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The Impact of Complex Strength Training on Special Strength and Some Snatch Holds for Young Greco-Roman Wrestlers

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Abstract: *In the last couple of decades, mankind has seen much progress in many fields of life, especially in sports. This is exemplified by the amazing levels of skills and scores we hear about across different types of sports. Wrestling is an open-ended sport where teaching and training have unique attributes, facilitating a requirement for specialized teaching and training, particularly after the recent changes in international rule in terms of technical performance of the Greco-Roman wrestling. Development of complicated strength training and its effect on specific strength and some snatch holds in Greco-Roman wrestlers in experimental and control groups. The researcher applied the experimental method to two groups (experimental and control) on a sample of young Greco Roman wrestlers aged 19-20 years from Al-Rafidain Club for the year 2025. Those were four weight classes, which include two wrestlers for each of the four weight classes (55, 60, 66, and 74 kg). They had an experimental group and a control group (two groups). From those weight classes, four wrestlers from each formed into groups. Specific strength levels and skill performance (drawing hold, over-the-chest throw, snatch, and other holds) were matched for the two groups. The complexity of strength training for (8) weeks included (3) training units per week for each group, with a total of (24) training units (Kanda). The researcher concluded improvement in the specific strength and skills in pull grip : over the chest throw grip (snatch) : Kanda grip in busting the performance levels through complex strength exercises had a significant positive effect to the experimental group than the traditional exercises in controlling group based on the results.*

Keywords: Complex strength training; Specific strength; Greco-Roman wrestling; Explosive power; Skill performance

Introduction

Over the past few years, we have seen great progress in many aspects and areas of life in general and in the field of sports in particular. There is evidence of this progress; advanced skill levels and impressive numeric totals have been recorded in some sports. Inspite of this advances in training methods there is still a necessity to discover much more scientific facts by conducting more scientific researches to find the most efficient method and means for training and developing each sport in order to maximize the human physical ability.

Wrestling is one of these sports but it has a significant position in Iraq for its history, popularity and the expansive practice in Iraq's provinces. Wrestling has made great strides since recent decades and has reached a high level of individual and team achievement both at the Arab and the international levels. As it is positioned as an open-skill sport, specificity in teaching and training is required (de Freitas, 2019) especially when considering new

rules introduced by United World Wrestling (UWW) regarding technical execution in the international arena of Greco-Roman wrestling (UWW, 2021). These changes require speed and a level of force from the competitor when applying holds.

Since holds represent a lion's share of the points scored by a well-executed move, most coaches spend the majority of their training units on the practice of different holds. Athletic performance in wrestling takes place in both sedentary and upright postures so forces generated will pull from large and small muscle groups from multiple muscle areas, compartmentalized to make a hold work. This responsibility on coaches needing to emphasize the muscles involved in performance where both muscular strength and speed are paramount to execution of the task against a significant resistant in the form of an opponent. Therefore, maximal strength and maximal speed is necessary to deny an opponent the chance to get into a position to play defense to any hold.

In line with this, one of the most profound methods for development of the specific strength and explosive capabilities of wrestlers is the complex strength training (Complex Training) and this develops significance of the present investigation. This results from its integration of heavy resistance exercises with biomechanically similar power (plyometric) exercises to elicit specific neuromuscular mechanisms that improve the quality of motor output in functional settings (e.g., competition).

Methodology

Research Problem

The researcher's experience of wrestling training indicated that for the majority of wrestlers there was a marked fluctuation in both the quality of particular strength and the performance of particular holds. The researcher explained that this problem is due to weakness in the core muscles, including back, abdominal and lateral muscles, as a result of imbalance in the performance of these muscles, which causes a decrease in the ability of the wrestler to perform skills. As a result of this, coaches have had to shift their focus toward a training modality that reinforces this crucial area of focus in the Core, complex strength training, since performance of such skills is dependent upon the abdominal and the back musculature. That attitude also focuses on moving away from vanilla trainings.

Research Objectives

1. To design complex strength training exercises aimed at developing specific strength and selected snatch-type holds for Greco-Roman wrestlers.
2. To identify the effect of complex strength training on specific strength and selected snatch-type holds for Greco-Roman wrestlers in the experimental group.
3. To identify the significance of differences between the experimental and control groups in pre- and post-tests.

Research Hypotheses

1. There are statistically significant differences between the results of the pre- and post-tests in favor of the post-test for both the experimental and control groups.
2. There are statistically significant differences between the post-test results of the experimental and control groups in favor of the experimental group.

Research Scope

1. Human Scope: Greco-Roman wrestling players of Al-Rafidain Club for the 2025 season.
2. Temporal Scope: From 12/8/2025 to 10/11/2025.
3. Spatial Scope: Wrestling and weightlifting hall at Al-Rafidain Sports Club, Al-Qadisiyah Governorate.

Research Methodology and Field Procedures

Research Method

The researcher adopted the experimental method using the experimental and control group design, as it is suitable for the nature of the study and ensures accurate and reliable results.

Research Population and Sample

The research population consisted of youth Greco-Roman wrestlers from Al-Rafidain Club aged 19–20 years for the year 2025. The players represented four weight categories (55, 60, 66, and 74 kg), with two wrestlers per weight. They were divided into two groups, experimental and control, each consisting of four wrestlers representing the mentioned weights. The two groups were matched in terms of specific strength and technical performance (pull hold, over-the-chest throw "snatch," and Kenda hold), as shown in Table (1).

Equivalence of the Research Sample

To ensure equivalence, the researcher conducted matching between the experimental and control groups based on the variables under study, as shown in Table (1).

Table (1) Arithmetic means and standard deviations for the experimental and control groups (youth category) in the research variables for pre-tests conducted for equivalence purposes.

No.	Variable	Unit	Experimental Group (Mean ± SD)	Control Group (Mean ± SD)	Calculated T-value	Significance
1	Height	cm	169.8 ± 7.496	168 ± 6.782	0.398	Random
2	Training Age	years	11.8 ± 2.387	10.4 ± 2.88	0.837	Random
3	Weight	kg	55.4 ± 9.502	54.8 ± 9.011	0.102	Random
4	Maximum Strength (Arms)	kg	0.713 ± 0.057	0.69 ± 0.048	1.362	Random
5	Maximum Strength (Back)	kg	1.073 ± 0.111	0.984 ± 0.020	1.696	Random
6	Maximum Strength (Legs)	kg	0.94 ± 0.065	0.875 ± 0.041	1.439	Random

7	Pull Hold	score	2.900 ± 0.568	2.800 0.789	±	0.325	Random
8	Over-the-Chest Throw (Snatch)	score	3.050 ± 0.725	2.750 0.635	±	0.985	Random
9	Kenda Hold	score	3.900 ± 0.775	2.750 0.755	±	0.439	Random

Tools, Instruments, and Equipment Used

Data Collection Methods

1. Arabic and foreign scientific sources and references.
2. Internet resources.
3. Personal interviews.
4. Observation.

Tools and Equipment Used

1. Iron weight plates.
2. Wrestling mat.
3. Two whistles.
4. Stopwatch.
5. Four iPhone 14 Pro devices.
6. Photographs and video recordings of the studied holds.
7. 3D imaging.
8. 3D animations.

Pilot Study

The pilot study is a procedure conducted to identify potential obstacles that may face the researcher during the implementation of the main experiment. It also serves as a preliminary preparation for the requirements of the experiment in terms of time, cost, assisting staff, and the suitability of devices and equipment, in addition to other requirements necessary for conducting the main experiment effectively.

Tests

Tests are considered one of the important tools for evaluating the level reached by athletes, as they also indicate the effectiveness and suitability of any training program.

Specifications of the Tests Used

Physical Tests

Back Muscle Strength Test (Deadlift)

- Purpose of the test: To measure the maximum strength of the back muscles.
- Equipment and tools: Barbell bench and various weight plates.
- Scoring method: The participant is given two attempts, and the best attempt is recorded in kilograms (kg).

Back Squat Test

- Purpose of the test: To measure the maximum strength of the thigh and leg muscles.

- Scoring method: The participant is given two attempts, and the highest attempt is recorded in kilograms (kg).

Medicine Ball Throw Test (3 kg) for Maximum Distance

- Purpose of the test: To measure the explosive strength of the arm muscles.
- Scoring method: The distance is measured using a measuring tape from the starting point to the point where the medicine ball lands. The average of the two attempts is calculated.

Skill Performance Tests

The researcher divided each of the holds into three phases and conducted the skill performance tests (pull hold, over-the-chest throw "snatch," and Kenda hold) on the research sample. Specific scores were assigned to each phase, which were 3 points for the preparatory phase, 5 points for the main phase, and 2 points for the final phase. For each hold, we took the best of 2 attempts per wrestler. The technical performance of the holds executed was evaluated by experts and specialists wrestling.

Pre-Tests

The researcher conducted pre-tests for the members of the research sample, which included measurements of specific strength and skill performance of selected holds for both the experimental and control groups. These tests were conducted in 2025 at the wrestling hall of Al-Rafidain Sports Club. The testing process lasted two days for both groups and included specific strength tests and skill performance (holds).

Application of the Proposed Exercises

1. Designing the specialized exercises.
2. Commencing complex strength training on 20/8/2025. The training program was applied for a duration of eight weeks, with three training units per week for each group, resulting in a total of 24 training units.
3. Training was implemented during the special preparation and pre-competition periods.
4. The experimental group performed complex strength training exercises.
5. The control group performed traditional specialized training exercises.

Post-Tests

After completing the application of the specialized exercises, and with the assistance of coaches and support staff, the researcher conducted post-tests for the research sample (experimental and control groups) on 23/10/2025. The same conditions applied in the pre-tests were maintained.

Statistical Methods

After data collection, the researcher used the Statistical Package for the Social Sciences (SPSS) for statistical analysis.

Result and Discussion

Table (2) Arithmetic means, standard deviations, and calculated T-values between pre- and post-tests for the experimental group in specific strength tests.

No.	Specific Strength Tests	Pre-Test Mean	SD	Post-Test Mean	SD	Calculated T-value	Significance
1	Maximum strength (arms)	0.713	0.057	0.823	0.049	3.11	Significant
2	Maximum strength (back)	1.073	0.111	1.112	0.067	4.031	Significant
3	Maximum strength (legs)	0.94	0.065	1.01	0.082	2.223	Significant

Table (3) Arithmetic means, standard deviations, and calculated T-values between pre- and post-tests for the control group in specific strength tests.

No.	Specific Strength Tests	Pre-Test Mean	SD	Post-Test Mean	SD	Calculated T-value	Significance
1	Maximum strength (arms)	0.69	0.048	0.723	0.119	2.131	Significant
2	Maximum strength (back)	0.984	0.020	1.01	0.097	2.172	Significant
3	Maximum strength (legs)	0.875	0.041	0.927	0.102	2.127	Significant

The tabulated T-value at a significance level of 0.05 and degrees of freedom (3) is 2.123.

Table (4) Differences between the experimental and control groups in the post-test of the study variables.

No.	Variables	Unit	Experimental (Mean)	SD	Control (Mean)	SD	Calculated t-value	Significance
1	Maximum strength (arms)	—	0.823	0.049	0.723	0.119	2.331	Significant
2	Maximum strength (back)	—	1.112	0.067	1.01	0.97	3.022	Significant
3	Maximum strength (legs)	—	1.01	0.082	0.927	0.102	2.143	Significant

The tabulated t-value at a significance level of 0.05 and degrees of freedom (6) equals 2.021.

Discussion of the Results of Specific Strength Tests for Both Groups

Based on the presentation and analysis of the pre- and post-test results shown in Tables (2) and (3) for the specific strength tests of both the experimental and control groups,

statistically significant differences were found between the pre- and post-tests in favor of the post-tests for both groups. The researcher attributes this improvement to the regular participation of both groups in programmed training based on scientifically selected training principles, whether through complex strength training or traditional training applied by the coach. This led to a clear effect of training on post-test results.

These results align well with sports training science, which indicates that properly planned training will have a positive effect on recipients. Table (4) compared the two groups at the post-tests to find out which of the two (groups) was better. Results Fully-trained athletes were found to exhibit more statistically significant differences in both specific strength and technical performance from pre-test to post-test than their control counterparts (all, $P \leq 0.05$) indicative of the superiority of complex training versus traditional training.

The implemented training program, the training length, and also the weights employed for the specific training caused the changes in most specific strength tests. This coincides with the results of Mohammed Mahmoud Labib (2017) that explained that strength training programs are complex and characterized by a variety of exercises which are directly related to the training aims within the components in the training unit. This progress, the researcher suggests, might be due to the impact of the complex strength training, which consisted of high-level exercises targeting physical qualities while performing resistance training in the form of barbell lifts, multi-joint movements, medicine balls, and weighted vests. These are ways of increasing physical abilities.

This reflects the rationale behind Charles Staley's (1996) comments, that strength training does in fact increase an athlete's speed and jumping ability by providing higher power outputs during specific exercises and thus, initiating adaptations in the nervous system. This coincides with what George B. Plog and others stated about using tools such as those in complex strength training programs and their roles in adding strength to the system and increased neuromuscular sensitivity needed for the body-response without any latency. In addition, these results coincide with that reported by Abdelaziz Al-Nimr and Nariman Al-Khatib as they mentioned that the organized training kinds in sport enhance the efficiency of the muscular system which appear in an increased rate of muscle s contraction by making maximum muscle contractions muscular between dynamic or constant in whole range of motion in the joint 1, 20. He indicated that the strength of muscles increases with repetitive exercise, especially if the exercise is organized under a specific burden corresponding to the physical capabilities of each athlete.

Therefore, the investigator applies the interpretation that specific strength developments due to complex strength training, as indicated by the enhancement of the technical performance level of the wrestlers, had enabled them to assume the various body positions required for effective performance comparatively better during the performance.

Presentation, Analysis, and Discussion of Skill Performance Results for the Experimental Group

Table (5) Differences between pre- and post-tests in selected snatch-type holds for the experimental group.

No.	Variable	Unit	Pre-Test Mean	SD	Post-Test Mean	SD	Calculated t-value	Significance
1	Pull hold	Score	2.900	0.568	8.950	0.832	12.658	0.000
2	Over-the-chest throw (snatch)	Score	3.050	0.725	7.350	1.081	7.926	0.000
3	Kenda hold	Score	3.900	0.775	9.050	0.725	10.549	0.000

Table (6) Differences between pre- and post-tests in selected snatch-type holds for the control group.

No.	Variable	Unit	Pre-Test Mean	SD	Post-Test Mean	SD	Calculated t-value	Significance
1	Pull hold	Score	2.800	0.789	4.550	1.092	3.530	0.006
2	Over-the-chest throw (snatch)	Score	2.750	0.635	5.100	0.699	7.870	0.000
3	Kenda hold	Score	2.750	0.755	5.100	0.775	7.870	0.000

Table (7) Differences between the experimental and control groups in the post-test of the study skill variables.

No.	Variables	Unit	Experimental Mean	SD	Control Mean	SD	Calculated t-value	Significance
1	Pull hold	Score	8.950	0.832	4.550	1.092	3.226	0.005
2	Over-the-chest throw (snatch)	Score	7.350	1.081	5.400	0.699	3.070	0.007
3	Kenda hold	Score	9.050	0.725	5.800	0.775	2.832	0.011

Discussion of Skill Performance (Holds) Test Results for Both Groups

For both groups, performance of the holds improved between the pre- and post-tests with the pulls (pull hold, over-the-chest throw "snatch," and Kenda hold) showing statistically significant differences between the pre- and post-tests in favor of the post-tests. The researcher explains that the observed improvements and the significant differences in some variables, were due to the overall development that both groups, the experimental group and the control group (which performed traditional exercises) underwent. Both federations demonstrated clear positive impacts from the interventions, which were tailored according to scientific principles related to training load parameters and intensities in the special preparation phase and also based on the principle of specificity in the use of skill-specific exercises reflecting actual performance. This resulted in physiological adjustment and better response of wrestlers' bodies to the exercises used.

Yet contrasts between post-test from both groups proved statistically significant in the favor of experimental group. This, according to the researcher, is because complex strength training caused a higher level of explosive strength in the arms, legs, and back than the traditional exercises used in the control group. It seems that the exercises created for the experimental group, were based on scientific basis directed for developing some specific strength and skill performance and thus had a minimal charge on the study variables especial on the control group at time of performance. His training method was also similar

to circuit training, with multiple wrestlers performing exercises at the same time, creating competition, motivation and fun during training.

What Ahmed Abdel-Hamid Amara and Hossam El-Din Mostafa Hamed said matches this: modern methods and aids of training dynamically simulating performance in reality give possibility to real-time interaction of the athlete with a virtual environment. And, a frequent training error of coaches is the lack of variability in training stimulus (number of repetitions, sets, load intensity, speed of execution, and rest intervals). It was also confirmed by Talha Hossam El-Din and others, the researcher state that that fast repetitions develop not only the physical development but also enables the nervous system to adapt to the performance nature more; thus be an input at and effective stage.

Conclusion

1. Statistically significant differences were observed between the pre- and post-tests in specific strength and the three studied holds for both the experimental and control groups in favor of the post-tests.
2. Complex strength training had a positive effect on developing specific strength and skill performance (pull hold, over-the-chest throw "snatch," and Kenda hold) for the experimental group.
3. The use of complex strength training for the experimental group was more effective in developing specific strength and skill performance than traditional exercises used by the control group.

Recommendations

1. Emphasize the design of exercises that simulate technical performance using modern training methods.
2. Stress the use of modern training tools to develop both physical and skill aspects of Greco-Roman wrestling.
3. Conduct further studies on different weight categories and age groups in individual sports.
4. Diversify training by incorporating modern technology, particularly during the special preparation phase.

References

Abdelaziz Al-Nimr & Nariman Al-Khatib (2007). Weight Training: Program Design and Seasonal Planning. Cairo: Book Center for Publishing.

Abu Al-Ala Ahmed Abdel-Fattah (1997). Sports Training: Physiological Foundations. Cairo: Dar Al-Fikr Al-Arabi.

Adel Turki (2009). Principles of Sports Training. Najaf Al-Ashraf: Dar Al-Diyaa.

Ahmed Abdel-Hamid Amara & Hossam El-Din Mostafa Hamed (2009). Principles of Training in Wrestling (1st ed.). Alexandria: Dar Al-Wafaa for Printing and Publishing.

Chaabene, H., Negra, Y., Capranica, L., Bouguezzi, R., Hachana, Y., Rouahi, M. A., & Granacher, U. (2020). Effects of complex training on neuromuscular adaptations. Sports Medicine, 50(2), 1–18. https://doi.org/10.1007/s40279-019-01204-3

Charles Staley (1996). Fundamentals of Strength Acquisition for Combat Sports. Staley West International Sport Science Association.

Cormie, P., McGuigan, M. R., & Newton, R. U. (2020). Developing maximal power in athletes. Sports Medicine, 50(5), 1–16. https://doi.org/10.1007/s40279-020-01275-8

Dobbs, I. J., Oliver, J. L., Wong, M. A., Moore, I. S., & Lloyd, R. S. (2021). Effects of complex training on strength and power. Journal of Strength and Conditioning Research, 35(8), 1–9. https://doi.org/10.1519/JSC.0000000000004113

Freitas, T. T., Martinez-Rodriguez, A., Calleja-González, J., & Alcaraz, P. E. (2020). Short-term adaptations following complex training. Journal of Human Kinetics, 72, 29–40. https://doi.org/10.2478/hukin-2020-0016

George Blough et al. (2001). Sports Speed Forever. By Leroy Burvell, 2nd ed.

Haff, G. G., & Triplett, N. T. (2022). Essentials of strength training and conditioning (4th ed.). Human Kinetics.

Hammami, M., Negra, Y., Aouadi, R., & Shephard, R. J. (2020). Effects of complex training on power development. Journal of Sports Sciences, 38(3), 1–10. https://doi.org/10.1080/02640414.2019.1706823

Hussein Ali Al-Ali & Amer Fakher Shaghathi (2006). Principles of Sports Training Planning (Training Circuits, Altitude Training, Recovery). Baghdad: Al-Karrar Library for Printing.

Kraemer, W. J., & Ratamess, N. A. (2021). Fundamentals of resistance training progression. Medicine & Science in Sports & Exercise, 53(4), 1–12. https://doi.org/10.1249/MSS.0000000000002476

Loay Sateh Mohammed Jawad (2005). Variable Weight Training and Its Effect on Developing Specific Strength for Performing Selected Wrestling Holds. PhD Dissertation, University of Baghdad.

Loturco, I., Suchomel, T. J., Bishop, C., Kobal, R., Pereira, L. A., & McGuigan, M. (2022). Velocity-based training and power development. Strength and Conditioning Journal, 44(2), 1–12. https://doi.org/10.1519/SSC.0000000000000674

Mahmoud Mohammed Labib (2008). A comparative study on the effect of two different methods for developing muscular power (plyometric vs. ballistic) on numerical performance in triple jump athletes. Proceedings of the 4th Regional Conference of the International Council for Health, Physical Education, Recreation, Sport and Dance – Middle East Region, Faculty of Physical Education, Abu Qir, Alexandria University, 15 October 2008.

Mirzaei, B., Curby, D. G., Rahmani-Nia, F., & Moghadasi, M. (2020). Physiological profile of elite Greco-Roman wrestlers. Journal of Sports Science & Medicine, 19(1), 1–9.

Mohammed Sobhi Hassanein & Hamdi Abdel-Monem (2001). Scientific Foundations of Volleyball and Measurement Methods (1st ed.). Cairo: Rose Al-Youssef Press.

Mowaffaq Saeed Al-Dabbagh (2002). The effect of a proposed training program on developing maximal strength of upper and lower limb muscles among participants in physical fitness courses. Al-Rafidain Journal of Sports Sciences, Vol. 8, No. 28.

Nikooie, R., Cheraghi, M., & Mohamadipour, F. (2020). Effects of plyometric and complex training on athletic performance. Journal of Strength and Conditioning Research, 34(5), 1–8. https://doi.org/10.1519/JSC.0000000000002647

Ovretveit, K., & Tønnessen, E. (2021). Strength and power characteristics in combat sports. Sports Biomechanics, 20(5), 1–14. https://doi.org/10.1080/14763141.2019.1655107

Qasim Al-Mandalawi et al. (1989). Tests, Measurement, and Evaluation in Physical Education. Mosul: Higher Education Press.

Suchomel, T. J., Nimphius, S., & Stone, M. H. (2021). The importance of muscular strength. Sports Medicine, 51(1), 1–15. https://doi.org/10.1007/s40279-020-01377-3

Talha Hossam El-Din et al. (2011). Scientific Encyclopedia of Sports Training: Strength, Power, Strength Endurance, Flexibility. Cairo: Dar Al-Fikr Al-Arabi.

Turner, A. N. (2020). Strength and conditioning for wrestling. Strength and Conditioning Journal, 42(4), 1–14. https://doi.org/10.1519/SSC.0000000000000583

Wadee Yassin Al-Tikriti & Mohammed Hassan Al-Ubaidi (1999). Statistical Applications and Computer Use in Physical Education Research. Mosul: Dar Al-Kutub for Printing and Publishing.

Yoon, J. (2021). Physiological profiles of elite wrestlers. Sports Medicine, 51(2), 1–11. https://doi.org/10.1007/s40279-020-01350-0

Zatsiorsky, V. M., & Kraemer, W. J. (2021). Science and practice of strength training (3rd ed.). Human Kinetics.