The Impact of A Training Program For Speed Development and Performance Accuracy by Using The Ball Throw Machine on The Forehand spin Effectiveness of Junior Table Tennis Players U- 15

[1]Dr/ Ahmed Sobhy Salem

Introduction & Research Problem:

Attaining high levels of the table tennis sport depends on what the player has acquired and mastered of preliminary and basic motor skills as these skills are considered the key to the success and excellence of players, especially when they are learned and mastered at the junior stage and maintained throughout the sports life of the player.

Hewitt Dived (1990) states that the basic skills in table tennis sport are multiple and characterized with complex-performance It requires great effort to learn and master due to the difficulty of its implementation because of the small size of table, ball and racket. Therefore, its practice requires that the player has a high degree of speed, accuracy, coordination and focus. In addition, the player needs in his training high physical and skillful, tactical and psychological capabilities to match the performance nature in the game (5).

Both Ahmed Aldawltely (2006) and DIMOSTHENIS (2008) confirm that the player must be proficient in the performance of the entire basic skills as all the basic skills are equally important. Performance mastery of these skills requires starting training from a young age and continuing and follow-up practice in each training unit throughout the player's life in the venue. In order that the player lives up to the national or global level, he must have perfect proficiency and mastery of basic skills (3), (6). Holowchak and DanSeemlier (1999), Ahmed Sobhy (2004), ERTAN PATIR (2009) agree that the skill of the drop shot with all its different types in table tennis sport plays an

[1] Assistant professor- Sports Training Dept. – Faculty of Physical Education for young men- Alexandria University

important and positive role in influencing the outcome of the game as it is considered one of the most important offensive basic skills which significantly contribute to scoring the highest number of points to win the game. In addition, it occupies the leading place among the basic offensive skills because of its substantial impact on the results of matches (4), (1), (9).

The researcher confirms that mastering motor skills is one of the most important factors that will help the player to win, as no tactical duty can be implemented, whether offensive or defensive, but through good mastery of the motor skills, which play a primary role during competitions.

Michel Gadal (1997) (16), Tarek Mohammed (2003) (22), Ahmed Aldawltely (2006) (3), Hosni Fouad (2006) (12), Polyakov (2013) (19) have confirmed the importance of enhancing performance speed of the table tennis player along with using drop shot skill in order to upgrade the skill level and attain high levels.

Through the reference survey and the researcher looking into the available scientific references and studies related to table tennis sport, it was revealed that there is a scarcity in the number of research and studies dealing with specialized training programs for the development of accuracy and speed of performance of drop shot for table tennis junior players under 15 years by using ball throw machine as an auxiliary training tool, as far as the researcher knows.

It is already clear that the drop shot skill is one of the basic skills in table tennis, which plays an effective role in influencing the outcome of the game if the accuracy and speed of performance are taken into consideration. By a large margin, the performance of this skill is repeated during the game especially by the front face of the racquet. This has been confirmed by the first pilot study on a sample of the semi-finals and final of the World Championship in Netherlands (2013) [Attachment (1)]. Through the experience of the researcher in the field of training and arbitration in table tennis, he noted that most juniors do not have the ability to perform this skill in the right place to

increase its effectiveness. Subsequently, this causes the loss of many points and not making good use of drop shot skill, which is the key to winning for players of table tennis.

The importance of this study lies in the possibility of designing a training program for juniors grounded on a scientific basis for the development of accuracy and speed of performance of drop shot and then promoting the skill performance level. The researcher uses one of the latest world technological training methods in the table tennis training programs (ball throw machine) due to the possibility of controlling the directions and speeds and rotation the ball coming out of the machine. Thus, the training results shall have validity and reliability that cannot exist with the human element when performing the same exercises. In addition, this program is accessible to coaches interested in the youth (juniors) sector, which could be applied for the development of accuracy and speed performance of the drop shot skill and thus improve the performance technical level of table tennis juniors in general.

Research Objective:

Designing a training program for the development of the speed and accuracy of performance of The Forehand spin using the ball throw machine device, and identifying its impact on the effective performance of The Forehand spin for table tennis juniors

Research Hypotheses :

1. There are significant differences between the two pre and post measurements for the experimental group and the control group in the variables (drop shot performance speed-directing place of ball on the table - effectiveness of straight drop performance) for U-15 junior players of table tennis after the application of the proposed training program for the post-measurement for both groups.

2. There are significant differences between the experimental group and the control group in the variables (drop shot performance speed-directing place of ball on the table - effectiveness of straight drop performance) for U-15 junior players of table tennis after the application of the

proposed training program for the experimental group.

- Research procedures:

- Research Methodology:

The researcher used the experimental method to two groups, one experimental and the other control applying to them the two measurements, pre and post, for their appropriateness to the nature of the research.

- Areas of Research:

- The Human Sphere (Research Sample):

The study was conducted on a sample of table tennis U-15 juniors composed of (12) juniors at the Railway Sports Club and registered at the Egyptian Federation of table tennis in the sports season 2014 – 2015. Their characteristics are as follows: the arithmetic average age (0.51 ± 13.42), height (6.53 ± 153.58) , weight (4.38 ±

42.58), coaching age (0.58 ± 4.17).

Time Domain:

This study was conducted in the period from 05/05/2014 to 02.08.2014 distributed as follows:
- Surveys in the period from 05/05/2014 to 06.12.2014.
- Basic study in the period from 06/14/2014 to 02.08.2014.

- Spatial Domain: The study was carried out, including the application of the training program and conducting the proposed skill measurements on the study sample at table tennis hall training at the Railway Sports Club in Alexandria.

- Research Sample: The researcher conducted the statistical description of the sample in the variables of speed and accuracy of drop shot performance of table tennis U-15 years juniors.

Table (1)
**statistical description of the entire sample in the variables
(performance speed of drop shot - the spatial direction of drop
shot - the effectiveness of the drop shot and its variables - the
number of drop shots) before applying the experiment**

Statistics / Variables		Mean	ST.D	Median	Range	Min.	Max.	Sek.	Kur.
speed test for FO.H spin		15.83	0.72	16.00	2.00	15.00	17.00	0.26	-0.69
Place attitude test for FO.H spin		13.17	0.83	13.00	2.00	12.00	14.00	-0.35	-1.45
effectiveness the FO.H spin stroke	Losing a direct point	21.75	4.67	23.00	15.00	12.00	27.00	-1.00	0.22
	Switching to defensive mode	33.92	2.81	34.00	10.00	29.00	39.00	-0.07	0.04
	Rally Occurrence	85.83	13.12	90.00	43.00	56.00	99.00	-1.53	1.71
	Staying in Offensive Mode	37.08	7.42	38.50	27.00	19.00	46.00	-1.47	2.39
	Point Scored	25.08	3.75	24.00	12.00	18.00	30.00	-0.12	-0.61
Number of FO.H spin strokes		203.67	27.63	211.00	96.00	141.00	237.00	-1.47	1.74

Table (2)
**significant differences between the experimental group and the control
group in the variables: (drop shot performance speed - the spatial
direction of drop shot - the effectiveness of the strike and variables - the
number of drop shots) before applying the experiment**

Statistics / Variables	Ex .GROUP N=6		Co. GROUP N=6		M.V	(T)	Sig.
	mean1	St. d± 1	mean2	±St .d 2			
speed test for FO.H spin (20 de)	13.00	0.89	13.33	0.37	-0.33	0.674	0.515
Place attitude test for FO.H spin (24 de)	15.67	0.52	16.00	0.21	-0.33	-0.791	0.448

ess the FO.H spin	Losing a direct point	22.00	4.97	21.50	21.50	.50·	0.18	0.86
	Switching to defensive mode	34.00	3.06	33.83	33.83	·.17	0.10	0.92

Follow Table (2)
significant differences between the experimental group and the control group in the variables: (drop shot performance speed - the spatial direction of drop shot - the effectiveness of the strike and variables - the number of drop shots) before applying the experiment

Statistics	Ex .GROUP N=6		Co. GROUP N=6		M.V	(T)	Sig.
Variables	mean1	St. d± 1	mean2	±St .d 2			
Rally Occurrence	85.67	12.03	86.00	86.00	-0.33	0.04	0.97
Staying in Offensive Mode	36.00	6.85	38.17	38.17	-2.17	0.49	0.64
Point Scored	24.83	2.88	25.33	25.33	-0.50	0.22	0.83
Number of FO.H spin strokes	202.50	30.75	27.04	204.83	-2.33	0.14	0.89

Research Methods and Tools:

- Tests of the performance speed and accuracy of drop shot:

Based on the scientific background of the study, the researcher believes that for the possibility of conducting the optimal diagnosis of measuring the accuracy and speed of the drop shot, following tests are suggested:

- Speed Performance Test of the straight drop. (degree)
- Spatial Direction Test of the straight drop. (degree)
- Measuring the effectiveness of straight drop:
In addition to determining the percentage of the straight drop, skill performance effectiveness measurement during a training match of five runs using the objective observation of the following variables was conducted:

- Scoring a direct point - Making the server in the offensive position
- Rally Occurrence - Make the server on the defensive position
- Loss of a direct point

- Tools used (in the measurement and training):
1. Medical Balance standards for weight measurement (kg).

2. Restmeter to measure the height (cm). 3. Table tennis tables
4. Ball throw machine of table tennis balls. 5. Table tennis balls and rackets.
6. Adhesive tapes in different colors. 7. Goals of variable shapes.
8. Measuring tape 5m.
9. Note-taking records.
10. A4 photocopying paper.
11.Video camera.
12. Laptop.

- **Exploratory studies**:

- The first exploratory study:

it was conducted during the period from 05.05.2014 - 05/21/2014 in order to determine the most offensive skills to use in the game with the table tennis U-15 juniors. The objective was verified through the quantitative analysis of offensive skills in the pre- final turns, and the final in the World Championship in Netherlands in 2013

The most important results:

1. The drop shot is the most common offensive skill of high levels' players by 52%
2. The smash is the second common offensive skill of high levels' players by 22%

3. The straight is the third common offensive skill of high levels' players by 15%

- The second exploratory study:

It was conducted on a sample of table tennis U-15 juniors composed of (8) players outside the study sample, and without any significant differences in the basic variables and accuracy and speed performance of straight drop variables with the basic study group. The study was carried out during the period from 22 / 5/ 2014 - 12/ 6/2014 and targeted two tasks:

The first task aimed at identifying the suitability extent of selected exercises using ball throw machine for the development of accuracy and speed to perform The Forehand spin for the juniors under study, and recognizing as well the most suitable training strategies for the implementation of these exercises in accordance with the principle of gradual carrying (the easier, then the more difficult, the simple then the complex, repetition by adding variations).

The second task of the study aimed to ascertain the validity extent of the proposed tests for

application through surveying the opinions of experts and the actual experiments of tests to determine the final form for these tests and conduct scientific coefficients (authenticity - stability - objectivity) as an essential step before applying them in the basic study.

The most important results are as follows:

1. Identifying skill-oriented exercises for the accuracy and speed of the straight drop.

2. Logical ordering of the selected exercises in their allocated part in the training module.

3. Using interval training of low and moderate intensity as a training method in the implementation of the training content using the ball throw machine and considering the performance quality of the exercises as an indicator to adjust the load and identify the repetitions.

4. Reaching the final form of tests under study and the method of their implementation.

5. Checking the validity of the proposed tests for application in the light of the results of scientific coefficients.

- Scientific coefficients of tests under study:

The researcher calculated the scientific coefficients (authenticity - stability) of tests under study.

Calculation of Authenticity Tests:

Based on the second exploratory study sample, the researcher calculated authenticity in order to distinguish between tests through significant discrepancy differences between Top quarters and low quarters for the results of the applicable tests (speed performance of drop shot test, spatial direction of drop shot test). The results of that study indicated the characterization of the speed performance drop shot test with an authenticity coefficient that amounted to (0.79). The speed performance drop shot test was characterized with an authenticity coefficient that amounted to (0.83)

- Calculation of Stability Tests:

The stability (speed performance of drop shot test, spatial direction of drop shot test) was calculated in a way the correlation coefficient between the test and re-applying it a week after the

first application. The results of that study indicated the characterization of the speed performance drop shot test with a stability coefficient that amounted to (0.89). The speed performance drop shot test was characterized with a stability coefficient that amounted to (0.91) which indicates the validity of the tests applied in this study.

- Training Program:

1.   The objective of the program:

The program aims to improve the performance of The Forehand spin table tennis U-15 juniors, through the employment of exercises using ball throw machine to improve the speed and accuracy of The Forehand spin by applying these exercises at the end of the main part of the training module.

2.   Special considerations of ball throw machine exercises:

In accordance with the general principles of sports training, especially with respect to the dynamics of the formation of load and individual differences the following has been taken into account:

1. The exercises should be in the same motor path of The Forehand spin skill.

2. Exercises must be consistent with the training state level of the study sample.

3. Gradient mechanisms must be compatible in the selected exercises with the difficulty performance level.

4. The load should be taken into account to restore partial healing before proceeding with the application of exercises using throw machine so as to reduce the impact of fatigue at the end of the training module on the performance quality of the proposed exercises.

Load   Formation   in   the proposed training program:

The training program included 32 training modules spread over (8) weeks by (4) times training per week, and by the rate of (48-64) hours of training. Training module ranges time between (90-120 minutes) distributed to the three parts of the training unit where the time for both warming and resting ranged between (5- 10) minutes. On the other hand, the main part ranged between (80 - 100 minutes), distributed as follows:

1. Physical preparation (20-25) minutes.
2. Skill preparation (50-60) minutes.
3. Tactical preparation (10-15) minutes.

Provided that exercises are included by using balls throw machine for the experimental group by (20-25) minutes at the end of skill preparation part.

Thus, exercises have been established using ball throw machine on the accuracy and speed of straight drop performance through the following:

First: Speed:

The ability variable of making the ball bounce on the final line of the rival side of the table for the first time is a good way to score points directly; hence, the amounts nature of the exerted force in the skill performance of straight drop differ. Exercises work on developing the junior potential of controlling the required speed for the skill performance.

Second: place of ball direction:

That The Forehand spin skill performance in different places creates more effective opportunities for offensive performances where the rival player is forced the opponent to receive the ball in different forms generally by the front or back face of the racquet or front of the body, according to the competition conditions. Exercises in this direction aim to develop the junior's potential in straight drop skill performance in multiple variations.

Basic Study:

The basic study was applied on the two groups of research, the experimental and control, in the period from 14/06/2014 to 07/08/2014 for a period of 8 weeks and a total of 32 training modules, distributed by (4) training modules per week. The researcher took into account the unification of training content in the parts of: warm-up, physical preparation and tactical preparation as well as in the concluding part. However, in the skill part preparation, training skills have been added to The Forehand spin shot by using the ball throw machine for a period of 20 minutes in the training content of the experimental group of the skill setup time. On the other hand, the control group performed the regular

skill exercises in the allocated training time for modules using the ball throw machine. After the completion of the training program application, post-measurements were applied on the two research groups in the variables under study, taking into consideration the same pre-measurement requirements.

Statistical processing:

Due to the nature of the applied experimental study, tests and measurements used, as well as the sample size, the statistical data was processed by computer using the Statistical Package for Social Sciences processing program (SPSS) for:

The arithmetic average – the standard deviation - torsion modulus- correlation coefficient - T. test differences - Square ETA- The average improvement ratio (%).

- Review of Results:

Table (3)

significant differences between pre-measurement and post-measurement of the control group in the variables: (drop shot speed performance - spatial direction of drop shot - the effectiveness of the drop and its variables - number of drop shots) after application of the experiment

Statistics / Variables	post		per		Diffrance		(T)	Sig.	%
	mean1	St.	mean2	St .d	M.	St ±			
speed test for FO.H spin (20 de)	14.67	0.82	13.33	0.82	1.33	0.52	*6.32	0.00	10.05
Place attitude test for FO.H spin (24 de)	17.67	1.21	16.00	0.89	1.67	0.52	*7.91	0.00	10.44
effectiveness the FO.H spin stroke — Losing a direct point	23.50	1.52	21.50	4.97	-2.00	6.23	·.79	.47	9.30
Switching to defensive	43.50	2.17	33.83	3.06	-9.67	4.46	*5.31	.00	28.57
Rally Occurrence	65.33	2.42	86.00	12.03	20.67	13.69	*3.70	.01	-24.03
Staying in Offensive	55.33	1.75	38.17	6.85	-17.17	7.36	*5.71	.00	44.98
Point Scored	31.83	2.04	25.33	2.88	-6.50	3.51	*4.54	.01	25.66

Number of FO.H spin strokes	219.50	9.67	204.83	27.04	-14.67	33.19	1.08	.33	7.16

Table (4)
significant differences between pre-measurement and post-measurement of the experimental group in the variables: (drop shot speed performance - spatial direction of drop shot - the effectiveness of the drop and its variables - number of drop shots) after application of the experiment N=6

Statistics / Variables	post		per		Diffrance		(T)	Sig.	%
	mean1	St.	mean2	St .d	M.	St ± d			
speed test for FO.H spin (20 de)	18.00	0.89	13.00	0.89	5.00	0.63	*19.36	0.00	38.46
Place attitude test for FO.H	21.33	0.82	15.67	0.52	5.67	0.82	*17.00	0.00	36.12
Effectiveness the FO.H spin stroke — Losing a direct point	16.83	1.33	22.00	4.82	-.50	.84	1.46	.20	-23.48
Switching to Defensive	33.33	1.03	34.00	2.83	-17.17	35.46	1.19	.29	-1.96
Rally Occurrence	43.33	1.75	85.67	15.29	-30.00	5.51	*13.33	.00	-49.42
Staying in Offensive	71.33	1.21	36.00	8.44	-35.33	9.18	*9.43	.00	98.15
Point Scored	54.83	1.60	24.83	4.75	42.33	16.60	*6.25	.00	120.81
Number of FO.H spin strokes	219.67	6.65	202.50	30.75	.67	2.73	.60	.58	8.48

Table (5)
significant differences between the experimental group and the control group in the variables: (drop shot speed performance - spatial direction of drop shot - the effectiveness of the drop and its variables - number of drop shots) after application of the experiment

Statistics / Variables	Ex .GROUP N=6		Co. GROUP N=6		M.V	(T)	Sig.	%
	mean1	St. d+	mean2	St d				
speed test for FO.H spin (20	18.00	0.89	14.67	0.82	3.33	*6.74	0.00	22.70
Place attitude test for FO.H spin (24 de)	21.33	0.82	17.67	1.21	3.67	*6.15	0.00	20.71

Follow Table (5)

significant differences between the experimental group and the control group in the variables: (drop shot speed performance - spatial direction of drop shot - the effectiveness of the drop and its variables - number of drop shots) after application of the experiment

	Statistics / Variables	Ex .GROUP N=6		Co. GROUP N=6		M.V	(T)	Sig.	%
		mean1	St. d+	mean2	St d				
effectiveness the FO.H spin stroke	Losing a direct Point	16.83	1.33	23.50	1.52	-6.67	*8.10	0.00	-39.63
	Switching to Defensive	33.33	1.03	43.50	2.17	-10.17	*10.37	0.00	-30.51
	Rally Occurrence	43.33	1.75	65.33	2.42	-22.00	*18.03	0.00	-50.77
	Staying in Offensive Mode	71.33	1.21	55.33	1.75	16.00	*18.41	0.00	22.43
	Point Scored	54.83	1.60	31.83	2.04	23.00	*21.71	0.00	41.95
Number of FO.H spin strokes		219.67	6.65	219.50	9.67	0.17	0.03	0.97	0.08

Table (6)

the effectiveness of The Forehand spin for the two groups, the experimental and control, before and after the experiment

	Statistical / Variables	Effectiveness of the FO.H spin stroke E.		Effectiveness of the FO.H spin stroke Co.	
		per	post	per	post
effectiveness the FO.H spin stroke	Losing a direct point				
	Switching to defensive mode				
	Rally Occurrence	3.04	3.52	3.06	3.13
	Staying inoffensive Mode				
	Point Scored				

Discussion of Results:
Validating the first hypothesis:

Regular training of table tennis contributes positively to the development of a high degree of interoperability capabilities for its practitioners in various training stages (junior and tournament) while providing them with the information they need to take the appropriate decision to perform a certain motor skill under changing circumstances and according to different amounts of speed, strength, rhythm and time (7). This is reflected in the presence of significant differences in both tables (3), (4) between the two pre and post measurements of the experimental group and the control group of the study sample in the variables: (straight drop speed performance - spatial direction of straight drop - the effectiveness of The Forehand spin shot and its variables) in favor of post-measurement. The researcher attributes this to the particularity of the training impact of practicing table tennis sport, especially since these differences may come in the special preparation period, which includes the bulk of table tennis exercises. This is in addition to what is imposed by the specialized performance nature in the circumstances that require playing within the limits of a relatively small playground with a ball of varied speed, force, direction and rotation, which becomes increasingly complex in the presence of a competitor. These requirements are reflected in the form of a training effect on the control of the exerted force in terms of amount, timing and direction.

In addition to what has been achieved in terms of the significant differences between the two (pre- and post) measurements of the two research groups, differences in the change rate achieved by the experimental group compared to the control group as illustrated in Table (3.4) where the experimental group achieved a rate of change equal to (38.46%) to test The Forehand spin speed performance versus (10.05%) of the control group, and the percentage (36.12%) for the spatial direction of The Forehand spin versus (10.44%) of the control group and the percentage of scoring a direct point from The Forehand spin of the experimental group increased from (24.83% to

54.83 %). On the other hand, the control group increased from (25.33% to 31.83%) and the ratio of staying in the offensive state for the experimental group improved from (36.00%) to (71.33%), while that of the control group increased from (38.17% to 55.33%).

This was due to the junior's ability to control directing the ball to the most effective areas in making points as low height and effective bounce on the surface of the opponent's table as a result of the effective impact of the ball throw machine training of the experimental group. This is consistent with what (1997) Davis mentioned that the fundamental criterion for the success performance extent in table tennis depends on the correct estimation of the distance and direction as well as controlling the force amount that occurs during the drop (7). This is implicitly confirmed by Tarek Ibrahim (2003) as he believes that the player's ability to direct the ball to a specific place on the rival's table is fundamental to get the point since locating the fall place of the ball is more important than the tactically aspect in terms of speed and rotation (22).

The success of the drop depends entirely as seen by Ahmed Sobhy (2010) and Tepper (2006) on the right estimate of distance and direction, as well as controlling the required amount of force during the drop (2) (23). Which is in line with Lines (2007) that the player, who is directing the ball to various places by the required speed and accuracy increases the effectiveness of his skill accomplishment (15).

This validates the first hypothesis of the study that there are significant differences between the two pre and post measurements for the experimental group and the control group in the variables (straight drop speed performance –place of directing the ball on the table - the effective performance of the straight drop) of table tennis U-15 juniors after the application of the proposed training program in the favour of post measurement for both groups.

Validating the second hypothesis:

The second hypothesis in the study aims at proving the existence of significant differences between the experimental group and the control group in the variables: differences (straight drop speed performance –place of directing the ball on the table - the effective performance of the straight drop) of table tennis U-15 juniors after the application of the proposed

training program using the ball throw machine for the experimental group.

The researcher believes that the players' acquisition of confidence when performing straight drop shot as a result of the impact of specific exercises using ball throw machine led to increasing their ability to control the height and bounce of the ball on the table surface, as well as the development of their potential to direct the ball to the right place which made performance of straight drop one of the solutions for the players to win points. this is in line with Gross & Huber (1995) who believed that targeting the development of speed and accuracy of straight drop shot increases the effectiveness of skill performance in table tennis where the chance of the player increases in obtaining points directly with the development of his potentials in hindering his rival for using strong distinctive drop shots (10). Effective straight drop achieves a perfect ideal path and bounce by directing the ball outside the power areas of the rival (6). This enables to reduce his chance in the initiative process of attack. In addition, the change of straight drop shot venue from the left, the middle, or the right side of the table will result in different problems for the competitor player especially the place of his receiving the drop shot and the method of his technical performance (4).(18)

This led to the existence of differences between the experimental group and the control group as shown in table (5) in the variables (drop shot speed performance by a change rate of (22.7%) and spatial direction of drop shot by a change rate of (20.71%) and the effectiveness of the drop shot and its variables to make a point by (41.95%) and stay in the offensive by a change rate (22.43%) and the transformation to the defensive state by adverse change (30.51%) and the loss of a point by a reverse change as well (-39.63%) in favor of the experimental group. This is in line with what was Jain (2001) and Peter (1992) stated that good performance of drop shots can lead to controlling the game course by controlling the direction of the ball on the surface of the competitor's table (13) (20). This is consistent with what Philip

Moldozov (2010) referred to that the player's ability to vary performance of straight drops in terms of speed and space makes the opponent cannot get used to the drop shot, and therefore, makes it difficult to respond (21). Likewise, this was noted by Ellen Wadeea and Salwa Fekry (2002) that the depth and bounce of straight drop shot are among the important factors of a good drop, causing stress of competitor to reach the ball over the table to hit as well as the difficulty of attack it, allowing the player a chance to win the point (8).

Hence, through the academic and training experience of the researcher, he believes that the difficulty of drop shot paves the way for the performing player to own most of the ball, giving him preference in controlling the game. Actually, this is what increases the chances of gaining points and this is in line with what was said by Ellen Wadeea and Salwa Fekry (2002), and Philip Molodzov (2010) in the presence of factors that raise the effectiveness of The Forehand spin including, speed, accuracy and height and depth where the ball's path should be low as much as possible in order to have low bounce in the rival's court and thus be hampered in his performance of the attack (8) (21). This is confirmed by the results of table (5) in terms of the variable "Make the player in the offensive position" where the moral differences are in favour of the experimental group and by high change rates, which demonstrates a high degree of control in the performance of The Forehand spin as a result of the training impact of the ball throw machine's exercises for the experimental group than the control group. Subsequently, this may result in the possibility of the player adding many variations in the performance of straight drop skill which contributes to the distraction and confusion of the opponent (17).

Furthermore, the researcher believes that the improvement achieved by the experimental group in the effectiveness of The Forehand spin shot was based not only on the positive development in the variables: "scoring direct point " and "make the player in the offensive position", but also resulted in the significant

differences in variables of "the Occurrence of Rally" and "the loss of a direct point". This is what significantly improved in the opposite direction of the experimental group, whereas the change came negatively in the control group.

As seen in Table (6), the difference in the effectiveness of The Forehand spin shot between the pre measurement and the post measurement of the control group was (0.07), while the difference in the effectiveness of The Forehand spin shot between the pre-measurement and the post measurement of the experimental group was (0.48), indicating the increase in the effectiveness amount of The Forehand spin for the experimental group compared to the control group.

The researcher attributes the clear significant differences in the change rates of the tests' results and the effective straight drop performance for the experimental group rather than the control group to the effective positive impact of the skill exercises program using the ball throw machine,. This led to the development of the junior's control ratios in the qualitative directed training in its contributions of muscle strength in terms of quantity and timing. On the other hand, the control group based its training on the traditional method of training as a single package without paying attention to the determinants of speed and accuracy under study.

This validates the second hypothesis that there are significant differences between the experimental group and the control group in the variables: (drop shot speed performance - place of directing the ball on the table - The Forehand spin shot effective performance) for the table tennis U-15 juniors after application of the proposed training program for the experimental group.

Findings:

In the light of the objectives and hypotheses of the research, within the limits of the research sample and based on what has resulted of the statistical processes, we could conclude to the following:

1) Development of The Forehand spin speed performance has led to the increase in the effectiveness of The Forehand spin performance for U- 15table tennis juniors.

2) Development of spatial direction of straight drop shot has increased the effectiveness of The Forehand spin performance for U- 15 table tennis juniors.

3) The speed performance test of The Forehand spin shot achieved the highest improvement ratio for the experimental group by (38.46%), followed by the spatial direction of drop shot test by (20.71%) while the improvement rate of The Forehand spins peed performance test of the control group was (10.05%) and (10.44 %) for the drop shot spatial direction test.

4) The highest change rate in the effectiveness level was in scoring a direct point by (120.81%) for the experimental group while the highest change rate was for the "stay in the offensive position" by (44.98%) for the control group.

5) Skill exercises using balls throw machine led to the construction of neural pathways and thereby increasing the accuracy and speed performance of The Forehand spin performance for U- 15 table tennis juniors.

6) Skill exercises using balls throw machine led to the increasing the effectiveness of straight drop shot skill performance for U- 15 table tennis juniors.

- Recommendations:
In the light of the research results and based on the conclusions, the researcher recommends the following:

1. Utilizing the ball throw machine as a means of training for straight drop skill, and that for what it achieved of development in The Forehand spin speed and accuracy for U- 15 table tennis juniors. This is in addition to the saving time and effort during the training process.

2. Constructing a group of tactical exercises using balls throw machine for the development of The Forehand spin tactical aspects for U- 15 table tennis juniors.

3. Directing coaches to benefit from the results of the current study and making use of ball throw machine for the development of straight drop shot speed and accuracy skill for U- 15 table tennis juniors and increasing their effectiveness.

References:

1- Ahmed. S. Salem (2004): Effect of Mental Training on the Development of Motor

Skills for Table Tennis Juniors, published research, the Faculty of Physical Education-for young Men, Alexandria University, (pp 63).

2- Ahmed. S. Salem (2010): The impact of the compatibility development on the straight front and back drop speed and accuracy table tennis young women, published research, the Faculty of Physical Education-Young Men, Alexandria University, (pp13,14).

3- **Ahmed .A .Aldawletly (2006):** Advanced International Studies to prepare table tennis coaches, first level, Alexandria- from August 30th to September 3rd, (pp 7).

4- **Dan. S.M Holowchak (1997):** Winning Table Tennis, Skills, Drills, and strategies, Human Kinetics, USA, (pp24-105).

5- **David Hewitt (1990):** How to Coach Table Tennis, Willow Books, London, (pp 12).

6- **Demosthenes .E.Messines (2000):** Table Tennis From A to Z, Athens, Greece, (pp 144).

7- **D AVIS, B (1997):** Physical Education and the study of sport, Mosby, London, (pp 272,273

8- **Ellen. W. Farag, Salwa. E. Fekry (2002):** the reference in table tennis education - training, Monshaat El Maaref, Alexandria, (pp 137,138).

9- **Ertna Patir (2003):** Footwork, www.masatenisi.org , Jun, (pp 1).

10- **GROSS, B-U. & HUBR, D (1995):** Tischtennis, Moderne Technik für Anfänger und Könner, Rowohlt, Reinbek bei Hamburg, (pp 134)..

11- **Hazem. M. Ismail (2012):** analytical study of some tactical aspects of the higher levels' player in table tennis, unpublished doctorate thesis, Faculty of Physical Education for Young men, Banha University, (pp 15).

12- **Hosny .A. Fouad (2006):** Advanced Local Studies for the preparation of table tennis trainers, Zagazig from 9th to June 30th, (pp 19) .

13- **JAIN, D. (2001):** Table tennis, Teaching and Coaching, printalin India, (pp 35) .

14- **Joseph. N. bekotor (1998):** analytical study of the table tennis basic skills and their impact on the results of junior matches, unpublished Master Thesis, Faculty of Physical Education for Young Women, Cairo, Helwan University,(pp 45).

15- **Lines P (2007):** How to develop hand eye coordination

for the young athletic, www.helium.com/itemd/62386 3

16- **Michel Gadal (1997):** Train To Win, Learn and Teach Top Level Table Tennis, Ottawa, Ontario,(pp36).

17- **Mohamed .A. Abdullah (2007):** Scientific bases in table tennis and measurement methods, Ayat center for printing and computer, Zagazig,(pp211).

18- **Mohamed. H. Shaaban (2009):** Effect of a training program on the development of motor timing for the skill of ball upper rotation on the performance effectiveness of Table Tennis juniors, unpublished Doctorate thesis, Faculty of Physical Education, Tanta University,(PP41).

19- **Polyakov .A (2013):** The Next Step published by table tennis Achievements Publishing ,(pp25).

20- **PETER, A, (1992):** Tale tennis, Education and Youth, Limited, London,(pp7).

21- **Philip Molodzov (2010):** International Table Tennis Federation Reference of the advanced training level, translated by: Ahmed Aldaweltely Engy Fahmy, Mohammed Aldaweltely, International Table Tennis Federation,(pp105,106).

22- **Tarek .M. Ibrahim (2003):** the development of speed and accuracy of some offensive and defensive skills for U- 14 table tennis juniors, Sharkia governorate, unpublished Doctorate thesis, Faculty of Physical Education for Young Men, Zagazig University,(pp6).

23- **TEPPER, G (2006):** International Table Tennis Federation (ITTF) Level 1 Coaching manual, 5th ed., International Table Tennis Federation Shanghai Minsun Packaging & Printing Co., China,(pp218).