IMPROVING THE METHODOLOGY OF FLEXIBILITY DEVELOPMENT IN 7-8-YEAR-OLD ARTISTIC GYMNASTS: AGE-SENSITIVE PERIODS AND TRAINING MEANS

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Abstract. The paper substantiates an improved methodology for developing flexibility in 7-8-year-old artistic gymnasts of the initial training group. The methodology is grounded in the age-specific features of children of this age, for whom flexibility is in a favourable period of development, and in current evidence on the effects of different stretching methods. It defines the training means (dynamic, static, partner-assisted and game-based exercises and preparatory technical elements), their place within a session of four parts - preparatory, main, partner and recovery - and five principles: progression, purposefulness, continuity and repetition, safety and motivation. The approbation of the methodology over 12 weeks in the Bukhara region (n = 30) showed a relative improvement of flexibility indicators of 30.8-69.6% in the experimental group against 7.9-24.6% in the control group, with moderate-to-large effect sizes (Cohen's d = 0.73-0.85). Practical recommendations for coaches of initial training groups are formulated.

Keywords: artistic gymnastics; flexibility; sensitive period; initial training group; stretching methods; training means; methodology.

1. Introduction

In artistic gymnastics the quality of technique depends directly on the level of flexibility: elements such as the bridge, split, handstand, cartwheel and handspring require a large range of motion in the spine, shoulder and hip joints [10]. A deficit of flexibility formed at the initial training stage is difficult to compensate later and limits the athlete's technical development throughout the sporting career [12].

State policy in Uzbekistan pays special attention to gymnastics. Presidential Decree No. PF-5924 of 24 January 2020 set measures for the further improvement and popularisation of physical culture and sport [1], and Presidential Resolution No. PQ-449 of 23 December 2022 established a new system for selecting and training talented gymnasts, including gymnastics programmes for preschool and primary-school children [2]. As a result, the number of children aged 7-8 in initial training groups is growing, and coaches need a clear, age-appropriate methodology for developing their flexibility.

The means of developing flexibility at the initial training stage have been described by E. A. Pirozhkova and V. G. Khustochkin [11], and the methodology of teaching gymnastics in Uzbekistan by A. K. Eshtayev and S. A. Eshtayev [6]. The value of gymnastics for children of this age has also been confirmed internationally: a 16-week gymnastics curriculum developed movement competence in primary-school children more effectively than standard physical education [8].

In coaching practice, however, flexibility exercises are often performed without a clear sequence, with uniform loads for all children and without a dedicated recovery phase. **The aim** of this paper is to substantiate an improved methodology for developing flexibility in 7-8-year-old artistic gymnasts, based on age-sensitive periods and an evidence-based choice of training means.

2. Age-specific foundations of the methodology

Flexibility differs from other physical qualities in that it is high in early childhood and tends to decline with age unless it is specifically trained [7]. Long-term athlete development models therefore

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regard the period of about 6-10 years as a favourable window for developing flexibility, together with basic movement skills [3]. At the age of 7-8, the musculoskeletal system is still forming: the muscles and ligaments are elastic and joint mobility is high, which allows a rapid increase in the range of motion.

The same features impose restrictions. Because the musculoskeletal system is not yet mature, forced passive loads and sudden, jerky movements at the end of the range of motion should be avoided, and exercises that load the spine, such as the bridge, should be introduced gradually and under supervision. In addition, children of this age cannot keep their attention on one monotonous exercise for long, so stretching should be presented in short, varied and game-based forms. These two facts - high trainability and limited tolerance of monotonous and forced loads - define the logic of the methodology.

3. Training means and their place in the session

Different stretching methods have different effects. In competitive artistic gymnasts, static stretching, PNF stretching and stretching on a vibration platform all increased flexibility, with PNF giving the greatest gain [5]. Prolonged static stretching immediately before explosive efforts may slightly reduce performance, which supports the use of dynamic exercises in the warm-up and the placement of longer static stretching later in the session [4]. On this basis the methodology assigns each group of means to a specific part of the session (Table 1).

Table 1

Training means of the improved methodology and their place in the session

Means	**Examples**	**Part of session**	**Main purpose**
Dynamic exercises	Circular movements in the neck, shoulder, knee and hip joints; swings; jumps in place and in motion	Preparatory	Warming up; preparing tissues for stretching
Game-based exercises	Mobile games, in-group contests	Preparatory, main	Motivation; sustaining attention
Static stretching	Forward and side bends, split positions, bridge exercises	Main, recovery	Increasing the range of motion
Partner-assisted stretching	Stretching with a partner's help, assisted arm-pulling	Partner	Extending the range beyond the active limit
Technical elements	Forward and backward rolls, handstand, cartwheel, round-off, front handspring	Main	Transferring flexibility to technique

4. Structure of the session and principles of the methodology

Each session of the improved methodology consists of four parts. The **preparatory part** (walking, light running, jumps, circular movements in the joints, mobile games) warms up the body and prepares the muscles and ligaments for the main load. The **main part** (bends, rolls, bridge exercises, walking along parallel bars, leg raises, jumps) develops flexibility through a combination of static, dynamic and game-based exercises. The **partner part** (partner-assisted stretching) extends the amplitude of stretching

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and builds cooperation and mutual trust. The **recovery part** (relaxation movements, breathing exercises, light stretching) relieves tension and reduces the risk of injury.

Technical elements are introduced in a progressive order that follows the growing demands on flexibility and strength: backward roll - handstand - cartwheel - round-off - front handspring. Each new element is introduced only when the previous one is performed confidently.

The methodology rests on five principles:

1. **Progression** - exercises become more complex step by step, and each new exercise builds on a previously mastered skill.
2. **Purposefulness** - each session is aimed at a clear and measurable result.
3. **Continuity and repetition** - flexibility exercises are performed at least 3-4 times a week, since gains are lost quickly without regular practice.
4. **Safety** - exercises are performed only after a full warm-up and under the coach's supervision, without forced loads.
5. **Motivation** - mobile games, in-group contests and regular demonstration of each child's progress maintain interest.

5. Approbation of the methodology

The methodology was tested in a 12-week pedagogical experiment in specialised gymnastics sports schools; the data of the Bukhara region (control group n = 15, experimental group n = 15) are given here [9]. The groups did not differ at baseline. After the experiment the experimental group showed a greater improvement in all five flexibility-related tests (Table 2), with moderate-to-large effect sizes (d = 0.73-0.85); the differences in the handstand and L-sit holds were statistically significant ($p < 0.05$).

Table 2

Relative improvement of flexibility indicators after 12 weeks, %

Test	Control group	Experimental group	d	p
Bridge	7.9	30.8	0.73	0.056
Split	14.2	35.3	0.75	0.050
Forward bend from a bench	24.6	69.6	0.75	0.050
Handstand hold	12.8	64.4	0.77	0.045
L-sit hold (90°)	11.4	56.6	0.85	0.027

Note: d and p refer to the between-group comparison of post-test results (Student's t-test, df = 28).

The high variability of results in the experimental group (coefficient of variation in the bridge test 47.1%, in the split 38.5%) showed that children responded to the methodology individually. This confirms the need to set the load according to each child's sex, initial preparation and rate of progress.

6. Practical recommendations

1. Organise flexibility-oriented sessions at least 3-4 times a week in the sequence preparatory - main - partner - recovery.
2. Use dynamic exercises in the warm-up and place longer static stretching in the main and recovery parts of the session.
3. Make recovery and relaxation stretching a compulsory element at the end of every session.

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4. Combine static stretching with game-based and partner forms, since children of this age cannot keep their attention on one exercise for long.

5. Set the load individually and record each child's progress separately.

6. Reduce the risk of injury through a full warm-up, constant supervision by the coach and avoidance of forced passive loads.

7. Conclusion

The improved methodology turns flexibility training of 7-8-year-old gymnasts from a set of separate exercises into a structured system, in which the training means, their place in the session, the sequence of technical elements and the principles of loading are defined and justified by age-specific features and evidence on stretching methods. Its approbation confirmed a consistently greater improvement of flexibility than under the standard programme. The methodology can be recommended to coaches of initial training groups in specialised gymnastics sports schools and gymnastics centres.

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