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THEORETICAL AND METHODOLOGICAL ASPECTS OF THE DIFFICULT PHYSICAL ACTIVITIES IN THE TRAINING PROCESS OF THE GYMNASTS' MOTOR BEHAVIOR

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Abstract. *The modern artistic gymnastics requires the synthesizing of the most efficient theoretical and methodological approaches concerning the process of learning the technique of the elements with a high level of difficulty that are provided in the actual competition program. One of the most constant problems of this sport is to create an efficient motor behaviour that would contain diverse difficult physical actions, with a high level of spectacularity during the gymnast's performance at each of the competition's events.*
Keywords: *artistic gymnastics; difficult physical activities; instructional programs; specific motor behaviour.*

In order to efficiently instruct the difficult actions, in this study is approached the problem of the algorithmic decoding of all the phases contained in a technical move, by exemplifying on the landing fall off from the fixed high bar. In the study there are highlighted all the phases of this element and there are created four specific working programs. The content of each program, as well as some remedies that identify the most optimal, rational and efficient method of training of this element is also described in the article.

This kind of programs can be elaborated for all the elements with high level of difficulty that are included in the process of training of the elite gymnasts. Depending on the kinematic structure of the moves, the programs can offer very useful information about all the instructive segments of an action, as well as about the connection between them. Thereby, the algorithmic form of the phases of a difficult action improves the promptness of the learning process of the element's technique, as well as the efficiency of leading the entire training process.

Artistic gymnastics is part of the sports group with a high degree of complexity in coordination and precision of movements. Determined by the requirements of the contest program, scoring code, apparatus standardization and their succession, artistic gymnastics imposes the training process on a wide range of laws and principles that direct all the specific components to the sport performance progress.

Targeting the high degree of technical training in the multi-annual training process, modern artistic gymnastics provides the acquisition of a specific motor behaviour, in which the realization of the wide spectrum of instructional aspects contains reference subjects of the study of difficult physical activities in all the competition poliatlon apparatus [1, 5, 8, 11]. At the same time, it must be recognized that sport performance in modern artistic gymnastics continues to produce impressive results, completing the training process with new constructive ideas. There are, however, a number of particular requirements of this sample, which require a synthesis of information that addresses the concept of the specific motor behaviour of gymnasts in the acquisition of various difficult actions whose results condition the efficiency of the instructional approach of ultra-complicated techniques.

A number of theoretical and methodological provisions related to the difficult physical activity of gymnasts denote certain laws and principles, on the basis of which can be learned the technical elements with a higher degree of difficulty [2, 3, 6, 10].

Being exclusively conditioned by the construction of the apparatus (the supporting surface, the thickness of the bars, the height above the floor, etc.), the body actions become even more amplified by the degree of difficulty and by the specific manners of executing the elements (with phases of flight, detached from apparatus, with rotating

movements around all axes, element bindings of different structural groups, etc.). The athlete is required to perceive and process all related signals on the basis of which the process of synthesizing the information in order to determine the right decisions to be carried out, in order to put into effect various segments, apparatus and systems of the body in order to efficiently perform the established / set motor chain. This process of synthesizing information can provide positive results if the athlete possesses various specific capabilities at various signals: performing an increased number of movements within a reduced or set time, determining the frequency of movements; the speed at which a single movement is performed but which includes several parts of the body and several muscle groups; the force that plays a primordial / dominant role in performing all the movements and their interaction (static, dynamic, explosive, etc.); the resistance to maintain the maximum effort (mainly determined by the magnitude of the static force), as well as other aspects, such as: space-time orientation, kinaesthetic distinction, balance, motor reaction, movement combining, movement transformation etc., whose overall to guide the training capacity to a high level of execution of any difficult action, the latter determining the essence of the coordination capacity of movements [4, 5, 7, 9].

Obviously, the acquisition of high-difficulty motor skills is based on a series of skills with a lower degree of complexity, including cyclical movements, and higher complexity skills that encompass acyclic skills.

In the same order of importance there is the precision of the movements (symmetrical, asymmetrical), because the higher degree of this ability influences the movement within certain limits of space and time, according to the established amplitude, in the intended direction, respecting the necessary tempo and rhythm.

Difficult bodily actions impose an optimal muscular strain on the athlete to efficiently achieve the element making technique, as long as all motor chain links are made with high accuracy and technical sensitivity, along with maximum concentration of attention, anticipation of motor steps to make correct and operative decisions, and so on. [1, 2, 11].

It should be noted that for the development of intelligent motor behaviour in difficult physical actions, in practice, various approaches and methods are combined, the most significant ones being based on:

alternating ways of synthesizing information;

combining the old, known knowledge with the new, unknown ones;

the development of new enforcement schemes so that the athlete can structure and organize his / her moves and actions;

the use of various auxiliary execution movements in the handy and clumsy part;

limiting the support surface, space, tempo and rhythm of execution, both with visual control and without visual control;

- alternating the execution conditions (internal and external forces, with the application of facilities, appliances and simulators, etc.).

One of the representative approaches for forming the motor behaviour in difficult physical actions is algorithmic analytical information based on graphical interpretation of independent kinematic programs that can provide a synthetically pronounced and clear image for both the theoretical recording and the psychophysical memory of the motor chain and all its specific features [3, 5, 8, 10].

Namely, the "kinematic language" of difficult motor actions in the acquisition of complicated techniques and pre-programmed algorithmic character is able to contribute to the athlete's awareness of the type of information necessary to interfere in certain instructional segments, knowing at the same time, which will be the perceptions that it will have in the motor act or the difficult motor sequence, which can confirm the alternative form of performance or not.

In many cases, the gymnast is not obliged to

know in detail both the structure and the kinematic content of the movement. If mistakes are made in all times, the gymnast, through multiple repetitions and various forms of help, will, however, acquire the difficult technique, but this process may be long-term or the effectiveness of the movements can be reduced [5, 6, 9].

Any difficult technical element may contain at least three kinematic programs.

Figure 1 provides the information from the four kinematic programs, based on the technique of the element in fall off with flight from the high

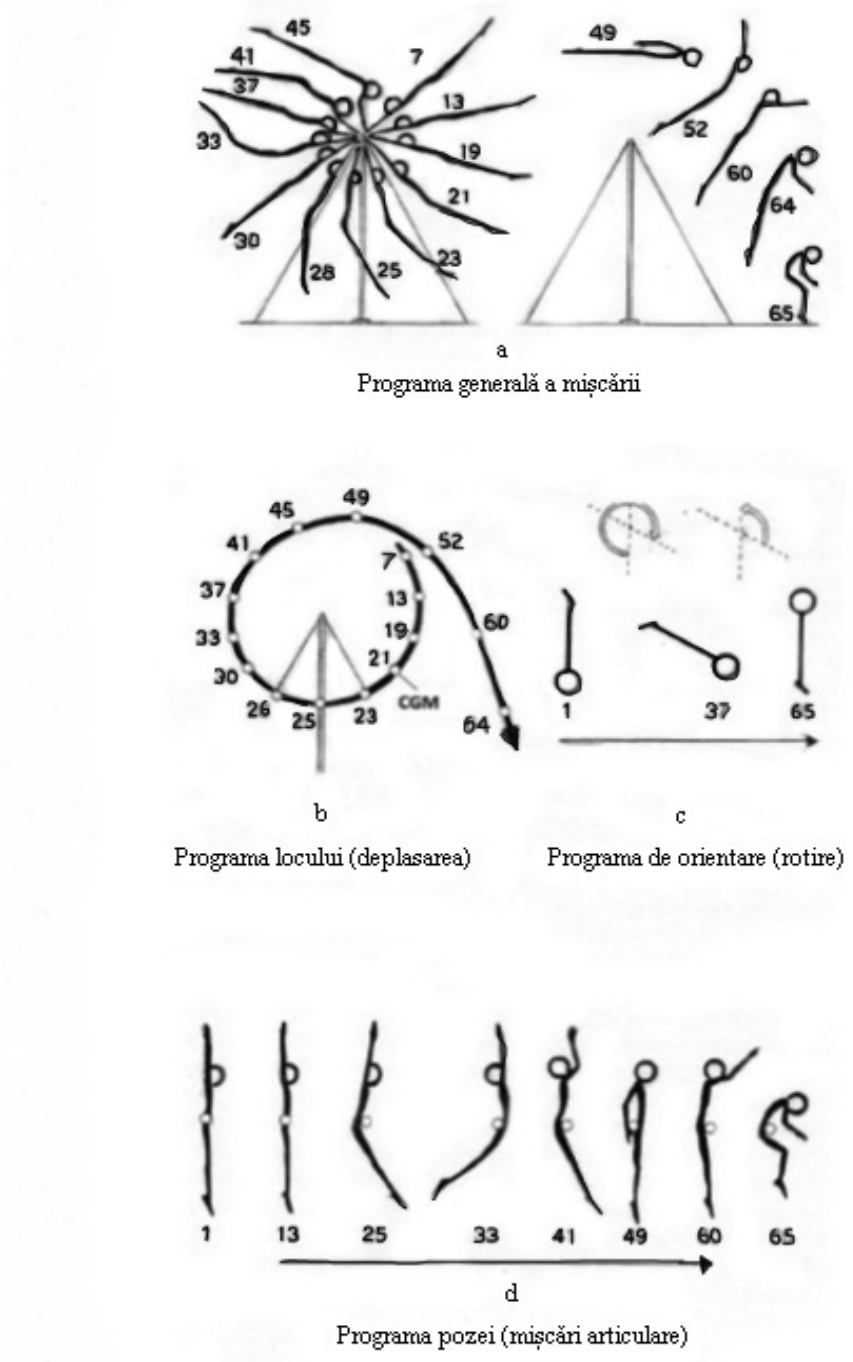

Fig. 1.

Note: a) – the general program of the movement; b) – c) – orientation program (rotation); d) – position program (joint movements).

Thus, in the general program of this movement, apart from the fact that the full execution technique is acquired, emphasising on the rational and optimal acquisition of the most important phases of the movement during the contact and non-contact periods (the detached from the apparatus with the subsequent phase of flight). It is necessary, at the time of acquisition, not to stop on isolated phases of the movement (such as positions 33, 37, 41, 47 of the "a" program, for example, but it is necessary, as soon as possible, to make a connection of phases in constitutive modules of the movement, so that later, these modules, linked together, provide the whole movement. In the case of exaggerated stopping on certain phases, the stereotype of the skill begins to be formed, and the whole motion can be dispersed and lately acquired.

The connection of the modules, made up of multiple phases of movement, can also be performed with alternative profile movements, which can provide information and create habits in certain periods, significant positions and actions of the basic movement, adjusted to the form of the set algorithmised prescriptions, whose sequence describes the correct classical and technical form of execution of the element as a whole. Such actions refer to the speed of movement, rotation, height at each phase module, flight time calculation, landing segment length.

This program also contains information about the subsequent failures that an athlete may commit during training. But this information is reduced to the minimum if only the correct calculations are highlighted in order to obtain an appropriate linear form of action.

Once the balance amplitude has reached maximum points, the flight phase perception begins, but not before conducting a detailed processing of all flight parameters (height, duration, flight length). Obviously, at the starting line of these actions a number of digital calculations are made, starting with the smallest flight paths, gradually increasing the flight angle during training, thus reducing the moment of inertia relative to the rotation axis (in this case, scapular belt axle). It provides all the information about the place where the landing is to be made, conventionally called the schedule of the place. As in the case of the first program, the gymnast does not over-stop on phases, in order not to create a surplus of information, focusing on the connection of the phase modules that guide the path of movement and the intended landing.

The accuracy of ownership of the first programs offers the possibility of the complexity of the flight phase by the addition of many forms of rotation as necessary (grouped, wide, stretched, rotated to 180°, 360°, 540°, 720°, double jump to 360°

This responsibility lies in the orientation program, which in the technical language of expression belongs to the first level of complexity. Various rotating elements around various body axes are included in the orientation program. However, for this purpose, the orientation program also provides for some alternative forms of execution of giant rotary movements with acceleration, depending on the number of elements, such as jumps or rotation to 360°, 720°

The program of the position or of the motor content, which encompasses certain positions of the body, is due to the joint movements. Thus, the entire motor chain depends on the size of the angles of all body joints, some of which are more significant, others are less significant, but provide information about certain muscular efforts that the gymnast must apply in certain phases of the general movement.

Flexions that occur in the joints involved in such an element can confuse, through the volume of information, the decisions of the athlete in a small unit of time. In this case, it is advisable to reduce the amount of information to the real level that the gymnast can currently process. Each time, the joint movements dictate the correctness of the component phase chain execution, but for a thorough attribute, it is still necessary to per-

ceive calculations that ensure that the body is displaced minimum for one aspect compared to the classical execution. At the same time, the difficult technique requires not just the exaggeration of the information volume but also the safety of the motor information, on the basis of which the technique of achieving the difficult elements is built.

Such programs can create privileges to carry out difficult actions in an automated way when the gymnast's motor behaviour in various manifestations seems to be unconsciously guided. However, the character of the difficult actions is closely correlated with the conscious form of directing any movement, which influences the promptness of the optimal and rational thinking for the realization of the technique of execution of any element with different degree of difficulty.

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