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DYNAMICS OF THE RELATIONSHIP BETWEEN GENERAL PHYSICAL FITNESS AND SPECIFIC PERFORMANCE INDICATORS OF YOUNG BOXERS DURING PRE-COMPETITION TRAINING

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Abstract
This article is devoted to studying the dynamics of the relationship between general physical fitness and specific performance indicators of young boxers during pre-competition training. The study analyzes changes in the physical condition, endurance, speed, and specific technical skills of young athletes in the pre-competition period. The results demonstrate the impact of general physical fitness on specific performance and their correlation with competition outcomes. The study provides practical recommendations for optimizing the training process of young boxers.

Keywords: Young boxers, general physical fitness, specific performance, pre-competition training, correlation.

Introduction

The process of preparing young athletes in the field of sports is one of the key directions of state policy. In Uzbekistan, a number of decisions have been made to advance sports development, particularly the Decree of the President of the Republic of Uzbekistan dated January 24, 2020, No. PF-5924, titled "On Measures to Further Develop Physical Education and Sports in the Republic of Uzbekistan," and the "Uzbekistan-2030" strategy adopted on April 6, 2022. These documents place special emphasis on promoting the health of the younger generation and training professional athletes. They aim to enhance the physical fitness of young athletes and improve their competitive performance. High-intensity sports such as boxing require not only specialized technical skills but also a high level of general physical fitness. Studying the relationship between general physical fitness and specific performance capabilities in the pre-competition training process of young boxers is highly relevant, as this process directly impacts their competitive results. Currently, research in this area is often limited to analyzing the impact of general physical fitness on specific skills and does not fully address dynamic changes. Therefore, it is necessary to investigate the dynamics of the interrelationship between these indicators during the training process of young boxers.

The relevance of this study lies not only in improving athletes' competitive results but also in providing coaches and specialists with the opportunity to develop effective training programs. This article holds scientific and practical significance by analyzing the indicators of general

physical fitness and specific performance capabilities of young boxers during the pre-competition training process, contributing to the resolution of existing challenges in the sports field.

Research Objective

The objective of the study is to investigate the dynamics of the interrelationship between general physical fitness and specific performance capabilities of young boxers during the pre-competition training process and to provide recommendations for developing optimal training programs.

Research Tasks

To study the dynamics of the interrelationship between general physical fitness and specific performance capabilities during the pre-competition training process of young boxers, the following research tasks were identified:

1. **Identify and analyze general physical fitness indicators.** Within this task, a series of tests were conducted to assess the general physical fitness level of young boxers. For example, indicators such as endurance (3 km run), strength (barbell lift), speed (30 m sprint), and flexibility (forward bend) were measured. These tests were conducted at the initial, intermediate, and final stages of pre-competition training.

2. **Evaluate specific performance capability indicators.** Specific performance capabilities include technical and tactical elements of boxing, such as punch speed, accuracy, defensive movements, and endurance in the ring. These indicators were measured using specialized simulators and sparring sessions. For instance, the number of punches per minute, punch force (in Newtons), and sparring duration were analyzed.

3. **Determine the interrelationship between indicators.** Statistical analysis methods, specifically the Pearson correlation coefficient, were used to identify the relationship between general physical fitness and specific performance capabilities. This method helped determine the extent to which general physical fitness affects specific skills.

4. **Study dynamic changes during the pre-competition training process.** Changes in indicators were observed at different stages of training (initial, intensive, and pre-competition). Results from each stage were compared using tables and graphs.

5. **Develop practical recommendations.** Based on the research findings, training programs and methodological recommendations were developed to optimize the training process for young boxers. These recommendations serve as a guide for coaches.

Table 1: Research Tasks and Corresponding Methods

Task	Method	Expected Outcome
Identify general physical fitness	Tests (running, barbell lift, flexibility)	Determine physical fitness level
Evaluate specific performance capabilities	Simulators, sparring analysis	Assess technical and tactical skills
Determine interrelationship	Pearson correlation analysis	Identify correlation between indicators
Study dynamic changes	Stage-by-stage measurements, graphical analysis	Identify changes in the training process
Develop recommendations	Summarize results, expert evaluation	Create practical guidelines

Research Process

The study was conducted at specialized boxing sports schools in the Fergana region, involving 30 young boxers aged 16–18. The research covered a 12-week pre-competition training period. Individual physical and specific performance indicators were measured for each participant. The research process included the following stages:

1. **Initial Assessment (Weeks 1–4):** During this stage, the general physical fitness level and specific skills of the athletes were determined. Test results served as the basis for designing the training program.

2. **Intensive Training (Weeks 5–8):** Specialized training sessions were conducted to improve the athletes' physical and specific performance indicators. Weekly measurements were taken, and results were recorded.

3. **Pre-Competition Stage (Weeks 9–12):** Athletes were prepared for conditions close to competition. Specific performance capabilities were tested through sparring and simulator-based training.

Table 2: Training Stages and Measurements

Stage	Weeks	Measurements	Objective
Initial	1–4	Physical tests, specific skills	Determine baseline condition
Intensive	5–8	Physical and specific tests	Improve indicators
Pre-Competition	9–12	Sparring, simulator tests	Prepare for competition conditions

Data collected during the research were analyzed using the SPSS software. Results from each stage were crucial in determining the impact of general physical fitness on specific performance capabilities. These tasks facilitated the achievement of the research objective.

Research Methodology

The research methodology was based on scientifically grounded approaches to studying the dynamics of the interrelationship between general physical fitness and specific performance capabilities during the pre-competition training process of young boxers. The study incorporated experimental, analytical, and statistical methods. Below are the key methodological aspects of the research.

The study was conducted using a longitudinal experimental design, which allowed for tracking changes in athletes' indicators over the 12-week pre-competition training period. Thirty young boxers aged 16–18 participated in the study. Participants were randomly assigned to groups to ensure the impartiality of the results.

Data Collection Methods

The following methods were used for data collection:

1. **Physical Tests:**
   - Endurance: Measuring the time for a 3 km run (in seconds).
   - Strength: Measuring the maximum weight lifted with a barbell (in kilograms).
   - Speed: Measuring the time for a 30 m sprint (in seconds).
   - Flexibility: Measuring the distance of a forward bend (in centimeters).

2. **Specific Tests:**
   - Punch speed: Measuring the number of punches per minute.
   - Punch force: Measured using a specialized simulator (in Newtons).
   - Sparring endurance: Measuring sparring duration (in minutes).

3. **Questionnaires and Surveys:** Feedback from coaches and athletes regarding the training process was collected.

Data Analysis

The SPSS 26.0 software was used for data analysis. The following statistical methods were applied:

1. **Descriptive Statistics:** Indicators such as mean, median, and standard deviation were calculated.

2. **Pearson Correlation Analysis:** Used to determine the relationship between general physical fitness and specific performance capabilities.

3. **T-Test:** Used to identify differences between indicators at different stages.

Table 3: Analysis Methods and Their Objectives

Method	Objective	Expected Outcome
Descriptive statistics	Determine the overall state of indicators	Calculate means and deviations
Pearson correlation	Identify interrelationships	Calculate correlation coefficient
T-test	Identify differences between stages	Determine statistical significance

Participants' consent was obtained, and data confidentiality was ensured. Tests were conducted under conditions that posed no risk to the athletes' health. The study was carried out in coordination with the administration of sports schools in the Fergana region.

The study was limited to boxers aged 16–18, so the results may not be fully generalizable to other age groups. Additionally, the research only covered the pre-competition training period. This methodological approach allowed for a precise and reliable investigation of changes in the training process of young boxers. The results are analyzed in the following section.

Analysis and Results

The research results helped identify the interrelationship between general physical fitness and specific performance capabilities of young boxers. The key findings are analyzed below, supported by tables and graphs.

General Physical Fitness Results

At the initial stage of the study, the general physical fitness level of the athletes was assessed as average. Over the 12-week training period, the following changes were observed:

- **Endurance:** The 3 km run time decreased from an average of 12:30 to 11:45 ($p < 0.05$).
- **Strength:** The maximum barbell lift weight increased from 65 kg to 72 kg ($p < 0.01$).
- **Speed:** The 30 m sprint time decreased from 4.8 seconds to 4.5 seconds ($p < 0.05$).

Specific Performance Capability Results

The specific tests revealed the following changes:

- **Punch Speed:** The number of punches per minute increased from 120 to 135 ($p < 0.01$).
- **Punch Force:** The average punch force increased from 800 N to 920 N ($p < 0.05$).
- **Sparring Endurance:** Sparring duration increased from 3 minutes to 4.5 minutes ($p < 0.01$).

Table 4: Changes in Indicators

Indicator	Initial (Week 1)	Final (Week 12)	Difference
3 km run (min)	12:30	11:45	-0:45
Barbell lift (kg)	65	72	+7
30 m sprint (sec)	4.8	4.5	-0.3
Punch speed (punches/min)	120	135	+15
Punch force (N)	800	920	+120

Interrelationship Analysis

Pearson correlation analysis revealed a high level of correlation between general physical fitness and specific performance capabilities:

- The correlation coefficient between endurance and sparring endurance was $r = 0.82$ ($p < 0.01$).
- The correlation coefficient between strength and punch force was $r = 0.78$ ($p < 0.01$).
- The correlation coefficient between speed and punch speed was $r = 0.75$ ($p < 0.05$).

These results indicate that general physical fitness directly influences specific skills.

Conclusion and Recommendations

The study successfully identified the interrelationship between general physical fitness and specific performance capabilities of young boxers during the pre-competition training process. The results confirmed that general physical fitness significantly impacts specific skills, particularly punch speed, punch force, and sparring endurance. Pearson correlation analysis demonstrated a high level of correlation between indicators such as endurance, strength, and speed with specific performance capabilities (r = 0.75–0.82).

The following recommendations are proposed:

1. **Optimize Training Programs:** Coaches should focus on general physical fitness, increasing the intensity of endurance and strength exercises.

2. **Stage-by-Stage Monitoring:** Regularly measure athletes' indicators at each training stage and develop individualized programs.

3. **Use of Specialized Simulators:** Modern simulators should be utilized to enhance punch speed and force.

This study holds practical significance for sports specialists and contributes to improving the competitive performance of young boxers.

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