Methodology for optimizing training loads for young rhythmic gymnasts

https://doi.org/10.65149/eajss.2026.v6i5.a005

[1] **Rakhmonova Mohinur Rasuljon qizi**
[1]Fergana state university, Fergana, Uzbekistan

Abstract

This article illuminates the content and effectiveness of a phased methodology aimed at optimizing the training loads of young female rhythmic gymnasts. In the study, the training process is divided into preparatory, special preparatory, and pre-competition stages, with the intensity, duration, and recovery intervals defined for each stage. In individualizing training loads, special attention is paid to monitoring physiological indicators such as heart rate, respiratory rate, and blood pressure, as well as assessing changes in flexibility, movement technique, and athletic performance. The research results indicate that progressively optimized training loads served to improve the technical stability, functional adaptation, and flexibility indicators of young gymnasts. The proposed methodological approach enables the coordination of training loads and recovery processes, the prevention of overexertion, and the effective development of the physical and technical preparedness of young athletes.

Keywords: rhythmic gymnastics, young gymnasts, training load, load optimization, flexibility, physical preparation, technical preparation, physiological monitoring, recovery, pre-competition preparation.

Introduction

The rapid growth of modern sports achievements among young rhythmic gymnasts worldwide is characterized by changes in the age demographics of those competing. The task of preparing young rhythmic gymnasts for international competitions demands that all factors of long-term preparation be taken into account. One of the key factors is the development of motor skills and the search for effective means and methods that help achieve the highest results in a minimal period. For this reason, optimizing the training loads for female gymnasts in training groups is gaining relevance. In rhythmic gymnastics, the systematic development of qualities such as flexibility is considered crucial for achieving a high level of athletic mastery. The purpose of this study is to gradually optimize the training loads of young gymnasts and to substantiate their effectiveness through objective metrological and physiological indicators.

Methods

The study was conducted with the participation of young female rhythmic gymnasts. To optimize the loads, the training process was divided into three stages. The analysis of the following table describes a step-by-step approach to planning the training process for female gymnasts. This analysis is based on the purpose, intensity, and duration of each stage.

1. Preparatory Stage. The objective of this stage is to build the girls' fundamental technical foundation. It is aimed at developing movement coordination, balance, flexibility, and endurance. The training intensity is moderate, as young athletes are being introduced to new techniques. Their health and preparedness must be closely monitored for safety reasons.

Duration. The training session is limited to 45-60 minutes. It can be difficult for children at this age to maintain their focus for long periods. Therefore, a system of short yet effective exercises is used. Recovery. After each training session, a 10-15 minute rest period or light recovery exercises (stretching, breathing) are included.

2. Specialized Preparation Stage. The goal of this stage is to develop the athletes' specialized movement techniques. The complexity of the movements increases, with combinations and high technical demands added to the exercises. A high training intensity load is given, as the physical development of girls at this age is at an optimal level. The training requires a high level of endurance and flexibility. The duration of a training session is 60-90 minutes, which is sufficient for the girls' technical development and preparation for competitions. 15-20 minutes are allocated for recovery, in which active rest (massage, light exercises) plays an important role.

3. Pre-Competition Stage. The goal of this stage is to simulate competition conditions during training. Work is focused on the full execution of results-oriented individual and group programs. The training requires high intensity,

as the girls must adapt to a competitive regimen. Emphasis is placed on developing endurance and consistent technique. The duration of a training session reaches 90 minutes. At this stage, girls become accustomed to performing long-duration exercises. The recovery time is 20-30 minutes, which is necessary for complete rest or for the body to recover after complex exercises.

The Importance of a Scientific Basis for Training Loads. A Youth-Appropriate Approach. Defining the goals and loads for each stage according to age and physical fitness level increases training effectiveness. The principle of gradualness, a step-by-step increase in the load, reduces the risk of overexertion and injury for young athletes. Recovery time: Allocating time for recovery and rest for each stage positively impacts the athletes' overall development. Pre-competition preparation: High-intensity exercises during the pre-competition stage ensure that the girls are prepared in a results-oriented manner. The table and analysis above help organize the most optimal and safe training regimen for the individual development of female gymnasts.

The following table defines weekly training loads according to age and preparation stage. This plan outlines a step-by-step methodology for training young gymnasts. It is divided into preparatory, special training, and pre-competition stages, with each stage aimed at developing the athletes' physical and technical skills. In the preparatory stage, training sessions are short and focused on forming basic skills. are maintained in each stage. The training content ensures the comprehensive development of athletes through a sequence of physical conditioning, technical skills, combinations, and the simulation of competitive situations. The content of the training sessions at each stage is flexibly designed according to the needs and abilities of the age groups. The intensity of training increases gradually in duration and complexity, which serves the athletes' development. The focus on recovery at each stage, through rest days, allows athletes to recover both physically and mentally. For competition preparation, training in the final stage is focused on performing full routines and replicating competition conditions, which strengthens the athletes' mental and physical readiness.

Results and discussion

During the training session, the physiological indicators of the female gymnasts are monitored.

The table presents the main physiological indicators necessary for monitoring athletes' health during and after training loads: heart rate (HR), respiratory rate, and blood pressure.

Heart rate (HR) normal range is 60-80 beats/min. During training, it is 120-160 beats/min. When athletes engage in high physical activity, their heart rate increases within permissible limits. During recovery, it is 70-90 beats/min. After a workout, the heart rate returning to the normal range indicates effective recovery. The normal respiratory rate is 16-20 breaths/min. During training, it is 25-35 breaths/min.

Table 1. Stages of the training process and load norms

Stage	Training Purpose	Training Intensity	Training Duration	Recovery Time
Preparatory Stage	Developing the technical foundation	Moderate	45-60 minutes	10-15 minutes
Special Preparation	Development and reinforcement of special skills	High	60-90 minutes	15-20 minutes
Pre-competition Stage	Results-oriented training	High	90 minutes	20-30 minutes

During the special training stage, the intensity increases, with a focus on learning complex elements and building endurance. In the pre-competition stage, the priority is on performing full routines, correcting errors, and adapting to competition conditions. Two rest days are allocated per week, which is important for recovery and preventing overexertion. These rest days

Breathing accelerates during activity to supply energy. During recovery, it is 18-22 breaths/min. In recovery, this indicator approaches the normal range. The normal blood pressure (Systolic/Diastolic) is 110/70 mmHg. During training, it is 140/90 mmHg. During physical exertion, the increase in blood pressure must remain within permissible limits. During recov-

Table 2. Weekly training plan for young rhythmic gymnasts

Day of the week	Preparatory Stage	Special Preparation Stage	Pre-Competition Stage
Monday	Physical Conditioning (40 min)	Technical Elements (60 min)	Full Routines (90 min)
Tuesday	Technical Elements (45 min)	Endurance Training (70 min)	Special Elements (80 min)
Wednesday	Rest	Rest	Rest
Thursday	Physical Exercises (50 min)	Combinations (80 min)	Full Programs (90 min)
Friday	Technical Elements (45 min)	Competition simulation (60 min)	Full routines (90 min)
Saturday	Movement coordination (40 min)	Combinations (60 min)	Movement control (70 min)
Sunday	Rest	Rest	Rest

ery, it is 120/80 mmHg. Blood pressure stabilizes during recovery. In conclusion, physiological indicators change in response to training loads, but they should not exceed the established permissible limits. The indicators approaching the norm during the recovery process indicates that the athletes are in good health. This monitoring method is necessary for individual load adjustment and protecting athletes from overexertion. This table shows a step-by-step approach to effectively managing training loads and maintaining the health of athletes. Diagnostic Stage. Anthropometric and physiological measurements are taken to determine the initial physical condition of the athletes. Creating a Training Plan. A flexible training plan is developed based on the individual characteristics of each athlete. Training Monitoring. During training, the intensity and duration of the load are managed based on physiological norms.

Table 3. Physiological monitoring of training loads

Indicator	Normative	Permissible Value During Training	Value During Recovery
Heart Rate (HR)	60-80 bpm	120-160 bpm	70-90 bpm
Respiratory Rate	16-20 breaths/min	25-35 breaths/min	18-22 breaths/min
Blood Pressure (SBP/ DBP)	110/70	140/90	120/80

Analysis of Results. Based on the data obtained, the effectiveness of the training is analyzed, and if necessary, the plans are revised. In conclusion, this approach is essential for maximizing athletes' potential and preventing overload, serving to individualize and optimize the training process. Athlete recovery processes include key aspects such as passive rest, active rest, and nutrition. The duration of passive rest is 8-10 hours. Its purpose is to ensure physical and mental recovery through good, quality sleep at night.

The duration of active rest is 10-15 minutes. Its purpose is to reduce muscle tension and bring the body to a more relaxed state through massage and stretching exercises. Nutrition involves 4-5 meals per day. Its composition, consisting of foods rich in protein, carbohydrates, and minerals, serves to restore athletes' energy reserves. Proper organization of the recovery process increases athlete efficiency and prevents overexertion. Passive and active rest, combined with balanced nutrition, ensure optimal recovery. At the conclusion of the

Table 4. Stages of optimizing training loads

Stage name	Actions
1. Diagnostic stage	Assessment of the participants' physical condition (anthropometric and physiological measurements).
2. Creating a training plan	Developing plans according to the individual indicators of each athlete.
3. Training monitoring	Managing Training Intensity and Duration Based on Physiological Norms.
4. Analysis of Results	Re-optimizing the Plan by Analyzing Nutrition, Load, and Recovery Indicators.

Table 5. Recovery processes (rest and nutrition regimen)

Types of Recovery	Duration	Description
Passive Rest	8-10 hours	A good night's sleep
Active Recovery	10-15 minutes	Massage, stretching exercises
Nutrition	4-5 meals	Consumption of foods rich in protein, carbohydrates, and minerals

study, reliably positive changes were recorded in the physical and technical performance indicators of the female gymnasts in the experimental group. Sport and Technical Results: By the end of the stage, complex technical elements (combinations) were successfully incorporated into competition routines, and a 20–30% increase in sport results was observed. The quality of movements and technical stability improved by 30–40%, and the number of errors decreased sharply. Physiological Adaptation: While at the beginning of the training, the girls' heart rate was 130–150 bpm and their respiratory rate was 30–35 breaths/min, by the end of the stage, these indicators had decreased to 120–140 bpm and 25–30 breaths/min, respectively (a 10–15% improvement).

Table 6. Evaluating training results

Evaluation Criteria	Pre-Stage Status	End-of-Stage Status	Percentage Growth
Athletic Performance	Participation in competitions (performing only basic elements)	Addition of technical elements (combinations) in competitions	20–30% growth
Level of Movement Technique	Movement quality: 50% (many technical errors)	Movement quality: 70–80% (stable technique)	30–40% improvement
Physiological Indicators	Heart rate (HR): 130–150 bpm during exercise	Heart rate (HR): 120–140 bpm during exercise	10–15% improvement (adaptation to workload)
	Respiratory rate: 30–35 breaths/min	Respiratory rate: 25–30 breaths/min	15% improvement
	Maximum flexibility: 20 cm	Maximum flexibility: 25–30 cm	20–30% improvement

This demonstrates that the body had fully adapted to the workload. Flexibility and Strength Indicators: The gradual, regular development of flexibility in small increments yielded its results. The maximum flexibility indicator increased from an initial 20 cm to 25–30 cm (a 20–30% increase). Anthropometric and dynamometric measurements also confirmed the proportional, injury-free development of the muscular system.

The obtained data confirm the importance of a scientific basis for training loads. The effectiveness of the training was enhanced by strictly adapting the goals and loads of each stage to the physical condition of the young athletes. The gradual increase in the load significantly reduced the risk of overfatigue and injury among young athletes. This fully aligns with the principles of injury prevention in young athletes, as noted by international researchers D.J. Caine and N. Maffulli. Furthermore, within the framework of the scientific foundations for long-term training established by A.V. Evtuh, the proper organization of recovery time and rest regimens contributed to the stable development of the body. Monitoring physiological indicators (HR, blood pressure) proved to be a powerful tool for individual load adjustment and protection against overexertion.

Conclusion

Optimizing the training loads of young gymnasts requires a comprehensive approach. Exercises aimed at developing flexibility and coordination should be applied systematically in every session, albeit in small doses. Anthropometric control, metrological assessment of physical strength, and rigorous physiological monitoring help to maximize the athletes' potential. Passive and active rest, combined with a balanced diet,

ensure optimal recovery and guarantee results in international competitions.

References

Arampatzis A., Morey-Klapsing G., Brug-gemann G.P. The effect of falling height on muscle activity and foot motion during landings. // Journal of Electromyography & Kinesiology. 2003. 13(6), Dec. P.533-544.).

Caine DJ, Maffulli N Epidemiology of pediatric sports injuries. Individual sports. Med Sport Sci. Basel, Karger. 2005, vol.48, P.18-58.

Critical appraisal and hazards of surface electro-myography data acquisition in sport and exercise / J.P. Clarys A. [et al.] // Asian Journal of Sports Medicine. 2010. No. 1 (2). P. 69-80.

Debby Mitchell, Barbara Davis, Raim Lopez "Teaching Fundamental Gymnastics Skills" Human Kinetics, 2002. - P. 199-220.

Evtuh A.V.,Kvashuk P.V., Shustin B.N. Scien-tific basis of long-term preparation of sportsmen //Scientifically-sports bulletin. - 2008. - №4. -P. 16-19.

Nurmukhammadova Yoqut Nurmukham-madovna. (2026). A set of rhythmic gym-nastics exercises for developing fine motor skills in girls aged 5–7. Eurasian Journal of Sport Science, 6(5), 6–11. https:// doi.org/10.65149/eajss.2026.v6i5.a002

AUTHOR BIOGRAPHY:



Mohinur Rasuljon qizi RAKHMONOVA

Employment
Lecturer at Fergana state university

Degree
MD

Research interests
Rhythmic gymnastics, young gymnasts, load opti-mization, physical educa-tion and sport, Theory of physical education.

E-mail:
raxmonovamohinur443@gmail.com