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Improving the specific strength of the arms and trunk according to plank exercises and the performance of shot put for young women

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Abstract

The modern qualitative idea of training experienced athletes is not only strengths but also extends to general strength training, reaching special strength training in the training stages specific to the different types of sports activities. The aim of sports training is not to be on the relief of what prompted the researcher to practice the special strength of the arms and trunk and the achievement of the players pushing the weight. The study aimed to prepare plank exercises to improve the special strength of the arms and trunk and the achievement. I learned with moral success between the pre- and post-tests with the well-being of the Al Ain players pushing the weight for the youth players, numbering (5), then trying the exercise in the field and field in the scouts' stadium. I got the (plank) exercises to a lot of positive and effective on the wonderful special strength and contributes to facilitating the arms and trunk and the achievement. The research experiment recommended the possibility of applying plank exercises in the special strength facilities for events in special athletics to learn more to achieve better.

Keywords: Specific strength, plank exercises, shot put performance, young women.

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Introduction

The results of ongoing scientific and practical experiments and research regarding the use of various training methods and techniques that contribute to the development of athletes' performance, in accordance with the theories and concepts of sports training and their practical applications, necessitate the harnessing of diverse sports sciences that significantly impact the enhancement and development of technical performance and numerical levels across all sports activities. Given the important status of athletics competitions in championships, countries have relied on scientific foundations, research, and analysis based on modern sciences in preparing champions, which has played a prominent role in guiding and selecting training methods and techniques for athletes to achieve high levels. The weightlifting event is one that requires specific physical attributes aimed at achieving optimal performance. However, for performance to be strong and characterized by distinctive motor coordination, the athlete requires effective training based on systematic measurements and training principles. As noted by Iman Sabeih, "The impact of specific exercises that consider the athlete's uniqueness through the use of training tools that simulate performance in terms of muscle contraction direction" (Iman, 2021, p. 138). The researcher believes that specific training, which involves the technical performance of strength and speed, the temporal trajectory of performance, and the direction of muscular work, is essential for those executed movements. It is well-known that the weightlifting event largely depends on grip strength and throwing speed in the final phase, in addition to the correct elevation of the arm to improve and enable the thrower to control the weight during grasping and then applying the throwing phases. Therefore, the researcher found that plank exercises possess a high capacity for improving specific strength through their execution according to regulated repetitions and rest times, relying on organized intensity during the training unit. Lyth Ibrahim asserts, "The strength exhibited in the specialized event is a necessary performance requirement for achieving the goal that necessitates the exertion of muscular force, depending on the variables and conditions of that event" (p. 42). The significance of this research lies in creating changes and significant differences between the pre-test and post-test through the preparation of modern exercises (plank) aimed at developing the specific strength of the arms and torso and enhancing the weightlifting performance of young female athletes.

There are numerous methods for preparing and training athletes, with the objective of ensuring that training does not occur at a uniform pace. Furthermore, the application of various training methods and their different forms serves solely as exercises aimed at achieving the training purpose, which is executed through specific methods and techniques. Additionally, the means employed in implementing training programs during the various preparation stages are directed towards enhancing performance and the level of achievement of the athlete. Accordingly, the

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research problem is manifested in finding modern methods to improve the performance of female weightlifters. As an instructor of athletics at the College of Physical Education and Sports Sciences for Girls, I have observed that most training regimens for weightlifters rely on added weights or throwing implements. Therefore, I found that plank exercises, which do not utilize weights, can enhance the specific strength of the body and the targeted muscles. These exercises are known to increase muscle elongation and joint flexibility. The research problem is summarized by the following question:

- Do modern plank exercises have a positive effect on the variables of female athletes regarding the specific strength of the arms and torso when these exercises are applied?

Ibrahim (2023) asserts that "the strength exhibited in specialized activities is a necessary performance requirement for achieving the goal that necessitates the exertion of muscular force, depending on the variables and conditions of that activity" (p. 42). The significance of this research lies in inducing changes and significant differences between the pre-test and post-test through the implementation of modern plank exercises aimed at developing the specific strength of the arms and torso, as well as enhancing the performance of young female weightlifters.

Research Objectives :1. To prepare plank exercises aimed at improving the specific strength of the arms and trunk, as well as the performance in weightlifting among young female athletes. 2. To investigate the effect of plank exercises on enhancing the specific strength of the arms and trunk and the performance of female athletes in weightlifting.

Research Hypotheses: There are statistically significant differences between the pre-test and post-test in improving the specific strength of the arms and trunk, as well as in the performance of young female athletes in weightlifting.

Research Areas:1- Human Domain: A sample of young female athletes participating in the shot-put event, consisting of (5) athletes. 2- Temporal Domain: The period from January 15, 2024, to March 15, 2024. 3- Spatial Domain: The fields and tracks of the athletics venue at the Scouts Stadium.

Methodology

Study Design

The researcher employed the experimental method to align with the research problem, "the researcher attempted to introduce a characteristic or variable that could facilitate the alteration of the state of the formula or the object intended for modification."

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Population and Sample of the Study

The research sample was selected using the age method, consisting of five young female weightlifters. Plank exercises were implemented as the main component of the training unit, with a duration of 20 minutes allocated for these exercises during the training session. The researcher conducted a homogeneity assessment of the sample participants based on the variables of height, weight, age, and training age, as illustrated in Table 1.

Table 1. *Shows the normal distribution of the research sample for the variables (Height, Weight, Age, Training Age)*

No.	Variable	Unit of Measurement	Mean	Median	Standard Deviation	Skewness
1	Height	cm	161.4	161	12.39	0.324
2	Weight	kg	71.33	71	9.48	0.453
3	Age	years	17.11	17	2.79	0.554
4	Training Age	years	3.13	3	1.00	0.477

Devices and Tools Used

- Foreign Arabic sources
- International Internet network
- Office tools
- Testing and measurement
- Observation and experimentation
- Export camera type (Sony) with a speed of 60 frames/second
- Computer device
- Measuring tape
- Medical scale
- Weights (5 units)

Tests Used in the Research

1. Test of Explosive Strength of the Arms
Test Name: One-Handed Throw of a 3 kg Medicine Ball
Objective of the Test: To measure the explosive strength of the arms

2. Test of Speed-Strength of the Arms
Test Name: Arm Flexion and Extension (Shenow) for 30 seconds
Objective of the Test: To measure the speed-strength of the arms

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3. Test of Strength Endurance of the Arms
Test Name: Arm Flexion and Extension (Shenow) for 60 seconds
Objective of the Test: To measure the strength endurance of the arms

4. Test of Endurance Strength of the Abdominal Muscles
Objective of the Test: To measure the strength of the abdominal muscles

5. Test of Weightlifting Performance

Procedures

The researcher conducted the pre-tests on January 20, 2024, at the athletics fields in the Scout Stadium at 10:00 AM on the research sample.

The researcher conducted the main experiment on the sample individuals after consulting experts regarding the division of plank exercises and implementing them on the sample members, while adjusting the repetitions, intensity, and rest periods during the training units as follows:

- The researcher applied the exercises to the research sample in the main part of the training unit.
- The duration of the exercises was 25 minutes.
- High-intensity interval training was utilized.
- A progression in repetitions was employed to reach the maximum repetition.
- Rest periods were adjusted in accordance with the repetitions.
- The duration of the program was 8 weeks, consisting of 3 training units per week, resulting in a total of 24 training units.

The post-tests were conducted on March 20, 2024, at the arena and field of the scouting ground at nine o'clock in the morning for the research sample, under the same conditions as those in which the pre-tests were administered.

Statistical Methods

The researcher employed the statistical method SPSS for the data analysis of the study.

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Results

Table 2. *Shows the means, standard deviations, t-value, significance level, and significance of differences for abdominal muscle strength in the research sample*

Variable	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	t-value	Significance Level
Abdominal Muscle Strength	51.22	12.43	58.65	11.88	3.119	0.026

Significant at $p \leq 0.05$

Table 3. *Shows the means, standard deviations, t-values, significance levels, and significance of differences for arm-specific strength and performance*

No.	Variable	Pre-test Mean	Pre-test SD	Post-test Mean	Post-test SD	t-value	Significance Level
1	Explosive Arm Strength (cm)	4.33	1.12	5.02	0.87	3.89	0.000
2	Specific Arm Strength (repetitions)	22.24	0.83	27.33	1.32	3.66	0.000
3	Strength Endurance (repetitions)	48.54	17.11	54.50	16.23	4.13	0.001
4	Performance	5.48	1.07	6.12	0.47	3.86	0.000

Discussion

Through the results presented in Tables (2,3) regarding the differences between the pre-test and post-test for the research sample, significant differences emerged in the abdominal strength, specific strength, and performance tests. The researcher attributes these differences to the exercises implemented, specifically the plank exercises, which significantly contributed to the improvement of muscular strength among the participants. These exercises enhance the balance and stability of the athlete by stabilizing the pelvis, lower back, and hips, thereby strengthening the core muscles to achieve coordination, which in turn leads to improved balance and posture. These exercises target the body's core muscles, working to strengthen them and enhance stability and strength through the fortification of the pelvic region, hips, and lower back, all of which contribute to the development of the athletes' weightlifting effectiveness.

Regarding the specific strength of the arms, the research results indicated significant differences between the pre-test and post-test in the research variables, which include explosive strength, speed-strength, and strength endurance. The researcher attributes these findings to the execution of specific exercises by the sample, which were facilitated through multiple repetitions

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in accordance with proper training conditions that align with the correct and ideal trajectory, preventing the loss of kinetic energy by the athlete and ensuring a smooth transfer of body parts without interruption of movement or loss of movement time. This is supported by the assertion of (Sari Abdul Karim Al-Fadhili, 2010) that "the rate of speed is the ability to perform consecutive repetitive movements of a single type over defined distances, which collectively form the total distance in the least possible time" (3: 371). The research results demonstrated a clear improvement in specific strength, attributed to the exercises utilized in the study, which aided in its development. The increase in strength during weightlifting is a result of the harmonious interaction between the nervous and muscular systems, establishing a coherent relationship between speed and performance strength in accordance with the relationship between angle and ideal performance, which reflects a high level of coordination among the angles adopted by the athlete. (Sulaiman Ali) indicates that "the line of action for the deliberate strength contraction of muscle groups should follow a straight path with the knee and hip joints to achieve optimal performance. The coach must enhance the athlete's ability to sense the angle and instruct them on the correct principles using methods that achieve this" (4: 18).

The researcher notes that the improvement in performance is attributed to the abdominal exercises developed by the researcher and applied to the research sample, which contributed to this development by enhancing the movement trajectory of the activity. Performance relies on the level of technical execution and physical capabilities, as well as the reliance on the plank training applied to the sample individuals. (Abu Al-Ala) states that "regular and continuous training improves the capacity of the nervous and muscular systems to overcome resistance, requiring a high degree of muscle contraction speed, which is a crucial determinant in sports that necessitate rapid muscle contraction and relaxation" (5: 99).

There is an awareness and understanding of the directed force through the application of finger pressure on the weight, thus allowing the player to control the amount of force exerted. Samia Khalil noted, "The signals from the neural centers responsible for movement, when increased through training, lead to the reduction of signals from adjacent centers that are unnecessary for the required movement, resulting in performance that is stable, precise, and economical." Additionally, Asil stated, "Training plays a positively effective role in focusing on the functioning of the specific muscle groups related to the activity and in their correct trajectory, ensuring energy efficiency and guaranteeing the fluidity of movement. Skill is a characteristic indicative of performance effectiveness, as the learner develops certain motor responses within a structured movement organization" (Asil, 2022, p. 96). The researcher emphasized that the training units should not be exhausting for the throwers and should align with their training units, increasing repetitions with interspersed rest periods. This is corroborated by Worren, who stated,

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"Well-regulated intensive training enhances the brain's capacity to establish new neural connections and pathways, improving mental neural responses and cognitive functions, as the brain's strength in receiving and processing information gradually increases through organized physical and sensory neural training."

Conclusions

1. The plank exercises applied to the research sample had a positive and effective impact on the variable of specific strength, which is represented by the explosive strength of the arms, speed strength, and strength endurance, as they contribute to strengthening the muscles utilized in the body.
2. In her main experiment, the researcher implemented plank exercises on her research sample, and significant differences were observed as a result of applying these exercises in the abdominal strength test.
3. The plank exercises contributed to improving the performance level of the weight throw athletes.

Recommendations

1- The potential benefits of utilizing plank exercises in other events of track and field.
2- The effort to leverage the integration of multiple training methods to enhance strength variables for throwing athletes.
3- Conducting a comparison between different events in track and field that employ plank exercises.

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