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Specyfika i zawartość merytoryczna czasopisma nie ulega zmianie.

Zgodnie z informacją MNIŚW z dnia 2 czerwca 2014 r., że w roku 2014 nie będzie przeprowadzana ocena czasopism naukowych; czasopismo o zmienionym tytule otrzymuje tyle samo punktów co na wykazie czasopism naukowych z dnia 31 grudnia 2014 r.

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## DIABETIC PERIPHERAL ANGIOPATHY TREATMENT USING A MULTI-LASER THERAPY DEVICE

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### Summary

The results of research on the effectiveness of multifunctional laser therapy treatment of diabetic peripheral arterial disease in patients with type 2 diabetes on the basis of a systematic approach.

The clinical picture of peripheral angiopathy consists of a combination of specific diabetic angiopathy with the medium and large vessels atherosclerosis. In the case of diabetes feet the combined lesions are underlying the obliterating vascular disease. In younger diabetic patients these changes have primarily functional nature in the form of changes in vascular tone and capillaropathy.

Thus, there is a need to develop efficient way to treat and prevent DPA that could actively influence the quality of life, reduce or prevent complications that arise during DPA and lower doses of pharmaceuticals. Nowadays we know several ways of physiotherapeutic treatment and prevention of complications of diabetes.

Almost all patients after 3-4 sessions have a slight improvement of blood microcirculation in the lower extremities and reduce overall blood sugar level. After 10-12 treatments the test scores improve.

The closest to the developed method is a method of treating diabetes and its complications prevention, which includes magnetic-laser-ultrasound therapy of the pancreas, liver and their segmental zones. This magneto-laser-ultrasound therapy treatment is combined with low-intensity electromagnetic radiation physiopuncture in a millimetric range spectrum [2].

The main drawbacks of existing methods of treating complications of diabetes is that they do not involve zonal influence on the DPA area and do not include the need to influence the oxygen capacity of blood and increase its energy activity, and in this regard, the effectiveness of the treatment is generally reduced. As the base of invention is laid the task of creating such a way that dramatically improves the performance of DPA treatment in patients with diabetes and reduces the procedural burden on them.

Our developed method of treating the DPA in diabetic patients is based on the simultaneous use of magnetic laser stimulation of the pancreas or liver with additional simultaneous laser irradiation of venous blood in popliteal areas and scanning laser beam therapy of the DPA area. Procedures performed 2-3 times a week. The course of treatment is 10 procedures. A second course is performed if necessary after 1-2 months. There may be some tactical changes, which are determined individually by your doctor depending on the clinical condition of the patient.

The technical results, achieved by suggested solution are: increasing the effectiveness of treatment, the removal of metabolic disorders, a positive effect on the microcirculation, desintoxication of the body, increasing blood oxygen capacity and increase of its energy activities, which largely prevents complications in the treatment of DPA.

Based on the proposed method treatment is performed using a laser multifunction system.

Magnetic-laser stimulation of the pancreas and liver is performed, for example, using the following parameters: modulation frequency of magnetic laser - 9.4 Hz, magnetic fields up to  $30 \pm 10$  mT, the optical flow power of red or blue range of the spectrum is  $30 \pm 10$  Wt, optical flow power of infrared spectrum - of  $50 \pm 20$  mW, magnetic laser applicator of red spectral range is set on the projection of the pancreas, magnetic laser applicator of infrared or blue range of the spectrum is set on the projection of the liver.

Popliteal overvessel blood laser irradiation is performed using the laser emission of red spectrum range - wavelength laser  $0,63 \pm 0,03$  mm, laser power -  $20 \pm 10$  mW.

The DPA zones therapy with the laser scanning beam: laser wavelength -  $0,63 \pm 0,03$  mm, laser power -  $150 \pm 50$  mW, scanning figure - "Grid", the scanning dimensions -  $400 \times 200$  mm. Additionally it is possible to perform nasal breathing with SOM using apparatus MIT-S. After the procedure is done the patient ingests the 50-200 ml of activated by singlet-oxygen mixture fluid. The liquid activation is held for 3 minutes.

As can be seen from the data in Table 1, the patient significantly improved metabolism indicators and clinical parameters (blood pressure, pulse, bowel function, etc.). The developed method can be used in hospitals, clinics, spa facilities and therapeutic centers, etc. and be combined with drug therapy.

**Key words: diabetic peripheral angiopathy, a multi-laser therapy device.**

The results of research on the effectiveness of multifunctional laser therapy treatment of diabetic peripheral arterial disease in patients with type 2 diabetes on the basis of a systematic approach.

Today, increasing number of patients with diabetes mellitus (DM) has become a worldwide epidemic. According to the World Health Organization in 2014 there were more than 377 million people suffering from diabetes. According to forecasts of the WHO, already by 2030 the number of diabetic patients in the world may exceed 500 million people.

As a rule, a chronic course of the disease within 3-4 years causes the development of peripheral angiopathy (DPA) in more than 40% of diabetic patients. According to IDC-10, it is classified I79.2.

The clinical picture of peripheral angiopathy consists of a combination of specific diabetic angiopathy with the medium and large vessels atherosclerosis. In the case of diabetes feet the combined lesions are underlying the obliterating vascular disease. In younger diabetic patients these changes have primarily functional nature in the form of changes in vascular tone and capillaropathy.

Thus, there is a need to develop efficient way to treat and prevent DPA that could actively influence the quality of life, reduce or prevent complications that arise during DPA and lower doses of pharmaceuticals. Nowadays we know several ways of physiotherapeutic treatment and prevention of complications of diabetes.

Similar to the developed method is a method of treating of complications of diabetes [1], which includes nasal breathing with singlet-oxygen mixture (NB

SOM) for 25 minutes and subsequent ingestion of 200 ml fluid activated with SOM (mineral or drinking water, herbal infusions). For the course of treatment 10-12 procedures are appointed. The procedures performed every other day.

Almost all patients after 3-4 sessions have a slight improvement of blood microcirculation in the lower extremities and reduce overall blood sugar level. After 10-12 treatments the test scores improve.

The closest to the developed method is a method of treating diabetes and its complications prevention, which includes magnetic-laser-ultrasound therapy of the pancreas, liver and their segmental zones. This magneto-laser-ultrasound therapy treatment is combined with low-intensity electromagnetic radiation physiopuncture in a millimetric range spectrum [2].

The main drawbacks of existing methods of treating complications of diabetes is that they do not involve zonal influence on the DPA area and do not include the need to influence the oxygen capacity of blood and increase its energy activity, and in this regard, the effectiveness of the treatment is generally reduced. As the base of invention is laid the task of creating such a way that dramatically improves the performance of DPA treatment in patients with diabetes and reduces the procedural burden on them.

Our developed method of treating the DPA in diabetic patients is based on the simultaneous use of magnetic laser stimulation of the pancreas or liver with additional simultaneous laser irradiation of venous blood in popliteal areas and scanning laser beam therapy of the DPA area. Procedures performed 2-3 times a week. The course of treatment is 10 procedures. A second course is performed if necessary after 1-2 months. There may be some tactical changes, which are determined individually by your doctor depending on the clinical condition of the patient.

The technical results, achieved by suggested solution are: increasing the effectiveness of treatment, the removal of metabolic disorders, a positive effect on the microcirculation, desintoxication of the body, increasing blood oxygen

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Activation of the liquid by SOM is performed using MIT-S system. As the liquid it is used:

- drinking water;
- water canteen, dining-therapeutic mineral;
- juices;
- herbal teas and infusions of herbs.

Procedures are performed 3-5 times a week; the procedure duration is 30 minutes. The course of treatment is 8-10 sessions. Repeated course is performed

in 1-2 months. There may be some tactical changes, which are determined individually by your doctor depending on the clinical condition of the patient.

The technical results, achieved by suggested solution are: increase the effectiveness of treatment, the removal of metabolic disorders, a positive effect on the microcirculation, desintoxication of the body, which largely prevents severe complications of DPA.

The developed method implementation real example.

Patient Anna, born in 1956. Clinical diagnosis of type 2 diabetes, moderate, sub compensated, diabetic sensory neuropathy of the lower extremities strongly expressed. Total atherosclerosis, coronary heart disease. Complaints about memory loss, fatigue, tartness (numbness) feet (mostly stop), depressed mood, reduced vision, during exercise there is pain in the heart, occasionally also notes constipation etc. An objective examination: height 164 cm, weight 66.5 kg, body mass index - 24.8 (normal!), Blood pressure - 150/90 mm. Hg. Art., pulse 80 beats./min, the liver is not palpable. In the neurological status: convergence insufficiency, moderate Marinescu-Radovici symptom (more left), reflections from the hands alive, D = S; in the lower extremities are reduced, achilles does not cause reflexes, no abnormal. Pulse on a. dorsalis pedis is weak on both sides, on a. poplitea - sufficient.

Related professionals xamination of and more tests.

ECG - myocardial degenerative changes, signs of coronary artery disease. Ultrasound examination of abdominal cavity: a few hypotonic gallbladder, liver symptoms without significant changes, micro-cysts in kidneys. ENMG from 11.15.2014: holding moderate decrease in sensory nerve fibers of the lower extremities with a small asymmetry, sin<dex. Defects in motor fibers were not found.

Conclusion: ENMG - signs of marked sensor polyneuropathy syndrome of the lower extremities. RVG of lower extremities from 11.16.2014: pulse arterial blood flow volume is reduced, the tone of the arteries increased.

EEG from 11.16.2014: pulse blood filling volume of the brain in the left vertebral artery basin moderately reduced. The tone of blood vessels is increased, vascular brain blood flow asymmetry S <D at 50%. Sick with diabetes for 12 years, fulfills all the recommendations of doctors, and adheres to a diet. Regularly (7 years) take hypoglycemic drugs sulfonylurea derivatives. Patient additionally used new generation antidepressants for the treatment: bupropion (bupropion), citalopram (citalopram) [3].

The treatment using developed method was started after examination.

Test results are summarized in Table 1.

Table 1.

Indicators	Before treatment	After 6 procedures	After 12 procedures
Blood pressure	150/90	140/95	120/75
Pulsde	80	78	70
Glucose fasting mmol / L	11.8	12.0	6.8
Total cholesterol (TC) mmol / L	6.39	-	5.24
Low-density lipoprotein cholesterol	4.21	-	3.10
High-density lipoprotein cholesterol	1.37	-	1.39
Triglycerides	1.83	-	1.72
Atherogenic index (units).	3.6	-	2.8

As can be seen from the data in Table 1, the patient significantly improved metabolism indicators and clinical parameters (blood pressure, pulse, bowel function, etc.). The developed method can be used in hospitals, clinics, spa facilities and therapeutic centers, etc. and be combined with drug therapy.

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