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EFFECT OF REACTION TRAINING ON DURATION AND REACTION TIMES

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Abstract

In this study, it was aimed to examine the effects of reaction training on reaction time and speed in tennis players. For this purpose a total of 18 tennis players; 9 male (age; 13.33 ± 1.80 years) and 7 female (13.85 ± 2.19 years) were voluntarily participated the study. In this study, the reaction training program, which was applied for 2 days a week for 12 weeks, was prepared in addition to tennis training. In the reaction training, exercises suitable for visual and auditory reaction were used. Before and after the 12-week reaction training, a 30 m speed running test and reaction time tests were performed. Whether the data showed normal distribution was analyzed with the Shapiro Wilk test and it was determined that the data did not show normal distribution. Mann Whitney U test was used in comparisons between the two groups. Wilcoxan Signd Rank test was used in the comparisons made before and after the training.

As a result of the statistical analysis, it was seen that both the physical characteristics and performance parameters of males and females in our study group were not statistically different ($p>0.05$). For this reason, all subjects were taken into consideration regardless of gender in comparisons before and after tennis training.

After the reaction training program applied to the subjects, it was determined that the 30 m speed performance values were shortened in duration compared to the pre-training period, that is, the speed improved ($p <0.01$). When the reaction time values were compared before and after the training program applied, it was seen that the reaction time values improved significantly after the training ($p <0.01$).

As a result, reaction training performed in tennis players' increases speed and reaction time performance. Reaction training is recommended in sports branches where this type of motor is important.

Keywords: Tennis, speed, reaction

1. INTRODUCTION

Tennis is a branch of sport where endurance, strength, speed, mobility and skill are used extensively (Meter et al., 2010). Tennis is an Olympic sport played with racket and ball between two people or between two teams of two. Players try to throw a hollow rubber ball over the net (net) into the opponent's court with their racket. According to the rules, the player with the most points wins the match (https://tr.wikipedia.org/wiki/Tenis). Tennis is played on a rectangular flat court, usually on a concrete (hard), clay, grass or wooden surface. In professional tennis, courts are made according to certain measurements. Tennis is a very active sport and leg strength is very important in this sport. It can be said that it constitutes 70-80% of tennis sport. Tennis has been an anaerobic force sport based on aerobic foundations, requiring a very high level of condition, fast playing, good holding and speed during defense and attack positions (Kuruger, 1991).

One of the most important indicators of the physical power that human beings can show their existence and impose themselves on nature is the speed feature.

In most of the recent studies, the conditional characteristics that a tennis athlete should have are divided into percentages as 15% strength, 15% speed, 25% endurance, 35% coordination and 10%

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flexibility (Karagöz, 2008). One of the most important indicators of the physical power that human beings can show their existence and impose themselves on nature is the speed feature. The competitions in which the speed element is processed have always dragged people to great excitement. Speed is a determinant of performance in sports that require explosive strength (Erden et al., 2005). As in the strength feature, its contribution to sports in speed varies depending on the speed requirement of the sport branch, the biological structure of the athlete and the technique applied in the sport. As a result, speed training performed by different athletes in the same sport as well as in different sports branches may be variable (Açıkada and Ergen 1990).

Biomotor properties such as strength, endurance, speed, flexibility and coordination are the basis of all physical movements. According to the characteristics of the sport, these elements complement each other and bring success according to the characteristics of the branch. Among these factors, the most important sub-element affecting speed is reaction time. In sportive performance, reaction times are one of the important parameters of speed, which is one of the motoric properties (Yıldırım et al., 2011).

Speed has two complements. One of them is the ability to move quickly, the other is the reaction time. These two complementary factors of speed performance are influenced by three fundamental factors. These are hereditary, psychological and technical factors. Reaction time and rapidity of action are largely inherited. An athlete's nervous system competencies and the fibril composition of his muscles are the factors that determine his ability to speed. Technical factors can be broadly addressed to encompass all other external factors that influence performance along with training. The most important of the technical factors is the speed technique required by the branch and the ability of the athlete to exhibit the best speed performance according to this technique, is closely related to the level of responding to the technical demands of the sports branch (Çakıroğlu, 1997).

In this study, it was aimed to investigate whether reaction training has an effect on reaction time and speed in tennis players.

2. MATERIAL AND METHOD

A total of 18 tennis players; 9 male (age; 13.33 ± 1.80 years) and 7 female (13.85 ± 2.19 years) were voluntarily participated the study. In addition to the daily training of these athletes, a reaction training program was prepared to be applied 2 days a week for 12 weeks. Appropriate drills were prepared for visual and auditory reaction in the training program. The 30 m sprint test and reaction time test were applied to the athletes before and after 12 weeks of reaction trainings.

Reaction Time Measurement: The auditory reaction time (right-left hand) of the subjects was done with the New Test 2000 reaction measurement device. Each of the tests was carried out three times and the best time was recorded.

Reaction Time test: A 30 cm long ruler was used for this test. The athletes were taken to the area prepared for this test to be administered by the trainer. The ruler, which was kept at eye level of the athlete from a distance, was told to be caught without falling to the ground. Each of the athletes performed the test three times and as a result of the data obtained, the best results were recorded.

30 m speed test: After the distance to be run was measured, funnels and an observer were placed at the start and finish lines. The classic Duobla timepiece was used in the test measurement. The test

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ended with the sign of the observer at the finish line. The 30-meter speed of the athlete was determined by recording the data obtained.

Reaction training: In reaction training, racquets, tennis balls with different colors and patterns, funnel, sheets, etc. materials were used. The following animations were made during the reaction training.

1. Drill: In this reaction drill, the trainer takes the athlete with his back facing. The athlete takes a position with his feet shoulder-width apart and waits. The coach sends the tennis ball straight from the ground between the back of the athlete's legs. The athlete tries to catch the ball as soon as possible.

2. Drill: In this drill, the trainer takes two athletes on the opposite side. The athletes take their positions with their backs turned again and wait. Color codes are given to one of the athletes as 'red' and the other 'white'. The coach takes a tennis ball in both hands and the athlete turns as soon as one of the coded colors is told to the athletes out of sequence, and whichever hand the ball is dropped, he must catch the ball after bouncing it on the ground only once as soon as possible.

3. Drill: In this drill, the trainer is in the T zone of the court. The athlete is waiting in the starting position on the back line (baseline), directly opposite it. The coach takes a tennis ball in both hands. He throws the ball to his forehand or backhand at an unexpected time to his athlete, who is waiting in a standby position in the baseline. The athlete kicks the ball according to the direction of arrival. In this study, it is aimed to run the athlete's reaction time and stroke flow time.

4. Drill: In this drill study, the athletes were matched mutually. One layer is placed on the floor for each group of athletes. A tennis ball is placed on this layer. When the specified keywords were pronounced or when the whistle sound was heard, the athletes were told to take the tennis ball on the layer placed on the ground as soon as possible. In this reaction study, the development of auditory reaction time was aimed.

Statistics: Whether the data showed normal distribution was analyzed by Shapiro Wilk test and it was determined that the data did not show normal distribution. Mann Whitney U test was used for comparisons between the two groups. Wilcoxan Signed Rank test was used for comparisons of pre and post training data.

3. RESULTS

Table 1: Comparison of the features measured according to the gender of the subjects

	Gender	N	Mean	Standard Deviation	p
Age (years)	male	9	13,33	1,80	0.554
	female	7	13,85	2,19	
Height (cm)	male	9	164,00	14,25	0,560
	female	7	159,43	8,71	
Bodyweight (kg)	male	9	60,88	14,58	0,055
	female	7	49,85	7,12	
Pre-exercise 30m speed (sec)	male	9	6,11	,66	0,916

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	female	7	6,22	,48	
Post-exercise 30m speed (sec)	male	9	5,98	,67	0,873
	female	7	6,11	,48	
Pre- exercise left hand auditory reaction time (msec)	male	9	239,31	8,34	0,296
	female	7	241,37	6,34	
Post- exercise left hand auditory reaction time (msec)	male	9	203,14	7,56	0,274
	female	7	206,23	8,67	
Pre- exercise right hand auditory reaction time (msec)	male	9	212,37	8,67	0,301
	female	7	216,34	7,31	
Post- exercise right hand auditory reaction time (msec)	male	9	195,78	6,66	0,245
	female	7	197,23	5,37	
Pre- exercise reaction time with ruler (cm)	male	9	19,44	2,65	0,336
	female	7	21,00	2,94	
Post- exercise reaction time with ruler (cm)	male	9	14,77	2,68	0,078
	female	7	17,14	1,95	

It was found that there was no statistically significant difference between the physical characteristics and performance parameters of males and females (p> 0.05).

Table 2: Performance values of the subjects before and after tennis training

		n	Mean	Standard Deviation	z	p
30m Speed (sec)	Pre-exercise	16	6,16	0,57	-3,520	0,000**
	Post-exercise		6,03	0,58		
Left hand auditory reaction time (msec)	Pre-exercise		240,21	8,75	-2,954	0,014*
	Post-exercise		204,34	9,41		
Right hand auditory reaction time (msec)	Pre-exercise		214,35	10,25	-2,645	0,022*
	Post-exercise		196,89	9,41		
Reaction time with ruler (cm)	Pre-exercise		20,12	2,80	-3,550	0,000**
	Post-exercise		15,81	2,61		

*p<0,05 **p<0,01

The 30 m speed values before the training program and after the training program were compared and a statistically significant difference was found (p <0.01).

When the reaction time values were compared before and after the training program, it was seen that the reaction time values after the training improved at a statistically significant level (p<0.01 and p <0.05).

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4. DISCUSSION

In this study, it was aimed to investigate the effect of reaction training on reaction time and speed in tennis players. As a result of statistical analysis, it was seen that both physical characteristics and performance parameters of males and females in our study group were not different. For this reason, the data of all subjects, regardless of gender, were taken together in comparisons before and after tennis training. After the reaction training program applied to the subject group, it was determined that the performance values of 30 m speed shortened in time, that is, improved. It is stated that reaction time is an important feature that plays a role in sports that require sprinting and starting. Reaction time, which is a necessary motor feature for athletes, is a determining factor in most sports and can be improved with regular training (Salonikidis & Zafeiridis, 2008). In a study, it was stated that the exercises performed with the light reaction device had a positive effect on both the development of agility-quickness characteristics and the reaction speed on the U-20 players. The percentage of improvement has also been higher compared to normal routine exercises (Vurmaz, 2018).

In our study, the reaction time values before and after the reaction training applied to the subjects were compared. After 12 weeks of training, it was seen that the reaction time of the subjects improved. In other words, it was determined that the reaction time developed through the training. The fact that tennis players include movements and training types that improve reaction times, apart from technical training, provides great convenience in performing such movements (Urartu, 1992).

In tennis, reaction time studies are also important in carrying forward the success of the athlete during the formation of the physical infrastructure required by tennis sports by discovering the future great athletes at an early age. Trainers should not only prefer technical training required by tennis, training programs should also include other elements that prepare them for success in tennis. In addition, the idea of determining athletes who are quick, fast and with good reaction time and making technical tactical investments on them is the most correct form of structuring in the emergence of a good tennis player (Ender et al., 2017).

Dündar (1996) stated that reaction time can be improved by 0.12 ms with training. Bayar and Koruç (1992) compared table tennis players and those who did not do sports and found that the visual reaction times of table tennis players were shorter. In a study conducted on young football players, it was observed that the players' ability to make the right decision and react positively increased as a result of reaction and correct decision-making exercises (Vaeyens et al., 2007).

In a study, it was found that reaction training applied to swimmers in the 10-12 age group contributed positively to the improvement of reaction time. In this respect, it is stated that reaction training applied in addition to the general training of children aged 10-12 can contribute to the performance of swimmers and improve their degrees at different distances in the water (Polat et al., 2018). In the study performed by Salonikidis and Zafeiridis (2008) on tennis players; they stated that the reaction training program applied outside tennis training had a positive effect by reducing the reaction time and this change was observed both in the training model applied in combination with only tennis drills.

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As a conclusion, reaction training applied to tennis players increases the speed and reaction time performance. Reaction training is recommended in sports branches where such motoric properties are important.

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