

## **INVOLVEMENT OF FUNCTIONAL SYSTEMS (ANALYZERS) IN MAINTAINING BALANCE**

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### **Abstract**

The process of maintaining balance is very complex, and a complex of all analyzers that make up a single mechanism is involved in this process.

**Keywords:** Movement skills, complex movements, differential information source.

Action analyzers are given priority in the formation of motor skills. The ability to manage complex actions depends to a large extent on these analyzers. It is an irreplaceable source of various and differential information and plays a very important role in maintaining balance. But without vision, vestibular and skin reception, it cannot provide orientation in the field. Next in importance in motion control are vision analyzers. With their help, up to 80% of information from the outside world is received.

Vision analyzers have different meanings in different sports. Their importance is not the same in all sports. The best indicators are observed in acrobats and figure skaters; shooting sportsmen have a high level of balance in a natural standing position, and athletics have a body stability level close to that of test athletes who practice regular sports.

When studying the effect of vision analyzers on the performance of several exercises in stabilization, it was clear that most of the failed attempts (74%) were observed when the above partner performed the exercises with his eyes closed. Only 16% of attempts were successful when both partners had no visual control, and 24% of attempts were unsuccessful when the lower partner's eyes were closed. (G.M. Sarsekeev, 2000).

It follows that visual information is a very important element in the balance control system in pair acrobatic exercises. The lower acrobat's balancing process is based on the information received through the eyes, while the upper acrobat's vision analyzers are also involved.

As gymnasts develop their athletic skills, vision control gives way to information from motion analyzers. With this in mind, it is recommended to do exercises with eyes closed when improving balance skills alone.

Any human activity, including sports-related activities, depends on the condition of multi-faceted vestibular analyzers. It perceives the body changes in the field by the reflex way, performs complex coordinated movements together with motion and eye analyzers.

The question of the participation of the vestibular apparatus in maintaining body balance and posture control causes different opinions among many researchers. (V.N. Boloban, 1988, 1991; Yu. M. Kabanov 1991).

The vestibular sensory system serves to analyze body movement and position in the field. This information is used to control body and head position.

According to Yu.M. Kabanov, the vestibular analyzer cannot be a direct regulator of balance reaction and body position, it participates in balance control through other regulatory systems. In the course of research conducted by G. Ya. Sokolov, A. P. Alyabyshev, it became known that the function of the vestibular analyzer increases several times for the quality of movement and accuracy of posture when performing exercises with eyes closed.

The vestibular apparatus plays a key role in controlling the vertical position of the body. The vestibular apparatus is considered an organ of balance. (V.N. Boloban, 1991).

The vestibular analyzer performs several tasks:

- space-time analysis of movements on support and without support;
- motion stability control;
- body balance
- stability, etc.

Due to the rejuvenation of records in recent years, the trend of training young professionals in complex coordination sports, the issue of studying the vestibular apparatus is gaining urgent importance.

The function of a vestibular analyzer requires training, which must begin at a young age. This is explained by the fact that training has a good effect on children at the age of 9-12 . The functional capabilities of the vestibular apparatus grow sharply at the age of 13-14 in boys and at the age of 12-13 in girls and reach the point of maximum development. Target accuracy in space increases, balance function improves. (V.N. Boloban, 1991).

1.4. Use of technical means of training in sports that require complex coordinated movement  
Today, non-traditional means of training are more widely used: technical means, accessories, special equipment, which allow to fully open the functional capabilities of the athlete's body, surpass previous achievements, and various trainers that ensure improvement in sports technique and development of physical qualities .

The issues of the use of technical means in the training of young athletes have been considered in the works of a number of authors. (T.P. Yushkevich, 1989; S.P. Evseev, 1992; S.A. Polievsky, 1992, etc.).

Studying the works in which the concept of "trainer" was revealed showed that, clarifying the essence of this term, the authors define it as follows:

- device ;
- technical means ;
- study guide .

For the technical training of athletes, the principle of feedback is the basis of the most advanced training devices. Depending on the speed of receiving data, they are divided into trainers with fast information about the qualitative and quantitative characteristics of movements, and trainers with non-fast information.

The main advantages of using technical tools during special training include:

- accurate programming of the structure of action execution;
- the ability to repeat the main phase of actions many times;
- activation of self - control;
- the opportunity to learn without mistakes and re-reading;
- reduction of psychological pressure and traumatism;
- repeating the exercises in the specified mode many times;
- quick skills formation, etc.

T.P. Yushkevich recommends using a training device at each stage of training, especially at the initial stage.

From the very beginning of teaching sports techniques, it is necessary to form a rational form of movement when preparing or performing special exercises on simulators.

It is necessary to plan the main work with projectiles during the preparatory period of training, performing the exercises at the end of the main part. The optimal duration of working with projectiles in training is 25 minutes.

With the growth of sports skills, the role of simulators and other training equipment in the training process should grow. This is due to the specialization of the training process at the stage of high sportsmanship.

When using technical tools during training, it is necessary to take into account the following features:

1. When working on the simulator, it is necessary to have constant information about the external impact parameters and the structure of movements. A young athlete should know the characteristics to which he should aspire.
2. At the initial stage of preparation, it is desirable to perform speed-strength exercises of a global nature on simulators , while at the later stages it is necessary to pay more attention to exercises of a special local nature.

The increase in the complexity of the exercises involving the movement process, associated with risk, in addition, the tendency to get younger, leads to the organization of the training process in sports gymnastics with the wide use of various simulators, additional projectiles.



Without these processes, it is impossible to implement modern methods of teaching movements and to provide safe conditions for training.

But in the forms of gymnastics, unlike other sports (weightlifting, swimming, etc.), technical equipment is used relatively little in training.

Current scientific developments and recommendations on the use of technical tools were used in training practice. The use of devices is partially based on the subjective opinion of the trainer, which in many cases complicates and prolongs the process of mastering the studied movement.

Non-traditional training tools used in complex coordination sports do not expand the range of training effects and are used only as additional tools, generally not integrated into a single system and require a lot of work.

Thus, in complex coordination sports, a limited number of trainers and projectiles are used during training. There are no scientifically based evaluation criteria for arm balance exercises. Control exercises that are evaluated at the level of two or three "did not do" used in practice do not provide an opportunity to objectively assess the level of mastery of the exercises being studied.

Scientific research and the experience of sports practice show that junior school age (7-10 years old) is the most optimal age for teaching movements using modern methods and teaching tools, performing exercises in a fixed sequence.

There are practically no obstacles to memorizing static exercises by the nervous-tissue and musculoskeletal apparatus, and technically correct performance of balancing on the hands does not require a lot of effort and physical effort from the performer.

Balance exercises play a leading role in sports that require complex coordinated movement. They serve as a connecting element in gymnastics, the initial position in diving, and the main exercise in sports acrobatics.

At the moment, the lack of reliable and stable skills for performing balance exercises is explained by trainers' underestimation of the importance of "standing" training. This does not allow the formation of solid and reliable movement skills at the initial stage of training.

To teach handstand exercises, some authors have recommended options for studying individual elements of the structural group of standups using traditional methods and teaching tools.

Currently, there is almost no demand for software education method by theoreticians and practitioners. In addition, one of the most effective methods is the method of algorithmic instructions. It was recommended to use it at the initial stage to create a movement base, to master complex exercises faster and better in the later stages of training.

Undoubtedly, it is impossible to implement the modern methodology of teaching movement processes without extensive use of simulators and auxiliary devices. However, the existing literature on the use of technical tools in handstand training still requires some work and

clarification. In particular, the recommended device is not classified taking into account the stages of training, the type of sport and the training level of the athlete. This complicates the process of choosing special equipment and approach exercises.

All this determined the need to carry out special research aimed at elucidating the methodology of handstand training in various educational structures and to develop a comprehensive program of training exercises using non-traditional training tools and algorithmic instructions.

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