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OFICJALNE PISMO POLSKIEGO TOWARZYSTWA FIZJOTERAPII

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Ocena wpływu kompleksowej terapii uzdrowiskowej z zastosowaniem wód leczniczych radoczynnych na poziom hemoglobiny – badania wstępne

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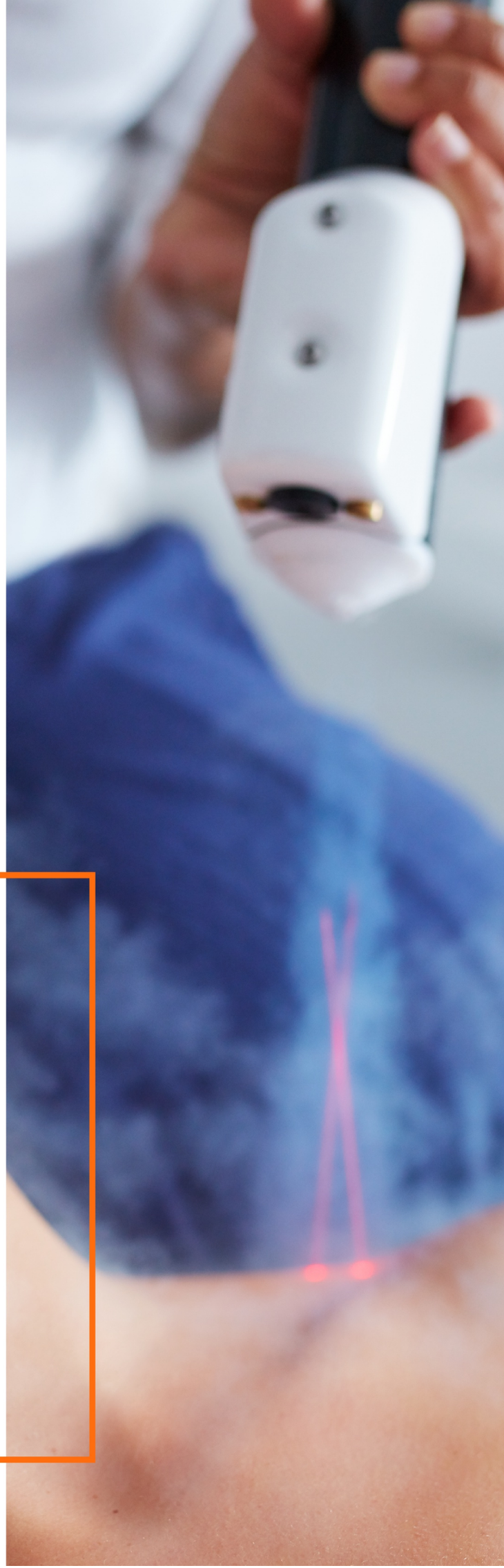

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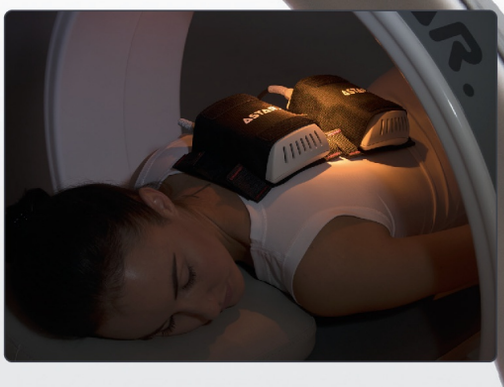

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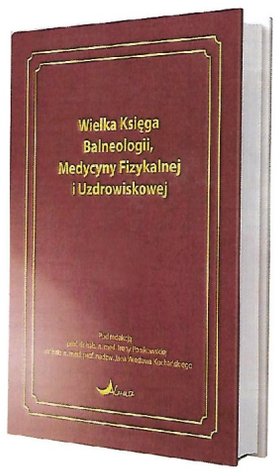

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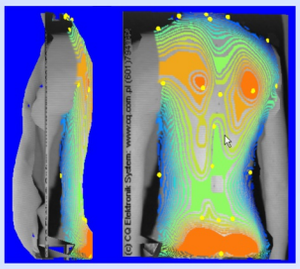

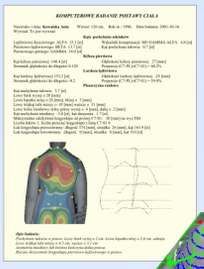

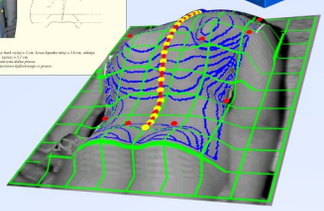

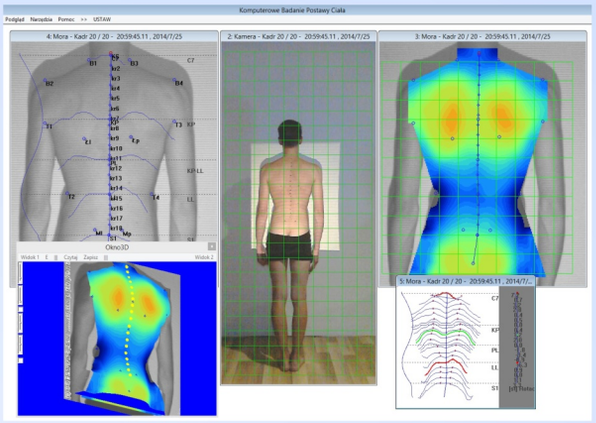

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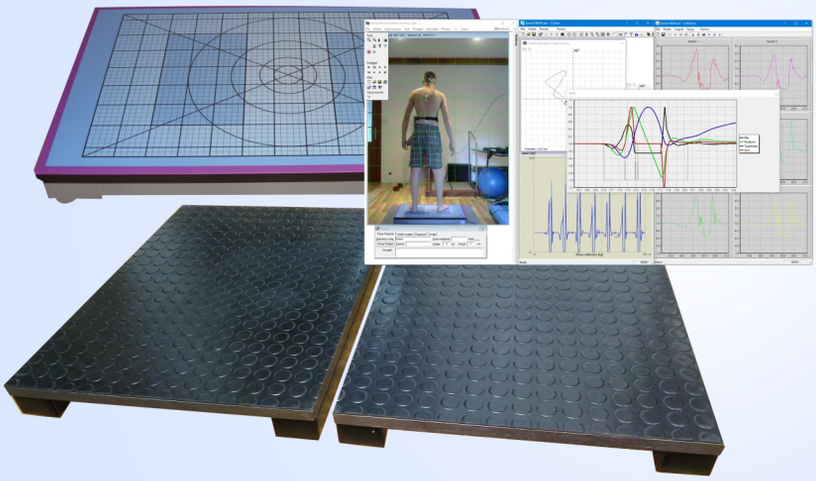

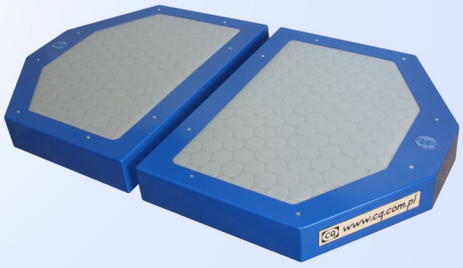

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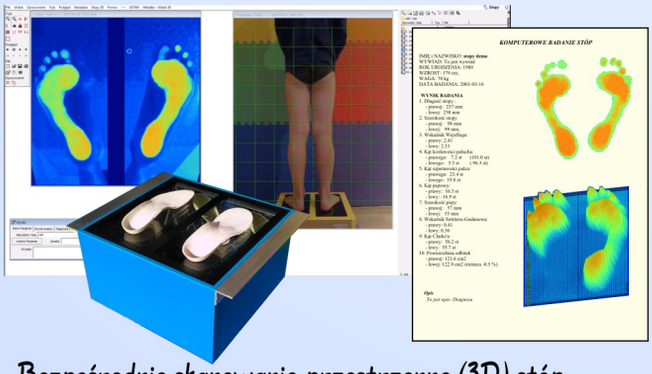

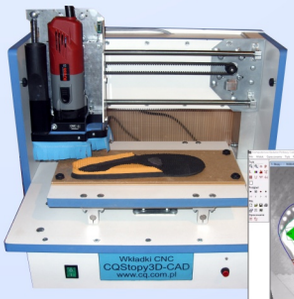

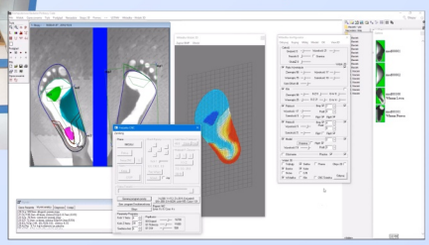

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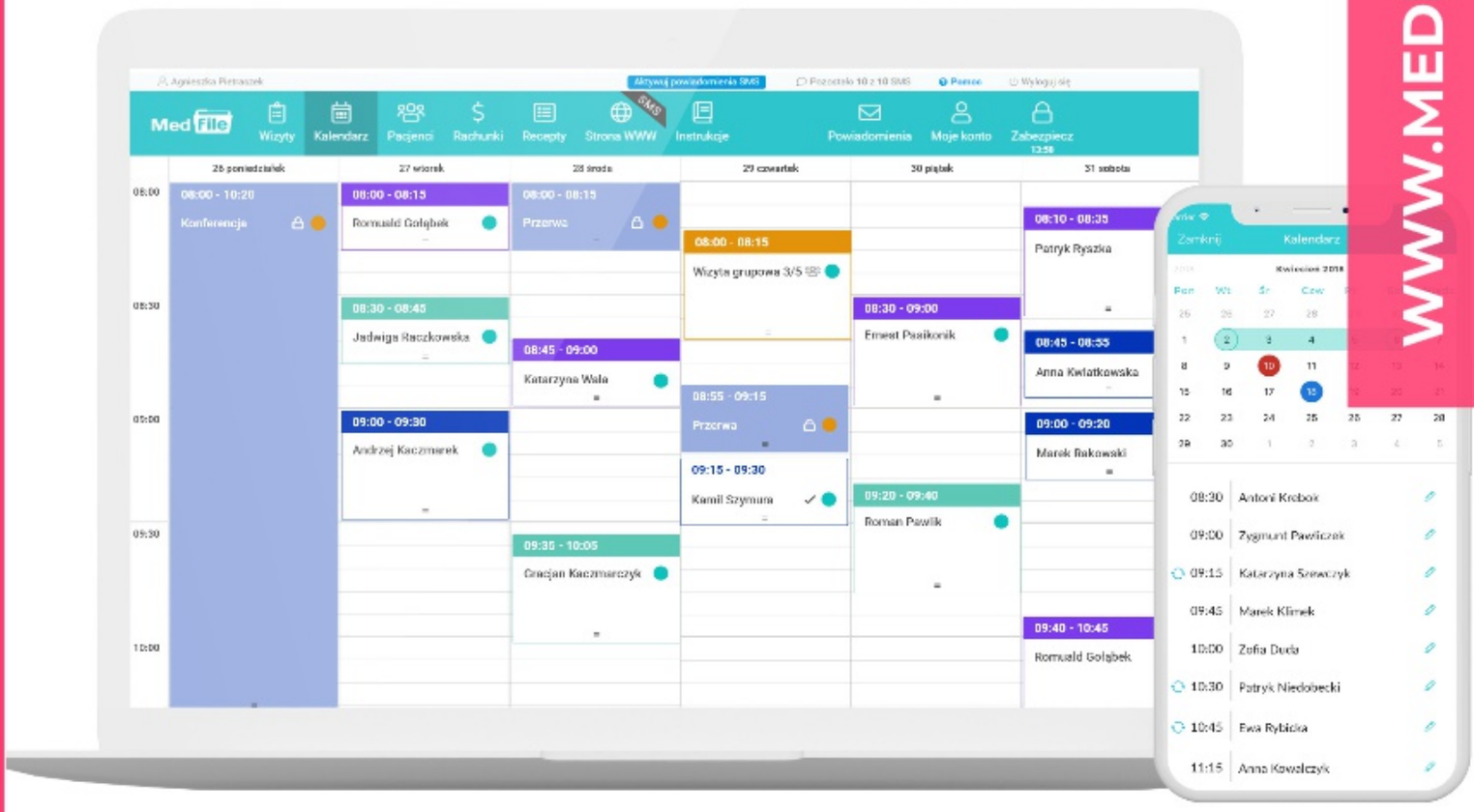

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Ból dolnego odcinka kręgosłupa – podsumowanie Spotkania Ekspertów 2017

Low back pain - summary of the 2017 Expert Meeting

下脊柱疼痛 – 2017 年度专家会议摘要

Mateusz Wojciech Romanowski[1,2(A,C,E)], Anna Kostiukow[1(B,EF)], Łukasz Kubaszewski[3(B)], Wojciech Romanowski[2(D)], Marian Majchrzycki[1(D)], Ernest Wiśniewski[4(D)], Włodzimierz Samborski[1(F)]

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Streszczenie

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Słowa kluczowe:

ból dolnego odcinka kręgosłupa, ból krzyża, niespecyficzny ból dolnego odcinka kręgosłupa

Abstract

Low back pain (LBP) is one of the main causes of health problems in developed countries. LBP can lead to a high degree of disability and sometimes involve high costs of treatment. The causes of LBP can be classified into the basic three groups: non-specific pain, pain potentially related to radiculopathy or spinal stenosis, pain potentially related to another specific cause. Treatment of low back pain should be directed to the cause of the disorder, and mainly includes non-invasive treatment, physiotherapy, pharmacotherapy, education. Invasive treatment of LBP includes pharmacological blockade, surgery.

Key words:

lower back pain, low back pain, non-specific lower back pain

摘要

下脊柱疼痛为发达国家中健康问题的主要原因之一，下脊柱疼痛可能会导致高度残疾，甚至产生高昂的治疗费用。下脊柱疼痛的原因可分为基本三组，包括：非特异性疼痛、可能与神经根病或椎管狭窄相关的疼痛、可能与其他特定原因相关的疼痛等。下脊柱疼痛治疗的重点应着重病因，包含非侵入性理疗、药物治疗和教育等。侵入性治疗下脊柱疼痛的方式包括药物阻滞、手术等。

关键词：

下脊柱疼痛、腰痛、非特异性的下脊柱疼痛

Introduction

Low back pain (LBP) is defined as pain, increased muscle tone, or stiffness sensation located below the rib arch and above the lower gluteal fold, with or without lower limb pain (radiation). Chronic pain occurs when it lasts 12 weeks or more. Over 70% of people in highly developed countries will experience LBP at some point in their lives. Every year 15-45% of adults experience LBP, and the first symptoms concern 5% [1]. In 20%, the symptoms persist for a year [2].

Symptoms and the presence of radiological changes are poorly correlated in case of LBP. The causes of LBP can be classified into the basic three groups: non-specific pain, pain potentially related to radiculopathy or spinal stenosis, pain potentially related to another specific cause [3]. Non-specific LBP is defined as pain without a clear, specific cause. Its origin is difficult to determine. Non-specific LBP concerns 85-90% of the patients [2, 4]. The diagnosis of non-specific LBP is mainly based on the exclusion of certain other pathologies. LBP associated with compression fracture concerns 4%, caused by the cancer – 1% [2]. The incidence of LBP associated with degeneration of the intervertebral disc is estimated at 1-3% [1, 2, 5], which most often affects people between 30 and 50 years of age [5]. The incidence of other pathologies is as follows: 3% spinal stenosis [6], 3% spondylolisthesis, 0.3% ankylosing spondylitis, inflammation of intervertebral discs or zygapophysial joints 0.01% [4].

For almost 80 years, the literature mainly described epidemiology, diagnosis and numerous methods of treating pain in the course of disc herniation / disk degeneration [5]. However, disc herniation confirmed by imaging examinations, including magnetic resonance, does not always co-exist with the discussed clinical symptoms [7].

So far, the diagnosis of LBP is not determined on the basis of standardized criteria. The cause does not have to be visible in imaging or during surgery. If a long-term improvement was obtained after the treatment applied, it can be assumed that the treated element was the cause of LBP [5]. Therefore, the diagnosing person should assess the range of motion of individual joints, spine, assess soft tissues on palpation, assess possible muscle shortening or lack of their capacity, using functional tests.

Imaging examinations are not necessary for every patient with LBP. However, their performance should be ordered to patients with severe neurological symptoms or when serious pathologies are suspected due to medical history, physical examination [8], laboratory tests (e.g., high OB, CRP), after two weeks of ineffective conservative therapy.

Causes of low back pain

Non-specific LBP

Intervertebral disc, zygapophyseal joints

Most of the published clinical trials did not show a correlation between clinical manifestations of LBP and degenerative changes observed in radiological studies, including radiographs, magnetic resonance imaging (MRI), computed tomography (CT), single photon emission computed

tomography (SPECT), radioisotopic examination, discography [9]. Therefore, degenerative changes are part of the potential causes of LBP [8]. Radiological examinations should be considered at the time of the occurrence of the so-called red flags [4]. The red flags accompanying LBP are shown in Table 1.

Table 1. Red flags, disturbing symptoms associated with LBP [133,134]

- Pain
  - Age < 20 or 50 >
  - Constant, growing, not dependent on physical activity
  - No improvement in the supine position
  - Chest or abdomen
  - Increased at night
  - Increased despite therapy
- Fever ≥ 38°C
- Taking steroids or immunosuppressants
- Recent bacterial infection
- History of cancer, AIDS
- Unintentional weight loss
- Significant neurological symptoms
- Changes in the frequency of urination, urinary incontinence, difficulty in urinating, hematuria
- Inflammation – morning stiffness, pain lasting over 3 months, decreasing after exercise
- Injury – structural damage to the spine

The occurrence of degenerative changes in the spine may be associated with LBP and cause reduction of physical performance. Their presence in imaging examination should be taken into account when determining the cause of LBP, as degenerative changes increase the likelihood of LBP. LBP may be associated with degeneration of the spine, but it should be emphasized that anomalies in the spine, which can be observed in imaging studies, do not have to be related to LBP. Studies have shown that 40-50% of people without LBP have degenerative changes [10]. Degenerative changes in the intervertebral disc in the lumbar spine may be the cause of pain in 1-3% of the population, including those between 22 and 55 years of age, 95% of cases relate to the lower part of the lumbar spine (L4-L5, L5-S1) [5]. Among older people, anomalies in the spine are very common [11], and can occur more often above the lower lumbar spine over 55 years of age [5]. At this point it is worth mentioning that the occurrence of LBP is not

correlated with body mass and age [12]. Three elements-locations which are usually the result of degeneration of the spine are mentioned: osteophytes, intervertebral joints, reduction of intervertebral space [13]. The incidence of osteophytes increases with age. Osteophytes can form in the course of the degenerative process of the zygapophysial joints and be present in the joint that is "healthy". The occurrence of osteophytes does not correlate with LBP [14]. Degeneration of the intervertebral disc progresses with age and is common in older people [15]. If LBP is caused by changes in the intervertebral joints, it can be confirmed by the Kemp test, which consists of extension, lateral flexion and rotation of the torso [16]. The Kemp test is positive and reproduces pain in the lumbar spine. The pain caused by dysfunction of the zygapophysial joints is described as lateral, acute, stabbing and located in the lower back, sometimes causing referred pain in the buttocks and back of the thighs [17]. However, degeneration of the intervertebral joints is not correlated with the occurrence of LBP [14, 18].
At this point, it should be mentioned that LBP may be associated with the intervertebral disc and intervertebral joints despite the lack of visible radiological changes. In this case, there is no gold standard to assess whether LBP is related to these structures. It has been shown that only the pharmacological blockade of this area may be an optional element that allows to conclude that LBP is associated with intervertebral joints [19]. However, it should be remembered that the diagnostic/therapeutic pharmacological blockade of the area is still controversial [20,21]. Intervertebral joint therapy includes, in addition to the blockade: manipulation, physiotherapy, behavioral-cognitive therapy and, ultimately, surgical intervention [19].

Sacroiliac joints

The cause of LBP is associated with sacroiliac joints in 15-22% of patients [22]. This percentage increases in patients who have undergone lumbar spinal fusion surgery [23, 24]. LBP associated with sacroiliac joints is located mainly in the lower back. Lying position often reduces discomfort [25], and walking increases it [26]. The pain may or may not be referred in the back of the thigh. In order to confirm LBP that may result from the involvement of sacroiliac joints, provocative tests may be used, the performance of which should reflect the patient's pain. For this purpose, Laslett's principle can be used, which states that a positive result in 3 out of 5 pain provocation tests indicates LBP associated with sacroiliac joints [27]. Laslett includes: distraction test, Gaenslen's test, compression test, Patrick's test, and thigh thrust test. These tests should be performed with proper precision and proper strength, which will translate into the impact on the sacroiliac joint.

Myofascial pain syndrome

LBP may be associated with disorders related to the fascia of the back and lower limbs. They can cause pain and reduce the range of motion during SLR and slump tests [28, 29]. Usually when LBP is associated with the myofascial pain

syndrome in the connective tissue, one can find areas that are tender on palpation, also characterized by increased tissue tension. Exerting local pressure may reflect the patient's ailments. Abnormal muscle and fascia tension may be associated with the lack of adequate elasticity of these tissues and the occurrence of myofascial trigger points, from which the pain may radiate to the thigh, sometimes below the knee [30]. The muscles that can most often cause LBP include: quadrilateral loins, gluteal muscles, piriformis muscle, ischiocrural muscles, latissimus dorsi muscle, erector spinae, iliopsoas muscle. Typically, the tension or extension of a particular muscle increases ailments, rest reduces them [16].

Based on the available studies, it is difficult to determine whether trigger points can be isolated and be the cause of the discomfort, or occur secondarily because of other dysfunctions [31]. Myofascial pain syndrome is usually not the only cause of LBP but coexists with other disorders/ dysfunctions.

Lumbar muscle syndrome

The lumbar muscle is one of the muscles responsible for the correct kinetics and stabilization of the spine. LBP associated with this muscle may result from its weakening or shortening. Most of the research is focused on the function of the lumbar muscle, i.e., its efficiency. The reduction of strength, and thus its cross-section, can lead to the loss of normal biomechanics, which may be associated with the occurrence of LBP [32]. What's more, the appearance of pain can limit the active life-style, which will additionally cause muscle atrophy, thereby starting a vicious circle [33]. Studies have shown that the cross-section of the muscle is greater in people with LBP, which may be associated with its increased activity due to lumbar spine instability as a result of degenerative changes [34]. Ploumis et al. [35] showed that in the case of LBP, which mainly affects one side of the back, on the side of the condition, atrophy occurs and the cross-section of psoas major muscle, quadratus lumborum muscle and erector spinae muscle decreases.

However, it should be remembered that LBP may also be associated with shortening of the lumbar muscle, which will cause flexion contracture in the hip joint, and the pelvis would be set in retroflexion [36]. In this situation, most often the palpation test reflects the patient's symptoms [37] and Thomas, Yeoman and Gaenslen's tests are positive [38].

Piriformis syndrome

Piriformis syndrome may affect 5% of people with LBP [39]. It is most often associated with increased tension of this muscle, which causes sciatic nerve compression at the level of the muscle [40]. It will limit the mobility in the hip joint. In this case, pain in the area of the buttock is characteristic, reflecting the patient's discomfort during: FAIR test - flexion, adduction, internal rotation (which consists in bending, inclination and internal rotation in the hip joint) and HCLK – Heel Contra-Lateral Knee maneuver (the heel of the affected leg is placed in the opposite knee and the maximum flexion movement is performed in the hip joints) [41]. When

performing the SLR test, the patient should feel the intensification of discomfort while increasing the internal rotation rate and reduction during the external rotation movement in the hip joint [41].

Inefficiency of muscles stabilizing the torso

When thinking about stabilizing the torso, the following muscles should be considered: from the front side - abdominal muscles, from the dorsal side - paraspinal and gluteal muscles, from the top - the diaphragm, from the bottom – the muscles of the pelvic girdle. The whole consists of 29 muscle pairs [42]. During the bending/straightening movement of the lumbar spine, lumbar vertebrae translation and rotation occurs in the sagittal plane, which is required for normal kinematics and spinal stability. The range of motion of these movements should be respectively 3-4 millimeter of translation at L1-S1 levels and rotation movement for levels L1-L5 of 7-13 degrees, and for level L5-S1 of 14-20 degrees [43]. In patients with LBP, the range of these movements increases [44]. Therefore, LBP will primarily be associated with weakness, lack of adequate efficiency of these muscles [45, 46]. In order to confirm or exclude this reason for LBP one can perform the following tests: stability of the torso in the frontal position, and strength of erector spinae in the lying position [42].

Psychological factors

Psychosocial factors and emotional stress should be taken into account as they may be related to LBP. In this case, functional tests, duration of symptoms and their intensity will play a smaller diagnostic role. The elements that may adversely affect LBP include: depression, social exclusion, dissatisfaction with work, higher level of disability [8]. O'Mara et al. [47] also showed that patients with claims for compensation are less likely to heal than patients without them.

LBP potentially associated with radiculopathy or spinal stenosis

Intervertebral disc herniation with compression of the nerve root

Nerve root compression and associated pain is most often characterized by radiation to or below the knee. The cause is usually the compression of nerve roots through degenerated structures of the spine (e.g., intervertebral disc, zygapophysial joints, epidural fat) [48]. Which of the nerve tissues has been compressed is determined by the area of radiating pain. Lumbar spinal stenosis (LSS) secondary to degenerative changes (e.g., osteophytes and hypertrophy of the yellow ligament) on one or more levels can lead to unilateral or bilateral radiculopathy and neurogenic claudication with or without LBP [49]. Neurogenic claudication is characterized by numbness and heaviness of the lower limbs that appear after prolonged walking, which can be alleviated by means of a bent position (e.g., tilting forward or sitting) [50]. In order to confirm the possible LBP associated with radiculopathy, the SLR (Straight Leg Raise) test should be performed, which will reproduce the radiating symptoms and cause the occurrence of 3 of 4 characteristic features: pain located in the place corresponding to the dermatome of the compressed nerve,

sensory impairment within the dermatome of the compressed nerve, weakened tendon reflexes and reduction of muscle strength [51]. The crossed SLR test also usually reflects pain complaints associated with nerve root compression [52]. Other tests that can help to determine the cause of compression include bowstring sign and slump test [5].

Spinal stenosis

Spinal stenosis is caused by the compression of the lumbar and sacral nerves in the spinal canal and can cause LBP. Additional symptoms include: sphincter dysfunction and impotence, urination disorders, muscle weakness, muscle flaccidity, weakened tendon reflexes [47, 53]. Potential causes of this syndrome include central disc herniation, degenerative spondylolisthesis in the lower part of the lumbar spine, spine tumors, fracture with vertebral dislocation and abscess in the spinal canal [53]. The diagnosis of the cauda equina syndrome can be based on Cook's rule [54]. This rule includes: age over 48 years, bilateral symptoms, greater leg pain in relation to back pain, increased pain while walking, relief during sitting. The presence of at least 3 positive results out of 5 indicates spinal stenosis.

Spondylolisthesis

Spondylolisthesis can cause LBP and most often occurs at the L4-L5 level [55]. Applies to over 90% of cases [56]. The occurrence of spondylolisthesis at this level is primarily associated with the iliolumbar ligament, which firmly holds L5 in its anatomical position [57]. There are four grades of spondylolisthesis – grade 1: 0% to 25%, grade 2: 26% to 50%, grade 3: 51% to 75% and grade 4: 76% do 99% [58]. The following tests are available to diagnose spondylolisthesis low midline sill sign - the examiner senses and evaluates the position of the upper spinous process in relation to the lower spinous process. It may lead to deepening of the lumbar lordosis and a "window sill" similar to the uppercase "L" is perceptible. [59], Interspinous gap change assessment of the mobility of spinous processes in relation to each other during flexion and extension of the torso and possible displacement of the processes in the sagittal plane [59].

LBP potentially related to another specific cause

Fractures

LBP caused by osteoporotic fracture of the spine occurs mainly among elderly [11]. According to Henschke's principle [60], this involves the coexistence of: the age over 70 and long-term use of corticosteroids. The occurrence of a significant injury speaks for LBP caused by the fracture of the spine. In the case when none of the above factors occurred, one can suppose that the fracture is not the reason for LBP [52].

Spondyloarthropathy

Spondyloarthropathies belong to the second group of rheumatic diseases. Among spondyloarthropathies, one can distinguish: reactive arthritis, psoriatic arthritis, arthritis in the course of inflammatory bowel diseases and AS, which is

the most frequent disease in this group [61]. These diseases have many common symptoms, including: the association with human HLA-B27 leukocyte antigen, the same type of peripheral joint involvement manifesting as asymmetrical inflammation, involvement of small amounts of joints – mainly in the lower limbs and the possibility of inflammation in the sacroiliac joints, spine, enthesis, the anterior segment of the uveitis [62]. Functional tests that refer to these diseases include, first of all, assessment of chest expansion and mobility in the BASMI (Bath Ankylosing Spondylitis Disease Activity Index) test: scope of lateral flexion of the spine, distance of the ear-wall fragment, modified Schober test, intercostal distance, range of rotation in the cervical spine.

LBP associated with cancer or infection

LBP associated with cancer can be suspected in people who have a history of cancer, have undergone unexplained weight loss, have no improvement after one month of therapy or are over 50 years of age. Among people with LBP with a history of cancer, the probability that LBP is caused by cancer increases from 0.7% to 9%. The presence of the other three symptoms increases the probability of cancer by 1.2% [8].

The presence of spinal infection has not been well researched, but the symptoms that may suggest its occurrence include fever, intravenous drug use, recent infection [63].

Treatment of low back pain

Low back pain significantly affects the quality of life of patients with this ailment. Most of them experience a significant reduction in their intensity or complete remission within the first six weeks after the appearance of a pain episode [64, 65]. Approximately 40% of patients will develop chronic LBP, persisting for months or years [64]. Even among people who are very quick to overcome the problems associated with the original pain episode, the risk of the next episode occurring in the next 12 months is very high and remains at the level of 47-54% [66, 67].

It is recommended that treatment in LBP be based on:

- providing a patient with a good prognosis [65, 68],
- informing the patient about staying physically active, with a strong discouragement to stay in bed,
- if necessary, prescribing pharmaceutical drugs,
- introducing manipulative techniques in the spine [4, 69].

Methods of treatment of acute and chronic low back pains depending on their effectiveness are shown in the Table 2.

An undisputable element of interdisciplinary treatment of patients with LBP is physiotherapy. Physiotherapists are healthcare workers most often involved in the treatment of people suffering from LBP [71]. Recommendations include group exercise, taking into account the individual capabilities of patients [8, 72], the "back school" movement exercise program, yoga [73], and stabilization exercises [74].

Table 2. Methods of treatment of acute and chronic lower back pain [8,70]

Efficiency	Acute LBP	Chronic LBP
High	Remaining active, non-steroidal anti-inflammatory drugs (NSAIDs)	Kinesitherapy, intensive interdisciplinary programs
Probably high	Spinal manipulations, behavioral therapy, interdisciplinary programs	Analgesics, acupuncture, antidepressants, backache exercises, behavioral therapy, NSAIDs, spinal manipulations
Moderate	Painkillers, acupuncture, backache exercises, epidural steroid injections, massage, TENS, tractions, thermotherapy, EMG biofeedback	Topical steroid injection, EMG biofeedback, massage, TENS, traction
Rather beneficial	Kinesitherapy	
Unfavorable	Staying in bed	Steroid therapy

In addition, manual therapy techniques should be considered - manipulation, mobilization, traction [75-77], soft tissue techniques such as massage [78-81], McKenzie [82] and osteopathy, whose effectiveness in LBP requires further research [83]]. Exercises programs suitably adapted to the patient are associated with the best results of treatment of patients with LBP [84].

The studies also confirm the effectiveness of selected physiotherapeutic procedures in patients with LBP. Among them, treatments in the field of thermotherapy (heat or cold therapy) are most often used, however, they have short-term effects [85-87]. In addition, interference currents, laser therapy, percutaneous electrical nerve stimulation can also be used [8].

The most common form of treatment for patients with lower back pain is pharmacotherapy. On the other hand, among pharmaceutical drugs, the most commonly prescribed for LBP

is acetaminophen [88]. In accordance with current clinical practice, it is the first choice drug for patients, especially with the acute phase of non-specific LBP [69, 89-92]. It has been recommended for over 60 years as one of the oldest analgesics in pharmacology [93]. Recommendations for this drug are based on the consensus of the expert group developing recommendations and the results of tests confirming the greater safety of acetaminophen over other pharmaceutical drugs – NSAID and opioid drugs [70]. The uncertainties regarding the effectiveness of the use of acetaminophen in LBP were emphasized in scientific publications [94]. At the same time, it was proved that in the case of acute lower back pain, there are no statistically significant differences between patients receiving acetaminophen (at a dose of 4 g per day) and patients taking placebo. [95]. Therefore, the common claim that the selected pharmaceutical drug improves the quality of life, including physical functioning or the quality of sleep in the discussed group of patients, is being undermined. [88, 95-97]. Not without significance is the fact that acetaminophen, widely recognized as a completely safe drug [93], can lead to disorders in the functioning of the liver, cardiovascular system and in extreme cases may even lead to death. [98-104]. Therefore, now non-steroidal anti-inflammatory drugs with the general recommendation are more often prescribed, however, these drugs should be administered in LBP at the lowest possible effective dose and as short as possible. Taking NSAIDs is associated with an increased risk of gastroenterological and cardiovascular disorders [91].

Invasive treatment of LBP includes pharmacological blockade of the painful area in the lumbar region and surgery. Pharmacological blockade is an effective form of therapy [5]. The blockage is performed under X-ray or ultrasound observation so that the procedure is performed in a “safe triangle”. The classic safety triangle is located between the base from the top, the side edge of the body laterally and the outer edge of the obliquely extending spinal nerve from the medial side. However one must be aware of the possible complications: Increasing pain, backache, leg pain intensification, vagotonic reaction, the occurrence of hypertension, glucose increase, meninx puncture [105].

The number of surgical procedures for patients with LBP in recent years has significantly increased. The surgical procedure is most often performed among people with LBP, which is caused by disc herniation, degenerative spondylolisthesis or spinal stenosis [106]. Absolute indications for surgery, however rare, are abnormalities of the sphincter of the rectum and bladder [5]. One of the most common treatments is spinal fusion/spine stabilization. So far, the most optimal method of anastomosis (lumbar fusion) has not been developed [2]. Despite the significant increase in the performance of this type of surgery, its effectiveness is low. It is worth paying attention to the fact that the performed anastomosis procedures are often not necessary [107]. Studies show that after anastomosis, 15% of patients do not show improvement, and as many as 40% of patients are uncertain/unhappy with the result 2 years after surgery [108,109], reporting persistent back pain and associated reduction of daily activities [110]. Therefore, before any surgery, the patient should be very carefully diagnosed, because its implementation will only help selected patients [111].

Very important is the education of patients with LBP [112]. It is emphasized that daily physical activity is the best form of therapy. At the same time, it has been proven that the limitation of this activity and the prolonged hypokinetic stay in bed for convalescence only prolongs the regeneration and recovery process before the appearance of the pain episode [78, 79]. Therefore, limiting physical activity is not recommended [113]. It should be noted that education regarding only the biomechanical aspect, including mainly focusing on what to avoid, which positions should not be taken, describing damage, may not be an effective form of therapy [114], what is more, it can increase LBP discomfort [115]. Education of a patient with LBP should include: information on physical activity, information on kinesiology of the spine, the mechanism of pain formation and methods of coping, the causes of LBP, prevention of LBP, information on the proper performance of everyday activities and activities at work [116-118].
The literature also includes alternative forms of assistance for patients with LBP. Among them is cognitive- behavioral therapy, recommended especially in patients with subacute painful conditions (persisting more than 6 weeks), and with the presence of psychosocial factors. However, the essence of the interdisciplinary approach [119] and the combination of kinesitherapy methods, manual therapy techniques and relaxation techniques within the spine [120-122] are emphasized here. In the case of chronic lower back pain, methods of moderate effectiveness, such as acupuncture, and spa therapy can be used [8,72,123].
Patients with high physical condition, higher self-esteem and taking fewer medicines suffer less pain. At the same time, it is worth stressing here such psychological factors as: the ability to cope with stress [124-126] self-confidence, faith in one's own abilities, satisfaction with one’s job [126,127]. They affect faster recovery and reduce the probability of risk of LBP [120, 128, 129].
At the end it is worth noting that the estimates show that in the near future between 60 and 80% of the general population will suffer from lower back pain at least once in a lifetime [130]. Such high prevalence of LBP generates huge financial costs and social burden [131]. Therefore, it is necessary to conduct scientific research on this topic and to promote effective preventive and curative interventions [132].

**Spotkanie Ekspertów zorganizowane przez pracowników Kliniki Reumatologii i Rehabilitacji Uniwersytetu Medycznego w Poznaniu odbyło się 21 października 2017 roku. W spotkaniu wzięli udział eksperci z zakresu fizjoterapii, ortopedii, reumatologii i osteopatii.*
Kolejne Spotkanie Ekspertów zaplanowane zostało na 12 października 2018 roku

**The Experts' meeting organized by the employees of the Rheumatology and Rehabilitation Clinic of the Medical University of Poznań took place on October 21, 2017. The meeting was attended by experts in the field of physiotherapy, orthopedics, rheumatology and osteopathy.*
The next Expert Meeting is scheduled for October 12, 2018

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XVII KONGRES

Polskiego Towarzystwa Fizjoterapii

Pabianice, 5-7 grudnia 2019 r.

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