

EVALUATION OF THE PHYSIOTHERAPY EFFECTIVENESS IN SYMPTOMATIC TREATMENT OF LOW BACK PAIN WITH RADIATION TO THE LOWER LIMB – PILOT STUDY

Agnieszka Krawczyk-Wasielewska¹, Elżbieta Skorupska², Włodzimierz Samborski^{2,3}

¹ *Department of Physiotherapy, Poznan University of Medical Sciences*

² *Chair of Physiotherapy, Rheumatology and Rehabilitation, Poznan University of Medical Sciences*

³ *Institute of Health Sciences, University of Economy in Bydgoszcz*

Summary

Introduction. Lumbosacral spine pain radiating to the lower limb is most often associated with degenerative disc disease and pressure on the sciatic nerve. Numerous clinical studies have also indicated other causes of pain, such as sacroiliac joint dysfunction, degenerative hip disease or the dysfunction of small joints in the spine. The most general classification of patients suffering from sciatica pain includes the division into pseudoradicular and radicular pain component. It should be noticed, however, that the role of mixed syndromes has been posited more and more often as dominant, especially in the group of chronic patients. The existence of mixed syndromes necessitates the selection of an appropriate therapy that would enable work with both radicular and pseudoradicular component.

Aim of the study: The evaluation of the efficacy of physiotherapy in low back pain syndromes correlated with radiation to the lower limb subject to varied therapy application.

Material and method. 21 patients with spinal pain radiating to the lower limb were included in the study. The examined patients were divided into two subgroups. In both subgroups, physical treatment in the form of TENS, ultrasounds and interferential current was applied in the area of the lumbar spine. Moreover, myofascial release was carried out in this area. In the second group, myofascial release was additionally applied in the area of buttocks. To evaluate pain intensity the VAS method and the Laitinen pain indicator questionnaire were used. The physical disability level was assessed by means of the Oswestry Disability Index. The examination was carried out twice, prior to a four-week long therapy and after its completion.

Results. Pain relief occurred in both groups. Slightly greater improvement was observed in group II. The assessment of physical disability conducted with the aid of the Oswestry Disability Index indicated statistically significant improvement.

Conclusions. As far as pain relief was concerned, therapy applied both within the lumbosacral spine and buttocks area gave slightly better results than therapy applied only in the area of the lumbosacral spine and evaluated with the aid of VAS. Minimally greater improvement in physical condition was observed in the group which underwent therapy both within the spine and buttocks area.

Key words: lumbosacral spine pain, sacroiliac joint, pain pattern, therapy.

Introduction

Spinal pain is one of the main symptoms patients present themselves with when they first visit a rehabilitation doctor, physiotherapist, osteopath or chiropractor. It is most often located in the lumbosacral area. It has been confirmed that approximately 90% of population suffers from pain in this area at least once in their lives [1]. Because of the frequency of pain occurrence in the lumbosacral area, the recurring nature of the pain and the complex pathomechanism of pain development, both the diagnosis and treatment in the group of patients suffering from such pain become a crucial problem of the 21st century.

Studies have confirmed the importance of numerous factors that may potentially cause lumbosacral spine pain radiating to the lower limb. Sembrano indicated three major sources of pathology: the spine (discopathy and intervertebral joint dysfunction), the sacroiliac joint and the hip joint. Moreover, he pointed to the possibility of their co-occurrence, which poses another difficulty with respect to the diagnosis (cf. Figure 1) [2].

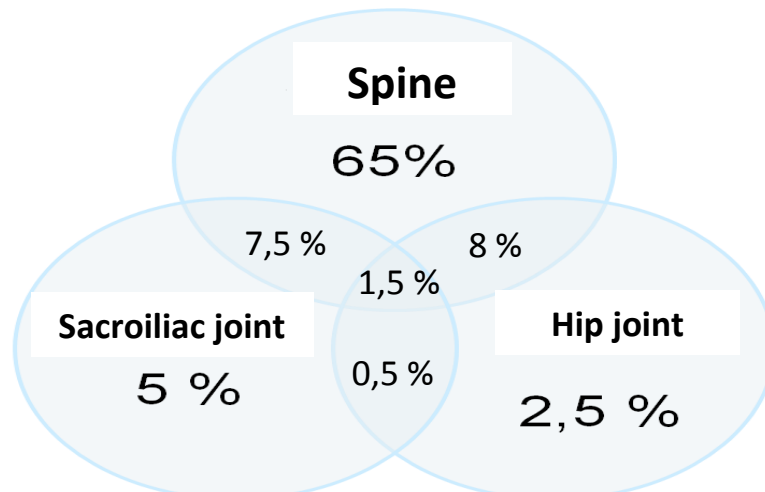


Figure 1. Sources of lumbosacral spine pain radiating to the lower limb [2].

For many years, a common belief was held that lumbosacral spine pain radiating to the lower limb is radicular in nature. Presently, it is said that pseudoradicular pain or even mixed syndromes should be taken into account [2]. It is assumed that the occurrence of sciatic nerve inflammation plays the most vital role in the case of the radicular component. The pseudoradicular component usually refers to non-specific spinal pain associated with the pathology of sacroiliac joint, hip joint or small spinal joints [3,4,5]. The greatest relevance is ascribed to sacroiliac joints, whose dysfunction may cause even from 16 to 30% of instances of lumbosacral spine pain radiating to the lower limb [6,7].

It is believed that in the majority of cases mixed nature of pain should be taken into consideration because of the convergent innervation of structures potentially responsible both for pain associated with radicular nerve inflammation and for pain associated with the sacroiliac joint (rami of L4-S2), which may cause radiation to the same area [8]. The brain may not be able to differentiate between pain impulses that are transported via the same neural route and use the same somatosensory neurons, though originate from different sources [2].

Differentiating between clinical pictures characteristic of the two components becomes almost impossible. However, from the clinical perspective, it is extremely significant.

The diagnosis of radicular pain is based on neurological and neurophysiological examination complemented with imaging methods, such as x-ray or MRI. It is believed that even if the MRI reveals disc herniation, it still may not be the cause of radiating spinal pain. Especially, that in 20-36% of patients with herniated disc, pain has not been observed [9]. Also the reliability of the Laseque test has been questioned. Even though its sensitivity is about 91% high, its specificity amounts merely to 26% [9]. Strong tension of hamstring muscles observed by many researchers in patients with sciatica may result in the wrong interpretation of the test and reduce its reliability. The Laseque test is recognised to be adequate for patients in acute condition, whereas for chronic patients it loses its reliability, especially when the relation between the intensity of pressure and the intensity of symptoms noticed in the test is taken into account [10].

In the case of the pseudoradicular component associated with sacroiliac joint dysfunction, the majority of researchers emphasise the lack of strictly defined diagnostic criteria. The diagnosis is based on clinical tests, which in the case of the sacroiliac joint may be divided into motion palpation tests and positional palpation test [11]. For patients with sacroiliac joint pain, the diagnostic criteria established by the International Association Society for the Study of Pain include: the presence of pain within the sacroiliac joint, pain caused by clinical tests characteristic of the joint and intra-articular injection of analgesic alleviating or reducing pain [6,12,13]. The reliability of both pain within the joint and a single test has been questioned. Data cited in the literature suggest that it is more useful to carry out a number of tests in a row. Improved diagnostic reliability has been confirmed after three or more positive results have been obtained [14,15,16]. Functional tests seem to be a useful method of diagnosing non-specific spinal pain. However, the efficacy of these tests needs further assessment [11]. Intra-articular injection of analgesic has been assumed to be a golden standard of the sacroiliac joint diagnosis only when the pathology concerns intra-articular structures. Unfortunately, when pain is caused, for instance, by a ligament, the method is no longer applicable [17,18].

The lack of golden standards for diagnosis that would enable the differentiation between patients with the pseudoradicular and radicular component causes that for all patients suffering from lumbosacral spine pain the applied treatment is identical or very similar. The standard physiotherapeutic approach focuses on the work within the lumbosacral spine area, which is justified only for patients with radicular nerve inflammation. In the case of the pseudoradicular component or mixed syndromes the above-mentioned approach may result in an ineffective treatment. It is assumed that in the case of the pseudoradicular component and mixed syndromes additional therapy application within the area of buttocks and the sacroiliac joint is justifiable and should be regarded as the standard procedure in patients with non-specific lumbosacral spine pain radiating to the lower limb.

Since it was impossible to make a reliable division of the examined patients into those with radicular pain and those with pseudoradicular pain, this paper follows the division into two subgroups defined by means of the location of applied therapy.

Aim of the study:

1. The evaluation of the impact of the area to which therapy is applied on the intensity of pain.
2. The evaluation of the impact of the area to which therapy is applied on the physical condition of the examined patients.

Material and method

21 patients, both men and women, diagnosed with spinal syndromes correlated with radiation to the lower limb were included in the study. The inclusion criteria embraced: low back pain radiating to the lower limb, positive Laseque test and age range of 30-60 years. Patients with surgical treatment of the lumbosacral spine or with endoprosthetic treatment in the past medical history, as well as patients with scoliosis, spondylolisthesis, degenerative hip joint disease or patients diagnosed with anatomical leg length discrepancies were excluded from the group examined in the study.

Patients were divided into two subgroups. For each subgroup, therapy application method varied. In both subgroups, the following methods were applied: ultrasounds in the area of the anterior superior iliac spine, TENS in the area of the lumbosacral spine and interferential current in the area of the lumbosacral spine. In the case of the first subgroup, myofascial release in the area of the lumbosacral spine was also performed (deep tissue massage, trigger point therapy and post-isometric relaxation of the trapezius and quadratus

lumborum muscle). In the second subgroup, therapy was applied in the area of the lumbosacral spine and was additionally supported by myofascial release in the area of soft tissues and buttocks (deep tissue massage, trigger point therapy and post-isometric relaxation of the piriformis and gluteus medius muscle, as well as trigger point therapy and post-isometric relaxation of the sacroiliac, iliolumbar and sacrotuberous ligament).

The duration of the disease in both subgroups ranged from 5 to 15 years. For group I (L-S), 12 patients (8 women and 4 men) were qualified and the average age was $48,34 \pm 8,14$. For group II (SI), 8 patients (7 women and 2 men) were qualified and the average age was $51,78 \pm 4,90$.

In the examined subgroups, the evaluation of pain intensity was conducted by means of the VAS method and the Laitinen pain indicator questionnaire. Also the physical condition of the examined patients was assessed by means of the Oswestry Disability Index used for physical disability evaluation in patients with spinal pain. Moreover, the patients underwent neurological examination (for diagnosis confirmation), lumbar spine MRI and functional tests characteristic of both pseudoradicular and radicular component (Laseque test, Bragard test, Patrick test, Gaenslen test, Yeoman test, Mennell's sign, standing flexion test). Every examination was conducted twice: on the second and the last day of a four-week long rehabilitation.

For the purpose of statistical description, GraphPad Instant programme was used. The evaluation of statistical significance of the differences between the levels of pain and physical condition before and after treatment was performed by means of the Wilcoxon matched-pairs signed-ranks test. Finally, the relation between the obtained results was studied with the aid of the Spearman's rank correlation coefficient.

Results

During the neurological examination, radicular symptoms were observed in the majority of patients (9 patients in group I, 8 patients in group II). MRI confirmed the presence of herniated intervertebral disc and the pressure on the L4-S1 nerve roots in all patients at least at one level, while some patients complained of pressure at two or even three levels. In both subgroups, the Laseque (SLR) test was positive for all patients and was confirmed in the majority of patients by positive Bragard test (group I - 11 patients, group II - 7 patients). Most of patients showed positive reaction to 4 out of 5 provocation tests characteristic of the sacroiliac joint (9 patients in group I, 8 patients in group II). Figure 2 illustrates the distribution of the results of additional tests for both groups.

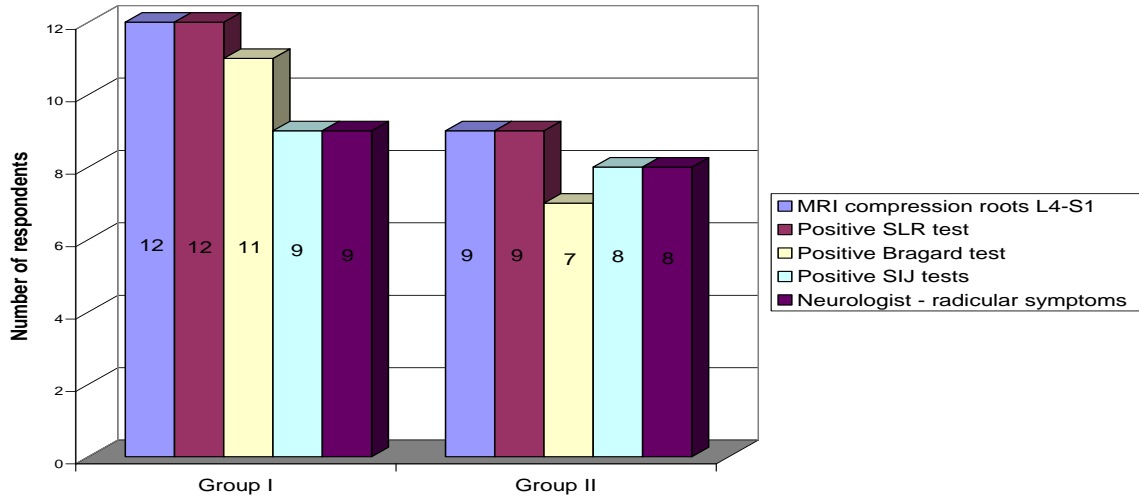


Figure 2. Results of the additional tests characteristic of the pseudoradicular and radicular component.

During examination, the evaluation of pain intensity by means of VAS was conducted (Table 1). In both groups, pain reduction was observed. It was more distinct in group II, in which the obtained result was at the margin of statistical significance.

Parameters	VAS before	VAS after	Difference	P value
Group I(L-S)	35.08	32.50	2.58	0.350
Group II (SI)	47.22	39.11	8.11	0.054

Table 1. VAS before and after treatment (Wilcoxon matched-pairs signed-ranks test)

The other method of pain evaluation was the Laitinen pain indicator questionnaire (Table 2). In group I, slightly better results were noted and the obtained result was statistically significant, whereas in group II the obtained result was at the margin of statistical significance.

Parameters	Before	After	Difference	P value
Group 1(L-S)	6.66	4.91	1.75	0.045
Group 2 (SI)	8.33	7.11	1.22	0.054

Table 2. Laitinen scale (Wilcoxon matched-pairs signed-ranks test)

The Laitinen pain indicator questionnaire measures not only pain intensity but also the frequency of pain episode occurrence, medicine usage and the influence of pain on the physical activity (Figure 3). Some discrepancies between group I and group II were noticed concerning the above-mentioned issues. In the second subgroup, pain occurred more frequently during the day and lasted longer, which made patients take painkillers more often.

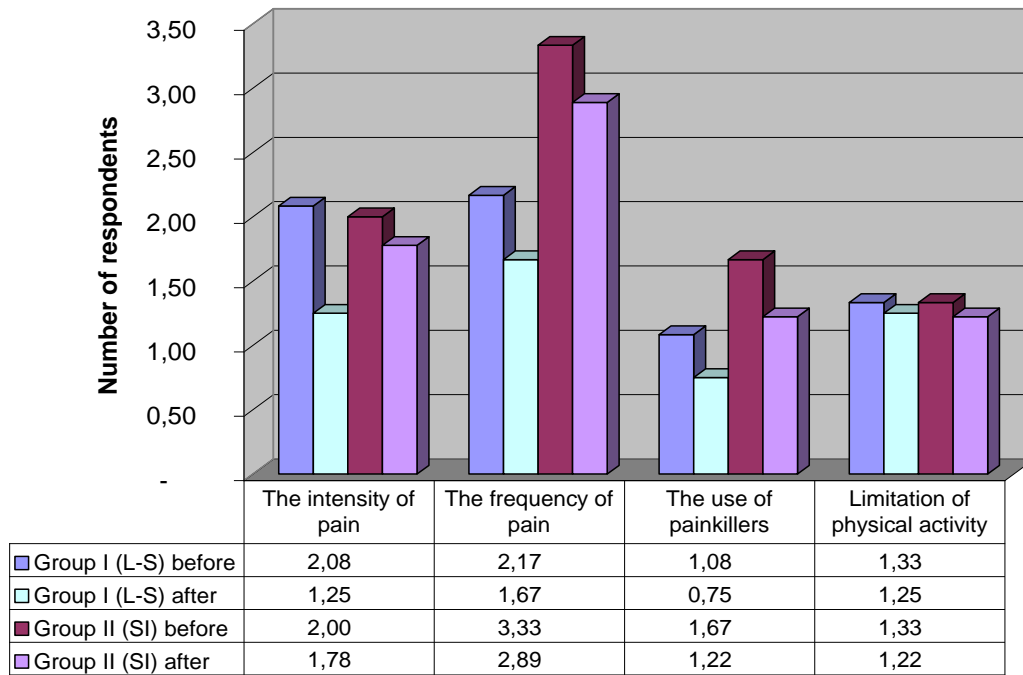


Figure 3. Laitinen pain indicator questionnaire - detailed results

The physical disability evaluation by means of the Oswestry Disability Index showed statistically significant improvement subsequent to therapy application in both groups. In the second group, the improvement was minimally bigger (Table 3).

Parameters	Before	After	Difference	P value
Group I(L-S)	21.44	19.77	1.66	0.026
Group II (SI)	17.91	15.83	2.08	0.023

Table 3. Oswestry Disability Index (Wilcoxon matched-pairs signed-ranks test)

The relationship between pain reduction level and physical condition improvement was also assessed during examination. In both subgroups, positive correlation was confirmed, namely the bigger was the difference in pain intensity before and after the therapy, the greater the improvement of physical condition of patients became. In the first group, the correlation was weak and the result did not exceed the margin of statistical significance. In the second group, on the other hand, higher value of Spearman's rank correlation coefficient was obtained, which indicates significant relation between measured factors. Moreover, the obtained result was statistically significant (Table 4).

	Spearman r	P value
Group I (L-S)	0.3676	0.3363
Group II (SI)	0.7581	0.0043

Table 4. Relationship between pain reduction level and physical condition improvement (Spearman's rank correlation coefficient).

Discussion

Many authors working on the subject of spinal pain radiating to the lower limb point to the widespread occurrence of mixed syndromes in the examined population [2,19]. The fact that positive results regarding both pseudoradicular and radicular component has been confirmed in the majority of patients seems to support the hypothesis. In the examined subgroups, mixed syndromes amounted to about 75% in group I and 88% in group II, which may be related to the long duration of the disease. Changes in the tension of ligaments and muscles brought about by the primary dysfunction lead to changes in body statics and, consequently, to the strain of consecutive elements of the kinematic chain. For this reason, the probability that the number of dysfunctions will grow increases as the duration of the disease elongates [1].

The effectiveness of pain reduction brought about by deep tissue massage, post-isometric relaxation or pressure therapy used in lumbar spine pain syndromes or in the sacroiliac joint syndrome has been proven by many authors [20-24]. However, the majority of studies describe therapy results concerning either the lumbar area [25] or the sacroiliac joint area [26]. Most often, pain reduction, the contribution to proper muscle balance recovery [20], as well as muscle tension reduction [21-22] are enumerated in the literature among the effects of massage application and the introduction of stretching exercises. Selkow in his study conducted on the group of 20 patients with pain of the lumbopelvic area, who underwent post-isometric relaxation, obtained pain reduction of the average level of 8.1 mm in all patients [25]. Furthermore, Romanowski noticed statistically significant pain reduction of the average level of 24.92 mm in all 26 patients receiving deep tissue massage [21]. Personal findings confirm information stated in the literature, i.e. in both subgroups the applied treatment caused pain reduction, which was evaluated with the aid of VAS and the Laitinen pain indicator questionnaire.

In the examined group, better pain relief effect was obtained on VAS. However, in group II it was not statistically significant. Such result could mean that the application of broader therapy would lead to the tension reduction of the structures causing both the pseudoradicular and radicular component, which would bring about pain alleviation. Owing to the small size of the group and the lack of statistical significance, the obtained result cannot be recognised as completely reliable and, thus, the cohort should be more numerous for the purpose of its verification. In the Laitinen pain indicator questionnaire, minimally better effect was observed in group I, while in group II pain relief effect was less significant. It should be reminded, however, that the Laitinen scale measures not only pain intensity but also pain frequency and the amount of taken drugs. In the second group, pain occurred more often and, thus, it might have been assumed to be more wearing, which might have negatively affected the general assessment conducted in this scale.

To evaluate the physical condition of patients, the Oswestry scale, i.e. a commonly accepted tool recognised as reliable for the evaluation of patients with lumbar spine pain, was used [27]. The therapy proposed in the study caused statistically significant improvement of physical condition in both groups. Wilson also obtained physical condition improvement after 64 patients with lumbar spine pain had post-isometric relaxation applied. In his group, he noticed that positional asymmetry was reduced and movability was increased [28]. Statistically significant improvement was also obtained in Romanowski's studies [21]. In the second group, slightly greater improvement was observed, which may be related to the better pain relief effect of therapy in this group. Especially that during the examination statistically significant relation between pain reduction and physical condition improvement was noticed in the second group.

The obtained results confirm the usefulness of myofascial release both in the lumbosacral spine and buttocks area for the treatment of mixed syndromes. Examination

should be conducted in a larger group for the purpose of confirming the results and determining the influence of the proposed therapy on patients with the pseudoradicular or radicular component.

Conclusions

1. As far as pain relief was concerned, therapy applied both within the lumbosacral spine and buttocks area gave slightly better results than therapy applied only in the area of the lumbosacral spine and evaluated with the aid of VAS.
2. Minimally greater improvement in physical condition was observed in the group which underwent therapy both within the spine and buttocks area.

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Author responsible for correspondence:
Agnieszka Krawczyk-Wasielewska
e-mail: krawczyk.agnieszka@wp.pl