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# The Effect of Slow-Rhythm Training on The Maximum Strength of Working Muscles and the Digital Achievement of the Deadlift for Young Weightlifters in Physical Strength

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**ABSTRACT:** This research investigates the effectiveness of a slow-rhythm training technique aimed at enhancing the maximum strength of lifters, particularly in the deadlift. The study arose from the researcher's observations of stagnant performance levels among weightlifters, despite traditional training methods that typically employ a single movement rhythm at natural speeds. Noting a deficiency in maximum strength values through preliminary muscle strength tests, the researcher sought to implement a slow-rhythm approach, which involves performing exercises at varying speeds to influence specific chemical variables and improve strength outcomes. The research targeted the bodybuilding weightlifters of the Najaf Governorate youth team, comprising 40 athletes affiliated with the Iraqi National Federation. A sample of 20 lifters, aged 19-23, was randomly selected and divided into two groups: an experimental group and a control group, each consisting of 10 participants. The experimental method was employed to align with the research objectives. The findings indicated that the slow-rhythm technique significantly enhanced maximum muscle strength values among the athletes. This improvement is attributed to the adaptations within muscle cells resulting from the high training loads applied at different speeds, thereby increasing the muscles' capacity to generate force. The study concluded that such adaptations positively affected deadlift performance, which is inherently characterized by slow execution. Data analysis was conducted using SPSS and Excel, reinforcing the efficacy of the slow-rhythm training method in developing strength in young lifters. Overall, the research contributes valuable insights into innovative training methodologies that can lead to improved athletic performance in weightlifting.

## 1. Introduction

The significant and swift advancement in athletic performance in both individual and team sports was not coincidental. Instead, it stemmed from the formulation of sound strategies grounded in explicit and codified scientific principles within the discipline of training. Trainers are increasingly focused on preparing individual athletes comprehensively to attain optimal performance. Consequently, the advancement of training science has led to the creation of methods and equipment designed expressly to enhance individual performance. "The methods may differ based on the sport, the athlete's proficiency, and the specific objectives of the training approaches. Consequently, numerous contemporary sports training methodologies have been established, deemed the most advanced, and must align with the specific requirements of the sport. One of these ways is the slow-rhythm technique, recognized for its role in enhancing physical performance, particularly maximum strength. It primarily emphasizes executing physical activities at varying velocities, so enhancing the concentration on movement and its effects. The

slow-rhythm method is attained by doing the necessary exercises for maximal strength development over an extended duration beyond the typical execution period. Strength training is a sport that necessitates a combination of physical and technical abilities to execute lifts efficiently. These lifts are difficult to execute due to their requirement for a continuous, uninterrupted effort. Consequently, the weightlifter must use maximal force consistently from the initiation to the conclusion of the lift, alongside maintaining fluidity and precision in execution without any breaks. Consequently, they predominantly depend on their stringent demands for overall muscular strength, with a specific emphasis on maximum strength. Maximum strength is a crucial component of muscular strength in numerous athletic competitions, including strength training, weightlifting, and other strength-related sports.

## 2. THE SIGNIFICANCE OF THE STUDY

The importance of the research lies in preparing slow-rhythm training exercises in an effort to develop maximum strength and numerical achievement for young strength players.

## 3. RESEARCH METHODOLOGY AND FIELD PROCEDURES

### 3.1. Research Sample and Community

"The research community was designated by the researchers as the bodybuilding weightlifters of the Najaf Governorate youth team. The weightlifters, 40 in number, represent the training center that has been accredited by the Iraqi National Federation for the game in the governorate. The research sample consisted of twenty weightlifters from the youth category, aged 19-23, who were selected through a simple random procedure (lottery). There were ten participants in the experimental group and the same number in the control group, which were randomly assigned to the two categories using a lottery. The original community was represented by 50% of the research sample.

### 3.2. Research Resign

Establishing the correct and appropriate method and choosing it accurately is a necessity of scientific research, which results in finding appropriate and effective solutions to the research problem, as the method "is the method that the researcher follows to determine the steps of his research through which he can arrive at a solution to the research problem" ( ). The researcher used the experimental method with the method of two equivalent groups because it is suitable for the nature of the study and the problem.

### 3.3. Sample Homogeneity and Equivalence

The researcher employed the following descriptive variables to test the homogeneity of the research sample members: age, weight, height, and training age. Equivalence was obtained between the two groups. One of the experimental control procedures employed was statistical equivalence. The equivalence of the two groups is determined by comparing the arithmetic mean, standard deviation, and other statistical measurements between the experimental and control groups. The researcher computed the t-test for independent samples after statistically processing the data. At a significance level of (0.05) and a degree of freedom of (18), the calculated t-test value was less than the tabulated t-test value. This suggests that the disparity between the two categories is not statistically significant, as illustrated in Table 1.

**Table 1.** Mean Values, Standard Deviations, Calculated *t*-Values, and Significance of Differences Between the Experimental and Control Groups in the Pre-Test

| No. | Variable | Unit | Experimental Group(Mean ± SD) | Control Group(Mean ± SD) | *t*-value | Significance |
|---|---|---|---|---|---|---|
| 1 | Shoulder Muscles | kg | 66.75 ± 4.41 | 66.85 ± 4.34 | 0.05 | Not Significant |
| 2 | Chest Muscles | kg | 121.25 ± 7.38 | 121.80 ± 7.09 | 0.16 | Not Significant |

| | | | | | | |
|---|---|---|---|---|---|---|
| 3 | Biceps Brachii | kg | 41.00 ± 3.94 | 41.50 ± 3.37 | 0.30 | Not Significant |
| 4 | Triceps Brachii | kg | 57.00 ± 5.37 | 58.00 ± 5.59 | 0.40 | Not Significant |
| 5 | Back Muscles | kg | 45.40 ± 3.56 | 46.50 ± 2.01 | 0.84 | Not Significant |
| 6 | Deadlift Performance | kg | 221.75 ± 9.20 | 221.30 ± 9.17 | 0.10 | Not Significant |

**Note:** The tabulated *t*-value at a significance level of 0.05 and degrees of freedom (df = 18) is 2.100.

### 3.4. Defining the Study Variables:

### 3.5. Defining the Physical Variables Under Study:

After presenting a set of variables to experts, the physical variable was identified, namely the maximum strength of the muscles involved in the performance. The selected variables were (shoulder muscles, chest muscles, biceps, triceps, and back muscles), in addition to the numerical achievement (for the deadlift).

3-6-2 Defining the Maximum Strength Tests for the Working Muscles Involved in Lifting:

After the researcher reviewed scientific sources and references to identify appropriate tests for the maximum strength of the working muscles involved in performing the deadlift, and conducted a number of personal interviews with experts and specialists in the field of sports training and testing, he noted the lack of tests that measure the maximum strength of the muscles under study. Therefore, the researcher constructed physical tests for this purpose, using scientific steps for construction, represented by extracting the values of scientific foundations, discriminating ability, and the degree of ease and difficulty of the tests, as shown in the following steps.

**Table 2.** Maximum Strength Tests for Muscles Involved in Performing the Deadlift

| No. | Test Type |
|---|---|
| 1 | Shoulder Muscles |
| 2 | Chest Muscles |
| 3 | Biceps Brachii |
| 4 | Triceps Brachii |
| 5 | Back Muscles |
| 6 | Quadriceps (Thigh) |
| 7 | Hamstrings (Posterior Thigh Muscles) |
| 8 | Gastrocnemius (Calf Muscle – Ankle Flexors) |

### 3.6. Exploratory experiment:

This is considered "a preliminary experimental study conducted by the researcher on a small sample with the aim of selecting research methods and tools." The researcher conducted the exploratory experiment on 10/29/2024 on a sample of four quadruplets randomly selected from the actual experiment groups. The exploratory experiment aimed to determine the validity of the test, the time required for the test, the scientific foundations, the validity of the devices and tools, the readiness of the sample and the support staff, as well as to extract the maximum intensity.

### 3.7. Pre-tests:

Pre-tests were conducted for the research sample (control and experimental) on Friday and Sunday, November 8 and 10, 2024, in the hall of the Physical Strength Training Center in Najaf Governorate, with the assistance of the support team. The conditions related to the tests were established in terms of location, time, tools used, and application method. The test days were divided into two days.

- The first day was the deadlift achievement tests for physical strength.
- Day Two: Maximum Strength Tests for the Muscles Involved in the Performance

### 3.8. Slow Rhythm Training Vocabulary:

Pre-tests were conducted for the research sample (control and experimental) on Friday and Sunday, November 8 and 10, 2024, in the hall of the Physical Strength Training Center in Najaf Governorate, with the assistance of the support team. Test conditions were established in terms of location, time, tools used, and application method. The test days were distributed over two days.

- The first day included the deadlift performance tests for physical strength.
- The second day included the maximum strength tests for the muscles involved in the performance.

### 3.9. Slow Rhythm Training Vocabulary:

After reviewing Arab and foreign sources in the field of sports training and conducting personal interviews with sports training specialists, the researcher developed slow rhythm training exercises for the research sample members. This was based on scientific foundations, taking into account all the requirements and conditions necessary for its preparation, as explained below:

To ensure the safety and effectiveness of the exercises, they were presented to experts and specialists in the field of sports training to express their opinions on their suitability for such a sample. They provided a set of directives and modifications, which the researcher took into account and implemented on the research sample members for the period from November 15, 2024, to January 24, 2025. The preparation of these exercises was based on scientific foundations in terms of:

- The suitability of the training curriculum content to the level and abilities of the sample members.
- Taking into account the individual differences of the research sample members.
- Taking into account the appropriate training load configuration in terms of intensity, volume, and rest. Gradually, the intensity and load were alternating according to the objectives of the training unit.
- The exercises were implemented using a slow-motion rhythm method in their various forms (2/0/2/0), (5/0/5/0), and (4/0/2/0) for specific training of the targeted muscles.
- The training curriculum took (10) weeks, at a rate of (3) training units per week. Thus, the number of training units for each group reached (30) training units, using the repetitive training method.
- The exercise intensity ranged between (80%-100%) of the weightlifter's maximum performance, with repetitions between (3-6), sets between (2-5), and rest periods for the groups between (2-5) minutes. The duration of one training unit was between (90-110) minutes. The time to perform the exercises used in the training curriculum during the main part of the training unit was between (60-75) minutes.

### 3.10. Post-tests

Post-tests were conducted for the research sample (control and experimental) on Sunday and Tuesday, January 26 and 28, 2025, in the hall of the Physical Strength Training Center in Najaf Governorate, with the assistance of the team. Test conditions were established in terms of location, time, tools used, and application method. The test days were divided into two days.

- The first day included the deadlift achievement tests for physical strength.
- The second day included the maximum muscle strength test.
- The researchers ensured that the tests were conducted under the same conditions as the pre-tests.

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### 3.11.Statistical methods:

The data obtained were processed using the statistical package (SPSS) and the Excel program.

## 4. PRESENTATION, ANALYSIS, AND DISCUSSION OF RESULTS:

Certainly! Here is a professional English translation of **Table (3)**:

**Table 3.** Results of the Differences Between Pre- and Post-Tests for the Experimental Group in Maximum Strength of Muscles Involved in Performing the Bench Press

| Research Variables | Unit | Pre-Test (Mean ± SD) | Post-Test (Mean ± SD) | Calculated *t*-Value | Significance of Difference |
|---|---|---|---|---|---|
| Maximum Strength of Shoulder Muscles | kg | 66.75 ± 4.41 | 76.10 ± 1.91 | 9.79 | Significant |
| Maximum Strength of Triceps Brachii | kg | 57.00 ± 5.37 | 70.20 ± 5.00 | 12.30 | Significant |
| Maximum Strength of Biceps Brachii | kg | 41.00 ± 3.94 | 49.30 ± 2.86 | 6.90 | Significant |
| Maximum Strength of Chest Muscles | kg | 121.25 ± 7.38 | 134.50 ± 5.38 | 6.93 | Significant |
| Maximum Strength of Back Muscles | kg | 45.40 ± 3.56 | 56.60 ± 4.67 | 8.35 | Significant |

**Note:** The tabulated *t*-value at a significance level of 0.05 and degrees of freedom (df = 9) is **2.26**.

Table (5) shows that there were significant differences between the pre- and post-test results for the maximum strength of the muscles involved in completing the deadlift, with the post-tests favoring the members of this group. The determined t-value for the maximum strength of the shoulder muscles was 9.79, while the calculated t-value for the maximum strength of the triceps brachii muscles was 12.3. The computed t-value for the maximum strength of the biceps brachii muscles was (6.90), and the calculated t-value for the maximum strength of the chest muscles was (6.93). The computed t-value for the maximum strength of the back muscles was 8.35. These results are greater than the tabulated t-value of (2.66) at a degree of freedom of (9) and a significance level of (0.05), showing that the post-tests outperformed the other tests. The experimental group showed significant progress in maximum strength tests, with increased values in post-tests compared to pre-tests across all variables related to the research. This means that all of the working muscles involved in performing the three physical strength exercises are developing and improving their maximal strength (Aliwie, 2025, 2026; Padhy et al., 2025).

### 4.1. Presentation and analysis of the results of the pre- and post-tests for the deadlift for the physical strength of the experimental group

**Table (4)** Results of the differences between the pre- and post-tests of the experimental group regarding chest lift achievement

**Certainly! Here is the professionally translated and formatted version of your data:**

| Research Variable | Unit | Pre-Test (Mean ± SD) | Post-Test (Mean ± SD) | Calculated *t*-Value | Significance of Difference |
|---|---|---|---|---|---|
| Deadlift Performance | kg | 221.75 ± 9.20 | 237.00 ± 6.74 | 8.83 | Significant |

Note: The tabulated *t*-value at a significance level of 0.05 and degrees of freedom (DF = 9) is 2.26.

Table (6) showed that there were significant variations in the outcomes of the pre- and post-tests for the deadlift achievement variable in physical strength, with the experimental group members performing better on the post-tests. The calculated t-

value, as well as the calculated t-value for deadlift achievement, reached (8.83), which is greater than the tabular t-value of (2.66) at a degree of freedom of (9) and a significance level of (0.05), indicating that the differences between the two tests were significant in favor of the post-tests. The experimental group demonstrated significant development, as seen by higher deadlift accomplishment values in post-tests compared to pre-tests. This demonstrates the development and improvement of deadlift physical strength (Essi et al., 2026; Salman et al., 2026)

### 4.2. Discussion of the results of the pre- and post-tests of the maximum strength of the muscles involved in performing the deadlift for the experimental group members.

Table (6) shows the superiority of the experimental group members in the post-tests of the maximum strength variable for all muscles involved in performing the deadlift in physical strength, based on the significance of the statistical values of the T-test. The researcher attributes this superiority to the effectiveness of the special physical training that was prepared based on scientific foundations in terms of consistency between the components of the training load according to the goal, training stage, and the level of training status of the research sample members, which was implemented by the members of this group. These trainings led to development in the capabilities of the physical strength players in terms of the maximum strength of all the muscles targeted during this study for the better, because the training programmed according to correct scientific foundations has a clear impact on the development of the maximum strength of all members of the group. This development is due to the nature of the exercises used during the training process, which were close to the technical performance of the deadlift, whether the constructive exercises or the special preliminary exercises. These exercises focused during their performance on the muscle groups actually involved in performing the deadlift, as well as the training volumes used in terms of intensity. The exercise, number of repetitions, and rest periods. We note this development in the maximum strength values of the research sample members resulting from the effectiveness of the prepared exercises through the results of the post-tests, which clearly outperformed the maximum strength values in the pre-tests, as "the use of exercises that are consistent in their performance nature with the general form of performing specialized skills leads to better results in gaining strength" ( ). This, in addition to the commitment of the members of the experimental research group and their correct application of the training components, led to achieving this development with positive values in maximum strength.

### 4.3. Presentation and analysis of the results of the pre- and post-tests of the strength of the working muscles and the deadlift achievement for the control group.

**Table 5.** Results of the Differences Between Pre- and Post-Tests for the Control Group

| Research Variable | Unit | Pre-Test (Mean ± SD) | Post-Test (Mean ± SD) | Calculated *t*-Value | Significance of Difference |
|---|---|---|---|---|---|
| Maximum Strength of Shoulder Muscles | kg | 66.85 ± 4.34 | 69.20 ± 5.05 | 3.23 | Significant |
| Maximum Strength of Triceps Brachii | kg | 58.00 ± 5.59 | 62.10 ± 6.82 | 3.87 | Significant |
| Maximum Strength of Biceps Brachii | kg | 41.50 ± 3.37 | 44.00 ± 3.65 | 3.27 | Significant |
| Maximum Strength of Chest Muscles | kg | 121.80 ± 7.10 | 127.20 ± 6.61 | 3.19 | Significant |
| Maximum Strength of Back Muscles | kg | 46.50 ± 2.01 | 50.80 ± 2.52 | 3.75 | Significant |

**Note:** The tabulated *t*-value at a significance level of 0.05 and degrees of freedom (df = 9) is **2.26**.

The research results from Table (7) indicated the presence of significant differences between the results of the pre- and post-tests for the maximum strength of the muscles involved in performing the deadlift, in favor of the post-tests for the members of the control group. The calculated value of (t) for the maximum strength of the shoulder muscles was (3.23), while the calculated value of (t) for the maximum strength of the triceps brachii muscles was (3.87), and the calculated value of (t) for

the maximum strength of the biceps brachii muscles was (3.27), while the calculated value of (t) for the maximum strength of the chest muscles was (3.19), while the calculated value of (t) for the maximum strength of the back muscles was (3.75), while the calculated value of (t) for strength was (3.50), which are values greater than the tabular value of (t) of (2.66) at a degree of freedom of (9) and a significance level of (0.05), which indicates the significance of these differences between the two tests in favor of the post-tests. From what was presented through the presentation of the results of the experimental group for the tests, we note the extent of progress in the level of the individuals of this group through the increase in the values of all the variables related to the research in the post-tests when compared to their values during the pre-tests. This indicates the development and improvement of the maximum strength of all the working muscles involved in performing the deadlift for the individuals of the control group sample.

### 4.4. Presentation and analysis of the results of the pre- and post-tests for the strength of the working muscles and the deadlift performance of the control group.

**Table 6.** Results of the Differences Between Pre- and Post-Tests for the Control Group in Deadlift Performance

| Research Variable | Unit | Pre-Test(Mean ± SD) | Post-Test(Mean ± SD) | Calculated *t*-Value | Significance of Difference |
|---|---|---|---|---|---|
| Deadlift Performance | kg | 221.30 ± 9.17 | 226.40 ± 7.32 | 3.36 | Significant |

**Note:** The tabulated *t*-value at a significance level of 0.05 and degrees of freedom (df = 9) is

The research results from Table (8) indicate the presence of significant differences between the results of the pre- and post-tests for the deadlift performance in physical strength, in favor of the post-tests for the members of the control group.The calculated t-value for deadlift performance was (3.36), which is greater than the tabulated t-value of (2.66) at a degree of freedom of (9) and a significance level of (0.05), indicating the significance of these differences between the two tests, in favor of the post-tests. From the above, through the presentation of the results of the control group, we also note the development of the level of the individuals in this group through the increase in the deadlift performance values in the post-tests when compared to their values during the pre-tests. This indicates the development and improvement of the achievement of this lift for the individuals in the control group.

### 4.5. Discussion of the results of the pre- and post-tests of the maximum strength of the involved muscles when performing the deadlift for the members of the control group.

Table (14) shows a significant improvement in the maximum strength of the chest, leg, back, arm, and shoulder muscles of the control group in the post-test.

The researcher believes that this improvement in the maximum strength of all these muscles is due to the nature of the specific exercises used during the training process, which was based on scientific foundations in terms of exercise intensity, number of repetitions, and rest periods. The effect of training on the post-test results was clearly evident.

The researcher also attributes the increase in maximum strength to the maximum training loads the sample underwent during the period of applying the specific exercises, which led to increased muscle tension, enabling the participating muscles to work at their maximum potential by stimulating the largest number of muscle fibers to generate neural stimulation. Continuing training with higher loads for a period of time increases muscle strength. "There is a basic rule through which maximum strength can be developed, which requires the use of a load intensity of (80%-100%) of the maximum, with repetitions of (1-5)"

### 4.6. Discussion of the results of the pre- and post-tests for the deadlift performance of the members of the two groups (control and experimental).

Through the statistical analysis of the results shown in Tables (7) and (8), it was evident that there was a significant improvement in the performance of both groups (control, experimental) in the post-test. The researcher attributes this development in achievement to the post-test of the two groups (control, experimental) for two reasons, the first reason is the development in the values of the maximum strength of the muscles involved in performing the deadlift as a result of the

nature of the effectiveness of special training and exercises based on scientific foundations, where "the importance of muscle strength for athletic achievement increases the greater the resistance and the duration of the effort expended in performance is short" Qasim also mentions that the maximum strength, and the second reason is the development in technical performance (technique) as a result of the special exercises used in training that contributed to raising the players' physical and skill capabilities.

### 4.7. Presentation and analysis of the results of the post-tests of the maximum strength of the muscles involved in performing the deadlift for the control and experimental groups.

**Table 7.** Results of the Differences Between the Post-Tests of the Control and Experimental Groups

| Research Variable | Unit | Control Group Post-Test (Mean ± SD) | Experimental Group Post-Test (Mean ± SD) | Calculated *t*-Value | Significance of Difference |
|---|---|---|---|---|---|
| Maximum Strength of Shoulder Muscles | kg | 69.20 ± 5.05 | 76.10 ± 1.91 | 4.04 | Significant |
| Maximum Strength of Triceps Brachii | kg | 62.10 ± 6.82 | 70.20 ± 5.00 | 3.02 | Significant |
| Maximum Strength of Biceps Brachii | kg | 44.00 ± 3.65 | 49.30 ± 2.86 | 3.60 | Significant |
| Maximum Strength of Chest Muscles | kg | 127.20 ± 6.61 | 134.50 ± 5.38 | 2.70 | Significant |
| Maximum Strength of Back Muscles | kg | 50.80 ± 2.52 | 56.60 ± 4.67 | 3.45 | Significant |

**Note:** The tabulated *t*-value at a significance level of 0.05 and degrees of freedom (df = 18) is **2.10**.

The research results from Table (9) indicated the presence of significant differences between the results of the post-tests of the control and experimental groups for the maximum strength of the muscles involved in performing the deadlift, in favor of the members of the experimental group. The calculated t-value for the maximum strength of the shoulder muscles was (4.04), while the calculated t-value for the maximum strength of the triceps brachii muscles was (3.02), and the calculated t-value for the maximum strength of the biceps brachii muscles was (3.60), while the calculated t-value for the maximum strength of the chest muscles was (2.70), while the calculated t-value for the maximum strength of the back muscles was (3.45), while the calculated t-value for strength was

These values are greater than the tabular t-value of (2.10) at a degree of freedom of (18) and a significance level of (0.05), which indicates the significance of these differences between the two tests in favor of the post-tests for the experimental group. From the above, by presenting the results of the control and experimental groups for the maximum strength tests of the involved muscles in performing the deadlift in the post-tests, we note that the experimental group members outperformed the control group members in the maximum strength values of the involved muscles. This indicates a higher level of development and improvement in the maximum strength of all the involved working muscles.

### 4.8. Presentation and analysis of the results of the post-tests for performing the deadlift in the physical strength of the control-experimental group.

**Table 8.** Results of the Differences Between the Post-Tests of the Control and Experimental Groups in Deadlift Performance

| Research Variable | Unit | Control Group Post-Test (Mean ± SD) | Experimental Group Post-Test (Mean ± SD) | Calculated *t*-Value | Significance of Difference |
|---|---|---|---|---|---|
| Deadlift Performance | kg | 226.40 ± 7.32 | 237.00 ± 6.74 | 3.36 | Significant |

**Note:** The tabulated *t*-value at a significance level of 0.05 and degrees of freedom (df = 18) is **2.10**.

The research results from Table (10) indicated significant differences between the post-test results of the control and experimental groups in the deadlift performance in physical strength, in favor of the post-tests for the experimental group members.

The calculated t-value for deadlift performance was (3.36), which is greater than the tabular t-value of (2.10) at a degree of freedom of (18) and a significance level of (0.05), indicating the significance of these differences between the two tests, in favor of the experimental group's post-tests.

From the above, we note the superiority of the experimental group members over the control group members in the deadlift performance values for physical strength during the post-tests when compared to their values during the control group's post-tests. This indicates the superiority of the experimental group in developing and improving deadlift performance.

Discussion of the results of the maximum muscle strength tests and the completion of the three-lifts for the control and experimental groups in the post-tests. From Table (10), it is clear that the experimental group outperformed the control group in the post-tests for the variable of maximum strength for all muscles involved in performance and deadlift achievement in physical strength through the significance of the statistical values of the T-test. The researcher attributes this superiority to the effectiveness of the exercises prepared by the researcher using the slow-rhythm method, which led to the development of maximum strength for all targeted muscles, which in turn was reflected in the development of the level of achievement. The integration of slow-rhythm training into training had a significant impact on bringing about a relative increase in muscle hypertrophy and maximum muscle strength, as it contained specific exercises aimed at raising the level of maximum strength. The American College of Sports Medicine recommends that "untrained individuals should use slow and medium-rhythm tempos. For intermediate athletes, it is recommended to use a moderate tempo. For advanced athletes, it is recommended to use a variety of tempos from slow to fast speeds." ( ). The study results are consistent with the study by Westcott et al. (2001), which indicates that "the slow-rhythm training protocol It may be more effective in developing total body strength than traditional resistance training. Westcott trained 147 men and women for 8-10 weeks using regular velocity resistance training (2/0/2/0) or slow tempo training (4/0/2/0). The regular velocity group completed 8-12 repetitions per set, while the slow training group completed 4-6 repetitions. The slow tempo group showed an improvement in maximal strength."

The development of the maximum strength of the muscles involved in performing the three bodybuilding strength lifts has led to the development and rise of the digital level of accomplishing these lifts, as the accomplishment depends mainly on the maximum strength produced by the working and auxiliary muscles."

## 5. CONCLUSIONS

- The slow-rhythm technique led to the development of maximum strength values for the working muscles of strength athletes by inducing adaptations within muscle cells due to the high training load using different speeds during performance.
- Performing maximum strength training at different slow speeds (2/0/2/0), (5/0/5/0), and (4/0/2/0) increased the muscles' ability to produce a high level of maximum force, which influenced the development of the chest lift, which is characterized by slow performance.

## 6. RECOMMENDATIONS:

1. The necessity of using slow-rhythm exercises designed for players, as they have a positive effect on increasing maximum strength in the working muscles.
2. The results of this study should be disseminated to coaches to develop maximum strength forms for strength athletes during the special preparation period.

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[9] Sure! Based on your references and topic—which seems to relate to **resistance training, muscle strength, scientific research in physical education, and possibly slow-motion tempo training**—here are some **additional scholarly references** you can include in your study. All are aligned with international research in **sports science, strength training, and resistance training tempo**:

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