

# Validation of a Russian Language Oswestry Disability Index Questionnaire

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## Abstract

**Study Design** Retrospective reliability and validity study.

**Objective** To validate a recently translated Russian language version of the Oswestry Disability Index (R-ODI) using standardized methods detailed from previous validations in other languages.

**Methods** We included all subjects who were seen in our spine surgery clinic, over the age of 18, and fluent in the Russian language. R-ODI was translated by six bilingual people and combined into a consensus version. R-ODI and visual analog scale (VAS) questionnaires for leg and back pain were distributed to subjects during both their initial and follow-up visits. Test validity, stability, and internal consistency were measured using standardized psychometric methods.

**Results** Ninety-seven subjects participated in the study. No change in the meaning of the questions on R-ODI was noted with translation from English to Russian. There was a significant positive correlation between R-ODI and VAS scores for both the leg and back during both the initial and follow-up visits ( $p < 0.01$  for all). The instrument was shown to have high internal consistency (Cronbach  $\alpha = 0.82$ ) and moderate test-retest stability (interclass correlation coefficient = 0.70).

**Conclusions** The R-ODI is both valid and reliable for use among the Russian-speaking population in the United States.

## Keywords

- ▶ Russian
- ▶ Oswestry Disability Index
- ▶ lower back pain
- ▶ visual analog scale
- ▶ nonoperative
- ▶ operative

## Introduction

Low back pain (LBP) affects ~25% of the U.S. population and accounts for ~3% of the complaints of emergency visits.<sup>1,2</sup> Regardless of the etiology, the subjective complaint of LBP has been quantified objectively by the Oswestry Disability Index (ODI). The ODI has been used to evaluate the outcomes of different procedures and interventions, both operative and nonoperative, and has been applied to broad patient populations. It has been widely adopted by clinicians and

regulatory agencies, such as the Food and Drug Administration, to set forth the criteria for clinical success. The ODI helps evaluate the different aspects of LBP, including perceived disability, quality of life, intensity of pain, and functional status. The ODI questionnaire was created by Fairbank et al in 1980.<sup>3</sup> It has been revised several times, up to the most recent ODI Version 2.1a.<sup>4</sup>

The ODI questionnaire has been translated into several languages, with multiple studies evaluating its validity and reliability following translation.<sup>4-9</sup> This study aimed to

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develop and validate a Russian version of the ODI (R-ODI) as a tool for evaluation of LBP in Russian-speaking patients.

## Methods

Informed consent in Russian was obtained from each study subject. The study subjects had to be over 18 years of age, have LBP, be fluent in Russian, and be patients seen in our clinic. The majority of the patients were immigrants from one of the republics of the former Soviet Union. The duration of their residence in the United States was not recorded.

The R-ODI was translated by six bilingual people (three in a spine-related profession and three in a nonmedical profession). The translated versions were analyzed and a consensus single version was obtained. This version was then analyzed by a Russian linguist for accuracy. This final version was presented to the Russian patients with LBP. The patients were asked to complete the R-ODI questionnaire at their initial evaluation. The same patients were asked to complete a follow-up questionnaire within 2 weeks of the initial visit to check the test-retest reliability of the questionnaire.

Test validity was estimated by comparing the results of the R-ODI to existing, validated outcome measurement tools. The R-ODI responses were compared with the visual analog scale (VAS) for back and leg pain (VAS back and VAS leg) taken at the same time as the follow-up R-ODI.

Stability (test-retest) and internal consistency are the two most common measurements of the reliability of foreign language translations of the ODI questionnaire. Test-retest reliability was used to measure the stability of the test over time by administering the test to the same individual at two different time points. Answers between the first day of administration and the retest day of administration were compared by calculating the interclass correlation coefficient (ICC) calculated between the two data sets. Internal consistency measuring the homogeneity of the test with Cronbach  $\alpha$  estimated for the whole questionnaire was utilized.

The protocol for this investigation was reviewed and approved by hospital's Institutional Review Board.

## Results

Ninety-seven patients participated in the study. The median age was 74 years (interquartile range 70 to 80 years, range: 26 to 92 years). Thirty patients (31%) completed the R-ODI questionnaire retest. The average time to retest was 10 days, ranging from 7 to 15 days. Eighty of 97 total participants, and 27 of the 30 patients who completed both the initial R-ODI questionnaire and the retest R-ODI questionnaire, did not complete the sex life section. The results of each questionnaire are listed in **Table 1**.

No change in the meaning of the questions on the R-ODI was noted with translation from English to Russian.

Concurrent validity was assessed by comparing the test and retest responses of the follow-up R-ODI with VAS leg pain and VAS back pain measurements by using the Pearson correlation coefficient (**Table 2**). There was a significant positive correlation between R-ODI and VAS back measurement for both day 0 ( $p < 0.01$ ) and day 10 ( $p < 0.01$ ). There was also a significant positive correlation between R-ODI and VAS leg measurement for day 0 ( $p < 0.01$ ) and day 10 ( $p < 0.01$ ).

Internal consistency was evaluated through the estimation of Cronbach  $\alpha$  between the test and retest response of the questionnaire. The instrument was shown to have high internal consistency (Cronbach  $\alpha = 0.82$ ). The test-retest stability of the R-ODI was evaluated through the estimation of ICC and was found to have moderate stability (ICC = 0.70).

## Discussion

The R-ODI in our study was shown to be both valid and reliable in our patient population. The translated version we generated can be used in the Russian-speaking patient

**Table 1** Scores for each scale in the studied population

Scale	Minimum (test, retest)	Mean (test, retest)	Maximum (test, retest)
VAS, back	10, 20	63, 55	100, 100
VAS, leg	30, 30	67, 57	100, 90
R-ODI combined	20, 37	60, 61	97, 91
Item 1	17, 33	53, 55	100, 83
Item 2	17, 17	52, 60	100, 83
Item 3	17, 67	78, 89	100, 100
Item 4	17, 33	57, 65	100, 83
Item 5	17, 17	54, 46	100, 100
Item 6	17, 17	73, 77	100, 100
Item 7	17, 17	41, 37	100, 83
Item 8	17, 17	63, 58	100, 100
Item 9	17, 17	62, 60	100, 100
Item 10	17, 17	70, 69	100, 100

Abbreviations: R-ODI, Russian language version of the Oswestry Disability Index; VAS, visual analog scale.

**Table 2** The correlations between the clinical parameters and the questionnaires (Pearson correlation coefficient)

Comparisons	Test		Retest	
	R <sup>2</sup>	p	R <sup>2</sup>	p
VAS, back	0.10	0.007	0.47	<0.0001
VAS, leg	0.14	0.005	0.56	<0.0001

Abbreviation: VAS, visual analog scale.

population to assess the outcome of operative and nonoperative interventions that target LBP.

Multiple articles have been published on the validity of the ODI translated into several languages, included simplified Chinese, Polish, French, Italian, and Brazilian Portuguese.<sup>4,5,9-14</sup> Monticone et al conducted a reliability and validity test of the Italian-translated ODI questionnaire.<sup>4</sup> Their questionnaire was taken by 126 patients, with a retest administered at day 7. They noted a high internal consistency of 0.855 and test-retest reliability of 0.961. Validity against the VAS was 0.73. Other studies have utilized the Short Form-36 and Roland-Morris questionnaire for validity with high correlation.<sup>5,15</sup>

Our study also had a high internal consistency of 0.82, similar to other published studies.<sup>12,14,15</sup> The ODI is used as an objective tool to evaluate LBP on both initial intervention and subsequent treatments.

A Russian version of the ODI was previously developed by Cherepanov.<sup>16</sup> A preliminary questionnaire was tested in 30 patients, and a final version of questions was generated and completed by 101 patients. Their adapted Russian version of the ODI was considered valid, but consistency and retest reliability values were not reported. Also, the results of the questionnaire were not compared with other established outcome measures. Six of thirty patients left the sex question in the preliminary questionnaire blank.

The majority of patients in our study (82% in the initial test and 90% in the retest) elected to skip the sex life section of the R-ODI questionnaire. This has been observed in other ODI translation studies and may be secondary to cultural differences.<sup>3</sup>

Limitations to our study include the small sample size for reliability, with ~31% of patients taking the retest, which could result in selection bias. We did not compare the demographics of the initial patient cohort and those who took the retest to determine if there were any significant differences between the cohorts. Other studies have reported an average follow-up response rate of 50 to 60%.<sup>11</sup> Another limitation is the low percentage of patients who answered the sex question. The test-retest stability of our questionnaire was slightly lower than previous studies have reported. This stability may be due to a large variability in the follow-up period (mean 10 days, range 7 to 15 days), as opposed to a lack of understanding on the part of the subject or translation on the part of the questionnaire. Most other studies of test-retest stability of translations of the ODI questionnaire had a shorter follow-up period of 7 days.<sup>4,7,17</sup> With a longer follow-up

period, symptoms are more likely to fluctuate, and the effect of memory may also influence the results.

Our proposed R-ODI is both valid and reliable for use among the Russian-speaking immigrant population in the United States. We believe it can be generalized for use with Russian-speaking patient populations in Russia and the former republics of the Soviet Union.

A free version of the R-ODI may be obtained by e-mailing the request to [sfspine@gmail.com](mailto:sfspine@gmail.com).

#### Disclosures

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