

## **The effect of different kinds of training (weightlifting, Plyometric, and ballistic) on developing the muscle ability and the skill performance level of players (Foil, Sabre, Epee)**

**\*Dr / Ahmed Ibrahim Azab**

**\*\*Dr / Mohamed Abass Safwat**

**\*\*\*Dr / Waleed Ahmed Saied**

### **Introduction & Research Problem:**

It is known that weakness in muscle strength results in hindering the comprehensive development of physical abilities of players in general and duels in particular, especially (the muscle ability) as it is considered one of the important physical abilities of players of (fencing, sword play, sword fencing).

In this regard, the coach must use modern training methods that match well with the requirements of specialized athletic activity and taking them into consideration when planning the training.

The researchers see that fencing sport requires a good use of legs and arms'

movements in attack and defense. Also, the skill performance technique involves the speedy advance, retreat and thrusting and repeating this, and returning to the standby pose makes it in urgent need to "a muscle strength that is released by maximum effort in short time. From here, fencing sport depends on power and speed (muscle ability) which is considered the basis for good performance which helps to well execution of planning phrases which achieves coherence and harmony between the movements of legs and armed arms; which it is the most part of it. As this is the

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\* Associate Professor in Department of competitive and aquatic Sports - Faculty of physical education - University of Sadat City.

\*\* Associate Professor in Department of competitive and aquatic Sports – faculty of Physical Education – University of Sadat City.

\*\*\* Lecturer in Department of competitive and aquatic Sports – faculty of Physical Education – University of Sadat City.

final outcome of correct performance, which confirms the importance of muscle power as a physical basis for skill and planning performance.

Therefore, some studies have been made (10) in fencing, (5), (6), (1), (3) in basket ball, (4), (16), (14) in volley ball, (11) in handball, (7), (12) in football, (13), in long jump, (2), (8), (9), in field hockey and table tennis, (17) in karate, (15) in baseball. Some of them addressed the effect of weightlifting training, Plyometric training and ballistic training each separately on the development of muscle ability. And the other handled the effect of weightlifting training and Plyometric training on the development of muscle ability and the comparison between the effects of each of them on developing the muscle ability.

Also, through the researchers' review of specialized scientific references in the field of fencing (fencing, duel, and sword play), and the reference survey of previous studies and researches, they noticed that no other researchers – as far as they know – have addressed the effect of using the trainings

of (weightlifting, Plyometric, and ballistic) as a comparing study on the development of muscle ability and the skill performance level of fencing players (fencing, duels, and sword play), which urged them to make this research.

**Key words:** Fencing, Foil, Sabre, Epee, Weightlifting, Plyometric, Ballistic

#### **Research Aims:**

1- To design 3 different training programs using (weightlifting, Plyometric, and ballistic) trainings of fencing players (fencing, duels, and sword play), and to recognize their effect on developing the muscle ability and improving the skill performance level.

2- To recognize each of these three training programs is the most positive in developing muscle ability and improving the skill performance level of fencing players (fencing, duels, and sword play).

#### **Research Procedures:**

##### **Research Method:**

The researchers used the experimental method by designing 3 experimental groups using the before & after measurements of each group as it suits the nature of the research.

##### **Research Sample:**

The research sample was chosen deliberately of (27) players under (17) years old registered in the Egyptian federation of fencing in the athletic season 2013/2014; w (24) fencing players, (24) duels players and (24) sword play players.

They used (12) players to represent the pilot sample of the study in order to calculate the scientific interactions (reliability, validity) of the physical tests used in the research.

#### **Homogeneity & Equivalence for Research Sample:**

The researchers calculated the coherence of research basic sample in the variables of (age, height, weight, training age, and body mass). The coefficient of torsion values were between 1.890 and -0.749, while the coefficient of torsion values of muscle ability were between 0.759 and -1.593, whereas these values were between ( $\pm 3$ ) which indicates the distribution moderation of research sample individuals.

The researchers also found that there are no statistically shown differences between the three research groups (weightlifting group, Plyometric group and ballistic

group) of fencing players (fencing, duels, and sword play) in the variables of “age, height, weight, training age, and the muscle ability variables”, which indicates the groups’ equivalence in these variables.

#### **The Pilot Study:**

The pilot study was performed in the period from 4/5/2013 to 16/5/2013. The validity coefficient was between (15.598 – 4.304) which indicates the tests validity. The reliability coefficient was between (0.988 – 0.914) in the physical variables studied in the research which indicates the tests reliability on a sample of (12) players (4) of them fencing players, (4) duels players, and (4) sword play players.

#### **The Design of the training program:**

The training program was designed either of general weightlifting training, or the three research groups (weightlifting group, Plyometric group, and ballistic group) through the reference survey of Arab studies and scientific books which handles these topics to determine the final form of the program. The program duration was (12)

weeks, included (6) training units, each training unit duration was between (60 – 90) minutes.

### **Steps of Research Application:**

#### **1- Before Measurement:**

The before measurement was performed on the three research groups in research variables of muscle ability tests and skill performance level on Saturday and Sunday 18 and 19/5/2013 on fencing players, and on Wednesday and Thursday 22 and 23/5/2013 on duels players, and on Saturday and

Sunday 25 and 26/5/2013 on sword play players.

#### **2- Execution of Basic Experiment:**

The three training programs were applied (weightlifting training, Plyometric training and ballistic training) on the research three groups in the period from Saturday 1/6/2013 to Thursday 29/8/2013.

#### **3- After measurement:**

The after measurement was performed on the research three groups in the variables (muscle ability tests and skill performance level) on Saturday 31/8/2013.

### **Scientific Treatments:**

- Mean
- Std. Deviation
- t-test
- one-way ANOVA
- The Median
- Skewness
- Pearson Correlation
- L.S.D. Test

### **Display & Discussion of Results:**

**Display & discussion of results of arms and legs' muscle ability of the three sports players (Foil fencing, Sabre, Epee).**

**Table (1)**

**The differences significance between the measurements' averages of research groups (weightlifting, Plyometric and ballistic) in the muscle Ability tests of arms and legs of foil fencing players**

Variables	Groups	Mean	LSD Value	Weightlifting	Plyometric	Ballistic
Arm strength (right)	Weightlifting	11.873	1.231		1.423	1.135
	Plyometric	10.450				-0.288
	Ballistic	10.738				
Arm strength (left)	Weightlifting	11.054	1.074		1.053	1.094
	Plyometric	10.001				0.041
	Ballistic	9.960				
Broad jump	Weightlifting	181.625	4.236		-5.000	-3.125
	Plyometric	186.625				1.875
	Ballistic	184.750				
Vertical jump	Weightlifting	40.194	3.433		-1.931	-3.494
	Plyometric	42.125				-1.563
	Ballistic	43.688				
Flesh	Weightlifting	178.375	5.346		-5.381	-2.827
	Plyometric	183.756				2.554
	Ballistic	181.203				

Table (1) shows that there are statistically shown differences between the

research groups in the muscle ability tests of Foil fencing players

**.Table (2)**

**The differences significance between the measurements' averages of research groups (weightlifting, Plyometric and ballistic) in muscle Ability tests of arms and legs of sabre players**

Variables	Groups	Mean	LSD Value	Weightlifting	Plyometric	Ballistic
Arm strength (right)	Weightlifting	11.715	1.011		1.218	0.685
	Plyometric	10.498				-0.532
	Ballistic	11.030				

**FollowTable (2)**

**The differences significance between the measurements' averages of research groups (weightlifting, Plyometric and ballistic) in muscle Ability tests of arms and legs of sabre players**

Variables	Groups	Mean	LSD Value	Weightlifting	Plyometric	Ballistic
Arm strength (left)	Weightlifting	11.151	1.293		1.308	0.791
	Plyometric	9.844				-0.516
	Ballistic	10.360				
Broad jump	Weightlifting	180.625	4.567		-3.250	-5.425
	Plyometric	183.875				-2.175
	Ballistic	186.050				
Vertical jump	Weightlifting	39.750	3.762		-1.750	-4.306
	Plyometric	41.500				-2.556
	Ballistic	44.056				
Flesh	Weightlifting	150.155	5.609		-2.720	-5.783
	Plyometric	152.875				-3.063
	Ballistic	155.938				

Table (2) show that research groups in the muscle there are statistically shown ability tests of duels players differences between the

**Table (3)**

**The differences significance between the measurements' averages of research groups (weightlifting, Plyometric and ballistic) in muscle Ability tests of arms and legs of Epee players**

Variables	Groups	Mean	LSD Value	Weightlifting	Plyometric	Ballistic
Arm strength (right)	Weightlifting	11.903	1.012		0.690	1.156
	Plyometric	11.213				0.466
	Ballistic	10.746				
Arm strength (left)	Weightlifting	11.265	1.129		0.868	1.263
	Plyometric	10.398				0.395
	Ballistic	10.003				

**Follow Table (3)**  
**The differences significance between the measurements' averages**  
**of research groups (weightlifting, Plyometric and ballistic) in**  
**muscle Ability tests of arms and legs of Epee players**

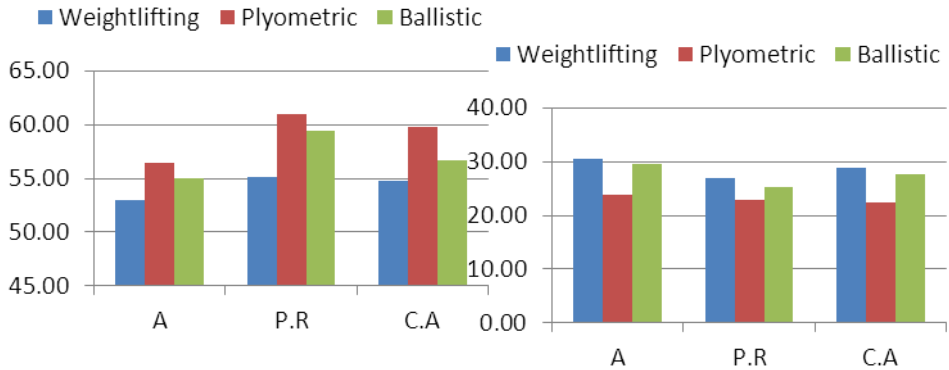
Variables	Groups	Mean	LSD Value	Weightlifting	Plyometric	Ballistic
Broad jump	Weightlifting	182.324	5.335		-5.666	-2.801
	Plyometric	187.990				2.865
	Ballistic	185.125				
Vertical jump	Weightlifting	40.946	3.052		-3.500	-1.429
	Plyometric	44.446				2.071
	Ballistic	42.375				
Flesh	Weightlifting	179.500	5.309		-6.796	-2.250
	Plyometric	186.296				4.546
	Ballistic	181.750				

Table (3) shows that there are statistically shown differences between the research groups in the muscle ability tests of sword play players.

The researchers attribute the progress in all the studied muscle ability tests of arms and legs of players (fencing, duels and sword play) in the training group of the weightlifting program, to the good planning of weightlifting program as it suits the age group of research sample, and to the weightlifting trainings used in the suggested

weightlifting program as the training was performed with the free weights and the weights equipments in order to develop the muscle power with its different kinds including the muscle power; as the nature of the skill performance requires the presence of arms and legs muscle ability. Hence, weight training contributed in developing the arms muscle ability and improving the skill performance of the skills studied in the research.

**Display & Discussion of skill performance level results**

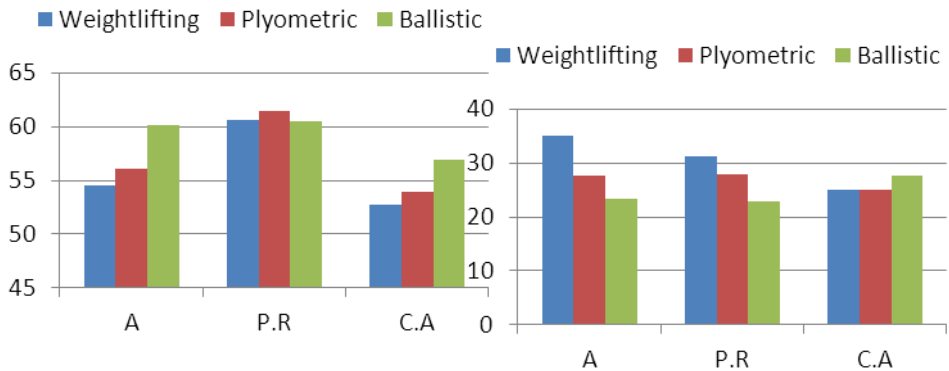


*Figure (1)*

*Successful performances percentages after applying the research program of the player Sabe*

*Figure (2)*

*Performances failed percentages after applying the research program of the player Foil*



*Figure (3)*

*Successful performances percentages after applying the research program of the player Saber*

*Figure (4)*

*Performances failed percentages after applying the research program of the player Saber*



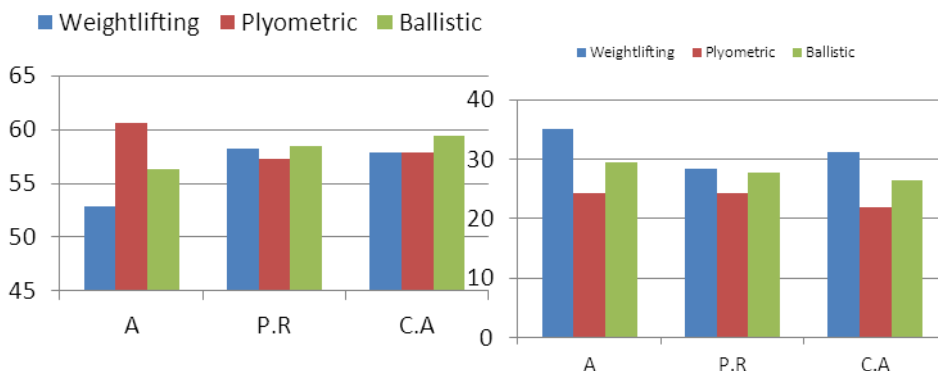


Figure (5)

*Successful performances percentages after applying the research program of the player Epee*

Figure (6)

*Renderings failed percentages after applying the research program of the player Epee*

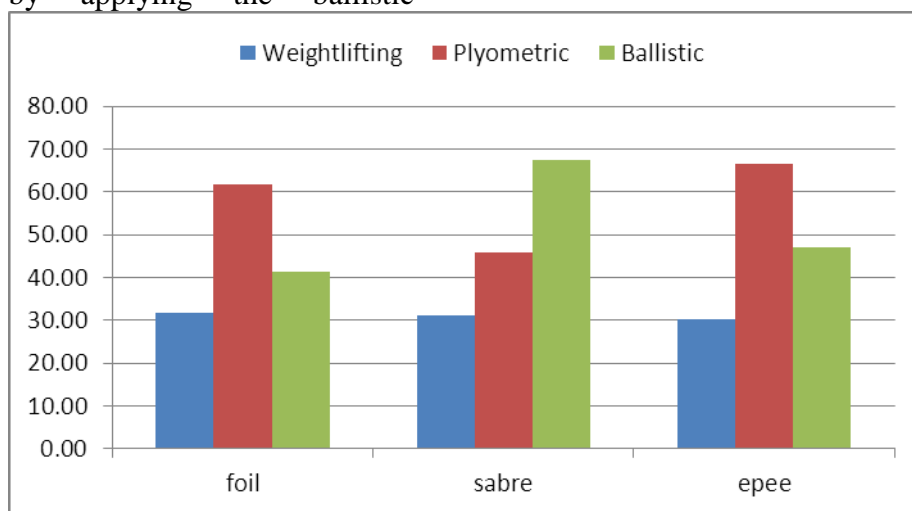
Table (4)

**Successful performances percentage of before measurement to after measurement failure performances of research groups in the three fencing kinds**

The weapons	Research Groups	Renderings Successful		Renderings failed		% R.S for failed pre	% R.S for failed after	difference between percent
		pre	Post	pre	Post			
Foil	Weightlifting	171	202	1030	417	16.60	48.44	31.84
	Plyometric	173	247	1052	316	16.44	78.16	61.72
	Ballistic	172	228	1032	393	16.67	58.02	41.35
Sabre	Weightlifting	171	212	980	435	17.45	48.74	31.29
	Plyometric	177	231	990	363	17.88	63.64	45.76
	Ballistic	171	247	883	284	19.37	86.97	67.61
Epee	Weightlifting	170	215	956	448	17.78	47.99	30.21
	Plyometric	169	243	932	287	18.13	84.67	66.54
	Ballistic	171	235	929	359	18.41	65.46	47.05

Table (4) shows that the percentage of successful to failure performances of before & after measurements of research groups in the three fencing kinds, it points out the improvement of duels players by applying the ballistic

training then the Plyometric then the weight training respectively. While the Plyometric then the ballistic then the weight training respectively for fencing and sword play.



**Figure (7)**

**The differences between the successful performances of the before & after measurements from the failure performances of the research Groups in the three fencing kinds**

The researchers pointed out the reason behind the improvement of skill performance level of fencing, duels and sword play players using the Plyometric training, as Plyometric training are performed by using medium

weights and with maximum speed which led to the development of arms & legs muscle ability. Also, the performance nature copes with the Plyometric training technique as it is medium between the weight training

which requires heavy weightlifting to develop the muscle ability and the ballistic training which aims to lift relatively light weights to develop the muscle ability; because the skills of progress, retreat, stab and defense depend in its performance on the two elements of power and speed.

The researchers attribute the reason behind the improvement of the skill performance level of duels players using the ballistic training to the fact that the ballistic trainings are performed by using relatively light weights and with maximum speed which led to the development of arms & legs muscle ability. In addition, the ballistic training technique copes with the skill performance nature of duels as it depends on the performance of attack and defense skills with great speed with maximum power and speed so as these skills to be effective and influential in scoring and winning the match.

The researchers also see that using ballistic trainings in a

correct and regular way led to reducing the contraction time of muscle fibers and improving the accordance between the working and reciprocity muscles. Also, the repeated performance of the special trainings is similar to the muscle work of performance in duels sport and individually designed which led to the increase of working muscle productivity which is crystallized in developing the arms muscle ability and subsequently, the increase of skill performance level studied in the research, which the researchers took into consideration when choosing the trainings kinds that suits the nature of the skill performance.

## **Conclusions & recommendations**

### **First: Conclusions:**

In light of research aims & hypotheses, the following results were concluded:

#### **a- Foil Fencing:**

– The training program using weight trainings was more effective than the other programs concerning the

development of arms muscle ability.

- The training program using Plyometric trainings was more effective than the other programs in developing legs' muscle ability and improving the skill performance level.

**b- Sabre Fencing:**

- The program training using weight trainings was more effective than the other programs in developing arms' muscle ability.

- The training program using ballistic trainings was more effective than the other programs in developing legs' muscle ability and improving the skill performance level.

**c- Epee Fencing:**

- The training program using weight trainings was more effective than the other programs in developing arms' muscle ability.

- The training program using the Plyometric trainings was more effective than the other programs in developing the legs' muscle ability and improving the skill performance level.

**Second: Recommendations:**

In limit of the characteristics of research sample, the used method and the - statistical treatment, the researchers recommend the following:

- Using the weight trainings to develop arms' muscle ability of duels players (fencing, duels and sword play).

- Using Plyometric trainings to develop legs' muscle ability and improve the skill performance level of duels players (fencing and sword play).

- Using the ballistic trainings to develop legs' muscle ability and improve the skill performance level of duels players (sword play).

- To pay attention to the period of creating the muscle power in the beginning of the athletic season before using the Plyometric and ballistic trainings.

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