left-side unilateral tasks (0 to -12), and bilateral tasks (0 to -12). Thus, the total functional rating corresponds to the right-side unilateral tasks + the left-side unilateral tasks + the bilateral tasks (0 to -36). The same sums are done in the five dimensions of the analysis section of the tasks. Considering that the precision of the fine movements is not rated in tasks one and three, and that the strength is not rated in tasks five to eight, the analysis dimension of the tasks may vary from 0 to -150. The total score represents the sum of the functional rating and of the task analysis. Although the original scale proposes a negative rate, zero being indicative of the absence of incapacity, and negative values indicating a greater incapacity, as far as the statistical analysis is concerned the values were used regardless of that signal. Therefore, in this study, greater values correspond to a greater incapacity.

Rater training

Theoretical and practical training was carried out with the raters. It consisted of a collective reading of the manual and practical application of the instrument to an individual without a motor deficit. Next, each one of the raters applied the test separately to a participant with hemiparesis and the evaluations were discussed in order to promote a greater standardization of the test application. The participants who took part in the training were not included in the sample.

Participants

The study of the translation and validation of the TEMPA began with the approval from the Human Research Ethics Committee of Universidade do Estado de Santa Catarina (CEP/Udesc), under protocol number 169/2006, and a signed consent form was obtained from each participant.

Twenty-three participants with hemiparesis due to stroke took part in the study. The mean age was 60.7±13.4 years. The participants were recruited from the university's Physical Therapy Out-Patient Clinic. Individuals with bilateral sequelae, other associated neurological pathologies, or comprehension deficits were excluded from the study. Although the study of reliability and validation of the English version used a sample of ten post-stroke participants[17], our initial sample was set at 25 participants in order to include participants with different degrees of impairment. Two participants were excluded from the final analysis: one due to participation in the training phase, and the other due to hemiparesis as a result of traumatic brain injury. The control group consisted of 23 participants without any motor deficits affecting the UL, paired by gender and age (±5 years) with a mean age of 60.0±11.5. These participants performed the tests so that the performance speed of the proposed tasks could be measured and compared to the speed of the hemiparetic individuals performing the same tasks. Participant characteristics are displayed in Table 1.

Test-retest and interrater reliability

Reliability was verified three times by two different raters. All of the materials were placed in specific and predetermined positions on a shelf in order to ensure a high level of standardization in the development of the tasks. The test procedure was explained, and then the rater would demonstrate the task to the participant. To ensure that the command was fully understood, the task was performed once before the test was timed. The participant was then asked to carry out the task using the unaffected side, followed by the impaired side. Thus the rate was obtained according to the explanations described in the manual. In the case of the control group, the participants performed the task starting with the dominant side. The first rater (R1) tested the same participant twice, time 1 (T1) and time 2 (T2), in evaluations separated by a one-week interval. The second rater (R2) applied the test once, on the same day as T1 of R1, with a one-hour interval.

Concurrent validity

The validity of the test for hemiparetic patients was assessed by its correlation with a scale that evaluates the degree of motor recovery after a stroke, named Fugl-Meyer Scale (FMS)[20,21]. Two meetings were scheduled to apply the TEMPA, and in one of them the FM (UL section) was applied. In addition to this, personal details (name, age, gender) were collected in the first session, as well as the characteristics of the pathologies when applicable (time of sequela and affected side), and also the participant's laterality.

Fugl-Meyer Scale

The FMS uses a three-point scale (0 to 2), in which 0 corresponds to the non-completion of the item, 1 to the partial completion of the item, and 2 to its full completion. Therefore, the motor domain for the UL totaled 66 points. However, the sensibility section that evaluates the tactile and proprioceptive sensibility (movement direction) totaled 20 points and eight points, respectively. The ROM is passively evaluated on the shoulder, elbow, forearm, wrist, and hand, and the joint pain section evaluates the presence of pain at the end of the ROM, and both scored a total of 24 points[20].

Statistical analysis

The intraclass correlation coefficient (ICC) and the 95% confidence interval (CI) were used to evaluate the test-retest and interrater reliability. Interrater reliability was evaluated by comparing the tests of R1 and R2. The comparison of T1 and T2 was used to evaluate the reliability of the test-retest. The values of the following variables were compared: a) the rate of the individual tasks graded from 0 to 3 in the functional rating and according to the scale's score grid; b) the total functional rate, i.e. the sum of the partial scores for all the tasks; c) the rate obtained in the analysis of the tasks; d) the performance speed of each task in the group of participants with hemiparesis and in the control group. Considering that the degree of motor impairment may interfere with the applicability of the instrument, a separate analysis was also carried out for those participants with a mild impairment (FM≥50) and moderate to severe impairment (FM<50)[15].

The validity of the scale for patients with hemiparesis was evaluated by its correlation with the FMS (UL section only) using the Pearson correlation coefficient.

Table 1. Demographic and clinical characteristics of participants.

Characteristics	Hemiparetics (n=23)	Controls (n=23)
Gender		
Male	11 (49%)	11 (49%)
Female	12 (51%)	12 (51%)
Age (years)	60.7 (±13.4)	60.0 (±11.5)
Affected side		
Left	11 (49%)	
Right	12 (51%)	
Time after stroke (months)	30.4 (±28.9)	
Fugl-Meyer Scale		
Motor Function (66)	40.2 (±21.6)	
Tactile Sensation (20)	13.6 (±7.6)	
Proprioception (8)	6.4 (±2.2)	
Passive ROM (24)	21.2 (±2.4)	
Pain (24)	20.9 (±3.5)	

ROM=range of motion.

Results

UL dysfunction varied greatly among the participants with hemiparesis. Ten of them had a mild impairment, according to the FMS (59±3), and 13 had a moderate to severe score (26±15). The total functional rating of the TEMPA ranged from zero to 22, and the sum of the five dimensions of task analysis ranged from one to 89.

Table 2. Interrater reliability.

	Rater 1 Mean (SD)	Rater 2 Mean (SD)	Interrater ICC (95% CI)	p value
Functional ratings in individuals tasks with affected arm (0-3; total 0-12)				
Pick up and move a jar	1.8 (1.2)	1.6 (1.3)	0.95 (0.90-0.98)	p=0.000
Pick up a pitcher and pour water	1.9 (1.1)	1.6 (1.4)	0.94 (0.87-0.97)	p=0.0000
Handle coins	1.9 (1.1)	1.8 (1.2)	0.96 (0.90-0.98)	p=0.0001
Pick up and move small objects	1.8 (1.2)	1.8 (1.2)	0.96 (0.90-0.98)	p=0.0000
Functional ratings in individuals bilateral tasks (0-3; total 0-12)				
Open a jar and remove coffee	0.9 (0.8)	0.7 (0.6)	0.79 (0.52-0.91)	p=0.0001
Unlock a lock and remove pills	0.7 (0.8)	0.7 (0.8)	0.86 (0.68-0.94)	p=0.0001
Write and stick a stamp	0.9 (0.9)	0.9 (0.8)	0.82 (0.58-0.92)	p=0.0001
Shuffle cards	0.9 (0.7)	1.0 (1.1)	0.91 (0.79-0.96)	p=0.0001
Task analysis –unilateral and bilateral tasks scores combined				
Strength	3.9 (3.3)	3.6 (3.5)	0.92 (0.81-0.97)	p=0.0001
Active ROM	7.9 (6.7)	7.9 (7.0)	0.93 (0.85-0.97)	p=0.0001
Precision of gross mov.	8.3 (6.5)	7.7 (7.5)	0.95 (0.87-0.98)	p=0.0001
Prehension	8.8 (6.1)	9.5 (7.1)	0.91 (0.79-0.96)	p=0.0001
Precision of fine mov.	5.9 (3.6)	6.7 (4.7)	0.86 (0.66-0.94)	p=0.0001
Total score	45.6 (34.0)	45.5 (38.0)	0.96 (0.90-0.98)	p=0.0000

mov. = movement

Interrater reliability

The ICC values between the two raters for the total scores, functional rating and task analysis were 0.94, 0.97 and 0.94 respectively, all with p=0.0001. Table 2 describes the mean values (±SD) of both raters, the ICC and the 95% CI for the functional rating in the unilateral individual tasks with the affected arm and the bilateral tasks, and for the five dimensions used in the task analysis.

The task analysis carried out separately for the unilateral and bilateral tasks showed different levels of reliability. In the unilateral tasks, the ICC varied from 0.95 (precision of fine movements and strength) to 0.97 (precision of gross movements), showing excellent reliability in all the dimensions of the task analysis. In the analysis of the bilateral tasks, the dimensions prehension, precision of fine movements, active ROM, strength and precision of gross movements had moderate reliability indexes (ICC 0.58, 0.65, 0.68, 0.73 and 0.78, respectively).

Test-retest reliability

The mean functional rating (sum of all tasks) was 10.8±6.4 (T1) and 10.3±6.8 (T2) and the ICC between the T1 and the T2 was 0.98 (p=0.0001). The task analysis value (sum of all five dimensions and all tasks) was 34.9±25.7 (T1) and 30.1±24.8 (T2), with ICC=0.96 (p=0.0001). The total TEMPA scores were 45.7±31.8 (T1) and 40.3±31.2 (T2), with ICC=0.97 and p=0.0001.

Test-retest and interrater reliability according to motor impairment

The test-retest and interrater reliability for the total functional score of the participants with a mild impairment (FM≥50) was 0.78 (p=0.02) and 0.79 (p=0.01) respectively. Although the reliability of the total functional scores (sum of all tasks) was appropriate, the reliability for the functional rating, when taken separately, was weak for some tasks (Table 3). For the participants with moderate to severe impairment (FM<50), the test-retest and interrater ICC for the total functional score was 0.95 and 0.92, respectively (p=0.0001 for both analysis). As shown in Table 3, the ICC values, both for the interrater and for the test-retest were appropriate.

The reliability of the test-retest for the five dimensions of the analysis of the tasks performed with the affected arm was adequate, both in the participants with mild impairment and also in the group with moderate to severe impairment. Except for dimensions such as strength, active ROM, and prehension in the mildly-impaired group, the interrater ICC was adequate for the analysis of the tasks performed with the affected arm (Table 3).

The test-retest reliability of the bilateral task analysis was adequate in the severely impaired group, scoring ICC values that ranged from 0.67 to 0.87. The interrater reliability, with the exception of the fine movement precision dimension, was moderate, with an ICC varying from 0.60 to 0.70. The interrater and test-retest ICC values for the analysis of bilateral tasks in the group with mild impairment were not satisfactory (all had ICC<0.30).

Table 3. Interrater and test-retest reliability according motor impairment.

Impairment	Mild (FMS≥50)		Moderate to severe (FMS<50)	
	Interrater ICC	Testretest ICC	Interrater ICC	Testretest ICC
	Functional rating			
Affected arm				
Pick up and move a jar	0.79 (p=0.01)	0.59 (ns)	0.92 (p=0.000)	0.92 (p=0.000)
Pick up a pitcher and pour water	0.68 (p=0.05)	0.90 (p=0.009)	0.94 (p=0.0000)	0.96 (p=0.0000)
Handle coins	0.78 (p=0.02)	0.53 (ns)	0.96 (p=0.0000)	0.96 (p=0.0000)
Pick up and move small objects	0.75 (p=0.02)	0.23 (ns)	1.00	0.96 (p=0.0000)
Bilateral tasks				
Open a jar and remove coffee	0.79 (p=0.01)	0.66 (p=0.06)	0.68 (p=0.03)	0.74 (p=0.01)
Unlock a lock and remove pills	0.36 (ns)	0.32 (ns)	0.87 (p=0.001)	0.83 (p=0.002)
Write and stick a stamp	0.69 (p=0.05)	0.69 (p=0.05)	0.70 (p=0.02)	0.90 (p=0.0002)
Shuffle cards	0.90 (p=0.001)	0.89 (p=0.002)	0.83 (p=0.002)	0.79 (p=0.005)
Task analysis (affected arm)				
Strength	-0.36 (ns)	0.78 (p=0.02)	0.94 (p=0.0000)	0.84 (p=0.002)
Active ROM	0.11 (ns)	0.92 (p=0.0004)	0.97 (p=0.0000)	0.95 (p=0.0000)
Precision of gross mov.	0.67 (p=0.05)	0.82 (p=0.01)	0.96 (p=0.0000)	0.92 (p=0.0001)
Prehension	0.50 (ns)	0.88 (p=0.002)	0.97 (p=0.0000)	0.98 (p=0.0000)
Precision of fine mov	0.65 (p=0.06)	0.83 (p=0.01)	0.99 (p=0.0000)	1.00

FMS=Fugl-meyer scale; ICC=Intraclass correlation coefficient.

Total test time and task performance speed

The total time needed for the test varied from 15 to 45 minutes; that included the private instructions, the respective demonstrations that precede each task and the trial before the test is timed. The reliability of the total task performance speed is shown in Table 4.

Considering that some of the participants were not able to complete all of the tasks, in which case the time was disregarded, the average task performance speed was statistically compared only for the group of mildly-impaired participants (Table 4). The reliability values for the task performance speed with the unaffected arm of the hemiparetic participants and the corresponding arm in the control group are also displayed in Table 4.

Concurrent validity with the FMS

The participants showed UL motor impairment that varied from mild to severe (63 to 5 points on the UL section of the FMS). Table 1 displays the mean values (±SD) obtained on the FMS. The analysis of correlation between total TEMPA score and Fugl-Meyer motor score had a Pearson correlation coefficient of r=-0.85 (p=0.001) and r=-0.86 (p=0.001), for R1 and R2 respectively.

Discussion

The interrater reliability was adequate, and verified by means of the ICC value of the translated and validated TEMPA version of the instrument comprising eight items. For

Table 4. Reliability (ICC and p value) for task performance speed.

Participants with hemiparesis				
Impairment	Mild		Moderate to severe	
	Interrater	Test retest	Interrater	Test retest
Total time	0.36 (ns)	0.94 (p=0.0001)	0.97 (p=0.000)	0.95 (p=0.0000)
Unilateral tasks – affected arm				
Pick up and move a jar	0.69 (p=0.04)	0.82 (p=0.01)		
Pick up a pitcher and pour water	0.72 (p=0.04)	0.77 (p=0.02)		
Handle coins	0.65 (ns)	0.95 (p=0.0001)		
Pick up and move small objects	0.88 (p=0.004)	0.97 (p=0.0000)		
Bilateral tasks				
Open a jar and remove coffee	0.90 (p=0.001)	0.66 (p=0.06)		
Unlock a lock and remove pills	0.83 (p=0.01)	0.68 (p=0.05)		
Write and stick a stamp	0.93 (p=0.0002)	0.93 (p=0.0002)		
Shuffle cards	0.93 (p=0.0003)	0.82 (p=0.01)		
Unilateral tasks	Participants with hemiparesis (n=23)		Controls	
Non affected arm	Interrater	Test retest	Interrater	Test retest
Pick up and move a jar	0.79 (p=0.0002)	0.72 (p=0.002)	0.42 (p=0.10)	0.36 (ns)
Pick up a pitcher and pour water	0.63 (p=0.01)	0.79 (p=0.0003)	0.84 (p=0.0000)	0.70 (p=0.003)
Handle coins	0.82 (p=0.0001)	0.53 (p=0.04)	0.69 (p=0.004)	0.81 (p=0.0001)
Pick up and move small objects	0.85 (p=0.0000)	0.91 (p=0.0000)	0.82 (p=0.0001)	0.87 (p=0.0000)

participants with a moderate to serious motor impairment, the findings of the researchers of this study also support the evidence of a high correlation between the results of the same rater, showing good time stability. These findings are in accordance with those of previous studies, which show a reliability ranging from 0.70 to 1.0[7]. These high reliability coefficients are probably due to the detailed description of the score method in the manual, as well as the test's standardized features. The importance of standardizing the test administration guide to lessen the measurement errors is referred by Sanford et al.[22]. Unlike the literature, however, in the present study the test-retest reliability of the functional rating for the two individual fine movement tasks was weak (as shown in Table 3). Two factors can explain this finding: the rater's occasional difficulty in identifying the compensations in the participants with mild impairment, and deciding when to offer assistance in the task (see 'scores' item in the TEMPA). In the functional rating, the -1 score is given when the participant shows some hesitation or difficulty, or when the task is performed with compensations. The literature has demonstrated that the trunk movement in hemiparetic patients may contribute to the positioning and guidance of the hand during the prehension tasks[23]. In patients with severe impairment, the compensations become more evident; however, in patients with mild impairment, the absence of a more objective criterion to evaluate the compensations, as in the scale by Levin et al.[24], could affect the decision between scores 0 and -1. Score -2 in turn is given when the rater needs to offer assistance or to change the task (by moving the material nearer or stabilizing it, for instance). Deciding whether or not to make these

changes during the task might be easier when it involves patients with a more severe impairment.

As in the studies on the Canadian version[19], the interrater and test-retest reliability for the performance speed of the individual tasks, both with the affected arm of the patients with a mild impairment, and with the unaffected arm of all patients, ranged from moderate to excellent. With the exception of the "pick up and move a jar" task, the same results were found for the performance speed of the unilateral tasks in the control group.

According to the study by Richards et al.[17], the reliability values for the analytical domains of the bilateral tasks were unsatisfactory (ICC<0.30). Nevertheless, in the present study, this result only applied to the patients with a mild impairment. In asymmetrical bilateral tasks, a limb can be used to hold the material, while the other limb is more active (to open the container, for example). The patients with severe impairment tend to use the affected arm to hold the material, while the good arm is the most active[25]. The patients with mild impairment can choose to use the affected arm as the active one, and thus the performance could be more subject to variations during the repetition of the task.

In the mildly impaired participants, although the test-retest reliability in the strength and active ROM domains with the affected arm was good to excellent (ICC from 0.78 to 0.92), the interrater reliability was not adequate (see Table 3). However, the reliability for the total functional scores was adequate for this group, as well as the reliability of the task performance speed tests (Table 4).

In Brazil, there are currently no validated instruments in Portuguese to evaluate UL function in patients with hemiparesis based on standardized task performance, or to quantify the difficulties encountered by the patients during the task. Because a higher score in the FMS indicates a better motor performance, and a higher score in the TEMPA indicates a lower functional capacity of the limb, the correlation between the tests was negative.

Although the TEMPA has been used in several studies involving post-stroke populations, only one study[17] has investigated the specific validation for this population. According to Richards et al.[17], within the 'task analysis' item for the individual items, the smallest agreement is for the bilateral tasks. Yet, the total scores for each dimension, including the unilateral and bilateral tasks, demonstrate an adequate reliability. Furthermore, a previous study[15] showed that the TEMPA can be a sensitive test to detect the recovery of UL function after therapy for the task, and that the gains are related to improvements in the kinematic parameters during a task involving reaching and grasping.

The results found in this research support the use of the TEMPA to evaluate the recovery of UL function in patients with hemiparesis, and the Brazilian version is an instrument with high reliability and validity. In patients with motor scores ≥50 in the FMS (mild impairment), it is preferable to take into account the total functional scores and the task performance speed.

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