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## The Quality of Life in Patients After Surgical Treatment of a Lumbar Disc Herniation — a Preliminary Study

### Jakość życia pacjentów leczonych operacyjnie z powodu przepukliny krążka międzykręgowego w odcinku lędźwiowym — badanie wstępne

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#### Abstract

**Introduction.** Herniated intervertebral disc is a disease that is one of the main causes of sciatica and severe, sharp back pain and usually concerns adults aged 35 to 50 years.

**Aim.** To evaluate the effect of surgical treatment on the quality of life in patients hospitalized and subjected to surgery due to a disk herniation in the lumbar spine.

**Material and Methods.** The study included 50 patients treated surgically for disc herniation in the lumbar region. The diagnostic survey method was applied for the purposes of this study with the use of the author's questionnaire, the Oswestry Disability Index (ODI), the SF-36 questionnaire and VAS scale. The statistical analysis of the material has been performed using the Student t-test, Shapiro–Wilk test, Wilcoxon test and Spearman and Pearson correlation test.

**Results.** The analysis of the study material showed that before surgery all respondents experienced pain sensations of varying degree in the lumbar region, and after surgery 52% of patients experienced no pain in this region. The analysis of data obtained through the ODI showed that before surgery, the majority of respondents belonged to the group 3, while after the procedure they were in group 1.

**Conclusions.** 1) Spinal disk disease and related pain had a negative impact on social and sexual life of patients. 2) After surgery, patients experienced significantly less pain. 3) It was observed that in patients operated for a lumbar disc herniation, the degree of disability was reduced and the quality of life increased after surgery. (JNNN 2017;6(1):4–10)

**Key Words:** lumbar disc herniation, quality of life, Oswestry Disability Index, SF-36

#### Streszczenie

**Wstęp.** Przepuklina krążka międzykręgowego to schorzenie, które jest jedną z głównych przyczyn wystąpienia rwy kulszowej i ostrego, silnego bólu pleców i najczęściej dotyczy osób dorosłych w przedziale wiekowym 35–50 lat.

**Cel.** Ocena wpływu leczenia operacyjnego na jakość życia pacjentów hospitalizowanych i operowanych z powodu przepukliny krążka międzykręgowego w odcinku lędźwiowym.

**Materiał i metody.** Badanie zostało przeprowadzone wśród 50 pacjentów leczonych operacyjnie z powodu przepukliny krążka międzykręgowego w odcinku lędźwiowy przy użyciu autorskiego kwestionariusza, kwestionariusza Oswestry, kwestionariusza SF-36 oraz skali VAS. Analiza statystyczna materiału badawczego została wykonana przy użyciu testu T student, testu Shapiro–Wilka i testu Wilcoxona oraz testu korelacyjnego rang Spearmana i rang Pearsona.

**Wyniki.** Analiza materiału badawczego wykazała, iż przed zabiegiem operacyjnym wszyscy ankietowani w różnym stopniu odczuwali dolegliwości bólowe w odcinku lędźwiowym, natomiast po zabiegu 52% badanych nie doświadczała bólu w tym odcinku. Analiza danych uzyskanych dzięki kwestionariuszowi Oswestry wykazała, iż przed zabiegiem operacyjnym większość badanych należała do grupy 3 (44%), natomiast po zabiegu znalazła się w grupie 1 (44%).

**Wnioski.** 1) Choroba dyskowa kręgosłupa i związane z nią dolegliwości bólowe miały negatywny wpływ na życie towarzyskie i seksualne pacjentów. 2) Po zabiegu operacyjnym pacjenci istotnie rzadziej doświadczały dolegliwości bólowych. 3) U chorych operowanych z powodu przepukliny krążka międzykręgowego w odcinku lędźwiowym kręgosłupa zaobserwowano zmniejszenie stopnia niepełnosprawności oraz wzrost poziomu jakości życia. (PNN 2017;6(1):4–10)

**Słowa kluczowe:** przepuklina dysku lędźwiowego, jakość życia, Oswestry Disability Index, SF-36

## Introduction

Herniated intervertebral disc is a disease that is one of the main causes of sciatica and acute, severe back pain [1]. The origin of this disease is the rupture of fibrous ring and displacement of the nucleus pulposus in the direction of a tear in the ring [2]. It concerns mainly people aged 35–50 years [2–6], which means among the economically active population which has significant social and economic implications [1,7].

The main cause of disc herniation is considered to be a rapidly progressive change in lifestyle. Shaping of the current figure of homo sapiens lasted many centuries, and currently in the course of several decades this physically active human being tends to turn into a physically passive — (homo sedentarius). From an early age we are trying to adapt a young body to a sitting position, the lifestyle has a negative effect on our health, causing overload of the spine. Lack of exercise promotes the accumulation of adipose tissue, which eventually leads to weight gain. Each kilogram of excess weight results in the overload of the spine. All the factors mentioned above are defined as stress, what is a direct cause of the spinal disease [8].

If, as a result of conservative treatment the pain did not subside and/or additionally the symptoms of defects of neurological character appeared (eg. Cauda equina syndrome), the surgical treatment should be applied — open discectomy or microdiscectomy [1].

The aim of this study was to evaluate the effect of surgical treatment on the quality of life of patients hospitalized and operated due to disc herniation in the lumbar spine.

## Material and Methods

The study included 50 patients treated surgically for disc herniation in the lumbar region in one of the Wrocław hospitals. Details of the study group are presented in Table 1.

All participants of the study were informed of its purpose and course and possibility of withdrawal from participation at every stage, and they also signed their informed, written consent to participate in the study.

The research project was approved by the Bioethics Committee of Wrocław Medical University no. KB 48/2015.

The diagnostic survey method was applied for the purposes of this study with the use of: author's questionnaire and standardized questionnaires i.e. the Oswestry Disability Index [9,10], VAS scale and Quality of life SF-36 questionnaire [11].

The author's questionnaire was a survey of own authorship, which included questions about socio-

Table 1. Characteristics of the examined group

Variable	N	%	Test result
Sex			
Women	21	42	p>0.05
Man	29	58	
Age			
Up to 40	10	20	p>0.05
41–54 years old	26	52	
55 or more	14	28	
Education			
Basic	3	6	p>0.05
Vocational	16	32	
Secondary	20	40	
High	11	22	
Place of residence			
Rural area	10	20	p>0.05
Town up to 10.000	3	6	
Town from 10 to 100.000	3	6	
City from 100 to 500.000	8	16	
City over 500.000	26	52	
Diseaseduration			
Sudden	5	10	p>0.05
Less than 6 months	6	12	
6 months–1 year	8	16	
1–5 years	16	32	
5–10 years	15	30	
Kind of work			
Physical	22	44	p>0.05
Intellectual	20	40	
Unemployed	8	16	

demographic data, i.e. age, sex, marital status, place of residence, education, type of profession and the course of illness.

The Oswestry Disability Index (ODI) allows for assessment of disability caused by spinal pains. The patient gives responses for 10 questions about intensity of pain, problems with lifting objects, walking, sitting, sleeping, traveling and general functioning with pain. The responses are arranged from 0 to 5. The overall result is presented on a 0–50 point scale. It is multiplied by two and expressed as a percentage. Then, the degree of disability is defined:

- 0–20% (group 1) minimal disability — This group can cope with most living activities. Usually no treatment is indicated, apart from advice on lifting, sitting posture, physical fitness, and diet,

- 20–40% (group 2) moderate disability — This group experiences more pain and problems with normal activities,
- 40–60% (group 3) severe disability — Pain is the main problem in this group. These patients require detailed investigation,
- 60–80% (group 4) full disability — Back pain impinges on all aspects of these patients’ lives,
- 80–100% (group 5) invalidity — Patients are bed bound. They require careful clinical investigation.

The VAS scale (visual-analog scale) is used to assess the intensity of pain. On the horizontal line 10 cm long there were marked two end points. One end was marked “no pain” (0 points), and the second end was “maximum pain” that a respondent can imagine (10 points). A patient indicated pain intensity between these values by marking the selected point value.

The SF-36 questionnaire (Short Form Health Survey) is a quality of life measure instrument. The questions included in this questionnaire allow to assess eight domains of quality of life:

- Physical functioning (PF),
- Role limitations due to physical health (RP),
- Bodily Pains (BP),
- General health perception (GH),
- Vitality (VT),
- Social functioning (SF),
- Role limitations due to emotional problems (RE),
- Mental health (MH).

Physical Component Score (PCS) consists of: PF, RP, BP, VT,

Mental Component Score (MCS) consists of: SF, RE, MH, GH.

According to the Polish version of the questionnaire, obtaining high score values means the lowest degree of quality of life assessment, whereas the lowest score value means the highest level of quality of life [11]. This questionnaire was completed by patients before and after surgery (on the third day after surgery).

All the obtained data were entered in Microsoft Office Excel 2010 and the statistical analysis of the parameters studied in the paper was performed with the use of STATISTICA software version 12.0.

For the measurable variables, the arithmetic means, medians, standard deviation and variation range (extreme values) were calculated. For qualitative variables, the incidence rates were calculated (percentage). All tested variables of quantitative type were verified with the Shapiro–Wilk test to determine the type of distribution. To compare results before and after surgery, the Student t-test or Wilcoxon test were used (depending on the fulfillment of the objectives of the test). For all comparisons the assumed level was  $\alpha=0.05$ , and the obtained values of “p” were rounded to four decimal places. In addition, the relationship between the selected

variables was determined using the Spearman’s rank correlation test or Pearson test ( $\alpha=0.05$ ).

## Results

The vast majority of respondents (66%) who underwent surgery had experienced pain in the lumbar region for more than a year, and the diagnosis was posed on the basis of imaging tests (MRI — 42%, CT — 6%, and x-rays — 10%). During exacerbation of pain, the respondents most frequently used the oral analgesics (70%) and anti-inflammatory or analgesic external ointments (12%).

According to respondents, the discopathy had a significant impact on their sexual activity (60%), led to the resignation of hobbies (64%) or reduction of social meetings (66%). However, after the surgery, most patients (62%) rated their mood as “good”, 80% of patients improved physical fitness, 90% declared improvement of quality of life, and the vast majority (92%) felt the improvement of the quality of their lives. However, the surgery also forced the respondents to introduce changes in the existing mode of life (46% of respondents), at work (20% of respondents) and reorganizations of household duties (18% of respondents).

The analysis of the study material showed that before surgery, all respondents in varying degrees felt pain (Table 2). One third of respondents experienced only the back pain (34%), while two thirds of respondents apart from the back pain experienced the pain radiating to the thigh, knee and calf (56%) and buttock pain (20%). Among other ailments associated with disc herniation, the respondents most commonly reported occurrence of tingling legs — 55.9%, and numbness in the big toe (23.5%).

Table 2. Pain intensity in patients before and after surgical treatment

VAS value	Number (percentage) of observations		Test result
	Beforsurgery	Aftersurgery	
1	0 (0%)	4 (17%)	p<0.05
2	0 (0%)	6 (25%)	
3	2 (4%)	5 (21%)	
4	4 (8%)	6 (25%)	
5	8 (16%)	2 (8%)	
6	11 (22%)	1 (4%)	
7	9 (18%)	0 (0%)	
8	11 (22%)	0 (0%)	
9	1 (2%)	0 (0%)	
10	4 (8%)	0 (0%)	

However, after surgery, up to 52% of respondents felt no pain. 24 patients who felt pain after surgery reported a dramatic reduction in pain intensity. On the VAS scale (1–10 points), patients rated the pain intensity described most frequently from 2 to 4 points, suggesting low levels of experienced pain (Table 2). The analysis of the study material showed that after surgery pain which was experienced by patients was significantly weaker ( $p=0.000$ , Figure 1).

The analysis of the data obtained from the Oswestry questionnaire showed that before surgery the majority of respondents was assigned to the group 3 (44%). However, after surgery, most patients were in the group 1 (44%) (Figure 2). The analysis also showed a statistically significant improvement of the functioning of patients and a decrease in the degree of disability after surgery ( $p=0.000$ ) (Table 3).

The analysis of the study material obtained from the SF-36 questionnaire before and after surgery showed no statistically significant differences in the different domains of questionnaire or in QOL in terms of gender, age and level of education of respondents. In contrast, before the treatment there was a statistically significant difference in the PCS domain due to the type of work ( $p=0.041$ ). Those who do their work mainly in the standing position were characterized by higher levels of physical activity (on average gained 57 points) than those performing work in a sitting position (on average gained 76 points).

The analysis showed, however, that the surgery itself had a significant impact on the general quality of life

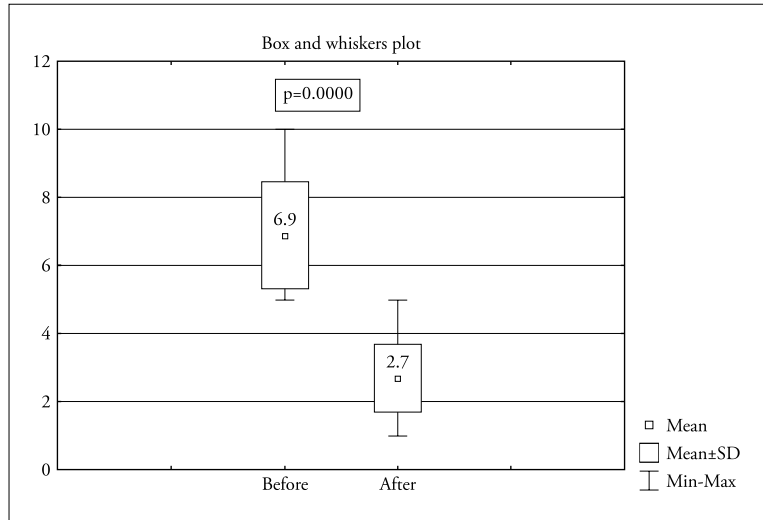


Figure 1. Pain intensity before and after surgical treatment

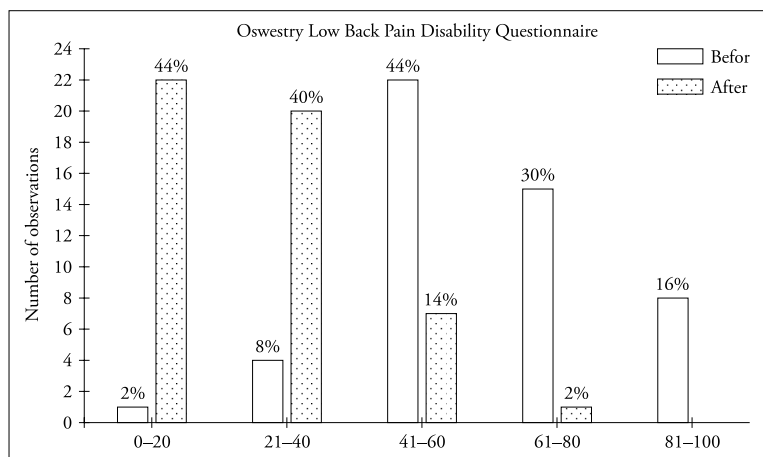


Figure 2. Disability degree according to Oswestry before and after surgical treatment

( $p=0.00$ ), as well as contributed to the improvement in the physical ( $p=0.00$ ) and mental sphere ( $p=0.00$ ) (Table 4).

Table 3. Disability degree according to Oswestry before and after surgical treatment

	Before					After					p-value
	Mean	Median	Min	Max	SD	Mean	Median	Min	Max	SD	
Oswestry Disability Index (n=50)	60.4	59.0	14.0	92.0	17.9	26.4	25.0	0.0	76.0	14.5	0.0000*

\* Wilcoxon signed-rank test

Table 4. The SF-36 questionnaire results before and after surgical treatment

		Before				After				p-value
		Mean	Min	Max	SD	Mean	Min	Max	SD	
SF-36	Physical (n=50)	70.2	16.0	105	20.8	35.6	3.0	95.0	23.0	0.000*
	Mental (n=50)	35.7	8.0	56	8.5	22.4	4.0	46.0	9.0	0.000**
SF-36 (n=50)		105.8	24.0	161	28.2	58.0	8.0	134.0	29.5	0.000**

\* Wilcoxon signed-rank test, \*\*Student's t test

The study also revealed a positive correlation between the Oswestry questionnaire and the SF-36 questionnaires. Patients who before surgery were characterized by a higher degree of disability, after surgery were characterized

by lower quality of life in the psychological domain ( $r=0.3509$ ,  $p=0.012$ ) and lower general quality of life ( $r=0.3049$ ,  $p=0.31$ ) (Table 5).

Table 5. Correlation between the results obtained from the Oswestry index and SF-36 questionnaires before and after surgical treatment

		Oswestry Low Back Disability Questionnaire	
		Before	After
Before	SF-36 — Physical Component Score (n=50)	$r=0.1409^*$ $p=0.329$	$r=0.0369^*$ $p=0.799$
	SF-36 — Mental Component Score(n=50)	$r=0.1479^{**}$ $p=0.305$	$r=0.0596^{**}$ $p=0.681$
	SF-36 (n=50)	$r=0.1490^{**}$ $p=0.302$	$r=0.0454^{**}$ $p=0.754$
	VAS	$r=0.0445^{**}$ $p=0.761$	$r=0.0668^{**}$ $p=0.648$
After	SF-36 — Physical Component Score (n=50)	$r=0.2533^*$ $p=0.076$	$r=0.0176^*$ $p=0.903$
	SF-36 — Mental Component Score(n=50)	$r=0.3509^{**}$ $p=0.012$	$r=-0.0021^{**}$ $p=0.989$
	SF-36 (n=50)	$r=0.3049^{**}$ $p=0.031$	$r=0.0131^{**}$ $p=0.928$
	VAS	$r=0.0604^{**}$ $p=0.738$	$r=-0.1397^{**}$ $p=0.438$
	Age	$r=0.1445^{**}$ $p=0.317$	$r=-0.1451^{**}$ $p=0.315$

\* Spearman's rank correlation, \*\* Pearson correlation

## Discussion

Spinal disc herniation usually affects people who are professionally active in the fourth and fifth decade of life, with an average age of slightly more than 40 years of age [2–6]. This was confirmed by the results of own study.

One of the main symptoms of discopathy is a severe, chronic back pain, which makes it difficult to function in daily life and leads to reduced quality of life [12,13]. Studies conducted by many authors [6,12,14,15] showed that patients with a herniated disc in lumbo — sacral region experienced pain sensations of a medium intensity which was confirmed by own study. However, post-operative pain sensation is reduced [5,6,14,16–18] as was also confirmed by this study.

In the full-blown disc disease, there appears also a symmetrical or asymmetrical pain sensation radiating to the lower limb and trunk transposition [2]. In the present study, 66% of respondents experienced the pain radiating to one of the limbs. Similar results were also obtained by Rosińczuk et al. [19].

The analysis of the study material showed that the majority of patients after surgery feel better comfort and

quality of life both in the physical and mental sphere. Studies conducted by other authors confirm the positive effect of surgery on the quality of life in patients who underwent surgery [3,16–18,20].

In this study, the evaluation of functional condition of patients was made with the use of ODI. Studies conducted by Czaja et al and Strömqvist et al. confirmed our findings that patients with discopathy are most frequently characterized by severe disability [12,18]. As a result of surgical intervention, the functional condition of patients has improved what is also confirmed by the results of other authors [5,18,21,22].

The own study also confirmed the existence of the relationship between the degree of disability and the level of the quality of life [12]. Patients, who before surgery were characterized by a higher degree of disability, after surgery evaluated the quality of life in the mental sphere and general quality of life as low.

## Conclusions

1. Spinal disk disease and associated pain had a negative impact on social and sexual life of patients.
2. After surgery, patients experienced significantly less pain sensations.
3. Patients operated for herniated disc in the lumbar region of the spine presented the reduction in the degree of disability and increase in the quality of life.

## Limitation

Studies on the quality of life of patients after surgical treatment due to herniated disks in the lumbar region are an important contribution to the discussion on the advantages of surgery and potential advantages of this type of treatment over conservative treatment. This study confirmed the positive effect of surgery on the physical performance and quality of life of respondents, however, the study group was relatively small, and the evaluation of efficiency and quality of life after surgery was done only once (on the third day). Therefore, it is advisable to conduct research on a larger group and make reassessments of physical performance and quality of life in the future (eg 6 or 12 months after surgery), so that the results were representative for all surgically treated patients due to herniated intervertebral disc and demonstrated long-term effects/impact of the surgery on performance and quality of life.

## Implications for Nursing Practice

Herniated intervertebral disc is a disease that limits the possibility of functioning in everyday life and contributes to the deterioration of the quality of life. Patients after surgical treatment require special care, emotional support and information from the nursing staff how to prevent of recurrence of back pain and maintain full independence for as long as possible.

## References

- [1] Gregory D.S., Seto C.K., Wortley G.C., Shugart C.M. Acute lumbar disk pain: Navigating evaluation and treatment choices. *Am Fam Physician*. 2008;78(7):835–842.
- [2] Rapała K. *Zespoły bólowe kręgosłupa — zagadnienia wybrane*. PZWL, Warszawa 2004.
- [3] Farzanegan G., Alghasi M., Safari S. Quality-of-Life Evaluation of Patients Undergoing Lumbar Discectomy Using Short Form 36. *Anesth Pain Med*. 2011;1(2):73–76.
- [4] Falavigna A., Righesso O., Teles A.R., Bossardi J.B., da Silva P.G. Preoperative motor deficit in lumbar disc herniation and its influence on quality of life. *Coluna/Columna*. 2014;13(4):282–286.
- [5] Häkkinen A., Kautiainen H., Järvenpää S., Arkela-Kautiainen M., Ylinen J. Changes in the total Oswestry Index and its ten items in females and males pre- and post-surgery for lumbar disc herniation: a 1-year follow-up. *Eur Spine J*. 2007;16(3):347–352.
- [6] Sedighi M., Haghnegahdar A. Lumbar disk herniation surgery: outcome and predictors. *Global Spine J*. 2014;4(4):233–244.
- [7] Juniper M., Le T.K., Mladi D. The epidemiology, economic burden, and pharmacological treatment of chronic low back pain in France, Germany, Italy, Spain and the UK: a literature-based review. *Expert Opin Pharmacother*. 2009;10(16):2581–2592.
- [8] Kiwerski J., Fiutko R. (Red.), *Bóle kręgosłupa. Poradnik dla Ciebie*. PZWL, Warszawa 2001.
- [9] Fairbank J.C., Pynsent P.B. The Oswestry Disability Index. *Spine*. 2000;25(22):2940–2953.
- [10] Fairbank J.C., Couper J., Davies J.B., O'Brien J.P. The Oswestry low back pain disability questionnaire. *Physiotherapy*. 1980;66(8):271–273.
- [11] Tylka J., Piotrowicz R. Kwestionariusz oceny jakości życia SF-36 — wersja polska. *Kardiol Pol*. 2009;67:1166–1169.
- [12] Czaja E., Kózka M., Burda A. Jakość życia pacjentów z dyskopatią odcinka lędźwiowo-krzyżowego kręgosłupa. *Pielęgniarstwo Neurol Neurochir*. 2012;1(3):92–96.
- [13] Cedraschi C., Luthy C., Allaz A.F., Herrmann F.R., Ludwig C. Low back pain and health-related quality of life in community-dwelling older adults. *Eur Spine J*. 2016;25(9):2822–2832.
- [14] Jabłońska R., Ślusarz R., Królikowska A., Beuth W., Ciemnoczołowski W. The conditions of functional efficiency of patients in early post-operative period after surgical treatment of lumbar-sacral spine discopathy. *Pielęgniarstwo Chir Angiol*. 2008;(4):144–150.
- [15] Misiak B., Snarska K.K. Quality of Life of Patients with Back Pain. *J Neurol Neurosurg Nurs*. 2014;3(3):97–144.
- [16] Peng C.W., Yeo W., Tan S.B. Percutaneous endoscopic discectomy: clinical results and how it affects the quality of life. *J Spinal Disord Tech*. 2010;23(6):425–430.
- [17] Silverplats K., Lind B., Zoega B. et al. Health-related quality of life in patients with surgically treated lumbar disc herniation: 2- and 7-year follow-up of 117 patients. *Acta Orthop*. 2011;82(2):198–203.
- [18] Strömqvist F., Ahmad M., Hildingsson C., Jönsson B., Strömqvist B. Gender differences in lumbar disc herniation surgery. *Acta Orthop*. 2008;79(5):643–649.
- [19] Rosińczuk J., Owsikowska K., Kołtuniuk A. Analysis of the Causes of Lumbar Disc Herniation in Patients Treated Neurosurgical Due to it. *J Neurol Neurosurg Nurs*. 2015;4(4):152–157.
- [20] Motter B.V., Machado A.N., Kolachinski Brandão T., Ueno F.H., Cesar A.E.M., Rodrigues L.M.R. Quality of Life in Patients Before and After Lumbar Surgery in Different Work Situations. *Coluna/Columna*. 2015;14(3):198–201.

- [21] Jabłońska R., Ślusarz R., Królikowska A., Rosińczuk-Tonderys J. Oswestry Disability Index as a Tool to Determine Agility of the Patients After Surgical Treatment of Intervertebral Disk Discopathy. *Adv Clin Exp Med.* 2011;20(3):377–384.
- [22] Jabłońska R., Królikowska A., Ślusarz R. The use of Repty Functional Index and Oswestry Disability Questionnaire for the Functional Evaluation of the Patients Treated Surgically Because of Intervertebral Disc Damage. *J Neurol Neurosurg Nurs.* 2014;3(2):64–74.

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