

## Effectiveness of physiotherapeutic procedures for the treatment of lumbar discopathy

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### Summary

Spine diseases are a worldwide social problem affecting increasingly high numbers of and younger individuals. The main complaints of patients with lumbar discopathy are pain sensations. The incidence of lumbar spine pain is increasingly high; therefore, lumbar pain disorders are called civilization diseases of our century. Effective treatment methods for lumbar pain that could be an alternative to pharmacological therapy are essential, particularly for patients with chronic pain. The aim of the study was to assess the effectiveness of physiotherapeutic interventions for the treatment of lumbar discopathy. In the years 2008-2009, physical methods were used in 70 patients with lumbar pain. They were supported by pharmacotherapy, massage and kinesitherapy in 38 patients. Six individuals were treated with pharmacotherapy alone. The present study focused on patients treated with physiotherapeutic interventions for lumbar discopathy. The study encompassed 70 patients subjected to the 21-day sanatorium rehabilitation. The age of patients ranged from 43 to 75 years (mean age - 59 years). Patients were divided into three age groups: Group I aged 43-55 years, 35 male patients (35%), Group II aged 56-65 years, 20 male patients (20%), Group III aged 66-75 years, 15 female patients (15%). Medical histories and physical examinations of patients were considered. The medical history data regarded the age of patients, time of the first pain sensations experienced and type of work. Physical examinations included: 1. the Laitinen pain questionnaire, 2. the presence of Lasegue's sign, 3. evaluation of the range of lumbar mobility. The following statistical methods were used to analyse measurement results: an arithmetic mean ( $\bar{x}$ ); standard deviation (SD); minimum-maximum values ( $E\bar{x}$ ); a change in  $\bar{x}$   $\Delta\bar{x}$  (%). The Student's t test for dependent groups was applied to evaluate the differences in parameters before and after rehabilitation.  $P < 0.05$  was considered as significant. The study findings demonstrated that the use of physical stimuli significantly increased the spine mobility, reduced subjective perception of pain measured according to the VAS and improved functional activity of the affected. The physical interventions were found to have beneficial effects on the selected parameters.

**Key words:** lumbar discopathy, pain, physical stimuli

### Introduction

According to the definition presented by Keutner and Goldberg in 1995, a degenerative disease results from biological and mechanical events destabilizing the processes of degradation and synthesis of articular cartilage and subchondral bone [1].

After knee and hip degenerations, spinal degenerative lesions are the third commonest cause of discomfort in life. The factors triggering degenerative processes include injuries, micro-injuries, organic diseases, congenital anatomical anomalies, developmental defects, body statics imbalance [2].

The most common and early degenerative changes affect the lumbar spine and lumbosacral passage, which is attributable to the imperfect process of evolution of this skeletal region and sedentary lifestyle characteristic of modern societies [3].

One of the most common causes of lumbar pain is discopathy [4].

The majority of spine diseases is initiated with physiological dysfunction of the intervertebral disc that can result from acute or chronic spine overload, past injuries or congenital spinal changes. The intervertebral discs are essential for spine biomechanics. With time

and wear as well as due to injuries, the biochemical composition of intervertebral discs is impaired, the nucleus pulposus becomes dehydrated, the disc level lowers, its elasticity decreases and the annulus fibrosus becomes soft. The intervertebral space stability decreases, the absorption properties of the intervertebral disc impair leading to shifts within intervertebral joints. With progression of the disease, the posterior annulus fibrosus becomes weaker and can rupture during efforts or uncoordinated movements, which contributes to shifts of fragments of the degeneration-affected intervertebral disc. This causes their bulging at the level of the weakened longitudinal ligament allowing the nucleus pulposus to bulge out.

In most cases, herniation of the nucleus pulposus occurs laterally to the median line, as the central annulus fibrosus is the strongest and the thickest part of the posterior longitudinal ligament. Depending on the place and extent of lesions, this can induce local nerve root complaints [5].

The relation between pain and depression has been widely recognized. Patients with lumbar discopathy experience chronic spinal pain that is likely to cause depressive conditions. Various causes and adverse

factors, predominantly of mental nature, are involved; therefore, it is difficult to select appropriate treatment and recovery options.

The development of depression mainly depends on the extent of everyday life limitations. The more severe the disability in daily life, the more severe the depression is. Depression amongst the elderly is associated with increased risks of substantially limited everyday physical activities, which leads to akinesia and increased pain, thus to more severe disability [6].

Patients with lumbar discopathy show high levels of depressive disorders, particularly disorders of sleep, concentration, libido, ability to make decisions, frustration, self-evaluation, withdrawal from professional activities, weakened needs of interpersonal and family contacts [7].

Negative emotions, such as sadness or anxiety, markedly reduce the pain tolerance threshold and increase the severity of pain.

The patient's mental status is essential for rehabilitation and recovery [8].

## Aim

The aim of the study was to evaluate the effectiveness of analgesic effects of physical interventions in patients with lumbar discopathy.

## Material and methods

Seventy patients were subjected to physical therapy of sacral pain supported with pharmacotherapy, massage and kinesitherapy (38 patients).

The study was focused on physical therapy of lumbar discopathy and encompassed 70 individuals subjected to the 21-day sanatorium rehabilitation

The age of patients ranged from 43 to 75 years (mean age – 59 years).

Patients were divided into three age groups (Fig.1):

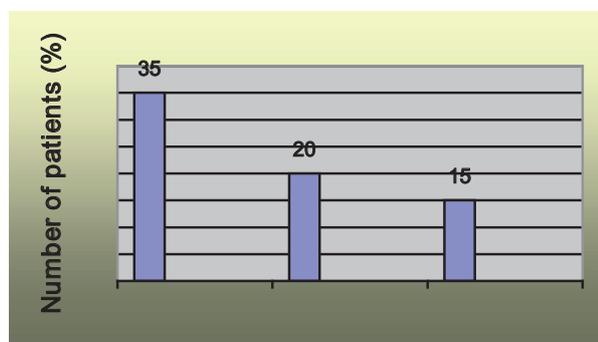


Fig. 1. Age of patients

Group I aged 43-55 years, 35 male patients (35%)

Group II aged 56-65 years, 20 male patients (20%)

Group III aged 66- 75 years, 15 females (15%).

The majority of patients (80%) were married;

Forty-seven respondents perform manual and 23 non-manual jobs

The history findings have demonstrated that 18 females experienced pain symptoms for a year, 37 – for 2-3 years and 15 – for 4-5 years or longer (Fig.2).

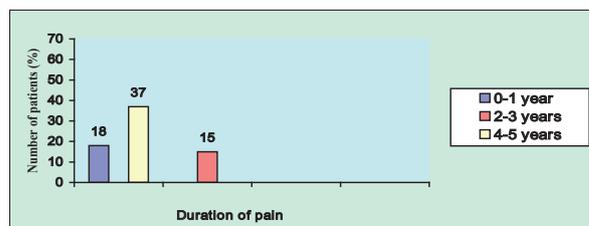


Fig 2. Duration of pain

## Discussion

Analysis of the Laitinen pain indicator questionnaire results.

The findings were as follows:

### 1. Pain severity

Prior to therapy (the first examination), 7 (7%) women defined their pain as unbearable, 25 (25%) - as very severe, 29 (29%) - as strong, 15 (15%) - as mild and 4 did not report any pain.

After rehabilitation (the second examination), 6 (6%) patients experienced no pain, 27(27%) - mild pain, 17(17%) – severe pain, 12(12%) – very severe and 2 (2%) – unbearable pain.

The results reveal a significant decrease in the number of patients with very strong pain sensations and an increase in the number of those with mild pain or no pain during the second questionnaire test compared to the first one.

Table 1. Results of pain severity evaluation before (I exam) and after (II exam) interventions

Severity	I examination		II examination	
	N	%	N	%
No pain	4	4	6	6
Mild pain	15	15	27	27
Severe pain	29	29	17	17
Very severe pain	25	25	12	12
Unbearable pain	7	7	2	2

### 2. General analysis of pain stimulus intensity according to Laitinen

After summing up the points from the above four categories, the pain stimulus intensity was determined for patients before and after therapy.

The test results indicate that prior to therapy 7 (7%) patients experienced slight pain, 18 (18%) – moderate pain, 36 (36%) - significant pain and 9 (9%) – severe pain.

After therapy, 22 (22%) patients experienced slight pain, 28 (28%) – moderate pain, 18 (18%) – significant pain and 4 (4%) – severe pain. Before therapy, the majority of patients (84%) reported moderate or significant pain sensations. Otherwise, after therapy most patients experienced slight and moderate pain (69%).

Table 2. Pain stimulus intensity before (I exam) and after therapy (II exam)

Pain stimulus intensity	I examination		II examination	
	N	%	N	%
Slight pain	7	7	22	22
Moderate pain	18	18	28	28
Significant pain	36	36	18	18
Severe pain	9	9	4	4

Analysis of the Lasegue’s sign results

The positive Lasegue’s sign was found in 56 respondents (56%) and the negative one in 14 patients (14%). After the series of interventions, the positive sign changed into the negative one in 52 (52%) patients. After therapy, the positive sign was observed in 18 individuals (18%),

Table 3. Incidence of Lasegue’s sign before ( I exam) and after therapy (II exam)

Lasegue’s sign	I examination		II examination	
	N	%	N	%
Positive	56	56	14	14
Negative	18	18	52	52

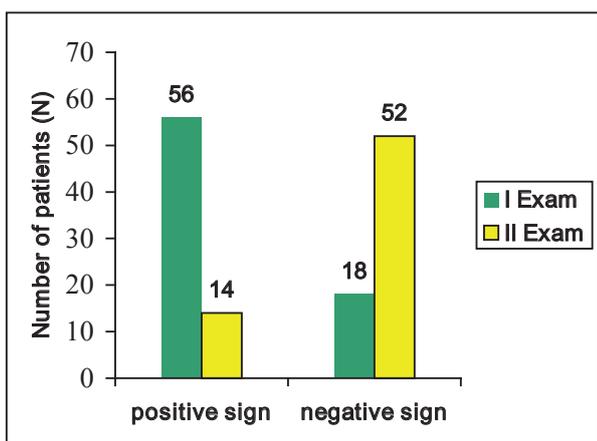


Fig. 3. Presence of Lasegue’s sign

Analysis of spine mobility measurements

All the measurements of spine mobility range were carried out within an accuracy of 0.5cm.

1. Analysis of lumbar flexion measurements

Priori to therapy (I exam), lumbar flexion was 3 cm and increased by 1 cm after therapy (II exam). The mobility change was 13.3% and was statistically significant.

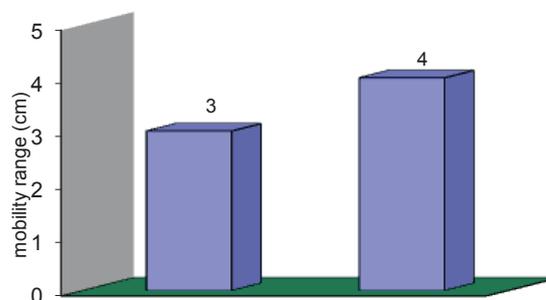


Fig. 4. Mean ranges of lumbar flexion before and after therapy ( I exam, II exam)

Table 4. Statistical characteristics of flexion results before (I exam) and after therapy (II exam)

Detailed data	I exam (cm)	II exam(cm)
Arithmetic mean ( $\bar{X}$ )	3	4
Standard deviation (SD)	0.8	0.95
Min-max values ( $E \bar{X}$ )	1.2-4.7	1.9-6
Change in $\bar{X} \Delta \bar{X}$ (%)	13.3	

The treatment applied resulted in flexion range improvement in 42 individuals (42%); 22 (22%) individuals showed no improvement while the condition of 6 females (6%) deteriorated.

Table 5. Treatment outcomes – lumbar flexion

Treatment outcome	Number of patients	
	N	%
Improvement	42	42
No change	22	22
Deterioration	9	9

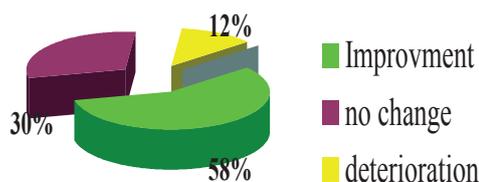


Fig. 5. Treatment outcomes (%) - lumbar flexion

## 2. Analysis of lumbar extension measurements

The mean lumbar extension was 4.5 cm before therapy and increased by 0.5 cm after therapy. The change in extension was 11.1% and was statistically significant.

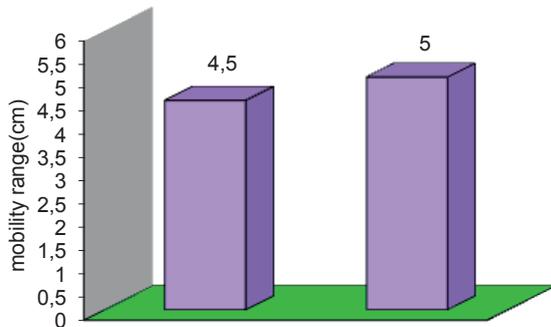


Fig. 6. Mean results of lumbar extension ( I exam, II exam)

Table 6. Statistical characteristics of extension results before and after rehabilitation

Detailed data	I exam (cm)	II exam (cm)
Arithmetic mean ( $\bar{X}$ )	4.5	5
Standard deviation (SD)	0.89	0.75
Min-max value ( $E \bar{X}$ )	2.6-6.2	2.9-6.9
Change in $\bar{X} \Delta \bar{X}$ (%)	11.1%	

The therapy used resulted in extension improvement in 32 individuals (32%); 22 (22%) patients showed no change while the condition of 14 deteriorated.

Table 7. Treatment outcomes - lumbar extension

Treatment outcome	Number of patients	
	N	%
Improvement	32	32
No change	22	22
Deterioration	14	14

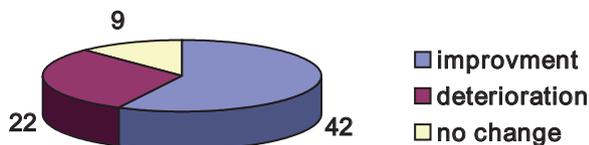


Fig.7. Treatment outcomes – lumbar extension

## Conclusions

Physical therapy is found to have beneficial effects on lumbar pain.

The therapy applied was effective in patients

characterised by high subjective perception of pain and high values of crossed Lasegue's sign.

Moreover, the physical procedures were effective in patients with altered Achilles sign and high values of crossed Lasegue's sign.

The study findings demonstrated that the crossed Lasegue's sign was the only parameter enabling dynamic evaluation of treatment effectiveness.

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