INTRODUCTION

The ISOTON denotes a health-recreation physical exercise system which encompasses different aspects of physical exercising: special system of static-dynamic, static and dynamic strengthening exercises, stretching exercises, aerobic training (breathing gymnastics), means of physiotherapeutic influence (massage, sauna, etc.), hygiene procedure and rational nutrition aiming at health improvement, physique improvement, prophylactics of cardio-vascular system diseases, etc. This exercise system can take up children, grown-ups, older people, individually and in groups as well.

The ISOTON is a scientifically based complex system of health-recreation physical exercise designed in Russia in 1992 in the Laboratory of the Central Institute of Physical Education (nowadays RGAFK) by the team coordinated by В.Н. Селуянова and is patent protected (№ 92-011380/14057161 on 11.12.92). This system is scientifically based and practice proven.

Methodological basis of this system incorporates the considerations on man and the creation of so called “controlled physical stress” for the activation of the anabolic process in “physical body” and the relaxation of the psyche on a “mental level” that preconditions healthy effect of the physical exercising.

The ISOTON got its name first of all according to the type of physical exercises that dominate the system (isotonic exercises), that is, the exercises that keep muscles constantly toned and according to the basic effect produced- constant high life tone of the exerciser.

The basic concept of this system encompasses biological wellbeing of the man (as a decisive factor of health status) and primarily a normal status of the endocrine and immune system and also of other physiological systems of the organism (muscle, cardio-vascular, etc), that play a subsidiary role in solving the health problems.

The leading principle of the ISOTON creation was created by means of computer simulated modeling of the functions of physiological systems and biochemical processes in the organism and the analysis of the wide range of physical exercising on man. Then the most efficient means and methods of man’s physical status (physical health) were elaborated on, selected and encompassed into a unique system by enhancing functional abilities of the crucial systems of the organism (hormonal, muscle, immune, digestive, cardio-vascular, etc.) Methodological basis used the experience in sports trainings, achievements of the eastern health systems (hatha joga, Qigong) and contemporary western meth-
ods (all types of aerobics, callanetics, body-building, etc). The ISOTON is a complete set of healthy influences whose each element is logically and mutually interwoven. Guaranteed effect is achieved on condition all demands are met. It is possible to use some discrete elements separately, for example, physical exercise or nutrition principles, but in that case the overall effect will depend on the qualifications of the exercisers and to a great extent, on the expertise of the instructor.

The ISOTON is usually used to solve two tasks:

1. Rapid improvement (2-3 months) of the general status, working ability, body composition (ration of the fat and muscle tissue), normal functioning of digestive organs and other vital systems of the organism, enhancement of the immune and normal functioning of the endocrine system, improvement of psycho-emotional status, etc.

2. Preservation of good physical status and physique with relatively little time and energy consumed.

The ISOTON system includes:

- Combination of different types of exercising (isotonic, stretching, aerobic, breathing);
- Means of psychological correction (relaxation);
- Means of physiotherapeutic influence (massage, sauna, etc.);
- Hygiene procedure;
- Organization of the rational diet;
- Control methods of physical development and functional status.

Central part of the system belongs to the isotonic (static-dynamic) exercises that provides for high efficiency and makes the ISOTON stand out compared to other health-recreational systems.

METHODS

The approach adopted to solve the set of tasks in this paper besides general inductive-deductive method also uses other methods such as observation, description, comparison and generalization of the scientific-methodic literature of the local and worldwide known authors. On the basis of description a descriptive-explicative analysis was used.

BASIC COMPONENTS OF THE ISOTON SYSTEM

1. Testing

As in any physical exercising the ISOTON demands determination of the initial indicators of physical status and the monitoring of its changes.

To monitor exercisers’ state sophisticated software is used to:

- Perform anthropometric measurement to determine body constitution, type of constitution, tissue composition (bones, muscles, fats), body proportions;
- Administer functional testing to estimate the state of cardiovascular system, muscle endurance and physical status index calculations;
- Create training programs.

2. Physical exercising

Physical exercising in the ISOTON can include five basic elements:

1) Isotonic exercising comprising isotonic, static-dynamic and static exercises, i.e. those exercises where there is no phase of muscle relaxation. Isotonic exercising has a central role and is applied to enlarge or diminish muscle volume, change their strength and endurance, perfect hormonal mechanisms responsible for the reaction to stressful situations, decrease in fats, creation of the general, so called “anabolic” phone in order to alleviate positive transformations in body; reflex and mechanical influence on the internal organs in order to optimize their functioning, improvement of intervertebral discs and lowering of deep muscles tonus of the vertebral column, creation of the „muscle corset“ to prevent their injury, etc.

2) Aerobic exercising of varied types – cyclic movements, funk, step and other types of aerobic, sports games, etc. Aerobic exercises are applied to improve aerobic muscle productivity, metabolism activation, improvement of the movement coordination, etc.

3) Stretching as a means of enhancing: agility, muscle and tendons elasticity, „joint gymnastics“; a way to regulate muscle volume and mass; endocrine glands functioning, internal organs and nervous system by reflex; relaxation.

4) Asanas (positions) which are borrowed from the hatha yoga and adapted to the requirements of the ISOTON. These are applied to regulate CNS, cardiovascular system, internal organs and psycho regulation. Breathing exercises are performed to normalize the abd-omen organs, as prevention of the pulmonary diseases and psycho regulation.

PRINCIPLES OF THE ISOTONIC EXERCISING

Central part of physical exercising is so called „isotonic exercising“, performed according to the following rules:

Exercising is local that is, simultaneously relatively small muscle mass is engaged. The poorer preparation the smaller number of muscles to be engaged in any exercise.

1. Muscle strain 30-60 % of maximal one must be applied in all exercises. Regime of muscle shortening is isotonic, static-dynamic or static (the latter – applied sometimes), i.e. without muscle relaxation. This is realized by slow tempo of movement, their uniformity and constant muscle tone maintenance. For example, next exercise: starting position – standing, shoulder width legs, fingers maximally separated, hands upwards interwoven, scapula close, upright back, pelvis positioned forward, seating muscles strained. Without lowering the tone of muscles make slow squat, maximal separate knees, slow rising, not complete erection of legs. Continue the movement until the strong strain of thigh muscle.

2. Exercises are to be performed till one is not able to continue due to the muscle or inability to over-
come the resistance pain (such a state is the basic factor of stress creation). This moment should come in the interval of 40-70 seconds after the start of the exercising. If there is no fatigue exercise technique is not good (probably there is phase of muscle relaxation). If there is earlier stop – the level of muscle strain is bigger than 60 % of maximal one.

3. To this influence all muscle groups in turn are subjected.

4. Exercises are by rule performed in each series (8-25 minutes) nonstop that is, without breaks for rest. Rest time between series is filled with stretching. Exercising lasts 15-75 minutes.

5. In most cases it is recommended to apply the ISOTON super series which is used in two variants: 1) alternating two-three approaches to two muscle groups; 2) changing of the initial position of the exercise, repeated strain on the same muscle groups for their ultimate engagement.

6. While performing exercises attention is fully paid to the engaged muscles.

7. Breathing is strictly nasal, deep with maximal use of diaphragm muscles (diaphragmatic or belly breathing).

8. Muscle stretching is performed until muscle full engagement (for warm up and increase elasticity and joint mobility). If the task is to decrease the fat tissue and muscle at the expense of intensity increase and duration of painful feelings then stretching is applied after the maximal muscle engagement. However, one should note that this variant – as a manner of „catabolic effect“ creation, and it should not be used too much during isotonic exercising so as not to hurt muscles.

9. During exercising one should take into account the following:
   a) attention is fully paid to one’s own feelings and correct exercise performance;
   b) life problems and „vanity“ are left aside;
   c) in case of fatigue one should prolong the exercise until it is „forced“, and endure as long as possible;
   r) only muscle fatigue gives healthy effect, „muscle fatigue is joy“;
   d) after the exercise it is necessary to „feel calm, relaxed, composed“ and to keep these feelings whole day;

10. Aerobic training is recommendable but not obligatory part of the system. Optimal load assumes two aerobic trainings a week each 30—50 min until relaxed (heart beat frequency 110—150 bpm). Isotonic exercising is applied in different days from aerobic exercising or it can be applied in the same day but after aerobic exercising.

11. Physical training in the ISOTON implies harmonized action with special nutritive diet.

INFLUENCE OF THE ISOTON ON BOD

Isotonic exercising provokes in body the state of so called „controlled stress“, which together with purposeful influence on muscle and joint systems enhances and increases functional abilities of cell structures thus providing the level and ‘feeling of health and fitness’. Here belongs:

- Different parts of hormonal system which influences stability and adaptive abilities of the body to any influence (physical, heat, hypoxic, toxic, psycho-emotional), and also physical and emotional activity;
- Bone marrow and immune system organs;
- Contractile elements of muscles (their force), oxidative possibilities of the muscle; structures for muscle contraction.
- Bones and joints (primarily vertebral column), tendon – ligament and muscle apparatus serving them.

1. Selection of ISOTON exercises, system of movements and postures provide for corresponding engagement of all muscle groups, fascias, tendons, ligaments and can be considered as „soft“, physiological, mechanical and reflection influence on the internal organs and main nervous centers reflexively connected with them. Neurogenic activation of these organs together with creation of „anabolic hormonal phone“ speeds up regenerative processes in them. In this way isotonic exercising can be considered as „session of reflexotherapy“ for the normal functioning of the central and peripheral nervous system, digestive system, kidneys, hormonal glands responsible for the metabolism and the immune system as well.

2. Creation of local hypoxic parts and bringing of engaged muscles to the phase of fatigue contributes to the separation of acid products in blood and increase of carbon dioxide. That is the way to regulate reaction of the peripheral blood system and enhancement of the blood micro-circulation.

3. Normalizing influence on the metabolic processes on the one hand and maximal stimulation of the mechanisms mobilizing fat depot during exercising on the other hand enables real change in fat body depots. Considerable anabolic potential of the isotonic exercising together with guided regulation of nutrition or the use of „catabolic“ local influences (for example, stretching of fatigued muscles) makes possible the change of the volume of selected muscles (to increase or to decrease). This fact associates ISOTON with body building in the efficient exerciser’s body shape.

SPECIFIC INFLUENCE OF THE ISOTON ON MUSCLE FIBERS

Strength and endurance are „on the opposite sides of barricades“. It is assumed that a person cannot be at the same time infinitely strong and have infinite endurance. In most cases a word „strength“ is associated with a massive and muscular weight lifter. Endurance is associated mostly with a skinny runner.

Difference in muscles is in that they are composed of different type fibers. Red (type I) – slow twitch fibers are characterized by low level contractions and great endurance. White (type IIB) – fast oxidative fibers are characterized by strength but not endurance. Pink...
(type IIA) muscles fibers by their color and features, are placed somewhere between the red and white types. Type IIA muscles fibers are responsible for strengths and endurance. Red muscles fibers function continuously, are first to engage even in slight strains. As the strain increases pink muscle fibers connect in. White muscle fibers feed in when considerable strain occurs. Special characteristics of red muscles fibers are that they use oxygen for energy generation, needed for the contractions. This is aerobic process and associates to aerobic. White muscle fibers generate energy without the oxygen – in anaerobic manner, which is typical for the strength training. Traditionally, one thinks of mainly white muscle fibers increase and the connection to anaerobic way of energy generation in them. Therefore in most methods of muscle mass enlargement with the aim of white muscle fibers engagement one applies considerable strains (weights) with small number of repetitions.

The authors of the ISOTON have shown that processes of rapid growth and directly connected increased growth of strength can take place in pink muscles as well but this needs during exercising a switch to anaerobic regime of energy generation. In practice this means elimination of the full relaxation phase during dynamic exercise performance which in turn limits the blood circulation in the engaged muscle, and in this way the oxygen as well. It is possible to include varied number of muscle fibers – from red ones in small strain, to pink and white muscles in bigger strains and one must observe the fatigue level during exercise performance.

This mode of operation yields extraordinary results such as:

- In adequate exercising organization Red muscles fibers grow, become stronger and do not lose their endurance
- Pink muscles fibers depending on the exercising conditions can become stronger and/or more endurable. This practically means connection of the non-connectable – strength and endurance. And even more than that; basis for the development of endurance is actually strength training.
- Strength training with large loads is considered one of the best ways to increase the concentration of the growth hormone in blood which also influences the growth of the muscles and fat elimination.
- Usually in strength training with small loads there is no increase in the concentration of the growth hormone. But it is enough just to stop muscle relaxation during exercising and the growth hormone literally flushes in.
- Slow muscles unlike the fast muscles are able to use fats. By stimulating their growth during isotonic exercising one increases potential consumption of excessive fats in one’s own body.

SAFETY MEASURES WHILE PERFORMING THE ISOTON EXERCISES

As research shows by all its basic characteristics isotonic training is one of the safest and thus most available to the widest category of the exercisers. Children, youth, and elderly can perform and exercise all together without any practical change in methods of exercising.

This is due to the following indicators of a typical exercise:

- Heart rate does not exceed over 130-140 bpm;
- Arterial blood pressure does not surpass the initial one by more than 30-40 mm;
- Muscle strain rate does not go over 60-70% of the maximal abilities.

During such exercising there is no:

1. Strain and breathing suppression, overload on carotid arteries, too big blood flux into the brains, etc.
2. Bending of the body and limbs, movements and body positions potentially harmful for the spine and joints are eliminated;
3. Swift, sharp, ballistic (non-controllable) movements;
4. Movements where there is muscle extension (strong eccentric shortening);
5. ‘Global fatigue’;
6. Disturbed coordination of movement related to lower blood sugar.

After exercising:
1. Starts relaxation and normalization of psychological processes;
2. In most cases one notes normalization of arterial blood pressure within 3-12 hours (in hypotonic it increases and in hypertonic it decreases);
3. There is no muscle pain, „worn-out effect“, extreme exhaustion of the carbon hydrate resources.

Safety of this system does not decrease its efficacy. Regime of two exercises a week (duration 50-55 minutes) essentially (according to the indicators of the functional investigations) the effects are felt just after 3-5 weeks, and after 2-3 months there appears „qualitative“ improvement of the physical status. These changes are especially felt if isotonic exercising is blended with aerobics performed twice a week.

Stated elements enable designation of the isotonic exercising as a sports training program, health related exercising, corrective gymnastics, massage and reflex-therapy at the same time. ISOTON uses most natural means of influences and the influence is felt extensively.

CONCLUSION

ISOTON uses natural means of influences on the body which greatly diminishes possible misbalance and disturbances in the body. Using principles and methods of the ISOTON it is possible to elaborate on any given individual program. What one has to bear in mind is that the efficacy of this health-recreational system is considerably decreased if this exercise set is applied rarely than twice a week within the time line of 6-8 months a year. Isotonic exercising is circular method exercising for strength for all basic muscle groups. It is also harmless, exerts positive influence on the whole body, has unique feature of efficiently increasing the potential of
slow muscle fibers, is efficient also in body mass control and most importantly, it creates „anabolic phone“ in the body which enables better „adoption“ of any load, it prevents internal organs illnesses and aids in quick injury healing.

REFERENCE


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