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# MEDICAL INNOVATION

# Physiotherapeutic assessment in gynecology

## *Fizjoterapeutyczna diagnostyka funkcjonalna w ginekologii*

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### Abstract

**Introduction.** Gynecological disorders are often manifested by experiencing pain. Disorders on the part of the musculoskeletal system can cause symptoms that can mimic diseases of internal organs, also internal organs can mimic symptoms of dysfunction for the musculoskeletal system. An ongoing disease process within a particular internal organ can trigger a reflex response from the musculoskeletal system, such as locking of the spinal joints in the corresponding organ's spinal segment. **Objective.**

The purpose of this study is to present the physiotherapeutic functional diagnosis of the pelvis in relation to gynecology.

**Material and methods.** Two independent reviewers searched medical and public databases, such as PubMed, Scopus and PEDro, using search terms and MeSH, such as physiotherapy, functional diagnosis, functional assessment, gynecology. The inclusion criterion was an article published in a peer-reviewed journal, with no restriction on the extent of the year of publication. There were no restrictions on the language of publication. Journal databases were reviewed between May and June 2023.

**Conclusions.** There is a lack of description of functional physiotherapy examination in gynecology including postural and pelvic types in scientific publications.

### Key words:

physiotherapy, functional assessment, gynecology

### Streszczenie

**Wprowadzenie.** Schorzenia ginekologiczne często manifestują się odczuwaniem dolegliwości bólowych.

Zaburzenia ze strony narządu ruchu mogą być przyczyną wystąpienia objawów, które mogą imitować choroby narządów wewnętrznych, również narządy wewnętrzne mogą imitować objawy dysfunkcji dla narządu ruchu. Toczący się proces chorobowy w obrębie danego narządu wewnętrznego może wywołać reakcję odruchową ze strony układu mięśniowo-szkieletowego, np. zablokowanie stawów kręgosłupa w odpowiadającym narządowi segmentowi kręgosłupa.

**Cel pracy.** Celem pracy jest przedstawienie fizjoterapeutycznej diagnostyki funkcjonalnej miednicy w odniesieniu do ginekologii.

**Materiał i metody.** Dwóch niezależnych recenzentów przeszukało medyczne i publiczne bazy danych, takie jak PubMed, Scopus i PEDro, używając wyszukiwanych terminów i MeSH, takich jak fizjoterapia, diagnostyka funkcjonalna, ocena funkcjonalna, ginekologia. Kryterium włączenia był artykuł opublikowany w recenzowanym czasopiśmie, bez ograniczeń co do zakresu roku publikacji. Nie było ograniczeń co do języka publikacji. Bazy danych czasopism zostały przejrane między majem a czerwcem 2023 roku.

**Wnioski.** W publikacjach o charakterze naukowym brakuje opisu funkcjonalnego badania fizjoterapeutycznego w zakresie ginekologii z uwzględnieniem typów postawy i miednicy.

### Słowa kluczowe:

fizjoterapia, ocena funkcjonalna, ginekologia



## Introduction

Gynaecological diseases are often manifested by experiencing pain. In physiotherapy clinical practice, spinal-organ connections, as described by Karel Levit [1], are often noted. Levit pointed out the connections between anatomical structures that belong to the same body segment, making it possible to radiate pain [1]. Complaints in the musculoskeletal organs can cause symptoms that can mimic diseases of internal organs, while the internal organs can also mimic symptoms of dysfunction for the musculoskeletal organs [1]. An ongoing disease process within a particular internal organ can trigger a reflex response from the musculoskeletal system, such as locking the spinal joints in the corresponding organ's spinal segment [1]. In clinical practice, a misunderstood situation might also occur, in which, despite the healing of the disease process of the organ in question, a functional blockage corresponding to the innervation segment of the organ appears and the existing symptoms may suggest the persistence of the disease [1, 2]. It is possible to seek the induction of disease processes in musculoskeletal system disorders [1, 2].

Gynaecological disorders are often accompanied by pain in the lumbosacral region of the spine [1, 3, 4]. In 1972, based on a study of 600 women, Novotny and Dvorak showed a link between disorders occurring in the pelvis and musculoskeletal disorders [5, 6].

The implications presented here require a holistic approach and differential diagnosis, including functional physiotherapy diagnosis in women.

In this article, the authors would like to draw attention to the need for functional physiotherapy diagnostics in gynaecology in order to exclude or confirm the association of a particular structure in the disease process. Functional diagnostics that are appropriately selected and carried out could have a significant impact on the selection of appropriate physiotherapeutic management in gynaecology, as a complement to the treatment recommended by gynaecology specialists.

## Materials and methods

Two independent reviewers searched medical and public databases such as PubMed, Scopus and PEDro, using search terms and MeSH such as physiotherapy, functional diagnostics, functional assessment, and gynaecology. The inclusion criterion was an article published in a peer-reviewed journal, with no restriction on the extent of the year of publication. There were no restrictions on the language of publication. Journal databases were reviewed between May-June 2023.

## Physiotherapy functional assessment in gynaecology

### *Body posture*

Considering the body within the framework of tensegrity (tension – integrity), a relationship whose principle states that structures remain tightly influenced by each other (an increase in the tension of one element causes an increase in the tension of the others) [7, 8]. Tensegrity was created by Buckminster Fuller and Kenneth Snelson and concerns structural

dependence; it explains how the human body functions as a whole to counteract the force of gravity, assigning a key role to the fascia that wraps around the internal organs like a scaffold and transmits tension [9].

Functional assessment should begin with an assessment of postural type [10] (Table 1,2; Figure 1). Mobility disorders in the lumbar spine or in the hip joints and pubic conjunctiva have a significant impact on muscle-fascial tension disorders [11].

It would be justified to collect information on the TMJ (temporomandibular joint) dysfunction in the interview, as there is a correlation between dysfunctions in this joint and posture [12,13].

Determining the posture type according to Hall is important because the type affects the functioning of the musculoskeletal, cardiorespiratory and visceral systems [10] (Table 1, 2; Figure 1). Both the anterior and posterior types according to Hall do not provide favourable conditions for the functioning of the pelvic organs.

**Tabela 1. Wzorzec postawy przedni według Halla [10]**

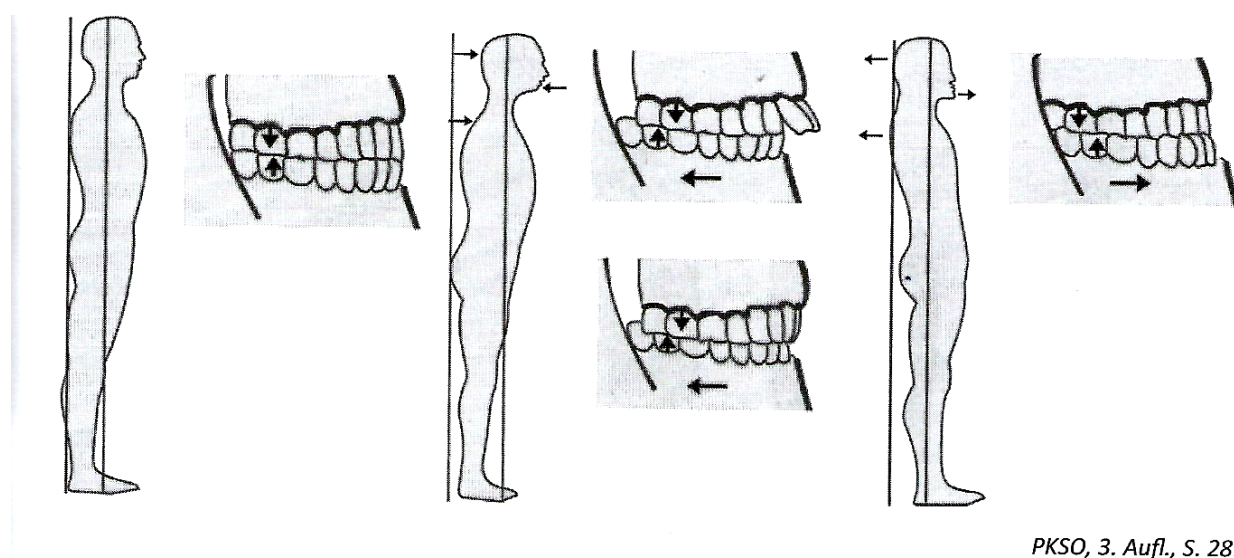
**Table 1. Posture models according to Hall – frontal model [10]**

Zmienna/Variable	Frontal model according to Hall
Musculoskeletal system	<ul style="list-style-type: none"> <li>– deepened lordosis in the cervical segment of the spine,</li> <li>– increased tension in the cervicothoracic junction,</li> <li>– increased tension in the back muscles and spine ligaments,</li> <li>– stiffening and increased tension at the T<sub>11</sub> and T<sub>12</sub> level,</li> <li>– increased tension in the lumbosacral junction.</li> </ul>
Cardio-pulmonary system	<ul style="list-style-type: none"> <li>– diaphragm tension, often while inhaling,</li> <li>– weakened and overstretched abdominal muscles.</li> </ul>
Visceral system	<ul style="list-style-type: none"> <li>– visceral ptosis of the internal organs,</li> <li>– loosening of the peritoneal wall,</li> <li>– tendency to hernias and irritation in the small pelvic area.</li> </ul>



Table 2. Posture models according to Hall – rear model [10]

Variable	Rear model according to Hall
Musculoskeletal system	<ul style="list-style-type: none"> <li>– occipital bone protrusion and compression – increased tension in the cervicothoracic junction,</li> <li>– deepened thoracic kyphosis and decreased tension of the lower thoracic section, <ul style="list-style-type: none"> <li>– compression of the sternocostal joints,</li> </ul> </li> <li>– increased lumbar lordosis – stress on the sacroiliac joints.</li> </ul>
Cardio-pulmonary system	<ul style="list-style-type: none"> <li>– diaphragm tension, often while exhaling,</li> <li>– disturbed pressure balance between the abdominal cavity and chest,</li> <li>– increased tension in the abdominal wall area.</li> </ul>
Visceral system	<ul style="list-style-type: none"> <li>– increased pressure exerted on the organs of the abdominal cavity and pelvis,</li> <li>– susceptibility to circulatory disorders,</li> <li>– susceptibility to problems on the part of the respiratory system,</li> <li>– susceptibility to constipation.</li> </ul>



PKSO, 3. Aufl., S. 287

Figure 1. Type posture [10]

### **Muscles: the psoas and abdominal muscles**

The lumbar muscle is located in the abdominal cavity and can be considered an internal organ [1]. Increased lumbar tonus can be a secondary symptom of kidney disease or a consequence of a blockage of the thoracolumbar passage [1]. In the case of diseases, including gynaecological diseases, abdominal muscle tone is also increased, and decreases after treatment of the lumbar muscle [1]. If the lumbar muscle is shortened, this is often accompanied by a shortening of the erector spinae muscles (musculus erector trunci) and the quadratus lumborum muscles (musculus quadrilumborum). Treatment involves relaxing the muscles so that by relaxing one muscle by reflex we relax the others.

The most common clinically indicative sign of lumbar muscle shortening is the post-cholecystectomy syndrome, which manifests as pain in the gallbladder area, despite the fact that the gallbladder has not been removed [1]. It should be noted here that in the case of actual gallbladder pathology, contracture of the lumbar muscle is not always present [1].

The lumbar muscles are very important during pregnancy, as it is on these muscles that the enlarging uterus with the growing baby within rests [2].

The abdominal muscles increase their tone when there is pathology of the abdominal organs, and they are not easy to examine. Increased tone in the rectus abdominis muscle can manifest as pain at the site of attachment, at the gladius spiracle of the sternum and at the pubic symphysis [1]. Pain occurring in the pubic bone can radiate to the lumbosacral region and cause the trunk to be positioned forward [1]. It is very important to relax the lumbar and abdominal muscles and teach patients self-therapy.

### **Pelvis and sacroiliac joint**

In 1965, Erdman and Gutman distinguished three types of pelvis and showed that the type of pelvic structure affects body statics [1]. The first type is a pelvis characterized by a long sacrum and its sacral promontory set high - this is called high promontory assimilation (Figure 2a); the second type (Figure 2b) is an intermediate pelvis between the first and third types; and the third type is characterized by a low-set sacral promontory and a significant pelvic slope – the overload type (Figure 3c) [1]. Evaluation of sacral inclination, pelvic tilt and the size of the lumbar lordosis are important in assessing the sagittal alignment of the spine and pelvis [14]. Examination of the pelvis should be performed in the standing, sitting and supine positions [15,16]. The caudal, sacral, hip and pubic bones are evaluated to exclude their dysfunction [16]. Of particular note are the sacroiliac joints, which, along with the pubic symphysis, provide some mobility in the pelvis [1]. If dysfunction or dysfunctions are found in the pelvic bones or sacroiliac joint(s), the condition requires manual therapy [17], using direct or indirect techniques to restore pelvic statics [16]. Dysfunction involving the bones or joints of the pelvis often manifests itself in pain, and the use of manual therapy also has the effect of reducing pain sensations [17].



Pelvic girdle pain (PGP) occurring in the sacroiliac joints, lumbosacral region or pubic bone often occurs in women in the third trimester of pregnancy, especially just before delivery and during the postpartum period, due to biomechanical changes in the pelvis [18-20].

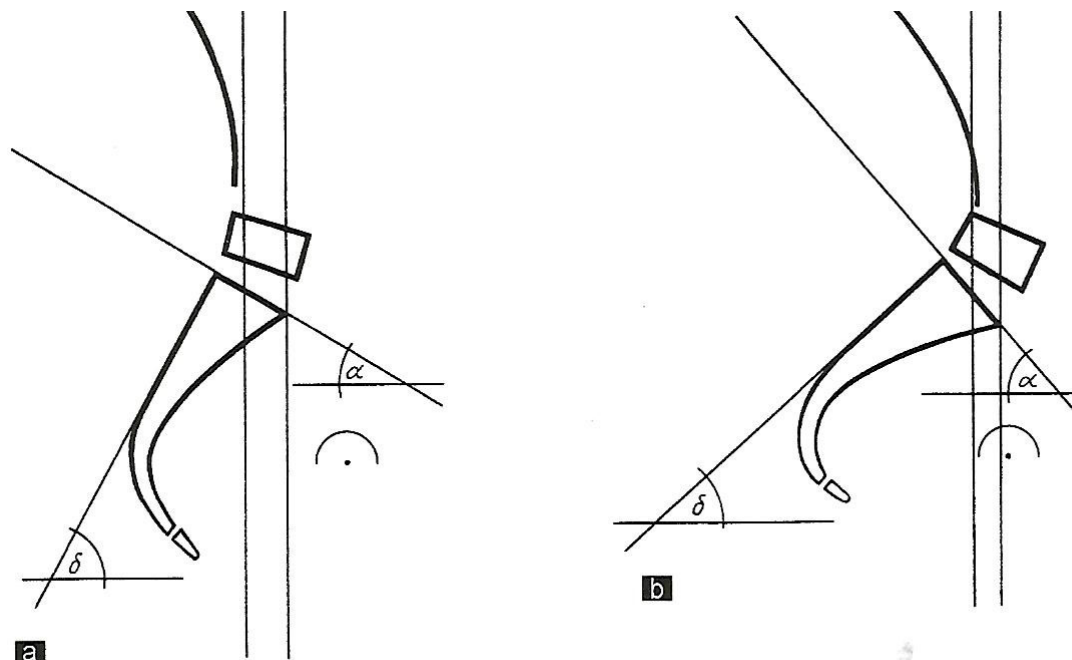


Figure 2 (a,b). Types of the pelvis; a: high promontory assimilation, b: intermediate pelvis [1]

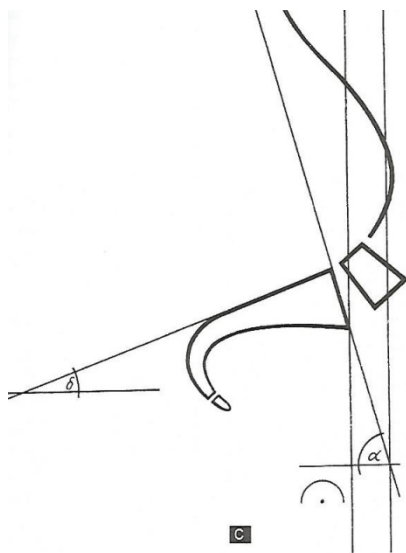


Figure 2c. Types of the pelvis; c: overload type: [1]

#### Pelvic ligaments

The pelvic ligaments are involved in the etiopathology of the occurrence of dysfunction in the musculoskeletal system [21]. A symptom of ligament irritation is local and/

or radiating pain [1,22]. By performing a test for the iliolumbar and sacrotuberous ligaments, one can determine which ligament requires physiotherapeutic intervention in the form of PIR (Post-Isometric-Relaxation) or active mobilization [1]. Irritation in the iliolumbar ligament manifests as lumbosacral pain radiating to the groin, which mistakenly indicates the pelvic organs as the cause [23]. Due to the extensiveness of the site of pain, PIR and active mobilization, which are non-invasive measures for the body, are recommended [24].

### **Perineal pain**

Chronic pain in most cases is caused by irritation of visceral nerve endings during the course of the disease process, which is accompanied by inflammation. In the differential diagnosis of perineal pain, as in the whole group of pelvic pains, we should take into account that this pain may be of visceral nature, felt in the lower abdomen, as well as radiating pain, mainly to the muscles and skin. In addition, in some women, several components of visceral pain may co-occur [24-26].

The pelvic floor muscles are recognized as a potential cause of acute or chronic pelvic pain. Musculoskeletal causes of acute and chronic pain should be considered in the initial evaluation. Diagnostic criteria for muscular and skeletal sources of lower abdominal pain have not been clearly defined [27]. The piriformis and obturator muscles are also located in the pelvis. While these are not elements of the pelvic floor, they can cause pelvic pain [28]. Increased tension in the pelvic floor muscles may be the primary cause of lower abdominal pain in some women, or it may just be a response to a pre-existing disorder [29].

In the management of women with chronic pelvic pain it is of critical importance to identify the location of the myofascial pain as the cause or trigger of the pain [30]. A detailed interview often indicates that the pain has an underlying cause in the pelvic floor muscles, among other areas, and patients complain mainly of pressure, a feeling of heaviness and pain. The pain may worsen with exertion, defecation, sitting and sexual intercourse. Pain radiating to the hip or lower back is also common.

A pelvic physiotherapy examination to diagnose acute or chronic lower abdominal pain should always include a one-finger examination of the rectus abdominis and piriformis muscles. Begin with palpation of the vulval vestibule to rule out vaginismus, and then bilaterally to the iliopubic and pubococcygeus muscles, paying particular attention to whether there is a hardening, or sudden strong contraction of the muscle or pain upon palpation.

A strong contraction of the rectus abdominis muscle is felt as a string-like tension of a narrow band of muscle or induration. The piriformis muscle should be examined with a finger placed posterolaterally, over the ischial spine [31].

In a woman with normally tense pelvic floor muscles, palpation examination of the levator ani and piriformis muscles produces a sensation of pressure, while in a woman with pelvic floor muscle dysfunction it causes



significant pain. The discomfort felt during the examination is similar to the pain experienced outside the examination. Another symptom appearing during the examination is a marked asymmetry between the right and left parts of the pelvic diaphragm. Such a shortening or contracture will occur on the same side as where the pain is felt. Examples of pelvic floor pain syndromes are dyspareunia and vulvodynia.

Based on the temporal pattern, we can divide the pain in pelvic floor disorders into permanent, persistent, intermittent, immediate and delayed [32].

Due to the difficult-to-define etiology of pelvic floor pain disorders, physiotherapeutic management should be holistic and individually tailored to the clinical case in order to address each aspect of the dysfunction (emotional, behavioural and physical) [33].

### Discussion

Functional diagnostics include an interview, physical examination, neurological evaluation, functional ultrasonography of the pelvic floor, electromyography of the pelvic floor muscles, per vaginum examination and/or per rectum examination.

Given the complexity of the symptoms presenting in women, as well as where they occur in the body, diagnosis seems to be multifaceted and include the musculoskeletal system. This system is extensive in terms of its surface area and responds with pain symptoms not only to strains arising from its components, i.e. the muscles, fascia, bones, joints [1, 5, 6]. It is also a support organ for all other systems of the human body.

With reference to the theory of tensegrity [9] or the model of stabilization proposed by Panjabi [34–37] in physiotherapy diagnosis, we should refer to all structures of the human body, i.e. soft tissues (connective tissue, ligaments, muscles and fascia), hard tissues (bones, joints) and the nervous system, which, being suspended in these structures, is also subject to strain [38].

Before starting urogynaecological physiotherapy, the patient should be informed about the possible duration of the therapy and the therapeutic options, which consist of physiotherapy (trigger point therapy, manual therapy, physical therapy), pharmacological treatment (hormonal, antidepressant, anti-inflammatory treatment, Botox injections), behavioural therapy and work with a psychologist and sexologist. In order to eliminate any possible environmental factors that could adversely affect the effects of therapy, patients should be educated on personal hygiene, the selection of suitable underwear and the avoidance of chemical irritants before therapy begins [39]. Physiotherapy and behavioural therapy play an important role in the proper treatment of vulvodynia and dyspareunia [40].

It was shown that increased tension in the pelvic floor muscles is characteristic for women with pelvic pain complaints [41]. This tension manifests itself in their pathological activation, which hinders the relaxation of muscle structures, affects the reduction in contraction strength and endurance, and is characterized by a lack of control over the contraction being performed [42, 43].

Manual therapy in the process of treating pelvic floor pain syndromes aims to relax muscles, release tension and trigger points, improve blood circulation, and improve mobility and postural balance. The techniques used include trigger point therapy, deep tissue massage, relaxation massage, and fascial therapy. Per vaginum, per rectum and peripheral torso procedures are used. All manual activities used by the physiotherapist are related to improving proprioception of the pelvic area, releasing trigger points, and thus normalizing the tension and work of the pelvic floor muscles. The physiotherapist also teaches self-therapy and self-massage [44].

Electrostimulation is one of the physical therapy methods used to treat pelvic floor pain. Its properties make it effective in increasing the blood supply to the pelvic floor muscles. It improves their proprioception, reduces the conduction of nociceptive signals by closing the control gate and increasing the release of endorphins [45, 46]. EMG biofeedback is a method used in physiotherapy for the correct verification and assessment of tension and relaxation in the pelvic floor muscles. It has been shown that more than 50% of women are unable to properly tone up their pelvic floor structures when verbally instructed. In order to teach the patient to contract and relax her pelvic floor muscles correctly, the physiotherapist should control their tension with visual information (ultrasound feedback, EMG biofeedback), through which he or she will be able to foster the correct muscle contraction and achieve effective control of the pelvic floor structures.

In gynaecological diagnostics performed by specialists from various fields, a serious diagnostic problem can be the symptom of pain experienced by patients, which may be mixed pain. The definition of this pain is "a complex overlap of different known types of pain (nociceptive and neuropathic) in any combination, acting simultaneously and/or concurrently, causing pain in the same area of the body. Each of these mechanisms can be more clinically dominant at any given time. Mixed pain can be acute or chronic" [47]. Modern pain taxonomy has proposed the concept of nociplastic pain, which is defined as altered nociception, but the cause of pain is not tissue or somatosensory damage [48].

Nowadays, perhaps due to the prevalence of incontinence, diagnostics are known that relate to the evaluation of the pelvic floor muscles [49–52].

There is a lack of an algorithm for physiotherapeutic functional diagnosis in gynaecological conditions. Certainly, this topic requires multicentre and interdisciplinary studies.

Physiotherapy management of pelvic pain syndromes should always begin with a functional diagnosis. This allows the physiotherapist to assess the pelvic floor muscles, taking into account their tension, and the possibility of contracting and relaxing them. An important part of functional diagnosis is the topography of trigger points within the pelvic floor muscles, as well as within the peripheral muscles, pelvic girdle muscles, lower extremity muscles, and trunk muscles.

Despite the lack of scientific research publications providing knowledge of what features a functional examination algorithm of physiotherapy examination should include, it is necessary to draw on experience from physiotherapy work. An individual examination of the musculoskeletal system would allow us to rule out probable dysfunctions and thus choose the appropriate physiotherapy management of the musculoskeletal system, including the pelvic ligaments.

### Conclusions

There is a lack of description of functional physiotherapeutic examination in the field of gynecology including postural and pelvic types in scientific publications.

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