

APPLICATION OF HARDWARES IN THE PROCESS OF TRAINING OF SKILLED SPORTSWOMEN

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Annotation. *Purpose of work* - to systematize information to scientifically-methodical literature and front-rank sporting practice about application of hardware in the process of training of skilled sportswomen. *Results.* Some directions of application of hardware are considered in track-and-field sport. The presented materials will be instrumental in intensification of process of training of skilled sportswomen. The prospects of further expansion of sphere of the use of hardware are shown in track-and-field sport. *Conclusions.* It is marked that among the possible ways of development of method of training of skilled sportswomen all less than it is possible to hope on achievement of success, leaning only against further growth of volume and intensity of the training loading. With all by large attention trainers and representatives of sporting science will examine the prospects of the use of hardware which provide moving toward higher trade. It is marked that for forming of proof motive skill creation of certain terms is needed for implementation of exercises. These terms must provide maximally possible probabilities for the effective achieving motive possibilities of sportswoman. Also, these terms must provide possibilities of process of implementation of exercises control on strengthening of skill which has large probability to reproducing in the attempt of desirable record result.

Keywords: hardware, technologies, skill, standard, electro-stimulation.

Introduction

The problem of application of instructional technologies and methods in the process of qualified track and fields sportswomen's training is rather far from being occasional. It is conditioned by growing competition's acuity of world sports states, by growing difficulty of achieving of every new record [12].

Analysis, provided by sports science, shows that among possible ways of development sportswomen training's methodic still less reliable growing of training's load scope and intensity becomes [2, 4, 7, 8, 10].

As on to day, there are two ways of qualified track and field sportswomen's training.

The first was – is training process of sportswomen with profound analysis of those bio-mechanical motion actions' indicators, which help to understand the reasons and essence of technical mistakes, to select individual variant of technique [4, 10, 12, 19]. On this way, in the process of mastering of movements and transition to higher level of mastering, there appear certain contradictions.

As it was stressed by G.I. Popov [14], transition to higher results is permanent process "training – improvement", as far as certain sport result requires stabilization of motion skill. At the same time this stabilization contradicts to further improvement of sport result, because new sport result requires new skill motion.

Besides, some authors think that inner content of movements if formed in the process of imitation of some etalon external forms, offered by coach as a standard. With it the fact, that external forms of movements are coordinated interactions of muscular groups (inter-muscular coordination) of sportswomen in every exercise, is not considered. [10, 12, 13, 16].

Finding the way out from this contradiction was hindered by nearly complete absence of any means of control over correctness of formation of inner content of movements. Coaches found solution of this problem in simplifying of motion task and dividing it into elements, when mastering complex movement [4, 10, 13, 16].

Some specialists [1, 2, 4–9, 13, 15, 16] proposed quite a new way of movements' training and improvement.

This way implies that motion skill can be formed not in natural conditions but in condition of specially created for this purpose environment. In this case, initial targeted orientation of movement's training means formation of new more effective rhythm-speed structure of motion skill. From the above said it comes, that the way, ensuring more reliable formation of highly effective movements, with significantly less negative influences of hindrances to their fulfillment, is application of instructional technologies.

Instructional technologies in sports are bio-mechanical stands, training devices, technical equipment and stimulators, sport equipment and other bio-mechanical technologies.

The research has been carried out as per subject 2.11 "Theoretical-methodic principles of sportswomen's training system for track and fields jumps' specialization" of plan of scientific & research works on the sphere of physical culture and sports for 2011-2015 of Ministry of family, youth and sports of Ukraine. Number of state registration: 0111U003839.

Purpose, tasks of the work, material and methods

The purpose of the research is to systemize the data of scientific-research literature and advanced sports experience about application of instructional technologies in the process of highly qualified track and field sportswomen's training.

The methods of the research: the methods of the research included theoretical analysis and generalization of literature, analysis of Internet resources, pedagogical observation, pedagogical experiment, method of "simplified leading", method of muscles' electric stimulation, methods of mathematical statistics.

Results of the researches

Among means that are traditionally applied for intensification and raising of qualified sportswomen's training level in track and fields we can especially mark out instructional technologies and methods. Even only on the base of application of instructional technologies it is possible to create such artificial conditions for simulation of trained movements, in which influence of external hindering factors will be limited and the process of movement task's fulfillment will be simplified owing to application of instructional technologies.

Among instructional technologies the most perspective are those, on the base of which it is possible to introduce external power elements in the process of movement's fulfillment. On the base of such artificially introduced power elements it is possible to prevent technical mistakes. Besides, artificial power elements can change the process of movement's fulfillment so, that it is possible to reach record result.

Implementing into practice theoretical principles concerning "controlling sportsman's interaction with external forces", I.P. Patov [16] and his followers [1, 2, 7, 13–15] developed a number of technologies, which permit to improve sportsmanship in much shorter time.

This stimulating means, based on principle of "make easier", create conditions for realization of planned result owing to elimination of "scattered forces" and facilitate formation of new effective rhythm-speed structure of movement and muscular activity in compliance with main motion task.

G.I. Popov [13–15] thinks that instructional technologies, based on principle of "make easier", facilitate progressing of motion skills, maximal demonstration of speed-power abilities, formation of new effective rhythm-speed structure of movement, reconstruction of old ineffective dynamic stereotype into more perfect one, overcoming of speed barrier.

All examples of power elements' introduction into process of movement's fulfillment make to think seriously about methodic possibilities, provided by instructional technologies [1–3, 13, 15, 16, 19].

In any sport exercise, where there is shifting of body mass, great energy consumption is connected with initial stages. With using of instructional technologies the task for sportswomen to reach optimal rhythmic-speed mode is easier.

One of instructional technologies, which are plied in sports training, is complex of "simplified leading". Carrying out of researches with the help of this stimulator permitted to determine possibility of reaching higher running speed as well as possibility to individually program running modes.

Structurally the stimulator is made as fixed above running track I-beam, which is a monorail for carriage on bearing rollers. Besides them there are guiding rollers for prevention the carriage from oscillations in horizontal plane. Carriage moves on beam due to horizontal drive forces, applied through steel ropes, which go through system of pulleys and are driven by DC electric motor. In lower part of carriage there are holes for fixing of suspension system's belts. Monorail edges are provided with shock absorbing arresters of carriage movement.

Value of static drive force is variable and is set by coach; he also helps to promptly change total length of flexible link of suspension system as per individual features of sportswoman and selected conditions of sportswoman's interaction with stimulator's carriage. Dynamometer, connected with suspension system permits to control the value of driving force.

Increasing or reduction of carriage speed is ensured by rheostat unit of the equipment. The range of carriage travelling speed is within 0 – 15 m.p. sec⁻¹, with possibility of its smooth regulation.

In the process of the researches we studied both influence of forces, applied to body of running sportswoman and directed upward (conventionally the first mode of running) and influence of forces, applied to sportswoman's body in direction of running in the same conditions of "simplified leading" (conventionally the second mode of running).

From the obtained data it follows that with increasing of running speed, duration of running cycle shortens, the time of supporting period also shortens, while indicators of run activity coefficient increases. Specific weight of shortening of running cycle's components is not one and the same for growing of efficiency of sportswoman sprinter. If time data of support with second running mode reduces by 10.75 % (p<0.001), in comparison with natural conditions, then with first running mode the value of supporting phase is reduced by 6.71 % (p<0.001). Flight phase time indicator remains unchanged in both modes.

The size of step is increased only if additional force in direction of movement is present in conditions of "simplified leading". Step length, in comparison with natural conditions, in average increases by 15 cm that is 5.73 %.

In the conducted researches, we should note the fact that fulfillment of exercises in conditions of stimulator influences not only on progressing of speed abilities, but also facilitates formation of speed endurance, which is manifested in more even running of longer segments at increased speed, than in usual conditions.

Application of "simplified leading" complex is of special interest with training of sportswomen, who are specialized in long running jumps. Application of complex permits to fulfill long jump at higher speed in combination with more powerful taking off. The latter permits to approximate these jumps to competition model of exercise. This mode is created by artificial conditions with influencing of resilient force on sportswoman's body, directed against vector of gravity force in the range of 5–8 kg (6–10 % from sportswoman's weight).

On the base of fulfilled researches in different conditions it was found that speed in pre-taking-off part (4) of middle (11-12 run steps) and increased (17-18 run steps) running exceeded this indicator, taken in natural conditions, by, accordingly, 0.53 and 0.42 m.p. sec⁻¹.

With increasing of running speed we observe reconstruction of pre-taking-off steps' structure, which is

expressed in reducing of their length and speed difference and, thus, permits to shorten the period of preparation for taking-off from four to two steps.

Certain changes were also observed in dynamics of taking-off. Analysis of the obtained dynamics diagrams showed that with optimal artificial conditions striking forces exceed average indicators of this parameter in natural conditions: vertical component – by 3,5 kg and horizontal – by 14 kg. An important moment of fulfillment of more powerful taking-off was increasing of forces' level at transition from yielding mode of take-off leg's muscles to overcoming one by 25-35 kg.

Dynamic diagram of active take-off phase has smoother configuration with higher indicators of forces than in natural conditions, owing to increased forces' level in preceding phase.

All these changes, appeared owing to artificial forces of exercise's fulfillment, permitted to increase result of long running jump from middle distance by 30.1 cm (4.3 %) and from long distance (17–18 run steps) – by 20.5 cm (2.6 %).

Application of stimulator complex “simplified leading” in system of qualified sportswomen's training, who specialize in long running jumps, permits to successfully solve tasks of technical, running and speed-power training. With the help of this complex it is possible to increase not only intensity of exercise's fulfillment but also the quantity of repetitions.

Recent years, in the system of sportswomen's training there has been being widely used method of artificial activating of muscles (i.e. electric stimulation), which also belongs to instructional technologies.

Demand in artificial activating of muscles is also grounded by the fact that sportswoman is not able to maximally activate her muscles, when fulfilling physical exercise [1–3, 7, 13, 16, 17, 21].

Theoretically generalizing available experimental material on electric stimulation and its effects, G.I. Popov [13] came to conclusion that this method should used in sports practice for improvement of sportsmanship. With it, he considered that artificial activation of muscles shall be carried out in the moment of fulfillment of main exercise's element.

Correctness of this statement was proved by a number of works. For example, in the work by T.G. Selivanova [17] it was shown that with the help of electric stimulation it is possible to correct technical actions during javelin throwing.

In the works by R.F. Akhmetov [1, 2], T.B. Kutek [7], T.Ye. Yavorskaya [20], efficiency of electric stimulation in training system of sportsmen and sportswomen, who specialize in track and field jumps, was convincingly proved.

The research of Ye.S. Boyko, who showed in his work, that electric stimulation was effective not only for correction of shot put technical actions, but also for intensification of muscular activity in final phase of this sport exercise, is of great interest. He found that electric stimulation, carried out in final phase of shot put, significantly improves sport result.

Finalizing the above said, we can make conclusion that application of instructional technologies in training process of sportswomen, who specialize in track and fields, facilitate development of physical condition, improvement of technical side of physical exercises and quick growth of sportsmanship.

Conclusions:

Analysis, carried out by sport science, witnesses that among possible ways of development of qualified sportswomen's training methodic further growth of training load's scope and intensity is becoming unreliable. Coaches and representatives of sport science will pay still more attention to prospects of instructional technologies' application, which would ensure reaching the highest levels of sportsmanship.

If to speak about application of such instructional technologies as different modifications of simplifying devices and electric stimulation, then the system of hypothesizes, which lies in the base of their application, comes from such logical assumptions: first of all let us note that the target of all sportsman's training system is not only execution of certain exercises; final goal of these exercises is achievement of record (i.e. exclusive) sport results, which would reliably ensure victory. But winning of record, in itself, means that sportswoman reached such quality of exercises that permits to fully demonstrate her formed motion skills. In other words, record result is an attempt, in which sportswoman realizes maximally her motion potential, using her perfect skills. But the process of realization of motion potential can be regarded also from the point of view of hindrances' prevention.

Record attempt can be in case, if sportswoman maximally prevented hindrances, which are usually make obstacles to realization of abilities' potential. In every attempt, since the very beginning, there appear different, sometimes even invisible from outside, obstacles; each of them as if takes imaginable units of quality from possible result, sometimes dozens of units. Record attempt differs from other exactly by prevention of typical coordination discords and by prevention of “attack of external forces” through “weak link of chain” of movement's alternating phases.

As far as we must achieve formation of stable motion skill, on the base of which record result is possible, creation of certain conditions for fulfillment of exercises can be the way to this. These conditions, on the one hand shall ensure maximally possible probabilities for most complete motion potential's realization. On the other hand, these conditions shall ensure such opportunities to control the process of exercises' fulfillment, in which skill will become solid and reliable, meaning the skill, which will be most probably reproduced in attempt to reach the desired record result.

From all above said it comes: the way of instructional technologies' application is the way, on the base of which it is possible to reach more reliably formation of highly effective movements with less probability of negative influence of obstacles.

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Cite this article as: Kutek T.B. Application of hardwares in the process of training of skilled sportswomen. *Physical education of students*, 2013, vol.5, pp. 60-64. doi:10.6084/m9.figshare.771086

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Received: 22.07.2013

Published: 10.09.2013