

ASSESSMENT OF THE EFFECTIVENESS OF MASSAGE FOR SPINAL PAIN AS PART OF PRIMARY HEALTHCARE: A PILOT STUDY

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ABSTRACT

Background: Pain in the spine is one of the most common issues in the musculoskeletal system. 70-80% of the population experiences an acute spine pain incident at least once in their life, and 50% struggle with a chronic form of this health problem. Factors contributing this situation include static work, a sedentary lifestyle, a minimal amount of physical activity, stress, and poor nutrition. Massage is among the many therapeutic methods used for the treatment of back pain. This is a non-invasive method that involves manipulation of the soft tissues of the musculoskeletal system, where symptoms directly related to the disease appear.

Aim of the study: The aim of this study was to assess the effectiveness of tensegrity massage therapy for lumbar spine pain. The study presents the possibility of cooperation between the physiotherapist and primary care physician as part of primary health care.

Material and methods: The study involved 25 participants (15 women and 10 men) diagnosed with pain in the lumbar spine. The participants were aged 23-70 years with a mean age of 50 years ($SD \pm 14.77$). Pain was assessed using the visual analogue scale (VAS) at rest and during a functional test, and functional disability was measured using the Oswestry Disability Index (ODI). Measurements were taken before and immediately after therapy. A palpation assessment was performed before each massage session. The therapy consisted of six 45-minute tensegrity massage sessions performed twice a week for three weeks.

Results: Pain during the functional test and the subjective feeling of pain measured by the VAS decreased following treatment. The ODI results revealed a significant improvement from moderate to low disability. The results obtained were statistically significant ($p < 0.05$).

Conclusions: Tensegrity massage contributed to a reduction in back pain and improved the functioning of the patient. This therapy can be a complementary method to conservative treatments for spinal diseases.

KEYWORDS: tensegrity massage, back pain syndrome, Oswestry Disability Index

BACKGROUND

In recent years, spinal pain has been found to affect almost all segments of society. It is no longer just adults and the elderly suffering from overloads within the soft tissues and degenerative changes in the

bone and soft tissues of the spine [1-6]. Back problems occur in young people, both in those who are actively working and students, including both women and men [7-8]. In addition, cases of back pain are increasingly reported among children. The incidence of pain positively correlates with the lifestyle that is

common in developed countries, including spending most of the day sitting, a lack of physical activity, irregular eating, and constant stress. These factors can lead to increasingly recurrent pain incidents, which often turn into a chronic form [1-3,9]. Pain occurs in different parts of the spine, but 80% of pain ailments are located in the lumbosacral region [1].

Pain has a direct impact on the simple and complex motor activities performed every day, and leads to limitations in the professional, family and social life, significantly reducing their quality [1,3]. Therefore, the therapeutic procedures used to treat pain should be comprehensive, holistic, applied early, and supplemented with forms of self-therapy.

The conservative treatment methods for pain include pharmacotherapy (analgesic, anti-inflammatory, and muscle-relaxing agents) and physiotherapy. Physical treatments include transcutaneous electrical nerve stimulation (TENS), low-frequency laser therapy, and local cryotherapy [7,10]. The forms of kinesiotherapy are craniosacral therapy, manual therapy, joint mobilization and manipulation, Pilates exercises, stretching of the sciatic and tibial muscles, exercises strengthening the paraspinal muscles, yoga, tai-chi, and acupuncture [7,8,11]. There are also many types of massage used to decrease pain. Among these are Swedish, classic, traditional Thai, Chinese, Ayurvedic with aromatic oils (ginger oil), deep tissue massage, therapeutic, relaxing, and structural [1,4,7-9,12-14].

In this study, we attempted to use tensegrity massage to reduce pain in the lumbar spine by normalizing the resting tension of the muscles and the ligament-tendon apparatus. Additionally, self-massage was introduced as a form of self-therapy performed by the patient in order to consolidate the therapeutic effect and prevent further pain incidents. This study was the result of cooperation with primary care physicians, and an example of receiving physiotherapy treatment as part of primary health care services, which has long been desired, recommended, and suggested for implementation. Cooperation with physicians allows for a targeting of the therapeutic procedure to the dominant symptoms diagnosed by the doctor, which makes managing pain more effective [15].

AIM OF THE STUDY

The aim of this study was to assess the effectiveness of tensegrity massage therapy for spinal pain.

MATERIAL AND METHODS

Setting

This research was conducted in the Faculty of Physiotherapy at the University of Physical Education in Wrocław. Participants were referred to the

university by primary care physicians. The cooperation between the doctor and the physiotherapist was carried out under a partnership agreement between the primary healthcare center and the university. The cooperation ensured diagnosis and qualification for therapy by a doctor, enabled a physiotherapist to use therapy methods aimed at diseases within the musculoskeletal system, and guaranteed the patient quick access to rehabilitation.

Participants

The study involved 25 people (15 women and 10 men) diagnosed with pain in the lumbar spine. The participants were aged 23-70 years and the mean age was 50 years ($SD \pm 14.77$). The study sample was not homogeneous in terms of age, and age was not an exclusion criterion, as we wanted to study a cross-section of the people who visit a general practitioner with back pain. The study confirmed that young people, adults, and elderly patients have problems with back pain. However, there was a difference in the type of pain experienced across the age groups. The pain experienced by young people was sudden, sharp, severe, and subsided on its own, while in the elderly it was chronic, continuous, and with a constant intensity. 30% of the respondents exhibited comorbidities with other musculoskeletal disorders, including degenerative joint disease of the knee and the hip, painful shoulder syndrome, and rheumatoid arthritis. 12% of the respondents also reported pain in the thoracic spine, and 16% in the cervical spine. 88% of the respondents lived in a city, and 12% in the countryside. The general practitioner qualified the patients for massage treatments based on the inclusion and exclusion criteria for the research. The inclusion criteria were pain in the lumbar spine, referral to rehabilitation, and a current lack of physiotherapy. The exclusion criteria included neoplastic disease, recent cardiac incidents, inflammation within soft tissues, gastric ulcer diseases, uncontrolled arterial hypertension, discogenic damage to the spine, and acute pain in the lumbar spine.

Study design

The therapy consisted of six 45-minute tensegrity massage sessions. The sessions were performed twice a week and the entire therapy lasted three weeks. The patient's position during the massage was lying on the side. If pain was located symmetrically, the massage was started on the side where the pain was more severe. Before each massage session, the selected structures were palpated in order to identify the abnormal resting tension of the tissues. An assessment of the massage needs was made using the patient's condition evaluation sheet (Table 1) [16].

Table 1. Patient status card for tensegrity massage

Symptoms (what hurts?)																	
Symmetrical																	
Asymmetrical																	
Disease course: When was the problem first experienced? How has it developed? When did it intensify? What is it associated with?																	
Left side						PERFORM PALPATION ASSESSMENT (COMPRESSION SENSITIVITY) AT THE FOLLOWING LOCATIONS						Right side					
Date of examination												Date of examination					
LATISSIMUS DORSI MUSCLE SYSTEM																	
						External lip of iliac crest of ilium											
						Lateral surface of spinous processes T5, T6, T7											
						Lateral surface of calcaneus											
						Pisiform bone											
GREATER PECTORAL MUSCLE SYSTEM																	
						Crest of greater tubercle of humerus											
						Medial surface of anterior superior iliac spine											
						Tuberosity of first metatarsal bone											
SERRATUS ANTERIOR MUSCLE SYSTEM																	
						Upper angle of shoulder blade											
						Coracoid process of scapula											
						Upper surface of greater trochanter of femur											
						Greater tubercle of the humerus											
						Lateral condyle of the humerus											
SACROTUBEROUS LIGAMENT SYSTEM																	
						Posterior superior iliac spine											
						Lateral surface of sacral bone											
						Linea aspera of femur (halfway along femur)											
						Inferior nuchal lines of occipital bone											
						VAS scale											

Based on the results of the palpation assessment, the methodology of massage was selected for each of the four systems, starting with the manipulation of the latissimus dorsi muscle system, and ending with the sacrotuberous ligament system. The methodology of massage included tissues being in indirect contact, located distal to the most painful place, and then structures located centrally to the lumbar spine showing the highest pain sensitivity [15-18]. During the procedure, the techniques of stroking, spiral rubbing and transverse kneading were used, as well as point manipulation, which involved local rubbing of the tendinous part of the muscles [15].

In order to consolidate the achieved therapeutic effect, the treatment also included instruction on self-massage (which is one of the forms of self-therapy). For this purpose, educational materials under the name "Self-massage in lumbosacral pain" on the website of the National Health Fund were used. These materials are freely available. The patient's education consisted of watching a film, performing a self-massage together with the practitioner, and

then performing a self-massage at home, copying the activities presented in the material [19]. During the therapy, only tensegrity massage was performed and no other physiotherapeutic methods were used, with the exception of self-massage.

Data sources/measurement

The results of the therapy were assessed using the Oswestry Disability Index (ODI). This questionnaire is divided into ten domains. Six of the domains concern the activities of daily living (standing, walking, sitting, sleeping, personal care, and lifting), two domains refer to pain (pain intensity and changes in pain intensity), one is related to social life, and one to traveling. For each domain, the total possible score is 5. If the first statement is marked the domain score is 0, and if the last statement is marked the domain score is 5. The lower the number of points, the better the functional state of the patient [20].

In the therapy, the functional "fingertip-to-floor" test (also referred to as the Thomayer test) was used,

which involves bending the torso forward while in a standing position. During the test, the level of perceived pain is rated on a scale from 0 to 5, and the difficulty in performing activities is assessed [21].

Before and immediately after the therapy, the level of perceived pain was also measured at rest, without performing activities.

Statistical methods

In order to check the normality of the variable distributions, the Shapiro-Wilk test was used. The Wilcoxon signed-rank test was applied to assess the results of the ODI, and the results of the Visual Analog Scale (VAS) at rest and during the functional test.

RESULTS

Descriptive data

The ODI results obtained before the therapy indicate that the minimal functional disability was present in 4% of the participants, moderate in 44%, severe in 40%, and crippled in 12%. Immediately after the end of the therapy, the results improved. Based on the answers provided, 36% of the respondents had minimal disability, 48% had moderate disability, and 16% had severe disability. There was no one in the group crippled after the therapy (Table 2).

The greatest positive changes were observed in the case of minimal disability. An increase of 32%

was observed in this group following treatment. By contrast, the percentage of respondents in the severe disability group decreased by 24%. There was no one in the crippled group after therapy. The obtained results are statistically significant (Table 3).

The average VAS results before and immediately after the therapy revealed statistically significant changes. The mean value before the applied treatment was 6.7, and after the treatment the value was 3.5. The change in the mean value was over 50%. Before the therapy, the highest value marked by the patient was 10 (maximum pain), and immediately after the therapy the highest score was 8. The minimum value before the therapy was 3, and after the therapy was 0 (no pain at all). The obtained results are statistically significant (Table 4).

During the functional test, the pain sensation during movement also changed. Before the therapy, the indicated values oscillated around 5 points (maximum pain) in 60% of the respondents, which meant that they could not perform the test. 40% of the respondents performed the test correctly, but 35% of them emphasized that the activity was accompanied by pain defined as moderate (3 points), while 5% experienced low pain intensity. The obtained results are statistically significant (Table 4).

During the therapy, all patients were recommended self-massage, but only ten patients were very interested (40% of the total), and asked the most questions about the method and the correctness of self-performed treatments at home. All respondents unanimously reported difficulty in maintaining the regularity of self-massage, but also emphasized that

Table 2. Comparison of the results of the ODI questionnaire before and after therapy in the study group.

Parameters	Statistics			p-value
	Mean \pm SD	Me (Q1 - Q3)	Min - Max	
ODI (%)				<0.001
Before	42.8 \pm 14.7	42 (31.1-56.0)	12.5-68.0	
After	28.3 \pm 13.6	26 (18.0-37.5)	8.9-56.0	
ODI (scores)				<0.001
Before	20.7 \pm 7.4	19 (15-26)	5-34	
After	13.6 \pm 6.7	13 (9-17)	4-28	

n: number of observations; Me: median; Q1: 25% quantile; Q3: 75% quantile; SD: standard deviation; p-value for Wilcoxon signed-rank test.

Table 3. Comparison of the results of the ODI questionnaire before and after therapy in the study group.

ODI (interpretation of the questionnaire)	Before		After		p-value
	n	(%)	n	(%)	
Minimal disability (0-20%)	1	4	9	36	<0.001
Moderate disability (21-40%)	11	44	12	48	
Severe disability (41-60%)	10	40	4	16	
Crippled (61-80%)	3	12	0	0	

n: number of observations; SD: standard deviation; p-value for Wilcoxon signed-rank test.

Table 4. Comparison of the VAS scale at rest and during the functional test before and after therapy in the study group.

Parameters	Statistics			p-value
	Mean \pm SD	Me (Q1 - Q3)	Min - Max	
VAS at rest				<0.001
Before	6.7 \pm 1.8	6 (6-8)	3-10	
After	3.5 \pm 2.2	3 (2-5)	0-8	
VAS functional				<0.001
Before	2.9 \pm 1.4	3 (2-4)	0-5	
After	1.5 \pm 1.1	1 (1-2)	0-4	

n: number of observations; Me: median; Q1: 25% quantile; Q3: 75% quantile; SD: standard deviation; p-value for Wilcoxon signed-rank test.

these simple massage movements prevented an increase in pain and frequent pain incidents.

DISCUSSION

Key results

By normalizing the resting tension of the muscles and ligament-tendon apparatus, massage helps to relieve pain in the musculoskeletal system, including in the spine. The elimination of pain makes it easier to perform everyday activities, which motivates an individual to take action and contributes to independent functioning. Massage therapy should be supplemented with self-massage, which allows the obtained therapeutic effect to be maintained, and may prevent further pain incidents in the future.

Interpretation

Numerous scientific studies on the use of massage for spinal pain have confirmed its effectiveness [4,5,7,9,13,22-25]. However, attention should be paid to the fact that there are different types of massage, the massage methodology is different, the method of applying techniques is different, the measurement tools used to assess the effectiveness of massage are different, and, therefore, it is difficult to compare the results across studies. This fact should not discourage the use of massage, but only encourage a precise description of the treatment methodology and the selection of standardized measuring tools. This will increase the repeatability of the procedure, thus contributing to the popularity of massage therapy.

Review publications are very helpful when assessing the effectiveness of massage because they provide more details on the topic. In one review, it was found that massage may have a beneficial effect on the well-being of patients with chronic back pain, especially when combined with exercises and patient education [26]. Another example of the effectiveness of

massage in reducing back pain is research conducted among the nurses employed in one of the hospitals in Brazil. After applying the therapy consisting of 12 massage sessions, pain reduction was observed in as many as 86% of the respondents. The achieved therapeutic effect also significantly limited the treatment of pain with pharmacotherapy [24].

The research conducted by Elder's team shows the possibility of cooperation between primary care physicians and licensed massage therapists. In this study, the doctors were responsible for qualifying patients for the study on the basis of the inclusion and exclusion criteria, while masseurs were responsible for performing therapeutic massage and assessing the perceived pain, the level of disability caused by pain, and the quality of life. Each measured item significantly improved (up to 50%), and the improvement was maintained at intervals of 12 and 24 weeks after the end of therapy. The authors of the study emphasize, however, that their observations require further research involving pragmatic trials with control groups [25]. The results obtained in our study are consistent with the results reported by other authors. Massage is an effective form of conservative treatment for back pain. This therapy can be a complementary method combined with self-therapy in the form of self-massage and simple exercises performed at home.

In the treatment of patients with back pain, it is extremely important to properly diagnose the origin of the pain via imaging tests, palpation or simple differentiation tests that can be performed by a physician, thus eliminating the causes of pain resulting from other diseases [15]. This action will allow the physiotherapist to conduct a quick, precisely tailored, and symptom-oriented therapeutic intervention.

Generalizability

Tensegrity massage is characterized by a specific/different methodology that involves manipulation of the tissues in the area of the greatest pain (in this

case the lumbar spine), but also tissues located distal to this area. This type of massage aims to normalize the abnormal resting tension, not only of the muscles located in a given area, but most of the muscles, fascias, and ligaments that are in direct and indirect contact with each other, and are subject to mutual compression and pulling forces (thus, interacting with each other) [16,17]. Selective manipulation of structurally connected tissues in individual systems contributes to the effective reduction of increased tissue tension, and thus the alleviation of pain.

Limitations of the study

The results of this study concern the state immediately after the end of therapy. In order to demonstrate the consolidation of the therapeutic effect, the measurements should be repeated one, three and six months after the end of the treatment. In addition, the size of the study sample was small due to the inability to continue the research during the COVID-19 pandemic and the associated restrictions. In the future, it is also advisable to ensure the homogeneity

of the group in terms of age and level of intensity of the pain syndrome.

CONCLUSIONS

Tensegrity massage contributed to a reduction of pain in the lumbar spine. Massage therapy also improved the functioning and performance of selected activities of everyday life. The cooperation of a physiotherapist with a primary care physician in the field of patient therapy is feasible, recommended/desirable, and contributes to a significant reduction in the duration of therapy, and a significant acceleration of the patient's convalescence.

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