

Original Article

The Efficiency of Taekwondo Training Program by Using Free Weights on Some Physical Abilities

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Abstract

The study aimed to acknowledge the training program's efficiency by using the free weights in order to develop the physical abilities for Palestinian Taekwondo Players Team. The sample consisted of 12 players, the training program was applied for three months by using the free weights, as one training unit daily, a total of six training units weekly. The three measurements included the maximum force of the chest muscles, the explosive force of the two legs, in addition to the maximum strength of the muscles of the two legs and the speed burdening. The percentages resulted from the study showed that the suggested training program had a positive impact on the mentioned variables (31%, -16.13%, 42.63%, 6.76%). Within these results, we suggested several recommendations and the most important one is the necessity to use free weights during training.

1. Introduction

Taekwondo is a Korean game, considered as the most famous game in Korea. It started to become important after the Korean war, by the end of the fifties. Then it started to grow to the world countries by 2000 as an official game from the Olympic games that Australia Sydney hosted (Pieter & Heijmans, 2000). It was noticed, in the last period, the size of development that occurred at Taekwondo game, which came as a result of the great development that happened in the field of sports training concerning the used ways, means and methods.

The scientific research is considered the ideal method for achieving the developing that occurred at the sports training operation, in addition to adapting it to serve the increase in the sport's level in an effective way. Taekwondo is considered one of the important games that gained lots of global achievements for

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many countries. It has also been listed among the Olympic games, as it was noticed the continuous interest in this game. Since it has the excitement in the technical and essential skilled fields, it may force us to train athletes by using different methods, in addition to the follow-up in the development and search for the substitutes in the sport's training field.

The physical training aims at achieving a high level of performance, by raising the players training level, combining the physical skills, planning and knowledge and psychological elements. The training case is a term that expresses the players abilities and the readiness of the body organs during the training and competitions. As for the training status of the athlete, according to the development of its components, the more the elements are higher, the more the athlete's level will raise. It is worth mentioning that there should be consistency between the development degree of these components, accordingly to the requirements of the competitive performance, to allow the player to reach the sports formation (Tønnessen, Shalfowi, Haugen, & Enoksen, 2011).

The physical preparation of the athlete is considered the support's core in the annual training plan, during its period and at different stages. The importance of the physical aspect was assured scientifically and technically, in addition to being related to the technical aspect. Therefore, the physical aspect can't be separated from the technical one at any preparation stages, also during the competition (Cherif, Said, Nejlaoui, Gomri, & Abdallah, 2012).

Hazza' (2005) and Zahran (2004) confirm the importance of training the players in the different sports games, after confirming its importance for the taekwondo players; opposite to the opinion of some of the athletes, in taekwondo are considered essential the speed and the different movement skills, which affect the physical and skilled abilities for the athletes.

The power trainings lead to an increase in the movement speed; therefore, it leads to the performance improvement among the different sports skills by enhancing the work upon the important muscles' groups. This may enable the player to achieve the speed skill for a better competition and for a longer period of time (Tønnessen et al., 2011).

The muscle strength is considered one of the most important aspects the Taekwondo player needs. All his movements depend on how he moves his body, the muscles are the ones that control this movement by the constrictions and extinctions, from one place to another. The more the muscle is strong, the more the efficiency of these constrictions will be raised, the muscle force has an effective role in the speed's increasing, the flexibility and fitness of the player, which may have a positive impact on obtaining the best performance of the essential skills and in protecting the player from the injuries risks (Hojatallah, Fatemeh, Alimohammad, & Monire, 2012).

Improving the force is considered a continuous aim for the physical training program, for getting the needed changes in the muscles. Thus, the structural muscles should get the needed level concerning the physical burden when applying the external resistance (Dorgo, King, & Rice, 2009).

The muscle strength is one of the most important aspect in most of the sports movements and games; it is therefore necessary to acknowledge how to measure, evaluate and develop them (Al Hazza', 2005).

Dorgo et al. (2009) confirms that some of the most used elements in training the resistance are free weights, different equipment, rubber etc.

2. Material and methods

The study problem:

The problem of increasing the muscle force is considered major in the training programs, specialized in achieving the comprehensive development of the fitness. Many researchers discussed about using the equipment, weights and other different tools. This equipment is very expensive and not available in all the clubs, especially in the societies that lack the economic resources, or they could not provide them among all the circumstances. Whenever the trainer wishes to form a resistance training unit, he should go to a special training room, which might not always be available and he could not form the training by giving other components at the same training. The modern training of strength simulates the conditions of competition in order to provide the desired results. Through the good planning for the physical modern training, which is reaching for the performance in sport, the most important are the physical preparations that need the muscle strength in order to achieve the movement tasks of the game according to a high efficiency system. The countries' concern, within its sports policies, has emphasized on employing the possibilities and providing the qualified trainers, in addition to caring for the aged groups for the best improvement of their abilities, skills and future. Furthermore, the international unions cared for the international championships of these categories in all the games, which made the field a better place for revealing the Global Competencies and Researchers for Achievement.

Within the resistance exercises, with all their different forms, the most important are the free weights. The muscle does not distinguish between using any equipment or any device for training or even raising a rock or resistance from a colleague. This way, will enable the muscle to respond to all types of the resistance and deal with them either with resistance or stress. In addition, using the free weights does not require using equipment, tools or any special places for training like a gym, which may be considered very costly difficult to provide. The researchers' work and their follow- up of taekwondo sport, in addition to the greatest need for developing the physical force and any other physical abilities, has impact in developing the skills of the taekwondo player. For the resistance exercise, using the free weights does not require providing the sport rooms and great potentials. We therefore present the idea of this research in designing the training program by using the resistance free weights with the aim of developing the physical abilities.

The study objective: to identify the effectiveness of a training program by using the free weights on some physical abilities of the Palestinian Taekwondo players.

The study question: what is the effectiveness of a training program by using the free weights on some physical abilities of the Palestinian Taekwondo players?

The study fields: the human domain - Players of the Taekwondo Palestinian national team.

The place domain: the national team training hall in Ramallah, Palestine.

Time Period: the study was conducted between 01.09.2018 and 15.12.2018.

Methods & Procedures: we applied the experimental approach by using the experimental design of one group according to the nature and procedures of the study.

Study Group: the study group comprised the 20 Palestinian Taekwondo players who are registered in the Palestinian Taekwondo Federation.

The Study Sample: a sample of 12 players was purposefully chosen from the Palestinian Taekwondo team. Table 1 shows the characteristics of the sample.

Table 1. Characteristics of the study sample members

Variables	Measurement Unit	Mean	Standard deviation
Age	Year	20.83	1.32
Height	Cm	177	5.83
Body Mass	Kg	70.66	11.91

The overall framework of the program - implementation of the program:

The study group received training for 12 weeks; in the period from 01.09.2018 to 15.12.2018. We applied six units per week and for a period of 60-75 minutes. The unit included:

- *The first part:* warm up for the physiological and physical enhancement;
- *The main part:* included the exercises of the maximum power and the explosive power for the muscles of the chest and legs and speed;
- *The final part:* included relaxation exercises to return to natural status.

Measures

Three measures were made for the study sample. The first measure was done before the beginning of the training program. The second measure was done after six weeks of the program. The last measure was done at the end of the training program, i.e., after 12 weeks of training.

The study variables:

The independent variable: the applied training program.

The dependent variables: the results of the three measures of the variables of the maximum power of the chest muscles, the explosive power of the legs, the maximum power of the legs' muscles and speed endurance.

The statistical processing: to answer the main question of the study, the SPSS program was used, by analyzing the variance of repeated measures using the Wilks' Lambda test and the Sidak Post Hoc-Test for binary comparison between averages, as well as the means, standard deviations and percentage of improvement.

3. Results and Discussions

The study question: What is the effectiveness of a training program using free weights on some physical abilities of the Palestinian Taekwondo players?

To answer this question, the analysis of variance of repeated measures using the Wilks' Lambda test was used. The results of Table 2 showed the mean and standard deviations of the measures, while the results of Table 3 showed the results of the Wilks' Lambda test.

Table 2. *Mathematical averages, standard deviations and the percentage of improvement*

Measures Variables	Unit	First Measure		Second Measure		Third Measure		Percentage of improvement %
		Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	
Maximum power of the chest muscles	Kg	59.16	16.85	68.33	13.29	77.50	16.95	31%
Explosive power of the legs	Second	30.00	1.89	27.33	1.21	25.16	1.47	-16.13%
Explosive power of the legs' muscles.	Kg	158.33	22.28	200.00	12.64	225.83	18.55	42.63%
Speed Endurance	One Time	66.50	4.76	68.33	3.32	71.00	2.82	6.76%

Table 3. *The results of Wilks' Lambda test for significant differences in the effectiveness of a training program*

Variables	Wilks' Lambda	(F) Approximate value	Numerator degrees of freedom	Denominator degrees of freedom	Significance level
Maximum power of chest muscles	0.061	30.93	2	4	*0.004
Explosive power of legs	0.080	22.97	2	4	*0.006
Maximum power of legs' muscles	0.10	16.62	2	4	*0.01
Speed endurance	0.016	123.60	2	4	*0.0001

* Statistically significant at significance level ($\alpha = 0.05$)

Table 3 shows statistically significant differences at the level of ($\alpha = 0.05$) in the effectiveness of the training program using free weights to develop some physical abilities of the Palestinian Taekwondo players among the three measures.

This indicates the impact of the training program and, in order to determine the differences between the three measures, the Sidak Post Hoc-Test was used for the binary comparison between the means and the results of Table 4 show that.

Table 4. The results of the Sidak test to determine the differences in physical variables

Variable	Measures	First Measure	Second Measure	Third Measure
Maximum power of chest muscles	First Measure		* 9,160 -	* 18,33 -
	Second Measure			* 9,160 -
	Third Measure			
Explosive power of legs	First Measure		* 2,66	* 4,83
	Second Measure			
	Third Measure			
Maximum power of legs muscle	First Measure		* 41,66-	* 67,50-
	Second Measure			* 25,83-
	Third Measure			
Speed Endurance	First Measure		1,83-	* 4,50-
	Second Measure			* 2,66-
	Third Measure			

* Statistically significant at significance level ($\alpha = 0.05$)

Table 4 shows significant differences ($\alpha = 0.05$) in the effectiveness of the training program using free weights to develop some of the physical abilities of the Palestinian Taekwondo players among the three measures - most of the differences were in favor of the third measure.

Discussions

Results of Wilks' Lambda test in Table 3, Sidak test in Table 4 showed that the proposed training program had a positive effect on the variables under study. The results of Table 2 showed that percentage of improvement for the variables of maximum power of chest muscles, the explosive power of legs, the maximum power of legs muscles and speed endurance came as follows: 31%, -16.13%, 42%, 6.76%. The results were consistent with the results of the studies that were concerned with the impact of training programs such as Eduardo and Janeira, (2012), Cherif et al. (2012), Hojatallah et al. (2012), William, Coburn, Brown, & Spiering, (2012), Shalfawi, Sabbah, Kailani, Tønnessen, & Enoksen, (2012), Bonnette (2011), Tønnessen et al. (2011), Al-Saoud (2008), Zayed (2000) and we believe the main reason lies in the nature of the program, which is based on scientific foundations and has stimulated motivation among the players.

The improvement in the maximum power of the muscles of legs achieved the highest percentage of (42%), because the program focused on the strengthening of those muscles for its key role in the Taekwondo game. The reason for improvement may be attributed to an increase in the employment of motor units. However, the speed endurance registered the least improvement (6.76%). The reason may be attributed to the fact that speed is more affected by the genetic factor than training. William et al. (2012) reported that athletes who practice jumping, sprinting and throwing have a high percentage of FT muscle fibers, where these fibers generate speed, strength and high energy in a short time. Cherif et al. (2012) noted that the use of resistance and speed exercises helps to employ quick twitch muscle fibers to perform the anaerobic effort efficiently. Wilmore and Costill (1994) confirm that

quick twitch muscle fibers account for 76% of the twin muscle at the short distance and jump sprints. This generates speed and strength in the shortest possible time and helps make achievements. Some facts confirm the importance of quick twitch muscle fibers as a gene-dependent variable to determine anaerobic ability.

Fox, Bowers and Foss (1989) say: "the sprinter is born, not made." P.O. Åstrand once said: "anyone interested in winning Olympic gold medals must select his or her parents very carefully" (Wilmore & Costill, 1994, p. 232).

4. Conclusions

In light of the results of the study and its discussion, we can conclude the following: the proposed program left a positive effect on the variables under study, where there was a percentage of improvement of the variables of the maximum power of the muscles of the chest, the explosive power of the legs, the maximum power of the muscles of the legs and speed endurance.

The highest effect of the training program was the maximum muscle strength of the legs (42%) and the least impact of speed (6.67%).

The recommendations:

1. applying the results of the current study and training program to clubs and sports federations to help the players develop their abilities based on scientific foundations;

2. making resistance training to develop the muscular capacity of the Taekwondo players' legs;

3. conducting a comparative study among Taekwondo players, games and other sport activities players with respect to physical, physiological and anthropological capacities.

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