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Visceral therapy in disorders of the female reproductive organs

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ABSTRACT

Dyspareunia is genital pain during sexual intercourse without constriction of the vulva or vagina. This is one of the most significant issues that lies at the border of gynaecology and sexology. Dyspareunia can be caused by endometriosis. Many women can also experience premenstrual syndrome, which can occur as a separate problem. All three of these can result from an imbalance between the female genital organs and their surrounding tissues with other structures of the skeletal or visceral system, with impaired mobility and motility of organs, intra-organ movement, vascular drainage, a pressure gradient between the urogenital and diaphragmatic cylinders, dysfunctions in the area of the broad ligament of the uterus, and fascial bonding. Apart from standard treatment methods used in gynaecology and sexology, physiotherapy (e.g., visceral therapy) is of great value. Visceral therapy aims at restoring intra-organ movement, reducing tension, focusing on the area of the two cylinders of the trunk, and supporting the functioning of the vascular system in the vicinity of the uterus. All these activities reduce pain and substantially change the functioning of the uterus and ovaries.

Key words: visceral therapy; woman; reproductive organ

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INTRODUCTION

The current fashion of healthy lifestyles translates into healthy eating, eco-living, and using a variety of non-pharmaceutical treatment methods that improve health. A good thing is that contemporary women are paying a lot of attention to the proper functioning of their bodies, wishing to stay healthy as long as possible, and also taking care of their sexual health. Dyspareunia (genital pain during sexual intercourse), which can be caused by endometriosis, is a very significant issue that lies at the border of gynaecology and sexology [1]. Dyspareunia is a form of female sexual dysfunction (FSD) that can involve hypoactive sexual desire disorder, aversion disorder, sexual arousal disorder, orgasmic disorder and vaginism. Many women can also experience premenstrual syndrome, which can occur as a separate problem [2].

All these issues can result from an imbalance between the female genital organs and their surrounding tissues with other structures of the skeletal or visceral system, such as impaired mobility and motility of organs, intra-organ movement, vascular drainage, a pressure gradient between the urogenital and diaphragmatic cylinders, dysfunctions in the area of the broad ligament of the uterus, and fascial bonding. Dyspareunia is a sexual dysfunction that manifests itself as pain in the reproductive organs before, during or immediately after sexual intercourse [3]. It should be emphasised that dyspareunia is pain during sexual activity, and it is not accompanied by constriction of the vulva or vagina, which is why it should be distinguished from vaginism, where penetration of the penis is not possible. Considering the issues outlined in this article, holistic care over patients experiencing these dysfunctions needs to be highlighted [1–3]. The structure and function of the body are interdependent. It is often the case that symptoms occur in the body in places very far from their causes. A holistic view on the body can significantly eliminate disorders.

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The influence on premenstrual syndrome and the above-mentioned lifestyle issues (physical activity, diet), personality disorders, addiction to psychoactive substances, and high body mass index (BMI) is pointed out.

Modifications to the diet can be an effective complementary treatment. For instance, as far as premenstrual syndrome is concerned, it is recommended to reduce salt and salty food intake. Similarly, caffeine (found mostly in coffee) can exacerbate emotional symptoms. It is also reasonably necessary to avoid drinking alcohol, as well as limit the consumption of simple carbohydrates and replace them with complex carbohydrates. Vitamin and mineral deficiencies can be a risk factor for the symptoms of the above presented issues. For example, B-group vitamins and folic acid are essential for the synthesis of neurotransmitters (potentially implicated in the pathogenesis of premenstrual syndrome). The importance of vitamin D has also been pointed out – a dose of above 2.5 µg lowers the risk of premenstrual syndrome. Between ovulation and menstruation, it is suggested to take a daily amount of 1200 mg of calcium and 6 g of tryptophan, as well as an increase in magnesium and vitamin D intake. Gingko, saffron, soya, vitamin E, as well as herbal preparations (vitex agnus-castus, St John's-wort and black cohosh) are effective in preventing the issues in question. It is crucial to recommend a balanced diet, tailored to the patient's personal needs by a dietician. Based on a dietary history, dieticians can identify mistakes made by patients and determine the necessity and scope of a diet modification [4].

Femininity, which manifests itself in good reproductive health, is of key importance for women. Dysfunctions in the female reproductive organs may take a variety of often clinically equivocal forms that in many cases feature similar aetiology. The reasons for that can lie in disorders of the fascia-muscle-organ axis, which qualifies for visceral therapy targeted to the causes of gynaecological disorders. Paying attention to the anatomical relationships of the uterus and ovaries through the ligament system with the sacral bone, or through the fascia with the surrounding muscle sheaths and organs, can give a clearer picture of the reasons of excessive tension resulting in pain in this area. An important factor causing discomfort in patients may be unbalanced pressure between the abdominal cylinders formed by the respiratory diaphragm and the urogenital diaphragm of the pelvic floor [5–7]. Disorder within the core stability can lead to diastasis recti, which is often observed in late pregnancy or in the postpartum period and affects the bowels. Visceral therapy significantly improves bowel function and help with constipation [8, 9]. Abnormal pressure between the respiratory diaphragm and the urogenital diaphragm can cause urinary incontinence. Randomised double-blind studies carried out among women suffering from urinary incontinence have shown that the groups which had undergone pelvic floor training and visceral therapy recorded significantly better results and improved quality of life [10].

Considering the system of connections between the reproductive organs and the bony components of the spine, the sacral bone can be pointed to as a source of pain in women visiting therapists. For that reason, differential diagnosis should be an indispensable element in the search for the source of the problem. The resulting conclusions, combined with history including information about dysmenorrhea, sexual activity, ovulation and other conditions indicating gynaecological pathologies, should suggest the implementation of visceral therapy in the treatments.

Amongst the lesions in the female genital tract, we can distinguish endometriosis, dyspareunia and premenstrual syndrome [11–13] that are characterised by pain within the abdominal cavity. It can be said that a common denominator of these disorders is increased muscle tone. Visceral therapy focuses on regaining the mobility and motility of internal organs, myofascial release, regulating pressure between the chambers of the abdominal cavity, and relieving the negative consequences of dysfunctions of the female reproductive organs [14, 15]. Visceral therapy can also support infertility treatment [16]. Due to the fact that women often consider their disorders as shameful, some techniques require an extensive trust in therapists.

Objective

the objective of this paper is to present visceral therapy — a non-pharmacological and non-invasive complementary method — in the treatment of gynaecological dysfunctions.

ANATOMICAL RELATIONSHIPS BETWEEN THE STRUCTURES OF THE REPRODUCTIVE SYSTEM

The uterus lies in the small pelvis, between the rectum and the bladder, in the intraperitoneal (and partially in the subperitoneal) space. The cervix is to some extent situated in the retroperitoneal space and can change its position depending on expansion in the rectum and bladder.

The vagina lies in the caudal direction, and the sigmoid colon and the ileum lie in the cranial direction. Dorsally, the small intestine enters from the top, and the rectum from the bottom. Ventrally, in the vicinity of the organs is the urinary bladder, and laterally, the wide ligament of the uterus [17]. The uterine suspension system relies on elements of the skeletal system and consists of the following structures: the peritoneum, the round ligament of the uterus, the broad ligament of the uterus, and the sacro-recto-genito-pubic lamina. Adhesions or other restrictions in the peritoneum area have a significant impact on the mobility of the uterus. The round ligaments of the uterus run through the inguinal canal to the litter of the labia majora, laterally on both sides

of the uterus. The broad ligament of the uterus is very important for the functioning of the entire reproductive system as most of the structures supplying the uterus with blood (veins, arteries, lymphatic vessels and venous plexuses) are located in this region. It provides support and stabilises this organ. Delbet's lamina (sacro-recto-genito-pubic) stabilises this organ in the sagittal plane using the sacro-uterine ligament, which when pulled and irritated restricts mobility in the area of the sacrum and hips [18]. Sensory information from the uterus travels through axons via the hypogastric plexus to the thoracolumbar segments of the spine via the minor visceral nerve (T10-L2) [19]. In the other direction, impulses from the parasympathetic system are transported. The sacro-recto-genito-pubic lamina is connected with the hypogastric plexus, which acts as a locating connective tissue structure [18]. The axons carrying the sensory sensations from the vagina reach the spinal cord through the pelvic nerves and run to the sacral segments (S2-S4). The area surrounding the cervix creates a transitional zone for the nervous system, and impulses from this area can reach the spine using both types of the above-mentioned pathways [19]. The organs supplied by the hypogastric plexus are connected to it by integration located along the strands constituting the stabilising structures. Any abnormal tension may lead to stress asymmetry on either side of the pelvis, or irritation of the particular tissues [20]. Autonomic control resulting from dual sympathetic and parasympathetic innervation in the genitals is very advanced and complex. Feedback processes take place and are reflected in pain impulses from internal organs, and in centripetal connections carrying tension information, and are connected with local feedback loops [21].

RELATIONSHIPS BETWEEN DYSFUNCTIONS OF THE REPRODUCTIVE ORGANS AND PAIN IN THE SPINE

In the abdominal-pelvic cavity there are somatic structures of the pelvic floor and the abdominal cavity, whose synergistic movement between the individual organs supports the maintenance of the body's midline in a proper relation to its anatomy. The fascial planes along with the organs surrounding and connecting the abdominal-pelvic cavity are the starting point for assessment of the slide and its dynamic, position in relation to other organs, and the decision to undertake visceral therapy [22]. The thoracolumbar fascia has a great influence on intra-abdominal pressure and contributes to the proper functioning of the lumbar and pelvic areas [23]. Other important elements of the fascial system in the context of the reproductive system are the diaphragm, the iliopsoas muscle, the iliac fascia, the superficial abdominal fascia, the transversalis fascia, the pelvic fascia, the urogenital fascia, and the presacral fascia [12].

Gynaecological diseases can cause pain in the pelvic area and in the lower spine. If the examination excludes musculoskeletal causes, dysfunctions in the reproductive system should be considered, and a more detailed medical history regarding the genital organs should be taken. Back pain can be caused by pregnancy, ovarian cysts, uterine retroversion, endometriosis, uterine fibroids, or inflammation of the upper genital tract [24, 25]. An increased tension in the abdominal cavity caused for example by hypertonia of the pelvic urogenital diaphragm can also shorten the iliopsoas muscle and, consequently, cause dysfunction of the lower spine. Each disease process in this area manifests itself in increased protective tissue tension [26]. Similar causes can be seen in pelvic pain: misalignment of the uterus, (ectopic) pregnancy, uterine fibroids and ovarian cysts, the use of an intrauterine device, endometriosis, pelvic prolapse, vulvodynia, premenstrual syndrome, adhesions, polyps, or varicose veins. In the case of pain in the sacrum and sacroiliac joint, the causes may be neoplasms of the reproductive system, prolapse of the uterus, pelvic inflammatory disease, uterine retroversion, pregnancy, ovarian cysts, the use of an intrauterine device, or endometriosis [27]. Pain in the lower spine, pelvis, sacrum and sacroiliac joint may also be caused by sexual abuse or incestuous intercourse [24]. Santos et al. showed that visceral manipulations combined with a physiotherapeutic programme improve mobility in the lumbar spine [28]. Visceral therapy can successfully be used for non-specific pain in the cervical spine. In the case of the liver and spleen, these techniques significantly reduced pain in the cervical spine and improved EMG [29]. A considerable improvement in functional status was observed following the use of visceral treatment for non-specific low back pain [30, 31].

VISCERAL THERAPY — PRINCIPLES AND OBJECTIVES

The objective of visceral therapy for selected dysfunctions is to support movement, articulation and tissue rhythm. Movement is a physiological phenomenon and a fundamental aspect of life. This also applies to micromovements. There is no body activity that is not expressed in the rhythm of pulsations, peristalsis and vibrations. The membranes and the fluids they contain vibrate and transmit mobility to the surrounding structures, which is explained by the tensegration phenomenon [32]. The anatomical structures in the human body (*e.g.*, muscles and internal organs) are not isolated tissue forms. Each of them is surrounded by bands of connective tissue and a system of blood and lymphatic vessels. Treatment of dysfunctions in these structures needs to include the structure of the entire cavity [14, 15]. In the case of dysfunctions in the reproductive system, this involves an assessment of the abdominal and pelvic cavity. For the cavity to be

able to maintain its physiological movement, the organs must move in relation to each other, and in relation to the surrounding sheaths. There are three pathomechanisms that disturb the sliding motion between organs and the surrounding myofascial structures that can lead to pain and other dysfunctions. These are referred pain, changes in the local tissue dynamics, and central sensitisation [22]. Dysfunction within an organ irritates C-fibre nerve endings, causing diffuse pain accompanied by an increased tension of the skeletal muscles within this organ that can radiate to areas on the surface of the skin innervated by a particular segment of the spinal cord supplying the organ in question [33]. Pain can occur in any structure connected to the nerve running from that particular spinal segment. This is due to the existence of ganglia transmitting and receiving information to and from the spinal cord through the plexuses [24]. Somatic dysfunctions can lead to disproportionate pressure gradients in the pelvic cylinder, which may result in stasis, inflammation processes, retentions, visceral disorders and vasomotor restrictions. Visceral pathologies can manifest themselves in abnormalities related to mobility, motility and the position of organs [20]. Mobility refers to the movement of organs in relation to each other, the diaphragm, the musculoskeletal system, and the cylinder. Organs can cause movement of the intestinal passage, fallopian tubes and ureters, the rhythmic pumping of the heart, as well as lung expansion and deflation. Movement is the determinant of health and life. Motility is the movement of an organ within its area caused by the breathing rhythm, which is why it can change morphologically and shape in a natural way [14, 15]. It is a sign of an organ vitality. Motility of the uterus, ovaries and fallopian tubes shows an upward and dorsal tendency, *i.e.*, upward and backward during the phase of inhalation [17]. The diaphragm, which does not show a propensity for tension, allows the organs to correlate with the movement of inhalation and exhalation, and conditions their physiological sliding motion between each other, the fascias and the cavities [26]. The pelvic urogenital diaphragm should also show similar movement characteristics. If intra-abdominal pressure is disturbed, the viscera will also yield to compression, and their mobility and motility will be disturbed [26]. According to Andrew Taylor Still, the founder of osteopathy, multiple dysfunctions of the reproductive organs are due to the retention of body fluids. Venous vessels that do not drain the arterial blood cause pelvic congestion that results in inflammation, considered by physiotherapists and osteopaths as a functional disorder. For this reason, the objective of treatment is to improve venous drainage within the pelvis [20]. In terms of physiology, the myometrium exhibits contractions that increase during the menstrual cycle and then subsequently decrease. This is a cyclical phenomenon. During the diastole phase, blood rich in oxygen and nutrients enters the tissues and the relaxation phase takes place. If this process is disturbed, the amount of oxygen decreases, and pain occurs. Improper drainage within the small pelvis can lead to extensive tension of the uterus [18]. General procedures for dysfunctions of the reproductive system involve restoration of the postural balance, breathing, pelvic activity, and balancing the pressures between particular diaphragms in the body. It is also essential to pay attention to tension in the muscles within the pelvis and the thoracolumbar fascia, centralisation of the hip joint and the area of the sacral bone, and pubic symphysis [23]. An assessment of the spine (particularly at the Th12-L1 and L5-S1 segments) and the sacrococcygeal joint is also important. Restrictions resulting from sympathetic innervation at the thoraco-lumbar junction of the spine can lead to vasodilation within the small pelvis. Blood pressure decreases, and the supply with oxygen and nutrients deteriorates significantly [26]. We cannot rule out external reasons for dysfunctions of the uterus and the reproductive organs, such as surgical treatments that cause intraperitoneal adhesions within scars, which can also result from the inflammation process [26]. Visceral therapy should begin with a postural analysis, as mobility disorders in the lumbar spine, hip joints and pubic symphysis have a key influence on the dissonance of myofascial tensions. A correct posture is characterised by a symmetry of weight distribution and a vertical line of projection of the centre of gravity passing through the acoustic meatus, the acromion, the L3 vertebral body, the greater trochanter and the lateral malleolus. In the anterior projection, the internal organs tend to descend through the inspiratory position of the diaphragm. It is also characterised by extensive tension within the trunk, which results in an inappropriate pressure gradient. The pelvis is tilted forward. The posterior projection features the expiratory position of the Figure 1, a backward tilted pelvis, as well as tension at the level of the sacroiliac joints and the cervicothoracic junction [26].

SELECTED VISCERAL THERAPY

When striving to balance pressures in the abdominal cavity, it is worth beginning by examining the diaphragm, the superior thoracic aperture, and the pelvic floor. A basic examination is by palpation of the uterus and the ovaries and is very important not just as an element of diagnosis, but also in therapy.

Palpation of the uterus

We palpate the uterus to assess any adhesions, pathological location (Fig. 2), shape, mobility and location. We can evaluate the physiological condition of this organ when we do not encounter strong resistance or pain in the lower

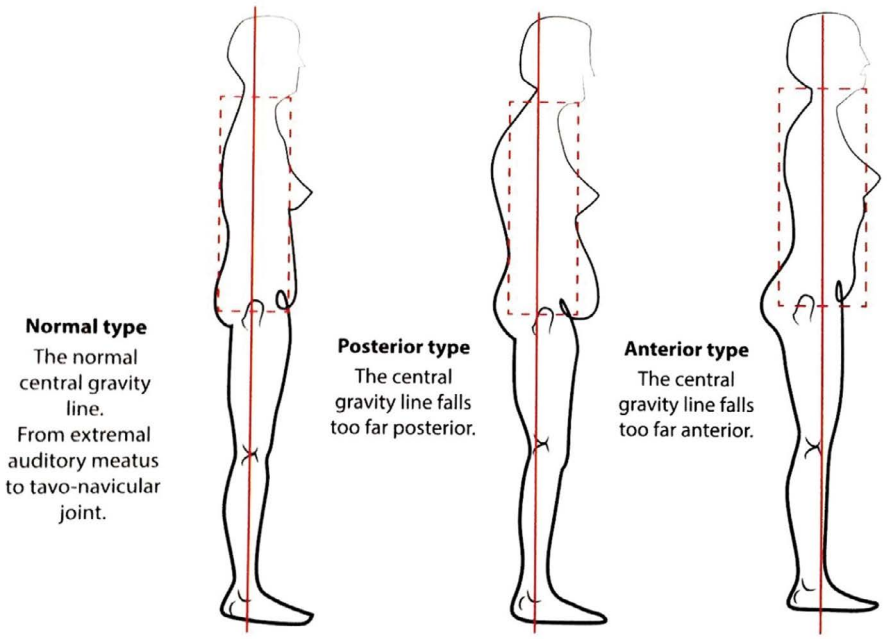

Figure 1. Projection types [18]

Figure 2. Palpation of the uterus (source: own elaboration)

Figure 3. Unilateral therapy with the diaphragm (source: own elaboration)

abdomen area. The uterus should show features of flexible shaping. A strong reaction to pressure may be a sign of adhesions. The complete absence of resistance may result from a retroversion of the uterus. The patient should be placed in a supine position with lower limbs bent, the therapist places their hands over the pubic symphysis on the side of the rectus abdominis muscle and palpates in the dorsal direction with a medial tendency. During localisation, one should focus on a sense of the organ's mobility by performing mobilisation movements [14, 15, 17].

Therapy with the respiratory diaphragm

Normalisation of the diaphragm can be carried out in several ways: by releasing the diaphragm ligaments, as well as working with the central tendon and the diaphragm cruses. Normalisation can be achieved by a unilateral or reciprocal action. With unilateral therapy, the patient lies on her side or back, the therapist places a hand under the costal arch and depresses as far as the tissue restrictions allow, then waits for their release (Fig. 3). With bilateral action, the therapist works with the respiratory rhythm in a cycle of several breaths (Fig. 4). While inhaling, the therapist holds the costal arches of the supine the patient with both hands, and while exhaling, prevents them from returning to their original position. The central tendon is mobilised in the backward position, the hand is placed above the navel and when exhaling, depressing deeper into the tissues and rotating them like clock hands (Fig. 5). The work with the

Figure 4. Bilateral therapy with the diaphragm (source: own elaboration)

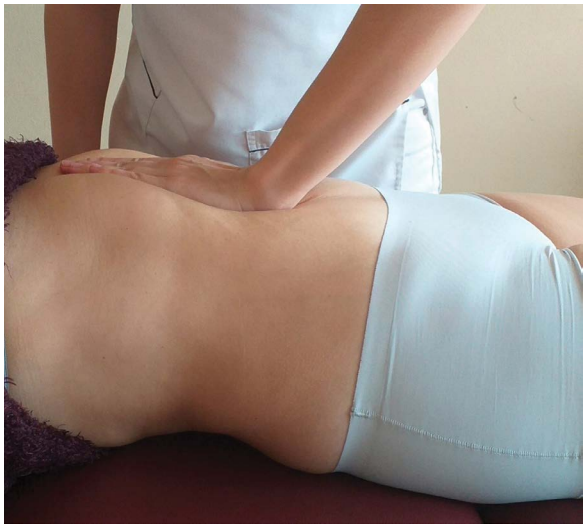

Figure 5. Therapy with the central tendon (source: own elaboration)

diaphragm cruses is performed when the patient is lying face down. The therapist places one hand at the height of L1, and the other near the popliteal fossa of the extended leg (Fig. 6). The patient should be asked to breathe in and relax the entire body as much as possible during exhalation. The therapist's hands should move away from each other, more and more with each respiratory rhythm [26].

The visceral therapy in somatic dysfunctions

Supporting the mobility and motility of the uterus also helps recover the mobility of the fallopian tubes and ovaries. The presented techniques are important in the case of genital dysfunctions, as the restoration of vascular circulation, elimination of adhesions (fascial bonds within the organs), and coordination of organ movement with the respiratory rhythm are helpful for the organ to work. In the event of loss of uterine mobility, a general technique that relaxes the uterus is useful (Fig. 7). It supports the drainage of blood vessels supplying this organ. The patient is lying on her back and the therapist is standing at the level of the patient's knee joints. The therapist places one hand on the sacrum of the woman and the other on her stomach, so that the wrist is above the pubic bone and the fingers are placed caudally. The tissues should be stretched up to the limit of resistance by moving both hands in opposite directions – with the hand upside down and forward, and the hand down at the bottom, up and backward. Another way to counteract adhesions in the genital area is a two-handed mobilisation of the uterus (Fig. 8). The patient is lying on her back with her legs extended. It is a deep technique which involves inserting a finger into the patient's vagina until the cervix is palpated, with the other hand feeling the bottom

Figure 6. Therapy with the diaphragm cruses (source: own elaboration)

Figure 7. General therapy for releasing the uterus (source: own elaboration)

Figure 8. Two-handed uterine mobilisation therapy (source: own elaboration)

Figure 9. Mobilisation therapy of the broad ligament of the uterus (source: own elaboration)

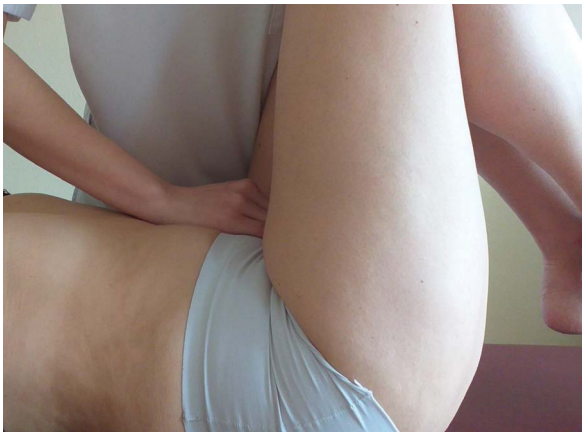

Figure 10. Another variant of the broad ligament mobilisation therapy of the uterus (source: own elaboration)

of the uterus through the skin on the abdomen and holding the hands close until the fingers are felt through the abdominal wall. With the finger placed inside the body, any adhesions are mobilised, and the hand placed outside moves the tissues in different directions. The treatment is continued until the effect of elastic resistance between the epithelia is obtained. Another option is indicated in the case of painful intercourse, premenstrual syndrome and painful periods. The procedure is based on regaining lost mobility in the area of the broad ligament of the uterus and consists of the patient lying down on her back placing her bent lower limbs on a couch and placing the therapist's hands close together on the patient's abdomen above the pubic symphysis (Fig. 9 and 10). Delving into the tissues and displacement of the small intestine loop laterally allows a good contact with the uterus. It should be mobilised in this grip in order to obtain the best tissue relaxation possible. Another possibility is to hold the pelvic floor in a similar grasp with one hand and obtain relaxation by supporting and mobilising the lower limbs with the other hand [14, 16].

CONCLUSIONS

Visceral therapy can be an effective complementary method in the treatment of gynaecological dysfunctions.

Visceral therapy can improve reproductive health in women.

Maintaining the mobility and motility of internal organs by means of visceral therapy can regulate anatomical relations and physiological processes within the urogenital diaphragm.

Conflict of interest

None.

REFERENCES

1. Drosdzol A, Skrzypulec V. Endometriosis in pediatric and adolescent gynecology. Ginekol Pol. 2008; 79(2): 133–136.
2. Danielsson I, Sjöberg I, Stenlund H, et al. Prevalence and incidence of prolonged and severe dyspareunia in women: results from a population study. Scand J Public Health. 2003; 31(2): 113–118, doi: 10.1080/14034940210134040, indexed in Pubmed: 12745761.
3. Jarząbek-Bielecka G, Radomski D, Mizgier M, et al. Dyspareunia and algomenorrhea in women with endometriosis – clinical aspects of

dienogest therapy. Current Gynecologic Oncology. 2015; 12(4): 271–277, doi: 10.15557/cgo.2014.0025.
4. Mizgier M, Jarzabek-Bielecka G, Jakubek E, et al. The relationship between body mass index, body composition and premenstrual syndrome prevalence in girls. Ginekol Pol. 2019; 90(5): 256–261, doi: 10.5603/GP.2019.0048, indexed in Pubmed: 31165464.
5. Panjabi MM. The stabilizing system of the spine. Part I. Function, dysfunction, adaptation, and enhancement. J Spinal Disord. 1992; 5(4): 383–9; discussion 397, doi: 10.1097/00002517-199212000-00001, indexed in Pubmed: 1490034.
6. Richardson CA, Snijders CJ, Hides JA, et al. The relation between the transversus abdominis muscles, sacroiliac joint mechanics, and low back pain. Spine (Phila Pa 1976). 2002; 27(4): 399–405, doi: 10.1097/00007632-200202150-00015, indexed in Pubmed: 11840107.
7. Wójcik M, Siatkowski I, Bodnar-Nanuś A. [The influence of segmental stabilization training upon the reduction of motor system weak connections in hockey players]. Chir Narzadow Ruchu Ortop Pol. 2011; 76(3): 145–150, indexed in Pubmed: 21961267.
8. Kirk B, Elliott-Burke T. The effect of visceral manipulation on Diastasis Recti Abdominis (DRA): A case series. J Bodyw Mov Ther. 2021; 26: 471–480, doi: 10.1016/j.jbmt.2020.06.007, indexed in Pubmed: 33992284.
9. Archambault-Ezenwa L, Brewer J, Markowski A. A comprehensive physical therapy approach including visceral manipulation after failed biofeedback therapy for constipation. Tech Coloproctol. 2016; 20(8): 603–607, doi: 10.1007/s10151-016-1489-4, indexed in Pubmed: 27343116.
10. De Marco M, Arbieto ERM, Da Roza TH, et al. Effects of visceral manipulation associated with pelvic floor muscles training in women with urinary incontinence: A randomized controlled trial. Neurourol Urodyn. 2022; 41(1): 399–408, doi: 10.1002/nau.24836, indexed in Pubmed: 34787917.
11. Pisarska-Krawczyk M, Jarząbek-Bielecka G, Mizgier M, et al. An outline of the problem of pelvic organ prolapse, including dietary and physical activity prophylaxis. Pielegniarstwo XXI wieku / Nursing in the 21st Century. 2021; 0(0), doi: 10.2478/pielxxiw-2021-0015.
12. Chmaj-Wierzchowska K, Wojciechowska M., Parda I., Plagens-Rotman K., Rzymski P., Wilczak M.: How do health problems affect the quality and everyday life of patients with endometriomas? Clinical and Experimental Obstetrics & Gynecology. 2020; 47(4): 571, doi: 10.31083/j.ceog.2020.04.5258.
13. Jarząbek-Bielecka G, Radomski D, Mizgier M, et al. Dyspareunia and algomenorrhea in women with endometriosis – clinical aspects of dienogest therapy. Current Gynecologic Oncology. 2015; 12(4): 271–277, doi: 10.15557/cgo.2014.0025.
14. Barral JP, Mercier P. Visceral manipulation. Eastland Press, Seattle 1998.
15. Stone C. Visceral and Obstetric Osteopathy. Elsevier 2006.
16. Kramp ME. Combined manual therapy techniques for the treatment of women with infertility: a case series. J Am Osteopath Assoc. 2012; 112(10): 680–684, indexed in Pubmed: 23055467.
17. Liem L, Dobler T, Puylaert M. Przewodnik po osteopatii wisceralnej. Tom 2. MedPharm Polska, Wrocław 2017: 514–517, 533–540.
18. Duczyński M, Mieszkalski M. Masaż tkanek głębokich w bólach menstruacyjnych. Praktyczna fizjoterapia i rehabilitacja. 2016; 61: 63–66.
19. Jobling P, O'Hara K, Hua S. Female reproductive tract pain: targets, challenges, and outcomes. Front Pharmacol. 2014; 5: 17, doi: 10.3389/fphar.2014.00017, indexed in Pubmed: 24592238.
20. Molinari R. Adaptacja do ciąży, czynniki rotacyjne, poród fizjologiczny. OSD Polska, 2018 : 3–8, 11.
21. Schünke M, Schulte E, Schumacher U. Atlas anatomii człowieka. MedPharm Polska, Wrocław 2017.
22. Horton RC. The anatomy, biological plausibility and efficacy of visceral mobilization in the treatment of pelvic floor dysfunction. J of Pelvic, Obstetric and Gynaecological Physiotherapy. 2015; 117: 5–18.
23. Sandler S. Osteopathy and Obstetrics. Anshan Publishers. 2012; 37: 120.
24. Goodman C, Snyder T. Diagnoza różnicowa dla fizjoterapeutów. Kiedy kierować pacjenta do innego specjalisty? DB Publishing, Warszawa 2010: 115, 673, 698, 704.
25. Plagens-Rotman K, Przybylska R, Gerke K, et al. Genital herpes as still significant dermatological, gynaecological and venereological problem. Advances in Dermatology and Allergology. 2021; 38(2): 210–213, doi: 10.5114/ada.2021.106198.
26. Tyszko-Bury E. Zastosowanie technik osteopatycznych u pacjentek z dolegliwościami bólowymi dna miednicy. Praktyczna fizjoterapia i rehabiliacja. 2015; 11: 6–11.
27. Plagens-Rotman K, Chmaj-Wierzchowska K, Pięta B, et al. Modifiable lifestyle factors and ovarian cancer incidence in women. Ann Agric Environ Med. 2018; 25(1): 36–40, doi: 10.5604/12321966.1233565, indexed in Pubmed: 29575880.
28. Villalta Santos L, Lisboa Córdoba L, Benite Palma Lopes J, et al. Active Visceral Manipulation Associated With Conventional Physiotherapy in People With Chronic Low Back Pain and Visceral Dysfunction: A Preliminary, Randomized, Controlled, Double-Blind Clinical Trial. J Chiropr Med. 2019; 18(2): 79–89, doi: 10.1016/j.jcm.2018.11.005, indexed in Pubmed: 31372099.
29. Silva AC, Biasotto-Gonzalez DA, Oliveira FH, et al. Effect of Osteopathic Visceral Manipulation on Pain, Cervical Range of Motion, and Upper Trapezius Muscle Activity in Patients with Chronic Nonspecific Neck Pain and Functional Dyspepsia: A Randomized, Double-Blind, Placebo-Controlled Pilot Study. Evid Based Complement Alternat Med. 2018; 2018: 4929271, doi: 10.1155/2018/4929271, indexed in Pubmed: 30534176.
30. Fernandes WV, Blanco CR, Politti F, et al. The effect of a six-week osteopathic visceral manipulation in patients with non-specific chronic low back pain and functional constipation: study protocol for a randomized controlled trial. Trials. 2018; 19(1): 151, doi: 10.1186/s13063-018-2532-8, indexed in Pubmed: 29499728.
31. Tamer S, Öz M, Ülger Ö. The effect of visceral osteopathic manual therapy applications on pain, quality of life and function in patients with chronic nonspecific low back pain. J Back Musculoskelet Rehabil. 2017; 30(3): 419–425, doi: 10.3233/BMR-150424, indexed in Pubmed: 27858681.
32. Myers KA, Rattner JB, Shrive NG, et al. Hydrostatic pressure sensation in cells: integration into the tensegrity model. Biochem Cell Biol. 2007; 85(5): 543–551, doi: 10.1139/o07-108, indexed in Pubmed: 17901896.
33. Konturek SJ. Fizjologia człowieka. Podręcznik dla studentów medycyny. Edra Urban&Partner, Wrocław 2016.