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The impact of the CROSSFIT training program

To develop the of cardiorespiratory endurance and explosive strength quality among senior handball players

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Abstract: Some scientists and specialists in the field of sports point out that the connection between explosive strength and cardiorespiratory endurance is one of the most important requirements for athletic performance at high levels of sports, and that this physical ability is one of the most important things that distinguish outstanding athletes

Therefore, the researcher thought about the possibility of planning an experimental program that includes training and developing explosive strength and cardiorespiratory endurance, as this training system works to raise the level of muscular ability and achieve the set goals in a very short time.

Based on all this and to solve this problem, we pose the general question:

Does the CrossFit training program have an impact on developing cardiorespiratory endurance and explosive strength among senior handball players?

After applying the training program by the Amjad youth team of the of Chattia - Chlef Province, class senior, and compared to the control sample, it was trained using the regular program, , such that there were no statistically significant differences between the two tests. Pre and post at the level of both cardiac and respiratory endurance tests and explosive strength**.**

Keywords: crosssfit; cardiorespiratory endurance; explosive strength; senior handball players.

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1. INTRODUCTION

In handball training, there are many ways and methods for developing cardiorespiratory endurance and explosive muscle strength. Overcoming external resistance through contraction is linked to the ability to resist fatigue for the longest possible distance and time. Some scientists and specialists in the field of sports point out that the connection between explosive strength and cardiorespiratory endurance is one of the most important requirements for athletic performance at high levels of sports, and that this physical ability is one of the most important things that distinguish outstanding athletes, as they possess a great deal of strength, endurance, speed, and skill, and the connection between these The qualities to produce powerful and efficient movement in order to achieve the best possible athletic achievement.

Among the modern training methods and ways in football, there is "Crossfit" training, which is special training to develop explosive strength and endurance and to link them together. Therefore, this type of training has quickly emerged, especially in the Arab countries, and has become one of the most popular methods. Training for all levels and ages has become accepted as it is one of the best fitness sports in the world. Although it is a completely safe sport, it should be practiced under the supervision of a specialized coach to create a comprehensive athlete with all physical qualities.

CrossFit exercises include push-ups, running, tummy tuck exercises, gymnastics exercises, weight lifting, etc., so that this type or training method is practiced either individually or in a group, and most tend to practice in groups, especially among young people, in order to add Competition and challenge among them. Some people want to practice CrossFit in order to lose excess weight, while others want to be physically fit and build strong muscles and flexibility.

It became clear to the researcher, through his review and observations of handball training, that the "CrossFit" training exercises were not given the necessary importance to bring the players to the required level, and from here the importance of research emerged in experimenting or using the "CrossFit" training exercises and knowing the extent of their effect in developing endurance and strength. The explosiveness of handball players is the highest level.

2. The problem: Handball has entered a stage of extreme complexity and modernization in the techniques and methods of playing, which includes many aspects, including physical, technical, skill, and tactical development. In order to

achieve the highest form of handball, players must reach the highest levels of physical performance, proficient skill, and technic performance with the least effort and time. It is possible, and this is what handball coaches seeka scientific training programs.

The efforts made in the field of sports training as a result of various studies and research has achieved advanced results in the game of handball, there are still existing problems and complexities related to the training process that require effective scientific solutions that fall on the responsibility of coaches and specialists in the game of handball, and also require research. Modern scientific means and methods supported by experiments help raise the level of physical and skill performance among players.

For this purpose, the CrossFit training program was designed to achieve direct development of the physical qualities that ultimately form the strength of a strong player with a high physical and technical level.

Therefore, the researcher thought about the possibility of planning an experimental program that includes training and developing explosive strength and cardiorespiratory endurance, as this training system works to raise the level of muscular ability and achieve the set goals in a very short time.

Based on all this and to solve this problem, we pose the general question:

Does the CrossFit training program have an impact on developing cardiorespiratory endurance and explosive strength among senior handball players?

2.1 partial problems

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2.2Second Subtitle

-Are there statistically significant differences between the control and experimental groups in the pre-test and post-test to develop the explosive strength quality of handball players?

-Are there statistically significant differences between the control and experimental groups in the pre- test and post-test for developing cardiorespiratory endurance among handball players?

3. General hypothesis

The CrossFit training program has an impact on developing cardiorespiratory endurance and explosive strength among senior handball players

3.1 Partial hypotheses

•There are statistically significant differences between the control and experimental groups for the development of explosive strength among senior handball players.

•There are statistically significant differences between the control and experimental groups for the development of cardiorespiratory endurance among senior handball players.

3.2 methods

We use the experimental approach in our application of the vocabulary training program for CrossFit exercises specialized in developing cardiorespiratory endurance and explosive strength as an independent variable for this research, while the dependent variable represents the relationship or effect of this type of exercise or training units on developing cardiorespiratory endurance and explosive strength among handball players. .

In our research, we tested the research sample in an intentional manner. The sample consisted of 18 handball players from the largest amateur club of the Sports Federation of the municipality of Chattia, Chlef Province. The sample was divided into two groups randomly, the first was control (09) players and the second was experimental (09) players. All members of this sample were from the same team in the section of the amateur leagues.

•Control group: practices a normal training program.

•Experimental group: practiced the regular training program and “CrossFit.”

This category trains 5 sessions per week, and their training life is estimated at more than 6 years of training.

-Presentation and analysis of the pre-test results between the experimental and control groups regarding cardiorespiratory endurance

Table No. 01 shows the results of the pre-tests for the experimental and control groups regarding maximum aerobic capacity:

Sample	arithmetic mean	standard deviation	Tabular T	T Calculated	significance
Experimental group	13.26	1.27	2.12	1.19	Not significant

Control group	13.23	2.29			

Degree of freedom16 significance level 0.05

We notice from Table No. (1) that there are differences between the means, but these differences are not statistically significant due to the fact that the calculated t value is estimated at 1.19, which is therefore less than the tabulated value of 2.12 at a degree of freedom of 16 and the significance level is 0.05, meaning that the two groups Homogeneous in the level of cardiorespiratory endurance.

- Presentation and analysis of post-test results between the experimental and control groups regarding cardiorespiratory endurance:

Table No. 2 shows the results of the post-tests for the experimental and control groups regarding maximum aerobic capacity

Sample	arithmetic mean	standard deviation	Tabular T	T Calculated	significance
Experimental group	14.52	0.77	2.12	3.69	Not significant
Control group	13.68	1.19			

Degree of freedom16 significance level 0.05

It is clear from what is represented in Table No. (2) that there are differences between the averages of cardiorespiratory endurance results between the experimental and control groups after the experiment, as the calculated T-score reached (3.69), which is therefore greater than the tabulated T-score, which was estimated at (2.12) at The level of significance is 0.05 and the degree of freedom is 16, meaning that there are statistically significant differences between the results of the two groups, which are in favor of the experimental group with regard to cardiorespiratory endurance measured after the experiment.

- Presentation and analysis of the results of the significance of the dimensional differences between the experimental and control groups regarding the explosive strength of the legs

Table No. 3 shows the results of the pre-tests for the experimental and control groups regarding the level of explosive power of the legs

Sample	arithmetic mean	standard deviation	Tabular T	T Calculated	significance

Experimental group	0.97	0.20	2.12	0.72	Not significant
Control group	0.90	0.15			

It is clear from Table No. (3) that there are no differences between the average results between the experimental and control groups before the experiment in the level of explosive force of the legs, as the calculated T reached (0.72), which is therefore smaller than the tabulated T, which is estimated at (2.12) at the level of The significance is 0.05 and the degree of freedom is (16), meaning there is homogeneity between the experimental and control groups in the level of explosive force of the legs.

- Presentation and analysis of the results of the significance of the dimensional differences between the experimental and control groups regarding the explosive strength of the legs

Table No. 04 shows the results of the post-tests of the experimental and control group regarding the level of explosive strength of the legs

Sample	arithmetic mean	standard deviation	Tabular T	T Calculated	significance
Experimental group	1.55	0.67	2.12	3.75	significant
Control group	0.97	0.71			

from Table No. (04) that there are differences between the average results of the explosive force of the two legs between the experimental and control groups after the experiment, as the calculated T reached (3.75), which is therefore greater than the tabulated T, which is estimated at (2.12) at the significance level of 0.05 and degree Run 16, meaning that there are statistically significant differences between the results of the two groups, which are in favor of the experimental group with regard to the level of explosive strength of the legs after the experiment.

4. CONCLUSION

- Discussing the results and hypotheses of the study:

First hypothesis:

The hypothesis states that there are statistically significant differences between the pre-test and the pre-test for developing cardiorespiratory endurance among senior handball players.

To confirm or deny this hypothesis, the researcher conducted pre- and post-measurements of the level of cardiorespiratory endurance for both the experimental and control groups. These results reflect the effectiveness of the training program proposed by the researcher, and this is consistent with (-, 1996, p. **108**)that cardio-aerobic endurance plays a major role in developing the performance of a handball player

It agrees with what **(Ibrahim, 2008, p. 42)** mentioned, that CrossFit works to increase endurance capacity, as the intensity of the exercise provides cardiovascular exercise, just as if you were on a fast running track, due to its focus on the short duration, but with greater intensity that increases endurance capacity.

It is consistent with the study of Muhammad Mahmoud Kazem that endurance in skill performance is a basic foundation for physical performance on which sporting events depend.

And the study of **(Al-Qadi, 2023)**Alaa Hosni Muhammad Al-Qadi showed that performing exercise and physical effort that depends on the oxygen system causes physiological changes in the circulatory-respiratory system, as it improves cardiorespiratory fitness, as well as the heart and circulatory system, as it works to raise the functional efficiency of the heart and circulatory system, and this is shown through Regular heartbeat and a decrease in its speed per minute during rest

Thus, the hypothesis is verified that CrossFit training improves the level of cardiovascular endurance

Second hypothesis:

Through the results that indicate the presence of statistically significant differences regarding explosive power in favor of the experimental group, as CrossFit training improved the level of explosive strength of the legs. These results show the effectiveness of the training program proposed by the researcher. Likewise **(Hamish Zakaria, 2023) (Mohamed, 2023)**

This is what (**others, 1998, p. 102**)said that these exercises work to develop the muscular strength of the athlete due to their distinctive characteristics in training

and developing strength. Through a complete program lasting 10-15 minutes, you can obtain a comprehensive, integrated program with high efficiency and in a short period.

The effect of a proposed training program in developing some physical abilities and basic handball skills

It is consistent with the study of **(Mustafa:, 2019, p. 55)**

Handball is one of the games that requires a high level of physical fitness, which in turn develops the skill side of the players. Which added a burden to trainers in finding training methods to raise the level of physical fitness. Handball is characterized by the fact that players must have a high physical level in order to achieve victory.

These results reflect the extent of the effectiveness of the training program proposed by the researcher applied to the experimental sample from what was previously explained, and through the results obtained statistically, we can judge that the second hypothesis is fulfilled.

After applying the training program proposed by the researcher to the research sample, which was represented by the Amjad youth team of the municipality of Chattia - Chlef Province, class senior, and compared to the control sample, it was trained using the regular program, as the results were modest for this sample, such that there were no statistically significant differences between the two tests. Pre and post at the level of both cardiac and respiratory endurance tests and explosive strength.

Thus, confirming the validity of our hypothesis that the proposed training program has a positive effect on developing the characteristics of cardiorespiratory endurance and explosive power among handball players.

Suggestions:

- Using crossfit exercises as a way to develop the physical qualities of handball players.

-The need to train trainers specialized in crossfit training.

- Extending the training period further to achieve goals and achieve other results that can be used to gain greater knowledge about physical characteristics.

-Conduct similar studies in other sports and different age levels.

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