MEANS OF REFLEXOKINESOTHERAPEUTICS, REHABILITATION AND TRAINING AND ADAPTATION OF SPORTS EQUIPMENT AND IMPLEMENTS FOR THIS PURPOSE

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The intensification of kinesotherapeutic rehabilitative and training process may be linked under non-medical methods with the utilization of the matching influence principle which is represented in detail in practice of biomechanics of sporting movements and training first of all by works on matching influence over movement structure by selective muscle electrostimulation, on basing and artificial dynamic medium and on means of facilitaton leading (Ratov I.P., 1974-1989). The matching vibrostimulation of the support motor apparatus may be attributed here (Kuznetsov V.B., Galitchaev M.P., 1985). In the field of experimental biomechanics examples of matching termic effect over the reflexogenial point on the surface of helix "zero" with the aim of slowing down palpitation and breathing in the course of ensuring the vertical steadiness of the body are well-known(Ratov I.P., 1982).

These methods are on the whole aimed at optimization of the dynamic structure of movements, at the acceleration of the nervous muscular structure relationship that ensures them and that is impossible under natural conditions and is characteristical for record movement regimes or normal ones but being such for a patient under rehabilitation.

If one takes into consideration that the dynamic structure of movements, determine the load structure on the functional system of the organism being trained or rehabilitized in the process of movement as well as functional systems influence in a certain way the dynamic structure, resultativeness of movements, then it is of interest to follow subsequent perfecting means of such, matched with the movements physical influence on the organism under which the dynamic structure remained the same or much more active, optimal while the functional systems of the organism training or ensuring the resultativeness of movements could be at the same time less loaded or under indispensable motor regime their activity and efficiency were heightened. This will allow with the non-changing load on the functional systems of the organism to broaden the range of the dynamic structure of the movement to stirring up its space and time dynamic accents which are important: when rehabilitating the support motor apparatus , when bringing out motor potentialities of the person, under the necessity of softening the functional system reaction to the motor regime, for example, while rehabilitating and making prophylaxis against heart vascular and respiratory systems deseases as well as in those cases when while rehabilitating the support motor apparatus it becomes necessary to avoid the pain syndrome.

One of the possible methods of such physical influence may be based on interconnection between the functioning of organs, systems of organism, the condition of connected with them Zakharjin-Hed reflex zones on the man's body and the state of muscles, cords and tendons in these zones which are the basis of aproximately sanitating systems practicing strictly regulated static postures, muscular tensions and have already become an object of scientific attention in biomechanics (Krjadjev V.D., 1990). The process of stirring up this state of things, exercising influence when performing active movements with selective influence on somatovegetative functions of the organism and when agitating physiological adaptive systems, are possible using the new widely spread electroreflexotherapeutics in hospitals.

Its matching in the process of kinesotherapeutics, rehabilitation and training with performance of the movement, stimulation being carried on these reflex points, which are connected with functional systems of those trained with the help of movements or those influencing the trained motor functions, will allow one to solve the above problems. This method may be defined as means of reflexotherapeutics, rehabilitation and training.

It can be performed in hospitals with the equipment available. But the patient often performs kinesotherapeutics rehabilitative and training tasks without assistance, under natural conditions with a wide movement amplitude, travelling considerable distances and therefore while realizing this method needs using reliable, portable, equipment inbuilt into the sports equipment and independent of current source feeding non limiting the student's movements equipment and implements. With this aim in view adaptation of the equipment and implements in hand and those of a new special type is necessary. One of the principle constructive elements of this type of apparatus may be piesoelectric elements, transforming mechanic impulses of support interaction into

electric impulses used for electropunction. A characteristic feature of these transformers is the impulsive character of their work and they may be used as constructive elements in apparatus, sports equipment and implements which are being affected with support force of impulsive characters in the course of movement or else they may transform continuous pressure on the support into a number of discrete impulses, for example, in swinging, sliding. Here sports equipment are so adapted that in the course of exercise a continuous contact of parts of the body with them should be ensured, supplied with reflex points and the vector of mechanic support interaction as much as possible, and ergonomic problems of comfort and contact with the elements of the implements being in use should be solved. One of the most convenient areas of the body for such an influence is the sole where a great deal of different (according to their function) points are located.

Various constructions of apparatus realizing acupressure, electropunctural, physiotherapeutic effect on reflex points of the soles are known. But their utilization is not always up to conditions of realization of the reflexokinesotherapeutic, rehabilitative and training methods under review.

Several examples of adapted and elaborated for these purposes constructions of sports equipment and implements are presented in this work.

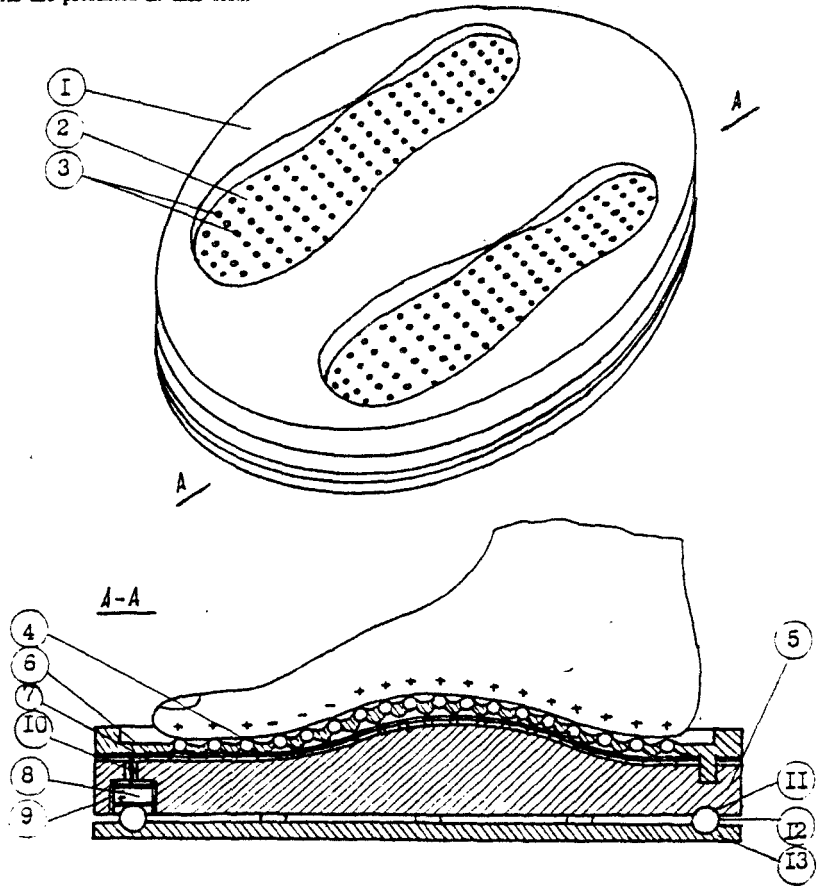

Figure 1: A set for Reflexokinesotherapeutics and Rehabilitation when Treating Arthritis, Arthrosis and Osteohandrosis of the Spine.

A SET FOR REFLEXOKINESOTHERAPEUTICS AND REHABILITATION WHEN TREATING ARTHRITIS, ARTHROSIS AND OSTEOHANDROSIS OF THE SPINE

This set represents a well-known adaptive device of sanitary gymnastics (Fig. 1) and contains: a superposed elastic disc 1 (with) two depressions for the feet (2) acupressure lugs (3), contact metal elements (4), an upper support disc (5), negative charge commutating padding (6), perforated isolating padding (7), piesoelectrics elements (8), padding isolating piesoelectrics (9), connecting condutors (10), guiding circular grooves (11), beads (12), lower support disc (13) (Galitchaev M.P., Anufriev I.I., 1988).

When using the set the patient stands barefocted into the depressions and begins to exercise rotary movements of the body with these movements the upper discs begin to rotate relative to the lower disc, the small bells roll along the groove and in areas where piesoelectric elements are part of its surface rolling over its surface create impulsive electric pressure on them. Impulsive electric charge appears according to the commutation scheme consisting of elements 4, 5, 6, 7, 8, 9, 10, go to certain contacting metal elements 4 and passing through them to reflectorial zones of the soles causes electrostimulating effect, its parameters depending on the piesoelectric materials, the speed of rotation and may be within the range: tension up 100 V, frequency up to 50 cycles per second, current up to 8Ω . The stimulating effect is of variable frequency and therefore eliminates adaption.

In this case for the purpose of prophylaxis and treatment of arthritis, arthrosis and osteohandrosis of the spine the reflex point Jun-tsuan affecting the functions of the organism connected with these deseases was under the action. In the course of comparative approbation of this set the patients having osteohandrosis of the spine showed (compared with an ordinary set) the following results: the patients using the set had their pain syndrom reduced 4-5 days earlier and inflamatory changes regressed in an even sborter period, the amount of the movements increased by 15-17 and the effect under observation was 1.5-2 times above the time spent by the test group.

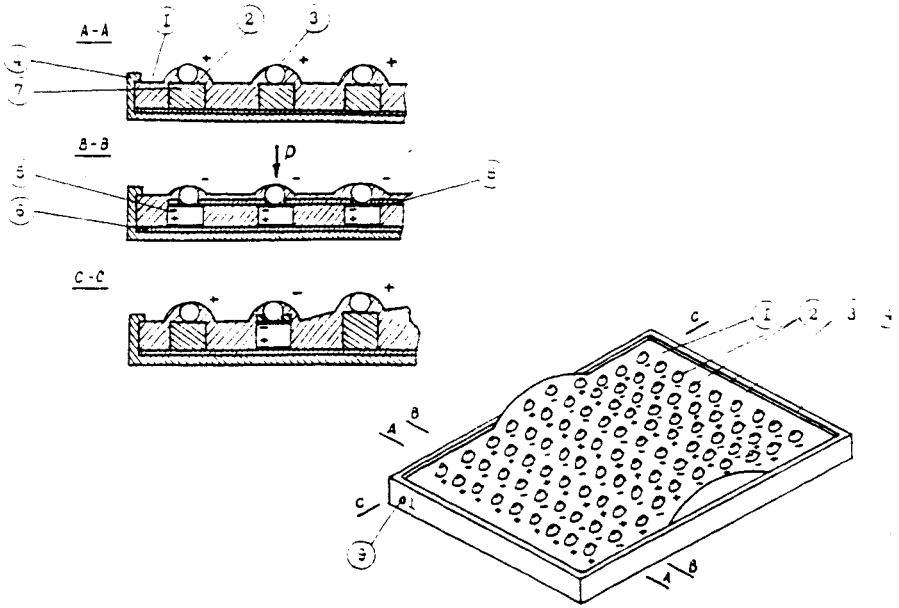

Figure 2: A Set for general Therapeutic and Sanitary Effect in the Course of Reflexokinesotherapeutics.

A SET FOR GENERAL THERAPEUTICS AND SANITARY EFFECT IN THE COURSE OF REFLEXOKINESOTHERAPEUTICS.

The set is intended for sanitary gymnastics and kinesotherapeutics in the form of running and jumping in sport (Fig. 2) and contains: an upper support plate (1), acupressure lugs (2), contact metal small balls (3), a lower support plate (4), piesoelectric elements (5), commutating elements: a plate (6), metal cylinders of different height (7), conductors (8), the terminal "ground" (9). (Galitchajev M.P., Anufrijev I.I., Belov L.P., 1988).

In walking, running and jumping in sport exercise barefooted on the upper support plate working surface in the contact points of the acupressure lugs with the soles mechanic pressure is passed through the small balls on to the piesoelectric elements. Electric charge appearing on their electrodes on one side is immediately passed on to the small metal balls 3 and then through them on contacting areas of the sole while from the other electrode of piesoelements it is passed through the commutation scheme on to the neighbouring areas of the sole. The elements of commutation scheme allow to distribute the charge along the working surface of the upper plate at will. The parameters of the impulse electrostimulating effect are analogous to the parameters of the previously described set.

Comparative approbations of this set in a group of patients suffering from vegetovascular distonia and hypertonia showed that its utilization allowed to strengthen the amount of therapeutic influence. The patients suffering from cardiac pain more quickly obtained a heart rhythm normalized according to the data of electrocardiography, the negative tooth T became positive earlier than usual and its amplitude was growing. In the groups of healthy people one could observe intensifying capacity for work that could be tested according to the submaximum load during 5 minutes on a bicycle ergometric and augmented from 150 to 180W.

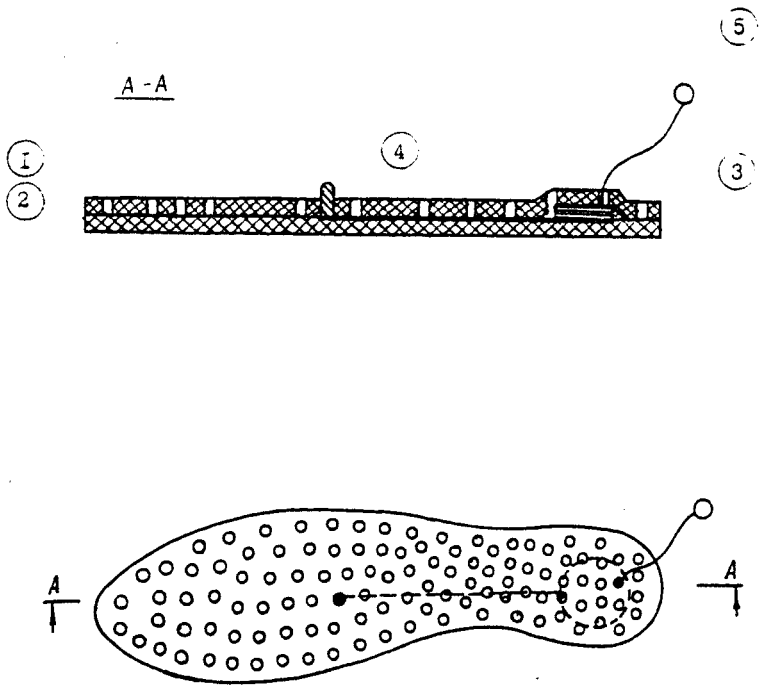

Figure 3: A Set Reflexokinesotherapeutics in the Process of Running and Walking.

A SET FOR REFLEXOKINESOTHERAPEUTICS IN THE PROCESS OF RUNNING AND WALKING

The set shown in Fig. 3 contains two flat elastic strata: the upper one (1) and the lower one (2). Between the strata in the heel area a piesoelectric element (3) is placed, its negative electrode is connected with the electrode (4), the positive one is connected with the passive leather electrode (5) (Belov L.P. with coauthors, 1988).

In walking, running or jumping the heel exercises pressure on the piesoelement and contrapolar charge appears on its electrodes and goes to the active electrode located in the place of a chosen reflex point and the passive electrode and is used in the process of reflexokinesotherapeutics.

During the approbation of this set in a group of patients suffering from cardiac and respiratory deseases obtained a positive therapeutic effect.

SUMMARY

In the above examples the sets presenting specially elaborated and adapted sports equipment and implements showed sanitary and medical prophylactic effectiveness when given reflexokinesotherapeutics, rehabilitation and training with patients who were pathologic or healthy people.

Simplicity and reliability of these sets allow to hope that they will be effective in mass recreative and perspective of their utilization in practice of sports training.

Other variants of technical solution of the problem are possible and we are carrying on our work in this field.

REFERENCES

BELOV L.P. with co-authors. Medical inner Sole. Claim for patent N 4340852, USSR.

GALITCHAJEV M.P., ANUFRIJEV I.I. A set for massage and electrostimulation of the sole reflex points. Claim for patent N 4418568, USSR, 1988.

GALITCHAJEV M.P., ANUFRIJEV I.I., BELOV L.P. A set for Acupressure and Sole Electrostimulation. Claim for patent N 4418564, USSR.

KRJADJEV V.D. Biomechanical and bioenergetical sanitation principles of the man. Theory and practice of physical culture, Moscow, 1990, N1, p. 29

KUZNETSOV V.B., GALITCHAJEV M.P. Means of stimulating sportsmen's muscles in the course of training and a device for its rehabilitation. Patent N1174026, USSR, 1985.

RATOV I.P. Investigation in sporting movements and possibilities of directing their characteristics with using technical means. Diss...doctor of pedagogics, Moscow, 1974.

RATOV I.P. Bordering problems of biomechanics, psychology and teaching movement theories. In the book: Psychology and present day sports, Moscow, Physical culture and sports, 1982, p. 42-51.