ملخص البحث باللغة الإنجليزية

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The Effect of Using Resistance Exercises on Certain Specific Physical Variables and the Performance Level of the Gymnastics Display Routine among Students of the Faculty .of Physical Education, Benha University

A research submitted in partial fulfillment of the requirements for obtaining the Master's degree in Physical Education

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Research Summary

First: Research Introduction:

Sports training is considered one of the most important scientific pillars fundamentally governed by the principles and laws of natural and human sciences. The primary objective of sports training is to attempt to raise the individual to the highest possible level of performance in the practiced type of sport. Achieving this goal requires developing and enhancing various capacities, skills, and attributes of the athlete. It also aims to develop and improve many physical elements, motor sports skills, and the individual's tactical abilities. (15:66)

In recent years, there has been a noticeable development in the field of physical preparation for athletes. As a result, countries have increasingly focused on physical preparation, placing it at the top of the priorities of training components, which highlights its importance. (7:22)

Tawfiq Ibrahim (٢٠٠٧) adds that physical preparation plays an active role in players' training programs. It serves as the means by which the level of general and specific physical fitness can be raised, in line with the nature of performance, ultimately leading to the best possible athletic results. (2:23)

Ahmed Mohamed (2025) highlights the importance of physical preparation in sports performance, considering it a fundamental component in enhancing athletic output. It includes strength, endurance, speed, and flexibility training. Regular physical training contributes to improving muscular ability and reducing injury risks, allowing athletes to perform at a higher level for longer periods. Diverse training also aids in improving motor balance and reducing fatigue during competitions. (31:11)

Mohamed Ali (2025) believes that strength and endurance training are essential components of physical preparation. They work on enhancing muscle capability and performance across various resistance-based sports, such as weightlifting, leading to increased muscle mass and improved cardiovascular function. Additionally, aerobic endurance exercises like running and cycling improve athletes' capacity to sustain physical effort for extended durations. (٣٣:٧٣)

Mustafa Atwa and others (2021) explain that resistance training relies on the principle of progressive loading, using varying weights or elastic resistance bands to develop muscular strength. A common method is circuit training, which

integrates resistance and endurance exercises, promoting comprehensive athletic performance. (24:80)

Physical fitness plays a crucial role in athlete preparation programs. It is a tool that controls performance and influences its direction and intensity to reach the best level. Flexibility is one of the physical components, and most definitions agree that flexibility is the ability to move within a wide range of motion, i.e., the range of movement allowed by the body's joints. (١٨١:٣٧)

In this context, Mahmoud Salim (2020) explains that compulsory technical exercises combined with resistance training contribute to developing physical and tactical aspects in junior football players. These exercises help improve passing and shooting accuracy and increase physical endurance during matches. (20:76)

Ahmed Mohamed (2020) states that training programs incorporating compound exercises lead to improved muscular capability and skill performance. A study on freestyle wrestlers showed that this type of training significantly improved the one-legged fall technique. (78:13)

Baha El-Din Salama (2008) emphasizes that resistance training programs should be used with caution in general training programs. These programs will not yield results unless implemented scientifically and with careful consideration of basic training load elements (repetitions – rest – intensity – frequency). (٤٢:٢١)

Leigh Crows (2012) stated that TRX exercises are based on three main principles:

1. **Resistance Direction Principle**: Increasing resistance by moving the body away from the device's anchor point and then returning to it.

2. **Stability Principle**: Performing exercises while supporting on one arm or one foot instead of both.

3. **Pendulum Principle**: Movement mimics a clock pendulum, moving away from the anchor point, passing through it, then moving to the opposite side (from side to side – front to back). (١٥:٩٦)

Abu El-Makarem Obeid and Osama Fouad (2024) indicated that plyometric training contributes to enhancing power endurance and performance results for 400m hurdles athletes under 20, highlighting its effect on developing muscular strength and endurance. (235:7)

Improving endurance and muscle strength leads to enhancements in physical variables and skill performance effectiveness among juniors. (391:89)

Elham Abdel Azim (2002) notes that sports festivals and performances play a significant role in opening ceremonies of international and Olympic events. They serve as a strong indicator of a country's progress in sports and performance arts. (174:19)

Research Problem:

Sports performances aim to develop motor skills, cognitive and cultural aspects, as well as physical attributes. They seek to comprehensively enhance individuals—physically, motorically, spiritually, and mentally—within the framework of preserving societal traditions and customs. Without a doubt, performing movements and physical exercises is highly challenging to appear in the aesthetic form we see in the final presentation. Performance routines consist of a large number of exercises that are linked, harmonious, and synchronized in execution and timing. These movements are not theatrical performances but rather constructive exercises with collective movements that align with age, gender, skill

.level, and the occasion for which the presentation is held.

Through the researcher's work as a teaching assistant at the Faculty of Physical Education, Benha University, in the Department of Gymnastics, Exercises, and Movement Expression Theories and Applications, and his assistance to faculty members in teaching the course of sports performances, he observed a weakness in students' performance level of movement phrases in sports performances. This was based on student grade records, showing a lack in several essential physical components necessary for performing most of the exercises. It was also noticed that there is a particular weakness in performing movement phrases that require lifting heavy weights, such as lifting a peer or heavy equipment, resulting in difficulty executing the assigned routines and failing to present them in the desired aesthetic form during the performance. This negatively affects the overall performance quality of the students' routines. Some participants were even unable to execute certain exercises properly during the performance, possibly due to weaknesses in physical variables that could be developed through a resistance training program aimed at enhancing muscular health, strength, endurance, and size.

Most students do not practice sports regularly before enrolling in the college, or they may have had limited or ineffective exposure to resistance training. Therefore, the researcher chose this study to identify the most suitable resistance training exercises for improving performance quality in the movement routines of sports performances among college students. From this, the research idea and title Emerged.

The Effect of Using Resistance Exercises on Some Specific Physical Variables and the Performance Level of Sports Performance Routines Among Students of the Faculty of Physical Education, Benha University

Research Significance

Applied Significance

1- Designing a training program that may help in developing and improving the physical performance of students at the Faculty of Sport Sciences

2- The researcher hopes that the study will contribute practically to the field and enrich the Arabic academic library

3- The researcher also hopes to provide a reference guide that can be used in educational institutions such as Faculties of Sport Sciences

Scientific Significance:

The significance of this study lies in it being a scientific attempt by the researcher to serve the sports field by designing a proposed program aimed at acquiring and developing the element of power for physical education students in the Sports Performance course

Research Objectives:

To design a training program using resistance exercises to investigate its effect on

١- The level of certain specific physical variables (muscular power – general endurance – flexibility – agility – coordination – balance)

2- The performance level of the sports performance routine.

search Hypotheses:

1- There are statistically significant differences between the pre- and post-measurements of the experimental group in the selected physical variables and

performance level, in favor of the post-measurement

2- There are statistically significant differences between the pre- and post-measurements of the control group in the selected physical variables and performance level, in favor of the post-measurement

١- There are statistically significant differences between the post-measurements of the experimental and control groups in the selected research variables, in favor of the experimental group.

Research Procedures:

Research Methodology

The researcher used the experimental method by applying a pre-post experimental design on two groups: one experimental and the other control, due to its suitability for the nature of the research.

Research Population and Sample:

The research population was intentionally selected from second-year male students at the Faculty of Sport Sciences, Benha University, for the academic year ٢٠٢٤–٢٠٢٥, during the first semester, totaling ١,٠٨٣ students.

A random sample of 200 students was drawn from this population. Twenty students were excluded due to participation in student activities, injury, or irregular attendance, resulting in a total sample of 180 students. The researcher ensured homogeneity in terms of height, weight, age, and selected physical variables, as shown in Tables (4) and (5)

An exploratory sample of 30 students was selected to conduct pilot studies and validate the scientific measures, leaving a primary research sample of 150 students. These were divided into two groups: experimental and control, with 75 students in each. Equivalence between the groups in the selected variables was confirmed, as shown in Table (6), Table (3), and Figure (2), which illustrates the classification of the research population and sample.

Tools and Methods for Data Collection Forms.

The researcher reviewed several references and previous studies to develop the following forms

Expert Opinion Survey Form :

Including:

1- Identification of the most appropriate physical abilities specific to sports performances

2- Selection of the most suitable tests for the sample under study

3- Determination of the training period duration, number of sessions per week, and training unit duration

Data Recording Form

Designed to ensure ease, speed, and accuracy in data recording, including

1- A form to record basic data (height, weight, chronological age)

2- A form to record test results related to the study topic to ensure sample homogeneity in physical attributes

3- A form to evaluate and record the sports performance routine.

Measurements Used in the Research:

Basic Variables Measurement:

1- Age Calculation

The age of all research sample members was calculated to the nearest year based on the birthdate stated in their national ID card

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2- Height and Weight Measurement

Height: Measured to the nearest centimeter using a stadiometer

Weight: Measured to the nearest kilogram using a calibrated medical scale

Physical Variables Measurement (Tests)

The researcher reviewed numerous scientific references and previous studies to select appropriate tests for the study. The main physical attributes related to the performance of the sports routine were identified, then reviewed by experts to select the most relevant components and suitable tests.

Expert Opinions on Physical Components Under Study:

Only components with expert approval of 70% or higher were selected for inclusion in the study

Variables Expert Opinions on Physical Tests for Selected Tests selected were those with the highest expert agreement for each component, summarized as:

Agility: ٥–٠–٥ Test (seconds)

Flexibility: Sit and Reach Test (cm)

Balance: Jump Over Marks (score)

Muscular Power: Standing Broad Jump (cm)

Endurance: 30×5 Test (minutes)

Coordination: Tennis Ball Wall Throw (score)

Program Planning:

١- The program implementation began at the start of the first semester of the academic year ٢٠٢٤–٢٠٢٥

2- The training program lasted 8 weeks, with 3 training sessions per week, totaling 24 training units

3- The duration of each training session ranged from 60 to 90 minutes, utilizing various resistance exercises and proposed training aids

4- One session per week was held on the field to develop performance of the sports routine and certain physical attributes, conducted at the Faculty Club playgrounds. Resistance bands: Five types with different resistance levels were used

5- Medicine balls: Weights ranging from 1 to 7 kilograms were employed

6- Leg power with speed was developed using plyometric jumping

٧- Strength endurance was developed using body weight at intensities of ٥٠٪–٦٠

٨- Power-speed development was achieved using jumping exercises at ٦٥٪–٧٥٪ intensity, with 6 to 8 fast repetitions

9- Speed-strength development was also targeted for the shoulders, trunk, and arms

١٠- Training load was adjusted through control of variables (intensity – volume – density) to match the objectives of each program phase in the following sequence: increased volume, altered rest timing, then increased intensity—while also considering the participants' age and applying the principle of gradual load increase across different training levels.

11- Exercises were selected for the sample based on technical and dynamic requirements

Main Research Experiment:

Pre-Test Measurement:

1- Conducted on Wednesday, October 16, 2024, for physical variables

2- Performance evaluation was conducted on Thursday, October 17, 2024, with a panel of three experts in sports performances

3- The routine performance was evaluated using the official evaluation form of the Egyptian Federation for Gymnastics for All, 2022/2023

Main Experiment:

1- The proposed training program was applied from Sunday, October 20, 2024, to Sunday, December 19, 2024, to the experimental group only (8 weeks, 3 sessions per week: Sunday, Tuesday, Thursday.(٢- The researcher applied the program to the experimental group during the first semester, with a total of ٢٤ training units, each lasting ٦٠–٩٠ minutes

3- The program included exercises to develop the selected physical variables based on expert input: power, coordination, balance, agility, flexibility, and endurance

4- The program was executed at a fixed time, consistent with both the pre- and post-testing schedule. ٥- The control group followed the regular sports performance curriculum only. ٦- The experimental group followed the same curriculum in addition to the proposed training program, aiming to assess its effect on the performance of the sports routine

The researcher ensured the program followed key physical and physiological training principles, including

7- Individual differences, adaptation, training load components (continuity, intensity, rest), gradual progression, and sufficient recovery periods

8- Variety in exercises

9- Designing the routine to match the sample characteristics

10- Structuring the exercises to improve physical attributes in synchronization with musical rhythm

11- Exercises were designed to require muscular power, coordination, agility, balance, endurance, joint flexibility, and the ability to link movements fluidly and perform smoothly.

Conclusions:

1- The results of the study showed that resistance exercises have a significant positive impact on improving the muscular strength of the participating students

2- Resistance training contributed to the development of muscular and joint flexibility, which reflected positively on the performance of the sports display sequence .

3- The results indicated that implementing a resistance-based training program led to increased motor ability and precision in executing the specific movements of the sports display sequence .

4- A clear improvement in balance during the motor sequence performance was observed due to enhanced physical strength and fitness .

5- The results confirmed that resistance exercises enhance neuromuscular coordination, improving overall performance and reducing injury risks .

6- Resistance exercises showed a notable improvement in muscular endurance, enabling students to perform the sports display sequence more efficiently and for longer durations .

7-exercises reduced physical fatigue caused by repetitive movements, leading to fewer errors during sports displays .

٨- Resistance training significantly boosted students' self-confidence due to improved physical performance and overall quality of the sports sequence .

9- The exercises improved muscular coordination and enhanced collective performance during the sports display, fostering collaborative values among students .

10- Resistance exercises effectively improved agility by enhancing quick motor responses and the ability to change direction efficiently .

11- Resistance exercises improved coordination between different body parts, particularly between upper and lower limbs, enhancing precision and fluidity

Recommendations:

1- Integrate resistance exercises as a core component of training curricula for physical education students to enhance physical and athletic performance

2- Design specialized training programs targeting muscular strength and endurance tailored to the nature of sports display sequences

٣- Conduct extensive studies to explore the impact of resistance exercises across different age groups and fitness levels in various sports disciplines

4- Emphasize balanced training combining resistance exercises with cardiovascular and respiratory fitness exercises for comprehensive performance enhancement

٥- Continuously monitor and evaluate students' performance during training programs to ensure desired outcomes.

6- Utilize modern training techniques, such as free weights and resistance machines, to improve training effectiveness

7- Diversify resistance tools in training programs (e.g., free weights, machines, elastic bands) to stimulate muscles through varied methods

8- Prioritize pre-training physical preparation before implementing resistance programs to avoid injuries and maximize benefits

9- Combine resistance exercises with balance and neuromuscular coordination drills to enhance integration between physical variables

١٠- Use motion analysis for periodic assessment of students' progress in physical aspects and execution of sports sequences

١١- Develop long-term training programs with progressive intensity and repetitions tailored to students' levels

12- Organize workshops for coaches on the latest scientific methods for using resistance exercises to improve athletic performance

13- Promote circuit training systems that combine resistance and explosive strength exercises to enhance motor and physical performance

14- Conduct periodic tests to assess physical variables (e.g., strength, flexibility, endurance) to ensure program goals are met

١٥- Integrate mental and psychological exercises (e.g., focus, attention) with resistance training to boost students' performance in sports displays

16- Conduct future studies on school students using resistance training due to its positive impacts