Original Article

The Effect of a Proposed Training Program Using the Ball Throwing Machine to Develop Performance Speed on the Counter-attack Skill for Table Tennis Players

Marcel Zia Yelda[1], Qahtan Adnan Ahmed[2]

[1]Faculty of Sport Education, Dhuk University, North Carolina, USA, [2]Faculty of Sport Education, Dhuk University, North Carolina, USA,

ABSTRACT

The world is currently witnessing a notable development in various aspects of life. All phenomena in the various fields were subject to scientific research as it is the best way to solve many problems. It becomes necessary for physical and sport education, being one of these fields, to keep up with this rapid progress by updating methods used in sport training to reach high levels at all sport activities in general and table tennis in particular. The problem of the study is that most international players are interested in training performance speed in attacking skills, counter-attacking skills with defensive skills in a balanced manner in the single training unit and comparing this with the level of Iraqi players. It was found that they are interested in training on attack and defense skills with limited focus on the speed of performing the counter-attack skill, which leads to lack good performance requirements. The study aims to design a training program using the ball throwing machine to develop performance speed and determine the effect of this program on counter-attack skill for table tennis players. As for hypotheses of the study, there are statistically significant differences between pre- and post-tests in the level of performance speed and counter-attack skill in favor of post-test of the control group, there are statistically significant differences between in favor of post-test of the empirical group, and there are statistically significant differences between the control and empirical groups in favor of post-test of the empirical group. As for human domain of the study, it is represented in table tennis juniors team in Dhuk Sporting Club (10 players) in the period from 15/11/2015 to 31/12/2015 in the table tennis court of Dhuk Sporting Club.

Keywords: Effect, Training, Ball, Tennis, Counter-attack, Skill

INTRODUCTION AND SIGNIFICANCE OF THE STUDY

The world is currently witnessing a notable development in various aspects of life. All phenomena in the various fields were subject to scientific research as it is the best way to solve many problems. It becomes necessary for physical and sport education, being one of these fields, to keep up with this rapid progress by updating methods used in sport training to reach high levels at all sport activities in general and table tennis in particular.

The concept of modern training puts into consideration the wide basis of individuals of society by determining special goals and scientific basics of training programs (various types of training) to be consistent with general sport and cultural trends of the various general levels to ensure practicing sport as an initial step toward to achieve the support of reaching high levels (Bosaty and Muhammad, 1998: p. 4).

Address for correspondence:
Marcel Zia Yelda, Faculty of Sport Education, Dhuk University. E-mail: sport.man61@yahoo.com

Table tennis is a sport with a distinctive feature as it includes special skills that distinguish it from other sport activities. In its practice, it depends on using the racket of special characteristics in terms of the size and type of materials covering its surfaces in addition to the ball with special properties in terms of size, manufacture material, diameter, and weight. This requires a high degree of performance speed and neuromuscular consistency between the arm movement of the ball hitter and controller and the movement of trunks, legs, and eyes. These movements cannot be separated (Fekry and El Din, 2002: p. 14).

The nature of performance in table tennis requires a high degree of performance speed. This is evident in the player's ability to perform consecutive moves in the least possible time, so he almost has to increase his performance speed in an attempt to gain points or to keep up with the opponent's performance speed (Shawki, 2002: p. 294). Moreover, one of the most difficult features of table tennis is that it became very fast and its decision-making should be done in a part of a second (International Federation of Table Tennis, 2001: p. 96).

The significance of this study lies in the ability to design a training program for junior players on a scientific basis to develop performance speed, and then, raise the skill performance level in general and the counter-attack skill in particular. The researcher uses training with the latest scientifically technological methods in table tennis training programs (the ball throwing machine) due to the ability to control directions, speed and spinning of the ball thrown out of the device, so training results will be valid and reliable that cannot be found with the human element during performing the same exercises.

Problem of the Study

The problem of the study is that most international players are interested in training performance speed in attacking skills, counter-attacking skills with defensive skills in a balanced manner in the single training unit and comparing this with the level of Iraqi players. It was found that they are interested in training on attack and defense skills with limited focus on the speed of performing the counter-attack skill, which leads to lack good performance requirements.

Objectives of the Study

The study aims to design a training program using the ball throwing machine to develop performance speed and determine the effect of this program on counter-attack skill for table tennis players.

1. Design a training program using the ball throwing machine to develop performance speed for the study sample's members
2. Determine the effect of the training program on the counter-attack skill for the study sample's members.

Hypotheses of the Study

1. There are statistically significant differences between pre- and post-tests at the level of performance speed and counter-attack skill in favor of the post-test of the control group
2. There are statistically significant differences between pre- and post-tests at the level of performance speed and counter-attack skill in favor of the post-test of the empirical group
3. There are statistically significant differences between post-tests for both control and empirical groups at the level of performance speed and counter-attack skill in favor of the post-test of the empirical group.

METHODOLOGY

The researcher used the empirical method using one of the empirical designs which are the empirical design of two groups; control and empirical groups using pre- and post-tests for both groups.

Population and Sample of the Study

The sample of the study was selected purposively from table tennis juniors team in Dhuk Sporting Club registered in files of the Iraqi federation of table tennis under 15 years for the season 2015-2016.

Table 1 shows that the population of the study is 14 players from which there are 10 players (71.4%) of the basic sample of the study and 4 players (28.6%) of an exploratory sample of the study.

Matching Sample of the Study

The researcher divided the sample of the main trial (10 players under 15 years) into two groups. Each group consists of five players due to matching procedures at the level of basic, physical, and skill variables under study.

Table 2 shows symmetry between the control and empirical groups in variables of the study as the tabulated (T) value was bigger than the counted one.

Table 3 shows that there are statistically significant differences between pre- and post-tests for the control group in physical variables as the counted (T) value was bigger than the tabulated one at significance level 0.05 except for passing in 10 s test and number circles, while in skill variables the counted (T) value was bigger than the tabulated one at significance level 0.05 except for the counter-attack after third ball test.

Thus, it becomes clear that the adopted traditional program with the control group had a positive effect on enhancing physical and skill variables under study except for the test of passing in 10 s and number circles test in physical variables except for the counter-attack test after the third ball in skill variables. The researcher attributes this due to the training program

Table 1: Description of the sample of the study

Total sample No.	Exploratory samples	Basic trial sample	Both groups of the study	
N (%)	N (%)	N (%)	Empirical group	Control group
14 (100)	4 (28.6)	10 (71.4)	N (%)	N (%)
			5 (35.7)	5 (35.7)

Table 2: Significance of differences between pre-tests for the empirical and control groups to show matching in basic variables of the study

Variables (N1=N2=5)	Mean±SD		F	(T) value
	Empirical group	Control group		
Growth variables				
Length	154.70±4.75	155.30±4.70	0.59	0.27
Weight	52.50±4.56	54.40±4.23	1.89	0.95
Age	13.11±0.86	13.18±0.76	0.09	0.26
Training age	2.00±0.80	2.20±0.77	0.19	0.54
Physical tests				
Passing in 10 s	9.50±2.22	9.40±2.75	0.10	0.09
Number circles	21.70±5.12	19.90±6.08	1.80	0.71
Pushed ball from the machine	13.90±2.42	13.60±2.63	0.30	0.26
Passing accuracy from movement	20.40±3.97	19.00±2.86	1.40	0.90
Skill tests				
Spinning hit by forehand	6.40±2.22	5.90±2.02	0.50	0.52
Spinning hit by backhand	6.20±2.25	5.40±2.31	0.80	0.78
Counter-attack after third ball	50.00±14.90	46.50±13.75	3.05	0.54
Super hit by forehand	10.30±2.75	9.10±2.84	1.20	0.96

*The tabulated (T) value at significance level 0.05=1.86. SD: Standard deviation

Table 3: Significance of differences between pre-tests for the control group in physical and skill variables of the study

Variables (N=5)	Mean±SD		F	(T) Value	Improvement %
	Pre-test	Post-test			
Physical tests					
Passing in 10 s	9.40±2.75	11.50±2.32	2.10	1.84	22.34
Number circles	19.90±6.08	17.30±5.92	2.60	0.96	15.02
Pushed ball from the machine	13.60±2.63	16.30±2.58	2.70	2.31	19.85
Passing accuracy from movement	19.00±2.86	21.7±2.35	2.70	2.29	14.21
Skill tests					
Spinning hit by forehand	5.90±2.02	9.20±1.39	3.30	4.24	55.93
Spinning hit by backhand	5.40±2.31	8.30±1.70	2.90	2.18	53.70
Counter-attack after third ball	46.50±13.75	57.00±13.98	10.50	1.69	22.58
Super hit by forehand	9.10±2.84	11.80±2.52	2.70	2.24	29.67

*The tabulated (T) value at significance level 0.05=2.13. SD: Standard deviation

and not using the ball throwing machine with the control group.

Table 4 shows that there are statistically significant differences between pre- and post-tests for the empirical group in physical and skill variables as the counted (T) value was bigger than the tabulated one at significance level 0.05 in all physical and skill tests. Thus, it becomes clear that the proposed training program applied on the empirical group had a positive effect on enhancing all physical and skill variables under study. The researcher attributed this to the proposed training program to develop performance speed using the ball throwing machine.

Table tennis depends on the high ability to respond to overlapping variables during matches which are provided by the ball throwing machine (Al Dawtaly, 2006. p. 9).

Using the ball throwing machine enhances the skill, physical and planning performance level as a result of focusing on weak points (Anderezej, 1996. p. 15).

Table 5 shows that there are statistically significant differences between pre- and post-tests between both the control and empirical groups in physical and skill variables under study in favor of the empirical group.

Thus, it becomes clear that raising physical and skill levels of the counter-attack for the sample of the study is due to the application of the proposed training program to develop the performance speed variable using the ball throwing machine and determine the

Table 4: Significance of differences between pre-tests for the empirical group in physical and skill variables of the study

Variables (N=5)	Mean±SD		F	(T) Value	Improvement %
	Pre-test	Post-test			
Physical tests					
Passing in10 s	9.50±2.22	14.10±1.66	4.40	9.22	46.31
Number circles	21.7±5.12	13.90±3.44	7.80	9.13	56.11
Pushed ball from the machine	13.9±2.42	24.20±3.19	10.30	28.09	74.10
Passing accuracy from movement	20.40±3.97	26.25±2.67	6.10	9.79	29.90
Skill tests					
Spinning hit by forehand	6.40±2.22	12.30±1.94	5.90	6.00	92.18
Spinning hit by backhand	6.20±2.25	10.00±2.40	3.80	3.64	61.29
Counter-attack after third ball	50.00±14.90	75.00±14.14	25.00	9.85	50.00
Super hit by forehand	10.30±2.57	14.80±2.74	4.50	3.66	43.68

*The tabulated (T) value at significance level 0.05=2.13. SD: Standard deviation

Table 5: Significance of differences between pre-tests for the control and empirical groups in physical and skill variables of the study (N1=N2=5)

Variables	Mean±SD		F	(T) Value	Improvement %
	Pre-test	Post-test			
Physical tests					
Passing in10 s	11.50±2.32	14.10±1.66	2.60	2.87	22.60
Number circles	17.30±5.92	13.90±3.44	3.40	1.86	24.46
Pushed ball from the machine	16.30±2.58	24.20±3.19	7.90	6.08	48.46
Passing accuracy from movement	21.7±2.35	26.25±2.67	4.80	4.25	22.11
Skill tests					
Spinning hit by forehand	9.20±1.39	12.30±1.94	3.10	4.09	33.69
Spinning hit by backhand	8.30±1.70	10.00±2.40	1.70	1.87	20.48
Counter-attack after third ball	57.00±13.98	75.00±14.14	18.00	2.86	31.57
Super hit by forehand	11.80±2.52	14.80±2.74	3.00	2.41	25.42

*The tabulated (T) value at significance level 0.05=1.86. SD: Standard deviation

effect of the training program on the counter-attack skill for members of the study sample.

Evaluating table tennis players should be made in fitness and psychomotor evaluation. It includes performance speed, response speed and motor performance speed (Misins, 2003. p. 31).

Physical preparation is the applied process to raise the training condition's level of players by giving them fitness which, in turn, affects the skill and planning aspects. Practicing exercises that develop components of fitness is accompanied with a rising in performance level for different basic skills of the practiced activity as well as raising the planning performance level (Jamal and Abdelhalim, 2005. p. 232).

CONCLUSIONS

1. Using the ball throwing machine helps the player to train by himself with saving time and effort during the training process
2. The proposed training program has a positive and effective influence on developing performance speed for members of the empirical group of the study
3. The training programs using the ball throwing machine help treating weak points of players, enhancing, and fixing strength points.

RECOMMENDATIONS

1. Consideration of training on the counter-attack skill regularly in addition to attacking and defense skills
2. The ability to use the ball throwing machine as effective means to evaluate skill performance for its reliability, validity, and objectivity
3. Working on spreading assistant tools and appliances in table tennis at the level of teams, youth centers and faculties of physical education.

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