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The Effect of Plyometric Training on Developing Muscular Endurance of the Legs and Performing the Skill of the Firewall in Volleyball

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Abstract:

The study aimed to prepare plyometric exercises for the research sample to develop muscular endurance of the legs, as well as identifying the impact of plyometric exercises and their relationship to the performance of the firewall in volleyball, the researcher used the experimental method in the style of pre- and post-testing in order to suit the nature of the research and its objectives, the research was conducted on a sample consisting of (20) players representing Najaf Youth Forum, the program was implemented on the research sample for a period of (12) weeks, and after the completion of the program, the data was collected and unloaded, in preparation for obtaining the results, the results of the study found that there is a positive effect of the use of plyometric training on the development of muscular endurance of the legs, the researcher recommends the importance of using plyometric exercises to develop the performance of the firewall skill in volleyball.

Keywords: Effect of plyometric training – muscular endurance of the legs – Firewall skill

The research

1.1 Introduction and importance of the research:

Introduction:

Sports training is a purposeful educational process, based primarily on many scientific foundations, which serve the aspects of physical, skill, tactical and psychological preparations, through it, the principle of integration is achieved in the development of these aspects to reach the player to the best levels of sports. Mohammed (2005) believes that raising

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the level of achievement and sports performance is a process with multiple scientific dimensions that is reflected through the application of various education and training programs and the contribution of scientific information and facts in the legalization of physical, skill and tactical training loads to prepare an integrated player, to face sports competitions. Mufti (1996) states that the methods of sports training varied to aim to develop the level of physical, skill and technical performance, in order to achieve advanced positions in various sports activities, those in charge of the training process seek to choose the best types of training methods, apply the most appropriate and use the latest means that suit the type of specialized activity, this is in order to invest the most important motor and physical abilities of the specific type of activity, because of their direct impact on the high level of physical and skill performance.

1-2 Research Problem:

Sports training aims to try to bring the player to the highest possible athletic level in a certain type of sports activities, to achieve this goal, sports training seeks to develop and develop both the elements of physical fitness and motor abilities of the chosen sports activity, and training Plyometric of the most famous methods currently in the development of muscular ability and depends on the development of strength and speed together and there are many activities used Plyometric to improve performance by it, it increases power and speed more than usual methods while retaining a high degree of speed (2002 Mike, stone). Al-Sukari (2002) indicates that plyometric training is an intensity training that is used to develop some physical qualities such as speed, agility and ability, this type of training characterizes speed in performance and its effective effect in developing these qualities and improving rates of muscle contractions.

Through the experience of the researcher being a player, teacher and follower of volleyball, they noticed a weakness in the level of skill performance of the players who practice the skill of the firewall for the muscles of the legs and the strength of jumping, which is reflected in the performance of the players, there is also a problem that lies in the lack of specialized training programs that players can acquire and develop their training and digital level with the least possible time and effort, hence, this study came to provide accurate and correct data on the effect of using plyometric training on the development of muscular endurance of the legs.

1-3 Research Objectives:

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1- The use of plyometric training in the development of muscular endurance of the two men.
2- Using the training of the plyometric to develop the performance of the firewall skill in volleyball.

1-4 Research Hypothesis:

1- There are statistically significant differences between the results of the measurements for the pre- and post-test of the research sample in the development of muscular endurance of the two men
2- There are statistically significant differences between the results of measurements for the pre- and post-test of the research sample in the development of the performance of the skill of the firewall volleyball.

1-5 Research Fields:

1- Human Field: players Najaf Youth Forum players
2- Time Field: 3/7/2022 to 23/10/2022.
3- Spatial Field: Najaf Youth Forum .

2- Research Methodology and Field Procedures:

2.1 Research Methodology: The researcher used the experimental approach in the style of experimental testing with tight control before and after so as to suit the nature of the research and its objectives "and experimentation is the deliberate and controlled change of the specific conditions of an accident and note the resulting changes in the incident itself and its interpretation and the reasons that affected it" (Dhafer Hashem Al-Kadhmi, 2012).

2-2 Research Sample: The research sample was represented by the youth players Najaf Youth Forum in Najaf Governorate, who were chosen in a deliberate way, and their number is (20) players registered within the club for the year 2021-2022.

2.3 Methods, tools and devices used in research:

2.3.1 Means of data collection:

- Arab and foreign scientific sources, observation and experimentation, testing and measurement.

2.3.2 Tools and devices used:

- Volleyballs number (5)
- Multi-height wooden boxes.
- Multi-height barriers.

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- Medical scale to measure weight.
- Meters to measure length.
- Stop Watch.
- Signs and cones.

2-4 Determine the tests:

First: Muscle endurance test for the legs

Test: Sitting from lying down with knees bent and hands on the chest.

- Purpose of the test: to measure the endurance of the abdominal muscles.
- Tools used: stopwatch.
- How to perform: From a lying position with the knees bent and hands on the chest crossed on the shoulders, when the start signal is given, the student straightens the knees to reach a standing position, then return to the initial mode and so repeat the test for the largest number of repetitions within 60 seconds.
- Recording: Records the number of correct attempts during a time of 60 seconds from the initial position until the return to it, and so on the length of the test period.

Second: Test the repetition of the firewall skill:

- Purpose of the test: Measure the player's ability to perform repeatedly at the same rate as the firewall skill from a single location on the network.
- Tools: legal volleyball court, seat (terrace), legal volleyballs, stopwatch, net with legal height (243 cm).
- Performance specifications: The seat (terrace) is placed behind the net in the middle and at a distance of (50 cm), the coach stands on the seat and holds the ball with both hands until it is higher than the level of the net by a distance of (20 cm), stands (the laboratory) inside the area (3 m) in the second half of the field until it is facing the net, when hearing the start signal, the tester advances and jumps (jump) to perform the skill of the firewall until it touches the ball that the coach catches with both hands from the top of the ball and then lands on the ground, repeating the performance for as many as possible for a period (10 seconds).
- Conditions: Every time the tester jumps to perform the firewall, it is necessary to touch the ball with both hands from the top of the ball - The tester must repeat the performance until he hears the signal to

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end the time specified for the test - The coach must keep the height of the ball above the net for the duration of the tester's performance - which performance that violates the previous conditions is not counted in the attempt within the number made by the tester during the time specified for the tests.

- Registration: The tester records the number of correct attempts made during a period of (10s) (Nouri Ibrahim Al-Shawk, 1996).

2-5 Exploratory Experience:

"It is a practical training to find out the negatives and positives that meet the researcher during the test to avoid them in the future" (Nahida Abd Zeid, 2002), so the exploratory experiment was conducted on 5/7/2022 AD in Kufa Club Stadium on a sample consisting of (8) players who were randomly selected and from outside the main research sample, and the aim was to:

- Know the obstacles facing the researcher when applying tests.
- Know the difficulties facing the researcher and develop appropriate solutions to them.
- Know the validity of the tests, devices and tools used, as well as know the time required to implement the training program.

2-6 Scientific foundations of tests:

2.6.1 Validation of the test

Validity means "the accuracy with which the test measures the purpose for which the test was developed" (Youssef Lazim Kammash, 2003) and in order to obtain the validity of the candidate tests.

2.6.2 Stability of the test.

Stability is defined as "if the test gives the same results if it is repeated on the same individuals under the same conditions" (Rahim Younis, 2008), to find out the stability of the tests, the researcher used the test method and re-applied the test, as the researcher carried out the tests on 12/7/2022 AD on a sample of (8) players other than the experimental research sample, and after seven days, the tests were repeated, as "The period between the two tests takes between (1-7) days (Ahmed Khater, Ali Fahmy, 1987)."

2-7 Pre-tests:

The pre-tests were conducted on (13/7/2022) on the research sample two houses in the closed hall of Najaf Sports Club at (3) pm, as the muscular endurance test of the two legs and the repetition test of the

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repelling wall were conducted, and all members of the research sample numbered (16) players were present, through the efforts of the assistant team, the tests were completed at 7 pm.

2-8 The main experience:

The researcher applied the training program on 14/7/2022 until 14/10/2022 The research sample underwent the training program developed by the researcher himself, the experiment lasted (12) weeks and three training units, as the researcher used the following rules in the output of the training unit:

- The exercises should be at the level of the research sample.
- The training was done in the manner of repetitive training and the method of low and high intensity interval training with interstitudinal rest.
- The researcher adopted in determining the rest periods between exercises to be sufficient to restore the normal functional state of the player (Raysan Khreibit, 1995).
- The duration of the program is 12 weeks.
- Weekly training times 3 times.
- The duration of the training unit is 90 minutes.
- Number of sets of one exercise 4-6 sets.
- Repetitions per exercise: * 7 for 70% intensity, 6 for 60% intensity, 5 for 50% intensity.
- Intergroup breaks 2-3 minutes.

2-9 Post-tests:

After completing the implementation of the training program, the post-tests were conducted on the research sample on 15/10/2022, taking into account the provision of temporal and spatial conditions and the means used in the pre-tests and the same assistant work team.

2-10 Statistical Methods:

The researcher used the SPSS statistical bag to process the data.

3- Presentation and discussion of the results:

3-1 Presentation of the results of pre- and post-tests for the research sample:

Shows the arithmetic means, standard deviations and value (T) of the experimental research sample in the pre- and post-tests of the tests used

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Table 1

S.	Tests used	Pre-test		Post-test		T-test value	Significance level	Significance type
		S	P	S	P			
1	Muscle endurance test for legs	31,67	5,43	35,24	3,87	5,76	0,05	Significance
2	Firewall Redundancy Test	12,918	2,123	14,035	1,065	1,258	0,05	Significance

3-2 Discussion of the results:

Through the results of Table No. (1) Show that there are significant differences in the post-test of the research sample and this is what achieves the validity of the research hypotheses.

The researcher attributes these results to the advantages of plyometric training that effectively affected the elasticity and flexibility of muscles and joints, especially their flexibility, and that the exercises were carried out in some forms on performance in the full range of motion, whether to kick during the performance of the skill on the boxes divided barriers or cones, along with some stretching and flexibility exercises and movements that were interspersed with the proposed training program, which positively affected the increase in the level of flexibility and strength of the muscles and surrounding ligaments and joints, this is consistent with what Abulela (1997) pointed out that plyometric training is one of the types of exercises that contribute to improving some special physical abilities, the most important of which is muscular strength, this finding is consistent with Al-Khatib's (1991) point out that deep jump training increases the ability of the muscles of the legs to perform explosively, the use of the deep jump also has an important impact on the development of agility, which is represented in the decrease in the time of changing direction in the air and on the ground and the importance of the link between the element of agility and what the body requires to change its direction in the air.

The researcher also attributes this to the impact of the proposed training program, which was characterized by balanced and comprehensive development of the elements of physical fitness under study and taking into

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account the individual differences between the research sample and the use of the principle of gradation in pregnancy, this is consistent with what Abulela Abdel Fattah (1997) pointed out that plyometric training is one of the exercises that contribute to improving some special physical abilities, the most important of which is muscle strength, this finding is consistent with what Al-Ameer (2011) pointed out that plyometric training is the link between muscle strength and ability, several studies have confirmed that a combination of plyometric training in addition to traditional strength training will lead to a high level of ability.

Ahmed Al-Bastawisi (1996) stressed that plyometric exercises are effective training methods to develop strength characterized by speed and contribute effectively to improving achievement in activities that need speed such as jumping and sprinting, this means that the plyometric exercises improved the reaction speed of the experimental sample as well as increased step length.

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The researchers also believe that the plyometric exercises worked on the development of vertical jump (jump up) this came as a result of the effect of plyometric exercises on the muscular ability of the legs by the vertical jump test as shown by the results of the study of Ibrahim Adel (1993) and the study of Salva Sahak (2000). Lenny Wilkins (Adams, 1999) confirms that one of the factors affecting the success of skill performance is plyometric exercises and that this type of training contributes positively to the development of explosive power and agility and that there is a strong relationship between each of the plyometric exercises on the one hand and explosive power and agility and the level of performance on the other hand as it can adapt plyometric exercises in the direction of agility by adding motor or rotational duties as most sports depend on the link between their combined vocabulary.

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4- Conclusions and recommendations:

4-1 Conclusions

1- The use of training plyometric has an effective effect in the development of muscular endurance of the two legs of the research sample.
2- The use of training plyometric has an effective impact in developing the performance of the skill of the firewall in volleyball.

4-2 Recommendations

1- Work on the application of the proposed training program using the plyometric training for its contribution to the positive impact for the development of muscular endurance of the two legs and the performance of the skill of the firewall volleyball for the research sample. Conducting this study on different age samples with different training ages.
2- Diversity in the use of training methods for plyometric exercises and not relying on one training method.

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تأثير التدريب البليومتري على تطوير قدرة التحمل العضلي للساقين وأداء مهارة الحائط الصد في الكرة الطائرة

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ملخص:

هدفت الدراسة إلى إعداد تمارين بليومترية لعينة البحث بهدف تطوير التحمل العضلي للساقين، وكذلك التعرف على تأثير التمارين البليومترية وعلاقتها بأداء مهارة الحائط الصد في الكرة الطائرة. استخدم الباحث المنهج التجريبي بأسلوب الاختبار القبلي والبعدي بما يتناسب مع طبيعة البحث وأهدافه. أجريت الدراسة على عينة مكونة من (20) لاعباً يمثلون منتدى شباب النجف، وتم تنفيذ البرنامج على عينة البحث لمدة (12) أسبوعاً. وبعد الانتهاء من البرنامج، تم جمع البيانات وتفريغها تمهيداً للحصول على النتائج. وخلصت نتائج الدراسة إلى وجود تأثير إيجابي لاستخدام التدريب البليومتري على تطوير التحمل العضلي للساقين. يوصي الباحث بأهمية استخدام التمارين البليومترية لتطوير أداء مهارة الحائط الصد في الكرة الطائرة.

الكلمات المفتاحية :تأثير التدريب البليومتري – التحمل العضلي للساقين – مهارة الحائط الصد