

Comparative evaluation of the use of pinotherapy and orthopedic manual therapy in the treatment of sacroiliac joint pain

Grzegorz Mańko^{1,2,*}, Agnieszka Dudek², Natalia Palka², Beata Stach^{2,3}, Wojciech Kurzydło^{2,4}, Kamila Makulec⁵, Ewa Kostecka-Wójs⁶

¹ Department of Biomechanics and Kinesiology, Institute of Physiotherapy, Faculty of Health Sciences, Jagiellonian University Medical College, Cracow, Poland

² Małopolska Rehabilitation Hospital in Krzeszowice

³ Department of Physiotherapy, Institute of Physiotherapy, Faculty of Health Sciences, Jagiellonian University Medical College, Cracow, Poland

⁴ Department of Clinical Rehabilitation, Institute of Physiotherapy, Faculty of Health Sciences, Jagiellonian University Medical College, Cracow, Poland

⁵ Department of Physiotherapy, Faculty of Health Sciences, Andrzej Frycz Modrzewski Krakow University, Cracow, Poland

⁶ University Children's Hospital in Krakow

* corresponding author: g.manko@uj.edu.pl


RECEIVED: March 21, 2025 ■ **REVISED:** May 5, 2025 ■ **ACCEPTED:** June 10, 2025 ■

PUBLISHED ONLINE: July 31, 2025

KEYWORDS: Pinotherapy, manual therapy, sacroiliac joint pain



This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>). The Authors retain copyright.




Aim. The aim of the study was to compare the effectiveness of pinotherapy and manual therapy in the treatment of pain in the sacroiliac joints.

Method. The study included a group of 40 patients, who reported to the physiotherapist office with pain in the sacroiliac joints. The clinical evaluation involved: a Pain Numeric Rating Scale and the Oswestry Questionnaire. Patients were divided into two groups of 20 people. In the first group shock therapy was used, in the second group selected manual therapy techniques were used.

Results. After the therapy, a statistically significant reduction in pain in the sacroiliac joints was observed in both groups (Pain Numeric Rating Scale). The relative difference in the severity of pain reduction in both groups was similar.

Conclusions. The study showed that pinotherapy and manual therapy techniques are effective in treating pain in the sacroiliac joints. In addition, both methods show comparable efficiency of treatment of the abovementioned disorders, because of it is possible, they can be used interchangeably in patients depending on individual contraindications.




Introduction

The sacroiliac joints connect the spine with the pelvis and transfer the load of the body to the lower limbs.[1] Movement in these joints is restricted, which further promotes their function. [2] They consist of two parts: synovial and a large ligament area.[1]

In the literature, they are often described as a source

of lower back pain. [3][4][5]. Due to the anatomical and biomechanical complexity of these joints and due to the variable clinical picture among patients, the best methods of diagnosis and treatment of SKB (sacroiliac joints) are unclear. [6] It is estimated that between 13%[7][8] and 32% of patients with chronic low back pain may have disorders in the above-mentioned structures. Most patients



who come to clinics show symptoms that can be diagnosed by radiological or laboratory tests. However, often diagnoses are temporary and overlook the sacroiliac joints along with the surrounding ligaments as a possible source of pain. Sacro-iliac joint pain can arise as a result of injury, pregnancy, degenerative disease and also in patients suffering from ankylosing spondylitis. In people who do not have any of the above factors, it is said to be sacroiliac joint dysfunction. [8] Pain can occur in the abdomen, [9] groin, hip, [10] leg and even feet. [9] Similar symptoms can be observed in dysfunctions related to the intervertebral disc and piriformis muscle syndrome. Differentiation from the former consists in finding the absence of neurological symptoms and a negative test result with the elevation of the straightened lower limb. Piriformis syndrome can be ruled out by a test of passive flexion, adduction and internal rotation of the lower limb. [11] Although several features have been identified that may indicate sacroiliac joint dysfunction, a specific clinical syndrome has not yet been presented, and radiological examinations do not always show changes in the joints. Several tests have been described to confirm the origin of pain, but there is no consensus on their actual effectiveness.

Treatment of patients with suspected sacroiliac joint disorders is very difficult. In the case of minor or moderate pain, pharmacotherapy and physical therapy are used, although opinions on the effectiveness of physiotherapy differ. [8] Manual therapy, pelvic stabilization exercises, balance exercises and orthoses are also used. [6]

Intra-articular injections containing anesthetics, steroids or a mixture of both substances are also used. [12,13] Currently, the two most common therapies that doctors recommend to patients with ailments of sacro-iliac joints are kinesiotherapy and spinal joint manipulation [6], which are often used by physiotherapists to treat neuromusculoskeletal disorders. [7] When the pain is severe, surgical intervention is considered during the consultation. The results of such surgery are mostly based on small groups of patients, often with only retrospective analysis, although a few larger groups have been reported. Despite this, the results of the treatments are contradictory. [8] There is also a new

non-invasive therapeutic method used in musculoskeletal dysfunctions - extracorporeal shock-wave therapy (ESWT). The mechanism of action of the above method is not yet fully known, but this method has been used more and more often in recent years. In 2017, a group of Korean researchers published a study that used this method to treat sacroiliac joint pain. The conclusion was that ESWT therapy could potentially be a treatment option for ailments of sacro-iliac joints [15].



FIGURE 1. Application using a standard set of pins (Source: private archive)

Pinotherapy is a reflex therapy. It shows great versatility in terms of its indications, due to the wide range of reflexes and reactions that are aroused by the techniques used in it. In pinotherapy, the most important part of diagnostics is the medical history, and in particular the pain history. This is because there are repetitive objective characteristics of pain and also repetitive subjective characteristics of pain. According to the WHO, health is "a state of complete physical, mental and social well-being", and the basis of this definition is the fundamental principle of balance, where its lack leads to a condition referred to as a disease. In medicine, on the other hand, health is perceived as a state of homeostasis conditioned by the efficiency of individual organ and tissue systems. Disease could therefore be described as a condition in which all local or systemic systems regulating the work of a given organ or the whole organism are disturbed for a long time. Therefore, therapy, including musculoskeletal therapy, should always have such an effect on the body that is to support its regenerative and regulatory abilities in order to return to a state of balance. Musculoskeletal therapy is no exception. Here, too, individual control paths characterized by

a specific type of transmitted information interact with each other in order to maintain the musculo-skeletal system in health and full efficiency (including resistance to external factors affecting it). The idea of determining regulatory systems important in the health and pathology of the musculoskeletal system was the guiding principle of the Polish creator of the manual medicine method, Radosław Składowski, MD.

Aim of the study

The aim of the study was to compare the effectiveness of pinotherapy and manual therapy in the treatment of pain in the sacroiliac joints.

Methodology

The study was conducted in a group of 40 patients of both sexes (24 women, 16 men) aged 42 to 59 years (51.45 ± 4.71) with an average BMI of $25.52 (\pm 1.83)$ kg/m² of body. The patients underwent rehabilitation at the Małopolska Rehabilitation Hospital in Krzeszowice and the District Hospital in Chrzanów. The subjects were randomly divided into two groups in order to compare the effectiveness of two treatment methods: pinotherapy and manual therapy according to Kaltborn-Evjenth.

1. Group I - (control) Pinotherapy: 20 patients (12 women and 8 men) aged 42-59 years (mean 51.25 ± 5.05) with an average BMI of $25.33 (\pm 1.61)$
2. Group II - (experimental) Undergoing manual therapy: 20 patients (12 women and 8 men) aged 43-58 years (mean 51.65 ± 4.48) with an average BMI of $25.70 (\pm 2.05)$

In both groups, 6 treatments were performed at intervals of two days. A standard set of pins was used for the pinotherapy treatment, the application was increased during each treatment. The place of application of the procedure was the area of the sacroiliac joint and the trapezius lumbar muscles. In the second group of subjects, the techniques of OMT Kaltborn-Evjenth Manual Therapy were applied to the area of the sacroiliac joints, post-isometric relaxation of the erector spine muscle and spinal mobilization in the L4-L5 and L5-S1 segments.

The assessment of the effectiveness of the procedure was assessed using two tools:

1. Pain Numeric Rating Scale. During the examination, the patient marked his pain sensations on a scale from 1 to 10 (1 means no pain, 10 the greatest pain imaginable) in 3 aspects: the level of pain felt at the time of the examination, the lowest and highest level of pain he felt in the 24 hours preceding the examination. The arithmetic mean of 3 scores indicated the average level of pain in a given patient [15].
2. Oswestry questionnaire. Patients were asked to answer about everyday life in 10 categories. Each of them had the opportunity to choose one of 6 answers, which were scored on a scale from 0 to 5. The maximum number of points that could be obtained was 50 [16]. Patients were examined with the above-mentioned tools twice: before the first procedure and one week after the end of therapy.

The statistical analysis was performed using GNU PSP and Libre Office Calc. The results of the analyses were presented using arithmetic means and standard deviation. Statistical analyses were carried out at the significance level $\alpha = 0.05$.

Results

Before the therapy, in group I (control), the mean pain score on the Pain Numeric Rating Scale was 5.62 points (± 0.85), and in group II (experimental) 5.55 (± 0.89). The lowest observed value in the first group was 4.33 points, in the second group 4 points. The highest values achieved were the same in both groups and amounted to 7.33 points. In the Oswestry Questionnaire, patients scored an average of 33.20 points (± 8.38) in the first group and 33.85 (± 8.00) in the second group. The lowest values in both groups were 18 and 24 points, respectively. The highest values were 46 and 47 points, respectively.

After pinotherapy, the mean pain score was 2.21 points (± 0.48), while in the manual therapy group it was 1.77 (± 0.55) points. The lowest value reached 1.33 points in group 1 and 0.67 in group two. The highest pain score values were 3.0 in group one, 2.67 in group 2.

The mean decrease in pain score in patients after pinotherapy was $3.40 (\pm 0.69)$ points, the minimum difference between baseline and posttherapy

scores was 2 points, and the maximum difference between baseline and posttherapy was 4.66 points. In the group of patients who received manual therapy, the mean decrease in the Pain Numeric Rating Scale was $3.78(\pm 0.96)$. The minimum and maximum differences between the pre- and post-treatment scores were 1.67 points and 5.66 points, respectively. In group I, after performing pinotherapy treatments, the average score obtained in the Oswestry Questionnaire was $8.85(\pm 4.80)$ points. The minimum and maximum values were 0.00 and 18.00 points, respectively. In group II, the following values were obtained: mean $5.90(\pm 3.77)$, minimum 0.00, maximum 12.00 points. The mean decrease in the number of points in the Oswestry Questionnaire recorded in group I was $24.35 (\pm 4.73)$ points. The minimum and maximum value of the decrease were 18.00 and 34.00 points, respectively. In group II patients, the mean decrease in the number of points was $27.95 (\pm 5.19)$ points, the minimum and maximum decreases were 21 and 37 points, respectively.

Applications

1. Pinotherapy and orthopedic manual therapy are effective in treating pain in the sacroiliac joints
2. Both therapies show similar effectiveness in the treatment of pain in the sacroiliac joints.
3. The study showed slightly greater effectiveness of treatments using manual therapy techniques.

Discussion

Chronic low back pain causes discomfort and inconvenience in everyday life, in many cases does not respond to conservative treatment, which is why new methods of treating this condition are sought. H. Han et al. They examined 30 patients with lower back pain. The subjects were divided into two groups of 15 people each: the first (mean age 46.0 ± 8.9 years) underwent conventional physiotherapy (heat therapy 20 minutes, ultrasound 5 minutes, TENS 15 minutes), the second extracorporeal shock wave (9.7 ± 8.3 years). The treatments were performed twice a week for six weeks. A shock wave with the following parameters was used for

therapy: 1000 shock waves (7 times per second), frequency 2.5 Hz, low energy flux 0.01-0.16 mJ/mm² using a 17 mm head. The places of wave application were the trapezius lumbar muscle and the sacroiliac joints, special places of pain. The VAS scale, the Oswestry Questionnaire and the Beck Depression Scale were used to monitor the progress of therapy. Intra-group comparisons showed significant decreases in scores on all three scales in those who had undergone extracorporeal shockwave therapy at the end of the study period. Comparison of both groups showed that the decrease in the examined parameters was greater in the group after shockwave therapy. [17]. Y. Moon et al. In his study, he randomly assigned 30 patients with sacroiliac joint pain into two groups: 15 people in the shockwave therapy group and 15 people in the control group. In the first group, a wave with the following parameters was used: 2000 shock waves, with the maximum energy flux tolerated by the patient (0.09-0.25 mJ/mm²). The head was perpendicular to the posterior line of the sacroiliac joint. The control group received simulated 2000 shock waves, where the head was pointed parallel to the posterior line of the joint. Patients were assessed using the Numerical Pain Rating Scale and the Oswestry Questionnaire before treatments, one week and four weeks after the end of therapy. In the first group to undergo actual therapy, after 4 weeks, a significant decrease in the value in the Numerical Pain Rating Scale was noticed. Scores on the Oswestry Questionnaire improved slightly after one and four weeks. In the control group, where the procedure was simulated, the scores of the Numerical Pain Rating Scale and the Oswestry Questionnaire did not differ at any time point after therapy. At week 4 after surgery, there was a difference in the Numerical Pain Rating Scale in both groups, but it was not visible in the results of the Oswestry Questionnaire. [18]. There are also studies on the use of manual therapy in the treatment of sacroiliac joint dysfunctions. As in the conducted study, post-isometric muscle relaxation is used. Alkady S. et al. in their research, they compared the effect of mobilization according to Mulligan and the muscle energy technique in dysfunctions of the sacroiliac joints. The 45 patients were divided into three groups, each with

15 people. In group A, mobilization with movement according to Mulligan and conventional treatment were used. Group B therapy included the technique of muscle energy-horizontal muscle relaxation: dorsi-erector, posterior group of the thigh, iliopsoas, trapezius lumbar and traditional physiotherapy. The C-control group underwent only conventional rehabilitation. Doppler examination, palpation meter and VAS scale were used to monitor the progress of therapy before and after. The results of the study revealed a significant improvement in the mobility of the sacroiliac joints in the group in which Mulligan mobilizations were used. In addition, a decrease in pelvic angle was observed after mobilization and in the group using post-isometric muscle relaxation[19]. Pirotherapy is currently eagerly used by physiotherapists, it works well in many ailments, there are very few scientific reports on its effectiveness, which prompts research using it [20,21,22].

Resumo

Celo. La celo de la studo estis kompari la efikecon de pinoterapio kaj mana terapio en la traktado de doloro en la sakroiliakaj artikoj.

Metodo. La studo inkluzivis grupon de 40 pacientoj, kiuj raportis al la oficejo de fizioterapiisto kun doloro en la sakroiliakaj artikoj. La klinika taksado implikis: Doloran Numeran Takso-Skalon kaj la Oswestry-Enketilon. Pacientoj estis dividitaj en du grupojn de 20 homoj. En la unua grupo oni uzis ŝokterapion, en la dua grupo oni uzis elektitajn manajn terapiajn teknikojn.

Rezultoj. Post la terapio, statistike signifa redukto de doloro en la sakroiliakaj artikoj estis observita en ambaŭ grupoj (Dolora Numera Takso-Skalo). La relativa diferenco en la severeco de dolorredukto en ambaŭ grupoj estis simila.

Konkludoj. La studo montris, ke pinoterapio kaj manaj terapiaj teknikoj estas efikaj en la traktado de doloro en la sakroiliakaj artikoj. Krome, ambaŭ metodoj montras kompareblan efikecon de traktado de la supre menciitaj malsanoj, ĉar eblas, ke ili povas esti uzataj interŝanĝeble ĉe pacientoj depende de individuaj kontraŭindikoj.

Conflict of Interest

The authors of this article declare that there is no conflict of interest.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

Reference

1. Polly R. The Sacroiliac Joint. *Neurosurgery Clinics of North America*. 2017;28(3):301-312.
2. Cox M, Ng G, Mashriqi F, Iwanaga J, Alonso F, Tubbs K et al. Innervation of the Anterior Sacroiliac Joint. *World Neurosurgery*. 2017;107:750-752.
3. Adhia D, Tumilty S, Mani R, Milosavljevic S, Bussey M. Can a Hip Abduction-External Rotation (HABER) test discriminate for low back pain of sacroiliac joint origin?. *Physiotherapy*. 2015;101:191-197.
4. Taheri A, Lajevardi M, Abad M, Zebardast J, Shaabani S. Sacroiliac Joint Intraarticular Injection in True Anteroposterior View: Description of a New C-Arm Guided Method. *Pain Physician*. 2018;21(1):61-66.
5. Hoffman M, Agnish V. Functional outcome from sacroiliac joint prolotherapy in patients with sacroiliac joint instability. *Complementary Therapies in Medicine*. 2018;37:64-68.
6. Kamali F, Zamanlou M, Ghanbari A, Alipour A, Bervis S. Comparison of manipulation and stabilization exercises in patients with sacroiliac joint dysfunction patients: A randomized clinical trial. *Journal of Bodywork and Movement Therapies*. 2019;23(1):177-182.
7. Sipko T, Paluszak A, Siudy A. Effect of Sacroiliac Joint Mobilization on the Level of Soft Tissue Pain Threshold in Asymptomatic Women. *Journal of Manipulative and Physiological Therapeutics*. 2018;41(3):258-264.
8. Nyström B, Gregebo B, Taube A, Almgren S, Schillberg B, Zhu Y. Clinical outcome following anterior arthrodesis in patients with presumed sacroiliac joint pain. *Scandinavian Journal of Pain*. 2017;17(1):22-29.
9. Murakami E, Aizawa T, Kurosawa D, Noguchi K. Leg symptoms associated with sacroiliac joint disorder and related pain. *Clinical Neurology and Neurosurgery*. 2017;157:55-58.
10. Prather H, Cheng A. Diagnosis and Treatment of Hip Girdle Pain in the Athlete. *PM&R*. 2016;8(3):S45-S60.
11. Kok H, Mumtaz A, O'Brien C, Kane D, Torreggiani W, Delaney H. Imaging the Patient With Sacroiliac Pain. *Canadian Association of Radiologists Journal*. 2016;67(1):41-51.
12. Salman O, Gad G, Mohamed A, Rafae H, Abdelfatah A. Randomized, controlled blind study comparing sacroiliac intra-articular steroid injection to radiofrequency denervation for sacroiliac joint pain. *Egyptian Journal of Anaesthesia*. 2016;32(2):219-225.
13. Cánovas Martínez L, Orduña Valls J, Paramés Mos-

- quera E, Lamelas Rodríguez L, Rojas Gil S, Domínguez García M. Sacroiliac joint pain: Prospective, randomised, experimental and comparative study of thermal radiofrequency with sacroiliac joint block. *Revista Española de Anestesiología y Reanimación (English Edition)*. 2016;63(5):267-272.
14. Moon Y, Seok H, Kim S, Lee S, Yeo J. Extracorporeal shock wave therapy for sacroiliac joint pain: A prospective, randomized, sham-controlled short-term trial. *Journal of Back and Musculoskeletal Rehabilitation*. 2017;30(4):779-784.
 15. Farrar J, Young J, LaMoreaux L, Werth J, Poole M. Clinical importance of changes in chronic pain intensity measured on an 11-point numerical pain rating scale. *Pain*. 2001;94(2):149-158.
 16. Sieradzki M, Krajewska-Kułak E, Van Damme-Ostapowicz K. Ocena występowania zespołów bólowych dolnego odcinka kręgosłupa w populacji studentów kierunku fizjoterapia. *Problemy Higieny i Epidemiologii*. 2013;3(94):451-458.
 17. Han H, Lee D, Lee S, Jeon C, Kim T. The effects of extracorporeal shock wave therapy on pain, disability, and depression of chronic low back pain patients. *Journal of Physical Therapy Science*. 2015;27(2):397-399.
 18. Moon Y, Seok H, Kim S, Lee S, Yeo J. Extracorporeal shock wave therapy for sacroiliac joint pain: A prospective, randomized, sham-controlled short-term trial. *Journal of Back and Musculoskeletal Rehabilitation*. 2017;30(4):779-784.
 19. Alkady S, Kamel R, AbuTaleb E, Lasheen Y, Alshaarawy F. Efficacy of Mulligan Mobilization Versus Muscle Energy Technique in Chronic Sacroiliac Joint Dysfunction. *International Journal of Physiotherapy*. 2017;4(5).
 20. Graczykowski M., Skibiński K., Goślińska J., Hejdysz K.: Pinoterapia - innowacyjna polska metoda. *Rehabilitacja w praktyce*, 2022.
 21. Składowski R., Pinoterapia – element składowy Medycyny Manualnej w Koncepcji Pięciu Układów Regulacyjnych, *Rehabilitacja w praktyce*, 2022.
 22. Graczykowski M., Rafalski T., Skrypt do kursu PINOTERAPIA w ujęciu FRSc, pod redakcją Składowski R. 2022.