TRANSLATION AND CROSS-CULTURAL ADAPTATION OF THE ROWE SCORE FOR PORTUGUESE

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ABSTRACT

*Objective: To translate and culturally adapt the Rowe score for use in Brazil. Methods: The translation and cross-cultural adaptation process initially involved the steps of translation, synthesis, back--translation and revision by the Translation Group. The pre-final version of the questionnaire was then created. The Stability and Function fields were applied to 20 patients with anterior shoulder luxation, and the Mobility field was applied to 20 health professionals. Results: It was found that some of the patients had difficulty understanding some of the expressions of the questionnaire, so these were replaced with terms that were easier to understand. All health professionals understood the translation of the Mobility field. The altered questionnaire was then reapplied to another 20 patients, and this time it was understood by all the assessed subjects. Conclusion: After a careful process of translation and cultural adaptation, a definitive version of the Rowe questionnaire was obtained in Brazilian Portuguese. **Level of Evidence II, Development of diagnostic criteria on consecutive patients.***

Keywords: Shoulder dislocation. Validation studies. Translation..

INTRODUCTION

The glenohumeral joint is that of greatest mobility in the body and due to this characteristic can present several types of instability, from repetitive subluxations and multidirectional instability to traumatic dislocations that can result in capsulolabral tears. Shoulder dislocation is a common problem in young and physically active patients, affecting subjects between the second and third decades of life more frequently.[1] In Sweden the incidence of traumatic dislocations in the general population is 1.7%[2] and the risk of suffering a traumatic anterior shoulder dislocation has been estimated at between 1% and 2% throughout the lifetime.[2,3] It is estimated that there is an incidence of 1.69 dislocations to every 1000 US soldiers per year, affecting white male individuals under 30 years of age with greater frequency.[4] According to Simonet and Cofield[5] and Norlin,[6] the incidence among people from 20 to 30 years of age ranges from 13 to 18 dislocations to every one thousand individuals. Anterior dislocation represents about 85% of the cases, whereas posterior dislocation is rarer, representing from 2% to 5% of dislocations.[7] The treatment of anterior shoulder instability will depend on the type and degree of instability, besides factors such as age, episodes of dislocations, physical demand and the presence or absence of associated injuries in the glenoid and/or humeral head. Young patients with two or more episodes of dislocations and inability to perform abduction and lateral rotation movement at 90° during activities of daily living or while practicing sports, generally present unsatisfactory results with conservative treatment. Surgical treatment can be divided between those that cover soft parts (capsulolabral reinsertion, capsuloplasties and re-tensioning of the inferior glenohumeral ligament) or bone procedures (Bristow-Latarjet and Patte procedure, which consists of the transfer of the coracoid process and the origin of the conjoint tendon to the lower border of the glenoid cavity). The postoperative period should be followed up at an early stage by a physiotherapist so that there is pain control, restoration of range of motion and of muscle strength, as well as the correct balance between the forces that act on the shoulder girdle, so as to achieve maximum functionality of the shoulder treated surgically after the anterior dislocation.[8] Evidently, the initial biological healing phase must be respected and for this reason the rehabilitation process must be careful and progressive,[9] regardless of the surgical technique used. Various measuring instruments can be used with the purpose of safely evaluating the functional results in the postoperative period

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of anterior shoulder instability. These include the Rowe Score, initially described in 1978 to evaluate postoperative results of Bankart repair.[10]

There are several questionnaires in the literature for functional evaluation of the shoulder. Bot et al.[11] show in a systematic review 16 questionnaires with this purpose in the English literature and so far only six questionnaires have a version for use in Brazil, but none of these is used to specifically evaluate the functional results of the postoperative period of repair of anterior shoulder instability.

The Rowe Score consists of a total of 100 points divided into three domains: (1) stability, which corresponds to a total 50 points; (2) mobility, which corresponds to 20 points; (3) function, which corresponds to 30 points. The score is considered excellent when from 90 to 100 points, good between 89 and 75 points, fair between 74 and 51 points and poor below 50 points. Stability is evaluated by the absence of recurrent subluxation or absence of apprehension sign (50 points), apprehension sign in variable positions (30 points), presence of subluxation without the need for reduction (10 points) and recurrent dislocation (does not receive a score). In the evaluation of mobility (with score assigned by the assessor) normal internal and external rotations and elevation correspond to 20 points, 75% normal external rotation and elevation and internal rotation movements correspond to 15 points, 50% of external rotation and 75% of normal elevation and internal rotation correspond to five points. The patient does not obtain a score with 50% of elevation and internal rotation, but without external rotation. In the evaluation of function, 30 points are assigned when there are no limitations in work and in sport and discomfort is slight or absent; 25 points when there is slight limitation of movements and discomfort; 10 points when there is moderate limitation and discomfort and there is no score in cases of pain accompanied by accentuated limitation.

Accordingly, the translation and cross-cultural adaptation of the Rowe Score for Portuguese allows the delivery of a new functional evaluation tool in the pre- and postoperative periods for the correction of anterior shoulder dislocations, usable both in the clinical environment and for surveys. Moreover, it will be possible to standardize the methods of functional evaluation of the shoulder in Brazil with regard to the studies conducted in the world and published in the literature, allowing a comparison of studies carried out in different populations.

MATERIAL AND METHOD

The translation and cross-cultural adaptation of the Rowe Score used the criteria described by Beaton et al.[12], which are used by the American Academy of Orthopaedic Surgeons (AAOS) and by the International Quality of Life Assessment (IQOLA). However, the authorization for the translation and cross-cultural adaptation process was obtained by the Department of Orthopedic Surgery of Massachusetts General Hospital (Boston, USA), since the author of the original version, Dr. Carter Rowe, died in 2001. The present study was approved by the Research Ethics Committee of Universidade Estadual de Campinas, under process no.493/2010.

All the patients who agreed to take part in the trial signed the informed consent form. The translation and cross-cultural adaptation process involved six stages: (1) translation, (2) synthesis,

(3) back-translation, (4) revision by the Translation Group, (5) pretesting and (6) evaluation of the documents by the Translation Group. The demographic data of the subjects involved in the study can be found in Table 1.

Initially the Rowe Score (in its original English version) was translated into Portuguese by two independent and bilingual sworn translators (T1 and T2), who had Portuguese as their native language and were fluent in English. One of them was knowledgeable in the area of health and was aware of the purpose of the survey while the other was not. They then created versions T1 and T2 which, in the second stage of synthesis, were analyzed together with the original questionnaire during a meeting of the initial translators with the researchers, producing version T3. In the following stage of back-translation, version T3 was translated back into English by another two bilingual translators (R1 and R2) who had English as their native language, were fluent in Portuguese and had Brazil as their country of residence. The translators responsible for the back-translation were not aware of the original version of the questionnaire in English.[13]

In the fourth stage there was a revision of all the versions (original, T1, T2, T3, R1 and R2) by the Translation Group, composed of three orthopedists (one a specialist in shoulder surgery), two physiotherapists and by the translators involved in the process, who consolidated all the versions of the questionnaire and developed the pre-final version of the Rowe Score. In the fifth stage two pre-tests were carried out on the pre-final version of the questionnaire aiming to eliminate any ununderstood item. The function and stability domains were applied to 20 patients, while the mobility field was applied to 20 health professionals (eight physicians and 12 physiotherapists). Only the function and stability domains were applied to the patients, as the mobility domain involves items of the clinical assessment performed by the examiner. The patients selected for the study presented anterior shoulder instability and were scheduled for surgical treatment.

The patients were recruited voluntarily in the Department of Orthopedics and Traumatology of Hospital das Clínicas da Universidade Estadual de Campinas (Unicamp). Subjects presenting rheumatic or neurological diseases, as well as fractures of any part of the humerus, were excluded from the study. The authors of the study decided that the questionnaire should be applied in interview form to avoid excluding patients with visual problems or who were not literate. After answering the pre-final

Table 1. Demographic data.

Demographic data	Pre-test I	Pre-test II
Mean age SD	29.6 8.76	26.58 6.25
	N (%)	N (%)
Sex		
Male	14 (70%)	16 (80%)
Female	6 (30%)	4(20%)
Level of education		
Illiterate	1(5%)	0 (0%)
Primary education	3 (15%)	5 (25%)
High school education	10 (50%)	12 (60%)
Higher education	6 (30%)	3 (15%)
Shoulder affected		
Dominant	13 (65%)	11 (55%)
Non-dominant	7 (35%)	9 (45%)

version, each patient was questioned by a researcher about their understanding of each item. The questions that were not understood by more than 15% of the patients or health professionals were reformulated by the Translation Group, to make the necessary alterations. The last stage consisted of sending the Brazilian version of the Rowe Score to the developers of the instrument and to the Translation Group for approval of the translation and cross-cultural adaptation process. (Table 2)

Table 2. Modifications in the translation phase of the Rowe score.

Item (session)	Original	Translator 1	Translator 2	Consensus
2 (Stability)	Apprehension when placing arm in certain positions	Apreensão quando o braço é colocado em determinadas posições	Apreensão quando posiciona o braço em certas posições	Apreensão quando posiciona o braço em determinadas posições
3 (Stability)	Subluxation (not requiring reduction)	Subluxação (sem redução)	Subluxação (não exigindo redução)	Subluxação (não exigindo redução)
4 (Stability)	Recurrent dislocation	Luxação recidivante	Luxação recorrente	Luxação recidivante
1 (Movement)	100% of normal external rotation, internal rotation and elevation	100% da rotação externa, normal, rotação interna e elevação	100% da rotação externa, rotação interna e elevação normais	100% da rotação interna, rotação externa e elevação normais
2 (Function)	Mild limitation and minimum discomfort	Discreta limitação e desconforto mínimo	Limitação discreta e desconforto mínimo	Limitação discreta e desconforto mínimo

RESULTS

The initial translation of the Rowe Score into Portuguese produced very similar versions, with slight differences between translations T1 and T2 in the second, third and fourth items of the stability session; first item of the mobility session and in the second item of the function session. A Translation Group meeting was held in order to reach a consensus for the differences found between T1 and T2; Table 2 shows the result of the synthesis stage of the entire process.

After a discussion among the members of the Translation Group, it was defined that, in the second item of the stability session, the translation of "apprehension when placing arm in certain positions" should be "*apreensão quando posiciona o braço em certas posições*". In the third item of the stability session the translation of "subluxation (not requiring reduction)" was defined as "*sub-luxação (não exigindo redução)*", and in the fourth item of the same session, the term "recurrent dislocation" was translated as "*luxação recidivante*". In the first item of the movement session the phrase "100% of normal external rotation, internal rotation and elevation" was defined as "*100% da rotação interna, rotação externa e elevação normais*". Finally, the second item of the function session was translated from "mild limitation and minimum discomfort" to "*limitação discreta e desconforto mínimo*". The first and second stages of the translation and cross-cultural adaptation process were thus concluded, defining version T3.

The back-translation stage was then initiated, observing that versions R1 and R2 were very similar to one another and substantially equivalent to the original version of the Rowe Score,

demonstrating the adjustment of the T3 version for obtainment of the pre-final version. (Table 3) The first pre-test revealed the need for alteration only of the second and third items of the stability session and of the second item of the function session, which were not understood by more than 15% of the patients. (Table 4) After the revision by the Translation Group, it was decided that the phrase "*apreensão quando posiciona o braço em determinadas posições*" (second item of the stability session) should be changed to "*apreensão quando coloca o braço em certas posições*". The third item of the stability session was changed from "*sub-luxação (não exigindo redução)*" to "*sub-luxação (sem necessidade de redução)*". Finally, the second item of the function session, "*limitação discreta e desconforto mínimo*" was changed by the Translation Group to "*pequena limitação e desconforto mínimo*". (Table 5) After these changes were made, the second pre-test was conducted to observe whether the modifications were sufficient to eliminate the questionnaire comprehension problems (Appendix 1).

Table 3. Items with differences between the two back-translation versions.

Items not understood	First pre-test (%)	Second pre-test (%)
2 (Stability)	6 (30%)	0 (0%)
3 (Stability)	7 (35%)	0 (0%)
2 (Function)	4 (20%)	0 (0%)

Table 4. Ununderstood items of the pre-final version and respective changes in the cross-cultural adaptation.

Item (Section) Original Version	Back-translation 1	Back-translation 2	Pre-final Version
2 (Stability) Apprehension when placing arm in certain positions	Apprehension when positioning the arm in certain positions	Apprehension when placing the arm in certain positions	Apreensão quando posiciona o braço em certas posições
4 (Stability) Recurrent dislocation	Relapsing luxation	Recurrent luxation	Luxação recidivante
4 (Function) Marked limitation and pain	Sharp limitation and pain	Marked limitation and pain	Limitação acentuada e dor

Table 5. Items not understood in the first pre-test and corrected in the second pre-test.

Ununderstood items	First pre-test	Second pre-test
x2 (Stability)	Apreensão quando posiciona o braço em certas posições	Apreensão quando coloca o braço em certas posições
3 (Stability)	Subluxação (não exigindo redução)	Subluxação (sem necessidade de redução)
2 (Function)	Limitação discreta e desconforto mínimo	Pouca limitação e desconforto mínimo

DISCUSSION

There are several kinds of specific questionnaires for evaluation of function in patients who suffer from certain diseases of the shoulder joint and girdle,[11] yet the vast majority are in English, not allowing their application in countries such as Brazil. Thus it is necessary to have systematized and discerning translations and cross-cultural adaptations of the questionnaires for Portuguese, so that they can be applied to the Brazilian

population with the same reliability as the data collected in English-speaking countries. The translation process of the specific questionnaires is obviously not simple as language is not the only differential between the countries, and cultural differences should also be considered. Consequently, the cross-cultural adaptation should be done carefully, in order to provide full coverage of the characteristics of the population to be evaluated with such instruments.

The instruments used to assess functional capacity of the shoulder must contain measurements of the components of pain, function, range of motion and daily habits that might be impaired by some pathological condition of this joint, allowing us to quantify functional conditions in the pre- and post-treatment periods, with the ability to assess the efficacy of the therapeutic procedure used.

Patients with anterior glenohumeral instability frequently complain of pains that vary depending on the function performed, which is one aspect that should be evaluated and assigned a score. Moreover, symptoms such as apprehension and instability should be quantified. Therefore, the instruments used should be objective and standardized, since all the shoulder questionnaires evaluate, in one way or another, the function and incapacity of the patient; yet these items differ between questionnaires both in terms of score and type of question asked to the patient.

Nowadays we do not come across studies on the translation and cross-cultural adaptation of questionnaires aimed specifically at evaluating patients with anterior shoulder instability. With this objective the authors Rowe et al.[10] created a questionnaire to evaluate the postoperative period of Bankart repair surgery, initially in 1978. Today there are four different versions of the Rowe Score, the first of which was published in 1978 in *The Journal of Bone & Joint Surgery*.[10] In 1981 and 1982 Rowe and Zarins[14,15] had the following two versions published also in *The Journal of Bone & Joint Surgery;* the last version was published by Carter Rowe in his book *The Shoulder.*[16] These four different versions are used in various clinical studies in parallel[17,18] and most of the time the results are published without any information about which Rowe Score version was used, which means that several results in different versions are compared in the international literature. Jensen et al.[19] show that there are significant differences between the four versions of the Rowe Score and that the same patients submitted to Bankart repair can present different scores, depending on which version of the score was used. In the present study we used the Rowe et al.[10] (1978) score, since it is the only one that clearly assigns a score to recurrent dislocations and, in the authors' opinion, this is a characteristic of shoulder instability that must be taken into account in the pre- and postoperative evaluation, besides evaluating the success or failure of the treatment. Even though there have not yet been any studies involving the translation and cross-cultural adaptation of the Rowe Score for Portuguese, there are Brazilian studies that used this instrument as a form of functional assessment of patients submitted to surgical procedures for anterior shoulder dislocation.[20]

The Rowe Score is very simple and objective, with its evaluation criteria divided into the items stability, mobility and function, with score ranging from zero to 100 points, where the better the score, the worse the patient's condition and vice versa.

Despite being a simple questionnaire, its literal translation into Portuguese might not translate the true meaning of the original questionnaire in English. For this reason the cross-cultural adaptation was executed carefully, seeking whenever possible to maintain the semantic, idiomatic and conceptual form, without losing the original concepts.[12]

Functional assessment questionnaires can be self-applicable or applied by interview. In this case, the Rowe Score was applied to the patient in interview form for two reasons: (1) so as not to exclude patients who were not literate or those with visual problems; (2) the mobility section should be completed by the evaluator, since it is a measurement criterion of the range of motion of the patient compared with the contralateral side. We also opted to make as few alterations to the structure of the original questionnaire as possible, in order to maintain the concepts described by the creators of the questionnaire. In this manner, the psychometric characteristics of the questionnaire in Portuguese can be evaluated in the same way as in the original instrument.

The final version of the Rowe Score translation was obtained after passing through the stages of initial translation, synthesis, back-translation, revision by the Translation Group, pretesting and evaluation of the documents by the Translation Group for approval of the final version. In the initial translation stage there were slight differences between the versions of translator 1 and of translator 2, described in Table 2. There were also differences between back-translations 1 and 2, yet they were not sufficiently significant to require a more thorough revision of the discrepant items. (Table 3) For example, the 4th item of the stability session that is originally described as "recurrent dislocation" was retranslated to "recurrent luxation" in back-translation version number 1 (R1) and "relapsing luxation" (R2) in back-translation version number 2 (R2). These back-translations were done with terms not used in scientific literature, possibly due to the fact that the translators of versions R1 and R2 do not work in the health area. However, the Translation Group decided that the translation for the pre-final version should be *"luxação recidivante"* ("recurrent dislocation"), as this is the best way to describe recurrent episodes of shoulder dislocation, in this Group's opinion. This also occurred in the 4th item of the "function" session, where the description from the original questionnaire reads "marked limitation and pain", which was translated back as "sharp limitation and pain" (version R1) and "marked limitation and pain" (version R2). The pre-final version of the Rowe Score (stability and function domains only) was then applied to 20 patients with average age of 29.6 ($\pm$ 8.76) years, 14 men and six women with varying levels of education. The patients evaluated in the first pre-test had their first dislocation episode 7.58 ($\pm$ 4.22) months previously. As regards education, one patient was not literate, three of them had completed primary education, ten high school education and six higher education. (Table 1) The characteristics of the patients evaluated were heterogeneous to allow the questionnaire to be applied to the Brazilian population in general, regardless of age, sex and level of education. In this pre-final phase, 30% of the patients evaluated had difficulty understanding the 2nd item of the "stability" session, 35% the 3rd item of the "stability" session and the 2nd item of the "function" session. Consequently, the Translation Group met once again to review these items, which were modified for better patient comprehension. In the

3rd item of the "stability" session, it is difficult to modify the term "subluxation" for better patient comprehension. Accordingly, the Translation Group decided that in this item the evaluator should briefly explain to the patient the meaning of the term subluxation, saying that "it is the sensation that the shoulder joint has come out of place, but not completely". Moreover, the mobility domain was applied to 20 health professionals, with eight orthopedists (two of them specialists in shoulder surgery) and 12 physiotherapists (seven of them specialists in orthopedic trauma). In the second pre-test none of the patients reported difficulty in questionnaire comprehension, showing that the corrections were effective and that the questionnaire was ready to be used with the Brazilian population.

CONCLUSION

The Rowe Score is known worldwide and used both in clinical practice and in surveys. The translation and cross-cultural adaptation process of this questionnaire for Portuguese allows its reliable use in Brazil for functional evaluation after the treatment of patients who have suffered anterior shoulder dislocation.

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Appendix1. Rowe Scale of shoulder instability *(Anexo1. Questionário Rowe de instabilidade do ombro)*.

Seção 1	Estabilidade
50	Sem recorrência, sub-luxação ou apreensão
30	Apreensão quando coloca o braço em certas posições
10	Sub-luxação (sem necessidade de redução)
0	Deslocamento recorrente
Seção 2	**Mobilidade**
20	100% da rotação externa, rotação interna e elevação normais
15	75% da rotação externa normal, elevação e rotação interna normais
5	50% da rotação externa normal e 75% da elevação e rotação interna normais
0	50% da elevação e rotação interna normais; sem rotação externa
Seção 3	**Função**
30	Sem limitação no trabalho ou esportes, pouco ou nenhum desconforto
25	Limitação discreta e desconforto mínimo
10	Limitação moderada e desconforto
0	Limitação acentuada e dor