

The Effect of Cluster Training on Speed-Strength and Explosive Power Endurance in Volleyball Players

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Abstract

To identify the significance of the differences between the pre-test and post-test in all variables under study. The researcher used the experimental method to solve the research problem, and the conclusions were: All the variables had the improvement was remarkable as a result of the efforts made by the coaches and players, and the second group significantly outperformed the control and first groups in all the variables studied. The role of cluster training in the development of all variables for the experimental groups became evident through observing the difference in results. Cluster-based exercises have a significant impact on development. The capabilities that helped in more effective field application. The overall superiority of the experimental group in the post-test of the research variables indicates the effectiveness of the units and the mechanism of their application to the aforementioned group. The cluster training method should be used and applied primarily in training units for different age groups. New trainers should be guided to use modern methods, as these have proven effective in achieving rapid development with balanced performance results. Conducting development workshops to train trainers on the importance and methodology of cluster training and other modern approaches. The need to conduct similar cluster training studies for other categories and games.

Keywords: Cluster training, volleyball, physical abilities, explosive power (characterized by speed), strength endurance.

Introduction

Despite the significant progress made in the sports field as a result of scientific research that helped raise the level of all sports games and events, Scientific research and specialists in sports training continue to work tirelessly to find the best and most effective ways to keep pace with scientific advancements. This is achieved through the integration and overlap of numerous theoretical and applied sciences that enrich the sports field and enhance the possibility of achieving peak performance. Furthermore, the development of sports equipment, tools, and other factors have led to improved player performance in international competitions and the emergence of record-breaking achievements. Therefore, studies and research related to the training process have helped coaches develop their knowledge of methods and... Methods that can influence the success of the training process include cluster training.

One of the most important modern training methods that has emerged globally in the last decade is cluster training, which relies on external resistance training. Its key feature is the provision of rest periods between repetitions, allowing for larger training volumes than other known methods. It is used to develop maximum strength, explosive power, and muscle hypertrophy, thus achieving [the desired results]. This is important for events and games that require production. Ability at the best level Among them is the game of volleyball. The importance of physical abilities in volleyball has increased recently because modern play has become more difficult and complex compared to previous playing styles. Functional abilities are also of fundamental importance in the development and advancement of a volleyball player and contribute to improving the player's skill level. The plan and understanding of this relationship are the foundation for developing appropriate training programs that help us reach high athletic levels; therefore, it has become imperative On the researcher that Analyze consciously the abilities that distinguish volleyball players, and it is not possible to determine the level of athletic training without resorting to physical and functional tests.

andbuildingBased on the foregoing, the importance of the research is evident in its useCluster training for young volleyball players and evaluating it through certain specific physical ability values.

Research Problem: One of the most important problems in strength sports, in all their forms, is the relationship between muscle building and muscle breakdown, and the degree of balance between the two.Each of these substances has its importance in the body's physiology.The athlete needs to work hard to find the best training method that will maintain his physical progress, develop his muscles, and bring them to their maximum potential.

andBased onThe above makes it clear that repeating different training loads according to training programs during the training season results in some physiological effects on players, particularly in the youth stages, leading to a stable level of muscle mass. Changes At their technical and skill level.

Research objectives: To identify the significance of the differences between the pre-test and post-test in all variables under study.

Research hypotheses: The researcher assumes that there are significant differences between the pre-tests and post-tests in the variables under study, in favor of the post-tests.

Research areas

- 1- **The human sphere:** Volleyball players of the specialized center in Dhi Qar Young people aged (16-18)
- 2- **Time domain:**13/12/2024 to 27/11/2025
- 3- **Spatial field:** Youth and Sports Forum Hall in Al-Shatra District.

Research methodology and field procedures:

Research Methodology: The researcher used the experimental method in a group approach One.

Research Community and Sample: The selection of a research sample is closely related to the objectives that the researcher sets for his research. Often, when studying a phenomenon, it is difficult for the researcher to use all members of the community. It is impossible or even impossible to select, observe, or measure all these individuals under controlled conditions. Therefore, the researcher resorts to selecting a sample that is representative of the original community. The sample is "that part of the community on which measurements are taken and which is selected according to scientific rules and methods so that it accurately represents the community." (Ma'youf, 2015, page 57).

The research community included young players at the specialized volleyball center in Al-Shatr district. The sample consisted of (24) players aged 16-18, representing the youth category. The pilot study included (4) youth players, representing (16.66%) of the original population. (2) players (the liberos) were excluded from the original population. For the experimental group It consists of (9)playeryenTheir proportion was (50%) One group was selected to conduct the main experiment on.

Sample homogeneity:

To verify the homogeneity of the sample, the researcher performed some procedures to control the variables, even though the selected sample was from a similar age group and homogeneity was performed on the entire sample. Statistical methods were used, including the arithmetic mean, standard deviation, and coefficient of variation for morphological measurements, to determine whether there was any difference. (Table) This explains it.

It turned out that the value of the coefficient of variation was less than 30%, and the sources mention that whenever the coefficient of variation is less than 30%, this means that the sample is homogeneous.

Table (1)The homogeneity of the research sample in terms of training age, height, weight, and morphological measurements is demonstrated using the coefficient of variation.

coefficientDifference	standard deviation	arithmetic mean	unit of measurement	Measurements
9.58%	1.66	17.31	year	Chronological age
1.19%	1.54	129.33	month	Training age
3.65%	2.71	74.431	kg	The block
1.03%	1.87	181.472	poison	height

The means, devices, and tools used:

Data Collection Methods:

- Arabic and foreign sources and references.
- Personal interviews.
- Observation and experimentation.
- Tests and Measurements

Tools and equipment used in the research:

- The researcher used the appropriate tools and equipment to complete the research requirements.

Field research procedures:

Defining the research variables:

The researcher for Defining the research variables after reviewing scientific sources and previous studies.

These are:

- 1- Explosive power.
- 2- Power characterized by speed

Description of the tests under consideration:

Physical fitness tests:

Firstly: Speed-strength test for the two men (Khazal, 2015, page 99)

Test name: Sit, get up, and jump Up (30) seconds of repetitions

Third: Explosive capability test for the two men (Al-Munim, The Scientific Foundations of Volleyball and Methods of Measurement, 1997, page 99):

- **The purpose of the test:** Measuring the explosive power of the two men
- ✓ **Fourth: Explosive capability test for hands** (Ahmed, 1997, page 76)
- ✓ **The purpose of the test:** Measuring the explosive power of the arms

3-5 Exploratory Experiments:

3-5-1 The first exploratory experiment:

The researcher conducted the exploratory experiment on Friday, December 13, 2024, at 5:00 PM. In the indoor sports hall at the specialized center in Al-Shatr district On the eye players from outside the research community were selected from the specialized volleyball center to apply physical capabilities. The purpose of this experiment is to assess performance, identify negative aspects and variables that will affect the work, and to confirm the following:

- 1- Knowing the appropriate tools and equipment to conduct those tests.
- 2- Knowing the appropriate time and place to conduct the tests.
- 3- Ensuring the adequacy of the support staff.
- 4- Defining the support staff in how to administer those tests.
- 5- Identifying the difficulties and problems that the researcher faces in applying those tests before applying them in the main experiment.

The second exploratory experiment:

The researcher conducted the second exploratory experiment on Monday, December 23, 2024, at 5:00 PM in the indoor sports hall at the specialized volleyball center in Al-Shatr district. The exploratory group was tasked with standardizing cluster training exercises and identifying their load components (intensity, volume, and rest).

- 1- Determining the extent to which the sample is able to apply those exercises.
- 2- Knowing the time required to perform those exercises.
- 3- Identifying the difficulties and problems that the sample faces in applying those exercises before applying them in the main experiment.

Main Experiment

3-6-1 Pre-tests for the research sample:

The researcher conducted the tests and pre-tests for the group. The trial period will take place on Monday and Tuesday before the training program is implemented. Wednesday Those who agree 3-4- 52/2025 at 5 PM (in the closed hall, Al-Shatr Youth Forum) Dhi Qar / Al-Shatr All (18) players in the research sample were present. On the first day, the researcher and his team took measurements (height, mass, and age) and then conducted physical ability tests.

3-6- 2 Cluster training method:

After reviewing sports training literature, particularly regarding cluster training, and consulting with experts, sports trainers, and specialists in sports training, the training method and approach were determined, and a training program was organized based on established scientific principles and the relationship between the components of the training load. It fits With capabilities and m The players' abilities in volleyball, and below are some explanations regarding the completion of the prepared training program.

The researcher adopted a cluster training method that closely addresses the specific needs of the skills and is scientifically based on the requirements for developing explosive power and speed-strength, as these are influential elements in volleyball skill performance. The method also incorporates a moderate intensity approach within the cluster training framework, focusing on the components involved in skill execution.

Explanations Special in the training curriculum:

Cluster training was implemented during the general preparation period from Tuesday, February 16, 2025 to Thursday, April 3, 2025, on the group Experimental She was applying the vocabulary of the curriculum prepared by the trainer.

- 1- The researcher used and designed 18 exercises during the special preparation period, 10 of which were done using weight machines inside sports halls to develop explosive power according to the cluster method, and 8 exercises designed by the researcher (physical) to be carried out in the volleyball court.
- 2- The researcher's exercises were distributed within four training units specific to the coach, as they were integrated with the team coach's program for the experimental group. Sunday and Wednesday were allocated to explosive power exercises, and Monday and Thursday to speed-strength exercises.
- 3- The exercises were carried out in the form of 32 training units distributed over 8 weeks of special preparation.
- 4- A model was adopted Jake Boly, 2018) Cluster training was chosen as a method for regulating the training load of the exercises performed. After consulting with the supervisor, the researcher decided to select this model of training load configuration as a basis for training the research sample in developing explosive power while reducing the weight intensity to suit the nature of performance in volleyball. The game requires developing speed of performance at the expense of strength, hence the selection of a 30 kg weight 50% of the maximum weight that can be lifted instead of 90%, and thus the proposed configuration is as follows:

Training ability

(2-2-1) 3 x 5 with 15 seconds of rest between each repetition, 30–50% intensity, and 3 minutes total rest between sets.

- 5- The intensity of performance in explosive power exercises was standardized through the weight of the weight, while the intensity of performance in speed-strength exercises was standardized through the speed of performance.
- 6- System 2 was adopted–1. In the undulation of training load during weekly loads.
- 6- The volume of the training load was reduced while the intensity of the training increased by decreasing the number of performance repetitions.

Post-tests for the research sample:

The post-test was conducted on the research sample in days Saturday and Sunday, corresponding to the 7th- 84/2025 (In the closed hall, Al-Shatr Youth Forum) After the completion of the curriculum application period, which lasted (8) weeks, the researcher ensured the provision of pre-test conditions and procedures for testing physical abilities. According to the division in the pre-tests.

Statistical methods:

The researcher used statistical methods that helped in processing the results and testing the research hypotheses through the use of the statistical package (SPSS) which is:

Presenting, analyzing, and discussing the results:

an offer Analysis results Tests Tribalism and the aftermath for the group First experimental in performance skills Physical.

Table (2) It shows the circles Calculation and deviations Standardization For the two tests Tribal And the post-physical skills and value(t) Calculated and value((Sig) and level Significance For the group empiricism

Significance	Sig	valuet	Post-test		Pre-test		Variables
			standard deviation	arithmetic mean	standard deviation	arithmetic mean	
moral	0.000	6.05	0.92	3.05	0.291	2.295	The explosive power of the two men
moral	0.000	5.45	0.45	3.02	0.23	2.43	The explosive power of the arms
moral	0.000	5.80	0.91	10.01	0.89	7.03	The strength and speed of the two men
moral	0.000	3.95	0.98	9.16	0.75	7.16	The distinctive power of the hands combined with speed

Discussion of the results of the experimental group:

By looking at Table (2), we note the significance of all the results and the validity of the post-tests for the first experimental group, as the researcher attributes this For many reasons, Cluster-based exercises help develop physical abilities. By working to achieve the desired impact on capabilities and taking advantage of the cluster training method, which is based on reducing and breaking down training into cluster-like parts. This is in agreement with (Abbas) **Rodrigo Ramirez Campillo Abbas Asadi And Rodrigo Ramirez- Campillo** Cluster training directly affects muscle strength, explosive power, and agility (speed of change of direction)." (Asadi, 2016, page 45).

The actual training achieves progress in one way or another, and practicing any sports activity in a regulated manner, as confirmed by (Risan Khribat and Ali Turki Musleh), that "the individual's practice of any sports activity may lead to biological changes in the various body systems, as well as changes in the blood. Some of these changes are temporary, accompanying the sports activity and disappearing after a period of time following its end, while others are permanent as a result of regular sports training, causing changes in the components of the blood that are characterized by continuity, leading to blood adaptation." (Muslih, 2002, page 67)

The researcher worked primarily with the support staff on the proper planning and implementation of training units, as the focus was on proper planning. For the workers Units and exercises It contributes significantly to understanding and standardizing training work and reducing the effort required to achieve the desired results. As Asil Thalj notes, "Changes in the training plan prove effective in good planning of exercises and their continued application for (12) weeks." (Snow, 2021, page 362) Likewise, the selected physical abilities have been carefully prepared with appropriate exercises for them, as they are important in developing the skills of volleyball players. The first attention was given to physical abilities, including explosive power, because muscular strength is the basis for building the body as a whole and the most important factor in improving and developing skills. This is in agreement with the opinion of (Musker), who says that any training program should include the element of muscular strength. I also agree with the opinion of (Di Carlo) that muscular strength is the first factor in developing skill performance. (Decarlo, 1963, page 37). The researcher worked on diversifying the exercises using a cluster training method. These exercises develop explosive leg and arm power and affect the muscles primarily involved in performance. This was achieved through understanding the technical aspects of the skill. As Husam Al-Momen and others state, "The consistency between exercises and training units is achieved through the proper distribution and division of exercises." (Salman Daoud Taima, 2024, page 37). Speed-strength and strength endurance are among the most important physical abilities, as they are the cornerstone of volleyball players' work. Jumping, hitting, and quick movement within the court require these physical abilities. Amjad Kazem states, "Speed-strength and strength endurance are among the most important physical abilities, as they help the player maintain his speed for a relatively long period of time and resist fatigue." (Kazem, 2023, page 41). The training process is a philosophy of the coach's thinking and a practical application on the ground. The exercises applied by the researcher are his philosophy about cluster training, as the training work includes taking into account the abilities and capabilities that the players have reached and studying their weaknesses. The researcher (Amir Abdul-Ridha) emphasizes that "it is important to point out that the application of the coach's philosophy regarding the exercises he chooses, or the method or training program." (Mazhar, 2023, page 68).

Abbas Mohsen notes that "creating competition and excitement on the one hand, and on the other hand, created the appropriate motivation for the players to integrate into the work and training." (Mohsen, 2024, page 33)

Mohammed Hadi states, "Including the correct training requirements in the training sessions, especially for the training group, helps the group to develop successfully and effectively." (Jasim, 2024, page 22)

Conclusions and Recommendations:

Conclusions: In light of the research findings, the researcher reached the following conclusions:

- 1- The variables The entire group had developed significantly as a result of the efforts made by the coaches and players, and the second group significantly outperformed the control and first groups in all the variables studied.
- 2- The role of cluster training in the development of all variables for the experimental groups became evident through observing the difference in results.
- 3- Cluster-based exercises have a significant impact on development The capabilities that helped in more effective field application.
- 4- The overall superiority of the experimental group in the post-test of the research variables indicates the effectiveness of the units and the mechanism of their application to the aforementioned group.

Recommendations

1. Using and primarily applying the cluster training method in training units for different age groups.
2. New coaches should be directed to use modern methods, as these have proven their effectiveness in achieving rapid development with balanced performance results.
3. Conducting development courses to train trainers on the importance and method of cluster training and other modern methods.
4. The need to conduct similar cluster-based studies for other categories and games.

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