



Rehabilitation Procedure in People with Degeneration of the Intervertebral Disc

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Abstract

Introduction: The International Association for the Study of Pain (IASP) defines pain as a subjective sensory and emotional sensation resulting from the action of stimuli that disturb the tissue. Pain significantly impacts the quality of our lives, mainly if it concerns the spine. In Poland, more than half of the population experiences pain in the spine, while as much as 44% of spine disorders concern the lower segment. Back pain is currently one of the most common reasons for contacting a GP, which makes it a medical and socio-economic problem.

Purpose of the study: Subjective evaluation of the effectiveness of rehabilitation in people with degeneration of the intervertebral disc.

Material and methods: The study was carried out in a group of 153 patients. A self-constructed questionnaire was the study tool.

Results and conclusions: The patients were asked to carry out activities of daily living. At the beginning, they reported the occurrence of pain, and thus the ordered activities were carried out by them carefully and slowly. At the end of rehabilitation, a control analysis was carried out, which showed an improvement in the quality of life of the patients (the pain rating on the scale decreased from 3.33 points to 2.36 points). The activities were carried out naturally. Properly selected and conducted rehabilitation causes both the improvement of the patients' quality of life and the reduction of pain associated with degenerative spine disease.

Key words: rehabilitation, degenerative disease, intervertebral disc.

Introduction

Pain in the spine is one of the main reasons for a patient to visit a GP. This is a key issue in terms of patients' quality of life, which is deteriorating significantly over time. Both in the acute and chronic period, back pain contributes to lowering the quality of life in every population [1].

In some cases, the problem is to isolate the main causative factor causing back pain. In these cases, both medical and socio-economic factors are considered [2, 3]. Most of the patients believe that the level of quality of life is influenced by the low socio-economic status, which can significantly impact on the physiological functioning of the organism or intensify the development of ageing processes [4, 5].

In 2014, the researchers showed a relationship between allostatic overload and reduced skeletal mineralization. A group of over 700 people was analysed in terms of the mineralization of the femur and spine was examined [6]. Disrupting the homeostasis of the system causes a number of changes in the body, as a result of which allostatic loads develop. Even a condition that lasts for a short period of time can cause disorders that provoke, inter alia: headaches or pain in the spine [2].

The degeneration of the intervertebral disc in the elderly patients results mainly from changes within the structure itself. However, in the case of people at the reproductive age, any modifications within the intervertebral disc are a consequence of an incorrect lifestyle [7]. The dynamic progress of civilization contributes to the development of civilization diseases. Chronic disorders appearing in the body, including in the form of pain in the spine due to the degeneration of the intervertebral disc, can significantly impact on the occurrence of depression [8].

Human evolution over the ages did not create adaptive mechanisms that could counteract the long-term factors impacting the human body, as a result of which the change of the human body posture from four-legged to two-legged has negative consequences. Weakening of the body's antigravity muscles, repeatability of everyday activities, incorrect ergonomics of work and rest cause pain in the spine [9, 10].

The development of technology contributes to the reduction of physical activity and improper diet, which results in an obesity epidemic among both adults and children. Overweight people often complain of pain in the spine. The main reason for this involves changes in the disc as a reduction in muscle stabilisation, as a result of which the remaining structures are forced to increase activity [11].

Material and methods

The research was conducted among 153 patients of the rehabilitation surgery. The study was carried out in a group of 87 women (56.9%) and 66 men (43.1%). The average age of the subjects did not exceed 43.9 years \pm 14.94 years. Body weight was 44–110 kg, mean 75.69 kg \pm 12.15 kg. The BMI index was 18.08 kg/m² – 37.77 kg/m², on average 25.8 \pm 3.55 kg/m². The BMI of half of the patients was normal and was not higher than 24.91 (Me).

All patients were diagnosed with the degenerative disease of the intervertebral disc. The study involved own questionnaire.

Statistical analysis was carried out in the Statistica 13.1 program. The Wilcoxon pair order test was used for the analysis. The Mann-Whitney U test was used to verify the data between the independent variables. The level of statistical significance in the study was 5% ($p < 0.05$).

Results. The largest group of the patients involved people who started rehabilitation no earlier than 12 months after the first pain ailments (N = 49; 32.0%), while the second largest group involved the patients (N = 38; 24.8%) who started rehabilitation in the period from 7 to 12 months. Only a small group of people managed to implement the therapy in the first months of pain. In the remaining groups, the patients declared the commencement of rehabilitation from 2 to 6 months after the occurrence of pain (Table 1).

Table 1. The time from the occurrence of the first pain to the start of rehabilitation

The time from the occurrence of the first pain to the start of rehabilitation	N	%
Up to one month from the occurrence of pain	13	8.5
From 2 to 3 months from the occurrence of pain	27	17.6
From 4 to 6 months from the occurrence of pain	26	17.0
From 7 to 12 months from the occurrence of pain	38	24.8
More than 12 months from the occurrence of pain	49	32.0
Total	153	100.0

n - number of observations; % - percent

Pain complaints most often concerned the lumbosacral section (N = 60; 39.2%) or only the lumbar spine (N = 50; 32.7%). The smallest group consisted of questionnaires with pain complaints in the cervical and thoracic sections (Table 2).

Table 2. The occurrence of pain symptoms depending on the spine section

Section of the spine	N	%
Cervical section	30	19.6
Thoracic section	13	8.5
Lumbar section	50	32.7
Lumbosacral section	60	39.2
Total	153	100.0

n - number of observations; % - percent

Most patients described pain as radiating and acute. The remaining patients described pain as girdling, shooting and pressing. Pulling pain was declared by 12.4% of the patients, while continuous pain was declared by 11.8% of them. Pain related to tingling, numbness and burning was declared by 11.1% of the patients, while similar results were recorded in the patients with prickly pain. Intermittent pain occurred only in a small percentage of the reported pain (Table 3).

Table 3. Nature of the pain

Nature of the pain	N	%%
Acute	65	42.5
Radiating	68	44.4
Shooting	34	22.2
Girdling	35	22.9
Prickly	17	11.1
Pulling	19	12.4
Pressing	20	13.1
Continuous	18	11.8
Intermittent	14	9.2
Combined with tingling, numbness, burning etc.	17	11.1

n - number of observations; % - percent

* multiple question; $\Sigma \neq 100\%$ Manner of pain symptoms

In the studied group, pain symptoms appeared suddenly the most often (N = 57; 37.3%) or there was a gradual intensification of symptoms (N = 55; 35.9%). Pain appeared and disappeared among 23.3% of respondents. The smallest group involved the patients whose pain occurred in a different way than presented above (Table 4).

Table 4. Manner of the occurrence of pain symptoms

Manner of the occurrence of pain symptoms	N	%
Sudden pain	57	37.3
Pain gradually intensified	55	35.9
Pain appeared and disappeared	36	23.5
Pain appeared in a different way	5	3.3
Total	153	100.0

n - number of observations; % - percent

The patients stated that the main cause of pain involved pressing and overloading the spine. They indicated another factor causing pain, namely the movement of bending, leaning and walking (N = 17; 11.1%). On the other hand, a large group of the patients (N = 35; 22.9%) described the source of pain as spontaneous, not preceded by a previous causative stimulus (Table 5).

Table 5. Circumstances in which the pain occurred

Circumstances in which the pain occurred	N	%%
It occurred during certain movement	17	11.1
It occurred during pressing	43	28.1
It occurred as a result of an overload on the spine	57	37.3
It was spontaneous; the occurrence of pain was not immediately preceded by anything	35	22.9
Other	1	0.7
Total	153	100.0

n - number of observations; % - percent

The patients used massage (N = 121; 79.1%) and exercise (N = 121; 79.1%) in analgesic therapy the most often. Physical procedures were also used extensively: magnetotherapy, electrotherapy, laser therapy and iontophoresis. The use of the kinesiotaping method was declared by 9.8% of the patients. The least amount of hydrotherapy was used: underwater baths, acid-carbon baths and brine baths (Figure 1).

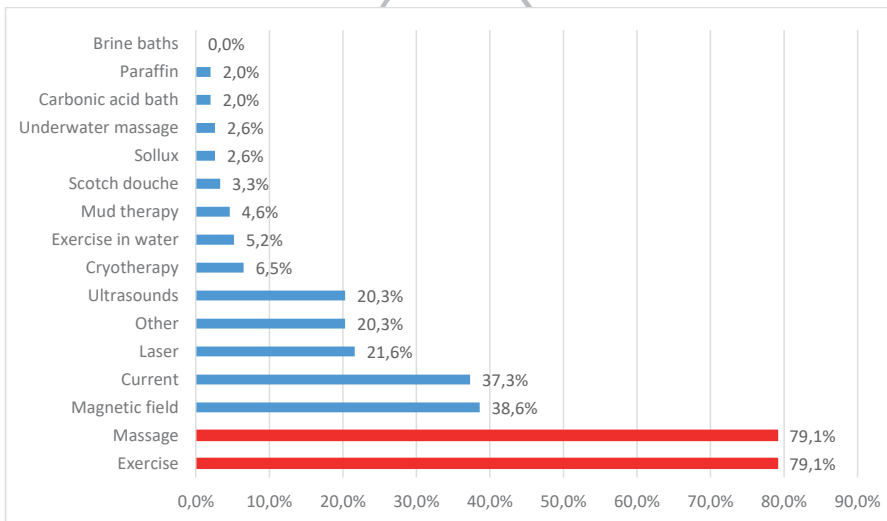


Figure 1. The type of physiotherapeutic procedures applied for the patients

Most patients used outpatient rehabilitation (N = 141; 92.2%). The remaining patients declared the use of outpatient health resort

rehabilitation (N = 36; 23.5%) and health resort rehabilitation (N = 32; 20.9%).

All people declared the need to use painkillers as a result of back pain in the period before rehabilitation. After rehabilitation, the number of the patients using painkillers decreased to 39.9%. The analysis confirms a significant reduction in the number of the patients taking pharmacological means after the applied rehabilitation ($p < 0.001$) (Table 6).

Table 6. The need to take painkillers for back pain in the period before and after treatment in the study group

Need to take painkillers for back pain	Before rehabilitation		After rehabilitation	
	N	%	N	%
Yes	153	100.0	61	39.9
No	0	0.0	92	60.1
Total	153	100.0	153	100.0
p	Z = 8.32 p < 0.001			

n – number of observations; % – percent; Z – result of the Wilcoxon pair order test; p – level of significance of differences

The patients assessed the intensity of the perceived pain on a 5-point scale. The measurement was carried out twice - before and after the therapeutic procedure. Before the implementation of rehabilitation, the average level of perceived pain was 3.33 ± 1.26 points. After the implementation of therapeutic treatment, the average pain level decreased significantly and amounted to 2.36 ± 1.2 points ($p < 0.001$) (Table 7; Figure 2).

Table 7. Assessment of back pain intensity before and after rehabilitation in the study group

Pain intensity Scale 1-5 points	N	\bar{x}	Me	Min.	Max.	Q1	Q3	SD
Before rehabilitation	153	3.33	3.00	1.00	5.00	3.00	4.00	1.26
After rehabilitation	153	2.36	2.00	1.00	5.00	1.00	3.00	1.20
p	Z=6.23 p<0.001							

n - number of observations; \bar{x} - arithmetic average; Me - median; Min. - minimum; Max. - maximum; Q1 - lower quartile; Q3 - upper quartile; SD - standard deviation; Z - result of the Wilcoxon pair order test; p - level of significance of differences

Assessment of the intensity of back pain before the start of rehabilitation: SW-W = 0.8993; p = 0.00000
 Assessment of the intensity of back pain after the completion of rehabilitation: SW-W = 0.8687; p = 0.00000

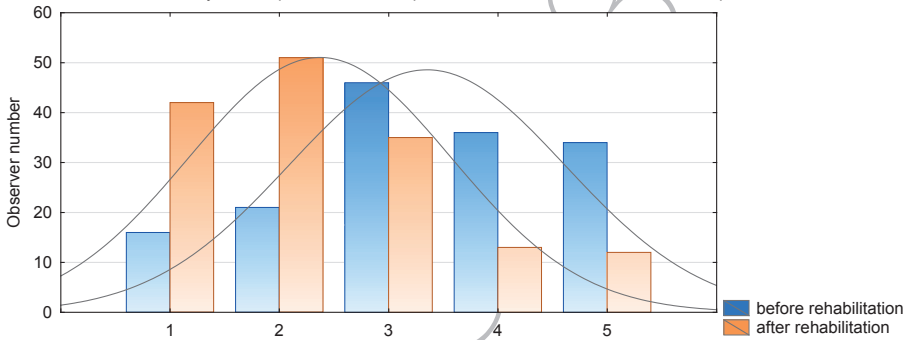


Figure 2. Assessment of back pain intensity before and after rehabilitation in the study group

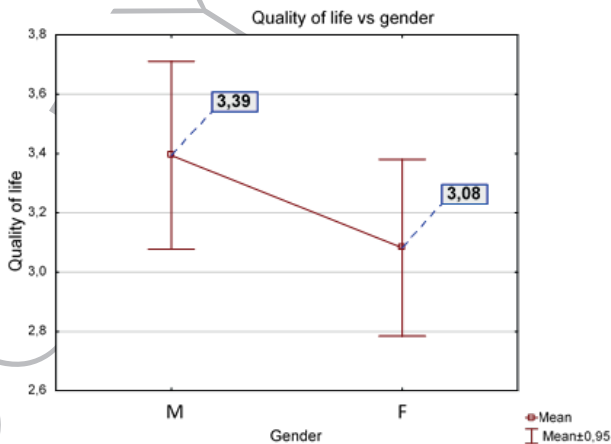


Figure 3. Average quality of life of the patients considering gender

Men assessed the average quality of life better ($\bar{x} = 3.39$) compared to the group of women, where the mean value was 3.08 points. The difference in the mean quality of life in both compared groups was not statistically significant ($p > 0.05$).

Discussion

The lesion of the intervertebral disc affects young people more and more often. The main causes of these changes involve the lack of physical activity, a sedentary lifestyle, obesity and overload accumulating over time. According to Kremer Juergen, the most important “determinant” where the risk of the first pain symptoms occurs is the period from the occurrence of changes in the spine movement segments [12]. It is extremely important, because the time of rehabilitation by the patients should not be too long, due to the possibility of stopping the disease or minimising its effects.

Considering their own studies, a low part of the patients reported to a doctor in the first months from the first pain incident. This may mainly mean that the problem is being neglected by the society, due to the still insufficient awareness among the population. The secondary reason for the long waiting time for rehabilitation can involve difficulties related to the excessive waiting time for the implementation of therapeutic treatment reimbursed under the National Health Fund.

Prevention and prophylaxis are the most important, which mean, inter alia, lifestyle changes or weight reduction. In addition, one can successfully use physical treatments in the treatment of pain. A significant proportion of the patients report to a doctor at all when the pain is unbearable. Long-term delay in diagnosis consequently causes permanent complications in the movement segment of the spine. In the secondary procedure, rehabilitation is used the most often, which mostly includes massage, kinesiotherapy, physical therapy and patient health education.

According to the analysis of the carried-out studies, the largest number of the patients reported pain only 12 months after the first incident

(N = 49; 32%). Gasik and Styczyński received similar studies, where the time from the occurrence of a pain episode to reporting to a doctor ranged from 0 to 45 years. According to the patients, the mean duration was up to 12 years [13].

Basing on the results of own studies, a significant part of the patients declared the presence of acute and radiating pain. According to Milano-w's study, pain of a similar nature is known as neuropathic pain [14].

The patients most used massage and exercise the most often, which is confirmed by the studies of other authors, including Sapuła, Lesiak or Mataczyński. They showed that the rehabilitation program was based on physical therapy and kinesiotherapy. According to Sidor and Kubińska, most patients are referred to laser (N = 122; 22.8%) and ultrasound (N = 99; 18.5%) [15]. According to Garczyński and Lubkowska, a significant proportion, as many as 63% of the patients, are referred for physical treatments. According to the patients, they choose treatments in the field of: cryotherapy, magnetotherapy and electrotherapy, as well as ultrasound, the most often. The main task of physical therapy is to completely reduce or decrease pain, and thus remove the resulting inflammation [17].

The respondents most often reported pain during pressing and overloading the spine. According to people studies by Klimaszewska and Krajewska-Kułak, women (N = 35; 22.44%) reported complaints during work performed while moving, while in men (N = 31; 19.87%) pain increased in a sitting position [16].

The study on the group of the patients showed that rehabilitation significantly reduced pain, thanks to which the amount of taken pharmacological agents decreased significantly. Among people studied by Klimaszewska and co-authors, only 20 people did not use painkillers, which constituted 12.8% of the entire group. The assessed subjective quality of life among women was lower than among men by 0.31 points.

The years 2000–2010 were declared as the Decade of Bones and Joints by the World Health Organization and the United Nations. This clearly proves the importance of the problem [18]. Summing up, the cur-

rent lifestyle contributes significantly to pain in the lumbar spine. It is mainly influenced by the decreasing level of physical activity and leading a sedentary lifestyle, and thus the inappropriate ergonomics of work and rest.

The correct rehabilitation program and early measures aim at removing or reducing pain in the lumbar spine. The results of the carried-out study proved that kinesiotherapy used in the course of pain reduces the perception of pain [19].

According to Garczyński and Lubkowska, early education of the patient is an effective method that could bring the expected results. This would reduce the percentage of the population that is at risk of developing degenerative changes in the spine. The authors' comments are important because back pain can sometimes be eliminated from professional, family and social life for a certain period.

Conclusions

1. The main percentage of the patients underestimated the first symptoms, and as a result they most often report to a GP at least one year after the first pain symptoms occurred.
2. The patients declared that the most often used therapeutic procedures were therapeutic massage and kinesiotherapy.
3. The number of people taking painkillers significantly decreased after the rehabilitation procedure was implemented.
4. According to the patients, pain was caused by pressing or overloading the spine the most often.
5. The patients considered pain as acute and radiating the most often.
6. Men subjectively assessed the quality of life at a slightly higher level than women. On a five-point scale, the average level of perceived quality of life in men was 3.39 points, and in women 3.08 points.

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