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An Analysis of The Impact of An 8-Week Tennis Training on The Improvement of Hit Percentage in Tennis Players

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Abstract

The present study aims to analyze the impact of an 8-week tennis training on groundstroke depth, groundstroke sensitivity and serve strokes. A total of 70 students, 34 females and 36 males, aged between 18 and 24 and studying at School of Physical Education and Sports voluntarily participated in the present study. Tennis trainings were held in the indoor tennis court at Yozgat Bozok University. The first measurements were taken following a general two-week tennis training. Later, students were trained for groundstroke depth, accuracy and serve strokes, and second measurements were taken. The data were analyzed in terms of normal distribution, and it was found that total scores displayed a normal distribution. T test was used to analyze whether total preliminary and final test scores of groundstroke depth, groundstroke accuracy and serve stroke significantly differed. There were no statistically significant differences between preliminary and final test scores in terms of groundstroke depth (i.e. t (69)=1.82, p>.05). However, a statistically significant difference was found between preliminary and final test scores in terms of groundstroke accuracy (t(69)=8.45, p<.05). While preliminary ground accuracy test scores were =12.22, final ground accuracy test scores increased to =23.50. Similarly, a statistically significant difference was found between preliminary and final test scores in terms of serve stroke (t(69)=2.81, p<.05). Preliminary serve stroke test scores were =19.81, whereas final serve stroke test scores increased to =23.28. In conclusion, it can be suggested that the improvement of hit percentages in tennis directly influences match winning statistics and that a higher hit percentage may help a tennis player win a match by challenging the opponent. Therefore, studies on the improvement of hit percentages in professional athletes will improve their performances in the long run.

Keywords: Tennis, Accurate Shot, Evolution.

Introduction

It is safe to argue that sports in today's world function and draw attention as a popular leisure time activity as it contains countless activities within itself thanks to a number of different branches, thus offering numerous options for an individual. One of these sports branches is tennis. It is a sportive game which is played on a straight ground with different physical conditions by using a racket to hit a felt covered ball and pass it over a net in the middle of a pitch (Kermen, 1996). Tennis mainly aims to keep the ball within the game and hit the ball more strongly and effectively with a less number of strokes and body movements (Ölçücü 2011). It is a sport that challenges an individual's technical, tactical, physiological and psychological abilities, and thus likely to improve their physical, mental, emotional and social development traits in the long term (Haşıl et al., 1998). Because it is an individual sports branch that develops within the course of time, it requires a lot of patience and endurance (Keskin et al. 2016).

Performance evaluation is one of the most important elements in sportive success because athletes display a higher performance when they are categorized and trained based on their sportive performances (Kamar, 2003). A regular analysis plays a major role in determining tennis players' problems and reasons for these problems in order to measure their technical, tactical, physical and mental levels (Kandaz, 2001). Therefore, tennis is not limited to technical and tactical aspects, and it is of vital importance to deal with various points such as training and training schedule, motor skills and technical skill tests (Ölçücü, 2011). A tennis player's values improving through physical and mental training is usually expected to have a higher hit percentage. ITN test is one of the scales used to measure these improvements. ITN stands for International Tennis Number. It was introduced by International Tennis Federation (ITF) in order to measure tennis players' levels around the world (ITF, 2004). ITN test evaluates a tennis player's strokes from a technical point of view and serve strokes, groundstrokes, volley strokes, which are 5 main strokes in tennis, in terms of stability, depth and strength as well as their physical fitness (Pektaş, 2016).

Hit percentage is one of the most significant components of a point during a high tempo tennis game (Signorile,2005). Therefore, trainings that address improving hit percentages bear utmost importance. The present study aims to analyze the impact of an 8-week tennis training on groundstroke depth, groundstroke sensitivity and serve strokes.

Method

Study Group

The study was conducted on 70 voluntary students, 34 females and 36 males, aged between 18 and 24 and studying at the department of coaching education at School of Physical Education and Sports. Tennis trainings were held in the indoor tennis court at Yozgat Bozok University. Necessary permissions were obtained from the related authorities prior to the beginning of training sessions.

Before the study, each participant was informed about all potential risks and disorders that may occur during the training sessions, and asked to sign a consent form for participation in the present study.

Data Collection

All participants were trained for 90 minutes twice a day. Seven groups of ten students were created before the training. A training schedule was formed for each group, and all students

participated in the same training program in different days. Training sessions were held between 14.00 and 15.30.

The first measurements were taken following a two-week tennis training. Later, students were put through an 8-week depth, accuracy and serve stroke training, and second measurements were taken.

International Tennis Number Test (ITN Test): ITN test is used by Turkish Tennis Federation (TTF) to measure a player's or a trainer's level of tennis skills (Keskin, Ateş and Kiper, 2016).

There is a suitable ITN number for each tennis player, be it a professional tennis player or a beginner level tennis player. They are categorized as ITN 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 10.1, 10.2 and 10.3. While a tennis player with the highest level is scored as ITN 1, ITN 10.3 represents the beginner level (ttf.org.tr, 2016).

Instead of technical aspects of tennis strokes, this test aims to measure stability, depth and strength elements in serve strokes, groundstrokes and volley strokes in a tennis player as well as physical movements (In each item of the following tests (except e), 1 point is given for each valid stroke and an additional 2 points is given for strokes that hit a strength area). In the present study, the measurement of serve stroke hit percentages was limited to serve stroke test measurement method in ITN test.

a- Groundstroke depth and strength test: The sum of 10 strokes (5 forehand-5 backhand) on the farthest point of the tennis court is calculated.

b- Groundstroke accuracy and strength test: In this test, trainees are asked to hit 6 strokes (3 forehand-3 backhand) on the farthest point of the parallel tennis court and 6 strokes (3 forehand-3 backhand) on the farthest point of the cross court.

c- Volley stroke depth and strength test: The sum of 8 strokes (4 forehand-4 backhand) on the farthest point of the tennis court is calculated.

d- Serve stroke test: In this test, trainees are asked to hit 12 strokes target and off-target serve points on the court.

e- Agility test: The trainees are asked to take the balls placed on five different points of the middle court to a racket placed on the center line. Then the duration of the training is scored (ttf.org.tr, 2016).

In the present study, all evaluations were performed using ITN Performance Test Evaluation Rules. Among different tests in ITN, only groundstroke depth and strength test, groundstroke accuracy and strength test, and serve stroke test were applied, and measurement values were categorized as preliminary and final test results.

Data Analysis

When skewness and kurtosis values were analyzed to observe whether the data displayed a normal distribution, it was observed that skewness and kurtosis values were (.794; 1.172) for preliminary depth test, (.774; .391) for preliminary accuracy test, (-.008; -.774) for preliminary serve stroke test, (.994; .610) for final depth test, (.627; .635) for final accuracy test, and (-.523; .216) for final serve stroke test. Thus, it can be stated that total scores of the study group display a normal distribution because they have a skewness value between +1 and -1 (Morgan, Leech, Gloeckner and Barret, 2004, p. 49), and a kurtosis value lower than 3 (Tabachnick and Fidell, 2015, p. 79). T test was used to determine whether there was a

statistically significant difference between students' total preliminary and final depth, accuracy and serve stroke scores.

Findings

Table 1. Descriptive Statistics

Demographic Information		f	%
Gender	Female	34	48.6
	Male	36	51.4
Branch	Team	41	58.6
	Individual	29	41.4

Table 2. Descriptive Statistics

Demographic Information	n	$\overline{X}$	S
Age	70	21.12	3.12967
Height	70	171.60	7.94984
Weight	70	66.50	11.40906
Athletic age	70	7.74	3.82473

Table 3. T test results related to total preliminary and final depth test scores

Measurement	n	$\overline{X}$	S	sd	t	p
Preliminary test	70	19.72	10.65	69	1.82	.073
Final test	70	16.38	10.51			

No statistically significant differences were observed between students' preliminary and final depth test scores (t(69)=1.82, p>.05).

Table 4. T test results related to total preliminary and final accuracy test scores

Measurement	n	$\overline{X}$	S	sd	t	p
Preliminary test	70	12.22	7.36	69	8.45	.000
Final test	70	23.50	10.80			

A statistically significant difference was found between students' preliminary and final accuracy test scores (t(69)=8.45, p<.05). While their preliminary accuracy test scores were =12.22, this value increased to =23.50 in the final accuracy test. Therefore, it can be argued that tennis training remarkably increased students' accuracy performance.

Table 5. T test results related to total preliminary and final serve stroke test scores

Measurement	n	$\overline{X}$	S	sd	t	p
Preliminary test	70	19.81	7.55	69	2.81	.006
Final test	70	23.28	6.79			

A statistically significant difference was found between students' preliminary and final serve stroke test scores (t(69)=2.81, p<.05). The students' preliminary serve stroke test scores were

=19.81, whereas it increased to =23.28 in the final serve stroke test following their tennis training, demonstrating that tennis training remarkably increased students' serve stroke performance.

Discussion and conclusion

The present study applied an 8-week tennis training to voluntary students to analyze potential changes in their levels of groundstroke depth, groundstroke accuracy and serve stroke.

ITN test used in the present study was introduced by TTF in order to measure both players' and trainers' level of tennis skills (Keskin, Ateş and Kiper, 2016). When ITN test was applied to voluntary students during an 8-week tennis training, it was demonstrated that no statistically significant differences were observed in terms of groundstroke depth, while some statistically significant differences were found in terms of groundstroke accuracy and serve stroke as a result of preliminary and finals tests.

In the present study, no statistically significant differences were found between students' preliminary and final groundstroke depth test ($t(69)=1.82$, $p>.05$). This may attributed to the insufficiency of the training duration because depth is a difficult skill to acquire for tennis players. Given that scoring system used for the depth requires a higher level of tennis skills compared to groundstroke accuracy and serve stroke, it is very likely that this training did not greatly contribute to beginner level tennis players' groundstroke depth skills.

There was a statistically significant difference between students' preliminary and final groundstroke accuracy test scores ($t(69)=8.45$, $p<.05$). While students' preliminary groundstroke accuracy test scores were =12.22, these scores increased to =23.50 in the final test following the tennis training. Therefore, it can be stated that tennis training increased students' groundstroke accuracy performance. However, considering that accuracy is a simpler tennis skill to acquire compared to depth, it is not surprising that preliminary and final accuracy test scores were higher compared to preliminary and final depth test scores. As a result, it is evident that an 8-week tennis training influences beginner level tennis players' accuracy skills positively and that this skill will improve in a direct proportion to the duration of tennis training.

Ertem et al. (2013) focused on the impact of coordination improvement exercises on female tennis players on forehand and backhand skills, and reported statistically significant differences ($p<0.05$) among mean ITN accuracy test scores.

Keskin et al. (2016) conducted a study on the impact of an 8-week tennis trainings on ITN level and agility and indicated that there was a statistically significant difference ($p<0.03$) among preliminary and final forehand/backhand accuracy test scores.

In the present study, a statistically significant difference was observed between students' preliminary and final serve stroke scores ($t(69)=2.81$, $p<.05$). While students' preliminary serve stroke test scores were =19.81, it increased to =23.28 in the final serve stroke test following the tennis training, indicating that tennis training increases beginner level tennis players' serve stroke performance at a certain level. It can also be added that a longer duration

of tennis training may improve their performance and increase the above-mentioned significant difference.

It must be noted that ITN test results did not yield any statistically significant differences in terms of serve strokes, which can be considered as a stepping stone in tennis. Challenging an opponent in tennis is directly proportional to the hit percentage of a tennis stroke. Therefore, the improvement of serve strokes plays a vital role in beginner level tennis players. If a tennis player can hit a stroke on a point that cannot be reached by the opponent, it will be more difficult for the opponent to receive the serve.

Ölçücü (2011) carried out a study on tennis players and reported that plyometric training had a positive effect on serve stroke hit percentage.

Gül et al. (2017) found a statistically significant difference between control and experiment groups in their analysis results in terms of serve stroke hit tests ($p<0.05$), and reported that technical and plyometric training contributed to serve stroke hit percentage positively in control and experiment groups, respectively, which eventually improved their tennis skills.

Given that nearly 75% of all strokes in a tennis game consist of forehand and serve strokes (Ellenbecker et al 2006), the critical position of hit percentages in forehand/backhand and serve strokes in a tennis game cannot be denied. In addition, it can also be argued that the ball speed also bears an important role at this point.

Similar to other sports branches where hit percentages play a major role, it is impossible to win a point in a tennis game with a certain hit percentage. Therefore, in addition to tactical and technical details, the analysis of various details such as training, training schedule, motor skills and techniques must not be ignored in tennis studies (Ölçücü, 2011). Apart from techniques, tactics, coordinating and endurance, it is clear that hit percentage is also a vital element in tennis, and thus tennis trainings must be organized accordingly.

In summary, it can be concluded that the improvement of hit percentages in tennis directly influence match winning statistics. A tennis player can win a point and, as a result, a match by challenging the opponent thanks to a higher hit percentage. It is evident that further studies on the improvement of hit percentages will greatly contribute to professional tennis players in the long term.

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