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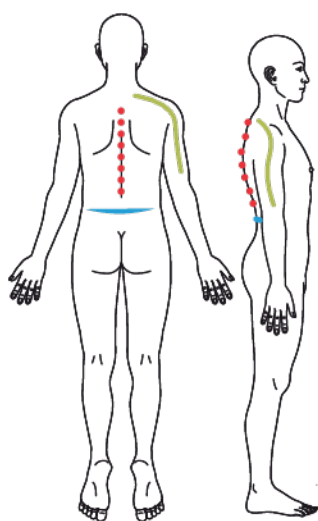
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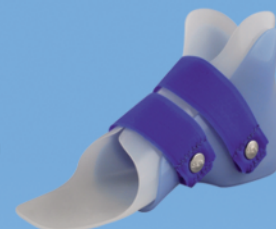
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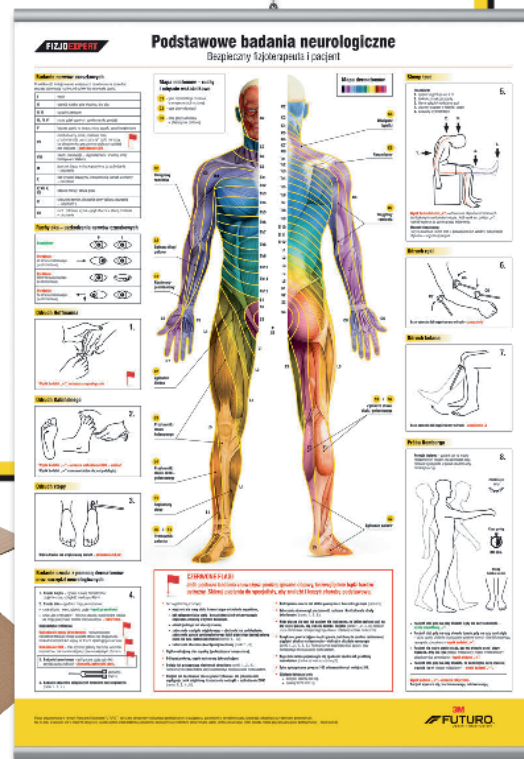
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Comparison of the effectiveness of two health resort therapy programs in office workers with the pain in the cervical spine occurring in the course of degenerative changes

对因退行性变化过程中产生颈椎疼痛的上班族所进行的两种水疗法的疗效比较

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Streszczenie

Wstęp. W dobie współczesnej cywilizacji dolegliwości kręgosłupa stanowią problem medyczny i społeczny. Mnogość zespołów bólowych, ich nawracający charakter i stałość bólu w przypadkach przewlekłych skłania do poszukiwania skutecznych metod diagnostycznych i terapeutycznych. Celem pracy było porównanie skuteczności dwóch programów terapii uzdrowiskowej w łagodzeniu bólu i eliminowaniu ograniczeń funkcjonalnych u pracowników biurowych z chorobą zwyrodnieniową kręgosłupa szyjnego.

Materiał i metody. Badaniami objęto 144 pracownice biurowe w wieku 45–55 lat, przebywające na turnusie usprawniającym z powodu dolegliwości bólowych szyjnej części kręgosłupa w przebiegu zmian zwyrodnieniowych. Pacjentki podzielono na dwie grupy, w zależności od zaaplikowanego programu usprawniania. Narzędzia badawcze stanowiły testy funkcjonalne szyjnej części kręgosłupa (Valsalvy, Kerniga, test kompresyjny i test dystrykcyjny), pomiary liniowe zakresów ruchu kręgosłupa szyjnego, skala NRS i wskaźnik NDI. Do analiz wykorzystano testy: chi-kwadrat, t-Studenta, U Manna-Whitney’a i Wilcozona.

Wyniki. W obu grupach po zakończeniu usprawniania odnotowano statystycznie istotną poprawę pod względem wyników testów funkcjonalnych, zakresów ruchu kręgosłupa szyjnego, wartości skali NRS i wskaźnika NDI. Różnice wyników uzyskanych w badaniu II w stosunku do I były istotnie większe w przypadku pacjentek z grupy I.

Wnioski. Zastosowanie obu programów terapeutycznych wpłynęło na złagodzenie dolegliwości bólowych i polepszenie sprawności funkcjonalnej, jednakże zakres uzyskanej poprawy był zdecydowanie większy w przypadku pacjentek poddanych programowi zawierającemu borowinoterapię.

Słowa kluczowe:

kręgosłup szyjny, ból, sprawność funkcjonalna, balneoterapia

Abstract

Background. Back problems become a medical and social problem in the era of modern civilization. Wide variety of pain syndromes, their recurrent character and persisting pain in chronic cases prompts the search for effective diagnostic and therapeutic methods. The aim of the study was to compare the effectiveness of two spa therapy programs in alleviating pain and eliminating functional limitations in office workers with degenerative disease of the cervical spine.

Material and methods. The study involved 144 office workers aged 45–55, staying on a rehabilitation stay due to pain in the cervical spine caused by degenerative changes. Patients were divided into two groups depending on the rehabilitation programme administered. Research tools was functional tests of the cervical spine (Valsalva, Kernig, compression test and traction test), linear measurements of ranges of cervical spine, NRS scale and NDI questionnaire. The data were analyzed based on the Chi-square test, Student t test, Mann Whitney U test, Wilcoxon test.

Results. In both groups, after improvement, a statistically significant improvement was noted in terms of functional test results, cervical spine movement ranges, NRS scale values and NDI index. The differences in the results obtained in Test II in relation to I were significantly greater for patients from group I. The application of both therapeutic programs had an effect on alleviating pain and improving functional capacity.

Conclusions. Application of both programs contributed to the relief intensity of pain and improved functional capacity, however, the extent of improvement was significantly greater in the case of patients subjected to a program containing mud therapy.

Key words:

cervical spine, pain, functional capacity, balneotherapy

摘要

简介。在现代文明时代，颈椎病痛成为医学和社会问题。在慢性病中的多种疼痛综合征、复发性疼痛和疼痛持续性促使人们去寻求有效的诊断和治疗方法。研究目的在比较两种水疗法对减轻上班族颈椎退行性疾病的疼痛和消除功能限制方面的有效性。

材料和方法。共 144 名年龄在 45–55 岁间的女性上班族参与研究，她们参与退行性变化过程中所产生颈椎疼痛的康复治疗。根据所应用的康复计划不同，这些女患者被分成两组。实验工具包括颈椎功能测试（Valsalva - Kernig、压缩测试及牵引测试）、颈椎活动范围的线性测量、NRS 量表及 NDI 指数等。分析时所采取的测试包括：卡方检验、学生 t 检定、曼-怀-威三氏检验等。

结果。两组康复治疗结束后，在功能测试、颈椎活动范围、NRS 标度值及 NDI 指数方面均观察到具统计学意义的显著改善。第二组患者所取得的研究结果差异比第一组更大。

结论。两种治疗计划的使用均有助于减轻疼痛并改善功能效率，然而接受包含泥疗法在内计划的患者所获得的改善程度更大。

关键词：

颈椎、疼痛、功能效率、疗法

Introduction

Back problems become a medical and social problem in the era of modern civilization. Wide variety of pain syndromes, their recurrent character and persisting pain in chronic cases prompts the search for effective diagnostic and therapeutic methods.

From a biomechanical perspective, the cervical spine with its high mobility is particularly vulnerable to degenerative changes that affect the proper function of the spine. Degenerative changes usually occur as a result of natural tissue wear or overload. This unfavorable phenomenon applies to both intervertebral discs, interprocess joints, bone tissue as well as spinal ligaments [1]. Cervical spine pains most often appear after the age of 45 and are frequently the result of many hours of adopting the same often non-physiological body position and constant repetition of the similar activities [2, 3]. Office workers, in their daily work routine, sit in front of the computer for hours, in the inclined position, with their head protruded. Initially, the muscles of the anterior and posterior walls of the neck are forced to work in imbalanced way, over time clear shallow physiological cervical lordosis occurs resulting in chronic changes in the soft paravertebral tissues [1]. In addition, stress and non-compliance with the principles of work ergonomics predispose to pain in the upper part of the spine. Moreover, lack of active rest leads to a weakening of strength and endurance in the postural muscles. Gradually, fatigue and impaired motor control of deep neck flexors occur. An increase in the tone of muscles stabilizing the cervical spine increases compression and intensifies pain, which, causes permanent mobility problems in the upper spine if not treated [4]. Despite progress in the field of medical sciences, backache and other ailments resulting from functional disorders of the musculoskeletal system still affect a significant percentage of the population. Epidemiological studies show that cervical spine pain periodically occurs in 35% of adults, 5% of whom have longer periods of work absence resulting from persisting ailments, including difficulty turning their heads and keeping their arms up and lifting objects, as well as accompanying migraines and sleep problems [5-8]. Long-term persistence of symptoms is the cause of a decrease in physical, social and professional activity, and consequently results in lower mood and depression [9-11]. According to Rudzińska et al. [12], women compared to men are more susceptible to the formation of pathological changes in the cervical spine due to the weaker muscular corset.

Spine diseases are a challenge for modern physiotherapy, both in terms of prevention and therapeutic management. Spa treatment is a combination of tradition and modernity. It is based on natural healing materials and climate, and is complemented by kinesiotherapy, physical treatments, and the possibility of using health education. It is aimed at repairing disturbed body functions and provides the opportunity for rest, relaxation, detachment from reality and daily duties, and establishing interpersonal contacts.

Aim

The aim of the study was to compare the effectiveness of two spa therapy programs in alleviating pain and eliminating functional limitations in office workers with degenerative disease of the cervical spine.

Material and methods

The study involved 144 office workers aged 45-55, staying on a rehabilitation stay due to pain in the cervical spine caused by degenerative changes. The studies were carried out in three spa facilities in Iwonicz-Zdrój: „Stomil-Ziemowit” Wellness Spa, „Piast” Wellness Spa and Health Resort „Iwonicz S.A”.

The selection for research subjects was deliberate. The inclusion criteria were female sex, diagnosis based on medical history, physical examination and medical documentation, degenerative changes in the cervical spine, pain in the cervical spine persisting for at least 12 weeks, age in the range of 45-55 years, performing occupations requiring office work for 8 hours a day during the last 10 years preceding the examination, no contraindications to participate in the rehabilitation program scheduled by the doctor and physiotherapist, participation in the whole therapy programme, attending both the first and second examination, written consent to participate in the study.

Exclusion criteria were as follows: women diagnosed with malformations or acquired cervical spine defects, neurological defects, conditions after whiplash injuries.

Patients were divided into two groups depending on the rehabilitation programme administered. Group I consisted of 73 women referred for spa treatment by the National Health Fund (average age: $\bar{x} = 49.60 \pm 3.40$ years) and group II included 71 women referred to the spa by the Social Insurance Institution (average age: $\bar{x} = 50.62 \pm 3.12$ years).

Table 1 contains basic descriptive statistics and comparison of selected somatic features of the examined women. These data indicate statistically significantly higher values of body height ($p = 0.040$) in women from group I. However, in the case of body weight and BMI, no statistically significant intergroup differentiation was noted.

Table 1. Comparison of selected somatic features in selected women groups

Group	$\bar{x} \pm SD$	max-min	Q ₂₅	Me	Q ₇₅	Student t test or MannWhitney U test
Body weight [kg]						
I	72.04 ± 11.17	100.00–46.00	67.00	72.00	79.00	t = 0.54; p = 0.585
II	71.04 ± 10.74	102.00–49.00	62.00	70.00	78.00	
Body height [cm]						
I	167.89 ± 7.45	182.00–154.00	163.00	162.00	173.00	Z ₁ = 2.06; p = 0.040*
II	165.10 ± 8.42	182.00–150.00	158.00	165.00	171.00	
Body Mass Index						
I	25.48 ± 3.09	33.73–18.43	23.55	25.39	27.40	t = −1.02; p = 0.308
II	25.98 ± 2.70	32.93–18.22	24.30	25.80	27.73	

* $p < 0.05$

Taking into account BMI values, the correct body build was observed in 29 women from Group I and 24 women from Group II, overweight was found in 38 patients from Group I and 42 from Group II, obesity was observed in 5 women from Group I and 4 from group II, while 1 woman from group I and 1 from group II were underweight (Table 2).

Table 2. Body build of tested women

Type of body build	Group I		Group II		Total	
	n	%	n	%	n	%
Underweight	1	1.0	1	1.0	2	1.0
Norm	29	40.0	24	34.0	53	37.0
Overweight	38	52.0	42	59.0	80	56.0
Obesity	5	7.0	4	6.0	9	6.0
Chi square test	$\chi^2(3) = 0.76; p = 0.860$					

The programme for group I included:

- morning group exercise – breathing and active slow-pace exercises. The morning exercises lasted 20 minutes;
- mud treatments – wraps in the form of a thick peat slurry 4-5 cm thick, at the temperature of 42° for 20-25 minutes were applied to the cervical spine. Mud paste containing 98% of organic, humic substances was used for the treatments. The aqueous extract of this raw material was acidic (pH = 5.5);
- TENS electrostimulation – treatments were performed using a Firing EVO apparatus. The electrodes were placed at the location of the pain. Treatment parameters: frequency 60-100 Hz, pulse duration 100 μ s. The intensity was increased above the sensory threshold. The duration of a single treatment was 20 minutes.
- classic massage on the area of the cervical spine - the following relaxation and heating techniques were used: longitudinal and transverse stroking, longitudinal and transverse rubbing, longitudinal kneading, labile vibration, mild shaking. The massage was performed every day before kinezytherapy. The duration of the treatment was 15 minutes.
- kinezytherapy – individual exercises aimed at improving the mobility of the spine and restoring proper muscle balance, relaxing and relieving the cervical spine and strengthening the paravertebral muscles. The basis of the therapeutic procedure was restoring the habit and teaching how to equalize the linearity of the entire body structures and the principles of proper head positioning. A 30-minute gymnastics run by a physiotherapist took place in the gym in the afternoon.

The rehabilitation programme for patients from Group II included:

- morning group exercise,
- TENS electrostimulation,
- classic massage on the area of the cervical spine,
- kinezytherapy.

Treatments applied to patients from group I were identical in type, frequency and duration as in group II. Patients from each group were educated on the principles of work ergonomics and had the so-called healthy back schools. The rehabilitation program included 15 treatment days (excluding Saturdays and Sundays). The tests were carried out twice, before the start of therapy and on the day of its completion.

Research tools:

- Functional tests of the cervical spine: Valsalva, Kernig, compression test and traction test [13].
- Linear measurements of ranges of flexion, extension, lateral inclination and cervical spine rotation [14].
- Numerical Rating Scale NRS [15].
- Neck Disability Index NDI [16].

All women received detailed information concerning the aim and methodology used in the study.

Based on the yielded data, the following descriptive statistics were calculated: arithmetical mean values ($\bar{x}$), standard deviations (SD), lower quartile (Q_{25}), medians (Me), upper quartile (Q_{75}), minimal and maximal values are given. Consistency of the results with normal distribution were estimated by means of Shapiro-Wilk's test. Intergroup comparisons of qualitative features were performed using the Chi-square test, and in the case of quantitative data: the Student's t test for independent samples or alternatively non parametric U Mann-Whitney U test was used. The Wilcoxon pair order test was used to assess intra-group variability (differentiation of results obtained in Test I and II). Results were considered statistically significant if the probability level of the test was lower than the predetermined level $\alpha = 0.05$. The Stat Soft STATISTICA application (version 13.1) was used to process the test results.

Results

Data in Tab. 3 indicate that in the Valsalva test in Test I, 53 women from group I and 52 women from group II declared no pain, while in Test II no pain was found in 69 women from group I and 60 women from group II. The difference in the number of patients experiencing ailments in Tests I and II was statistically significant, both for groups I ($p < 0.001$) and II ($p = 0.012$).

During the Kernig test, in Test I, no pain occurred in 16 women from group I and 15 women from group II, while in Test II, 38 women from group I and 29 women from group II did not experience pain. The differences in the number of women not experiencing pain in tests I and II were statistically significant in relation to groups I ($p < 0.001$) and II ($p = 0.002$).

Compression test of the cervical spine showed that before starting rehabilitation there were no pain in 30 women from Group I and 34 women from Group II, while after the therapeutic process 54 women from Group I and 48 women from Group II did not experience pain. The differences in the number of patients experiencing pain in Test I compared to Test II were statistically significant for groups I ($p < 0.001$) and II ($p = 0.001$).

During cervical spinal traction, in Test I reduced pain was found in 35 women in Group I and 19 women in Group II, while in Test II pain did not appear in 52 women in Group I and 36 women in Group II. The diversity in the number of women experiencing pain reduction in Tests I and II was statistically significant, both for groups I ($p = 0.001$) and II: $p = 0.001$ (Table 3).

Table 3. Comparison of the results of functional tests of the cervical spine obtained in tests I and II by women qualified for individual groups

Functional test		Group I				Group II			
		Test I		Test II		Test I		Test II	
		n	%	n	%	n	%	n	%
Valsalva test	Pain	20	27.0	4	5.0	19	27.0	11	15.0
Wilcoxon test	No pain	53	73.0	69	95.0	52	73.0	60	85.0
		$Z_2 = 3.51; p < 0.001^*$				$Z_2 = 2.52; p = 0.012^*$			
Kernig test	Pain	57	78.0	35	48.0	56	79.0	42	59.0
Wilcoxon test	No pain	16	22.0	38	52.0	15	21.0	29	41.0
		$Z_2 = 4.11; p < 0.001^*$				$Z_2 = 3.07; p = 0.002^*$			
Compression test	Pain	43	59.0	19	26.0	37	52.0	23	32.0
Wilcoxon test	No pain	30	41.0	54	74.0	34	48.0	48	68.0
		$Z_2 = 4.29; p < 0.001^*$				$Z_2 = 3.29; p = 0.001^*$			
Traction test	No improvement in the form of pain reduction	38	52.0	21	29.0	52	73.0	35	49.0
Wilcoxon test	Pain reduction	35	48.0	52	71.0	19	27.0	36	51.0
		$Z_2 = 3.25; p = 0.001^*$				$Z_2 = 3.25; p = 0.001^*$			

In Test II, for both groups, significantly higher values were found for the mobility of the cervical spine in individual planes (Table 3).

A more detailed analysis, consisting in comparing the values determining the improvement, and in particular the differences between the results obtained in Tests I and II, showed that they were significantly higher in patients qualified for group I, except for the range of flexion: $p = 0.461$ (Table 4).

The data in Table 5 indicate that the level of pain intensity in women classified into individual groups on the day of starting the therapy was similar ($p = 0.103$). Calculations using the Wilcoxon pair order test showed statistically significant intra-group differences in the results of the Tests: I-II ($p < 0.001$), which indicate a decrease in the severity of pain in the studied groups of women under the influence of therapy. Comparison of the results obtained in Test II shows that after completion of the rehabilitation, women from group I had significantly lower severity of pain ($p = 0.033$). In addition, the difference in the results obtained in Tests I and II was definitely greater in women from group I ($p < 0.001$).

On the day of starting therapy, women qualified for both groups presented a similar level of disability caused by pain in the cervical spine ($p = 0.241$). Calculations with the Wilcoxon test showed for both group I and II statistically significant intra-group differences in the results of the Tests: I-II ($p < 0.001$), which indicate an improvement in women's functional fitness as a result of therapy. Comparison of the results obtained in Test II allows to state that after the completion of the rehabilitation, women from group I had

significantly higher functional capacity ($p = 0.002$). In addition, the difference in the results obtained in Tests I and II was definitely greater in group I women ($p < 0.001$).

Table 4. Comparison of ranges of cervical spine movement and their differences between tests I and II in women from both groups

Variable		$\bar{x} \pm SD$	Me	max-min	$\bar{x} \pm SD$	Me	max-min	Statistics
Movement [cm]	Group	Test I			Test II			Wilcoxon test
1	I	2.10 ± 0.37	2.00	3.00-1.50	2.34 ± 0.35	2.50	3.00-1.50	$Z_2 = 5.37; p < 0.001^*$
	II	2.10 ± 0.36	2.00	3.00-1.50	2.30 ± 0.33	2.50	3.00-1.50	$Z_2 = 4.86; p < 0.001^*$
2	I	7.36 ± 0.48	7.50	8.00-6.00	7.68 ± 0.44	7.80	8.50-6.00	$Z_2 = 5.84; p < 0.001^*$
	II	7.39 ± 0.44	7.50	8.00-6.50	7.61 ± 0.36	7.50	8.00-7.00	$Z_2 = 4.94; p < 0.001^*$
3	I	5.81 ± 0.33	6.00	6.50-5.00	6.11 ± 0.27	6.00	6.50-5.50	$Z_2 = 5.91; p < 0.001^*$
	II	5.82 ± 0.30	6.00	6.50-5.00	6.03 ± 0.26	6.00	6.50-5.00	$Z_2 = 4.70; p < 0.001^*$
4	I	5.59 ± 0.41	5.50	6.20-4.90	5.91 ± 0.37	6.00	6.50-5.00	$Z_2 = 6.03; p < 0.001^*$
	II	5.68 ± 0.48	5.80	7.50-4.50	5.84 ± 0.39	6.00	7.00-4.50	$Z_2 = 4.14; p < 0.001^*$
5	I	7.28 ± 0.46	7.50	8.00-5.50	7.66 ± 0.49	7.80	8.50-5.50	$Z_2 = 6.45; p < 0.001^*$
	II	7.41 ± 0.37	7.50	8.00-6.00	7.65 ± 0.38	7.50	8.30-6.30	$Z_2 = 5.23; p < 0.001^*$
6	I	6.98 ± 0.43	7.00	8.00-5.50	7.37 ± 0.51	7.50	8.20-5.50	$Z_2 = 6.45; p < 0.001^*$
	II	7.07 ± 0.27	7.00	8.00-6.50	7.32 ± 0.33	7.50	8.00-6.50	$Z_2 = 5.30; p < 0.001^*$
Movement [cm]	Difference	Group I			Group II			Mann Whitney U test
1	Test I-Test II	0.23 ± 0.24	0.20	0.70-0.00	0.21 ± 0.24	0.00	0.60-0.00	$Z_1 = 0.74; p = 0.461$
2	Test I-Test II	0.32 ± 0.27	0.50	1.00-0.00	0.22 ± 0.26	0.00	0.80-0.00	$Z_1 = 2.24; p = 0.025^*$
3	Test I-Test II	0.30 ± 0.26	0.50	1.00-0.00	0.21 ± 0.27	0.00	1.00-0.00	$Z_1 = 2.22; p = 0.026^*$
4	Test I-Test II	0.32 ± 0.27	0.40	1.00-0.00	0.16 ± 0.24	0.00	0.50-(-0.50)	$Z_1 = 3.49; p < 0.001^*$
5	Test I-Test II	0.37 ± 0.24	0.50	0.80-0.00	0.23 ± 0.25	0.20	0.80-0.00	$Z_1 = 3.22; p < 0.001^*$
6	Test I-Test II	0.39 ± 0.27	0.50	1.00-0.00	0.25 ± 0.25	0.20	0.80-0.00	$Z_1 = 3.01; p = 0.003^*$

1 – Flexion; 2 – Extension; 3 – Right side bending;
4 – Left side bending; 5 – Dextrorotation; 6 – Levorotation

* $p < 0.05$

Table 5. Comparison of the severity of back pain and the degree of disability caused by pain in the cervical spine in the examined groups of women

Variable	Group I			Group II			Mann Whitney U test
	$\bar{x} \pm SD$	Me	max-min	$\bar{x} \pm SD$	Me	max-min	
NRS scale							
Test I	5.25 ± 2.15	6.00	9.00-0.00	4.56 ± 2.47	5.00	9.00-0.00	Z ₁ = 1.63; p = 0.103
Test II	2.14 ± 1.70	2.00	6.00-0.00	2.93 ± 2.09	3.00	9.00-0.00	Z ₁ = -2.13; p = 0.033*
Wilcoxon test	Z ₂ = 7.21; p < 0.001*			Z ₂ = 6.32; p < 0.001*			
Difference I-II	-3.11 ± 1.61	-3.00	0.00-(-7.00)	-1.63 ± 1.41	-2.00	1.00-(-6.00)	Z ₁ = -5.25; p < 0.001*
NDI [%]							
Test I	35.15 ± 14.81	34.00	72.00-8.00	31.75 ± 11.55	32.00	58.00-6.00	Z ₁ = 1.17; p = 0.241
Test II	20.52 ± 11.79	20.00	70.00-4.00	26.11 ± 11.25	26.00	56.00-4.00	Z ₁ = -3.13; p = 0.002*
Wilcoxon test	Z ₂ = 7.21; p < 0.001*			Z ₂ = 6.32; p < 0.001*			
Difference I-II	-14.63 ± 9.93	-14.00	6.00-(-40.00)	-5.63 ± 5.17	-6.00	8.00-(-20.00)	Z ₁ = -5.64; p < 0.001*

* $p < 0.05$

Before starting therapy in group I, the majority of women with disability caused by pain in the cervical spine was low (33 subjects) or medium (23 subjects). In Test II, the majority (40 women) showed no signs of disability, and 31 patients reported minor disability. In turn, in group II before therapy the majority (45 women) declared minor disability, and in Test II the number of women with minor disability did not change, and the lack of disability was reported in 22 women. These changes were statistically significant both in the case of women qualified to groups I ($p < 0.001$) and II: $p < 0.001$ (Table 6).

Table 6. Comparison of the number of women presenting different levels of disability caused by pain in the cervical spine

Disability	Group I				Group II			
	Test I		Test II		Test I		Test II	
	n	%	n	%	n	%	n	%
Lack (up to 20%)	14	19.0	40	55.0	13	18.0	22	31.0
Low (up to 40%)	33	45.0	31	43.0	45	64.0	45	63.0
Medium (up to 60%)	23	32.0	1	1.0	13	18.0	4	6.0
Serious (up to 80%)	3	4.0	1	1.0	0	0.0	0	0.0
Total (up to 100%)	0	0.0	0	0.0	0	0.0	0	0.0
Wilcoxon test	$Z_2 = 5.69$; $p < 0.001^*$				$Z_2 = 3.72$; $p < 0.001^*$			

* $p < 0.05$

Discussion

Back problems are a challenge for modern physiotherapy. The basic goal is to reduce pain and improve the functioning in everyday life of those affected. In recent years, inte-

rest in the subject of assessing the effectiveness of various therapeutic programs has increased. Matuszewska and Tomczak [17] compared the results of physiotherapy for women with pain in the cervical spine, the patients from group I had the program with laser therapy and galvanization, while the patients from group II attended ultrasound and TENS therapy, group III received treatments as in groups I and II plus additional kinesiotherapy. It was found that comprehensive management, regardless of the type of the treatment included in individual programs, reduces pain intensity. In turn, Dudek et al. [9] comparing the effects of two therapeutic programs in patients with osteoarthritis of the cervical spine, found greater effectiveness in relieving pain in a program containing TENS currents, diadynamic, magnetotherapy and kinesiotherapy compared to a program consisting of Träbert currents, diadynamic currents, magnetotherapy and kinesiotherapy. Kuliński et al. [18] as a result of analysis of the results of the therapeutic program, which included: laser therapy, magnetotherapy, ultrasounds, diadynamic currents, cryotherapy, infrared radiation and kinesiotherapy in people with osteoarthritis of the cervical spine, found that the use of the above procedures was effective in terms of alleviating pain, increasing the range of movement in the cervical spine and improved sleep quality. Maayah and Al-Jarrah [19] came to the conclusion that TENS therapy reduces pain, but this treatment is more effective for people reporting low intensity of pain. Kuciel et al. [20] based on the results of the tests of 57 people with osteoarthritis of the cervical spine undergoing therapy at the Specialized Propylaxis and Medical Center "Provita" in Wrocław, found that therapy including electrotherapy, laser therapy and irradiation with a sollux lamp with a blue filter has the effect of reducing pain to the extent that allows improvement of functioning in everyday life. Jankowska et al. [21] in studies of 74 people with chronic nonspecific pain syndrome of the cervical spine, demonstrated the effectiveness of massage, TENS therapy and infrared radiation in reducing the frequency and intensity of pain, as well as improving mobility and functional capacity of the cervical spine. Cramer et al. [22] observed reduction of cervical spine pain following the use of heat compresses for a period of 14 days.

There are no reports in the literature on the impact of spa treatment on pain and functional fitness of people with degenerative changes of the cervical spine. Few studies include Koyuncu et al [23], which showed much better effect of balneotherapy compared to physical treatments in improving functional performance in patients with chronic cervical spine pain. In turn, Nechvatal et al. [24] based on the results of the NDI questionnaire, found that spa therapy had an impact on improving the functional efficiency of people after intervertebral disc replacement within the cervical spine. Ignasiak and Ziółkowska-Lajp [25] noted an improvement in the range of flexion and extension of the cervical spine as a result of spa treatment in women aged 35-60, with pain in the musculoskeletal system, including the cervical spine, undergoing spa treatment at the KRUS Farmers Rehabilitation Center in Szklarska Poręba.

Our research has shown the effectiveness of both therapeutic programs in improving the range of cervical spine mobility, reducing the level of pain and the degree of disability caused by pain in the cervical spine. Nevertheless, it should be emphasized that the extent of improvement, which is the difference between the results obtained in Tests II and I, was definitely greater in the case of women who implemented a mud therapy program. The-

refoe, it can be concluded that the use of treatments using natural resources increases the effectiveness of therapy aimed at improving the functional capacity of people with pain in the cervical spine in the course of degenerative changes. The topic that has been conferred about in the paper is part of a comprehensive discussion on the effectiveness of therapeutic methods used in patients with spinal pain syndromes. It constitutes a fundamental problem that is faced by most therapists dealing with the rehabilitation of these people. The need for further long-term research should be stressed in order to more fully evaluate the effectiveness of spa therapy.

Conclusions

As a result of using each of the therapeutic programs, the range of movement of the cervical spine improved, the level of pain and disability decreased due to pain in the cervical spine, however, the extent of improvement, which was the difference in the results obtained in Test II in relation to I, was significantly greater in the case of patients subjected to a program containing mud therapy.

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Piśmiennictwo/ References

1. Barczyk K., Skolimowski T., Jasiński R., Stefański G., Hawrylak A., Wpływ zmian zwyrodnieniowych kręgosłupa szyjnego na zaburzenia czynnościowe narządu ruchu kobiet w średnim wieku. *Fizjoter.* 2006; 14 (1): 53-58.
2. Hoy D., March L., Woolf A., Blyth F., Brooks P., Smith E., Vos T., Barendregt J., Blore J., Murray C., Burstein R., Buchbinder R., The global burden of neck pain: estimates from the Global Burden of Disease 2010 study. *Ann. Rheum. Dis.* 2014;73 (7):1309-1315.
3. Lin I.H., Chang K.H., Liou T.H., Tsou C.M., Huang Y.C., Progressive shoulder-neck exercise on cervical muscle functions in middle-aged and senior patients with chronic neck pain. *Eur. J. Phys. Rehabil. Med.* 2018; 54 (1): 13-21.
4. Nowotny J., Nowotny-Czupryna O., Brzęk A., Kowalczyk A., Czupryna K., Postawa ciała a zespoły bólowe kręgosłupa. *Ortop. Traumatol. Rehab.* 2011; 13 (1): 59-71.
5. Schomacher J., Falla D., Function and structure of the deep cervical extensor muscles in patients with neck pain. *Manual. Ther.* 2013;18 (5): 360-366.
6. Tsang S., Szeto G., Lee R., Altered spinal kinematics and muscle recruitment pattern of the cervical and thoracic spine in people with chronic neck pain during functional task. *J. Electromyogr. Kinesiol.* 2014; 24(1):104-113.
7. Jull G., Falla D., Does increased superficial neck flexor activity in the cranio-cervical flexion test reflect reduced deep flexor activity in people with neck pain? *Manual Ther.* 2016; 25: 43-47.
8. Karimi N., Rezasoltani A., Rahnema L., Noori-Kochi F., Jaberzadeh S., Ultrasonographic analysis of dorsal neck muscles thickness changes induced by isometric contraction of shoulder muscles: A comparison between patients with chronic neck pain and healthy controls. *Manual. Ther.* 2016; 22: 174-178.
9. Dudek J., Rogoziński H., Wilczyński J., Wpływ prądów Tens i Träberta na zmniejszenie dolegliwości bólowych u pacjentów z chorobą zwyrodnieniową odcinka szyjnego kręgosłupa. *Stud. Med.* 2012; 27 (3): 23-29.
10. Pille V., Tuulik V.R., Saarik S., Tint P., Vare T., Sepper R., Work-related musculoskeletal symptoms in industrial workers and the effect of balneotherapy. *Agron. Res.* 2015; 13 (3): 820-828.
11. Saeterbakken A.H., Nordengen S., Andersen V., Fimland M.S., Nordic walking and specific strength training for neck- and shoulder pain in office workers: a pilot-study. *Eur. J. Phys. Rehabil. Med.* 2017; 53 (6): 928-935.
12. Rudzińska A., Nowotny-Czupryna O., Knapik H., Ocena znajomości i stosowania zasad profilaktyki zespołów bólowych odcinka szyjnego kręgosłupa w życiu codziennym. *Fizjoter. Pol.* 2002; 2 (1): 6-10.
13. Buckup K., Buckup J., Testy kliniczne w badaniu kości, stawów i mięśni. PZWL, Warszawa 2014.
14. Zembaty A., Kinezyterapia Tom I. Zarys podstaw teoretycznych i diagnostyka kinezyterapii. Kasper, Kraków 2002.
15. Leppert W., Forycka M., Ocena bólu i jakości życia u chorych na nowotwory. *Gastroenterol. Pol.* 2011; 18(3): 120-126.
16. Guzy G., Vernon H., Polczyk R., Szpitalak M., Psychometric validation of the authorized Polish version of the Neck Disability Index. *Disabil. Rehabil.* 2013; 35 (25): 2132-2137.
17. Matuszewska W., Tomczak H., Ocena wpływu kompleksowej fizjoterapii na poziom bólu w odcinku szyjnym kręgosłupa. *Acta Balneol.* 2011; 53 (2): 124-132.
18. Kuliński W., Oleksak D., Analysis of physical therapy in degenerative disease of the cervical spine. *Acta Balneol.* 2018; 60 (2): 93-100.
19. Maayah M., Al-Jarrah M., Evaluation of transcutaneous electrical nerve stimulation as a treatment of neck pain due to musculoskeletal disorders. *J. Clin. Med. Res.* 2010; 2 (3): 127-136.
20. Kuciel-Lewandowska J., Paprocka-Borowicz M., Jagucka B., Kierzek A., Pozowski A., Ratajczak B., Boerner E., Ocena skuteczności wybranych zabiegów fizjoterapeutycznych w leczeniu bólu w przebiegu choroby zwyrodnieniowej kręgosłupa szyjnego. *Acta Bio-Opt. Inf. Med. Biomed. Eng.* 2012; 18 (3): 194-199.
21. Jankowska A., Paprocka M., Zeńczak-Praga K., Zgorzalewicz-Stachowiak M., Skuteczność wybranych metod fizjoterapeutycznych w leczeniu przewlekłego nieswoistego zespołu bólowego odcinka szyjnego kręgosłupa. *Pol. Prz. Nauk Zdr.* 2017; 51 (2): 176-183.
22. Cramer H., Baumgarten Ch., Choi K-E., Lauche R., Saha F.J., Musial F., Dobos G., Thermotherapy self-treatment for neck pain relief. A randomized controlled trial. *Eur. J. Integr. Med.* 2012; 4 (4): 371-378.
23. Koyuncu E., Ökmen B.M., Özkük K., Taşoğlu Ö., Özgirgin N., The effectiveness of balneotherapy in chronic neck pain. *Clin. Rheumatol.* 2016; 35 (10): 2549-2555.
24. Nchavatal P., Takac P., Stehlikova B., Effect of spa therapy after intervertebral disc surgery in the cervical spine. *Bratisl. Lek. Listy.* 2014; 115 (4): 238-242.
25. Ignasiak T., Ziolkowska-Lajp E., Ocena kierunku zmian zakresu ruchomości stawów w wyniku leczenia sanatoryjnego u kobiet wiejskich z dolegliwościami bólowymi narządu ruchu. *Med. Og. Nauk. Zdr.* 2012;18(2): 85-91.