Efficiency of selected physiotherapeutic treatments for low back pain


1. Lomza State University of Applied Sciences, Institute of Medicine, Poland
2. Department of Statistics and Medical Computing, Medical University of Bialystok, Poland
3. Outpatient Rehabilitation Clinic, Regional Hospital in Lomza, Poland
4. Rehabilitation Ward, Regional Hospital in Lomza, Poland

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ABSTRACT

Purpose: Low back pain (LBP) occurs among approximately 60-80% of the population, gradually contributing to long-term or recurring disability. We aimed to evaluate the efficiency of two physiotherapeutic treatments (namely, Träbert current and kinesiotherapy) among patients with LBP.

Material and methods: Comprised of function tests and scales of pain and functionality, clinical tests were performed according to a prospective method in a regional hospital in Lomza. Forty patients randomly distributed into two groups: one group a subject to physical therapy with Träbert currents, the other group to kinesiotherapy following a proprietary programme. Physiotherapy was performed from Monday to Friday for two weeks in a series of ten treatments.

Results: The treatment used in both groups significantly decreased pain and increased functionality of patients, evaluated by Laitinen’s survey, the Oswestry Disability Index (ODI), and the Roland Morris Disability Questionnaire. Results of the Schober’s and “fingertip-to-floor” tests also showed increased improvement.

Conclusions: The physiotherapy facilitated a significant decrease in pain, an increase in the mobility in lumbosacral segment of the spine and a decrease in disability among patients with LBP.

Key words: Low back pain, degenerative lesions, physiotherapy, kinesiotherapy, physical therapy

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*Corresponding author:
Agnieszka Dakowicz
State University of Applied Sciences, Institute of Medicine
Akademicka 14 Str, 18-400 Lomza, Poland
e-mail: agadak@interia.pl

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INTRODUCTION

Low back pain (LBP) occurs among approximately 60-80% of population, gradually contributing to long-term or recurring disability [1]. A degenerative joint disease is the most frequent disease of joint, and in developed countries it is the most frequent reason of pain, loss of functions and disability of a motor system [2].

A degenerative disease is the main reason of occurring ailments among a big number of people. The disease is a heterogenic group of chronic illnesses comprising all elements of joints and periarticular connective tissues [3]. It may affect patients at every age, but its incidence increases between 40th and 50th year of age. After 65th year of age it is the most frequently described among lesions in an organ of movement in radiological assessment, and it occurs among over 80% of patients over 75 years of age [4].

Chronic pain and progressing lesions within the spinal joints influence the deterioration of the quality of life, lack of acceptance of a disease, often lead to mood depression and even to depression [5].

A precisely conducted inquiry and a physical examination are particularly important in a diagnosis. A standard X-ray is helpful in confirming a diagnosis and eliminating other chronic illnesses. The treatment comprises pharmacotherapy, physiotherapy, spa-treatment, and education [6].

Physical exercises play an important role in the prevention and treatment of back pain. These exercises mostly aim at breaking an erroneous pain circle by decreasing a reflex intensified tension of paraspinal muscles, improvement in stability of a lumbar segment as a result of increasing abdominal press, as well as restoration of a muscular balance, which prevents a recurrence of ailments [7].

Dynamic stabilisation exercises lead to the creation of an adequate muscular control in lower segment of spine, which causes the decrease of recurring micro traumas of spine components [8].

Träbert currents are used among physical methods in patients with degenerative lesions. The effect of these currents is based on analgesic effect, decrease of muscular tension and circulation improvement. Analgesic effect is based on modulation of nociceptive information in a spinal cord and higher parts of a nervous system, as well as on stimulation to secrete opioid peptides.

Currents cause the reduction of muscle tension through the induction of tetanus spasms and lead to the reduction of sympathetic system activity. Influencing the autonomic nervous system, currents cause vasodilatation which leads to the increase of blood flow. The important element of the procedure is proper arrangement of electrodes which simultaneously ensures influence on sensory, motor and autonomic nervous system. [9-15].

The purpose of this paper was to evaluate the efficiency of physiotherapeutic treatments evaluation (Träbert currents and kinesiotherapy) in patients with low back pain. The influence of aforementioned procedures on pain, patients physical condition and everyday activities has been evaluated as well as the influence of the therapy on spine mobility.

MATERIALS AND METHODS

The tests were conducted in regional hospital in Lomza (Outpatient Rehabilitation Clinic), after obtaining a consent of the bioethics committee. The group consisted of 40 patients with LBP in a course of degenerative lesions. Two groups were isolated at random. The first group was a subject to physical therapy – treatments with the use of Träbert currents. The second group was subject to kinesiotherapy – in accordance with a proprietary programme. The mean age of the examined patients was 55.3 years (Tab 1).

Table 1. Demographical data

<table>
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</tbody>
</table>

The duration of pain ranged from 1 month to 20 years. Most of the patients had degenerative lesions - II° - 64%.

Criteria for patients inclusion to the study:
- RTG examination confirming degenerative changes in spine and allowing evaluation of disease severity,
- Patient’s written consent for participation in the study

Criteria for patients exclusion from the study:
- Lack of pain
- Presence of root symptoms (concurrent with discopathy); all patients underwent tests excluding root symptoms: Hoover’s sign, stretching tests for sciatic, femoral and lateral femoral cutaneous nerves: neuromobilization
Physiotherapy in treatment of patients with back pain

according to G. Sozanskiej, J. Szpryngera, Lasègue's sign.
Also tests excluding hip joint dysfunction have been performed: Thomas test and Drehmann sign.
- other, like for instance: pregnancy, pacemaker, metal implants in the area of spine, pain with unknown etiology, cutaneous changes in L-S area (for electrotherapy).

Methods

The clinical evaluation of patients was conducted on the basis of an interview and physical examination, carried out both before and after treatment. Kellgren-Lawrence Grading Scale, Visual Analog Scale (VAS) - subjective pain evaluation by the patient using 10-point scale where “0” is lack of pain and “10” is unbearable pain, Laitinen questionnaire – evaluation of following factors: intensity and frequency of pain, analgesic drugs administration and limitations in physical activity. The Oswestry Disability Index - ODI – evaluating the severity of disability caused by spine pain. The questions regarded pain, everyday activity, lifting, sleeping, social life, walking, standing, travelling. The Roland Morris Disability Questionnaire – conducted in order to evaluate the influence of pain and spine ailments on patients everyday activities which may induce pain as functional tests: the Schober’s tests and “fingertip-to-floor” tests [12-20].

Group 1 (n=20) was subject to physical therapy (Träbert current), parameters: impulse time – 2ms, break time – 5ms, impulse frequency – 143Hz, treatment time - 15 minutes. Kinesiotherapy in group 2 (n=20) was conducted in accordance with a proprietary programme in time amounting approx. to 30 minutes. The exercises started with a warm-up, which was preparing a motor system to effort. The objective of the subsequent part of exercises was the strengthening of paraspinal muscles, buttocks, and abdomen. The relaxing exercises of superficial dorsal muscles, stretching ischiocrural muscles and corrective exercises as well as learning to maintain a regular posture. Gymnastics was started from low positions (frontal lying, crouching on hands and knees) to high positions – standing. Physiotherapy was conducted in the rehabilitation ward every day for two weeks (with a break for Saturday and Sunday) in a set of ten treatments.

Statistical analysis

Data were analyzed using Statistica 10.0. Results were presented in a graphic form with the use of programmes: Microsoft Excel 2007 and Statistica 10.0. The normality of distribution has been tested with Shapiro-Wilk test. Non-parametric tests were used to verify research problems due to lack of normal distribution, such as: Wilcoxon test for dependent variables and Mann-Whitney U test for independent variables. Results were regarded as statistically significant at the level of p< 0.05.

RESULTS

VAS scale

The treatment used in both groups significantly decreased pain (p< 0.05). The pre- and post-treatment medians in group 1 were 6.0 and 4.0, respectively, while in group 2, they were 7.0 and 2.0 (Fig. 1).

Figure 1. Pain evaluation in VAS scale

Laitinen’s survey

In group 1, the pre- and post-treatment median sums of points were 8.0 and 3.5, respectively, while in group 2, they were 7.0 and 2.5 (Fig.2), (Tab.2).

Figure 2. Laitinen’s survey
### Table 2. Used questionnaires

<table>
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</table>

#### Oswestry Disability Index

Before treatment in group 1, the median sum of points was 24.5, although after treatment, it decreased to 10.5. In group 2, by contrast, the median sum of points was 17.0 before therapy and 7.0 afterward. The differences in values in both groups were statistically significant \( p<0.05 \) (Fig.3), (Tab.2).

#### Rolland-Morris Disability Questionnaire

Before treatment in group 1, the median was 16.0, which decreased to 7.0 after treatment. In group 2, the median was 13.0 before treatment, which decreased to 4.5 afterward. A moderate level of disability was observed among patients in both groups before treatment, whereas after treatment, their results from the questionnaire reflected a low level of disability.

#### Schober’s test

A scope of bending of lumbar spine amounted to 4.5 cm before treatment in group 1, however after termination of treatment it was 4.8 cm. In group 2, scope of bending amounted to 4.6 cm, and after treatment it improved and amounted to 5 cm. The medians in both groups amounted to 5 cm. The values in both groups were statistically significant \( p<0.05 \) (Fig.5).

#### „Fingertip-to-floor” test

Before the commencement of physiotherapy in group 1, the test results amounted to 17.2 cm, and in group 2 – 13 cm. After treatment a change in results was observed of 4 cm. The improvement in spine mobility was noted of 5.5 cm.
in group 1 and 2.4 cm in group 2. Results were statistically significant \( p<0.05 \) (Fig.6).

**DISCUSSION**

Our results indicate that the physiotherapy used in both groups significantly influence the decline in intensity and frequency of pain, the patients' motor activity improved and a number of taken painkillers decreased.

Twenty-nine patients were subject to tests in a paper by Straburzynska-Lupa et al. [21]. A set of ten treatments of magnetic therapy and kinesiotherapy were conducted in accordance with the established programme. Significant decrease of pain, walking improvement, decrease in a degree of rigidity of joints and a general improvement in everyday activities after treatment in the entire group were noted.

However, Kujawa et al. [22], compared the efficiency of laser therapy and kinesiotherapy treatments with relation to a group treated with interference currents connected with gymnastics. The evaluation of used treatment conducted on the basis of the Laitinen’s survey demonstrated a higher analgesic effect in a group treated with a laser and kinesiotherapy.

In another study, three groups were isolated out of a group of 90 patients. Ultrasounds were used in the first group, kinesiotherapy in the second one; however, a therapy combining ultrasounds with kinesiotherapy was used in the third group. After termination of treatment a significant decrease of pain concentration evaluated by VAS scale and the Laitinen’s survey, improvement in general fitness defined by the Oswestry index were observed [19].

In another study by Łukowicz co-workers, 40 patients of the two randomly groups were examined. Kinesiotherapy preceded by sonotherapy were applied in a research group (n=20), however, stabilising-strengthening exercises for muscular corset were done in the second control group. A decrease of pain concentration and the frequency of its occurrence were observed with all examined patients. Patients reduced the use of painkillers as well [23].

A team of Charłusz analysed the efficiency of the selected methods of physiotherapy. They found a significant improvement in the Laitinen’s survey. Ninety-four people aged from 24 to 75 were examined, out of whose 3 equal groups (A, B, C) were isolated. Patients in group A were subject to laser biostimulation treatments, in group B sonotherapy was used, and in group C – hypotension therapy combined with the effect of Träbert currents [15].

Mikołajczyk and colleagues assessed two 40-person groups out of a group of 80 patients. The first group was subject to a traditional physiotherapy, however, Kinesio Taping was applied in the other one. Rehabilitation in both groups comprised ten treatment days. The complex physiotherapy used significantly influenced the decrease of pain and influenced the improvement in the patients’ functionality [24].

Effect of physiotherapy in a group of 30 patients was evaluated in a paper by Ratajczak and colleagues. A series of ten laser therapy, magnetotherapy and kinesiotherapy treatments were conducted. A significant decrease of pain in VAS scale was found as well as increase in mobility of spinal joints [25].

In another study, Träbert currents and kinesiotherapy were used in a group of 50 patients. A statistically significant pain reduction was obtained after therapy [12].

In a paper by Kuciel-Lewandowska and colleagues 40 people were subject to tests, out of whose two research groups were isolated. TENS currents were used in the first group, and Träbert currents were used in the second one in a series of ten treatments. After the use of currents, pain significantly decreased with almost half of patients [11].

In a similar study by Kuciel [10], ten treatments with Kotz and Träbert currents were used in a group of 30 patients. After treatment a significant decrease of pain was observed and the patients’ everyday activity improved.

The Oswestry index and Rolland-Morris questionnaire were used in own research to evaluate a degree of quality of life and disability level. A sum of points before treatment in the ODI index amounted in group 1 to 24.5 and in group II to 17.0. After termination of treatment the values significantly decreased to 10.5 in group 1 and to 7.0 in group 2. However, in RMQ parameters of disability level in group 2 from the median 16 dropped to 7, however in group 2 from the median
patients. Physical therapy constitutes a supplement of kinesiotherapy, providing analgesic, antiedema and anti-inflammatory effects thanks to improvement of microcirculation and decrease of muscular tension [3,31,32].

CONCLUSIONS
After the physiotherapy a significant decrease of pain, with improvement of patients physical condition, and everyday activity was observed. Applied treatment improved the spine mobility.

Conflicts of interest
The authors declare that they have no conflicts interests.

REFERENCES