SELECTED OSTEOPATHIC TECHNIQUES IN LOW BACK PAIN TREATMENT

Marian Majchrzycki[1], Marcin Hoffmann[2], Sławomir Marszałek[3,4]

[1] *Department and Clinic for Rehabilitation, Karol Marcinkowski University of Medicine in Poznań*
[2] *Osteopathy and Rehabilitation Office in Poznań*
[3] *Department of Athletics, University School of Physical Education of Eugeniusz Piasecki, Poznan*
[4] *Department of Head and Neck Cancer, Greater Poland Cancer Centre, Poznan*

Summary

Introduction. Low back pain is a serious problem of Western societies in the 21st century. It sometimes starts with a so-called acute state, which is characterized by a rapid, strong, peracute course, which makes the patient unable to function normally; sometimes this pain is the sum of overlapping pathologies and dysfunctions.
Method. The aim of the authors is to present a treatment process of low back pain which is based on the osteopathy concept. Osteopathy treats the dysfunction, which means the loss of mobility in the myofascial, joint and visceral system, and not the pathology or structural lesions. Due to the fact, that back pain can be caused by many factors, sometimes even life threatening, the osteopath is obliged to make a preliminary differential diagnosis. This relates both to the medical plane in terms of excluding pathologies and the functional plane based on a palpatory evaluation as well as osteopathic tests for dysfunctions in joint, tissue and visceral mobility. A detailed diagnostic approach based on medical knowledge and palpatory skills enables one to choose the right treatment technique.
Conclusion. The osteopathic approach to low back pain in both acute and chronic states delivers positive results. Applied techniques are safe, non-invasive and non-traumatic. These techniques consist of direct, indirect, functional, and reflex techniques (these use the nervous and muscular reactions), and techniques which drain parts of the body affected by an inflammatory state.

Key words: osteopathy, pain, low back pain, lumbar spine

Introduction

Low back pain (LBP) can affect many structures, including: nucleus pulposus, nerve roots, bones, zygapophyseal joints (as well as articular surfaces), iliosacral joints, interspinal ligaments, supraspinous ligaments, iliolumbar ligaments, sacroiliac ligaments, and soft tissues – muscles and fascia. This refers

also to referred and projected pain, which might result from a disease of another part of the body, especially the innominate bone [1, 2]. It can also be a result of undiagnosed internal diseases.

Low back pain

Back pain, especially when located in the lower part of the spinal cord, is a serious clinical and social issue in the developed countries. It is estimated that almost 80% of their citizens are affected by this dysfunction, and that half of them suffer from this kind of pain each year This problem affects middle-aged people between 45 and 60 years of age [3,4].

According to Deyo RA low back pain is mainly (97% of cases) of mechanical origin or develops as a result of physical activity. It relates mainly (70% of cases) to soft tissue dysfunctions and myofascial tension. The origin of the pain is usually idiopathic, of an unspecific origin [2].

Each third or fourth patient in Poland consults a general practitioner and complains about “rheumatic problems”; their underlying causes are problems with soft tissues [5].

To a smaller degree, in about 10% of all cases pain is related to the age of patients and is caused by the degeneration of vertebrae, articular surfaces and discs. Discopathy, spinal stenosis and other causes complete the picture.

Non-mechanical causes such as bone and joint infections, metabolic bone diseases or fibromyalgia constitute only 1% of causes of low back pain. Referred pain should also be taken into consideration. It can be caused by visceral diseases, reproductive organ and abdominal aorta diseases. These causes constitute only 2% of low back pain [2].

Diagnostics are important for full recognition, and palpatory examination is as important as the interview itself. More than 85% of patients with low back pain are not properly diagnosed [2, 6]

Low back pain is sometimes taken as a symptom of strain injuries – spondylosis: degenerative osteoarthritis of the joints and articular surfaces – caused by excessive use of spinal structures due to an overload exceeding its resistance in a condition of reduced adaptive capability [7]. Repetitive and cumulative overloads of the spine, especially in the lumbosacral portion, can gradually lead to degenerative lesions, which in many cases cause pain [8]. The course of spondylosis can be asymptomatic as well as symptomatic [9]. In 10% of patients degenerative lesions can constitute the primary cause of pain.

The muscular system is often subject to strain. On one hand it is influenced by many external factors – impulses from the environment; on the other hand it is the executor of conscious and unconscious impulses sent by the central nervous system [10, 11, 12].

Reflex points

Very important and helpful in the healing process are painful reflex points such as myofascial trigger points and other pressure-sensitive points, which occur in muscles, fascia, periosteum, periarticular tissue (joint capsule) and muscle attachments [11, 12]. Periosteum, joint capsules and ligaments, which

passively stabilize joints, can also be a source of pain. Many experiments have been conducted during which structures of the musculoskeletal system, such as joint capsules, ligaments and skin, and scars in the locomotor system and myofascial trigger points were irritated or anaesthetized, confirming their influence on the occurrence of local and metastatic pain. One cannot forget that in muscles, muscle attachments and ligaments are also pain receptors [11, 13].

Structures causing metastatic pain:

– Muscle tissues
– Skin
– Joint capsules
– Ligaments
– Scars
– Periosteum
– Fascia [10, 11, 12, 13, 14, 15].

Zygapophyseal joints and the sacroiliac joint are also a source of local pain in the low back and referred pain in the gluteal region and in the lower extremities. Other regions where referred pain can occur are the sacroiliac joint, low back and hip joint [15, 16].

Fascia

One has to emphasize the role of fascia in the locomotor system. They surround the muscles and inner organs and are a carrier of tension. Through a change in tension or restriction in tissue mobility in the myofascial system one can provoke the dynamic transmission of tension and disturbances to remote parts of the body. This happens through muscle chains. In physiological and pathological states the human body reacts as a whole. Through the continuity of the fascial system dysfunctions of one organ or a part of the body can affect linked or even remote structures.

Tissue restrictions in the myofascial system can disable a normal range of motion of the tissue. It is important that soft tissues, especially those in deeper layers of the connective tissue around muscles and fascia, can freely slide against one another. Due to the fact that they cohere to each other they have an influence on muscles and other structures, which can have problems with shortening and lengthening, causing dysfunctions and restrictions in the myofascial system [16].

Osteopathic treatment

The osteopath, during the patient's visit to the treatment room, conducts a detailed interview, performs a diagnosis and physical examination , and makes a differential-excluding diagnosis. If necessary, the patient is directed to an appropriate specialist due to the fact that not all clinical cases can be subject to osteopathic treatment, or sometimes there is a need to consult another specialist of a given branch of medicine [17]. Osteopathic treatment can be the only treatment or be included in neurological, orthopedic, dental, and psychological treatment.

Osteopathic medicine is a holistic approach rather than local treatment, and a global approach of perceiving the body as a whole. It concentrates on how

a person functions in the environment and on the lifestyle, looking for the ultimate causes of health problems. In chronic diseases osteopathic treatment has a constitutional rather than a local character; its aim is to help the organism to restore homeostasis and the tone balance in the whole body [18].

Through a palpatory examination (and tissue mobility tests) the osteopath "senses" function disorders. These include: tissue texture changes, structural asymmetry, mobility restrictions and tenderness. Function disorders can occur in painful areas or at a certain distance from them. Dysfunctions can be the reason for pain or can be a result of pathologies – degenerative changes, discopathy or tension caused by stress, which cause a dysfunction of the myofascial system. [12,19].

The aim of osteopathic treatment is to strengthen the self-healing abilities of the organism by removing barriers to physiological functions in order to reduce pressure on nerves and veins, as well as inducing metabolic, biochemical and circulatory changes. The manipulation is based on manual therapy, active and passive soft tissue release techniques, and sacral techniques [18,20].

Osteopathic techniques can be divided into 5 main categories:

1. Direct techniques: high velocity low amplitude (HVLA), joint technique, general osteopathic treatment, muscle energy technique.
2. Indirect techniques: functional technique, strain and counterstrain technique, ligament techniques.
3. Combined techniques: myofascial release, visceral technique, cranio-sacral osteopathy.
4. Reflex techniques: Chapman reflex, myofascial trigger points, neuro-muscular techniques.
5. Liquid based techniques: lymph pump techniques [21].

After a preliminary examination, the majority of the above-mentioned techniques can be applied in the case of most patients in an acute or chronic state of low back pain. The safest and most often applied techniques are: muscle energy technique, strain and counterstrain technique, facilitated positional release, myofascial release and ligament release technique, and Sutherland technique [21, 22].

Muscle energy techniques

Muscle energy techniques relate to isometric tension of the group of antagonistic muscles which require treatment. During the therapy the muscle tissue is used as a lever for joint mobilization and restoration of tone balance in the myofascial system, simultaneously reducing tension and improving joint mobility. The force applied by the therapist equals the muscle force of the patient and there should be no movement in the given segment. These techniques are based on the postisometric relaxation effect.

There are different types of muscle energy techniques: isometric contraction using reciprocal inhibition; isometric contraction using postisometric relaxation (without stretching); isotonic concentric contraction; isotonic eccentric contraction (isolytic) [22, 23].

Strain and counterstrain techniques (strain counterstrain (SCS) is a positional release technique)

Techniques developed by L. Jones consist in passive movements of a given joint by the therapist to the position of best comfort. Diagnostics are based on "tender points" specific for each joint and possible to locate only through a palpatory examination. The comfort position found, which corresponds with the "tender point", is kept for about 60 to 90 seconds and subsequently there is a slow and gradual return to the neutral position [23].

Fig. Muscle energy techniques: Lower lumbar region.

A hypothetical treatment of the lower lumbar region starts with a specific diagnosis. The patient lies on the abdomen with a pillow under it in order to reduce the lumbar lordosis. The therapist stands aside the patient with his face turned in his direction and places his thumbs on the spinous processes of the vertebra. Through flexion/extension motions of the wrist and horizontal pressure the therapist looks for a facilitated movement in the flexion or extension.

Posterior Lumbar Lateral L3

Tender point localization: ± 4 cm below the iliac crest and 7 cm apart of PSIS. Treatment: Patient prone, operator on opposite side. Operator lifts patient's leg above knee. Extension – moderate to marked, more for upper lumbars; Sidebend – away, move patient's leg towards operator; Rotate – towards, raise leg up on side opposite operator [23, 24, 25].

Facilitated positional release

Facilitated positional release is a passive, indirect manipulative technique developed by S. Schiowitz. The therapist directs a given segment of the spinal cord (through flexion or extension) to a facilitated mobility position. This is done on three planes so as to move apart articular surfaces. In order to spare 90 seconds of time, which are needed in SCS techniques, here we add pressure and twist. The body is held up in this position for a few seconds and then released. This technique helps to reduce muscle strain. It can also be used to treat muscles of the joint at the level where the problem occurs [23,24].

Fig. Strain and counterstrain techniques: Posterior Lumbar Lateral L3.

Myofascial and ligamentous release techniques

Myofascial release techniques are applied using the concept of tissue barrier. We can feel it when we stretch and move tissues. The physiological, correct extreme motion range (the barrier) should be sensed as something elastic and soft, and during attempts to increase the range of motion the resistance should be resilient. A disorder can be diagnosed when we reach the extreme possible motion range rapidly and we can sense an inflexible tissue barrier without resilience.

The therapist while applying the technique of passive stretching of the myofascial and ligament system uses a fixed point on the patient's body and a variable point with the help of his body. For maximum stretching of fascia the therapist applies torsion or traction to the skin. The whole treatment is about bringing the tissue into a state of tension by reaching the motion barrier and waiting for

spontaneous relaxation and an improvement in mobility (the so-called "relaxation phenomenon"). Other authors explain it as the "sticky flow phenomenon", i.e. the stimulation of the elastic component of the elastic collagen complex. The treatment is continued until we reach a tone balance and restore the balance of the fixed point of the patient [12, 23].

In the treatment of low back pain it is of great use to also apply myofascial techniques, which release the fascia of the lower half of the body forming the so-called lower unit – which connects the thoracolumbar fascia, the gluteus maximus, tensor fasciae latae, iliotibial band and tibialis anterior and the foot [11].

Ischemic compression – treatment reflex points

A specific palpation, finger pressure, is used in order to identify, locate and treat active myofascial trigger points, periosteum points and painful ligaments. The therapist with the help of his fingers locates the barriers and uses pressure with a force that is acceptable for the patient. He holds this pressure for a few seconds and releases the point – he repeats this activity until the pain is gone. Usually after a few seconds a relaxation can be sensed and then the therapist searches deeper layers of the tissue looking for the next barrier [12,22,23]. In low back pain treatment it is important to reduce the tone of the quadratus lumborum muscle, iliopsoas, erector spinae, and pelvic muscles such as the gluteus medius muscle or piriformis [11].

Visceral osteopathy

The diagnostics and treatment of visceral diseases is specific to the work of osteopaths. There is a series of interrelations between the lumbar portion of the cordial spine and the system of deep fascia of the thoracic cage, abdominal cavity and pelvis. The continuation of all autonomic structures is the reason why the therapist uses visceral manipulation as a part of the LBP treatment away from the direct source of pain.

Fig. Myofascial release technique.

The diagnostics of visceral dysfunctions are based on palpation, which allows one to judge whether the organ has normal parameters:
1. placement,
2. quality of structure based on the palpation examination,
3. its mechanical behavior.

During the examination of the abdomen we use a classic medical diagnosis, which, in connection with the primary reason for the consultation, can help to exclude potential pathologies. It will also help to interpret such symptoms as pain, a feeling of discomfort or flatulence.

Additionally, osteopaths make a hypothesis of osteopathic dysfunction. This is based on a potential relation with adjacent muscular-skeletal structures that have reacted abnormally during the palpation. Attention is also drawn to related information which is based on schemes of somatic-visceral, visceral-somatic or visceral-visceral interactions and psycho-somatic patterns, which often occur along with visceral dysfunctions.

The aim of visceral osteopathic techniques is also to activate the venous drainage at the level of the abdomen, thoracic cage and pelvis. This leads to compensation of pressure in the abdomen; it improves elasticity, eliminating restrictions in deep fascia structures [18, 26, 27].

In LBP treatment we remove restrictions in the lumbar part of the spinal cord in the area of:
– the pelvic floor,
– the abdominal diaphragm,
– deep visceral fascia – of the abdomen and thoracic cage,
– thoracic cage and ribs.

While diagnosing and treating the lumbar portion of the spinal cord one has to pay attention to the diaphragm. The diaphragm plays an important role in the process of spine stabilization and is responsible for normal intra-abdominal pressure. Its normal functioning is essential for the right holding of abdominal organs, especially for the right tone of the transverse abdominal muscle; it controls the tone of the thoracolumbar fascia and the front fascia. Restrictions often occur in this system and result in increased myofascial tone of the lumbosacral portion of the spinal cord.

Techniques applied after an examination include the normalization of the greater omentum. The aim of the treatment is to mobilize the greater omentum and related elements of the venous and lymphatic system.

The patient's position is on all fours on the table; the therapist stands aside the patient at the level of his pelvis. He embraces the abdomen of the patient with his arms and crosses his fingers. With the lower part of his palm he presses the tissues which are of maximum depth between the navel and pubic bone and mobilizes them in all possible directions. If he senses any problems in mobility of those tissues he starts to increase the traction. In this position he can also perform a push through the traction according to the principle 'high velocity low amplitude' in the direction of the plane of the table.

This technique is called normalization of the mesenteric root.

Fig. Visceral technique.

The aim of the treatment is to mobilize the deep fascia, which corresponds with the attachment of the mesentery and superior mesenteric artery.

The patient lies on his back; lower extremities are bent at the knee joints. Upper extremities along the trunk. The therapist stands on the left of the patient at the level of his pelvis and puts the base of his palm under the hypothetical line where the duodenojejunal flexure comes together with the ileocecal fold. In the exhalation phase he applies pressure in a horizontal direction to the line. During the inhalation phase, he slightly reduces the pressure; the therapist repeats this action many times in time with the respiratory cycle, performing something like "pumping" of the strained tissues [18, 26, 27].

Conclusions

The osteopathic approach to low back pain in both acute and chronic states is safe and is based on a differential diagnosis.

Osteopaths have a wide range of methods and techniques for muscle, fascia and joint treatment. These techniques are safe, non-invasive and non-traumatic.

These techniques cure osteopathic dysfunctions, i.e. tissue mobility loss, which can be a direct cause of pain or a result of a pathology.

References

[1] Loeser J.D.: The prevention of needless pain: research opportunities. *Prev. Med.*, 1994; 23: 709-711.

[2] Deyo R.A., Weinstein J.N.: Low Back Pain. *NEJM*, 2001; 344: 363-370.

[3] Palmer K.T., Walsh K., Bendall H., Cooper C., Coggon D.: Back pain in Britain: comparison of two prevalence surveys at an interval of 10 years. *BMJ*, 2000; 320: 1577-1578.
[4] Burton A.K., Balagué F., Cardon G., Eriksen H.R., Henrotin Y., Lahad A., Leclerc A., Müller G., van der Beek A.J. COST B13 Working Group on European Guidelines for Prevention in Low Back Pain. How to prevent low back pain. *Best Pract. Res. Clin. Rheumatol.,* 2005; 19 (4): 541-555.
[5] Szczepański L., Piotrowski M., Chudzik D.: Zespoły bólowe układu ruchu, jako problem lekarza pierwszego kontaktu. *Reumatologia*, 1996; 34, 376-381.
[6] Atlas S.J., Nardin R.A.: Evaluation and Treatment of Low Back Pain: An Evidence-Based Approach to Clinical Care. *Muscle Nerve*, 2003; 27: 265-284.
[7] Stodolny J.: Choroba przeciążeniowa kręgosłupa. Epidemia naszych czasów. ZL Natura, Kielce 2000.
[8] Buckwalter J.A., Kuettner K.E., Thonar E.J.: Age-related changes in articular cartilage proteoglycans: electron microscopic studies. *J. Orthop. Res.*, 1985; 3: 251-257.
[9] van Tulder M.V., Koes, B.W., Bouter LM.: Conservative treatment of acute and chronic nonspecific low back pain: A systematic review of randomized controlled trials of the most common interventions. *Spine*, 1997; 22: 2128-2156.
[10] Stecco L. Stecco C.: Manipolazione fasciale: trattamento. Piccin, Padova, 2007.
[11] Travell J.G., Simons L.S.: Myofascial Pain and Dysfunction: The Trigger Point Manual, t. 1. Williams & Wilkins, Baltimore 1999.
[12] Lewit K.: Terapia manualna w rehabilitacji narządu ruchu. ZL Natura, Kielce 2001.
[13] Hackett G.S.: Ligament and tendon relaxation (skeletal disability) treated by prolotherapy (fibro-osseous proliferation). 3rd end. Springield, IL: Charles C Thomas; 1958.
[14] Schamberger W. (ed.): The Malalignment Syndrome. Implications for Medicine and Sport. Churchill Livingstone, 2002.
[15] Lee D.: Obręcz biodrowa Badanie i leczenie okolicy lędźwiowo-miedniczo-biodrowej. DB Publishing, Warszawa 2005.
[16] Paoletti S.: The Fasciae: anatomy, dysfunction and treatment. Estland Press Inc. Seattle, 2006.
[17] Goodman C.C., Snyder T.E.K.: Differential diagnosis in physical terapy. Philiadelphia: WB Saunders; 1995.
[18] Ward R.C. (ed.): Foundations for osteopathic medicine, 2nd edn. Philadelphia: Lippicott Williams and Wilkins, 2003.
[19] Willard F.W.: Nociception, the neuroendocrine system, and osteopathic medicine. In: Ward RC (ed). Foundations for Osteopathic Medicine, 2nd edn. Philadelphia: Lippicott Williams and Wilkins; 2003; 137-156).
[20] Sammut E.A., Searle-Barnes P.J.: Osteopathic diagnosis. Cheltenham: Stanley Thornes Ltd; 1998.
[21] Lesho E.P.: An overview of osteopathic medicine. *Arch. Fam. Med.*, 1999; 8: 477-483.
[22] Chailtow L., Fritz S.: Masaż leczniczy. Bóle dolnego odcinka kręgosłupa i miednicy. Elsevier Urban & Partner. Wrocław 2009.
[23] Chaitow L. (red.): Manipulacje czaszkowe na tkankach kostnych i tkankach miękkich. Teoria i praktyka. DB PUBLISHING. Warszawa, 2010.
[24] Debroux J.J.: Kurs technik powięziowych. Szkolenie Osteopatów. Sutherland College of Osteopatic Medicine, Belgia/Polska, 2007.
[25] Friedman H., Gilliar W., Glassman J.: Counterstrain Approaches in Osteopathic Manipulative Medicine. SFIMMS Press, 2000.

[26] Quef B.: Kurs trzewnych technik osteopatycznych. Sutherland College of Osteopathic Medicine, Namur, Belgia, 2006.
[27] Lossing K.: Visceral Manipulation. In: Ward R.C. (ed.): Foundations for osteopathic medicine, 2nd edn. Philadelphia: Lippicott Williams and Wilkins, 2003.

WYKORZYSTANIE WYBRANYCH TECHNIK OSTEOPATYCZNYCH W LECZENIU DOLEGLIWOŚCI BÓLOWYCH DOLNEGO LĘDŹWIOWO-KRZYŻOWEGO ODCINKA KRĘGOSŁUPA

Marian Majchrzycki[1], Marcin Hoffmann[2], Sławomir Marszałek[3,4]

[1] Katedra i Klinika Rehabilitacji Uniwersytetu Medycznego im. Karola Marcinkowskiego w Poznaniu
[2] Gabinet Osteopatii i Rehabilitacji w Poznaniu
[3] Zakład Lekkiej Atletyki Akademii Wychowania Fizycznego w Poznaniu,
[4] Oddział Chirurgii Głowy i Szyi i Onkologii Laryngologicznej,
Wielkopolskie Centrum Onkologii, Uniwersytet Medyczny w Poznaniu,

Streszczenie

Wstęp. Dolegliwości bólowe odcinka lędźwiowo-krzyżowego kręgosłupa są poważnym problem zachodnich społeczeństw XXI wieku. Niekiedy rozpoczynają się tzw. stanem ostrym, charakteryzującym się przebiegiem nagłym, silnym, uniemożliwiającym funkcjonowanie, a innym razem są sumą nakładających się patologii i dysfunkcji.
Metoda. Autorzy mają na celu przedstawienie postępowania terapeutycznego w koncepcji osteopatycznej w dolegliwości bólowych odcinka lędźwiowo-krzyżowego. Osteopatia leczy dysfunkcję, a więc utratę ruchomości w obrębie systemu mięśniowo-powięziowego, stawowego i trzewnego. Nie leczy patologii, zmian strukturalnych. Ze względu na to, że powodów dolegliwości bólowych kręgosłupa może być wiele, niekiedy zagrażających życiu pacjenta, osteopata zobowiązany jest do przeprowadzenia wstępnej diagnostyki różnicowej. Dotyczy ona zarówno płaszczyzny czysto medycznej w celu wykluczenie patologii jak i funkcjonalnej w oparciu o badanie palpacyjne oraz testy osteopatyczne dotyczące dysfunkcji ruchomości stawowej, tkankowej czy trzewnej. Szczegółowe podejście diagnostyczne oparte na wiedzy medycznej i umiejętnościach palpacyjnych pozwala na dobór odpowiedniej techniki leczenie.
Wnioski. Podejście osteopatyczne do leczenia dolegliwości bólowych odcinka lędźwiowo-krzyżowego kręgosłupa zarówno w stanach ostrych jak i przewlekłych daje pozytywne skutki leczenia. Stosowane techniki są bezpieczne, nieinwazyjne i nieurazowe. Należą do nich techniki bezpośrednie, pośrednie, funkcjonalne, odruchowe – wykorzystujące oddziaływanie nerwowo-mięśniowe, a także techniki drenujące okolice ciała objęte stanem zapalnym.

Słowa kluczowe: osteopatia, ból, odcinek lędźwiowo-krzyżowy kręgosłupa.