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Proposed training program in the preparation phase using plyometric exercises on the development of explosive abilityof lower limb muscles in soccer playersU17.

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Abstract:

The study aimed to identify the impact of the proposed training program in the preparation phase using plyometric exercises to develop the explosive ability of the lower limb muscles of football players U17, and to identify the statistically significant differences between pre and post testing in the explosive ability of the experimental group, for that we used the experimental method in the style of equal groups (control and experimental), On a sample of 20 players, after which we performed thenecessary statistical treatment and analyzed by the Spss program, the results of the study and found that the proposedtraining program had a positive impact on the development of explosive ability for football players U17, and also found there are statistically significant differences between pre and post testing in the explosive ability of the experimental group, in addition to that there are statistically significant differences in the post test of explosive ability characteristic between the control and experimental groups.

Keywords: Training program, plyometric exercises, explosive ability, football, class under 17 years of age.

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1.Introduction:

The world is witnessing a significant increase in sporting achievements as a result of researchers' efforts to benefit from other sciences (physics, psychology, biomechanics, sociology, **medicine**, etc.) in the field of physical education and sports, as well as the world of training, in order to raise sporting standards. Performance and the scientific component to always achieve the best, set records, and achieve international numbers.
(Muwaffaq Asaad, 2009, p. 95).
Although many studies and research in the field of football training in general and training of small groups, in particular, have focused on the process of Programming or scientific principles of sports training, the game of football has evolved in recent years and the character of playing has changed due to the variety of modern ways of playing, where the physical level has increased and the level of technical, physical, tactical, and psychological performance has increased. However, these studies did not address qualitative exercises in terms of performance and muscle work and their relationship to the requirements of playing football. Also, in the recent period, interest in the form and quality of motor activity of players in the field of football during matches has begun, which shows the importance of the need for a special type of training in line with the nature of physical, technical, tactical and psychological performance and changing playing situations.
(Moussa boutahra, abderrahimsellami, 2023, p508).

Sports training is a targeted and directed process through those processes that depend on scientific foundations that aim to develop the capabilities of players in order to reach higher levels and achieve high achievement **(kermicheabdelmalek, 2022, p79),**As the training helps to maintain the level of the player's training condition in the physical, technical, tactical, and even psychological aspects and others for a long period of time, and this is only done through building a training program that helps reach what is required to be achieved **(benhamidouchefaiza, mazarifateh, 2022, p429).** The development of physical, technical, tactical, psychological, and mental skills as well as the creation of similar situations, such as competition, are necessary for achieving athletic success; “a football player who has knowledge and experience in the arts of the game and uses his tactical field intelligence to play and fight for Achieving the goal with great effectiveness can excel with his team and get good results in matches, and this superiority and success requires the presence of the basic factors for developing attack and defence tactics, which are physical capabilities and capabilities. **(Muwaffaq Asaad Mahmoud, 2009, p. 95).**

In the sport training we have many training methods aimed at developing the level of physical and skill performance in order to achieve advanced positions in the practiced activity through the capacity of the trainers to choose the best training methods and use the latest means in order to achieve the highest possible level of benefit **(Halloubameur, allolighani, 2022, p64).** The plyometric method is one of the best way using to the development of the physical aspect of the athlete to perform physical efforts efficiently without any problem hindering his progress towards achieving high levels**.**
(Alaa Hammoudi and others, 2021, p. 104).

The physical aspect has become more manageable and workable, by assigning this task to the physical equipment that seeks to find the best ways to develop the physical aspect

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of players **(Tarek Salaheddine, Sayed Mustafa, 2005),** through the use of multiple types of exercises in training classes that are subject to training methods and programs codified according to scientific principles and foundations **(Alaa Hammoudi and others, 2021, p. 104),** where modern football has become dependent on speed, strength and the change in the implementation of various skills, whether with or without the ball, which has made modern training move towards the peculiarities of the footballer, and we find that explosive ability enters many of those skills **(al-antari Mohammed Ali and others, 2020, p. 68),** Where there are many ways to develop it, perhaps the most important of which is plyometric training, **Mohammed Jamal al-Din**said about this method: Plyometric exercises are one of the most appropriate ways to develop explosive ability to improve the level of motor performance more than the usual methods **(Jamal al-Din Hamada, 1993, p. 92),** and one of its most important advantages is that the strength gained from this type of training leads to better motor performance in the sports activity practiced by increasing the ability of muscles to contract at a faster pace.

(Abdul Aziz Ahmed Al-Nimr, Nariman Ali Al-Khatib, 1996, p113-114).

The researcher believes that the explosive ability in the sport of football is one of the basic physical qualities in raising the level of skill performance such as shooting towards the goal or direct free kicks or upgrading to hit the ball with the head, and from these valuable data the researcher believes that what the games and the conditions of competition make it urgent to conduct a scientific study experimental by proposing training program in the preparation stage using plyometric exercises to develop the explosive ability of the lower limbs muscles in soccer players U17, in light of all of the above and the valuable opinions of researchers in the theories and curricula of sports training in football, we decided to ask the question of the following year, **which explains the problem (The central question):**

- Is training program proposed in the preparation phase using plyometric exercises effective in developing the explosive ability of the lower limb muscles of 17U footballers?

Sub-questions:

- Are there statistically significant differences in the explosive ability of the lower limbs between pre and post testing in the experimental group?.
- Are there statistically significant differences between the post test results in the control and experimental groups in the explosive ability of the lower limb muscles?.

1-1. The general hypothesis:

- training program proposed in the preparation phase using plyometric exercises is effective in developing the explosive ability of the lower limb muscles of 17U footballers.

Sub hypotheses:

- There are statistically significant differences in the explosive ability of the lower limbs between pre and post testing in the experimental group.
- There are statistically significant differences between the post test results in the control and experimental groups in the explosive ability of the lower limb muscles?.

1-2.Study objectives:

- Knowing the effect of training program proposed in the preparation phase to the development of the explosive ability of the lower limb muscles of football players U17.

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- Knowing the nature of statisticallysignificant differences in the explosive ability of the lower limb muscles between the pre and post testresults of the experimental group.
- Knowing the nature of statisticallysignificant differences in the explosive ability of the lower limb muscles between the post test results ofcontrol and experimental groups.
- The use of physicals tests in the detection process to improve and develop some physicals fundamental qualities for soccer players under the age of 17.
- Identify the most effective ways and methods to raise the level of explosive ability (muscle ability) in football.

1-3. The importance of the topic:

- proposal training program in the preparation stage using plyometric exercises and it's effective to the development of the explosive ability of lower limb muscles.
- highlight the modern training methods used with young players in the football sport and know the most qualitative method to increase physical performance.
- Plyometric training are especially important for soccer players under the age of 17.
- Testing football players physical abilities during the preparation stage.
- Providing a special training program to assist those in charge of future trainingaffairs in preparing their players in a committed and purposeful manner, developingbasic physicals quality's and thus raising Algerian footballer'sphysicals level.

1-4. previous and similar studies (Literary Review):

1-4-1.Al-Antari Mohammed Ali study (2020):

title: "The impact of a training program using plyometric exercises on some physical variables of U19 football players".

Objective:the study aimed to know the impact of the proposed training program using plyometric exercises on some physical variables of football players.

Approach: The experimental approach designed by the two independent groups was adopted.

Results:there are statistically significant differences between the control group and the experimental at the level of physical variables under study (speed- explosive force - VMA) in the distance measurement.

1-4-2.Alaa Hammoudi and others study (2021):

title: "The impact of a training program in the method of circular training in the development of the qualities of explosive power and transitional speed in the football players is a middle class".

Objective:the study aimed to find out the impact of the proposed training program based on the method of circular training on the development of the characteristic of explosive power and transitional speed in the football players a middle class.

Approach: The sample of the study was represented by 14 players in the middle class in Telemcen state.

Results:there arestatistically significant differences in the qualities of explosive force and transitional speed between pre and post testing in the experimental group.

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1-4-3.Abdul Rahman study (2017):

title: "The effect of plyometric exercises in a repetitive way on the development of the muscle capacity of the muscles of the legs and the shooting power of the U17 football players ".

Objective:the study aimed to reveal the effect of plyometric exercises repetitively on the development of the muscle capacity of the muscles of the legs and the shooting power of football players**.**

Approach: The sample of the study consisted of 18 players from the MC Team Khamis Meliana divided into two groups.

Results:the proposed program has a positive impact on the development of muscle ability and shooting power of U17 football players.

1-4-4.Rashad Djeddi and others study (2020):

title: "The impact of high-intensity interval training on improving some physical qualities (speed - explosive force - agility) on U17 footballers".

Objective:the study aimed to identify the impact of high-intensity interval training on improving of some physical qualities(speed - explosive force - agility) of the football players U17**.**

Approach: The sample of the study consisted sample of 20 players from the sports club of the Tebessa Federation divided into two groups**.**

Results: The high-intensity training has a positive impact on the study variables (speed, explosive force, agility).

1-4-5.Awadi Fares, Mashrock Mustafastudy (2018):

title: "Proposing a training program using mini-games to develop some basic physical qualities and skills of U17 football players".

Objective:the study aimed to determine the effectiveness of the training program based on mini-games on the development of some physical qualities and basic skills in football players**.**

Results:the training program based on mini-games has a positive impact on the development of some physical and skill qualities in U17 football players.

1-4-6.Aissa Chouaf, ZemamAbderrahmenstudy (2022):

title: "The effect of plyometric training units on explosive strength and its reflection on the shooting skill of U15 football players ".

Objective:the study aimed to identify the effect of plyometric training units on explosive force and its reflection on the shooting skill of U15 football players**.**

Approach: The sample of the study consisted sample of 30 players divided into two groups (15 players in control group - 15 players in experimental group).

Results: The plyometric training had a positive effect in improving explosive force and shooting, at the significance level ($P < 0.05$).

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1-5.Theoretical aspect of the study:

1-5-1. Training program: Training Program: It is the operations required to be implemented, taking into account the start and end time of this process according to a specific time and a clear goal. **(Ridha malek and others, 2022, p139).**

1-5-2. Plyometric training: is to train muscles in simplicity and lengthening to produce the greatest strength in the shortest possible time, where it depends on shortening the time of contact with the feet of the earth at the moment of upgrading and producing the greatest constriction force in the working muscles. **(Aref Saleh Mohsen Al-Karmadi, 2016, p. 182).**

1-5-3. Explosive ability: This is the maximum muscle tightening that can be performed in a single muscle contraction. **(Hadji Ahmed Murad, and others, 2018, p. 222).**

1-5-4. Football: is a collective sport that all people adapt to, and anyone who wants to practice it can turn into a sport in an empty place, on a green space, or on a green rectangular floor**.**

(Ibrahim Sayed Abdul Wahab Lachin: Definition of Football, 2017-12-01, ww.search-academy.com).

1-5-5. The category of less than 17 years: According to Dorney Rogers, it is a period of physical growth and a social phenomenon, as it differs in its beginning and its end in different societies in terms of civilization and development.

(Zerougalotfi, Hichem guendouz, 2020, p113).

2- he practical aspect and the methodological procedures of the study:

2-1. Survey Study:

The exploratory study was conducted on a sample of (05) players from the G.S.M soccer club, and the sample taken matches the age conditions of the research sample, where the test was conducted to take into account some of the points required to begin field work, which are:

- Understanding the various circumstances that surround the application process.
- Identifying the most critical training aids, such as tools, equipment, and balls.
- Choosing the best tests to assess the explosive ability.
- Knowing how long each test takes and where you stand in terms of organization.
- Determining the level of validity and reliability of the field study tool

2-2. Psychometric characteristics: MoqaddamAbdel-Hafiz defines it as: "the accuracy and stability of the results shown if applied to a sample of individuals on two different occasions". **(MoqaddamAbdel-Hafiz, 1993, p52).**

2-2-1. Test reliability: Muqaddam Abdel Hafeez defines that it will give the same results if this test isrepeated on the same individuals and under the same conditions. The researcher applied thetest to a sample of 05 players from the G.S.M club, and after a week of applying the test,they were re-applied to the same sample.

2-2-2. Validity of the test: It is measured by calculating the square root of the test reliability coefficient **(Moqaddam Abdel Hafeez, 1993, p. 152).** It was found that the test has a high degree of self-veracity as shown in the table.

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Table 02: Shows the stability and sincerity of the physical's tests adopted in the research.

Axes / tests	Samplevolume	Stabilitycoefficient	Validitycoefficient
Vertical jump test	05	0,995	0,997
long jump test		0,983	0,991
Degree of freedom: 04		**Level of significance: 0,05**	

Source: Made by the researcher (Spss V.25).

A table showing the reliability and validity (Sincerity) coefficients of the physical test (Vertical jump test - long jump test) approved in the research are high and close to (1) where the value of the stability factor (0,995 - 0,983), and the value of the validity factor was (0,997-0,991), so the two tests are characterized by two high degrees of Stability and Sincerity coefficient factors.

2-3.Approach:

- The method used by the researcher in his study is determined by the nature of his research and its objectives. The research objectives are based on understanding the training program based on plyometric exercises in improving and developing the explosive ability of soccer's players U17.
- We see that the "experimental approach"of the two groups (control- experimental), is the appropriate approach based on the objectives of the study and the nature of the subject, as well as the problem at hand, and this approach is defined as a deliberate and controlled change of the specific conditions of the phenomenon and the observation of the outcomes of the change in the phenomenon under study, and it is also known as the use of experience in proving hypotheses. **(Muhammad Khalil Abbas et al, 2007, p. 79).**

2-4.Research community: To study any problem we need to collect all the information and data related to the subject of the study, where it is defined as all individuals, events or things who are the problem of research. **(Mohammed Abdel Fattah Al-Sirfi, 2009,p185-186).**

- In our study, The research community represents all football players teams under the age of 17 who are at the level of the State of M'sila.

2.5.Research sample: The sample is defined as part of the community containing some elements selected from it in a certain way to study the characteristics of the community. **(Mohammed Abdel Fattah Al-Sirfi, 2009,p185-186).**

- In our study, The sample was chosen with care, and it consisted of 20 players from the G.S.M football team under the age of 17 who were divided into two equal groups (10 players represent the control group - 10 players represent the experimental group).

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2-6. Research areas:

2-6-1.Human Domain: The number of people on whom or through whom the study wascompleted is included inthe human field. Our human field of study consists of 20G.S.M team football playersunder the age of 17.

2-6-2.Spatial domain:n terms of the pre- and post-skill tests, they were used in addition to the proposed training program at the stadium he located in the middle of the 270 housing district, close to the petrol station (complex stadium).

2-6-3.Time domain: The exploratory experiment was fromOctober 2021 to March 2022, and the field study was divided into 3 phases:

2-6-4.pre-tests stage: the dimensional measurement of the study variables (explosive ability) was applied on Saturday, 10 December 2021.

2-6-5.Training program implementation phase: Our proposed training program consisted of 10 training sessions, and the group trains at a rate of (01)training units per week, from Tuesday, 17December2021 until Saturday, 18February, 2022.

2-6-6.Post-test stage: The post-measurement of the study variables (explosive ability) was applied on Saturday, 25February 2022.

2-7.Study Variables:

2-7-1. The independent variable:"training program proposed in the preparation phase using plyometric exercises **".**

2-7-2. Dependent variable:" explosive ability **".**

Axes / variables	Experimental group		Control group		Value of (F) levante	(F) indication	differences
	Mean	Standard deviation	Mean	Standard deviation			
Age	15,70	0,481	15,60	0,516	0,750	0,398	There isHomogeneity
Height	1,697	0,313	1,732	1,732	1,387	0,254	
weight	58,89	6,272	63,46	4,945	1,269	0,275	
HR max	199,56	0,694	199,21	0,706	0,002	0,969	
Vertical jump test	0,3222	0,113	0,334	0,073	1,890	0,186	
long jump test	1,935	0,108	1,862	0,071	2,743	0,115	
A sample Volume: 20		Level of significance: 0,05			Degree of freedom : 18		

Table 01: Represents sample homogeneity in terms of: age, height, weight, HRmax, and pre-tests results of Vertical and long jump test.

Source: Made by the researcher (Spss V.25).

- Through table 01, it is clear that there are no statistical significant differences between the control and experimental groups in the variables of the: age, height, weight, HRmax and the pre-test results of (Vertical jump and long jumptest), where the value of (F) was (0,750 - 1,387 - 1,269 - 0,002 -1,890 - 2,743), While the indication of (F) was (0,389-0,254-0,275 - 0,969 - 0,186 - 0,115), and when compared betweentheindication of (F) and the level of

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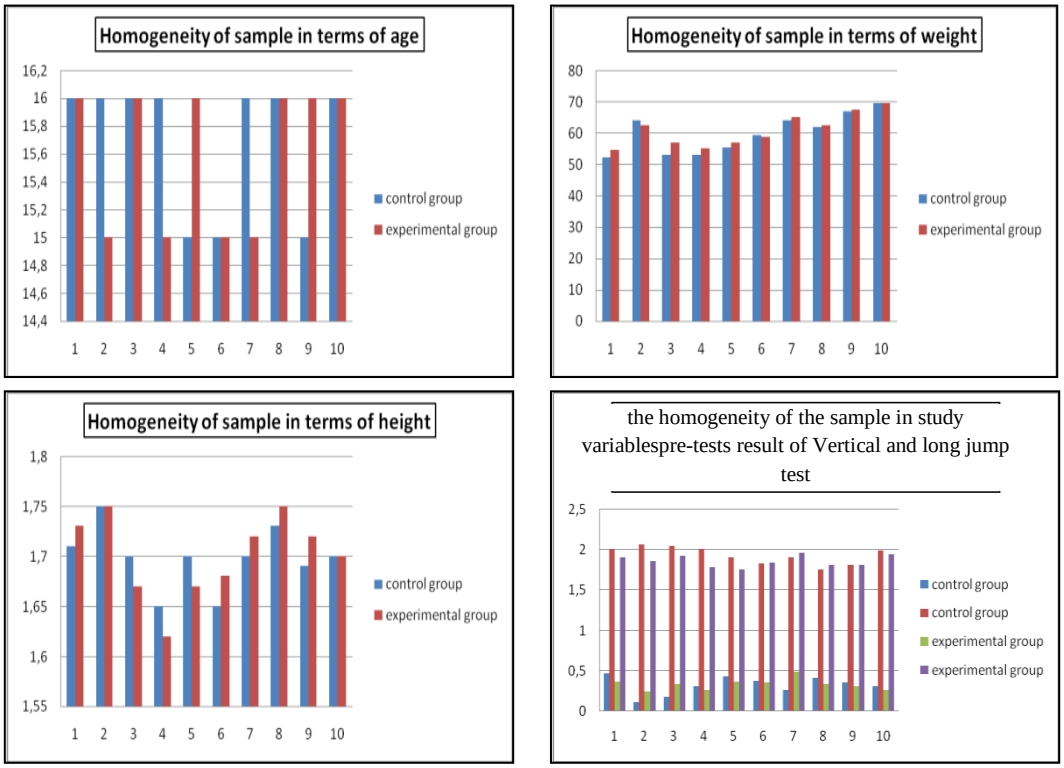
indication (0.05) is was greater than the indication of (f), and it can be said there are no statisticaldifferences, and this indicates the homogeneity and equivalence between the control and experimental groups in all the specific variables to start the application of the training program.

- Graphs 01: represent the homogeneity of the sample in study variables (age, height, weight, pre-testsresult of Vertical and long jump test).



- Photo 01: represent the calculated of Maximal Heart rate for the soccer players U17 (control and experimental group).

Nom	Prénom	Age	Poids	FC repos	M. astrand (220-age)	M. tanaka (208-0,7*age)	M. gellish (206,9-0,67*age) pour -35	M. edward (214-0,5*age-0,11*poids)	M. spanaus (223-0,9*age)
hafid	1	16	52,2	75	204	196,8	196,18	200,258	208,6
islam	2	16	64	74	204	196,8	196,18	198,96	208,6
mouaid	3	16	53	82	204	196,8	196,18	200,17	208,6
raouf	4	16	59,2	76	204	196,8	196,18	199,488	208,6
abderahim	5	15	64	75	205	197,5	196,85	199,46	209,5
aymen	6	15	53	75	205	197,5	196,85	200,67	209,5
saleh	7	16	55,3	80	204	196,8	196,18	199,917	208,6
khaled	8	16	61,8	76	204	196,8	196,18	199,202	208,6
mostapha	9	15	67	77	205	197,5	196,85	199,13	209,5
azize	10	16	69,4	77	204	196,8	196,18	198,366	208,6
adbellatif	11	16	59,5	76	204	196,8	196,18	199,455	208,6
said	12	15	62,3	80	205	197,5	196,85	199,647	209,5
karim	13	16	61	75	204	196,8	196,18	199,29	208,6
mohamed	14	15	56,7	75	205	197,5	196,85	200,263	209,5
farouk	15	16	72	76	204	196,8	196,18	198,08	208,6
ahmed	16	15	58,7	82	205	197,5	196,85	200,043	209,5
khalil	17	15	65	74	205	197,5	196,85	199,35	209,5
taher	18	16	67,3	75	204	196,8	196,18	198,597	208,6
fouzi	19	16	62,5	76	204	196,8	196,18	199,125	208,6
ibrahim	20	16	69,6	77	204	196,8	196,18	198,344	208,6

2-8. Research tools: The researcher used the following tools:

2-8-1. Theoretical studies (bibliographical analysis): books, previous studies, Arab and foreign references.

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2-8-2. The training program based on plyometric exercises: The training program consisted of 10 training sessions, and the group trains at a rate of (01) training units per week.

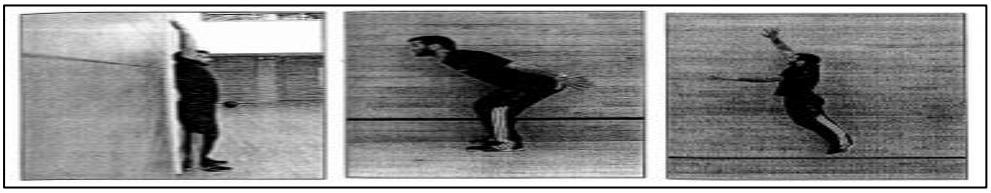
2-8-3. Test tool: The test is defined as a set of triggers that are provided to an individual to provoke responses that are essential to give him a digital score that is an indicator of the amount, he possesses from the characteristic measured by the test. **(Ary.D, 1996, p233).**

- In his study, the researcher relied on the following physical tests:

2-8-3-1. The first test: the vertical jump test (Sergent test):

- **The goal of the test:** measuring the explosive ability of the muscles of the two men.
- **Tools used:** chalk, measuring bar, listed plate.
- **Performance description:** A panel is placed next to the laboratory and extends its arm to point to the point at which it reaches with a piece of chalk, and when given the signal the laboratory takes jump mode and then jumps to reach the highest possible point .
- **Registration:** The distance between the first and second signals is measured and the number is recorded and the player is given two tries that count for the best.

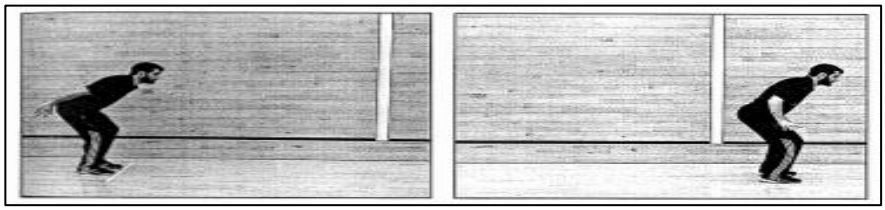
Figure 01: Represents how the vertical jumping test performs.



2-8-3-2. Second Test: Long Jump Test.

- **The purpose of the test:** measure the explosive ability of the muscles of the two men.
- **Tools used:** flat ground, bar to measure distance.
- **Performance description:** Installing a measuring tape on flat ground where the player or laboratory stands behind the starting line and then bends the knees and then returns the arms after that jump as far as possible, and gives the laboratory three attempts and calculates the best.
- **Registration:** The distance from the starting line is calculated until the nearest foot mark from the starting line.

Figure 02: Represents how to perform a long jumping test.



(Aurelien broumal-derval, Olivier bolliet, 2012, p34-39).

3- Results:

3-1- Presentation, analysis and discussion of results:

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Table 03: Represents the results of the pre and post-test of experimental group in the vertical jump and long jump test.

Axes / group	tool	Test	Mean	Standard diviation	(T) calculted	(T) indication
Experimenal	Long jump test	Pre test	1,862	0,0713	9,367	0,001
		Post test	2,059	0,0617		
	Vertical jump test	Pre test	0,334	0,0731	6,219	
		Post test	0,525	0,0765		
sample Volume: 10		Level of significance: 0,05		Degree of freedom : 09		

Source: author (Spss V25).

3-1-1. Presentation, reading, analysis and discussion of the results of the test of the validity of the first hypothesis:

We can see from Table No. (3), which compares the results of the experimental group of the pre and post tests of the explosive ability(Long jump test - Vertical jump test):

In the pre-test of long jump and vertical jump test, the experimental group had an arithmetic mean of (1,862 - 0,334) and a standard deviation of(0,0713 - 0,0731). In the post-test resulted of some tests in an arithmetic mean of (2,059 - 0,525) and a standard deviation of(0,0617 - 0,0765). The calculated t-value of the two tests (Long jump test - Vertical jump test)was (9,367 - 6,219) and the probabilistic value (sig)of two tests was (0,001), and when compared between the value of the indication (t) of the two tests, and the level of significance (0,05) it is below. As a result, we can conclude that thereare statistically significant differences in the explosive ability of the lower limbs between the results of pre and post measurementin the experimental group. Thus, the trainingprogram proposedin preparation phase using plyometric exercises applied to the experimental groupaided in the development of explosive ability.

In our study are in line with the scientific study carried out by: thestudy of **Al-Antari Mohammed Ali 2020**, And the study of **Alaa Mahmoud and others 2021**, in statistically significant differences in the explosive ability of the lower limbs between the results of pre and post measurementin the experimental group. And after subjecting the experimental group to the field experience (training program), **Wilkeson (1999) and Gambita (2001)** state: that Plyometric training is a most and best method to develop the power of speed and explosive ability of muscles **(Hamada Hadji, Mohammed Murtad, 2021, p 143),** as **Tarek Sayed Mustafa** says about plyometric training is: one of the training methods designed to develop muscle ability by rapidly prolonging the working muscles to produce strong and rapid muscle work in performance.

And after all this, it can be said that the results of our study agreed with the study of **Al-Antari Mohammed Ali (2020),** and **Alaa Mahmoud and others (2021)** and it can be said that the **first hypothesis**: thereare statistically significant differences in the explosive ability of the lower limbs between the results of pre and post measurementin the experimental group, **has been achieved**.

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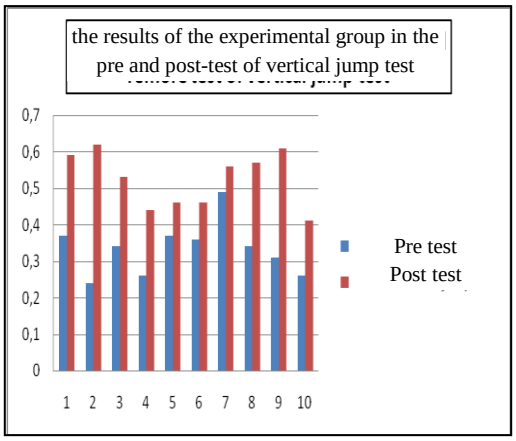
- Graphs 03: represent the results ofthe experimental group in the pre and post-test of vertical jump and long jump test.



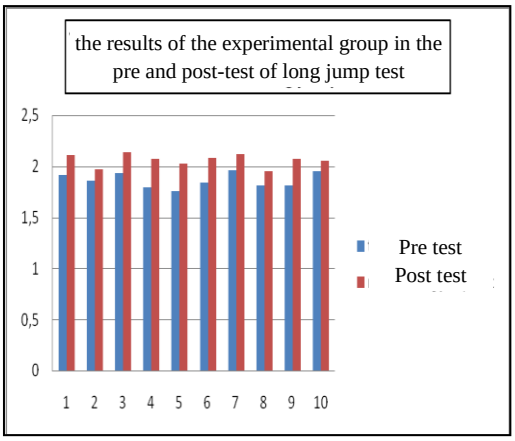


Table 04: Represents the results of the control and experimental groups in the post test of vertical jump and long jump test.
Source: author (Spss V25).

Axes / tool	test	group	Mean	Standard diviation	(T) calculted	(T) indication
Long jump test	post	control	1,945	0,0982	3,107	0,001
		experimental	2,059	0,0617		
Vertical jump test		control	0,322	0,1113	4,752	
		experimental	0,525	0,0765		
A sample Volume : 20		Level of significance : 0,05		Degree of freedom : 18		

3-1-2. Presentation, reading and discussion of the results of the second hypothesis validity test:

We can see from Table No. (4), which compares the results of the control and experimental groups In the post test of vertical jump and long jump test:

In the post-test of long jump and vertical jump test, the experimental group had an arithmetic mean of (2,059 - 0,525) and a standard deviation of(0,0617 - 0,0765), when the control group had in some post-test resultedan arithmetic mean of (1,945 - 0,322) and a standard deviation of(0,0982 - 0,1113). The calculated t-value of the two groups (experimental – control) in post-tests (Long jump test - Vertical jump test) was (3,107 - 4,752) and the probabilistic value (sig) of two tests was (0,001), and when compared between the value of the indication (t) sig of the two tests, and the level of significance (0,05) it is below. As a result, we can conclude there are statistically significant differences between the experimental and control group in the post tests results (vertical jump and long jump test) of the explosive ability. Thus, the trainingprogram proposedin preparation phase using plyometric exercises applied to the experimental group aided on the development of explosive ability.

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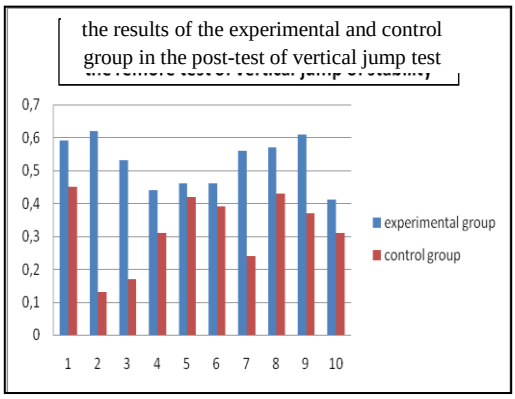
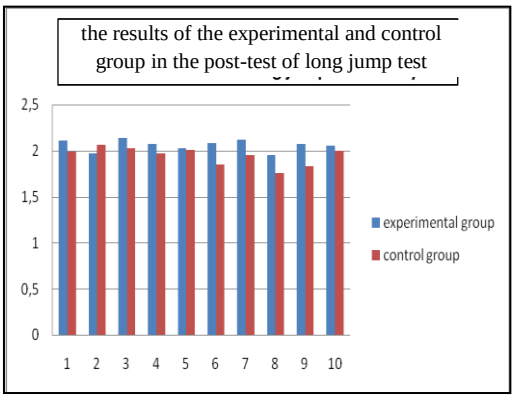
- Graphs 04: represent the results of the control and experimental group in the post measurement of vertical jump and long jump test.





In our study are in line with the scientific study carried out by: thestudy of **Aissa Chouaf, ZemamAbderrahmen(2022)**, And the study of the **Remaal Abdel Rahman (2017),** in there are statistical differences in the results of the post-test between the control and experimental groups in the variables studied (explosive ability), as **Mohammed Al Sayed (2002)**said: that plyometric training is a set of exercises designed to develop muscle ability and therefore improves dynamic performance, and**Wafa Salaheddine**confirmed thatwhen she said: Plyometric training is one of the training methods that works to develop explosive ability and power and can be used as a means with other training methods.
(Rahrah Hamza, 2017, p95).

And after all this, it can be said that the results of our study agreed with the study of **Aissa Chouaf, ZemamAbderrahmen (2022)**and **Remaal Abdel Rahman (2017),** and it can be said also the **second hypothesis**: there are statistically significant differences between thecontrol and experimental group in the post-testsof explosive ability, **has been achieved**.

Table 05: Cohen's test results represent a measure of the magnitude of the impact the course has had on the pilot group.

Axes / Group	tool	test	Mean	Standard diviation	(T) calculted	(T) indication	Test cohen's
Experimenal	**Long jump test**	Pre test	1,862	0,0713	9,367	0,006	2,962
		Post test	2,059	0,0617			
	Vertical jump test	Pre test	0,334	0,0731	6,219	0,001	1,967
		Post test	0,525	0,0765			
A sample Volume : 10		Level of significance : 0,05			Degree of freedom : 09		

Source: author (Spss V25).

3-1-3. Presentation, reading and discussion of the results of the general hypothesis validity test:

We can see from Table No. (5), which compares the results of the experimental group of the pre and post-testsof the explosive ability(Long jump test - Vertical jump test):

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In the pre-test of long jump and vertical jump test, the experimental group had an arithmetic mean of (1,862 - 0,334) and a standard deviation of(0,0713 - 0,0731). In the post-test resulted of some tests in an arithmetic mean of (2,059 - 0,525) and a standard deviation of(0,0617 - 0,0765). The calculated t-value of the two tests (Long jump test - Vertical jump test) was (9,367 - 6,219) and the probabilistic value (sig) of two tests was (0,001), and the Cohen's size test of long jump test and vertical jump test it is (2,962-1,967) respectively at the indication level were (0.05), and that means the training program proposed in preparation phase have large effecton improving the explosive ability of football players U17, because the Cohen's size it is larger than the coefficient (0.8).

In our study are in line with the scientific study carried out by: the study of **Rashad Djeddi and others (2020)**, and the study of **Awadi Fares, Mashrock Mustafa (2018)**, That the training program have positive effects on improvingthe variables studied in the research (explosive ability), when **Bastawisi Ahmed 1999** said: Plyometric training has a significant impact on improving the level of jumping by improving the characteristic of explosive ability**(Bastawisi Ahmed, 1999, p40),** as **Abdel Fattah Abu Alaa 2003** asserts that when he said: the use of plyometric training increases muscle fibers, which lead to the participation of a large number of them, resulting in strong and rapid contraction and increases explosive performance.

And afterall this, it can be said that the results of our study agreed with the study of **Rashad Djeddi and others (2020)** and **Awadi Fares, Mashrock Mustafa (2018),** and it can be said that the **general hypothesis**: training program proposed in preparation phase using plyometric exercises have positive effect on the development of the explosive ability of the lower limbs muscles in soccer players U17, **It's been achieved**.

4. Conclusions and suggestions:

In our research, we focused on the characteristic of explosive ability as a basic and serious requirement for the footballer, by proposing training program during the preparation phase using plyometric exercises to develop the explosive power of footballers U17. **Saad Mohsen Ismail (1996)** said: any training program proposed have positive effect, if built on a scientific basis (principles of training - intensity - repetitions - comfort) and taking into account individual differences and under good training conditions, and good planning based on scientific foundations. **(Belfrites Yassin, Ghannam Noureddine, 2020, p240),**

After the applicated of the program proposed, we have found there are statistical differences between pre and post testing in the results of the experimental group, and also we found that program proposed with plyometric exercises have a positive effect on the development of explosive abilityof the lower limbs in football players U17.

4-1. Results: The following findings were reached within the parameters of the research procedures, inlight of its objectives, and through statistical analysis of the results obtained:

- The results of the statistical treatment showed: there are statistical differences between the pre and post testing in the experimental group.
- The results of the statistical treatment showed: there are statistical differences between the control and experimental groups in the post-tests results (vertical jump and the long jump test).

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- The results of the statistical treatment showed: that the training program proposed in the preparationphase using plyometric exercises have a positive and significant impact on the development of the explosive ability of the lower limb muscles in football players U17, whichresults in effective repetitions that aid in the stabilization of football players, and such exercises are one of the plyometric methods, which is one of thebest training Methods.
- Programming training according to scientific foundations and principles with thecontent of traditional exercises is not enough to bring the player to the highest levels.

4-2.Suggestions: Depending on the data we collected through this study and based on the conclusions drawn, and within the framework of the study, the researcher makes the following recommendations:

-Use of plyometric exercises on the development of explosive ability, where it is one of the most important method adopted in the development of this quality, and putting players in changing positions similar to competition and to adapt before the competition.
- The necessity of using plyometric exercises in training programs for theyoungest because of their positive impact on the development of physical abilities.
- Applying the various physical tests required to young players at the beginning of training season to detect their physical level, which helps to underline training programs based on the results of those tests .
- Analyzing the performance of players in international level competitions in order to extract new playing situations.

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