

The Effect of Interactive Agility Training on the Feet Movements Structure and Skill Performance Level of The Tennis Junior

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Introduction and research problem

Tennis is one of the most popular sports in the developed world. One of the most important characteristics of tennis is that one must master not only the use of one tool like most other sports, but must master the use of two tools at the same time, namely the ball and racket, and to match the work of the legs and arms with These two tools are flexible in implementing basic and advanced skills throughout the performance period perfectly (1: 12) (54: 3)

Paul et al. (2012) argues that agility is a kinetic activity of tennis, and its significance in direction change maneuvering and deception of all kinds, sudden breakthroughs, and rapid and sudden defensive moves. (20: 200)

Goodmann (2008) adds that it is important for all player positions. The playmaker and wings need to be agile to beat the defenders with or without the ball, as well as in the process of acceleration and deceleration

and move from the enemy in front of the jump and other moves in which the angle of change direction is less From 90 degrees imposed by the game conditions, the players of the focal point and the front line need to be able to perform the movements of the pivot and rotation effectively, in addition to its importance in the process of defense and rapid defensive moves of all players. (13: 10-12)

"Delexrat et al." (2015), "Young et al." (2015), "Chatzopoulos et al." (2014), "Sekulic et al." (2014) indicates that there is a recent trend that divides agility into pre-planned agility and the concept that there is a prior planning of closed movements performed by the athlete,

He knows when and where to move before starting to move to change direction, and because the positions of play are characterized by permanent and rapid change shows another type called Reactive Agility requires the player to quickly re-orientate

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(reactivate the agility) again during the movement to match his movements with the change of stimuli (movement of the opponent, colleague, ball or position in the stadium) surrounding him and perceived by the brain through the sensors In Al Ain, which represents 70% They add that 80% of the information surrounding the player is transmitted through the eye and can carry out motor duties (12: 161), (25: 160), (10: 305), (23: 3307)

Louise Engel (2011) adds that interactive agility is a modern concept in physical education that has changed the accepted view of agility to a modern approach that integrates agility with perception and decision-making factors,

And explained that it is open movements that are concerned with cognitive skills and appropriate decision-making during the game according to the new stimulus. Whether visual or auditory, Figure 1 illustrates the modern concept of agility. (78:17)

Dave Anthony (2013), Ben Abdelkarim et al. (2010), and Hubert (2006) agree that foot movements play a large and effective role due to the changing and rapid performance of ongoing change direction maneuvers.

All these skills require a high ability to control the body, otherwise the player committed errors and irregularities that lose possession of the ball, causing boredom and frustration (15: 33) (13: 72), (10:35)

Scanlan (2014), Milanovic (2013) and Ben Abdelkrim (2010) note that interactive agility exercises contain specific exercises geared to the development of physical and functional abilities that help to increase awareness and a sense of correct motor performance.

They are in the same direction as the work of the muscles working and the same form of performance of the skills of the game, it aims to improve the ability of players in the control of their bodies, and the development of speed, agility and agility of the body, because it is built and determined on the principle of developing the general skills of the athlete,

Which then moves to the skills of specialized sports , They are exercises with free tracks A variety of diverse and interesting, which affects the performance and works to improve and develop the technical performance of the basic skills and have a significant impact in the development of the work of foot movements, which is the

key to the success of the skills of the game (23: 370), (18: 102), (9: 2328)

Young et al (2015), Scanlan (2014) and Scott Lucett (2013) agree that this type of exercise stimulates the nervous system by sending constantly changing information to the eye using stimuli. Optics (light-colors) that make the brain permanent focus to stimulate the muscles to work and performance with a high speed by operating more units of movement, Which increases the strength used during muscle contraction, strong muscle contractions lead to the production of strength and a large capacity of lightness, speed, agility and balance of the body and this Helps to stabilize and endure joints during fast and variable movements Fitness training provided by Interactive (25: 168), (22: 372), (24: 210.)

Through the follow-up of the researcher of the activity of tennis and supervisor work on the youth sector at the Tanta Railway Club in the Governorate of Gharbia noticed the low level of foot movements for young people under (14) years and the adoption of trainers on the fitness exercises planned in advance, and based on the concept of modern agility and the structure of the movements

of the feet of tennis players Based on the results of foreign scientific studies and research such as the study "Delextrat et al. Delextrat et al." (2015) (12), 'Young et al.' (2015) (25), 'Scanlan' (2014) (22), 'Sekulic et al.' (2014) (23), 'Locki et al.' (2013) (16), 'Milanovic et al' (2013) (18), 'Scott Lucett' (2013) (24) found scarcity in research on the impact of interactive fitness training on the tennis skills, especially on the structure of the movements of the feet,

Despite their importance in the skills of tennis due to the rapid change of conditions according to strikes, either defensive or offensive, prompting the researcher to conduct this study to identify the impact of interactive fitness exercises on the structure of the movements of the feet of young people Tennis

Research Goal

The aim of this research is to identify the impact of interactive agility training on the structure of the movements of the feet of the tennis junior.

Research hypotheses

1-There are statistically significant differences between the two measurements (pre and post) in favor of telemetry in some of the motor abilities of the movements of the feet of the tennis junior.

2-There are statistically significant differences between the two measurements (pre and post) in favor of telemetry in the basic strikes of the tennis juniors.

Research Methodology:

The researcher used the experimental method to design one group and the system of pre and post measurements to suit the nature, objectives and procedures of the research.

The research sample:

The research sample was chosen intentionally by Tanta railway club's beginners. The sample included (22) young people under (14) years old and registered in the records of the Egyptian Tennis Federation.

The researcher's reasons for selecting the following research sample:

A. The researcher trains the tennis team at the Tanta Railway Club.

B. The presence of a school for tennis juniors at the Tanta Railway Club.

C. Approval of the Board of Directors of Tanta Railway Club to conduct this research.

The researcher conducted the homogeneity between the members of the research community in the variables (age - weight - height - training age - physical variables - skill variables) of the sample under study, the following is a statistical description of the sample:

**Table (1)
Homogeneity of the research sample in the basic variables under consideration N n= 22**

Serial	Variables		measuring unit	SMA	standard deviation	Mediator	Torsion coefficient	
١	Growth rates	Age	Year	52,13	11,1	43,13	13,	
		Weight	Kg	13,42	68,1	94,41	15,	
		Height	Cm	06,148	19,2	77,145	32,1	
٢	Training age		Year	17,4	03,1	56,4	-13,1	
٣	Physical variables	Transitional speed	Degree	11,8	125,	11,8	255,	
		Fitness	Degree	69,13	486,	-,13	817,	
		Power characteristic of speed	Degree	50,20	672,	-,20	03,1	
٤	Skill variables	Front strike	Accuracy	Degree	12,11	177,	-,11	126,1
			Speed	Degree	27,12	455,	-,12	09,1
			Strength	Degree	54,45	509,	-,46	196,
		Backhand	Accuracy	Degree	13,11	351,	-,11	27,2
			Speed	Degree	08,11	005,	09,11	736,
			Strength	Degree	27,42	455,	-,42	09,1
		Serve	Accuracy	Degree	59,11	503,	-,12	397,
			Strength	Degree	40,26	666,	50,26	699,

It is clear from Table (1) that the values of the torsion coefficient of the research sample in the variables used ranged between (-13.1) and (27.2) and all of them are less than (± 3), which indicates that the research sample is free from defects of non-moderate distributions; This confirms the homogeneity in the previous variables.

Data collection tools and tools:

- Expert questionnaire to determine the mobility capabilities of the movements of the youngsters of tennis, the exercises needed to improve them as well as the tests necessary to measure them.

- Forms of registration of the pre- and post-measurements of the research sample in the special motor abilities and basic strikes of tennis juniors (ground strikes)

Research tools

- Tennis balls and rackets.
- Plastic cones (Cons), elastic cords, chains, Swedish seats, barriers, training wall, wooden boxes, stopwatch.
- Measuring tools (divided ruler - divider tape)

Tests used in the research:

A- Kinetic tests under discussion:

1-Speed characteristic: Sargent's vertical jump test.

2-Agility: Test running in the form of figure 8.

3-Transitional speed: Test the enemy 22 meters from the high start.

B- Basic Strikes Tests

- Chavez and Neider test for basic strikes Chavez & Neider.

- Dair test for ground strikes Dair.

- Cobane test.

Survey:

The researcher conducted a pilot study on a sample of tennis beginners at the Tanta Railway Club.

Time Planning for Interactive Fitness Training

To prepare interactive fitness training, the research looked at several Arab and foreign references, studies and researches such as "Delextrat et al." (2015) (12), "Chatzopoulos et al." (2014) (10), "Scanlan" (2014) (22) "The researcher identified the following steps- :

1-The goal of interactive fitness training:

Interactive agility training aims to improve the structure of the movements of the feet and improve the level of skill performance of tennis beginners.

2-Time Planning for Interactive Agility Training Facility (5):

1-Total time of exercises (12) week.

2-The number of training times 4 units per week.

3-The time of interactive fitness training ranged from 30: 66 BC of the total unit time.

4-The warm-up and cooling-off time ranges from 10: 20 BC to be outside the training unit time, with the inside part being "warm-up and calming exercises for the eye."

The researcher has determined the time frame and the size of the interactive fitness exercises.

**Table (5)
Timeframe and size of interactive fitness exercises over twelve weeks**

Preparation period													
Stage	General preparation stage				Private Preparation phase				Preparation phase of the competition				
No of weeks	1	2	3	4	5	6	7	8	9	10	11	12	Week load time
Degree of load	Max			●			●			●	●		24.0 m
	High	●	●		●			●					178.0 m
	Medium			●		●			●			●	108.0 m
Total time	016.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	27.0 m	016.0 m
Interactive physical fitness	82 m	100 m	80 m	123 m	90 m	22 m	70 m	06 m	22 m	23 m	23 m	28 m	806 m
General Physical	77 m	70 m	01 m	100 m	20 m	21 m	22 m	22 m	21 m	11 m	—	—	278 m
Special physical	10 m	20 m	22 m	22 m	0. m	21 m	27 m	22 m	21 m	22 m	23 m	28 m	288 m
Kinetic interactive agility	122 m	120 m	189 m	222 m	210 m	120 m	128 m	107 m	120 m	108 m	127 m	122 m	2076 m
Skill Interactive Agility	20 m	20 m	02 m	70 m	70 m	82 m	97 m	101 m	82 m	110 m	122 m	97 m	978 m
Offensive skills	20 m	20 m	22 m	70 m	0. m	82 m	77 m	87 m	82 m	90 m	102 m	97 m	822 m
Defensive skills	—	—	10 m	—	10 m	—	29 m	10 m	—	20 m	20 m	—	122 m
Interactive tactical agility	—	—	00 m	01 m	70 m	—	12 m	—	—	—	—	—	222 m
Setup type	%			Number of weeks				Time					
physical	%20			2				1028m					
Skillful	%20			2				2072m					
Plans	%20			2				1028m					

Presentation and discussion of the results

Showing results.

Table (3)
The significance of differences between the mean of the pre and post measurements of variables Physical variables under consideration N = 22

S	Kinetic abilities	Pre		Post		M F	T	The difference between the two averages	Rate of change
		M	± E	M	± E				
١	Transitional speed	11,8	125,0	30,6	117,0	81,1	82,51*	81,1	32,22%
٢	Agility	69,13	486,0	59,10	572,0	10,3	42,18*	10,3	64,22%
٣	Power characteristic of speed	50,20	672,0	54,25	595,0	04,5	33,26*	04,5	758,24

Table (3) shows that there are statistically significant differences at a significant level (0.05)

between the pre and post measurements of physical variables in favor of the post measurement.

Table (4)
The significance of differences between the mean of the pre and post measurements of variables The skill of the front strike is under consideration

S	variables	pre		Post		M F	T	The difference between the two averages	Rate of change
		M	± E	M	± E				
١	Front strike accuracy	12,11	177,0	31,13	476,0	19,2	28,21*	19,2	69,19%
٢	Front strike speed	27,12	455,0	45,16	509,0	18,4	77,26*	18,4	06,34%
٣	Front strike force	81,46	588,0	54,58	509,0	72,11	300,78*	72,11	03,25%

Table (4) shows that there are statistically significant differences at a significant level (0.05) between the pre and post

measurements of the variables of the forward strike skill in favor of the post measurement.

Table (5)
The significance of differences between the mean of the pre and post measurements of variables Backhand skill is being researched

S	variables	pre		Post		M F	T	The difference between the two averages	Rate of change
		M	± E	M	± E				
١	Rear strike accuracy	13,11	351,0	77,12	294,0	63,1	56,10*	63,1	69.14%
٢	Rear strike speed	08,11	059,0	36,14	492,0	27,3	10,31*	27,3	51.29%
٣	Rear Strike Force	27,42	455,0	63,51	726,0	36,9	06,46*	36,9	%22.14

Table (5) shows that there are statistically significant differences at a significant level (0.05) between the pre- and post-measurements of the backhand skill variables in favor of the post-measurement.

Table (6)
The significance of the differences between the mean of the pre - post measurements of the transmission strike skill variables

S	Variables	Pre		Post		M F	T	The difference between the two averages	Rate of change
		M	± E	M	± E				
١	Serve accuracy	59,11	503,0	45,15	509,0	86,3	34,32*	86,3	3,33%
٢	Serve force	40,26	666,0	31,32	476,0	90,5	53,40*	90,5	%34.22

Table (6) shows that there are statistically significant differences at a significant level (0.05) between the pre and post measurements of physical variables in favor of telemetry.

The researcher attributed this result to the use of interactive agility exercises under research as well as attributed to the interactive agility exercises under research

Discuss the results

It is clear from Table (3) that there are statistically

that were characterized by diversity and comprehensive And integrated fitness training with physical performance, physical skills and plans, which contributed to the improvement of the results of tests of the variables structure of the movements of the physical and artistic feet.

This was agreed by Lockie et al (2013) and Milanovic et al (2013), who pointed out that physical aspects should be linked with performance during training, because athletic performance involves a physical and a harmonic aspect. Kinetic, when the physical and harmonic side develops, there will be an evolution of the motor aspects and improvement of skill level performance (16: 768), (18: 101.)

The researcher believes that interactive fitness training is one of the modern trends to develop sports performance in the sport of tennis, because this type of training is related to the theory of stimuli, where a variety of different motors that are integrated in an integrated manner during physical performance and skills and plans, integrate fitness with

perception The sense of kinesthetic and decision-making factors,

And because the requirements of the game requires the player to quickly change his directions and speed under the pressure of time and the frequent change of movement of the exciter (ball) within the stadium, which results in changing the decisions of the planners play an important role in obtaining the emerging The information that reaches the brain, where the proportion of between 75% - 90% is transmitted to the brain through the eye and the rest is distributed to the other senses of the player.

This is pointed out by Scanlan et al (2014), 23 and Louise Engel (2011), 17 in that the eye drives the motor system through information transmitted to the brain. This information was correct and accurate.

The researcher believes that the rate of change is due to the impact of special interactive agility exercises used in the training program to improve some of the motor abilities of the movements of the feet of tennis beginners and

the similar exercises included for performance to improve the variables (transition speed, agility, strength characteristic speed)

Saleh Kayali (1999) points out that "the speed of the element at this stage shows a significant improvement. This is due both to Farna and Snaul Farfel. This is due to the growth and maturation of neurological processes in that age group under 14". (5: 148)

These results are also consistent with what Abdul-Nabi Al-Jamal (2001) noted that the development of the distinctive force of speed is an important factor in the development of the characteristic of speed, especially transitional and kinetic speed. (6:10)

Dave Anthony (2013) points out that the power of speed plays an important role in determining the performance of tennis juniors, especially in skills that require a high ability both to overcome body weight or gravity during leaps and moves during various strikes. In tennis. " (11:11)

Thus, the first hypothesis of the research, which states that there are

statistically significant differences between the two measurements (pre and post) in favor of the post measurement in some of the motor abilities of the movements of the feet of the tennis junior.

It is clear from table (4), (5) and (6) that there are statistically significant differences at the significant level (0.05) between the pre and post measurements of the variables of the skill of the front and back strike and transmission in favor of the telemetry.

The better the trainer to use interactive agility training contributes to the development of compound movements, because it increases the ability to control the body, especially the movements of the feet that help the player to maintain proper motor conditions and thus reach the ideal motor performance.

The researcher believes that the movements of the feet play a large and effective role in the sport of tennis, because the quality of performance in this sport comes from the feet and the ability to control and control the body because of the nature of the rapid and variable

performance between the maneuvers constant change direction,

All these skills require a high ability to control the body or else The player has made mistakes and irregularities that cause boredom and frustration, so the coach must be interested in looking for new exercises to develop the structure of physical movements of the feet and art.

The researcher believes that tennis is one of the sports that are closely related to Reactive Agility, which can be developed during the training process, where emphasis is placed on the exercises of compatibility between the eye and hand and external awareness and the speed of visual reaction,

Which plays an important role and is based on the accuracy of body control The movements of the feet and the ball, and this helps the player to adjust his movements with the ball and characteristics of the link to the accuracy of the perception of the ball shape and speed and height and strength when doing the skills of the game from the front or back (2: 18) (33: 7.)

This is consistent with Delextrat et al. (2015), 12 Young et al (2015), 25 Chatzopoulos et al. (2014), 10 The interactive agility exercises contain qualitative exercises directed to the development of physical and functional abilities that help to increase the perception and sense of performance and be in the same direction of the work of the working muscles and the same form of performance of the skills of the game,

Which helps players to adjust their movements with the change of external stimuli (movement of the opponent, ball or position in Pitch) Continuous due to changing play positions continuously and quickly, making its decisions fast and timely because the use of External stimuli work to link the agility and perception kinesthetic and decision-making, receptors kinetics in the eye transmit external information quickly and accurately to the brain, allowing to quickly perceive the positions and make the right decisions in a timely manner, because 80% of the information surrounding the player is transmitted through

the eye can Successful execution of motor and plan duties.

The researcher believes that the rates of change (ratios of improvement) in the telemetry measurements compared with the pre measurements refer to the influence of the skill part and competition exercises during the training program in improving the basic skills variables (Forehand Stroke - Backhand Stroke - The Serve) 14 years.

Elaine Wadie (2007) asserts that the movement of the feet and the coverage of the stadium are the most important factors that contribute to the success of the youth in the performance of various strikes in the game of tennis, in many cases the youngster moves to different directions within the relatively large stadium to try to receive the ball and return Because the opportunity Do not always have the youngster towards the ball directly to the place where it stands, so much of what the youngster does using the movements of the feet in the move to try to receive the ball well to be

within reach of strikes, which requires a lot of training. (3:37) This is consistent with what Darren Mustafa (2009) noted that the performance of basic strikes in a game of tennis is done by hand and specifically by the hand holding the racket, however, the correct performance of most strikes in tennis requires the operation of the entire arm, shoulder, torso and foot movements. (9: 234)

While Abdul-Nabi Al-Jammal (2001) suggests that many youngsters should pay attention to the movements of the feet before hitting the balls, it is the strong players who can accelerate access to the ball in sufficient time and a suitable position to perform various strikes correctly. On the pitch they perform smoothly and harmoniously, allowing them to perform a good model of various strikes in tennis. (54: 6)

The researcher believes that the movements of the feet are very important for the performance of all strikes excellently in tennis, and indicates that the young must move quickly and effectively within the stadium to perform strikes in the appropriate position and properly.

Ahmed Maher (2003) agrees with these results, pointing out that "tennis is one of the most important sports in which the use of foot movements is of great importance, because there is no single hit during which the movements of the feet are not used directly and effectively. Inside the stadium during changing play positions."
(2: 13)

The researcher believes that interactive fitness training aims to improve the ability of players in controlling their bodies, and the development of speed, agility and body agility, because they are built and designed on the principle of developing the general skills of the athlete, which then travels to the skills of specialized sports, they are exercises with various movement paths characterized by Diversity and suspense,

Which affects the performance and works to improve and develop the technical performance of basic skills and have a significant impact in the development of the structure of the movements of the feet, which is the key to the success of the skills of the game.

Thus, the second hypothesis of the research, which states that there are statistically significant differences between the two measurements (pre and post) in favor of the post measurement in the basic strikes of tennis juniors, has been achieved.

Conclusions:

Within the limits of the research problem and its importance and in the light of its objective and hypotheses and the nature of the sample and within the framework of statistical treatments and the interpretation and discussion of the results, the researcher was able to reach the following **conclusions:**

1-Interactive agility training applied to tennis beginners has led to an improvement in the physical structure of the movements of the tennis youth.
2-The interactive agility training applied to tennis beginners led to an improvement in the level of forward and backhand and transmissions for tennis beginners.

Recommendations:

Within the framework, objective, community, sample and research findings, the

researcher recommends the following:

1-The need to conduct similar studies in the light of the program of interactive fitness training on other variables.

2-Use interactive agility exercises under consideration when training tennis players.

3-Conducting refinement studies for trainers to make them aware of the importance of interactive fitness training and the use of modern techniques to improve performance.

4-Conducting similar studies at different dental stages.

5-Conduct new research that measures the extent of interactive agility to plan performance.

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