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REVIEW ARTICLE

Differential diagnosis between fibromyalgia syndrome and myofascial pain syndrome

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Abstract

Introduction. Fibromyalgia syndrome *(FMS)* and myofascial pain syndrome *(MFPS)* can be ranked among disease entities being difficult to diagnose clinically, manifesting themselves mainly through pain in specific hypersensitivity points.

Aim. To present the current state of medical knowledge about pain spots appearing on hypersensitive points of soft tissue in the context of selected disease entities.

Summary of the knowledge. MFPS is defined as sensory, motor and autonomic complaints, caused by the occurrence of trigger points *(TrP)*. Yet the FMS is stated during the anamnesis on the basis of generalized pain, and pressure achiness of at least 11 out of 18 tender points *(TP)* of precisely determined location. Patients with FMS report numerous additional complaints – apart from the above mentioned ones; these are however highly non-specific and are not confirmed during routine medical check-ups. There are also no laboratory tests that can confirm presence of TrP being characteristic to MFPS and differentiating it from other muscles' disease entities. Such points are identified only with the use of palpation. Unfortunately while examining a patient this way TrP – being symptoms of MFPS – can be quite easily confused with TP – being symptoms of FMS.

Patients with MFPS which is developing in consequence of long-lasting global disorder of muscle tension balance and sensitivity of nociceptors as a result of chronically remaining pain, frequently suffer from achiness fulfilling the criteria of generalized pain. Moreover – in effect of static overload of soft tissues (especially of tonic muscles) – there occur hypersensitive palpable areas (points). Stimulating them cause lively reaction of the patient. Described symptoms can suggest a suspicion of FMS – the more so that making a diagnosis of MFPS does not exclude its coexistence. Having this in mind, there is a pretty large group of authors who raise a supposition that the differential diagnosis between TrP and TP should be observed in the quantitative rather than in the qualitative categories, despite the still binding definition and nomenclature.

Recapitulation. Looking at the MFPS and at the FMS from the perspective of evolution of knowledge about them and from the point of view of period when scientific researches were conducted and their results published, it must be stated that during last years a considerable progress has been obtained in scope of better understanding of pathogenesis and pathophysiology of pain in specified points of soft tissue hypersensitivity, and the parallel clinical studies – confirming the hypotheses that were made – clearly increased the diagnostic and therapeutic capabilities of clinical practice.

Key words

myofascial pain syndrome, fibromyalgia syndrome, trigger points, tender points, differential diagnosis

SOFT TISSUE FUNCTIONAL DISORDERS

Overloads in the area of individual constituent of motor organ (system) manifest themselves in the first instance in form of soft tissue functional disorders [1]. To define such state there are also the following terms used: functional change of soft tissue condition [2] or soft tissue disease entity [3]. As a matter of fact all soft tissues can form a source of pain, and the functional disorders within their areas can be differentiated as follows: painful tension of muscle fibres – painful tension of fasciae – achiness of periosteum – painful tension of ligaments – skin zones of excessive achiness and zones of cellular-pain – painful post-traumatic and postoperative scars [1, 4].

It can be noticed that the common ground for all the above mentioned matters is the phrase "functional" – describing etiology of pain, and "soft tissues" – indicating the location of existing anomaly. Changes in medical nomenclature are reflection of this situation as well. Previously it was possible to encounter terms such as: rheumatism of soft tissues; inflammation of connective tissue – *fibrositis*; inflamation of muscles – *myositis*; myofascial inflamation – *myofascitis*. It was however found that the common feature of the above mentioned disease entities (clinical states) is a chronically remaining pain in specific points (areas) of body alongside the results of laboratory and imaging studies being within normal limits. Due to that reason, for such disseminated (systemic) zones of pain hypersensitivity there is more often used a term emphasizing the pain factor (for example: miofascialgia; Greek: *mio-* muscles, Latin: *fascium* – fasciae, Greek: *algos* – pain), and not – as it was previously done – the inflammatory condition (in Greek, the end of the word: *itis* – inflammation) [1, 5, 6]. In practice it means that pain – being the only a symptom of existing abnormality – was accepted as a "rightful" sickness indicator, demonstrating its own dynamics of development. Both fibromyalgia syndrome *(FMS)* and myofascial pain syndrome *(MFPS)* can be ranked

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among disease entities manifesting themselves mainly through pain in specific hypersensitivity points.

MYOFASCIAL PAIN SYNDROME

MFPS is defined as as sensory, motor and autonomic complaints, caused by the occurrence of trigger points *(TrP)* [7]. Presence of TrP makes up minimal criteria provided by Simons and collaborators [8] – TrP have to occur in order to enable recognizing MFPS. The other predicates are: palpable tense muscle strand (so called "tense ribbon") in the area of which a presence of at least one painful nodule (papule) is stated. Subsequently in the area of aforesaid nodule there is a hypersensitive point which – if being pressed, scratched by needle, or when only the tissues surrounding it are stretched – cause pain disproportionate to the intensity of stimulus and frequently radiating. Such pain is recognized by the patient as the one experienced before. This sensitive point is defined as a trigger point.

A characterization of TrP useful for every clinician can be found in the later publication of Simons. This description includes reference to anamnesis and to basic and additional diagnostic criteria – chart 1 [9].

Chart 1. Description of TrP essential to differential diagnosis [9]

Data from anamnesis:
– local pain
– sudden start, with episode of muscles' overload
– long-lasting start, connected with chronic muscles' shortening
– start connected with injury summing up in time (symptoms grow together with escalation of causative factor/stressor)
Leading clinical diagnostic criteria:
– tense muscle strand (so called "tense ribbon")
– sensitive point in the area of a tense muscle strand (TrP)
– occurrence of radiating/referred pain caused by pressure
– such pain is recognized by the patient as the one experienced before (it concerns only active TrP)
Other clinical criteria:
– local twitch response of muscle fibres due to pressure (difficult to obtain)
– immediate loosening of tense muscle strand in response to specialized treatment
– presence of "central" and "associate" TrP

FIBROMYALGIA SYNDROME

In accordance with guidelines of the American College of Rheumatology *(ACR),* the FMS is diagnosed on the basis of two basic criteria. The first is a generalized pain stated during the anamnesis (that is: occuring on the left and right side, below and above waist, and concerning at least one part of spine and chest). The second criterion is a pressure achiness of at least 11 out of 18 tender points *(TP)* of precisely determined location – chart 2 [5,10, 11, 12].

The cause of FMS remains unknown; there are disorders of 4th phase of sleep (*non-REM-sleep*) proposed here. This leads to improper synthesis of growth hormone, the result of which is a tendency to micro-injuries within the area of muscles which – together with the lack of reparatory mechanisms – is the reason of pain. In other concept ill people have a disturbance of metabolism of serotonin noted, the result of which is an improper (excessive) perception of pain and tendency to depression (according to: [5]).

Chart 2. Location of TP [5, 10, 11, 12]

Reference point*	Exact location of point
Occiput	suboccipital muscle attachment
C5 – C7	front surface; intervertebral disc spaces
Trapezius	midpoint of upper edge
Supraspinatus muscle	middle of the spine of scapula
Second rib	upper surface, costal cartilage attachment
On the side of an elbow joint	in the area of external epicondyle of humerus
Buttock	upper external quadrant
Great trochanter of the femur	In place of piriformis muscle attachment
Knee	medially, proximally from joint space

*Points are localized symmetrically on both sides of the body

Patients with FMS report numerous, additional – apart from pain – complaints, among others: morning stiffness, dryness in the oral cavity, excessive perspiration, dizziness, respiratory arrhythmia, sleep disorder, dysuria complaints, shortness of breath [13]. These are however highly non-specific and are not confirmed during routine medical check-ups. The highly specialized diagnostic tests are necessary here, for objectification – among others: the P substance concentration in plasma and cerebrospinal fluid; concentration of prolactin, calcitonin, tryptophan, serotonin, PGE_2, IgE [5]. The situation is also complicated by the fact that ill people with FMS have neurotic, functional symptoms very often observed – including anxiety states, emotional instability and personality disorders. Due to that reason, patient's complaints are not treated as symptoms of organic diseases – "serious" ones – but as functional diseases in the course of neurotic disorders. Such patients are quite often directed to another specialists when doctor/therapist is not able to notice in them a perceptible deviation during physical examination because they cannot notice/examine existing TrP or TP. In extreme cases, even confabulations can be prescribed for such patients.

DIAGNOSIS OF MYOFASCIAL PAIN SYNDROME

It must be mentioned that certainty and repeatability of stating presence of criteria determining diagnosis of MFPS has been questioned by many scientists [14, 15, 16].

Fernandez-de-las-Penas and collaborators [17] made a review of reference books with acknowledgment of Cohen's kappa coefficient – which is used for comparison of experts assessing the same objects [18] – in this case individual criteria of TrP presence (chart 3). The closer to unity is the value of Cohen's kappa coefficient, the closer to unanimity can the conformity of experts be acknowledged.

The conformity of experts described as "high" (kappa: 0.61–0.80) was noted in respect of only two out of six examined symptoms: "presence of sensitive point" and "causing a *jump sign* reaction" after irritating it. In relation to another three ("localization of tense muscle strand", "presence of radiating pain" and "recognizing" it by a patient as "the one experienced before") the conformity of experts was only "moderate" (kappa: 0.41–0.60). Meanwhile, in scope of "causing a local muscle-contraction" after irritating the TrP, the conformity was determined merely as an "medium" one (kappa: 0.21–0.40) (according to interpretation of Landis and Koch) (according to: [18]).

Chart 3. Indicator of conformity in diagnosing MFPS (according to: [17])

Author	Diagnostic criteria (Kappa coefficient)						
	Tense strand	Sensitive point	Twitch response	Radiating pain	„Jump sing"	Recognizing pain by a patient	Average
Nice [1992]	------	------	------	0.38	------	------	**0.38**
Njoo [1994]	0.49	0.66	0.09	0.41	0.70	0.58	**0.49**
Wolfe [1992]	0.29	0.61	0.16	0.40	------	0.30	**0.35**
Gerwin [1992]	0.85	0.84	0.44	0.69	------	0.88	**0.74**
Average	**0.54**	**0.70**	**0.23**	**0.47**	**0.70**	**0.59**	---------

Certainty of presence of the above mentioned criteria can be increased with the use of electromyographic examination (EMG) from surface or needle electrodes [7]. Local twitch response is a spinal reflex and it seems to be unique for TrP. In the EMG examination it is visible as a multiphase discharge with a big amplitude. Unfortunately, in a clinical practice the EMG examinations are not done routinely.

On the basis of presented comparison it can be assumed that arbitrary adoption of reliable criteria – enabling to diagnose MFPS – is troublesome by reason of subjectivism with which the palpation test is always encumbered.

Unfortunately there are no available and objective laboratory tests that can confirm presence of TrP being characteristic to MFPS and differentiating it from other muscles' disease entities. Such points are identified only with the use of palpation – mostly with the use of a flat technique (the person examining is pressing a muscle with a thumb or another finger, pushing it to the bone situated deeper) or with the use of a pincer technique (a muscle is pressed between the fingers of the person examining) [7]. Unfortunately while examining a patient this way TrP – being symptoms of MPFS – can be quite easily confused with TP – being symptoms of FMS [15,19, 20, 21].

TENDER POINTS AND TRIGGER POINTS – CLASSIFICATION AND DIFFERENTIATION

In the classical interpretation, TP are places of increased tenderness and irritating them (for example with the use of palpation or needle) causes tissues' pain whose strength is disproportionate to the intensity of acting stimulus; they can also be a source of spontaneous pain [1]. Such pain is felt only locally – this means it does not manifest symptoms of radiation.

On the other hand the TrP are defined as points of increased tenderness in the area of hard nodule (size: 3–6 mm) – hypersensitive at touch and perceptible during palpation test – located in the tense strand of skeletal muscles. Irritating TrP with needle or through pressure causes unintentional defensive reaction of the patient (*jump sign*) – of strength disproportionate to the intensity of used force – the same as it was in case of TP.

Moreover, as it was mentioned before, TrP can be a cause of typical radiating pain, motor dysfunctions and autonomic disorders in the parts of body being many times very far from TrP location [8, 22]. This feature however is not assigned to TP.

Another difference concerns the place of arising of TrP and TP. In the traditional interpretation it is acknowledged that – in contrast to TP that can concern soft tissues in wide approach – TrP evolve mainly in the muscle-fascia area (and there comes their name from: myofascial trigger points) [1].

Arising TrP – the same as TP – is connected with exhaustion of adaptive possibilities of the body, yet TP disappear after removal of the basic cause (for example: normalizing the muscle tension), in contrast to TrP, that since the moment of coming into existence start – metaphorically – "to live their own life, leading their own existence". Due to that reason TrP can provoke pain long after the clinical symptoms of illness abate, giving a wrong feeling that it still remains [1, 23].

TENDER POINTS AND TRIGGER POINTS – CONTROVERSIES

On the basis of above mentioned arguments it is possible to get an impression that individual features of TrP and TP are so perceptible that their differential diagnosis in clinical practice should not cause troubles. It is however otherwise. There is a pretty large group of authors who raise a supposition that the differential diagnosis between TrP and TP should be observed in the quantitative rather than in the qualitative categories, despite the still binding definition and nomenclature.

In order to present this problem more closely it must be stressed that not all the TrPare characterized by the same ability to provoke pain. Due to that, in the literature we can find a division to: 1) latent/lethal/passive/retained) TrP; and 2) active TrP [7, 8, 22, 24, 25, 26]; while Chaitow and Fritz [27] distinguish additionally embryonic TrP.

When pressing the active TrP (or stimulating it by needle), the patient starts to feel a very well known pain (both local and referred) – harassing him lately and being a reason for seeking help at physiotherapist. Moreover, the place where the active TrP appeared can show spontaneous activity, not preceded by a mechanical irritation. On the other hand, the latent TrP does not show spontaneous activity, but mechanical stimulation of them causes strong pain – both local and referred – which the patient could feel in the past.

However the embryonic TrP – considered as the most gentle and not causing the occurrence of referred pain – are the mainspring of many disputes. They are defined simply as the excessively sensitive points (small areas) appearing in the area of soft tissues [27]. As it is known, TP are defined in the same way [1, 5, 11, 12]. Situation is aggravated by a very interesting observation: under the influence of traumatic factors on tissues (situation called a biomechanical state of "tissue stress") the latent TrP are transformed into active ones, and the embryonic TrP into latent ones [27]. On the other hand, when the conditions are good, the patient's state can improve – then the active TrP convert into latent ones, and the latent TrP change into embryonic ones. So it is then possible to draw a conclusion that TrP and TP form indeed the two polar opposites of the same phenomenon.

The above mentioned observations seem to be confirmed by a pathogenetic basis – common for TrP and TP [23, 25, 28, 29]. This pathogenetic basis is usually defined basing on the "energy crisis theory" or the "reflectorical disorders theory" [23, 30].

The energy crisis theory assumes that under the influence of tissue stress the neurovasoactive substances – increasing the sensitivity of nociceptors and the permeability of blood

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vessels – are released from tissues, and as a result, in the area of surrounding tissues a swelling evolves [28]. The swollen tissues press down the surrounding capillaries causing local inadequate blood supply (ischaemia) and then hypoxia. Oxygen deficiency limits the ability to create energy which conducts to tissues' dysfunction [25, 29] and can lead to occurrence of pain, painful muscle twitch, muscle coordination disorders and decrease of exertional tolerance of muscles [8].

At the same time, the assumptions of reflectorical disorders theory are that the hypersensitive points arise as the reflex disorders whose source is the improper functioning of spinal nerve or anomalies in the area of determined segment of spine [1, 24, 31, 32]. The assumptions of the reflectorical theory confirm – among the others – the results of Rivner's examinations [32] on the animal specimen which show that after cutting the efferent motor fibres or after infusion of lidocaine, a deactivation of TrP occurs. The same observes Bennett [3] – that cutting the spinal cord above the level from which a muscle (in the area of which a TrP was detected) is supplied, causes a momentary twitch response recorded in EMG.

In this place it is worth mentioning about another phenomenon that shed a slightly new light on the above mentioned reflections. A neuropathic phenomenon of arising the embryonic TrP in the area of pain radiating from the active TrP is described in the reference books [24]. In this situation, the emergent embryonic TrP are called the associate TrP [27]. This neuropathic mechanism favours the spread of embryonic TrP sensitive to palpation, which can lead to occurrence of generalized pain when the conditions are disadvantageous – as a result of activating the biomechanical disorders chain.

If the above mentioned considerations allow to maintain the judgement that TP and TrP do not form different entity but they are just a measure of escalation of functional disorders in the area of muscles, then furthermore the possibility to differentiate FMS and MFPS must be thought over – pursuant to the mention on the subject of possibilities of generalized pain occurrence.

FIBROMYALGIA SYNDROME VS. MYOFASCIAL PAIN SYNDROME

Patients with MFPS which is developing in consequence of long-lasting global disorder of muscle tension balance [1, 33] and sensitivity of nociceptors as a result of chronically remaining pain [34], frequently suffer from achiness fulfilling the criteria of generalized pain. Moreover – in effect of static overload of soft tissues (especially of tonic muscles) – there occur hypersensitive palpable areas (points). Stimulating them cause lively reaction of the patient [1, 4, 33,]. Described symptoms can suggest a suspicion of FMS – the more so that making a diagnosis of MFPS does not exclude the coexistence of FMS. Although, as Bennett writes [35], the myofascial pain is not a synonym of generalized pain appearing in the FMS, but still – according to this author's point of view – the pain complaints from muscles make a potential stimulus leading to sensitizing the central nervous system. Moreover the existing TrP can initiate such sensitization and then sustain it which indicates the active phenomenon of facilitation.

How difficult is the differentiation between patients with degenerative overload illness of motor organs or with the FMS was noticed also by another scientists. In many announcements concerning disease entities of motor organs there are severe restrictions used – the restrictions leading to exclusion of people with FMS which, when not noticed, could have influence on homogeneity of the group and could falsify the obtained results [25].

Univocal identification of ill people with symptoms of FMS is only possible through the assessment of palpable tenderness of points recommended by ACR. In accordance with the recommendations of ACR, a tender point is recognized as the one which – while pressed with a power of 4 kg/cm^2 [12] – causes clear pain signalled verbally or nonverbally by the ill person (for example through moving back the examined limb, so called: *jump sign*) [5, 11, 13].

Unfortunately during the palpation test it is not always possible to determine reliably whether the tender point has characteristics of TrP or TP, especially if this case pertains to latent or embryonic TrP. This problem has been preoccupying also the other scientists. Tunks and collaborators [21] stated that although differentiation between broadly defined norm in scope of intensity of tolerated pressure and pathological hypersensitivity did not cause any problems to scientist, the necessity to make a differential diagnosis between FMS and MFPS caused indeed a real problem to them. On the other hand Wolfe and collaborators [15] noticed that clinicians experienced in recognizing FMS had problem with repeatability in scope of identification of TrP and differentiating active TrP from the latent ones.

The experience of scientists was also indicated by Gerwin and collaborators [19] who demonstrated big conformity in identification of TrP by practicing clinicians. Slightly different conclusions come from researches of Hsieh and collaborators [20], who did not state any difference in ability to assess TrP between appropriately trained and inexperienced scientists. Meanwhile on the basis of our own experience it is possible to state that making use of palpation test in order to formulate reliable conclusions not only does not help but it sometimes even makes realization of this task difficult.

IN CONCLUSION

TrP and the disease entity related to them: MFPS and also tender points TP and adequately: FMS, that appear in determined hypersensitive areas of soft tissue, are still a subject of many experiments, discussions and controversies – despite many examinations in scope of morphological, neurosensory or motor changes. A very important element of this debate is a fact, that such points are discovered again and again, and they are considered as important – in diagnostic and therapeutic respect – in many illnesses (which seemed to be already very well defined) having a nature of functional disorders. Completing the description of disease entity, there are terms connected with discovered pain spots introduced or specified. Due to the fact that these researches concern practically almost all the medical fields, most often a diverse terminology appears. So it can be noticed that different classification and nomenclature systems hinder the correct interpretation of maybe the same or very similar clinical symptom (state).

In this context, very interesting and "abnormal" to some extent is an observation that as a matter of fact a definition of embryonic TrP coincides with a definition of TP. Precise

examination of this phenomenon seems to be more exact when the objective quantitative methods (thanks to which it is possible to assess the sensitivity of structures to the standard stimuli) are used. It is then legitimate to apply EMG with the use of surface or needle electrodes. EMG can confirm location and activity of TrP in MFPS and in FMS, and also in pressure algometria that estimates (in suitable scale) sensitivity of soft tissues in both above mentioned disease entities.

The following must also be emphasized: it is currently commonly acknowledged that inseparable feature of all the lingering (chronic) pain conditions are TrP, and that the active TrP (their specific attribute is that they refer symptoms to fixed places, and these places show slight individual variability) are one of the sources – sometimes the main one – of pain that is suffered by people with FMS.

Looking at the MFPS and at the FMS from the perspective of evolution of knowledge about them and from the point of view of period when scientific researches were conducted and their results published, it must be stated that during last years a considerable progress has been obtained in scope of better understanding of pathogenesis and pathophysiology of pain in specified points of soft tissue hypersensitivity, and the parallel clinical studies – confirming the hypotheses that were made – clearly increased the diagnostic and therapeutic capabilities of clinical practice. Having this in mind, the fact of more and more common scientific discussion and progress in differential diagnosis in the area of so many functional pathologies within the range of soft tissue disorder gives pleasure.

REFERENCES

1. Stodolny J. Choroba przeciążeniowa kręgosłupa. Epidemia naszych czasów. Wydawnictwo Medyczne ZL Natura, Kielce, 2000 (in Polish).
2. Rakowski A. Materiały do kursu Terapii Manualnej w Modelu Holistycznym. cz. I, Centrum Terapii Manualnej, Lusówko k. Poznania, 2004 (in Polish).
3. Bennett R. Myofascial pain syndromes and their evaluation. Best Pract Res Clin Rheumatol. 2007; 21(3): 427–445.
4. Lewit K. Terapia manualna w rehabilitacji chorób narządu ruchu. ZL NATURA; Kielce, 2001 (in Polish).
5. Samborski W. Fibromialgia – studium kliniczne i biochemiczne. Post Nauk Med. 1998; 11: 5–6 (in Polish).
6. Domżał TM. Przewlekłe nieswoiste bóle krzyża – stara dolegliwość czy nowa choroba neurologiczna? Pol Przegl Neurol. 2007; 3(4): 216–227 (in Polish).
7. Dommerholt PT, et al. Mięśniowo-powięziowe punkty spustowe – przegląd uwzględniający dowody naukowe. Rehabil Med. 2006; 10(4): 39–56.
8. Simons DG, et al. Travell & Simons myofascial pain and dysfunction. The trigger point manual. Tom I. Upper half of body. Wiliams&Wilkins, Baltimore, 1999.
9. Simons DG. Review of enigmatic MTrPs as a common cause of enigmatic musculoskeletal pain and dysfunction. J Electromyogr Kinesiol. 2004; 14(1): 95–107.
10. Solga B, et al. Czy w diagnostyce fibromialgii potrzebna jest standaryzacja różnych metod dolorymetrii? Reumatologia 1994; 32(4): 375–380 (in Polish).
11. Samborski W et al. Ocena efektów leczenia rehabilitacyjnego chorych na fibromialgię na podstawie badania poziomu bólu oraz siły mięśniowej mierzonej nowym dynamometrem typu Cybex II. Reumatologia 1997; 35(4): 431–438 (in Polish).
12. Wolfe F, et al. The American College of Rheumatology 1990. Criteria for Classification of Fibromyalgia: Report of the Multicenter Criteria Committee. *Arthritis Rheum.* 1990; 33(2): 160–170.
13. Samborski W. Fibromialgia – nowe poglądy na temat patogenezy, diagnostyki i leczenia. Reumatologia 1993; 31(1): 75–79 (in Polish).
14. Nice D, et al. Intertester reliability of judgments of the presence of trigger points in patients with low back pain. Arch Phys Med Rehabil. 1992; 73(10): 893–898.
15. Wolfe F, et al. The fibromyalgia and myofascial pain syndrome: a preliminary study of tender points and trigger points in person with fibromyalgia, myofascial pain syndrome and no disease. J Reumatol. 1992; 19(6): 944–951.
16. Gerwin RD, et al. Identification of myofascial trigger points: inter-rater agreement and effect of training. J Musculoscelet Pain. 1995; 3(suppl.1): 55.
17. Fernandez-de-las-Penas C et al. Manual therapies in myofascial trigger point treatment: a systematic review. J Bodyw Mov Ther. 2005; 9: 27–34.
18. Jarosz-Nowak J. Modele oceny stopnia zgody pomiędzy dwoma ekspertami z wykorzystaniem współczynnika Kappa. Matematyka Stosowana 2007; 8(49): 154–168 (in Polish).
19. Gerwin RD, et al. Interrater reliability in myofascial trigger point examination. Pain, 1997; 69(1–2): 65–73.
20. Hsieh CY. Interexaminer reliability of the palpation of trigger points in the trunk and lower limb muscles. Arch Phys Med Rehab. 2000; 81(3): 258–264.
21. Tunks E, et al. The reliability of examination for tenderness in patients with myofascial; pain, chronic fibromyalgia and controls. J Reumathol.1995; 22: 944–952.
22. Travell JG, Simons DG. Myofascial pain and dysfunction. Tom II, The lower half of body. Williams&Wilkins, Baltimore, 1992.
23. McPartland JM, Simons D. Myofascial trigger points: Translating Molecular Theory into Manual Therapy. J Man Manip Ther. 2006; 4: 232–239.
24. Wheeler A. Myofascial pain disorders. Theory to therapy. Drugs 2004; 64(1): 45–62.
25. Ruiz-Saez M. Changes in pressure pain sensitivity in latent myofascial trigger points in the upper trapezius muscle after a cervical spine manipulation in pain-free subjects. J Manipulaive Physiol Ther. 2007; 30(8): 578–583.
26. Hanten WP, et al. Effectiveness of a home program of ischemic pressure followed by sustained stretch for treatment of myofascial trigger points. Phys Ther. 2000; 80(10): 997–1003.
27. Chaitow L, Fritz S. Masaż leczniczy – badanie i leczenie mięśniowo-powięziowych punktów spustowych. Elsevier Urban&Partner, Wrocław, 2010 (in Polish).
28. Guzek J. Patofizjologia człowieka w zarysie. PZWL, Warszawa, 2008 (in Polish).
29. Hong CZ, Simons DG. Physiologic and electrophysiological mechanisms of myofascial trigger points. Arch Phys Med Rehabil. 1998; 79(7): 863–872.
30. Fernandez-de-las-Penas C. Musculosceletal disorders in mechanical neck pain: myofascial trigger points versus cervical joint dysfunctions: a clinical study. J Musculoskelet Pain. 2005; 13: 27–35.
31. Gunn C. Radiculopathic pain: diagnosis and treatment of segmental irritation or sensitization. J Musculoskelet Pain. 1997; 5: 119–134.
32. Rivner MH. The neurophysiology of myofascial pain syndrome. Curr Pain Headache Rep. 2001; 5(5): 432–400.
33. Rakowski A. Kręgosłup w stresie. GWP, Gdańsk, 2001 (in Polish).
34. Domżał TM. Ból przewlekły – problemy kliniczne i terapeutyczne. Pol Przegl Neurol. 2008; 4(1): 1–8 (in Polish).
35. Bennett R. Emerging concepts in the neurobiology of chronic pain: evidence of abnormal sensory processing in fibromyalgia. Mayo Clin Proc. 1999; 74(4): 385–398.

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