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THE WESTERN ONTARIO ROTATOR CUFF INDEX (WORC) – THE POLISH LANGUAGE VERSION
THE POLISH LANGUAGE VERSION OF THE WORC

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SUMMARY

Introduction

The Western Ontario Rotator Cuff Index (WORC) is a specific research tool for assessing the quality of life of patients with various rotator cuff problems. Researches were undertaken because of the lack in Poland the research tool of this type. Approval was obtained from the copyright owner – Sharon Griffin – to create a Polish version of the WORC.

Aim

The aim of this study was to cross-culturally adapt the English version of the WORC for use in the Polish population.

Material and methods

Methods. In the adaptation process, use was made of the procedure, recommended by the Mapi Research Institute, of translating research tools, enabling translation errors to be minimised. Two professional English language translators and one native speaker living in Poland for several years, as well as the authors of the study, were involved in the translation process. To evaluate the

KWESTIONARIUSZ WESTERN ONTARIO ROTATOR CUFF INDEX (WORC) – POLSKA WERSJA JĘZYKOWA
POLSKA WERSJA JĘZYKOWA KWESTIONARIUSZA WORC

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STRESZCZENIE

Wstęp

Kwestionariusz Western Ontario Rotator Cuff (WORC) jest specyficznym narzędziem badawczym do oceny jakości życia pacjentów z różnymi problemami w obrębie stożka rotatorów. Badania podjęto ze względu na brak w Polsce tego typu narzędzia badawczego. Uzyskano zgodę na utworzenie wersji polskiej WORC od właściciela praw autorskich – Sharon Griffin.

Cel

Celem niniejszej pracy jest przedstawienie etapów adaptacji lingwistycznej angielskiej wersji kwestionariusza WORC do wersji polskiej.

Materiał i metody

W procesie adaptacji wykorzystano rekomendowaną przez Mapi Research Institute procedurę tłumaczenia narzędzi badawczych, pozwalającą na zminimalizowanie błędów wynikających z przekładu. W proces tłumaczenia zaangażowani byli 2 tłumacze języka angielskiego i 1 nativespeaker od kilku lat mieszkający w Polsce oraz autorzy pracy. W celu ewaluacji dokonanego

translation performed, an experts and patients' assessment was used.

Results
The Polish linguistic adaptation was made in six stages. In the first stage, two independent translation versions were created: forward versions A1V and A2V. On the basis of these, forward version BV was agreed (stage 2). In stage 3, a native speaker from the UK performed a back-translation: BTV version. Next, the BTV version was compared with the source version and several corrections were made – forward version CV was created (stage 4). In stage 5, on the basis of the results of the analysis of the experts' assessments, two questions were developed – no. 7 and 10 – regarding which the experts expressed reservations. Corrections were made on the basis of the results of the experts' discussion, and forward version DV was created. In the final stage, it was assessed by five people with rotator cuff damage. In analysing the responses received, an average result of 2.97 was obtained (in a range of from 0 to 3). The group of experts made one correction suggested by the patients, and forward version EV was created. Each stage was completed with a report describing the changes made.

Conclusions
The Polish language version of the WORC was accepted by the copyright owner and constitutes a valuable tool to evaluate the effectiveness of applied orthopaedic and physiotherapeutic treatments. The received version of the WORC questionnaire will be subjected to a validation process in order to assess psychometric properties.

Keywords: WORC, questionnaire, quality of life, shoulder

tłumaczenia posłużono się oceną ekspertów oraz pacjentów.

Wyniki
Polska adaptacja lingwistyczna przebiegała w 6 etapach. W pierwszym etapie powstały 2 niezależne wersje tłumaczenia: A1V i A2V. Na ich podstawie uzgodniono wspólną wersję – BV (etap 2). W 3 etapie nativespeaker z Wielkiej Brytanii dokonał tłumaczenia wstecznego – powstała BTV. Następnie porównano wersję BTV z wersją źródłową i naniesiono kilka poprawek – powstała wersja CV (etap 4). W etapie 5 na podstawie wyników analizy ocen ekspertów wyodrębniono 2 pytania – nr 7 i 10 do których eksperci zgłosili zastrzeżenia, naniesiono poprawki i powstała wersja DV. W ostatnim etapie poddano ją ocenie 5 osobom z uszkodzeniem stożka rotatorów. Analizując uzyskane odpowiedzi – uzyskano średni wynik 2,97 (w zakresie od 0 do 3). Grupa ekspertów naniosła jedną poprawkę zasugerowaną przez pacjentów i powstała wersja EV. Każdy etap zakończony był raportem opisującym dokonane zmiany.

Wnioski
Polska wersja językowa kwestionariusza WORC została zaakceptowana przez właściciela praw autorskich i stanowi cenne narzędzie do oceny skuteczności stosowanych zabiegów ortopedycznych oraz fizjoterapeutycznych. Otrzymana wersja kwestionariusz WORC przed wprowadzeniem do badań naukowych i praktyki klinicznej zostanie poddana procesowi walidacji w celu oceny właściwości psychometrycznych.

Słowa kluczowe: WORC, kwestionariusz jakości życia, bark

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Introduction

Rotator cuff tear is one of the most frequent causes of pain and restriction of movement around the shoulders. The frequency of rotator cuff tear increases with age, and its disjunction is very rare before the age of 40 years. Those falling ill most frequently are men engaged in physical work, who complain of pain in the dominant limb. The tear is the result of constant strain and micro-injuries which lead to degeneration in the area of the so-called "critical zone". Its weakening, due to extension, thinning, then being worn out, and finally separated, has the effect of destabilising the shoulder joint by disturbing the centralisation of the head of the humerus. Damage to such structures is also a frequent problem in sports involving actions performed over one's head, e.g. baseball, tennis or volleyball. Such actions by the upper limbs pose a serious challenge to the rotator cuff, which is responsible for maintaining the head of the humerus in the centre of the acetabulum and preventing its pathological dislocation as a result of extreme forces acting on the shoulder. Rotator cuff tear is one of the most frequent indications for operational treatment of patients with shoulder pain problems (McMas hon *et al.* 2014; Mall *et al.* 2013).

Opinions of patients concerning their own health can differ from the objective assessments of professionals. For that reason it is increasingly stressed that assessing the quality of life together with an objective assessment should constitute a mutually complementary holistic assessment of a patient's health, the effectiveness of operations and physiotherapy, and should also be helpful in modifying therapy (Kolk *et al.* 2016; Cieślik *et al.* 2015).

The Western Ontario Rotator Cuff Index (WORC) is a specific, self-report questionnaire developed to evaluate disability and quality of life in persons with pathology of the rotator cuff. Originally, list of 321 items was reduced to 76 by the investigators eliminating duplicated, incomprehensible or ambiguous items. A random selection of 100 patients from the same registry were then asked to indicate whether they experienced each of the items, and to rate the importance of the symptom/disability to their overall shoulder functioning. Then, 50 items with the highest values were correlated with each other. For every pair of items with coefficients greater than 0.6, one of the items was eliminated, resulting in the final 21 questions (Kirkley *et al.* 2003). In a systematic review on the patient-reported outcomes used for the evaluation of symptoms and functional limitations in people with rotator cuff problems, it was concluded that the WORC is one of the most responsive questionnaires and showed good psychometric properties for the targeted population (St-Pierre *et al.* 2016).

The selection of methods for assessing quality of life is therefore an extremely important problem. Researchers often make use of scales or questionnaires developed in other countries. The aim of a linguistic validation of a quality of life questionnaire is the production of a version in a language other than the language of the original questionnaire which is conceptually equivalent (Eremenco *et al.* 2005). However, a condition for obtaining reliable results is that research is conducted with the use of research tools standardised and validated in accordance with international requirements (Membrilla-Mesa, Cuesta-Vargas *et al.* 2015; Xu *et al.* 2015; Membrilla-Mesa, Tejero-Fernández *et al.* 2015).

Aim

The aim of this study was to cross-culturally adapt the English version of the WORC for use in the Polish population.

Material and methods

1. The description of the Western Ontario Rotator Cuff Index (WORC) questionnaire

The original version of the WORC was created in English by A. Kirkley, C. Alvarez and S. Griffin in 2003. It specific research tool for assessing the quality of life of patients with various rotator cuff problems contains 21 items grouped into five domains – physical symptoms (six items), sport/recreation (four items), work (four items), lifestyle (four items) and emotions (three items). The WORC also includes instructions to patients how to complete the questionnaire and an explanation of the meaning of the questions in the WORC. Those patients give responses concerning symptoms and problems they have observed over the past week. They put a slash "/" on a 10 cm visual-analogue scale.

2. The assessment of the level of quality of life and functional state of Patients with rotator cuff problems on the basis of WORC questionnaire

To calculate the result, the distance from the left side of the line must be measured and the result converted into 100 (with a precision to 0.5 mm). The total result for each area can be calculated (physical symptoms/600; sport and recreation/400; work/400; lifestyle/400; emotions/300). The best possible result in the whole questionnaire is 0, and the worst 2100. The result presented in a significantly clinical manner is a percentage of the basic result. Because the worst possible result is 2100, the total result is subtracted from 2100, then divided by 2100 and multiplied by 100, to obtain a percentage result. The number of final WORC points can therefore change, from 0 per cent (i.e. the lowest level of the functional state) to 100 per cent (i.e. the highest level of functioning) (Kirkley *et al.* 2003).

The WORC questionnaire has been translated and validated into 9 languages, including German (Huber *et al.* 2005), Turkish (El *et al.* 2006), Portuguese for use in Brazil (Lopes *et al.* 2008), Norwegian (Ekeberg *et al.* 2008), Iranian (Mousavi *et al.* 2009), Dutch (Wessel *et al.* 2011), Japanese (Kawabata *et al.* 2013), Swedish (Zhaeentan *et al.* 2016) and Chinese (Wang *et al.* 2017).

3. Translation methods and language adaptation applied to the Polish version of WORC questionnaire

Before the research was undertaken, approval was obtained from the copyright owner – Sharon Griffin – to create a Polish version of the Western Ontario Rotator Cuff Index questionnaire. The adaptation process was carried out in accordance with the guidelines of the Mapi Research Institute (*Acquadro et al. 2004*) and including 6 stages:

1. "Forward" translation by two independent translators → forward version AV1 and forward version AV2
2. Reconciliation meeting between the two "forward" translators and the local team → forward version BV
3. "Backward" translation by an independent translator → backward translation BTV
4. Comparison of the source questionnaire with the "backward" translation by the local team, "backward" translator and author → forward version CV
5. Review by clinicians working in the relevant medical field → forward version DV
6. Cognitive debriefing – test of the clarity, understandability and acceptability of forward DV on 5 individuals with specific orthopedic problems and who are native speakers of the target language → forward version EV (final version).

Results

The procedure of adapting the WORC questionnaire to Polish and its results

The Polish linguistic adaptation was made in six stages:

Stage I

In the first stage, two translators of Polish extraction prepared two independent

translation versions from English into Polish (forward versions AV1 and AV2). In the linguistic adaptation process a translation was used which is characterised by a high degree of faithfulness but allows the original of Polish language equivalents to be introduced in place of terms difficult to translate.

Stage II

A team composed of two translators and the joint authors of the Polish version analysed both the particular items and both sets of answers to the questions, the instructions for doing the scale, and its visual layout. At this stage of the translation, permissible discrepancies between the two translations were ascertained, and in 3 of the 21 questions potential problems were found with their adaptation to Polish. These resulted chiefly from a lack of equivalent for a given English term or from a large number of equivalents which the translator might use. The team took appropriate action, as a result of which it agreed a joint version of the translation (forward version BV).

Stage III

On the basis of the agreed version B, though without leaning on the text of the original, a backward translation version (BTV) was prepared into English. This was performed by a person who has been living in Poland for several years and is fluent in Polish, but whose mother tongue is English.

Stage IV

The BTV was compared with the source version (SV) by a joint author of the source version of the questionnaire, and discrepancies were pointed out. The translator who prepared the BTV and the authors of the adaptation also made comparisons. The comparison of the source version with the backward translation made it possible to verify the first version (BV) of the questionnaire in Polish. Following detailed analyses, corrections were made and a further Polish version of the questionnaire was created (forward version CV). Table 1 presents the main changes made to the WORC in the Polish version (CV), after comparing the source version (SV) with the backward translation (BTV). Also, a frequent change was replacing the wording „Jak znaczne trudności odczuwasz" ("How significant are the difficulties you feel") by „Jak duże masz trudności" ("How much difficulty do you have"), as well as a change of tense in a sentence.

Stage V

The assessment of version CV was prepared by using a team of experts in orthopaedics, composed of one orthopaedist, one physiotherapy doctor and three physiotherapists with many years' practice working with orthopaedic patients. Their task was to assess the consistency of each question in the source version with the equivalent question in the questionnaire in Polish CV, i.e. whether both questions measure the same symptoms or problems appearing in the course of performing everyday, recreational or professional work actions – a further Polish version of the questionnaire was thus created (forward version DV). Consistency was assessed on a 6-level scale from 0 to 5. In this case 0 means that the Polish translation is inadequate, and 5 that it is fully adequate. If the expert assessed a question at level 3 or lower, he was obliged to present an alternative proposal (table 2).

On the basis of the results of the analysis of the experts' assessments, two questions were developed – no. 7 and 10 – regarding which the experts expressed reservations.

They made very minor comments on questions 1,3,4,5,8,9,16,17.

The aforementioned questions were discussed by the experts, after which changes were made to the translation.

In question 7, the expression "poziom aktywności" ("level of activity") was changed to "poziom sprawności fizycznej" ("level of physical fitness").

Table 1. Changes made to the WORC of the Polish version (CV) during phase IV.

No	Source version SV	Translated joint Polish version – BV	English version after backward translation – BTV	Polish version – CV i.e. corrected after backward translation
1.	How much sharp pain do you experience in your shoulder?	Jak bardzo odczuwasz silny ból w swoim barku?	How severe is the pain you feel in your shoulder?	Jak bardzo ostry ból odczuwasz w swoim barku?
5	How much are you bothered by clicking, grinding or crunching in your shoulder?	Jak bardzo cierpisz z powodu tarcia, strzelanie lub klikanie w twoim barku?	How much do you suffer from friction, popping or clicking in your shoulder?	Jak bardzo dokucza Ci zgrzytanie, strzelanie lub klikanie w twoim barku?
17	How much difficulty do you have "roughhousing or horsing around" with family or friends?	Jak znaczne trudności odczuwasz podczas „wygłupiania się" ze swoją rodziną lub przyjaciółmi?	How significant are the difficulties you feel when fooling around with your family or friends?	Jak duże masz trudności podczas "figlowania" lub "wygłupiania się" ze swoją rodziną lub przyjaciółmi?

No. – number

Table 2. Conformity assessment of SV of the WORC with CV on the example of question number 3.

No.	Source version SV	Polish version CV (corrected after backward translation)	inadequate translation translation fully adequate						Assessment 0, 1, 2 or 3
3	How much constant, nagging pain do you experience in your shoulder?	Jak bardzo stały, dokuczliwy ból odczuwasz w swoim barku?	0	1	2	3	4	5	Write out badly translated word or expression ..... Give your suggestions .....

No. – number

In question 10, the expression "forsownych ćwiczeń" ("forceful exercises") was replaced by "intensywnych ćwiczeń" ("intensive exercises").

The experts assessed the translation of the remaining questions as fully adequate.

Stage VI

The questionnaire – DV, was tested on a group of five patients diagnosed with rotator cuff tear, who had been suffering for a minimum of three months. The group was composed of two women and three men aged from 51 to 63 years (an average of 56.6 years). It had suitable experience in functioning in everyday life with a damaged shoulder, so as to be able to reliably assess the accuracy of the questions and the clarity with which they were formulated. The task of those people tested was to fill out the scale and state whether a given item on the scale was fully comprehensible or caused doubts to arise. The answers were assessed according to a four-level scale, where: 3 means that the question is fully comprehensible, 2 – that the question is fully comprehensible after reading the explanations to the questions, 1 – that the question is only partially comprehensible, even after reading the explanations to the questions, and 0 – that the question is totally incomprehensible.

In cases where a question was incomprehensible to a person tested, he or she was asked to give the reason for the lack of understanding.

After analysing the answers received from the five people, an average result of 2.97 was obtained. The average assessment given by those tested in questions 8, 10 and

14 was 2.8, while other items were given maximum points by all persons tested (3.0).

The questions giving rise to doubts were no. 8: "How much has your shoulder affected your ability to throw hard or far?" („Jak bardzo Twój bark ogranicza Twoją zdolność do rzucania mocno lub daleko?") no. 10: "How much difficulty do you experience doing press-ups or other strenuous exercises for your arms?" („Jak dużą trudność odczuwasz przy wykonywaniu pompek lub innych forsownych ćwiczeń na ramiona?") and no. 14: "How much difficulty do you experience lifting heavy objects at or below shoulder level?" („Jak duże masz trudności z podnoszeniem ciężkich przedmiotów na wysokość barków lub poniżej ich poziomu?") All the above questions posed a problem with the answer in a situation where the person tested had no need to perform such actions or was unable to perform them.

The group of experts decided that the information at the start of the scale in the instructions for patients section: "If the question does not apply to you or you have not experienced given symptoms in the past week, try to give the answer which might be the most accurate" would be highlighted in bold and underlined, so that the patient could remember it. At the same time a decision was made to supplement item 8 by including other activities, i.e. throwing a stick to a dog, crawl swimming, serving in tennis, which were stated in the commentary section. Patients understanding question 8 will not consult the commentary. Extending the question causes it to be answered more easily if it contains an activity a patient does in everyday life. The final shape of question 8 was: "How much has your shoulder affected your ability to throw to do activities like throwing things hardly or far, throwing a stick to a dog, crawl swimming, serving in tennis?" („Jak bardzo Twój bark ogranicza Twoją zdolność do aktywności typu rzucania mocno lub daleko, rzucania kijem do psa, pływania kraulem, serwowania w tenisie?").

Those tested assessed the instructions for patients as "fully comprehensible" – 4 persons, 1 person described them as "fairly comprehensible" the average result on a four-level scale from 0 to 3 was 2.8. They also specified the time needed to complete the scale, which was an average of 14 minutes, ranging from 10 to 20.

They were also asked about their understanding of a scale used to provide answers to questions, as well as of the commentaries on the questions, and also whether they believed that the scale deals with all problems connected with a bad shoulder, and whether the visual layout is clear. Those tested gave replies to the above questions on a scale from 0 to 3, where 3 means acceptance of the visual layout, total comprehension or exhaustion of the subject, while 0 means an unsuitable visual layout, lack of comprehension or cursory treatment of the subject. According to four of the people polled, the scale of the answers is "fully comprehensible", while one person described it as "fairly comprehensible" (average 2.8), the commentaries on the questions are comprehensible and exhaustive for all (average 3.0), and the questionnaire deals with all areas of life affected by shoulder problems (average 3.0).

One of those polled suggested including a commentary under each question, so that it did not have to be looked for should the need arise. After analysing all the pros and cons of this suggestion, the team concluded that including a commentary on each question would lengthen the questionnaire's main content and make it less clear. At the same time, most people did not have to resort to the commentaries, so no need was ascertained to include them under each item.

After the team of experts had analysed the patients' responses, corrections were made and the scale assumed the shape of its final version (forward version E, EV).

Discussion

The described process of producing a linguistic adaptation of the WORC questionnaire shows the multiplicity of stages of the research done. The research was performed in accordance with the Mapi Research Institute's guidelines (*Acquadro et al. 2004*). Using official language versions of research tools is a prerequisite for being able to compare both the results of the research obtained in Poland and the results among researchers in Poland and abroad.

The process of a double translation of the questionnaire into Polish and a backward translation was carried out. Disputed issues identified were resolved in the course of creating a joint version of the translation into Polish, on the basis of an opinion concerning various items of the questionnaire, issued by a pilot group of people with long-term (over three months') experience as patients suffering from shoulder problems caused by damage in the area of the rotator cuff, as well as in the course of discussions of the team of experts.

The strong points of the methodology are that it involves a procedure complying with international guidelines and the comprehensive experience of a group of experts, including full commitment to the process of adapting the joint author of the questionnaire. The research provided evidence of the test's accuracy as to content, but further research was also begun in assessing the psychometric properties of the final Polish version of the WORC questionnaire.

The Polish version of the WORC questionnaire is available free of charge for scientific research exclusively with the consent of the WORC co-author – Sharon Griffin. Please send correspondence to the following e-mail address: sgriffinlaity@gmail.com. This version of the WORC is attached to this publication. It can be also downloaded from the website of the Holy Family Specialist Hospital in Rudna Mała: http://www.klinika-rzeszow.pl.

Conclusions

1. The Polish version of the Western Ontario Rotator Cuff Index (WORC) was accepted by the copyright owner and constitutes a valuable tool to evaluate the effectiveness of applied orthopaedic and physiotherapeutic treatments.
2. The Polish language version of the WORC questionnaire will be subjected to a validation process in order to assess psychometric properties.

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