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УДК 616.711+616.728)-079.2-08

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### CLINICAL VALUE AND DIAGNOSTICS OF UNEQUAL LENGTH OF LEGS AT PATIENTS WITH MYOFASCIAL PAIN SYNDROMES

Results of research of the reasons of hip's asymmetries at patients with painful syndromes of various localization, prevalence and clinical value of leg length inequality at myofascial syndromes are presented in the article. The conclusion on necessity of its orthopedic correction was made.

**Key words:** myofascial painful syndromes, hip's asymmetries, leg length inequality

**The topicality of the research.** The most frequent reason for recourse for the patients with MSA pathology can be pains of various localization, which diagnostics and treatment make up the subject matter for not only orthopedic traumatologists and rheumatologists but also for neuropathologists, specialists in sports medicine, manual therapists [4, 7, 10]. One of their factors of occurrence is static violations connected with inherent or acquired asymmetry of MSA segments [14].

Inequality of lower extremities length also described as «the short leg syndrome» and «the syndrome of legs length discrepancy» is of great interest among these asymmetries [1, 12, 13, 14]. Incidence of this syndrome in general population is rather high and comprises from 0.1 to 13% depending on the quantity of discrepancy [11]. In patients with pathological manifestations on the part of musculoskeletal apparatus its frequency reaches 17.8–81.2% [13], though clinical value of legs length discrepancy remains open. The role of unequal legs length in myofascial pain syndromes pathogenesis in lower extremities and the trunk is little studied. Along with the recognition of the role of even tiny legs length discrepancies (4–5 mm) in the development of skeleton-muscular pathology of the extremities, hip and vertebra [3, 6, 14, 15] there is an opinion about clinical value and necessity of correction of only distinct (15 and more mm) difference of lower extremities length [2].

Thus inequality of legs length is a versatile and unsolved problem.

**The aim of the research** was the study of clinical value and diagnostics efficiency improvement of inequality of legs length at patients with myofascial pain syndromes in various segments of musculoskeletal apparatus.

**Material and methods of the patients' examination.** 351 patients seeking advice from the institute «Zdorovye» were examined from 2002 to 2007 with complains on constant or paroxysmal pains of various intensity in lumbar and/or gluteal region and/or sacral region and lower extremities. Under examination all patients demonstrated presence of hip warps and asymmetries revealed clinically and proved by supplemental research methods.

Character of pain syndrome was carefully analyzed: occurrence, formation and dynamics of pain syndromes

peculiarities, preferential localization and echoic regions as well as their intensity, incidence and irradiation. Preliminary evaluation of pain syndromes and their correlation with classical myofascial pain syndromes with further palpation identification of typical trigger zones was done. Intensity of pain syndromes was evaluated according to simplified McGill method on trebellina system as well as with the help of F-METER apparatus algostrain measurement (1.0 version). Peculiarities of F-measurement method are in threshold painfulness determination in the area of pressure exertion. In connection with individual sensitivity in each patient before seeking of zones of maximal painfulness corresponding to trigger points painfulness threshold was defined in admittedly not impressed region, adjacent to the painfulness zone or on contralateral side. Further evaluation of F-measurement indices was carried out on the basis of pain threshold quantities differences in healthy and painless region of the corresponding area of the extremity.

For leg length inequality identification classical method of pomegranate measurement of lower extremities length was used with the help of measuring tape as well as computer optical tomography (COT) of dorsal space of the trunk which allows revealing the position of various anatomy points of the trunk regarding vertical and horizontal axis with high accuracy [5]. COT is an absolutely harmless, high accuracy method allowing repeated usage (Eurasian package № 000111 from 15.06.98).

In the presence of MSA expressed pathology roentgenological study of the patients was done for structural degenerative changes occurrence clarification.

The data received during the patients' examination were recorded to the corresponding individual charts with further statistical processing undergoing.

**The results of our own research.** Average age of the examined patients was  $55.2 \pm 14.0$  years (from 19 to 89), including 211 women and 140 men. People of employable age prevailed (19–59 years) – 222 (63.2%). Duration of pain syndromes being the reason for addressing for medical help comprised from one month to 36 years ( $6.2 \pm 6.0$  years, mediana – 4 years). 85 patients suffered recurrent pain syndromes for 10 and more years. The greater part of the patients was examined by orthopedist for the first time – 310. (88.3%) patients were ob-

served at the neuropathologists and therapists, more seldom – surgeon. 71 (20.2%) patients have never addressed for medical help, preferring autotherapy or visiting “traditional healers”.

More frequent degenerative-dystrophic vertebra diseases and gonarthrosis were identified in patients (37.6% and 38.5%, consequently). Rather often hip joint pathology was found – coxarthrosis and turnsip bursitis (22.5% and 14.8%, consequently). Besides in 23,1% cases valgus or varus knee joint deformation was identified; in 6.3% – flat-valgus foot deformation. Furthermore in 13 (3.7%) cases shin fracture was in anamnesis, in 6 (1.7%) – hip fracture from 3 to 7 years ago, accompanied by post-traumatic lower extremities deformations as a result of malunions.

More frequent complaint of the patients was pain in lumbar region, hip joint or hip area, knee joint and/or shin and foot. Practically all pain syndromes were multifocal or spread and more often were of myofascial character. More frequent pain syndrome in examined patients was the syndrome of square lumbar muscle – identified in 172 (49.0%) patients. Estimating according to McGill scale it was stated that in 87 (50.6%) cases the pain was weak (19.2±2.9 Un according to F-measurement); in 80 (46.5%) patients - moderate (14.8±2.9 Un according to F-measurement) and in 5 (2.9%) patients - weak (8.3±0.5 Un according to F-measurement). In 82 (47.7%) patients lumbar muscle syndrome was bilateral. Popliteal syndrome was on the second place. It was found in 162 (46.2%) patients including 67 (41.4%) – where it was weakly expressed, in 52 (32.1%) – moderate and in 43 (26.5%) patients – weak. Estimation according to McGill scale comprised 17.4±2.7 Un, 12.3±2.0 Un and 6.2±1,3 Un, consequently. Piriformis syndrome was identified in 119 (33.9%) cases. On expression estimation according to simplified McGill scale it was stated that in 72 (60.5%) patients pain was moderate (18.2±1.6 Un according to F-measurement); in 38 (31.9%) cases – prominent (14.4±2.7 Un according to F-measurement) and in 9 (7.6%) patients – severe (10.1±1.9 according to F-measurement). In 54 (45.4%)

patients piriformis syndrome was bilateral. The next was perennally syndrome which was identified in 95 (27.1%) patients. In connection with superficial location of trigger points even under weak pain according to McGill scale which was found in 34 (35.8%) patients level of pain sensitivity according to F-measurement comprised 12.6±1.2 Un. Moderate pain was identified in 28 (29.5%), severe – in 33 (34.7%) – estimation according to F-measurement 9.7±0.9 Un and 7,3±1,1 Un, consequently.

In 90 (25.6%) patients glutalgia was identified, including 24 (26.7%) cases in which it was bilateral. In glutalgia structure weak and moderate pain prevailed – 35 (39.2%) and 37 (40.1%), consequently. Severe pain was identified in 18 (20%) cases. Assessment of severity according to F-measurement comprised –21,2±1,8 Un, 15,4±1,6 Un and 11,3±2,1Un consequently. Lumboishialgia was found in 72 (20.5%) cases including 24 (33.3%) – with weak pain (18,4±8,2 Un according to F-measurement), 35 (48.6%) – with moderate (14,6±2,1 Un according to F-measurement), and in 13 (18.1%) – with severe (13,7±2,0 Un according to F-measurement). In 54 patients (15.4%) coccygodynia was identified: weakly pronounced - 22 (40.7%), moderate – 17 (31.5%) and severe – in 15 (27.8%), (according to F-measurement 12.3±1.1 Un, 9.7±1.2 Un and 8.2±0.8 Un, consequently).

Tarsal canal syndrome was identified in 40 (11.4%) patients. Weak intensity of pain was marked in 14 (35%) patients (according to F-measurement 9.7±1,0 Un, 7.2±0.8 Un and 6.1±0.4 Un, consequently), moderate – in 9 (22.5%), in other cases – 17 (42.5%) – severe pain (according to F-measurement 9.7±1.0 Un, 7.2±0.8 Un and 6.1±0.4 Un, consequently). More often the syndrome was developing on the background of flat-valgus foot deformations.

Analyzing parameters characterizing hip position (angle of the hip – frontal projection of the top rear of the iliac bones; rotation angle of the hip in horizontal plane and twisting angle of the trunk – rotation of the shoulder girdle in regard to the hip) according to CAT, all the patients demonstrated hip’s asymmetry (table 1).

Table 1

Average values of parameters characterizing hip’s position in examined patients

Group of the patients	Hip’s asymmetry indices		
	min	max	average
AP (angle of the hip in frontal plane)	0.2°	5.2°	2.4±1,2°
RA (rotation angle of the hip in horizontal plane)	0.7°	5.9°	2.9±1,3°
TAT (twisting angle of the trunk in horizontal plane)	0.5°	6.1°	3.2±1,3°

Taking into account absence of rough degenerative-dystrophic changes in joints and vertebra in patients included into the trial as well as expressed scoliotic vertebra deformations changes of hip’s position can be explained by presence of supplementary factors, first of all – lower extremities asymmetries.

The difference from 10 to 40 mm (in average 1,8±0,7 sm, median – 20 mm) was identified in 248

from 351 patients while studying lower extremities length, including:

– in 172 (49.0% from general number of cases) patients without evident lower extremities deformations – real (anatomy) shortening. Besides in 153 (61.7%) – congenital lower extremities deformation; in 19 (7.7%) – shortening as a result of previous hip or shin fracture);

– in 76 (21.7%) patients shortening was connected with knee joint and/or foot deformation and was stipulated for asymmetric inclination of lower extremities axis.

In other 103 cases (29.3%) hip’s asymmetries were not connected with different lower extremities length. In this case they can be explained by hip’s muscular stabilization violation as a result of hypertone of hip’s and/or overhip’s muscles which is interpreted by some authors as “functional lower extremity shortening” [14].

Analysis of hip’s asymmetry structure reasons was done at various age periods (table 2).

In greater part of the patients at the age from 18 to 29 anatomy difference of leg length was stated – 63.6%, hip’s muscular stabilization violation take the second place in the given age group – 22.7%. in singular cases in the given age group extremities deformations were found. In patients at the age of 30–44 years the dominating reason of leg length inequality development were violations of hip’s muscular stabilization (48.8% and 9.8% more on the background of extremities symmetric deformations). Anatomy leg length inequality was a less occurring reason (39.0%).

Table 2

Reasons of hip’s asymmetry in patients with myofascial pain syndromes in various age periods

Reason of hip’s asymmetry	Age group				
	18–29 (n=22)	30–44 (n=41)	45–59 (n=159)	60–74 (n=107)	75–89 (n=22)
Anatomical difference of leg length	14 (63.6%)	16 (39.0%)	81 (50.9%)	56 (52.3%)	5 (22.7%)
Valgus or varus deformation of knee joint	1 (4.5%)	1 (2.4%)	18 (11.3%)	26 (24.3%)	12 (54.5%)
Flat-valgus foot deformation	–	–	5 (3.1%)	8 (7.5%)	5 (22.7%)
Hip’s muscular stabilization violations	5 (22.7%)	20 48.8%)	39 (24.5%)	16 (15.0%)	–
Hip’s muscular stabilization violations on the background of symmetric deformations of lower extremities	2 (9.1%)	4 (9.8%)	16 (10.1%)	1 (0.9%)	–

In age group from 45 to 59 years anatomy difference of leg length (50.9%), hip’s muscular stabilization violations (24.5%) are of great importance and the unit weight of knee joints deformation increases (11.3%). In elderly people (from 60 to 74) anatomy difference of leg length saves the value (52.3%), the unit weight of knee joints deformations increases considerably, flat-valgus foot deformation becomes more frequent (7.5%). Thus in comparison with other age groups occurrence of other reasons decreases (to 15.0%). In senile age the main reasons of leg length inequality are varus or valgus knee joints deformations (54.5%), and the unit weight of anatomy difference of leg length and flat-valgus foot deformations is the same (22.7% per each). Hip’s muscular stabilization violations as the reason for hip’s asymmetry were not found in this age group.

Thus, in all patients with myofascial pain syndrome in lower extremities and lower part of the trunk hip’s space orientation violations were found - angle of the hip changes in frontal and/or in horizontal plane and hip’s position with respect to shoulder girdle. In 70.7% of patients hip’s asymmetries were connected with unequal leg length as a result of real (anatomy) shortening or asymmetric lower extremities axis deviation as a result of their unilateral deformations.

According to literature data [14] it is known that occurrence of various lower extremity length in general population (in people without distinct pathology of musculoskeletal apparatus) depends on the value of this

difference, but not more than 13%. According to our research data occurrence of unequal leg length (from 10 to 40 mm) comprised 70.7%, which is more than 5 times higher, than general population indices.

This proves about pathogenic importance of leg shortening of various origin in the formation of myofascial pain syndromes and it becomes clear that hip’s space orientations violations which develop in this case are accompanied by activation of various adaptive reactions directed on hip’s position normalization. Over-hip’s and hip’s muscles take place in thus adaptation as well as muscles of lower extremities in which durable tonic muscular contractions and hypertone as well as muscular tissue overdistention can develop. In its turn durably existing muscular tensions promote myofascial pain syndromes development which can become the most prominent clinical manifestations of leg length inequality. The data received prove not only about clinical importance of lower extremities unequal length but also about the necessity of its correction in patients with myofascial pain syndromes. More prominent occurrence of unequal leg length in early age (from 18 to 29) serves the validation of pathogenic importance in the formation of myofascial pain syndromes. In elder age the unit weight of deformation diseases of musculoskeletal apparatus increases among possible reasons of pain syndromes.

**Conclusions.** Summarizing the data received we can come to a conclusion:

1. The frequency of unequal leg length identification of various origin in patients with myofascial pain syndromes in lower extremities and trunk is 5 times higher than average popular indices.

2. Under unequal leg length as a result of adaptable reactions directed on hip's position normalization durable

muscular misbalance develops which is one of the main reasons of myofascial pain syndromes.

3. It is reasonable to consider the necessity of short leg length orthopedic correction for effective treatment of the patients with myofascial pain syndromes.

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### КЛІНІЧНЕ ЗНАЧЕННЯ ТА ДІАГНОСТИКА НЕРІВНОЇ ДОВЖИНИ НІГ У ХВОРИХ ІЗ МІОФАСЦІАЛЬНИМИ БОЛЬОВИМИ СИНДРОМАМИ

У статті наведено результати дослідження причин асиметрії таза у пацієнтів з болем у різних сегментах опорно-рухового апарату, розповсюдженість та клінічне значення нерівної довжини ніг при міофасціальних синдромах. Зроблено висновок про необхідність ортопедичної корекції асиметрії.

**Ключові слова:** міофасціальні больові синдроми, асиметрія таза, нерівна довжина ніг

**Стаття надійшла до редакції: 2.12.2014 р.**