

# *Translation and cultural adaptation to the portuguese language of the American Shoulder and Elbow Surgeons Standardized Shoulder assessment form (ASES) for evaluation of shoulder function*

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## ABSTRACT

Shoulder pain affects a significant percentage of the population. The American Shoulder and Elbow Surgeons Standardized Shoulder assessment form (ASES) is an outcome tool used to assess shoulder function, regardless of the disorder. However, at the moment the current study was undertaken, a Portuguese version of the ASES was not available. The objective of this work was to translate and make a cultural validation of the ASES to the Portuguese language. The original version of the ASES underwent the specific process of translation and cultural adaptation, comprising of the *initial translation*, *back translation*, *committee*, *pre-test* and the *approval by the original author*. The *pre-test* was applied in 20 patients with shoulder disorders (9 women, 41.1 ± 13.0 years of age, 11.2 ± 8.9 months with the disorder, and 12.5 ± 3.1 schooling years). The final Portuguese version of the ASES was established after patients considered all items of this tool comprehensible and clear, and the author of the original questionnaire considered it adequate. The results obtained with this study will help Brazilian rehabilitation professionals and researchers, since they have one more outcome measure to be applied in patients with functional disabilities of the shoulder.

**Keywords:** shoulder, rehabilitation, functional assessment.

## INTRODUCTION

Disorders in the shoulders are commonly seen in the Occident<sup>1</sup>. Studies have demonstrated that 14-21% of the people experience pain in the area of the shoulder<sup>2,3</sup>, and it has been estimated that two out of every three individuals will have at least one episode of neck or shoulder pain some time in their lives.<sup>4</sup>

Although the prevalence and incidence of shoulder disorders are elevated in the general population, they tend to increase in workers and athletes exposed to specific risk factors, such as repetitive movements and excessive strain.<sup>5-9</sup> Thirty-seven to 45% of industry and service sector workers

experience shoulder pain, and eight new cases in 100 workers are seen each year.<sup>5-9</sup>

Shoulder injuries cause pain and reduce articular mobility and, consequently, have a negative effect on functional abilities, work activities, and quality of life of the individuals.<sup>10</sup> Besides, disorders of this joint represent an important socio-economical burden<sup>1</sup> because they affect workers assiduity and productivity<sup>11,12</sup>, leading to a high investment in the treatment of those patients,<sup>13</sup> and, in European countries, they are responsible for 18% of health care costs with disabled workers.<sup>2</sup> Although a large percentage

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of the information in the literature comes from European and North American studies, their data can be applied to the Brazilian reality, since most individuals work in less than ideal ergonomic conditions.

To minimize the impact of those injuries in the lives of individuals and in society, the quality and duration of rehabilitation and prevention programs should be maximized. Evidence indicates the efficacy of different physical therapy methods in shoulder rehabilitation.<sup>14</sup> Initially, during and after the treatment period, measuring tools are used by physical therapists to plan the rehabilitation program and monitor its efficacy.

Functional assessments represent one of the ways of measuring the impact of a musculoskeletal injury in the life of an individual.<sup>15</sup> Usually, assessment of muscular strength and amplitude of movement of the affected joint is used for this end. However, those measurements are poorly associated with the functional status for activities of daily living (ADLs) and work activities.<sup>10</sup>

Several questionnaires for the functional evaluation of the shoulder have been developed since the 1980s.<sup>16</sup> In a systematic review of the literature, Bot *et al.* found 16 questionnaires with this objective in the English literature.<sup>17</sup> Currently, only three of those questionnaires have a Brazilian version: The Disabilities of the Arm, Shoulder, and Hand Questionnaire (DASH),<sup>18,19</sup> Western Ontario Rotator Cuff Index (WORC),<sup>20,21</sup> and the modified version of The University of California at Los Angeles Shoulder Rating scale (UCLA).<sup>22, 23</sup>

The Disabilities of the Arm, Shoulder, and Hand Questionnaire (DASH) has been developed by the American Academy of Orthopaedics Surgeons (AAOS) in cooperation with the Institute for Work & Health (Toronto, Canada). It is composed of 30 items that evaluate symptoms and physical, social, and psychological function, and it was developed to be used in patients with any disorder in any joint of the upper limbs. This generalization favors the use of the DASH in different medical areas, but makes it less responsive and, therefore, less effective as a research tool.<sup>20,24</sup>

The Western Ontario Rotator Cuff Index (WORC) is a questionnaire composed of 21 items graded by visual analogue scales (VAS), and it encompasses physical symptoms, sports, recreation, work, life style, and emotional status. Unlike the DASH, the WORC is a specific tool for patients with changes in the rotator cuff.<sup>21,25</sup>

The modified version of the UCLA was introduced by Ellman *et al.* for the pre- and postoperative evaluation of degenerative lesions of the rotator cuff.<sup>22,23</sup> The modified UCLA has a maximal score of 35 points, 10 for pain, 10 for function, 5 for amplitude

of movement for flexion of the shoulder, 5 for the strength of the group of flexors of the shoulder, and 5 for patient satisfaction.<sup>24</sup> Although widely used in Brazilian literature, the UCLA does not evaluate the functional status of the shoulder in specific movements and physical activities. Besides, in the pain-evaluation section, the options of answers combine the frequency and severity of pain, as well as the type and amount of medication used for pain relief. This increases patient difficulty to choose the answers that best apply to him/her, since the existing answers do not always correspond to the characteristics of the pain experienced by a patient.<sup>23,24</sup>

Among the tools for the shoulder that are not restricted to specific disorders and that do not have a Portuguese version, the American Shoulder and Elbow Surgeons Standardized Shoulder assessment form (ASES)<sup>26</sup> should be mentioned due the number of times it is mentioned in the literature. The ASES was elaborated by the Research Committee of the American Shoulder and Elbow Surgeons,<sup>26</sup> and it is divided in two sections, one administered by a physician, and the other self-applied by the patient. This last section is composed by one item related to pain and ten items related to function, and the validity, reliability, and responsivity of this section have been demonstrated.<sup>27,28</sup> The item related to pain is evaluated by a VAS (10 cm) that ranges from “no pain at all” to “pain as bad as it can be”. The items related to function are evaluated by a four-point Likert scale. The scores of the pain and function subsections are transformed in percentages and each one represents 50% of the final score, which can range from 0 (absence of function) to 100 (normal function).<sup>24</sup> This questionnaire, which evaluates shoulder function through questions related to common daily activities, is easy to apply. Unlike other tools that require recollection of the pain behavior, the ASES assesses pain at the time of the evaluation, without focusing on the past, allowing it to be applied in shorter intervals. Besides, studies have demonstrated that the ASES has better responsiveness than similar tools.<sup>28</sup>

Besides providing a new tool for Brazilian rehabilitation professionals for clinical- and research-oriented uses, the Portuguese translation and cultural adaptation of the ASES will help standardize functional evaluation methods of the shoulder, similar to that of the methods used in other countries, allowing comparison of studies undertaken in different populations. Thus, the objective of the present study was to establish the Portuguese translation and cultural adaptation of the ASES to be used in patients with different shoulder disorders.

## PATIENTS AND METHODS

### Patients

Twenty patients (9 females and 11 males; mean age  $41.1 \pm 13.0$  years) whose clinical diagnosis, schooling, socioeconomical status, and cultural status are summarized in Table 1, participated in the Portuguese translation and cultural adaptation processes of the ASES.

Inclusion criteria were as follows: 1) 18 years of age or older; 2) clinical diagnosis of a shoulder disorder; and 3) native speaking Portuguese. Exclusion criteria were: 1) the presence of neurological or musculoskeletal disorder other than the shoulder; 2) cognitive changes; and/or 3) illiterate, incapable of understanding and filling out the translated questionnaire.

All participants were recruited at a teaching outpatient clinic in Curitiba. Initially, medical records were reviewed to identify potential participants. The project was presented to patients who fulfilled the inclusion criteria and they had all the time they required to make a decision. Besides, any

questions participants could have, after the presentation of the project, were answered. Patients under treatment, as well as new patients who started their treatment during the study period, were invited to participate in this study. Patients who agreed to participate signed an informed consent. The study was approved by the Research on Humans Ethics Committee under protocol #5257.

### Translation and cultural adaptation

Only the section of the ASES administered by the patient underwent Portuguese translation and cultural adaptation, according to the steps proposed by Guillemin.<sup>29</sup>

Two Portuguese native speaking English teachers were responsible for the literary and conceptual translation of the ASES. Only one of the translators was aware of the objective of the study, and translations were independently done. The two versions were compared and analyzed, by both translators and two investigators, to reach a consensus for the first Portuguese translation.

**Table 1**  
Patient's clinical and demographical description

Patient	Gender	Age (years)	Clinical diagnosis	Duration of the disorder (months)	Schooling (years)	Occupation
P1	F	25	Tendinitis	5	11	Student
P2	F	22	Tendinitis	8	11	Student
P3	M	46	Bursitis	36	15	Bank clerk
P4	F	52	Tendinitis	6	17	Professor
P5	M	59	Bursitis	12	17	Professor
P6	F	29	Tendinitis	5	11	Student
P7	M	60	Bursitis	24	11	Retired
P8	M	51	Adhesive capsulitis	24	16	Lawyer
P9	F	45	Adhesive capsulitis	24	8	Retired
P10	F	42	Bursitis	12	11	Secretary
P11	M	55	Tendinitis	6	15	Architect
P12	F	38	Tendinitis	8	8	Maid
P13	F	29	Bursitis	11	8	Maid
P14	M	35	Bursitis	6	11	Student
P15	M	28	Tendinitis	5	11	Student
P16	M	62	Tendinitis	12	15	Accountant
P17	F	42	Bursitis	2	11	Secretary
P18	M	29	Bursitis	6	15	Athlete
P19	M	24	Tendinitis	7	11	Athlete
P20	M	48	Tendinitis	5	17	Professor

F, female; M, male.

After the first Portuguese version of the questionnaire was defined, *back translation*, in which the Portuguese version was translated into English, independently, by two native English speaking translators who were fluent in Portuguese, who were unaware of the objective of the study and did not have access to the original questionnaire, was undertaken. Those newer versions of the questionnaire were then compared to the *initial translation*.

After the *back translation*, a *committee* formed by the four translators, three investigators, and three physical therapists, compared the original version, the first Portuguese translation, and the version of the *back translation*. The objectives of the committee included: 1) guarantee the translation was fully understandable; and 2) verify the semantic (i.e., vocabulary, grammar), idiomatic (i.e., colloquial expressions), and conceptual (i.e., concept validity) equivalence between the original version and the translation. At the end of this step, a second Portuguese version of the ASES was approved.

The clarity, comprehension, and acceptance of the second Portuguese version were tested in 20 individuals with shoulder disorders who were treated at the teaching outpatient clinic. On this step, called *Pre-test*, the investigator gave the questionnaires to the patients, who answered whether they understood or not each item and made comments on what they understood. If any item was not understood, the patient was stimulated to suggest changes. It was established that items with 15% or more of “lack of understanding” would be reformulated in a new meeting of the committee and, afterwards, tested in the patients.<sup>15,30</sup> Thus, the Portuguese version of the ASES would only be accepted when all items were considered understandable.

Finally, the documentation demonstrating all steps of the translation and cultural adaptation was sent to the author of the original questionnaire (i.e., the English version) to guarantee the process used was adequate and that the translation was appropriate.<sup>28</sup>

## RESULTS

After the *initial translation*, both translators presented similar versions. Small differences were observed in the description of the VAS, in the enunciate, and in items 4, 7, 8, and 10 of the section that evaluates function, which can be seen in Table 2. After discussion among the translators and investigators, the word “ability” was substituted by “capacity”. Finally, on this step, item 7 was established as “lift 5 kg above the shoulder”.

After the *back translation*, four items were modified. In this step, the definition of the score “3” was changed from “easy to perform” to “performs without difficulties”. In item 9 of the functional assessment, the word “yours” was included, while item 10 was changed from “perform daily sports activity” to “practice the usual sport” (Annex 1).

In the *committee* composed of specialists, three changes were made after the *back translation*. Item 3 was described as “reaching the upper portion of the back”, item 4 was substituted by “wipe oneself after using the bathroom”, and item 8 was changed to “to throw a ball above the head” (Table 3).

Table 4 shows the level of “non-comprehension” by patients of the items and words of the ASES in Portuguese. None of the items were considered “non-comprehensible”, since all of them had “comprehension” levels higher than

**Table 2**  
Initial translation of the American Shoulder and Elbow Surgeons Standardized Shoulder assessment form (ASES)

Item	Version			
	Original	Translator A	Translator B	Consensus
VAS	0 – No pain at all	0 – Nenhuma dor	0 – Sem dor alguma	0 – Nenhuma dor
VAS	10 – Pain as bad as it can be	0 – Dor intensa	10 – Pior dor possível	10 – Pior dor possível
II	Circle the number that indicates your ability to do the following activities with your painful shoulder	Circule o número que demonstra sua habilidade em fazer as seguintes atividades com o ombro dolorido	Circule o número que mostra sua habilidade em fazer as seguintes atividades com o ombro dolorido	Circule o número que demonstra sua capacidade em fazer as seguintes atividades com o ombro dolorido
4	Manage toileting	Fazer higiene pessoal no toalete	Fazer a higiene pessoal	Fazer a higiene pessoal ao usar o vaso sanitário
7	Lift 10 lbs. above shoulder	Levantar 4,5 kg	Levantar 10 libras (5 kg)	Levantar 5 kg acima do ombro
8	Throw ball overhead	Jogar uma bola sobre a cabeça	Jogar uma bola sobre a cabeça	Jogar uma bola por cima da cabeça
10	Do usual sport	Fazer atividades esportivas corriqueiras	Fazer atividades esportivas do dia a dia	Fazer a atividade esportiva do dia a dia

85% and, therefore, it was not necessary to adjust the questionnaire to apply them again to the patients. The time necessary for patients to answer the ASES ranged from 2 to 7 minutes, corresponding to the mean time necessary to answer the original version of the ASES, which ranges from 3 to 5 minutes.<sup>17</sup>

The *back translation* of the *pre-test* version was sent to the original author, who considered the process to be adequate and the translation to be appropriate. Thus, the final Portuguese version of the ASES, adapted to the Brazilian culture, was established (Annex I).

### Annex I

ASES scale translated to Portuguese and adapted to the Brazilian reality – American Shoulder and Elbow Surgery (ASES) Shoulder Index

<b>I. Pain</b>				
How is your pain today? (Mark on the line below)				
0	1	2	3	4 5 6 7 8 9 10
No Pain		Worst pain possible		
<b>II. Function</b>				
Check the number that demonstrates your ability to perform the following activities with your painful shoulder				
0 = incapable of doing				
1 = very difficult to do				
2 = somewhat difficult to do				
3 = without difficulties				
1. Put on a coat				
0	1	2	3	
2. Sleep on the painful side				
0	1	2	3	
3. Reach the upper part of the back				
0	1	2	3	
4. Manage toileting				
0	1	2	3	
5. Comb your hair				
0	1	2	3	
6. Reach a high shelf				
0	1	2	3	
7. Raise 10 lb above the shoulder				
0	1	2	3	
8. Throw a ball over the head				
0	1	2	3	I never tried
9. Do usual work				
0	1	2	3	I never tried
10. Do usual sport				
0	1	2	3	I never tried

### DISCUSSION

Several tools to evaluate shoulder function can be found in the literature;<sup>17</sup> however, very few have been translated to Portuguese.<sup>15,19,23</sup> Although the ASES has been mentioned in the Portuguese literature,<sup>31</sup> it is one of the questionnaires that, before the present study, did not have a Portuguese version elaborated after a specific methodological process.<sup>29</sup>

Only the section of the ASES self-applied by the patient was translated and culturally adapted in our study. This can be justified because the section applied by the physician is not adopted as a measuring tool in studies found in the literature, probably because this section does not contribute for the final score.<sup>24</sup>

The Portuguese version of the ASES was determined after the following steps: *initial translation*, *back translation*, *committee*, *pre-test*, and approval by the author of the original version. The main cultural and linguistic adaptation during the process was done in the first three phases. In the *initial translation*, the measuring unit “pounds” (lb) was substituted by “kilogram” (kg) in item 7. This is justified because, unlike the United States (*i.e.*, British system), Brazil uses the International Units System. Although 10 lbs do not correspond exactly to 5 kg (but to 4.54 kg), the approximation of this value was done to help patients imagine the effort on the shoulder during the movement, since many products in the daily lives of those patients comes in 5-kg packages (*i.e.*, rice and sugar).

In this step, the word “*ability*”, seen in the second part of the original questionnaire, was translated as “*habilidade*” by both translators. However, during the meeting of those translators and the investigators, it was decided that the word “*capacidade*” would be more appropriate, since the objective of the questionnaire is to determine the level of difficulty to perform a task regardless of the technical condition of the patient.

In the *back translation* phase, item 10 was modified from “perform every day sports” to “practice the usual sport”, mainly because the expression “every day” is related to “daily”, while “usual” suggests a “habit”, regardless of being performed every day or not.

Adaptations were also done during the meeting with specialists. In item 3, it was stated that patients should reach the “upper portion” of the back, according to the original questionnaire. Without this specification, the movement to be performed would be subjected to several interpretations, affecting both the level of difficulty and the group of muscles used. For example, instead of reaching the upper portion of

**Table 3**

Changes after the back translation of the first Portuguese version and modifications proposed by the expert committee for the new version of the American Shoulder and Elbow Surgeons Standardized Shoulder assessment form (ASES)

Version			
Item	Consensus after the initial translation	After back translation	After the committee meeting
<b>Scale</b>	3 = Fácil de fazer	3 = Sem dificuldade de fazer	
<b>3</b>	Alcançar as costas		Alcançar a parte de cima das costas
<b>4</b>	Fazer a higiene pessoal ao usar o vaso sanitário		Limpar-se ao usar o vaso sanitário
<b>8</b>	Jogar uma bola por cima da cabeça	Arremessar uma bola por cima da cabeça	Atirar uma bola por cima da cabeça
<b>9</b>	Fazer o trabalho do dia a dia	Fazer o trabalho do seu dia a dia	
<b>10</b>	Fazer a atividade esportiva do dia a dia	Praticar o esporte de costume	

**Table 4**

Percentage of “non-understanding” of items or words by participants during pre-test

	Item-word	Non-understanding (%)
1	Pain. How is your pain today? (check on the line)	5%
8	Throw a Ball over the head	10%

the back through flexion, adduction, and external rotation of the shoulder, the patient could reach for the lower portion of the back, combining extension, adduction, and internal rotation.

The *pre-test* was applied in patients with different diagnosis and occupations, 41.1 (± 13.0) years of age, shoulder disorders for 11.2 (± 8.9) months, and 12.5 (± 3.1) years of schooling. The heterogeneity of the participants is important to reproduce the level of understanding of the general population. In this phase, two out of 20 patients had difficulties with item 8 of the functional assessment, in which the task mentioned is similar to the movement of throwing a handball, *i.e.*, throwing a ball with one of the hands. Both patients were in doubt of whether the ball had to be thrown with 1 or both hands and the direction of the movement. However, the item was considered understandable because it had a level of comprehension of 90%. This indicates a small possibility of different interpretations, which could affect the reliability and responsivity of the questionnaire. Establishing the level of pain by the VAS, in which only the absence of pain and maximal pain are represented numerically (*i.e.*, 0 and 10, respectively), was another difficulty met by patients. However, this only happened with one patient and, therefore, the level of comprehension of this item was also considered to be good. However, we chose to modify the original scale,

as former studies have shown that Brazilian population understands better a numerical scale.<sup>32</sup>

Only one pre-test was necessary to define the final Portuguese version of the ASES. This was due to the simple language, objectivity of the items of the questionnaire, and the fact that it uses common everyday tasks, making it easy to be understood by patients. Since this is a self-applied tool, the clarity observed in ASES items is fundamental for its validation. However, self-administration restricts the use of this tool to people who can read, which represents a limitation in the Brazilian reality.

Although the psychometric properties of the original ASES have been investigated,<sup>27,28</sup> determination of the validity, reliability, and responsivity of the Portuguese version is ongoing, since this information is fundamental to support its use.

The conclusion of all steps of the elaboration of the Portuguese version of the ASES will contribute with the daily practice of Brazilian physical therapists since, with this tool, they will be able to improve treatment planning and follow-up, allowing objective comparisons of shoulder-specific function in individuals with different clinical diagnosis. Besides, the Portuguese version of the ASES is important for the Brazilian scientific community because it represents one more type of evaluation that can be used as a measuring tool in clinical assays.

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