COORDINATION OF COORDINATION SKILLS AND THE DEVELOPMENT OF MOVEMENT ACCURACY IN ARTISTIC GYMNASTICS TRAINING SESSIONS

L.Sh. Beknazarova
University of Information Technologies and Management
https://doi.org/10.5281/zenodo.20151915

Abstract. *This article discusses the issues of developing coordination skills, coordination, and accuracy of movement in the process of rhythmic gymnastics. It is justified that the specific features of rhythmic gymnastics require a high level of sensorimotor control in children, namely, spatial-temporal accuracy and coordination of movements. The issues of the gradual formation of coordination skills by improving the spatial, force, and time parameters of movements, strengthening control and self-control mechanisms, and the effective use of inertial movements are considered.*

Keywords: *muscle, rhythmic gymnastics, inertial, potential, space, coordination, time, parameter, motor, dynamic, sensor mechanism.*

Introduction

At present, achieving high results in the field of physical education and sport directly depends on the comprehensive preparation of athletes. In particular, artistic gymnastics, as a sport rich in complex coordinative movements, requires athletes to possess a high level of coordination ability, speed, flexibility, sense of rhythm, and movement accuracy. Performing exercises to musical accompaniment, based on a precise tempo and rhythm, further necessitates the effective development of coordination skills.

Coordination skills refer to the ability to control movements and perform them accurately, quickly, and purposefully. In artistic gymnastics, these skills are especially important for proper spatial orientation, maintaining balance, executing complex turns and jumps precisely, and effectively working with apparatus. Movement accuracy ensures the correct execution of technical elements, their aesthetic appearance, and compliance with competition evaluation criteria. Modern sports practice shows that developing coordination abilities from an early age facilitates the acquisition of complex technical elements in later stages. Therefore, it is essential to pay special attention to both general and specialized coordination exercises during training. These exercises contribute to strengthening the vestibular system, increasing reaction speed, ensuring precise execution of movement sequences, and improving spatial orientation.

Literature Review

Coordination abilities are defined as an athlete’s capacity to perform various complex motor activities quickly, accurately, and purposefully. In scientific sources (in particular, in the studies of Lev Pavlovich Matveev and Vladimir Ivanovich Lyakh), coordination is interpreted as an essential component of physical qualities and is closely associated with movement control, balance maintenance, sense of rhythm, and spatial accuracy. It is especially emphasized that in artistic gymnastics, exercises performed with apparatus (hoop, ball, ribbon, and clubs) require a high level of sensitivity and precision.

Results

Coordination abilities refer to the capacity to solve motor tasks –especially complex and unexpected ones – with a high level of mastery, characterized by speed, accuracy, efficiency, economy, and resourcefulness. The wide range of abilities associated with motor coordination can be broadly classified into three groups.

1. **First group:** The ability to accurately measure and regulate the spatial, temporal, and dynamic parameters of movements.
2. **Second group:** The ability to maintain static (postural) and dynamic balance.
3. **Third group:** The ability to perform movements without excessive muscular tension (stiffness).

The coordination abilities classified in the first group are closely related to the "sense of space," "sense of time," and "muscle sense," that is, the perception of the force being exerted.

The coordination abilities of the second group are associated with maintaining a stable body position, i.e., balance, which includes stability in static postures and equilibrium during movement.

The coordination abilities of the third group can be divided into the regulation of tonic tension and coordination tension. The former is characterized by excessive tension in the muscles responsible for maintaining posture. The latter manifests as stiffness and rigidity in movements caused by excessive muscle contraction, over-involvement of different muscle groups—especially antagonist muscles—and the inability of muscles to fully transition from the contraction phase to the relaxation phase, which hinders the development of perfect technique.

Main Objectives of Developing Coordination Skills:

In the development of coordination skills, two groups of objectives are considered: a) comprehensive development, and b) targeted (specialized) development.

The first group of objectives is mainly addressed within general physical education. The overall level of coordination skills achieved at this stage creates broad conditions for the further improvement of motor skills. The objectives aimed at more specific and advanced development of coordination skills are considered within sports training and professionally applied physical preparation. In the first case, the requirements are determined by the specific characteristics of the chosen sport, while in the second case, they are defined by the selected profession. In sports where competition focuses on movement technique (such as artistic and rhythmic gymnastics, figure skating, diving, etc.), the ability to create new and increasingly complex movement forms is of primary importance, as well as the ability to differentiate movement amplitude and timing across various body parts and regulate muscular effort among different muscle groups.

The development of coordination skills is also highly specialized in professional and applied physical training. Many existing and emerging types of professional activities, evolving under the influence of scientific and technological progress, do not require significant muscular strength but impose high demands on the human central nervous system—particularly on coordination mechanisms—as well as on motor, visual, and other sensory system functions. The integration of humans into complex "human–machine" systems creates the need for rapid perception of the environment, quick processing of incoming information, and execution of highly accurate movements based on spatial, temporal, and force parameters under overall time pressure. Based on this, the following objectives of physical education for the development of coordination abilities have been identified:

1. to improve the ability to coordinate movements of different body parts (especially asymmetric movements and those related to professional activities);

2. to develop coordination of non-dominant limb movements;

3. to enhance the ability to coordinate movements based on spatial, temporal, and force parameters.

Solving the objectives of physical education for the targeted development of coordination abilities leads students to the following outcomes:

- significantly faster and higher-quality acquisition of various motor actions;
- continuous expansion of motor experience, which enables them to successfully perform tasks related to mastering more complex motor skills (in sports, work, etc.);
- the ability to use energy resources economically during motor activity;
- experiencing a sense of joy and satisfaction from mastering new and diverse movements to a high level of proficiency.

Physical education and sport offer a wide range of means for effectively influencing and developing coordination skills.

Main Means of Developing Coordination Skills:

The primary means of developing coordination skills are physical exercises that involve increased coordination complexity and elements of novelty. The complexity of physical exercises can be enhanced by altering spatial, temporal, and dynamic parameters, as well as external conditions: changing the arrangement of equipment, its weight and height; modifying the support surface or increasing its instability in balance exercises; combining motor skills; integrating walking with jumping, running, and catching objects; performing exercises based on signals or within limited time. These include exercises aimed at developing the sense of space, time, and the level of muscular force.

Special exercises designed to improve motor coordination are developed with consideration of the specific characteristics of a chosen sport or profession. These exercises are similar, in coordination terms, to the technical and tactical actions required in a particular sport or work activity.

In sports training, such means are generally divided into two groups:

- **Preparatory exercises**, which facilitate the development of new movement forms in a specific sport;
- **Developmental exercises**, which are directly aimed at improving coordination skills manifested in particular sports (for example, in basketball: performing complex exercises under difficult conditions, such as jumping over a gymnastics bench and passing the ball to a partner, catching a ball after performing several consecutive somersaults on gym mats, and then throwing it into the basket, etc.).

Exercises aimed at developing coordination skills are effective only until they become automated. After that, they lose their effectiveness, since any movement mastered to the level of a skill and performed repeatedly under constant conditions no longer stimulates further development of coordination abilities.

Coordination exercises should be planned in the first half of the main part of a lesson, as they quickly lead to fatigue.

Age-related characteristics of coordination abilities:

The manifestation of coordination abilities depends on a number of factors, including:

1. the individual’s ability to accurately analyze movements; 2. the activity of analyzers, especially the motor system; 3. the complexity of the motor task; 4. the level of development of

other physical abilities (speed, dynamic strength, flexibility, etc.); 5. courage and determination; 6. age; 7. the overall level of preparedness of the student (i.e., a wide range of mainly variable motor skills and abilities), among others.

Discussion

Artistic gymnastics is a type of gymnastics that represents a system of exercises aimed at improving energy, health, and muscular well-being, as well as enhancing the tone of the nervous system. It encompasses a wide range of movements engaging all muscle groups and includes the development of motor-coordination skills such as agility, flexibility, endurance, plasticity, and sense of rhythm. Coordination skills are associated with the ability to control movements in space and time. A person does not merely respond to external situations; rather, they must take into account the potential dynamics of changes, anticipate upcoming events, and accordingly develop an appropriate program of actions aimed at achieving a positive outcome.

The reproduction of spatial, force, and temporal parameters of movement is reflected in the accuracy of motor actions. Their development is determined by the improvement of sensory mechanisms that regulate movement. The accuracy of spatial movements in various joints (simple coordination) gradually increases through exercises involving the repetition of predetermined positions. In modern conditions, the volume of activities carried out in probabilistic and unexpected situations has significantly increased, requiring resourcefulness, rapid reactions, the ability to concentrate and shift attention, as well as spatial, temporal, and dynamic accuracy of movements and their biomechanical efficiency. These qualities are essential components of coordination and the ability to precisely regulate it.

Coordination (from the Latin *coordinatio* – ordering or arrangement) is the process of harmonizing the activity of body muscles aimed at successfully performing a motor task. During the development of motor skills, motor coordination undergoes changes, including the mastery of the inertial characteristics of moving organs. At the initial stages, control is mainly achieved through active static fixation of these organs; later, it is carried out through short, precisely timed physical impulses directed at specific muscles. Finally, at the advanced stages of skill development, inertial movements emerge and are utilized, becoming directed toward solving motor tasks.

In dynamically stable movement, all inertial actions are automatically balanced without the need for special corrective impulses. When human muscles interact harmoniously and efficiently, it indicates good motor coordination. Individuals with well-developed coordination tend to perform movements easily and without visible effort, similar to professional athletes. However, coordination is not only essential in sports – it underlies every human movement.

Conclusion

In conclusion, the most extensive and accessible group of means for developing coordination skills consists of general preparatory gymnastic exercises of a dynamic nature that simultaneously engage the major muscle groups. These include relatively simple and more complex exercises performed both with and without apparatus (such as balls, gymnastics sticks, skipping ropes, clubs, etc.), carried out under varied conditions, in different body positions or positions of its parts, and in various directions. They also include acrobatic elements (somersaults, various exercises, etc.) and balance exercises.

Mastering the correct technique of natural movements significantly contributes to the development of coordination skills, including running, various types of jumps (long, high, and depth jumps), throwing, and climbing. Among the most effective means for developing the ability

to quickly and efficiently adapt motor activity in response to rapidly changing environments are active and sports games, martial arts (such as boxing, wrestling, fencing), cross-country running, skiing, and alpine skiing.

REFERENCES

1. Lyakh, V. I. (2006). *Coordination Abilities of Schoolchildren*. Moscow: Prosveshcheniye.
2. Ozolin, N. G. (2003). *Coach's Handbook.* Moscow: Astrel.
3. Karpenko, L. A. (2003). *Rhythmic Gymnastics*. Moscow: All-Russian Federation of Rhythmic Gymnastics.
4. Abdullayev, A. A. (2018). *Theory and Methodology of Physical Education*. Tashkent: O'qituvchi.
5. Salomov, R. S. (2014). *Theory and Methodology of Physical Education*. Tashkent.