

## **APPLICATION OF SU JOK THERAPY FOR TREATMENT OF CHRONIC ISCHAEMIC HEART DISEASE**

*Drs. V.I. Molodan, I.I. Yermakovich, Kharkov State Medical  
University, Institute of Therapy of Academy of Medical  
Sciences of Ukraine (Kharkov)*

Much success has been achieved by now in prevention and treatment of ischaemic heart disease (IHD). But still, the fact remains that invalidation and lethality with regard to this pathology take the leading positions throughout the world [4]. Therefore, new - more perfect - antianginal preparations and new methods of treatment are being developed.

In addition, there appear reports about successful application of alternative non-pharmacological approaches to treating IHD [6, 8]. However, in this direction, too, there remain a lot of unclear issues which hinders the employment of these therapeutic methods. The purpose of the present work was to study clinical effectiveness of Su Jok therapy (SJT) in treatment of chronic IHD, to assess a SJT effect on the degree of development of myocardial ischaemia and the state of haemodynamics, and also on the factors that determine the condition of vascular tension and formation of coronary thrombosis, in particular, the functional state of the endothelium and thrombocyte haemostasis.

### **MATERIAL AND RESEARCH METHODS**

Fifty seven patients were examined with stable angina on exertion of functional class II and III (according to the classification of the Canadian Association of Cardiologists) in the dynamics of different therapeutic variants. The average age of the patients was 52±2, there were 65.5% of men and 34.5% of women respectively. Twenty patients had prior episodes of myocardial infarction (35.0%), 16 patients suffered from arterial hypertension (28.0%). Coronarangiography was previously taken in twelve patients (21.0%). Almost every one displayed haemodynamically significant stenosis of the branches of the coronary artery, and, according to findings of Holter monitoring (HM), an ECG registered episodes of myocardial ischaemia. Prior to drug administration in hospital, on the background of withdrawal of antianginal medication we assessed a number of attacks of angina, dosage of nitro-glycerine (NG) tablets taken per week, arterial blood pressure (BP) and heart rate (HR) were also measured.

In the first stage of research work 26 patents (group I) were treated using prolonged nitrates from the Isosorbide-Dinitrate group (cardiket dose per 24 hours 40-80 mg, isodinite or isosorbide-dinitrate 30-60 mg). In 12.5% cases results were not satisfactory. The course of treatment was 21 day, the effective single dose was

selected individually based of the paired VEM-test.

Considering the results, the next stage of our work was to study the effectiveness of the combination: prolonged nitrates + Su Jok therapy (N+SJT). Treatment was administered for 31 patients (group II) with ischaemic heart disease. Groups I and II of patients were compatible by their clinical characteristics. Haemodynamics was investigated by echocardiographic method. Ischaemic episodes and disturbance of rhythm were determined by findings of 24-hour ECG monitor with interpretation of the data obtained using the unit (France). The state of endothelium function was evaluated by the ratio of pressor and depressor factors. For this purpose, in blood plasma endothelin-1 (ED-1) was estimated - vasoconstrictor, prostacycline metabolite (6-keto-PHF1a) - vasodilator, and also the cHMF level in thrombocytes, which indirectly characterises the activity of the endothelial factor of relaxation. For estimation, standard radioimmunological units were used. Morphofunctional properties of thrombocytes were investigated by microluminescence method [2]. In blood plasma, the thrombocyte factor-4 (TF-4) and beta-thromboglobulin (beta-TG) were estimated. The level of opioid peptides of beta-endorphin and leucine-enkephalin was specified by radioimmunological technique too.

A course of Su Jok therapy included 7 to 10 sessions, administered daily or with 1- or 2-day intervals. One manipulation lasted 20 to 30 minutes. When selecting the frequency of sessions the clinical symptoms were taken into account, ECG dynamic and the electrophysiological state of acupoints.

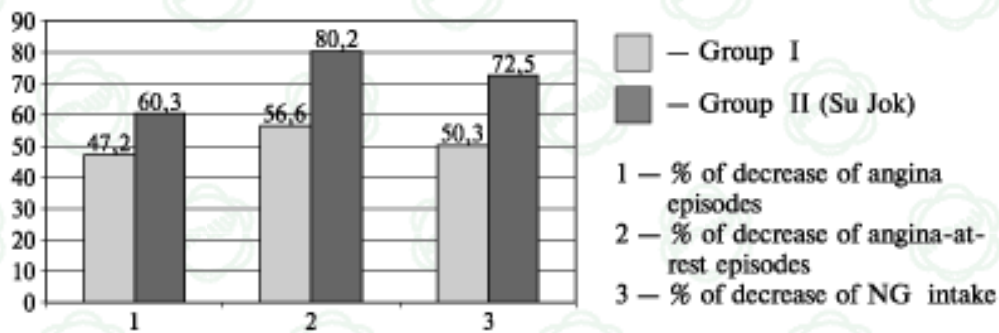
The acupuncture prescription was composed considering peculiar features of the clinical course of disease, results of tendon-muscular and pulse Onnuri diagnosis and Nakatani method (1956). The Wong points were investigated, regional and functional approaches were employed, time energies were considered. Treatment included action on byol-meridians, including Border, Core ones, internal and external byol-chakras, periungual regions, hand, foot and auricular correspondence points. In acupuncture prescriptions we used the functions of subjugation, antisubjugation, applied the combined method, horizontal treatment. The formation of different kinds of energy constitutions was taken into consideration: classical, of Core axes, symmetrical axial ones. Depending on the characteristics of the course of disease, treatment was administered on the physical, emotional or mental level.

Based on the analysis of clinical data, the results of treatment were evaluated as - when episodes of angina at rest disappeared, attacks of angina on exertion were more rare and additional NG was taken less by 50% or more; - when analysed indices decreased less than by 50%, and when angina episodes and need for NG on normal exertion did not decrease more than by 25%.

The patients' condition was controlled before treatment and on the 20th to 21st day of treatment.

## **INVESTIGATION RESULTS**

Treatment conducted in two groups lead to a considerable decrease of angina episodes and intake of NG tablets. The antianginal effect was more pronounced in the group of patients who received SJT. Thus, in Group I examined during the first week of treatment the number of episodes of angina decreased by 47.2%, and additional intake of NG was less by 50.3%. In Group II the same parameters decreased by 60.3% and 72.5% respectively. The number of attacks of angina at rest decreased especially markedly in Group II - by 80.2% (against 56.6% in Group I) (Fig. 1).



**Fig. 1.** Dynamic of changes of basic IHD parameters after the first week of treatment

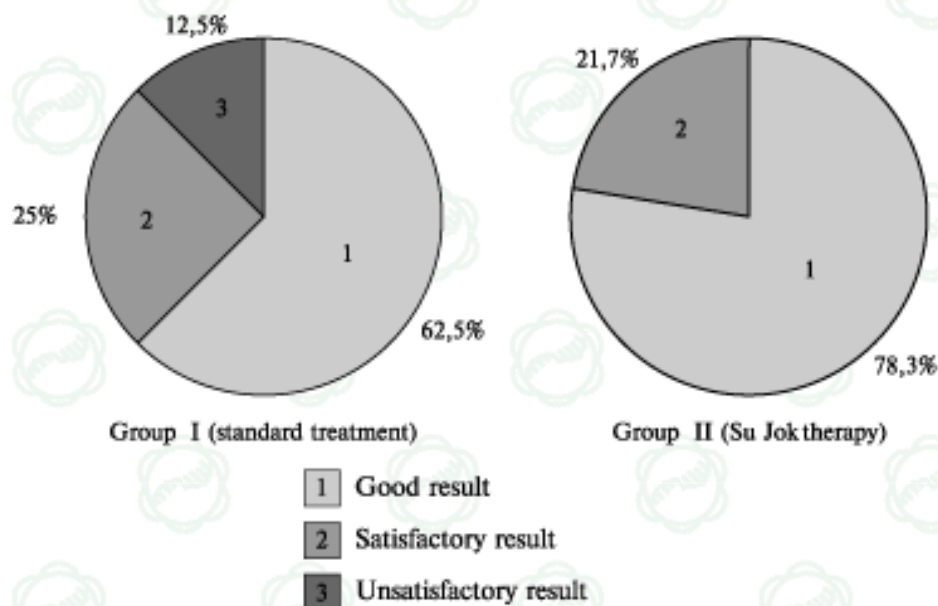
As the therapy went on, HR became moderately lower. The hypotensive effect was reported reliably in the Group II patients (Table 1).

Parameter	ISDN, n=26 (Group I)		SJT+N, n=31 (Group II)	
	Before treatment	After treatment	Before treatment	After treatment
Number of episodes of angina:				
- per week	29,6±5,3	7,8±1,2***	31,0±5,5	5,1±1,2***
- including at rest	12,2±2,6	3,4±0,3**	14,8±2,2	2,7±0,2***
Additional expenditure of NG per week, tabl.	22,8±3,4	4,8±0,6***	24,6±3,2	3,7±0,3***
BP syst., mm Hg	158±11	144±6	163±10	138,4*
BP diast., mm Hg	91±4	82±3	93±4	79±3*
HR, min <sup>-1</sup>	78±4	83±6	82±6	81±4
Side effects in cases and %	Headache, noise in the ears, facial hyperaemia - 4 (25,0%)		Absent	

Reliability of indices covariance before and after treatment: •>0,05; \*•<0,05; \*\*•<0,01; \*\*\*•<0,001

**Table 1.** Clinical effectiveness of different therapies in angina pectoris patients ( $M\pm m$ )

The majority of the patients tolerated treatment well. Side effects in Group I were typical enough for all organic nitrates (headache, noise in the ears, facial reddening, palpitation, BP decrease) and occurred in 25.0% of cases. Whereas in the supplementary SJ therapy group (Group II) side effects were absent. In addition, the Group II patients reported that they felt better beginning with the first procedures, they had more energy, normal sleep, appetite. The troublesome noise in the ears, dizziness, headaches disappeared during treatment. In general, the results of the course of treatment showed the following distribution: in Group I in 62.5% of patients, in 25.0%, in 12.5%. In Group II the and results were obtained in 78.3% and 22.7% of patients respectively. There were no unsatisfactory results (Fig. 2).



**Fig. 2.** Comparative results of a course of treatment in Groups I and II

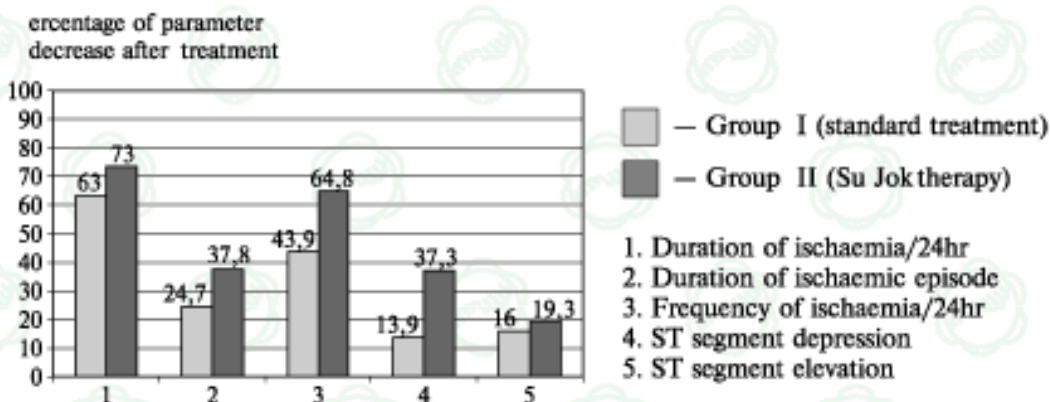
In the course of treatment the total volume of performance has increased reliably (in Group I by the average 36.3%, in Group II by 64.7%), and SJT also had an effect on the capacity of threshold exertion (increase by 36.4%). at the peak of exertion almost did not change. Therefore, in Group II performance did not cause additional strain of the cardiovascular system.

The analysis of the HM ECG findings (Table 2) allowed to come to the following conclusion: in the total positive dynamics in Groups I and II of patients the changes of almost all indices of effectiveness were more pronounced in SJT treatment. Thus, the average duration and average number of ischaemic episodes per 24 hours in Group I decreased by 24.7% and 43.9% respectively; the same parameters in Group II of patients who underwent SJT, decreased by 37.8% and 64.8% (Fig. 3). Interestingly, on the background of SJT, a considerable decrease of extrasystole rate was obtained - both supraventricular (-33%) and ventricular (-25%), which was not characteristic of nitrate monotherapy. Possibly, less frequent episodes of arrhythmia under SJT can be accounted for by better coronary blood flow and anti-ischaemic effect.

Parameter	ISDN, n=26 (Group I)		SJT+N, n=31 (Group II)	
	Before treatment	After treatment	Before treatment	After treatment
Total duration of ischaemia, min/24h	54,8±4,6	20,4±2,5***	62,7±5,8	16,8±2,3***
Average duration of ischaemic episodes, min	8,1±1,2	6,1±0,7*	8,2±1,0	5,1±0,6**
Average number of ischaemic episodes per 24 hrs	13,2±1,7	7,4±0,9**	14,2±2,0	5±0,6***
Average amplitude of ST segment depression, mm	2,6±0,25	2,2±0,15**	3,1±0,21	2,1±0,1***
Average amplitude of ST segment elevation, mm	2,5±0,2	2,1±0,1	2,6±0,17	2,1±0,15*

Reliability of indices covariance before and after treatment: •>0,05; \*•<0,05; \*\*•<0,01; \*\*\*•<0,001

**Table 2.** HM ECG readings in the dynamic of different therapies in patients with angina pectoris ( $M\pm m$ )



**Fig. 3.** Comparative diagram of decrease of HM ECG parameters in Groups I and II

In both groups an improvement of intracardiac haemodynamics indices was obtained as demonstrated by ultrasound investigation. The left ventricle was smaller (in Group I unreliably). In the course of treatment the contractility and pumping function of the myocardium increased which is proven by the statistically significant increase of the degree of systolic shortening of the anteroposterior dimension of the left ventricle (Group I +20.3%, Group II +23.2%\*), stroke volume (Group I +8.4%, Group II +8.86%\*) and output fraction (Group I +9.76%, Group II +13.2%\*). This dynamic of indices and also absence of tachycardia and moderate hypotensive effect, especially on the SJT background, in its turn, could contribute to economical work of the heart and rule out excessive expenditures of energy leading to enhanced oxygen requirement of the myocardium. The obtained positive inotropic effect of the combined therapy (Group II) can be related to the correcting action on the coronary blood flow and regulation of peripheral vascular tension: pre- and post-exertion. The degree of OF increase directly correlates with the pronouncedness of the initial dysfunction of the left ventricle and improvement of its segmentary contractility. Characteristic features of the effect of the therapeutic methods under study on the indices of endothelial dysfunction are presented in Table 3.

Parameter	Control	ISDN, n=26 (Group I)		SJT+N, n=31 (Group II)	
		Before treatment	After treatment	Before treatment	After treatment
Endothelin-1, pg/ml	5,6±0,5	12,03±1,56	8,16±1,62	12,6±1,32	8,0±1,42*
6-keto-PHF1a, pg/ml	85,4±10,8	75,3±5,8	96,4±7,3**	71,3±4,8	103±11***
cHMF in thromb., pmol/10 <sup>9</sup> thr	3,4±0,21	6,83±1,11	6,40±0,82	6,3±0,72	11,7±1,34***

Reliability of indices covariance before and after treatment: •>0,05; \*•<0,05; \*\*•<0,01; \*\*\*•<0,001

**Table 3.** Influence of different therapies on some indices of endothelial dysfunction in patients with angina pectoris ( $M\pm m$ )

It is noteworthy that the vascular endothelium is a system that synthesises factors of vascular regulation and puts into effect the circulating humoral blood components. In IHD, impairment of the function of the

endothelium is mainly manifested in predominance of vasoconstrictor reactions. The initial decrease of the level of vasodilator prostacycline (6-keto-PHF1 alpha), endothelial factor of relaxation (cHMF) and increase of endothelial vasoconstrictor - endothelin-1 (ED-1) is observed. In Group I decrease of ED-1 level was a tendency rather than a statistically significant feature.

The combined therapy (SJT + nitrates) resulted in significant ( $p < 0.05$ ) decrease of concentration of ED-1 in plasma, and also in more marked, than in monotherapy, decrease of 6-keto-PHF1 alpha and cHMF content. Thus, combined application of SJT and nitrates is accompanied by potentiation of their vasodilating effects. When evaluating the state of thrombocyte homeostasis in both groups of examined patients by findings of luminescent microscopy of thrombocytes it was revealed that the character of interthrombocyte relationships in the very aggregates has changed: the percentage of degranulated thrombocytes decreased, the number of cells that retained granulation increased. Taking into account a correlation between the shape of thrombocytes and their level of activation [1], one can speak about stabilisation of the secretory activity of thrombocyte granules in the dynamic of treatment with nitrates, especially in combination with SJT. Thus, in Group II of patients a significant increase was revealed of the density of discocytes in blood plasma at the expense of lower percentage of activated and degranulated forms, and also of mega-thrombocytes (Table 4).

Parameter	ISDN, n=26 (Group I)		SJT+N, n=31 (Group II)	
	Before treatment	After treatment	Before treatment	After treatment
Discocytes:	48,6±4,5	62,7±4,9*	40,1±4,2	62,1±4,4***
- activated	12,6±1,9	9,8±0,6	18,2±2,2	11,2±1,8*
- degranulated	20,5±2,4	12,2±1,8**	20,3±2,4	12,1±1,7**
- aggregated	12,4±1,9	10,6±1,7	13,5±1,9	10,3±1,5
M-thrombocytes	5,8±0,5	4,7±0,4	6,0±0,63	4,4±0,3*

Reliability of indices covariance before and after treatment: •>0,05; \*•<0,05; \*\*•<0,01; \*\*\*•<0,001

**Table 4.** Influence of different therapies on morphofunctional properties of thrombocytes in patients with angina pectoris ( $M \pm m$ )

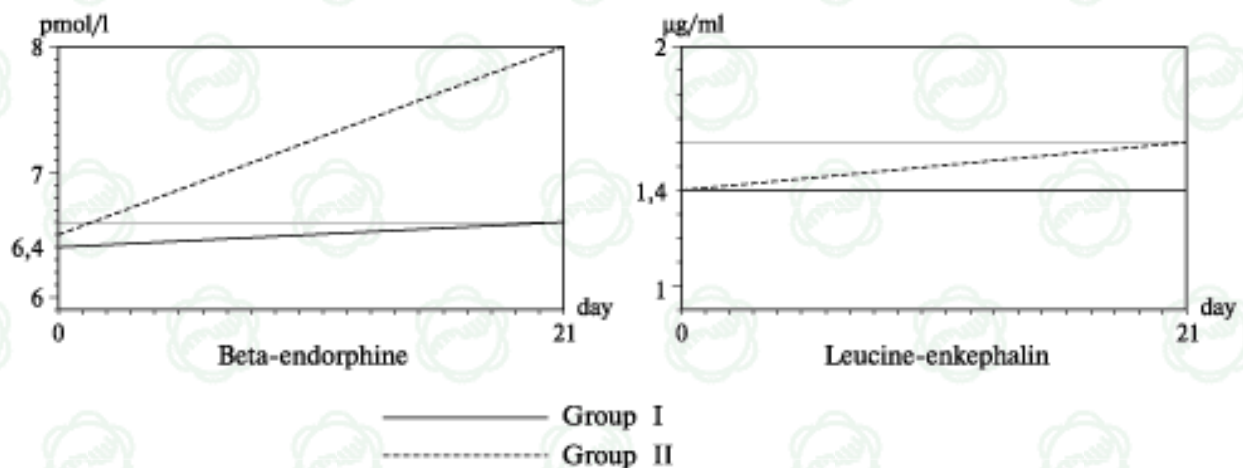
In the Group II patients, a correlational analysis revealed a close and direct relationship between the frequency of angina episodes and the percentage of activated thrombocytes both before and after treatment ( $r = +0.68 \pm 0.03$ ,  $r = +0.65 \pm 0.04$ ), and also a negative correlation between the total duration of myocardial ischaemia and percentage of discocytes ( $r = -0.5 \pm 0.02$  and  $r = -0.62 \pm 0.03$ ).

One can see activation of thrombocytes in vivo and the degree of correction of their function, if one considers the levels of thrombocyte proteins, in particular, thrombocyte factor - 4 (TF-4) and beta-thromboglobulin (beta-TG), secreted from alpha-granules. While in Group I there was only a tendency toward decrease of these parameters, in Group II a reliable increase was revealed of the concentration of thrombocyte proteins in blood plasma: TF-4 (-32.9%\*), beta-TG (-36.5%\*\*). It is noteworthy that in both groups the functional properties of thrombocytes were initially high which is connected, apparently, with the pronounced myocardial ischaemia before therapy was administered.

The research work demonstrated that in patients with IHD (angina on exertion functional class II and III) there is an impairment of endothelial function and morphofunctional properties of thrombocytes. This is manifested in increased synthesis of a vasoconstrictor - endothelin-1 on the part of the endothelium, in lower activity of vasodilators: endothelial factor of relaxation (cHMF marker) and prostacyclin (6-keto-PHF1 alpha). A therapy

with prolonged nitrates and combined treatment with nitrates in combination with Su Jok therapy allowed to improve the functional state of the endothelium and decrease vascular-thrombocyte disturbances. Therefore, the utilised scheme of combined medication and non-medication therapies is pathogenetically validated and yields good clinical results. Also, it should be noted, that the antianginal and anti-ischaemic effect, change of the function of the endothelium and thrombocytes in applying Su Jok therapy is higher that in the group of patients who received the nitrate monotherapy. No less important is that SJT potentates the therapeutic effect of nitrates and allows to avoid the development of tolerance to them. Thus, in the group of patients who received only nitrates, by the end of the course in 48% of patients there appeared the need to enhance the drug dosage (1.3-fold on the average). At the same time, with SJT application the drug dosage remained stable, and in 21% of patients it could be even made lower while the obtained clinical effect persisted. Apparently, this is due to the increased level of the cyclic nucleotide - cHMF with which the vasodilating (coronarolytic) effect of the action of nitrates is connected [3].

Beginning with the first procedures, the Su Jok therapy was accompanied by a considerable subjective improvement of the patients' state: cardialgias, vertebrogenic pains disappeared, gone were symptoms related to associated pathologies. This character of changes is apparently determined by the systemic action of the Su Jok therapeutic method. Our investigation reported that in the group of patients receiving SJT the level of opioid peptides increased (Fig. 4).



*Fig. 4. Dynamics of endopioid content in the patients' blood plasma*

As is known, these biologically active substances exert a wide range of action. They protect the body in stressful events, have a pain-killing effect, positively influence the neurohormone and humoral regulation, act as immunomodulators, influence the coagulation and thrombocyte haemostasis. The action of opioid peptides on the cardiovascular system is characterised by cardioprotective, anti-ischaemic, anti-arrhythmic effect and normalises the lipid exchange.

Therefore, the proposed method of treating IHD patients, contributing to removal of endothelial and thrombocyte dysfunction, to normalisation of the functional activity of thrombocytes, and also having a positive effect on the endogenic activity of opioid peptides, ensures stabilisation of regulatory mechanisms and increases antianginal effectiveness of nitrate therapy.

Evaluating the results of the treatment, one can make the following conclusions:

1. Utilisation of SJT in the complex treatment of IHD patients (stable angina pectoris) allows to enhance the effectiveness of nitrate therapy, to decrease the occurrence of ischaemic episodes, to improve the contractile function of the left ventricle.
2. An individually composed SJ-prescription ensures a pathogenetically justified therapeutic (antianginal, anti-

ischaemic) effect, accompanied by stabilisation of the function of the endothelium and thrombocyte haemostasis.

3. Treatment using SJT contributes to correction of the function of endopioids that have an integrative action in the body; normalises general adaptive reactions of the body, thus widening the framework of traditional treatment, enhancing effectiveness and quality of therapeutic work.

4. A wider application of SJT can be recommended in treatment of IHD patients, especially in cases of tolerance to prolonged nitrates, and also the use of SJT as a method of preventive non-pharmacological enhancement of the body's adaptation and regulation of thrombocytovascular haemostasis.

## REFERENCE

1. A.S.Gavrish, K.D.Babov, O.V.Sergienko et al. Structural and functional properties of thrombocytes in patients surviving myocardial infarction. In: Vrachebnoye delo, 1994, VII, p.51-56.
  2. A.I.Ladnyi, I.K.Kondakov, I.I.Yermakovich. Express-method of diagnosing morphofunctional state of thrombocytes. In: Laboratornoye delo, 1988, II, p.18-21.
  3. L.T.Malaya, A.N.Korj, L.B.Balkovaya. Endothelial dysfunction in cardiovascular pathology. Kharkov: Torsing, 2000, p.426.
  4. R.G.Oganov, G.Ya.Maslennikova. Cardiovascular disorders in the Russian Federation in the second half of the 20th century: tendencies, possible causes, perspectives. In: Cardiology, 2000, VI, p.2-6.
  5. Park, Jae Woo. Lectures in Su Jok therapy, part I, II. Moscow: Su Jok Academy, 1995.
  6. Park, Jae Woo. Onnuri Su Jok therapy, vols. I, II. Moscow: Su Jok Academy, 1998.
  7. Park, Jae Woo. Atlas of the energy system of the human body. Moscow: Su Jok Academy, 2000.
  8. I.Z.Samosiuk, V.P.Lyseniuk. Acupuncture. Encyclopaedia. Kiev-Moscow: Ukrainskaya entsiklopedia, AST-Press, 1994, p.240.
-