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RESEARCH ARTICLE

Validation of the functional and social performance – DSF-84 checklist: preliminary study*

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Abstract

Purpose: To develop, implement and validate an instrument for assessing the functional and social performance of young male adults with lower limb amputees based on the international classification of functionality, incapacity, and health. *Methods:* Developed the instrument, the items were grouped into domains (organic aspects – OA, daily activities – DA, performance components – PC, social participation – SP and environmental factors – EF) for statistical analysis. The implementation of the instrument was filmed for validation. Four assessors watched the films on two occasions and gave scores. Intra-class correlation was used to evaluate intra- and inter-rater reproducibility and to the internal consistency was calculated by Cronbach's alpha and the criterion validity was assessed by Student's *t*-test and the Mann–Whitney *U*-test. *Results:* The results showed good reliability in the scores for OA, DA, PC and SP domains and a reasonable reliability for the EF domain. The differences between assessors performed by the analysis of variance were not significant. The reliability intra-rater, performed through the test–retest method, showed in all domains high levels of intra-rater correspondence. *Conclusions:* The results show the validity and reliability of DSF-84 to young male adults with amputation of the lower limb, being useful for this population.

Keywords

Assessment, functional performance, ICF, social performance

History

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➤ Implications for Rehabilitation

- In this study have been developed, implemented, and validated an instrument (DSF-84) for assessing the functional and social performance of young male adults with lower limb amputees based on the ICF.
- The results show the validity and reliability of DSF-84 to young male adults with amputation of the lower limb, being useful for this population.

Introduction

Every year among Americans 40 000 new cases of amputation of limbs occur and the main causes for amputation of the lower limbs are the peripheral vascular diseases (PVD), followed by traumas (generally due to automobile accidents) or lesions due to fire-gun bullet [1]. The incidences show that traumatic causes strike young adult individuals and are quite more incident in the male sex, while the PVD strike individuals over 60 [1–3]. In Brazil, it is similar for in a study performed with 154 individuals with amputation has identified that 67.5% of the amputations were due to vascular and or infectious causes and 17.5% due traumatic causes, and the average age showed variation according to the cause of amputation, average of 67.4 years in the vascular and/or infectious diseases of 43.5 years to tumor causes and 34.8 years to the most traumatic causes [4].

Despite it occurs less frequently, the cases of amputation in young adults deserve a highlight as they are in a productive age what, consequently, brings repercussions to their activities and participation, referring harms in several areas of their occupational performances, difficulties to adapt to activities performed before, either daily life activities as independence for dressing, feeding or

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self-hygiene or in practical and instrumental life activities, as gait and transferences, either in productive and occupational activities or in leisure activities [5].

During the treatment process, it is necessary to use instruments or protocols. However, they must be validated and must contemplate the evaluation of the different aspects of health of the individuals. Literature has presented several instruments used in clinical practice and/or in researches of individuals with amputation who, in general, present specific focuses as locomotion, prosthesis use and functionality.

The ones that evaluate locomotion are: the Questionnaire for persons with a transfemoral amputation [6], the Locomotor Capabilities Index [7], gait performance by Steinberg [8] and amputee mobility predictor [9]. The instruments that evaluate the use of prostheses are: the prosthetic profile of the amputee [10] and Houghton Scale [11]. The instruments that approach functionality are: Howard Rusk [12]; functional measure for amputees [13], Russek's classification [14], Prosthesis Evaluation Questionnaire [15] and Groningen Questionnaire Problems after Leg Amputation [16].

In spite of the various instruments that do exist, each one focuses on very specific aspects (prosthesis use, gait, functionality), what justifies the need for the creation of a new instrument that may included various dimensions of life and health from persons with amputations, from the new paradigm of health proposed by the international classification of functionality, incapacity and health – ICF.

The ICF has the aim to promote a new international language, common to all different health practitioners as well as it may be a conceptual parameter to describe the processes of functionality and human incapacity [17,18], offering a scientific base that allows to understand and study all the aspects of human health and the conditions related to health [18].

The classification system of ICF may still auxiliary the description of functional impact of a health condition in the life of the individual or base the process of evaluation for identification and measurement [18]. Several studies based on the ICF have been published and some of them report the process of development and validation of ''Core Sets'' that is, the gathering of codes that contemplate in a summarized and practical way the main categories of the ICF [19]. Among the studies that report the creation of core sets based on the ICF, there are those directed to rheumatoid arthritis [20], chronic conditions [21], fibromyalgia [22], musculoskeletal disorders and chronic widespread pain [23].

As for the studies turned specifically to the individuals with amputation, it is important to point out a systematic review of the literature with the aim to identify and evaluate the instruments for measurement used in the rehabilitation of individuals with amputation of lower limbs and relate them to the functions of the body of the ICF [24]. Another study of systematic review has analyzed 17 instruments that presented a potential for the use in rehabilitation of persons with amputation, concluding, however, that there was absence of evidence as for the quality of their responsiveness and that they needed to optimize the use of new investigations [25].

A study that has not been concluded yet approaching the construction of a core sets to persons with amputation points out that the ICF may be used in clinics as a list of verification to evaluate the necessities of the patient, formulate aims of rehabilitation and evaluate the progress of the treatment [26].

Up from this bibliographic research about the several instruments of evaluation directed to the individuals with amputation, the necessity of development of instrument based on the ICF that would enable not only to identify the main limitations and potentialities, but also contemplate aspects of the functional performance and participation of these individuals in society, favoring the identification of environmental factors that interfere in a positive or negative way on their lives, always under the optics and perception of each individual was verified.

Hence, the aims of this article were to develop, implement and validate an instrument for the assessment of functional and social performance of lower limb amputees based on the ICF.

Methods

Population

Male adults from 16 to 52 with a unilateral lower limb amputation who practice amputee soccer (GP) and individuals with the same characteristics who do not practice any sports (NP) were included in this study. The total number of participants in the implementation of the preliminary checklist was 138 individuals with amputation. For the final stage, i.e. the validation of the checklist, the number of participants was 30.

The selection of participants in the GP group was initially performed by contacting the Brazilian Amputee Sports Association (Associação Brasileira de Desporto para Amputados – ABDA). From the data gathered from the ABDA, contact was made with people who are responsible for each amputee team in different states of Brazil, and interviews for data collection were scheduled.

The selection of the NP group was performed with the support of the Pará State Department of Health (Secretaria de Estado de Saúde do Pará) and the ''Demétrio Medrado'' Specialized Treatment Unit (Unidade de Referência Especializada Demétrio Medrado – a rehabilitation center for the care of individuals with amputation in the state of Pará). After obtaining authorization from these institutions, these individuals were contacted.

The full investigation was conducted in different states of Brazil (Amapá, Goiás, Minas Gerais, Pará, Paraná, Rio de Janeiro, and São Paulo) and in the Federal District. This study was approved by the Research Ethics Committee of the ''Gaspar Viana'' State Hospital (Fundação Pública Estadual Hospital de Clínicas Gaspar Viana – Belém, Pará), protocol no. 065/09.

Location of research

The data were collected in a private environment with reduced physical and auditory distractions to facilitate the implementation of questionnaires.

Procedures

The ICF is an extensive and complex classification; therefore, different categories that could be related to the functional capacity and social performance of individuals with unilateral lower limb amputation were selected. Thus, a specific instrument for this investigation was developed based on the ICF; it was called the functional and social performance checklist for lower limb individuals with amputation (DFS).

To standardize the preliminary implementation of the DFS, an interview script was developed that contained one question for each component included in the ICF. For body functions, body structures, and environmental factors, the script presented direct questions, such as, ''How do you classify the muscle strength of your amputated limb''? or ''In the city where you live, are there transport services that meet your needs''? For activity and participation, the script presented an initial question and was complemented with a request for a performance assessment in the given activity, such as, ''Do you often walk long distances? How do you evaluate your performance when carrying out this activity''? or ''Do you usually prepare simple meals? How do you rate your performance in this activity''?

The collection of data from each individual was preceded by orientations that have cleared up the objectives of the research,

asked the reading and signature of the term of free and clear consent and, finally, three tags were prsented where the qualifiers of the ICF were printed.

To the *organic aspects* the qualifiers used were: 0 – no deficiency, 1 – slight deficiency, 2 – moderate deficiency, 3 – serious deficiency, 4 – complete deficiency, 8 – non-specified and 9 – not applicable. In the *daily activities, components of social performance and participation,* the qualifiers used were: 0 – no difficulty, 1 – slight difficulty, 2 – moderate difficulty, 3 – serious difficulty, 4 – complete difficulty, 8 – non-specified and 9 – not applicable. Hence, to the *environmental factors,* the following qualifiers were used: 0 – no barrier, 1 – slight barrier, 2 – moderate barrier, 3 – serious barrier, 4 – complete barrier, +0 – no facilitator, +1 – slight facilitator, +2 – moderate facilitator, +3 – serious facilitator, +4 – complete facilitator, 8 – non-specified barrier, +8 – non-specified facilitator and 9 – not applicable. Thus, the individuals should choose the qualifier that best identifies their answer to each of the presented questions.

The items of the preliminary DFS were grouped into five domains in order to enable a statistical analysis:

Domain 1 – Organic aspects, with 2 divisions and 6 action components.
Domain 2 – Daily activities, with 2 divisions and 35 action components.
Domain 3 – Performance components, with 3 divisions and 18 action components.
Domain 4 – Social participation, with 3 divisions and 31 action components.
Domain 5 – Environmental factors, with 1 division and 18 action components.

To define the final DFS, which was to be validated, there was a selection of items relating to domains 1–4 that showed statistically significant differences ($p \leq 0.01$) between the two groups (the group of individuals with amputation who played soccer, GP, and the group of individuals with amputation who did not practice sports, NP). For domain 5, all items were kept, because of this domain, the components are initially qualified as a barrier or a facilitator and subsequently, the extent of the positive or negative effects is indicated. Regardless of the *p*-value, when comparing the responses of the two groups classified as barriers or facilitators, we observed that the facilitator qualifier was predominant. This justifies the decision to keep all of the items. Thus, the final DFS contained 84 components distributed into 5 domains and is it referred to as the DFS-84 (Table 1).

Preliminary validation of the DFS-84

Implementation of the DFS-84 for 30 subjects was filmed and, subsequently, these films were viewed by four assessors. The assessors viewed the films twice and gave a score each time; this strengthened the reliability of the validation. To obtain numerical values needed for statistical analysis, the responses to the DFS-84 were coded numerically, and were subsequently used to determine scores for each of the five domains. The allocation of points to the domains was performed by transforming the answers to questions into scores that varied from 0 to 100, where 0 was the worst and 100 was the best for each domain. This was called a raw scale because the final value was unitless. The raw scale calculation for each domain resulted from the application of a formula that contained a parameter adjustment for each domain. Thus, scores were calculated for all domains; five scores were obtained and these scores were treated separately (i.e. they could not be combined or averaged).

Table 1. Comparison between the domains and components of the initial instrument and the instrument subjected to validation.

Domains	Initial instrument	Validated instrument
1. Organic aspects	6 Components	6 Components
2. Daily activities	35 Components	29 Components
3. Performance components	18 Components	17 Components
4. Social participation	31 Components	14 Components
5. Environmental factors	18 Components	18 Components
Total components	108	84

The raw scale is an interval scale. Therefore, it provides an order and a distance between the points of the scale. This scale enabled us to identify the existence of an absolute distance between points on the scale. Generally, the descriptors of the raw scale represent a numerical set that includes all possible answers for a question (e.g. ''Terrible'', ''Weak'', ''Regular'', ''Good'' and ''Great''). It is not mandatory for the distance between two points on the scale to be equal. Within a range of values (e.g. from 0 to 100), the researcher can develop more significant structures based on averages and standard deviations or create data structures based on the mode, median, frequency distribution or other measures of variation.

Phase 1: The assignment of values to the questions was established according to the criteria shown in Table 2.
Phase 2: Raw scale calculation. In this phase, the responses to the questions were converted into scores for the five domains; the scores varied from 0 to 100, where 0 was the worst and 100 was the best for each domain. In this health assessment, it is also possible to classify the score of the domains into the following three categories: low (from 0 to 33.3 points), average (from 33.4 to 66.6 points) and high (from 66.7 to 100 points).

The following procedure was used for the calculation of the domains: the scores of every question of each domain were summed up, then this sum was divided into the variation (sum of the highest values that could be obtained in each domain) and, if there were invalid questions (not applicable or n/a), the numbers from these questions would be multiplied by 5 (to obtain the maximum value of each question) and subtracted from the score described above. Finally, this total would be multiplied by 100 to obtain the value for the domain. Figure 1 shows the formula used for the calculation of values for each domain.

Data processing and statistical analysis were conducted using the statistical package BioEstat (Version 5). Intra-class correlation

Table 2. Scores of questions.

Domains	If the response is	Score
Organic aspects	There is no problem	5
	Slight, mild, or small problem	4
Daily activities	Moderate, average, or regular problem	3
	Non-specified	2
Performance components	Severe, large, or extreme problem	1
	Complete or total problem	0
Social participation	Not applicable	n/a
Environmental factors	Complete facilitator	11
	Substantial facilitator	10
	Facilitator not specified	9
	Moderate facilitator	8
	Mild facilitator	7
	No facilitator	6
	No barrier	5
	Mild barrier	4
	Moderate barrier	3
	Barrier not specified	2
	Severe barrier	1
	Complete barrier	0
	Not applicable	n/a

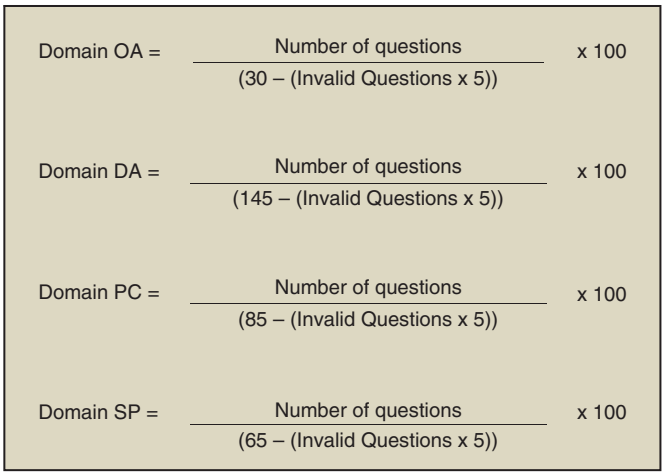

Figure 1. Formula for the calculation of domains.

Table 3. Reliability of the assessment evaluated by Cronback's alpha.

	Cronback's alpha	Reliability
OA – organic aspects	0.7852	Good
DA – daily activities	0.8692	Good
PC – performance components	0.8893	Good
SP – social participation	0.7190	Good
EF – environmental factors	0.5167	Reasonable

Table 4. Evaluation of inter-rater validity of domain OA – organic aspects, central tendency measures and variations of scores given by the four assessors, $n = 30$.

	OA – organic aspects			
	Assessor 1	Assessor 2	Assessor 3	Assessor 4
Minimum	16.7	16.7	16.7	16.7
Maximum	100.0	100.0	100.0	100.0
Median	80.0	80.0	80.0	80.0
First quartile	60.0	60.0	60.0	60.0
Third quartile	95.8	95.8	95.8	95.8
Arithmetic mean	75.3	75.1	75.3	75.3
Standard deviation	22.7	22.6	22.7	22.7
Standard error	4.1	4.1	4.1	4.1
Coefficient of variation (%)	30.1	30.0	30.1	30.1

$p = 0.9999$, ANOVA.

was used to evaluate intra- and inter-rate reproducibility [27]. Cronbach's alpha was calculated to evaluate internal consistency. To evaluate the validity of the criterion, a Student's *t*-test and a Mann–Whitney *U*-test were used. The level of significance was set at 0.01 *a priori*.

Results

Internal consistency

The evaluation of the internal consistency (homogeneity of the items inside a domain) was determined by Cronbach's alpha (a number between 0 and 1), what is proposed as the most proper one for instruments with multiple scores where the scores in the items equally vary in a scale, 0 to 5 in this case in the domains AO, AC, CD and OS and in a scale from 0 to 11 in the FA domain. In order to investigate reliability, the Cronbach's alpha was evaluated to each one of the domains in the questionnaire. The results have shown a good reliability for the scores on the AO, AC, CD and PS domains and reasonable reliability on the FA domains (Table 3).

Table 5. Evaluation of inter-rate validity of domain DA – daily activities, central tendency measures, and variations of scores given by the four assessors, $n = 30$.

	DA – daily activities			
	Assessor 1	Assessor 2	Assessor 3	Assessor 4
Minimum	30.3	31.4	30.3	30.3
Maximum	100.0	100.0	100.0	100.0
Median	92.1	91.4	92.6	92.1
First quartile	86.4	86.4	86.4	86.4
Third quartile	97.8	97.7	97.7	97.8
Arithmetic mean	89.3	88.7	89.0	89.3
Standard deviation	13.8	14.1	14.3	13.7
Standard error	2.5	2.6	2.6	2.5
Coefficient of variation (%)	15.4	15.9	16.1	15.4

$p = 0.9975$, ANOVA.

Table 6. Evaluation of inter-rate validity of domain PC – performance components, central tendency measures, and variations of scores given by the four assessors, $n = 30$.

	PC – performance components			
	Assessor 1	Assessor 2	Assessor 3	Assessor 4
Minimum	21.2	18.8	18.8	21.2
Maximum	100.0	100.0	100.0	100.0
Median	82.4	82.4	83.6	82.4
First quartile	68.9	68.6	68.9	68.9
Third quartile	90.1	91.2	91.0	90.1
Arithmetic mean	78.7	78.2	78.6	78.5
Standard deviation	18.9	19.6	19.0	19.0
Standard error	3.4	3.6	3.5	3.5
Coefficient of variation (%)	24.0	25.0	24.2	24.2

$p = 0.9996$, ANOVA.

Reproducibility inter-rater

In the five domains of the instrument, the evaluation of the difference among the assessors was performed by the analysis of variance (ANOVA) and all found results were not significant, so there is no real difference among the assessors (Tables 4–8).

The intra-class correlation has shown the precision of the variability inter-rater in all domains, evidenced by the following coefficients of correlation: 0.9994, among assessors 1 and 2, 2 and 3, 2 and 4, and 0.9999 among the assessors 1 and 3, 1 and 4, and 3 and 4.

On the second domain (daily activities) the following coefficient of correlation was evidenced: 0.9819, 0.9921, 0.9999, 0.9951 and 0.9922. On the components of performance domain (third domain), the following coefficient of correlation was obtained: 0.9954, 0.9974, 0.9994, 0.9971, 0.9949 and 0.9969. On the social participation (fourth domain) the intra-class correlation has evidenced the following correlation: 0.9116, 0.9766, 0.9991, 0.9373, 0.9103 and 0.9754.

Thus, on the final domain, environmental factors, the following coefficients of correlation was obtained: 0.9692, 0.9847, 0.9987, 0.9645, 0.9679 and 0.9848. All coefficients

obtained from the five studied domains have indicated excellent replicability [28], these correlations being confirmed by the $p < 0.0001$ which is highly significant.

Intra-rate reproducibility

The evaluation of intra-rate reproducibility, based on the test re-test method, was performed using the intra-class correlation, which evaluates the similarity between the two periods of data collection. We observed that all domains showed highly significant levels of intra-rate correlation; the respective intra-class correlation coefficients indicated excellent correlation ($p < 0.0001$).

Table 7. Evaluation of inter-rate validity of domain SP – social participation, central tendency measures, and variations of scores given by the four assessors, $n = 30$.

	SP – social participation			
	Assessor 1	Assessor 2	Assessor 3	Assessor 4
Minimum	43.3	32.0	43.3	43.3
Maximum	100.0	100.0	100.0	100.0
Median	99.2	99.2	100.0	100.0
First quartile	93.0	91.7	95.1	93.0
Third quartile	100.0	100.0	100.0	100.0
Arithmetic mean	92.9	92.5	93.7	93.0
Standard deviation	13.8	14.2	12.9	13.7
Standard error	2.5	2.6	2.4	2.5
Coefficient of variation (%)	14.8	15.4	13.8	14.7

$p = 0.9885$, ANOVA.

Table 8. Evaluation of inter-rate validity of domain EF – environmental factors central tendency measures, and variations of scores given by the four assessors, $n = 30$.

	EF – environmental factors			
	Assessor 1	Assessor 2	Assessor 3	Assessor 4
Minimum	41.2	37.7	41.2	41.2
Maximum	97.7	95.5	95.5	97.7
Median	67.1	65.9	65.9	67.1
First quartile	59.8	60.2	59.8	60.6
Third quartile	77.2	76.7	77.2	77.5
Arithmetic mean	68.2	67.6	67.8	68.3
Standard deviation	13.4	13.4	13.3	13.4
Coefficient of variation (%)	19.6	19.8	19.6	19.6

$p = 0.9963$, ANOVA.

Criterion validity

Criterion validity is a measure of the practical applicability of a test. It evaluates the applicability of a test for use in comparing groups according to specific criteria. In this article, parametric and nonparametric tests were used; the Student's *t*-test was used preferentially, but when the scores of the domains did not show a normal distribution, the Mann–Whitney *U*-test was used. For this analysis, the applicability of the assessment was tested using comparisons between the following two groups with an undeniable difference in the levels of functional performance and social participation: the GP group, which consisted of individuals with amputation who play soccer, and the NP group, which consisted on individuals with amputations who are not in the habit of playing sports. We observed that the means for the GP group were significantly higher than those for the NP group (Table 9).

Discussion

The value of the ICF has been widely recognized in the 10 years since its creation; however, its use as an assessment tool still requires much research for a particular practical application.

Assessment tools have been reproducible throughout the years and in different cultures [29]. This study showed the intra- and inter-rate reproducibility of the DFS-84 assessment tool. This study also verified the internal consistency of the assessment tool, as measured by Cronbach's alpha, which showed a good correlation between questions from the OA, DA, PC and SP domains as well as a reasonable correlation between the questions from the EF domain.

The internal consistency tests evaluated the relationship between several components of a domain. For the EF (environmental factors) domain, a lower correlation was expected, because this domain addresses diverse issues that are independent of one another. Therefore, different types of qualifiers for the same individual were expected.

In all DFS-84 domains, the inter-rate reproducibility as assessors using ANOVA did not show differences between the assessors. In comparisons between assessors, all coefficients indicated the existence of excellent reproducibility ($p < 0.0001$). We postulate that the agreement between the assessors is due to the presence of knowledge of the ICF and the presence of the questionnaire attached to the DFS-84, which standardized the implementation of the questions. For some questions, there was a difference between the assessors. This may indicate that there were different ways to understand the same situation or that the quality of the audio footage was poor. Nevertheless, the division of the questions into domains meant that the small differences between the assessors were diluted among the other components of a given domain. Intra-rate reliability, where the intra-class correlation was applied, also showed high levels of correlation. Small differences

Table 9. Descriptive statistics of the five domain for the GP ($n = 69$) e NP ($n = 69$).

	OA		DA		PC		SP		EF	
	GP	NP	GP	NP	GP	NP	GP	NP	GP	NP
Minimum	25.0	0.0	71.7	29.7	82.4	18.8	53.3	7.7	49.4	41.2
Maximum	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	89.0	84.6
Median	90.0	60.0	95.2	81.3	86.7	88.2	100.0	85.0	67.2	60.4
First quartile	68.3	40.0	90.7	60.0	84.7	53.8	94.3	61.5	59.4	54.0
Third quartile	96.7	76.7	97.7	91.1	96.5	97.7	100.0	96.7	77.3	71.6
Arithmetic mean	80.3	56.5	93.6	74.3	89.8	75.7	95.9	76.9	69.1	62.9
Standard deviation	21.3	26.8	5.4	20.7	6.6	26.5	7.4	24.2	12.9	13.0
Standard error	2.6	3.2	0.7	2.5	0.8	3.2	0.9	2.9	1.6	1.6
Coefficient of variation (%)	26.6	47.3	5.8	27.8	7.4	35.0	7.7	31.4	18.7	20.7
p Value (intergroup)	<0.0001*		<0.0001*		<0.0001*		<0.0001*		0.0082*	

* denotes significant differences.

between the assessors sometimes indicated a lack of attention when filling in the form. In addition, for the inter-rater reproducibility, small differences between two records from the same assessor became diluted among the other components of the domain. Finally, the validity criterion enabled us to establish comparisons between two different groups. We observed that the means from the GP group were significantly higher than those of the NP group. This is highly relevant for the study, because it confirms that the DFS-84 facilitated not only the detection of differences between the two groups but also the identification of the domains with the best performance. Thus, this assessment tool achieves its specified purpose.

Though using differs methodologies and focusing different diseases or disorders [20–23,25], the works published emphasize the use of assessment tools based on ICF. In general, these studies represent sets of patients with a spectrum of functional abilities [20], allow recording of a wide range of information on health and health states [21], and favor a detailed understanding of the functioning of a disease [22]. Therefore, the results of this study show that methodology used was satisfactory and met the objectives proposed corroborating and ratifying others researches related to ICF.

It is worth noting that the development and validation of research tools based on the ICF can have different applications. Their potential is emphasized as a tool to measure the quality of life at both the individual and collective levels [30]. These tools can support the clinic, be it in the evaluation of the needs of the patients, in the formulation of the objectives of rehabilitation, in re-evaluations [26] or for record keeping and statistical assessment of the living conditions of disabled people. Finally, this tool can contribute to the planning of intervention actions and policies [30,31].

Thus, it is possible to state that the DFS-84 presents itself as an instrument of evaluation based on ICF, enabling the analysis of multiple dimensions involved in the process of human health and functionality and, thus, it brings contributions to the evaluation of the individuals with amputation, facilitating a dynamic and detailed analysis.

In spite of approaching items related to the gait and the use of prosthesis, the detailed evaluation of such aspects is not the main focus of the DFS-84, hence, whenever necessary, either at the clinical practices or in researches, instruments that involve those questions in detail may be used in association to the DFS-84.

Thus, assessment tools based on ICF will enable the analysis of multiple dimensions of human health and function in a practical and dynamic manner. Considering that validation of such an assessment tool is complex, and do not be generalized for all populations, the results presented here point the validity of DFS-84, understanding that this instrument is limited only to sample similar to this study.

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Declaration of interest

The authors declare that they have no competing interests.

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