

## THE EFFECT TRAINING PROGRAM WITH MIXED CONTRACTION ON THE CHARACTERISTICS OF MAXIMAL STRENGTH AND EXPLOSIVE STRENGTH OF THE LOWER LIMBS IN FOOTBALL PLAYERS

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### Abstract:

The aim of the research is to propose a training program (mixed contractions) in order to develop the maximum power and explosive power levels of the lower limbs of the football players of the state university of Tissemsilt under the age of 17 years, as well as experimenting with some tests that allow the evaluation and development of the two classes of maximum strength and strength this study was conducted in the period from 10 /11/ 2023 to 15 / 03/2024 .the two researchers conducted their studies on the middle of the Olympic football team under the age of 17 years for the 2023 /2024 sports season.

The results show that explosive force requires rapid and strong muscle contractions during performance. This is characteristic of weight training, and the researchers believe that is result is in maximum force and explosive force and that the program well-designed strength training in mixed contractions (isometric and anisometric) is one of the best, fastest and most effective means of developing.

**Keywords:** Proposed Training-Mixed Contraction-Explosive Force-Maximum Force.

## **Introduction:**

The game of football is one of the global sports activities that have witnessed a remarkable development in recent years in the physical, technical, rhetorical and psychological aspects, so the modern play in different teams and international teams quickly and forcefully in the exact technical performance, and this is due to the interest of international coaches, The good training of the players during the youth stage at the level of various aspects to develop all the techniques that have a great effectiveness in competitions according to scientific methods studied, The muscle strength plays a very important role achieving the performance player during the game and it is clear the need for the player in many situations, especially when jumping to hit the ball head or the goal on the goal or long passes of different types and in the performance of various skills by force and speed appropriate to the possession of the ball or the control of the court of the court while overcoming the body weight during the game it is known that the stronger the muscles of the athlete and the reduced joints injuries, and the strength increases energy saving such as Latin phosphate and glycogen, and develop the player for a game football volitional qualities of the most important of courage, determination And self-confidence. There are also some skill movements that can not be performed without a certain level of strength, so the development of power may affect the effectiveness of the long-term training system.

### **1. The problem:**

The success of any training program is based on the proper progression of the successive training programs of the force. The weight training for some sports activities should be in the direction of specialized training for the type of activity, the correlation of the exercise with the skill objective chosen from the exercise (Dynamic or Fixed), type of contraction (Central and non-Central) and performance, (Fast or slow), in many sports it is necessary to have sufficient strength, ability and tolerance at the competitive level. The problem experienced by football coaches age groups less than 17 years old where they need to know you can de exposed to this age group high-intensity drills using resistors and what are the effects of these exercises.

In order to be strength training is effective in the development of maximum strength must know the direction of movement in the basic game first and then the most important muscle working in particular, Those muscles, which is the burden of motor work during the competition and thus can be formed or build movements exercise weights on the basis of correct to benefit the player from this exercise without losing its effort (Mufti Ibrahim,1996, p.152)..Since football sports de-

depends heavily on the development of strength for the lower limbs where the muscles of the four thighs play the quadriceps and the ichcio-jambie muscle muscles play an important role in producing a large muscle force used by the athlete to jump and kick.

In strength training, (Marehouse and Rash and Loy) states that strength in any muscle functions is a determinant factor of pregnancy and that physical pregnancy can easily overcome weak stresses quickly by strength muscles and stress that the development of muscle Strength in weight is a key factor in increasing injury prevention the Hara program that the weight training program can be designed for various types of sports activities and easily control the resistance to muscle groups. Aut 1990 controy said resistance training can have an impact on bone growth in both boys and girls. Research has shown that those who exercise weight training from young people have bones that are more intense than those who do not exercise weightlifting. Next one:

Is the training program in the combination of isometric and anisometric impact on the maximum force and explosive force of the football team less than 17 years?

### **1.2. Partial questions:**

- Are there statistically significant differences between the pre-test and post-test of the study sample for the maximum force test?
- Are there statistically significant differences between the pre-test and post-test for the 30meter test?
- Are there statistically significant differences between the pre-test and post-test of the study sample for the Sargent test explosive force test?

### **1.3- Study hypotheses:**

The proposed training program in mixed contractions (Isometric and Anisometric) has a positive effect on the two extremes of maximum force and explosive force of the lower limbs of football players under 17 years?

#### **- Partial hypotheses:**

**The first hypotheses:** There are statistically significant differences between the pre-test of the study sample for the maximum force test and for the post-test.

**The second hypotheses:** There are statistically significant differences between the pre-test of the study sample for the 30-meter test and for the post-test.

**The third hypotheses:** There are statistically significant differences between the pre-test of the study sample for the explosive force test (Sargent test) and for the post-test.

**1.4. Study objectives:** The objectives of the research are as follows:

- Knowledge of the effect of a training program on mixed contractions (Isometric and Anisometric) on the extreme strength of raising the level of football players under 17 years.
- Know the impact of the training program of the explosive power of lifting football level less than 17 years.
- Experimentation of some test that allow for the evaluation and development of the maximum power and explosive power levels of the lower of football players under the age of 17 years.

**1.5. Study terms and concepts:**

**Training Program:**

a structured educational process planned according to the principles and scientific foundations aimed at developing physical abilities and skill and rhetorical and cognitive to achieve a high level of achievement in sports activity.

**- Isometric Exercise:**

Isometric training is based on the strength of muscle exercises constant muscle contraction, which does not occur any changes in length of muscle during the contraction and does not occur the movement of the result of this contraction.

**-Isometric contraction:**

Other terms that can be explained are central and decentralized contraction, the movement of the muscles decentralized is one of the movements in which the muscle development and intensity of the length (sometimes called passive work) the movement of the central muscle is the development of muscle but the intensity but shorten (called positive action), (Zaki Mohamed Darwish, 1998,p.97).

**-Explosive force:**

Strength is the ability to exert muscle strength and the possibility of use, and is intended to develop muscle strength, especially the muscles used play.

**Maximum force:**

The greatest strength that muscles can generale from the maximum constriction.

### **1.6. Previous and similar studies:**

-**The first study:** (Iyad Hamid Rachid El khazrarji,2001): the effect of using circle training style to develop the force featured with speed and some principal handball skills to the players under the age of 17 years.

-**The second study:** (Othman Adnan El Bayati, Iraq university,2004), the effect of force training with using the fixed and moving and mixed muscular constriction in some muscular force faces and functional variables to the player of handball under the age of 17 years.

## **2. Scientific research procedures and methodology:**

### **2.1. Study method:**

The researchers adopted the experimental curriculum to fit with requirements of search.

### **2.2. Study community and sample:**

The researchers conducted them study's intentionally on football players W.A.B.T team, (Tissemsilt),(Algeria) under the age of 17 years to the championship 2023/2024, where they selected randomly 20 players they representing the sample of search them estimated number is 25 players under the age of 17 years, which participated in the regional section (West) Saida Association, and participated too in the republic cup, we selected the sample of search according to the following conditions:

- The relation of researchers with team board directors.
- Participate in the sport competitions (the champion) regional (West) in addition to the republic cup.
- The nearness of facilities (the Stadium /bodybuilding hall).

As the researchers conducting to the equality between the two experimental and witness samples of search and study the variables which would affect on the experimental sample where the researchers get by the way the homogeneity between the two samples and variables of weight and height and physical variables.

### **2.3.Temporal period:**

-The limit period of search 02/10/2023 to 15/03/2024.

-Conduct the tools search (Measurements, Tests, and the Applicable Training Program with mixed contractions. (Isometric and Anisometric).

-In 01/01/2024 we ended the theory of study.

-In November 2023 we chose the tools search (measurements, tests) after the expert consult.

-In 01/01/2024 to 14/02/2024 we have achievement set the training program with mixed contractions.

18/02/2024 to 15/03/2024 we re-measure again, then we collect and analyse and discuss the data.

#### **2.4. The Space:**

-Residence and stadium of team, in addition to the bodybuilding hall.

#### **2.5. Human Resources:**

-Team of Z.Q.B.T (Tissemsilt) of football under the age of 17 years, Algeria.

-The total number of study is 20 players.

#### **2.6. Tools search:**

- Sources and References in (Arabic, and French, and English).

-The direct and personal interviews.

- Questionnaire distributor for trainers (specialists in football) to built the problematic.

#### **2.7. Tests and measurements:**

-Measurements of (Height, Weight, Age, Sex).

-Tests of (RM-1), (Speed 30m), (Sargent Test).

-The applicable training program (mixed contractions).

Cycle1 / Rising pyramid strength		
A maximum Speed, Accustom, the organization on construction auxotonique		
Intensity (%de RM)	50%+60%70%	2 <sup>nd</sup> session the same exercises as the cycle1.
Nombre of repetion	Block of (8+6+4)	
Recovery	1 min with in the block and 2 min inter series	
Nombre de séries	3	

Cycle2 / Maximum force construction auxotonique		
Intensity (%de RM)	92%	2 <sup>nd</sup> session of week. Same exercise as cycle1.
Nombre of repetition	3	
Nombre of séries	3	
Recovery	3-4 min	
Cycle3 / sinusoïdale, session 1 : the explosive force intention of maximum accelerator, throw him from helm		
Intensity (%de RM)	30%	1 session of week for the second meeting here is the following - Exercises closer to Activity (squat heiden, fentes , rowing with one arm ).
Number of repetition	5	
Number of séries	3	
Recovery	2 min	

Cycle4 / sinusoïdale, session 1 the dynamic – stato		
Intensity (%de RM)	60%	*the second session of cycle 4 uses method oriental force development but with lighther broads in order to limit the constrains on muscles.
Number of repetition	6	
Number of séries	3	
Recovery	2 min	

(Didier Reiss.Pascal Prévost 2013)

### 3. Presentation and analysis of the field study:

#### 3.1. Discuss the results of the tribal and remote it's of research sample:

The exams	Pre –test		Post -test		T calculator	Degree of freedom	T table	Significance level 0,01
	X	Y	X	Y				
RM-1 test (kg)	165,11	9,27	171,94	9,41	11,8	17		Indicates
30M test (m)	4,66	0,12	4,36	0,26	5,09			Indicates

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Sargent test (cm)	33,88	4,77	37,22	3,56	6,14		2,89	Indicates
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**Table (01) shows the averages calculation and values of study's variables to the first measurement.**

### **3.1.1. Discussion of results of the first hypothesis:**

The table number (01) indicates that there is a moral difference at the level of significance 0.01 to test the maximum iteration in the pre-and post-measurement to the group of search, the two researchers indicates that this result back to the effectiveness of the proposed program though the number of duplicates and intensity applied in adversely, as the players got a good morphology structure can eye observed, as we register improvement at the level of general total duplicates to the applicable program by the mixed contractions, (Isometric and Anisometric) to the lower parts of body (legs) and this is what the previous study's indicated.(Madjid El Mawla, 2000), the importance of totals muscular (trunk) to the movement transport which done from trunk and belly to another totals and control her accuracy, and this is what the young coaches neglects on foxes to develop this muscular totals.

This phase it's the most suitable phase to improve the maximum force as what stated in book of (Bastouiasia Ahmed): basis and theories of movement during the adolescence there is the best chance, and most suitable times for training on force, it's in general the growth moving in this phase mainly from transverse side, so we observe increase in size of muscles with knowing that there are a differences between the totals muscles, and then between the level of evolution, females they up to the maximum force muscular, In general in the age of 17 to 19 years, while males in the age of 17 to 22 years during this weightlifting phase, and the training ways used, it can be on the base of the adult with taking the importance to weights lift-out, it's a important principal to force training, especially at this sensitive phase.

### **3.1.2. Discussion of results of the second hypothesis:**

The table number (01) indicates that there is a moral difference at the level of significance 0.01 to test 30m speed in the pre-and post-measurement to the total search, and the two researchers indicates though the number of duplicates and the intensity applied adversely, as the players got a good morphology structure can eye observed, as we register improvement at the level of

general total duplicates to the applicable program by the mixed contractions , and this is what the previous study's indicated .

### **3.1.3. Discussion of results of the third hypothesis:**

The table number (01) indicates that there is a moral difference at the level of significance 0.01 to test of Sargent test in the pre-and post-measurement to the group of search. The current evolution in the explosive force to arms and legs, in reason of exercises effectiveness during periods by using force exercises like exercises of jump and shoot, by using different resistors like body weight in jump exercises, and using the medicine balls in jump exercises, the affect to develop this character “that the exercises which used in a large resistance is one from the most suitable method for develop the components of explosive force “(**Hosine and Ankabi, p.113**), so the force exercises increases the muscle ability to activate the possible number from the fibers as (Alawi and Abd el Fatah) indicated that “ whenever the possible number of muscular fibers increasing , whenever led to increase the force which the muscle able to produced “(Alawi and Abd el Fatah, 2003,p.122), whenever Mathews and Fox explained that the muscular ability of arm and shoulder can be developed by using the periods training program , includes weight trainings with a fast performance of arm, as the muscular ability of legs it's more important in basketball, for this reason must building periods training program. By using the speed trainings and jump on the stairs and cord jump and verticals jumps and something like that from trainings . (Mathews & Fox, p.197).

### **3.2. Facing the results with hypotheses:**

Depending on the previous results the table number (01) shows the calculated values (T) of physical tests that represented (max iteration test RM-1, and speed test 30m, test of Sargent test) in addition to the post test to the experimental search group in a row where is show that all the large values from (T) table this indicates the appearance of differences function for the benefit of the post measurement in total tests which show the positive affect of the applicable training program of mixed contractions (Isometric, Anisometric) specialist for develop the maximum force and explosive force to the lower part of body (legs).

The researchers seen that this result agree with what the previous study's indicate, in addition to the personnel observation about force program which designed well, result to develop the maximum force and explosive force if it's selected the appropriate measurement of work especially the study's which took up training affect of maximum force and explosive force in the

different phases to the football players under age of 17 years, each of (Masaad Ali Mahmoud & Fox & Westcott) indicate that the scientific research which conducted in domain of training by weights most of their results indicated that the training by weights become from the effectiveness element to develop the different kinds of muscular force especially to the professional players in the world countries. The researchers indicates the reasons of the moral differences which appeared with maximum force test (RM-1) and 30m speed test, and test of explosive force (Sargent) which measuring the quality of maximum and explosive force to develop this quality for the persons of the experimental group and reasons of organizing curriculum of training, the training process dependent on his organized, which creating case of development in the level of players performance through the harmony of the proposed curriculum training with the ability and capabilities members of search sample, as a result the positive evolution become visible to them. This is what (Cariou, 2008) confirmed, he said that his content contains exercises of Anisometric natural, thing that help on develop the speed of movements units to the muscle, and increase the nervous alert frequency, and improve the synchronization units movements, whenever it's more compatible, whenever the force be big.

As (Zaki Mohamed, 2007) indicated that the Anisometric training characterized its ability to effect on the nervous system that's includes the muscles by his training to affects quickly on the activity of muscle, and then produce intraday explosive force. According to (Amish and Salah, 1990) "football coaches are advised to develop the own muscular totals to the direction of speed that's mean the development of speed force for their importance in games".

And (Goutouk) agree that this research and study's have proved in the current time that it's possible to develop the force in the early age but in condition of using exercises fit with structural characteristics and capacity and functional and psychological and not reflected negatively on their health (Goutouk, 2011, p.290). The researchers indicates the reasons of the moral differences which appeared the measurements of maximum force and explosive force quality to the development of the two own qualities of the experimental members group, it can be traceable to the reasons of the proposed organizing curriculum of training, the process training depend on his organized which creating case of evolution in the level of players performance through the harmony of the proposed organizing curriculum of training with capabilities and ability of search sample members (the experimental group), as a result it's become clear them positive evolution and that's what (Hosine) confirmed that's the training process is "those organized process and

continuous which earn the person knowledge or skill or ideas or opinions to perform a particular work or reaching a particular goal, in addition to achieve regulatory goals and adaptation with work, and what submit to the person from a particular information or skills or moral directions required in regulatory view to achieve the ruler goals” (Hosine,2007,p.178) and that’s what showed the results of experimental group as the affect of program in them physical performance in moral way which indicate on the rise of physical side and it’s have a more importance to the football player and it’s principal feature from attributes of the modern game, and the real reason from the training is access the person to the highest levels of sports by create a case of harmony between components and capabilities of youth players with the following program if the response of this group to the content of program be a positive response, which led to develop and improve the physical level the result of the application of the scientific basis through the work and his force, and comfort times, and duplicates, and the number of totals, and bonding between them, and that’s what the researcher followed in the training program. “Due to the importance of these kinds of force to the football players, so it’s represents a large proportion from own time to develop the muscular force in the trainings programs” (El Khashab and others, 2005,p.29).

“And football trainers are advised to develop the own muscular totals to be in the direction of speed so develop the seep force for their importance in games” (Amish,2007,p.31), and implementation of (6-9) exercises in one hour training, and must be the exercise performs quickly and the repeat of this exercise from (3-6) within the repetition (6-9).

#### **4. Conclusions of search:**

##### **4.1. From the results of form distributed to coaches:**

Despite the coaches have a long qualifications and experiences in the field, but they still missing some modern scientific ways in the trainings especially force trainings (maximum force) and explosive force, in addition these coaches they don’t seen the natural of this trainings in way of how develop the muscle force which they nominated from the principal physical characteristics to the football player as they don’t gives importance to training this characteristics to the ages phase less than 17 years old.

-Lots of coaches they using the traditional ways and materials in them trainings so they foxes on the individual free exercises and twin exercises (with colleague) to develop the muscle force and especially ages phase (U17) and neglecting weightlifting exercises.

- Lots of coaches are against this exercises because it's leads to the hypertrophy muscles and reducing the movement and hardening the muscle and dangers of accidents and it's affect negative on the movements skills and some physical qualities like agility and speed and flexibility, which shows that the coaches are not interest to seen what's new in the field of football sport training, especially in field of force training.

#### **4.2. From the results of tests:**

- The results of statistical treatment produced show that there are a differences of statistics significant between the pre-and post to the sample of search in the program with the mixed constrictions (Isometric, Anisometric) for the benefit of post- test in the physical tests in measuring the maximum force to the totals of lower muscular and explosive force test and test of 30m speed.

- Must the movements of trainings with weights or exercises converge from competitions movements for example: running with weights on the back.

- The achievement of sample it's a moral increase in the test of study and that's refer the experimental test which is designed with the mixed constrictions for develop the maximum force and explosive force to the totals of lower muscular.

The two researchers indicates that the explosive force need a quick constrictions and stronger in the muscle during the performance, and this is what features the trainings of weightlifting, and the researcher see that the result agree with what indicated the results of study's that there are a stronger and direct link between the maximum force and explosive force, and that the program of force training designed well, it's from the quick and best tools and much effectiveness in development of maximum force and achieve the consistency and the control of body parts, and makes muscles in more response to mastering the principal movements skills perfectly and become in high level, and the researcher agree that this statistical collection match with results of research and previous study's to prove important facts that the program of weightlifting training which designed well, will result in develop the performance and improving the movements compatibility skills and improving the compatibility between the working muscles collections.

## 5. Suggestions and Recommendations:

- 1- The two researchers suggest the program force affects under long time conditions of which done in the current study.
- 2- also the researcher Recommended makes some study's in order to put a specialist program for develop the force individually to the players to achieve individually privacy principal, and the program be according to individually privacy ( Physiological , Morphology, Genetic Factors, The training age....)
- 3- The two researchers suggest to makes another study's in order to measure the maximum force by using new equipment like: (Electro- stimulation) device which develop the totals muscles, we suggest too to the officials in our universities the necessity of providing this device.

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