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Comparative analysis of rehabilitation efficiency in persons of the second mature age with spinal column osteochondrosis with the help of regular medicinal physical trainings and daily wearing of medicinal prophylactic clothes.

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ABSTRACT

Starting in youth osteochondrosis steadily progresses and gradually causes becoming more frequent episodes of temporal disability. Evident negative osteochondrosis impact on the body is mostly connected with the development of microcirculatory disturbances against its background. In this respect it seems to be urgent to estimate the potential of medicinal physical training and medicinal prophylactic clothes as far as the impact on microcirculation indices in patients with osteochondrosis of the 2nd degree is concerned. In the fulfilled research we conducted the results' comparison of 6 months' application of these two medicinal approaches in patients of the second mature age with lumbar osteochondrosis of the 2nd degree. In the course of the research there were detected the advantages of medicinal prophylactic clothes. Its application efficiently reduced osteochondrosis symptomatology and inhibited the processes of lipids' peroxidation. Against the background of medicinal prophylactic clothes' wearing there was noted more evident positive reaction of microcirculatory course and more evident perfusion of soft tissues at the moment of systolic emission than in the result of regular exercises. The persons with osteochondrosis daily wearing medicinal prophylactic clothes were noted to have more evident indices' improvement of erythrocytes' micro rheological properties and platelets' aggregation. Detected advantages of medicinal prophylactic clothes allow considering it an important component of mass prophylaxis of osteochondrosis progression and one of effective non-pharmacological means of its treatment. So, it can be confirmed that wearing of medicinal prophylactic clothes by persons with lumbar osteochondrosis of the 2nd degree in the course of 6 months is more preferable than regular medicinal physical trainings in the course of the same time.

Keywords: the second mature age, osteochondrosis, erythrocytes, platelets, and microrheology.

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INTRODUCTION

Spinal column osteochondrosis still remains one of rather widespread diseases in mature age [1]. The progression of this pathology causes very often becoming more frequent with aging episodes of temporal disability, and, sometimes, leads to invalidism [2]. It is connected with the fact that given pathology can worsen many common indices of a body's functional state [3] and negatively influence most internals [4]. Such negative impact of osteochondrosis on the body is mostly connected with the development of regular blood elements' micro rheological dysfunctions against its background. Their presence promotes the development of hypoxia in tissues [5] and disturbs metabolic processes in them [6, 7]. It is the basis for the development of stable vessels' spasm [8, 9] leading to various internals' dysfunctions and, sometimes, to the formation of arterial hypertension [10, 11].

At present more and more information is being accumulated that disturbances of regional microcirculatory blood circulation are an important pathogenesis component of local and reflectedvertebrogenic painfulness [12, 13] which becomes strengthened at progression of compressive-ischemic disturbances in spinal column [14]. This opinion is supported by the absence of sharp connection between the evidence of degenerative changes in intervertebral disks and the strength of pain syndrome [15, 16]. At the same time, there was noted the possibility of pain syndrome deepening at worsening of microcirculation and speed lowering of bloodstream in micro vessels. In this respect, restoration of local microcirculation is more and more often considered as an important factor of pain syndrome reduction at osteochondrosis [17, 18]. In this respect, for further efficiency rise of osteochondrosis treatment it seems to be necessary to apply variants of non-pharmacological correction which maximally improve microcirculatory processes.

Medicinal physical training (MPT) is traditionally applied correction of osteochondrosis clinical manifestations. The possibility of impact with its help on the processes of microcirculation [23] was noted earlier in clinic [19, 20] and in experiment [21, 22]. In earlier conducted researches there were shown comparable capabilities of MPT and somemedicamental impacts in respect of microcirculation separate parameters [24]. At the same time, bulk of the working population is characterized by low attachment to regular physical exercises [25]. In this respect, further search of efficient variants of non-pharmacological correction which will be more popular among most persons with osteochondrosis [26, 27] and will be able to eliminate clinical manifestations of the disease and disturbances of microcirculation, is becoming really necessary. The author considered daily wearing of medicinal prophylactic clothes (MPC) as an alternative to MPT at osteochondrosis. It was proved earlier that attachment to MPC among patients was much higher than to MPT [28]. In previous researches there was also established the possibility of correction of clinical and hematological disturbances caused by the pathology of spinal column [29, 30], with the help of MPC. That's why, it seemed urgent to conduct comparative estimation of MPT and MPC rehabilitation capacities in respect of clinical manifestations and microcirculation indices in persons with osteochondrosis. So, we put the following aim in our research: to conduct comparative analysis of microcirculation indices' dynamics in persons of the second mature age with osteochondrosis of the 2nd degree having had MPT or having daily worn the author's MPC for half a year.

MATERIALS AND METHODS

The research was conducted on people living in Central Russia (Moscow City and Moscow region). Into our research we took 37 healthy people of both sexes (18 men and 19 women) of the second mature age (mean age 43.5 ± 2.5 years) who composed the control group. We also examined 90 people of both sexes of the same age (mean age 45.0 ± 2.2 years) with osteochondrosis of the 2nd degree who composed the two groups of observation. The first observation group is represented by 47 people, including 24 men and 23 women. The second observation group consisted of 43 persons, including 21 men and 22 women. The diagnosis of osteochondrosis in all cases was confirmed clinically and rontgenologically. In 94.4% of patients, the duration of exacerbation of the disease exceeded 2 weeks, with 88.9% of patients receiving treatment (medication, physiotherapy, massage, and reflexology) for osteochondrosis, which in all cases was not effective enough. This research is approved by the local Ethics Committee of the Russian State Social University on May, 14th, 2015 (Record №5). All the examined persons gave written informed consent on participation in conducted research.

Patients underwent clinical and neurological examination, neuropsychological testing using a four-part visual-analogue pain scale [31], as well as surface electromyography of the muscles of the trunk and lower limbs.

For the estimation of microhemodynamics in the extremities we used the noninvasive transcutaneous ultrasonic doppler-ography which was equipped by the diagnostic system "Minimax-Doppler-K" produced by "Minimax" (Russia). The state of microcirculation was determined on the nail folds of the first toes and fingers applying ultrasonic detector 25 MH. In our research we took into account the following indices: linear systolic speed of bloodstream (Vas), linear average speed of bloodstream (Vam), volume systolic speed of bloodstream (Qas), average volume speed of bloodstream (Qam).

In our research we determined the activity of the processes of lipids' peroxidation (LPO) in blood plasma which was registered according to the content of Thiobarbituric acid (TBA)-active products in it with the help of a set produced by the firm "Agat-Med" (Russia) and to the level of acylhydroperoxides (AHP) [32]. We also registered antioxidant activity (AOA) of blood [33].

The concentration of P-selectin and PECAM-1 molecules (Bender Med Systems GmbH, Austria) was determined by plasma enzyme immunoassay.

In blood plasma of examined children we determined the content of thromboxane A₂ metabolite – thromboxane B₂ and prostacyclin metabolite – 6-keto-prostaglandin F_{1α} by enzymeimmunoassay with the help of sets produced by the firm "Enzo Life science" (USA). We also determined the summary content of nitric oxide metabolites [34] in children's plasma.

We judged the state of erythrocytes' micro rheological features of children by their cytoarchitecture and aggregation. We determined the quantity of erythrocytes' normal and changed forms in blood with the help of light phase-contrast microscopy [35].

The ability of erythrocytes to spontaneous aggregation was determined with the help of light microscopy by calculating the quantity of erythrocytes' aggregates, the number of aggregated and non-aggregated erythrocytes [35] in Guryev's box.

Platelets' aggregation (AP) was estimated by visual micro method with application of ADP (0.5×10^{-4} M), collagen (dilution 1:2 of the basic suspension), thrombin (0.125 un/ml), adrenaline (5.0×10^{-6} M) and hydrogen peroxide (7.3×10^{-3} M) as inductors [35].

In the first group of observations, the correction of the condition was carried out with the help of daily physical therapy exercises one hour a day [36]. The following exercises were used:

The starting position - lying on the back

1. Hands along the trunk, legs together. Raise your hands up - inhale, lower - exhale. Repeat 4-5 times.
2. Bend and unbend the foot with simultaneous squeezing and unclenching of the fingers. 10 times.
3. Circular rotation with stops 4-6 times in each direction. Repetition 2.
4. Alternately pulling the knees to the chest. 6- 8 times.
5. Alternate diversion in the direction of the right arm - the right leg, the left arm - the left leg. 4-6 times.
6. Hands in the "lock" behind the head. Raising his head, pull his toes on himself. Repeat 8 times.
7. Hands along the trunk. Raise your arms up, at the same time pull the socks of your feet from yourselves- inhale, return to the ip-exhalation. Repeat 8 times.
8. Bend the legs in the knees, put on the width of the shoulders. Right knee to get the left foot, then the left knee right foot. Repeat 4-6 times.
9. Simulation of riding a "bike". 5 circles in each direction.
10. Put your hand on your stomach. Take a deep breath in your stomach, then a slow exhalation. Repeat 3-4 times.
11. Left arm along the trunk, right upper. Alternate change of hand position. Repeat 10 12 times.
12. Feet on the width of the shoulders, arms spread apart. With your right hand, get the left hand, go back to the IV, then with your left hand get out the right hand. Repeat 6-8 times.

13. Alternately tighten the knees to the chest with the help of hands. 6- 8 hands.
14. Bend and unbend the foot with simultaneous squeezing and unclenching of the fingers. 10 times.

The starting position is lying on the side

1. on the left side. Flapping movements with your hand and your leg up. 4-6 times.
2. Pulling the knee to the chest. 6-8 times.
3. Flip forward and backward. 6-8 times. On the right side, repeat all the exercises that were done on the left side.

The starting position - standing on all fours.

1. Alternately taking away the straight arms to the sides. 10-12 times.
2. alternate sweeping movements with a straight back foot. 8-10 times.
3. Alternately pulling the right knee to the left arm then left-to the right arm. 6-8 times.
4. Tighten the left knee to the chest, move the leg back, sliding with the toe on the floor and sitting down on the right heel. Then perform this exercise with your right foot. 6-8 times.
5. Alternate flapping a straight leg up and back and the opposite hand up. Then repeat with the other hand and foot. 6-8 times.
6. "Crossing" hands to the right and left, the legs remain in place. 5 times in each direction.
7. Sit on your heels without taking your hands off the floor (at a slow pace). 6-8 times.
8. Go to the sitting position on the right, and then on the left buttock, without lifting the hands off the floor. 6-8 times.
9. Lean straight with the hands on the floor, raise your head. Lowering his head on his chest (without bending his hands), bend his back (especially in the belt), then bend over. Perform slowly, 8-10 times.

All the persons from the second group of observation were recommended to wear designed by the author's medicinal-prophylactic clothes [37] every day to correct osteochondrosis manifestations. The applied MPC consisted of belt-cast with warming effect which was composed of two details – backplate and breast-plate. There were elements of their mutual connection. The belt-cast was also provided with vertical pockets of different width. Stiffening ribs of elastic material were inserted into one of them, warming elements – into the others. Both plates were made of two layers of fabric. Vertical stitches forming pockets were made along whole their surface. Both layers of fabric were sewed between each other along the lower cut and sides. The upper cut was left open and was provided with a zipper. A set of salt heaters was used as warming element.

The patients from the both group of observation were examined at the beginning and in 3 months, 6 months of constant MPC wearing. The control group was examined once.

Received in our research results were processes by Student's (t) criterion.

RESULTS OF INVESTIGATION AND DISCUSSION

In the result of daily MPC wearing the patients had full reduction of lumbar ischialgia signs already in 4 weeks. It was noted in 5 weeks in all the patients having MPT. No cases of pain syndrome recidivation were detected in both groups in the course of the following observation. More evident positive impact of MPC wearing than MPT on the dynamics of pain syndrome was confirmed by data received with the help of visual-analogue scale of pain. With its help we proved firm elimination of pain in a month of MPC application and in 5 weeks at MPT. Other neurologic disturbances (antalgic postures, alterations of tendon reflexes, sensitivity fall, disturbances of muscles' tonus and strength) were eliminated in both groups of observation in the same terms.

In the result of MPC wearing the patients were noted to have gradual improvement of electromyography indices. To the end of observation the amplitude of muscle contractions in patients increased in 5.5 times ($p < 0.01$), and frequency of muscle fibers' contractions – in 2.3 times ($p < 0.01$). Against the background of physical therapy, the results were more modest - 4.4 times and 1.8 times, respectively.

Daily wearing of the author's MPC provided fast and more pronounced than in the practice of therapeutic physical training, improvement of microcirculation indices in the lower extremities. By the end of observation the persons daily worn MPC were registered to have Vas increase in the lower extremities from the right side – by 22.5%, from the left side – by 25.6%, Vam from the right side – by 78.6%, from the left side – by 73.3%, and Qam value from the right side – by 92.3%, from the left side – by 78.6%, at the fall of Qas value from the right side – by 42.3%, from the left side – by 41.1% (Table 1). The achieved dynamics of parameters of microcirculation exceeded similar results in the group of observed, engaged in therapeutic physical culture.

Table 1: The dynamics of microhemodynamics' characteristics of the examined people with osteochondrosis against the background of non-pharmacological impact application

Parameters	Physical training in physical culture, n=41, M±m		Wearing preventive clothing, n=43, M±m		Control, n=34, M±m
	initial state	6 months	initial state	6 months	
Vasright leg, cm/s	1.28±0.039 p<0.01	1.43±0.022 p ₁ <0.01	1.29±0.032 p<0.01	1.58±0.019 p ₁ <0.01 p ₂ <0.05	1.57±0.027
Vamright leg, cm/s	0.15±0.021 p<0.01	0.21±0.016 p ₁ <0,01	0.14±0.017 p<0.01	0.25±0.012 p ₁ <0,01 p ₂ <0.05	0.26±0.010
Qasright leg, ml/min	0.73±0.034 p<0.01	0.60±0,019 p ₁ <0.01	0.74±0.028 p<0.01	0.52±0,020 p ₁ <0.01 p ₂ <0.05	0.51±0.022
Qamright leg, ml/min	0.14±0.007 p<0.01	0.21±0,009 p ₁ <0.01	0.13±0.002 p<0.01	0.25±0,007 p ₁ <0.01 p ₂ <0.05	0.24±0.008
Vasleft leg, cm/s	1.24±0.015 p<0.01	1.43±0.34 p ₁ <0.01	1.25±0.010 p<0.01	1.57±0.25 p ₁ <0.01 p ₂ <0.05	1.58±0.030
Vamleft leg, cm/s	0.15±0.008 p<0.01	0.20±0.017 p ₁ <0.05	0.15±0.007 p<0.01	0.26±0.010 p ₁ <0.01 p ₂ <0.05	0.26±0.009
Qasleft leg, ml/min	0.73±0.033 p<0.01	0.59±0.028 p ₁ <0.05	0.72±0.027 p<0.01	0.51±0.024 p ₁ <0.01 p ₂ <0.05	0.52±0.021
Qamleft leg, ml/min	0.15±0.019 p<0.01	0.21±0.018 p ₁ <0.05	0.14±0.012 p<0.01	0.25±0.011 p ₁ <0.01 p ₂ <0.05	0.25±0.010

Conventional signs: p – signification of parameters' differences in people with osteochondrosis and the control group; p₁ – dynamics' signification of accountable indices in people with osteochondrosis in the course of correction in comparison with the start; p₂ – differences' signification of correction results in both groups. The signs are similar in the following table.

As a result of the correction in both groups of persons with lumbar osteochondrosis, the weakening of LPO processes in plasma was noted. So, already in 3 months of in persons who wore daily MPC the quantity of AHP and TBA products in plasma lowered from 2.45±0.48 D₂₃₃/1 ml and 4.48±0.52 umol/l (control values – 1.77±0.23 D₂₃₃/1 ml and 3.26±0.29 umol/l, respectively) till 2.05±0.52 D₂₃₃/1 ml and 3.91±0.42 umol/l, respectively. By 6 months of the use of MPC, the content of AGP in the blood of the individuals of the observation group was reduced by 36.1%, while the TBA-active compounds decreased by 35.7% and reached the control values. This turned out to be possible as a result of amplification of AOA plasma by 35.3% to the level corresponding to control. For half a year of wearing MPC in individuals with osteochondrosis, the levels of P-selectin and PECAM-1 significantly decreased by 22.2% and 22.1%, respectively, and approached the values of control. These indicators in the group of persons regularly engaged in exercise therapy were statistically significantly inferior to those in the group of those who carried MPC.

The plasma of persons with osteochondrosis, who daily wore MPC, was noted to have gradual leveling of the existed imbalance of arachidonic acid metabolites. By 6 months of observation the level of thromboxane B₂ in their plasma lowered in comparison with the initial one by 30.2% and the derivative level of its functional antagonist – 6-keto-prostaglandin F_{1α} rose by 15.6% and reached the control values in both cases (Table 2). In 6 months of observation it was accompanied in the observed persons by content rise of nitric oxide summary metabolites in their plasma by 23.3%.

Daily MPC wearing by persons from the group of observation was accompanied by the rise of dissociates' percentage in their blood (Table 2). So, in 3 months of their application the level of discoid erythrocytes in their blood was equal to 80.3±0.20% additionally rising by the 6th month till 85.4±0.16%. The quantity of erythrocytes' reversibly and irreversibly modified forms in the group of observation gradually lowered in the result of MPC wearing and became equal in half a year of observation to 11.1±0.07% and 3.5±0.07% respectively.

In the result of daily 6 months' MPC application to persons with lumbar osteochondrosis there was reached the fall of erythrocytes' sum in aggregates by 32.5% and the quantity of these aggregates by 31.1% at the rise of freely laying erythrocytes by 21.6% what allowed taking out the accountable indices to the control level.

The persons with osteochondrosis regularly having MPT, were noted to have far less rise of erythrocytes-dissociates' percentage in blood (by 6.4%) (Table 2). The quantity of erythrocytes' reversibly and irreversibly modified forms in blood of the examined patients from this group lowered by the end of observation by 17.5% and by 70.4% respectively. The persons from this group were found to have less weakening of erythrocytes' aggregative properties. It was pointed by the index fall of erythrocytes' summary involvement into aggregates by 21.2%, quantity rise of these aggregates by 16.4% and number rise of freely lying erythrocytes by 14.8%.

MPC application to persons with osteochondrosis conditioned more evident positive dynamics of platelet aggregation than in the result of regular MPT. Daily MPC wearing provided the observed patients with PA (platelets' aggregation) inhibition in response to all the applied inductors till the level near to the control one. By the end of observation they had the most evident platelets' reaction on collagen, ADP and ristomicin. PA was less active with H₂O₂ and thrombin. Maximal duration of PA development was observed in persons with osteochondrosis wearing MPC. It was in response to adrenaline – 93.8±0.30 s (Table 2). Positive PA dynamics in persons having regular MPT was rather scarce what didn't allow it reaching the control level (Table 2).

Table 2: The dynamics of hematological indices of the examined people with osteochondrosis against the background of non-pharmacological impact application

Parameters	Physical training in physical culture, n=41, M±m		Wearing preventive clothing, n=43, M±m		Control, n=34, M±m
	initial state	6 months	initial state	6 months	
Acylhydroperoxides of plasma, D ₂₃₃ /l ml	2.47±0.056 p<0.01	1.98±0.038 p ₁ <0.05	2.45±0.048 p<0.01	1.80±0.029 p ₁ <0.01 p ₂ <0.05	1.77±0.023
Thiobarbituric acid-products of plasma, umol/l	4.50±0.059 p<0.01	3.67±0.035 p ₁ <0.01	4.48±0.052 p<0.01	3.30±0.034 p ₁ <0.01 p ₂ <0.05	3.26±0.029
Antioxidant activity of plasma, %	24.0±0.50 p<0.01	30.6±0.36 p ₁ <0.01	23.8±0.41 p<0.01	32.2±0.32 p ₁ <0.01 p ₂ <0.05	32.6±0.49
P-selectin, ng/ml	121.0±0.61 p<0.01	107.2±0.44 p ₁ <0.05	119.9±0.49 p<0.01	98.1±0.39 p ₁ <0.01 p ₂ <0.05	98.4±0.42
PECAM-1, ng/ml	57.9±0.35	52.4±0.29	58.6±0.38	48.0±0.25	47.3±0.27

	p<0.01	p ₁ <0.05	p<0.01	p ₁ <0.01 p ₂ <0.05	
thromboxanB ₂ , pg/ml	226.4±0.62 p<0.01	187.3±0.48 p ₁ <0.01	220.3±0.67 p<0.01	169.2±0.45 p ₁ <0.01 p ₂ <0.05	168.7±0.75
6-keto-prostaglandin F _{1α} , pg/ml	83.2±0.41 p<0.05	90.1±0.27 p ₁ <0.05	82.8±0.32 p<0.05	95.7±0.29 p ₁ <0.05 p ₂ <0.05	96.0±0.42
nitric oxide's metabolites, umol/l	28.9±0.27 p<0.05	33.4±0.25 p ₁ <0.05	29.2±0.24 p<0.05	36.0±0.28 p ₁ <0.05	36.1±0.29
erythrocytes-dissociates, %	76.4±0.25 p<0.01	81.3±0.19 p ₁ <0.05	75.6±0.24 p<0.01	85.4±0.16 p ₁ <0.01	85.2±0.17
reversibly modified erythrocytes,%	15.4±0.17 p<0.01	13.1±0.09 p ₁ <0.05	15.2±0.12 p<0.01	11.1±0.07 p ₁ <0.01	11.2±0.09
irreversibly modified erythrocytes,%	9.2±0.11 p<0.01	5.4±0.08 p ₁ <0.01	9.2±0.08 p<0.01	3.5±0.07 p ₁ <0.01 p ₂ <0.05	3.6±0.06
sum of all the erythrocytes in an aggregate	44.5±0.10 p<0.01	36.7±0.14 p ₁ <0.05	43.6±0.11 p<0.01	32.9±0.10 p ₁ <0.01 p ₂ <0.05	32.8±0.12
quantity of aggregates	8.5±0.08 p<0.01	7.3±0.18 p ₁ <0.05	8.4±0.07 p<0.01	6.4±0.17 p ₁ <0.01 p ₂ <0.05	6.3±0.11
quantityoffreeerythrocytes	237.3±0.39 p<0.05	272.4±0.36 p<0.05	238.6±0.32 p<0.05	290.1±0.29 p ₁ <0.05	288.5±0.34
Aggregation of platelets with ADP, s	32.1±0.19 p<0.01	38.1±0.11 p ₁ <0.05	31.9±0.18 p<0.01	41.9±0.09 p ₁ <0.01	42.2±0.11
Aggregation of platelets with collagen, s	22.2±0.15 p<0.01	28.2±0.21 p ₁ <0.05	23.5±0.19 p<0.01	32.0±0.15 p ₁ <0.01	32.3±0.09
Aggregation of platelets with thrombin, s	41.3±0.16 p<0.01	50.1±0.09 p ₁ <0.05	41.0±0.14 p<0.01	56.0±0.08 p ₁ <0.01 p ₂ <0.05	56.1±0.14
Aggregation of platelets with ristomycin, s	34.8±0.17 p<0.01	42.1±0.08 p ₁ <0.05	33.2±0.15 p<0.01	46.0±0.09 p ₁ <0.01	45.8±0.10
Aggregation of platelets with H ₂ O ₂ , s	33.6±0.23 p<0.01	41.5±0.17 p ₁ <0.05	35.1±0.25 p<0.01	47.0±0.15 p ₁ <0.01 p ₂ <0.05	46.7±0.20
Aggregation of platelets with epinephrine, s	73.8±0.35 p<0.01	86.7±0.41 p ₁ <0.05	72.2±0.33 p<0.01	93.8±0.30 p ₁ <0.01 p ₂ <0.05	93.6±0.036

Further progress of society is impossible without planned development of new efficient variants of prolonged support of physiological optimum in a human body and ways of its various dysfunctions' effective elimination [38, 39]. It is also especially urgent in respect of developing already in young age involutive alterations in intervertebral disks forming the basis of osteochondrosis [40]. Last decades, notwithstanding the efforts of medicine, this state remains one of rather widespread in the world among population of mature age [41]. The great frequency of its exacerbations at that continues to cause serious economic damage in many countries of the world [42].

A search of efficient rehabilitation forms and social integration of various groups of people with broken health is being actively led in the world at present. One of new rehabilitation variants is MPC application [43, 44]. Its design is being conducted according to the last achievements of science [45]. Taking into account very wide prevalence of osteochondrosis, design of MPC for the given category of patients [46, 47] acquires special

signification. For the final estimation of medicinal potential of this health-improving impact it was necessary to compare the results of MPC application with efficiency indices of traditionally applied at the given pathology MPT.

On the basis of neurologic examination and results of electromyography it was established that daily MPC wearing leads at lumbar osteochondrosis to quicker and fuller reduction of neurologic symptoms. Regression dynamics of pain sensations, pathologic symptoms and disturbances of electromyography indices points at the achievement of earlier osteochondrosis remission with the help of MPC. It can be considered that received results are conditioned by continuous medicinal MPC impact on a body in the course of the day whereas MPT impact on a patient lasts just limited period of time in the course of the day. Fuller and earlier elimination of elements of osteochondrosis pathogenesis, edemas of tissues, muscle spasms and weakening of tropic disturbances at MPC application is, evidently, caused by this very circumstance.

It was found out that wearing of the author's MPC at osteochondrosis exacerbation fuller eliminated the dysfunction of microcirculation and minimized the bypassing type of bloodstream. At the same time, regular MPT didn't allow reaching such evidence of positive reaction of microcirculatory course. Besides, daily MPC wearing can lead persons with lumbar osteochondrosis to fuller (than at MPT) optimization of erythrocytes' rheological properties. It is also rather significant for the optimization of microcirculation [48]. Maximal strengthening of the body's antioxidant protection against the background of MPC wearing has great signification for the achievement of this effect. It leads to weakening of LPO impact on lipids and erythrocytes' membrane-bound proteins, and preserves their normal secondary and space structure. In the result we have the situation providing preservation of optimal state of erythrocytes' bulk membranes by minimizing the content of their modified forms in blood and normalizing the quantity of their discoid forms.

Found in the course of MPC application weakening of initially strengthened erythrocytes' aggregation in patients with osteochondrosis was more evident than against the background of MPT. It can be estimated as the result of deeper positive MPC impact on the elements of osteochondrosis pathogenesis negatively influencing micro rheological processes [49, 50]. Besides, optimal number fall of reversibly and irreversibly modified erythrocytes against the background of MPC wearing also provides quantity fall of erythrocyte aggregates in blood of these persons.

Reached PA weakening in patients against the background of MPC wearing surpassed the indices received against the background of MPT. Time increase of PA development under the impact of ristomicin in persons with osteochondrosis wearing MPC should be connected with not only great LPO weakening but also with content fall of von Will brand's Factor in blood (more significant than against the background of MPT application [21]). Daily MPC wearing also turned out to be able to raise platelets' resistance to peroxidation what could be judged by the dynamics of PA time with H_2O_2 .

Reached optimization of erythrocytes' rheological properties and PA in the result of daily MPC wearing was, evidently, connected with balance achievement of biologically active substances which could influence regular blood elements' aggregation in the examined persons. So, optimization of proaggregants' and antiaggregants' levels was reached in patients' blood against the background of daily MPC wearing. It was connected with more evident weakening of thromboxane A_2 formation and greater activation of prostacyclin synthesis than in the group having regular MPT. Positive dynamics of pro- and antiaggregants' balance was strengthened also on behalf of NO production growth in vascular walls. It was more evident under the impact of MPC. Given changes were functionally favorably added in patients who daily wore MPC, by significant plasma level fall of P-selectin and PECAM-1. Given effect surpassed the impact of MPT as it significantly weakened aggregative processes of regular blood elements [33]. It minimized the risk of episodes of capillary course blocking by their aggregates and formed optimal conditions for metabolism in tissues of persons with osteochondrosis [38].

It becomes clear that it is possible to weaken significantly LPO processes in plasma by improving the indices of erythrocytes' and platelets' aggregation in the course of 6 months' MPC application to persons with lumbar osteochondrosis. Received results surpass the indices which were reached in this category of patients in the course of 6 months with the help of regular medicinal physical trainings. High clinical MPC efficiency is, evidently, connected with the very possibility of microcirculation parameters' normalization with its help, and, consequently, provision of metabolism necessary level in tissues.

So, it can be established that MPC constructive peculiarities [51] allow reaching more evident positive results in the course of 6 months' application to persons with lumbar osteochondrosis than regular MPT, in respect of clinical manifestations of this pathology and the level of microcirculatory indices. In this respect it can be considered that in the field of efficiency given medicinal approach is not inferior to the traditionally applied [52] and innovative [53] medicinal impacts which are applied at osteochondrosis. At the same time, taking into account availability, simplicity of application and absence of pharmacological or physiotherapeutic load on a body, MPC can be widely recommended to patients with osteochondrosis having various contraindications to traditional variants of treatment.

CONCLUSION

In the conducted research we fulfilled the comparison of correction capacities of 6 months' MPT application and daily wearing of the author's variant of medicinal prophylactic clothes in respect of lumbar osteochondrosis manifestations. It turned out that MPC application could more efficiently reduce the symptomatology of osteochondrosis and inhibit the processes of lipids' peroxidation than regular MPT. Against the background of MPC we also noted more evident positive reaction of accountable microcirculatory indices. It provided more evident perfusion of soft tissues in patients than regular MPT. Detected advantages of MPC to MPT allow considering them an important component of mass prophylaxis of osteochondrosis progression and one of effective non-pharmacological means of its treatment.

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