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RELATIONSHIP BETWEEN TENNIS PERFORMANCES AND EXTREMITIES LENGTHS

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Abstract:
The purpose of this study was to investigate the relationship between extremity measurement and tennis performance in athletes aged 22-25 years. 15 male and 15 female athletes who has 23.57 ± 1.15 year average age participated in the study voluntary. AOS test was applied to athletes and the data were analyzed by Spearman test. Data were given with averages and standard deviation values. The average body height of the female athletes were 179,14 ± 5,97 cm, the average body weight was 75,00 ± 5,79 kg, the average arm length was 37,46 ± 1,53 cm, the average leg length was 97,00 ± 2,21 cm, the average foot length was 26.71 ±, 72cm. AOS test averages 173.85 ± 19.39 and the mean age was found to be. The mean height of the male athletes participating in the study was 170.33 ± 3.47cm, the weight average 60.60 ± 3.66kg, the arm length average 32.90 ± 1.07cm, the leg length average 89.40 ± 2.72cm, the foot length average 23.20 ±, 77cm, AOS test average of 148,53 ± 11,90, average age was found to be 23,67 ± 1,17. As a result, there was no significant relationship between Tennis performance and Body Weight, Arm length, Hand length, Leg length, Foot length both Female and Male participants. (p> 0.05).

Keywords: tennis, performance, extremity, AOS test

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1. Introduction

Tennis is a popular sport that is pursued with interest in the world, recreational and performance. Unfortunately, one of the most important reasons for not being a popular sport branch in our country is because is a branch that requires investment. Tennis, a sport formerly played by the elite, is now attracting people's attention through mass media (television, internet, newspaper etc.) publications, elite sportsmen, sponsorships (material reasons) (Karagözoğlu 2005, s:15).

In Turkey, tennis continues its development as it is in every sports branch of the past day-to-day. Promising studies on the development of tennis is done. It is important that the tournaments organized in our country show that tennis can come to the desired spot in future times (Karagözoğlu 2005, s:16).

Factors affecting tenant motor learning were investigated. The movement chain is found to be very important when tennis techniques are applied. Tenant forces are usually produced locally during leg exertion and flexion, indicating that these forces are transmitted to the body, transmitted from the body to the upper limb, and from there to the paddle and ball (Schmidt at al 2004, s:74).

2. Material and Methods

A. Research Group

A total of 30 volunteer athletes were included in the study, 15 males and 15 females aged 22-25 years. It has been noted that the athletes participating in the study have not experienced a serious injury in their lower and upper limbs during the last 6 months.

B. Data Collection Methods

Arm length, hand length, leg, foot, and length of the participants were taken. Measurements were made in accordance with the extremity length protocol.

C. Arm Length

The distance between the shoulder protrusion and elbow bone (Acromion-Olecranon) was measured.

D. Hand Length

The length between the second knuckle and the longest finger in the bone-distal bone (radius and ulna distal) of the bone-forearm spoon finger on the forearm thumb.

E. Leg Length

The distance between the front upper stalk of the hip and the hammer bone was measured.

F. Foot Length

The distance between the extreme end of the toes and the outermost point behind the heel was measured.

G. Length

The length scale of the athlete's foot heel, adjacent to the head face and eyes look at other case making measurements in cm, measured values are recorded in the test result form.

E. Performance Measurement

The AOS test was applied to measure the tennis performance of the athletes.

a. AOS Test Protocol

In the AOS on-site evaluation procedure, the trainees will be assessed on the following topics by looking at their tennis playing skills.

1. Depth assessment of ground impacts,
2. Sensitivity assessment of ground impacts,
3. Vole stroke evaluation,
4. Service evaluation.

b. Forehand and Backhand Depth Evaluatıon

In this evaluation, the athlete stands in the place indicated by the letter P, and the ball feeders in the place indicated by the letter F. The ball feeder makes 10 ball feeds to the area marked "x x" in front of the athlete, on the side of a forehand of the athlete, on a backhand side. The athlete makes a hit in this area, making forehand and backhand strokes and falling in against the field. Each of the 10 hits in which the athlete has played is awarded points according to the first and second zones. Points are collected and the athlete's ground stroke depth score is found. The highest score the athlete can get is 90. In case players fall into the field against the balls they shoot, points will be awarded according to the 1st and 2nd place of the ball (http://www.ttf.org.tr/assets/files/aos_testı_uygulama_proseduru.pdf).

Points are given as the following;

- 1 Points - When the ball falls on the top of the service
- 2 Points - When the ball lands on the front of the back court area
- 3 Points - When the ball falls to the center of the back court area
- 4 Points - When the ball lands on the last part of the back court area

Power Points are given as below;

Power Range - 1 Extra Points - 1 extra point is awarded when the ball falls anywhere in the court area and falls between the second tab back line and the power line.

Power Range - Double Points - Points are multiplied by 2 when the ball falls at any point in the singles cords and the second tab is behind the power line.

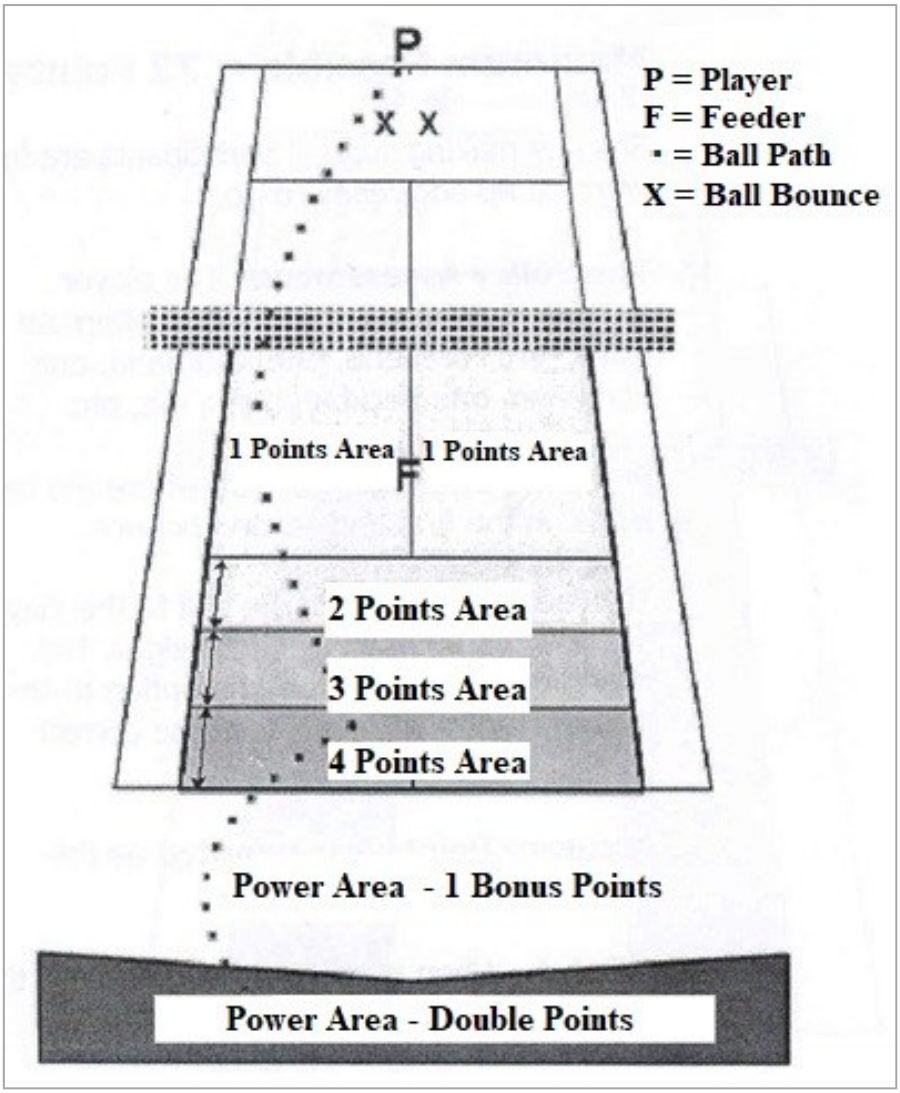

Figure 1: Depth assessment of ground impacts

c. Forehand and Backhand Sensitivity Assessment

In this evaluation, the athlete will stop at the place indicated by the letter P, and the ball feeders at the place indicated by the letter F. The ball feeder makes 12 balls on the side of the athlete in front of the athlete marked "x x", on the side of a forehand of athletes, on the backhand side. The athlete makes a hit in this area, making forehand and backhand strokes and falling in against the field. A total of 8 strokes, in which the athlete has played, are awarded points according to the first and second zones in the opposing area, and these points are collected and the floor depth score of the trainee is obtained. The highest score the athlete can receive in this evaluation is 84.

1 Score - When the ball lands at any time in the middle area except the target areas.

2 Score - When dropping forward from ball service line

3 Score - When the ball falls to the targeted area in the arc section of the singles crown in the ground hit.

Power Range - 1 Extra Points - 1 extra point is awarded when the ball falls into any space in the singles court and the second tab is between the back line and the power line.

Power Range - Double Points - Double points are awarded when the ball falls on any field in the singles cortex and falls behind the second tab power line.

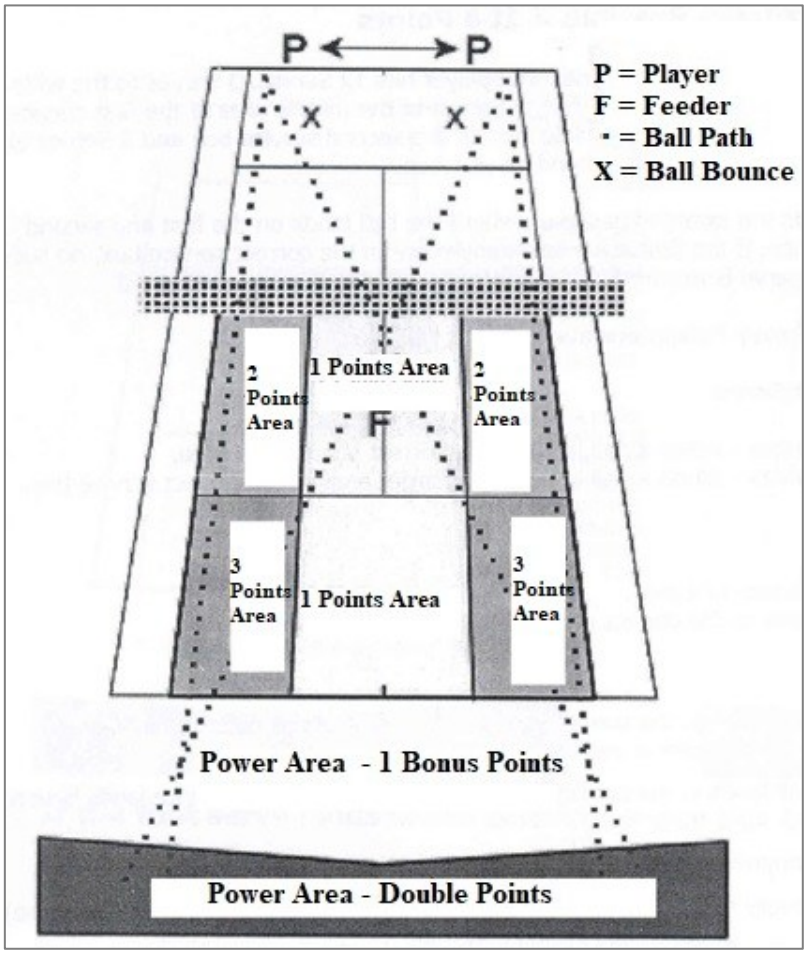

Figure 2: Forehand And Backhand Sensitivity Assessment

d. Evaluatıon of Vole Hit

In this evaluation, the trainees will stop at the location indicated by the letter P, and the ball feeders at the place indicated by the letter F. The ball feeder places 10 balls between the buttocks and the shoulder level, on the side of a forehand of the athlete, on the backhand side, towards the area marked "x x" in front of the athlete. The athlete makes a hit in this area, making forehand and backhand volley strokes and falling in against the field. The highest score that the athlete can receive on this assessment is 50.

1 Points - Whenever the ball falls in the top of the service square.

2 Points - When the ball lands on the front part of the back court area.

3 Points - When the ball lands on the middle of the back court area.

4 Points - When the ball lands on the back of the back court area.

Power Field 1 and 2 Extra Points are not awarded because the precision of the volley hit is prioritized. "0" Points - When the first ball of the ball falls out of the singles field. Compliance - 1 extra point is awarded for each hit without error. All points are collected to find the total score in the volley depth study section.

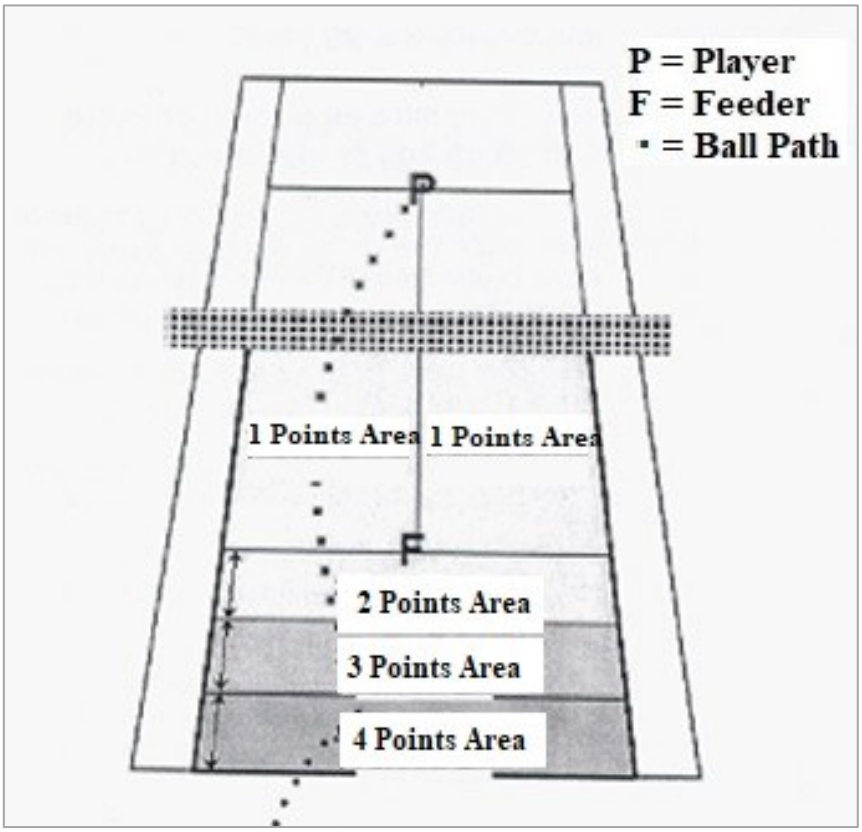

Figure 3: Evaluatıon Of Vole Hit

e. Service Hit Evaluation

The player has 12 services. 3 services are placed in the wide area of the first service box. 3 services are assigned to the middle of the first service box. 3 service assigns the middle part of the second service box. 3 services to the second part of the service box. Points are awarded according to the first and second round of the ball. If the first service is dropped into the correct service box, the second service is not required.

Full points will be given as below:

First Service:

2 Points - When the ball is thrown into the correct service box area,

4 Points - When the ball is thrown to the target area in the correct service area.

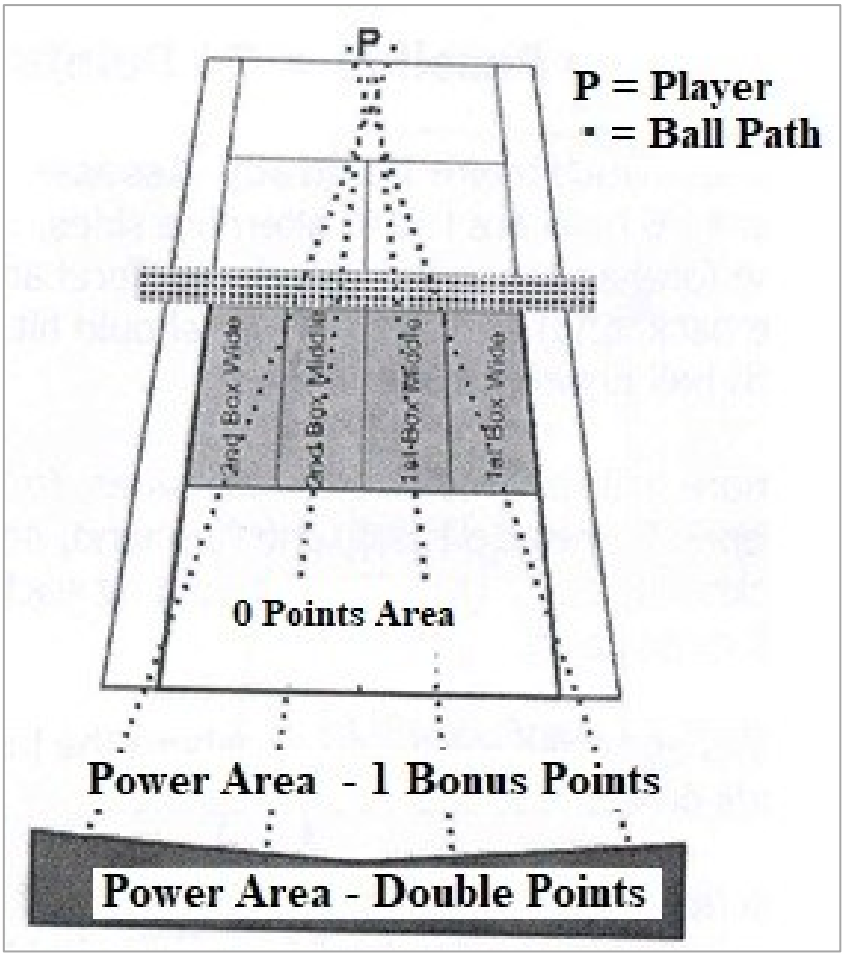

Figure 4: Servıce Hit Evaluation

Second Service:

1 Score: When the ball is thrown into the correct service box area

2 Score: When the ball is thrown into the targeted area in the correct service area.

Power Zone - 1 Extra points: When the ball is thrown into the correct service box and If the second tab falls between the power line and the back line, 1 extra point is awarded.

Power Zone - Double Score: When the ball is thrown into the correct service slot and you will be awarded double points when you fall behind the second tab power line. "0" Points - When the first tab of the ball is outside the correct service box.

Compliance (Consistency): Each service ball is awarded 1 extra point when dropped into the correct service box.

2.1 Comparison Table

The AOS table was divided into two parts, male and female.

Categories										
Gender	AOS 10	AOS 9	AOS 8	AOS 7	AOS 6	AOS 5	AOS 4	AOS 3	AOS 2	AOS 1
Women	43-71	72-100	101-129	130-158	159-187	188-216	217-245	246-274	275-303	304-332
Men	58-85	86-112	113-140	141-167	168-195	196-222	223-250	251-277	278-305	306-332

2.2 Data Analysis

Analysis of the data used SPSS-20.0 package program. The relationship between tennis performance and extremity lengths of the group was analyzed by spearman test. The significance level of $p < 0,05$. The data are presented with the mean and standard deviation values.

3. Results and Discussion

Yapıcı et al (2015) investigated the relation of 50 m free swimming performance to lower extremity Wingate anaerobic power and capacity test. The study included 11 men (age: 13:45 ± 1:03 year, length: 166.18 ± 10.12 cm respectively, weight: 55.00 kg ± 11:13, sports age: 6.2 ± 1.1 years) participated voluntarily in the performance of swimmers. Wingate anaerobic power and capacity test was performed on all subjects on the first day. 50 m Swimming test was performed on the second day. In this study, the 50 m free-floating performance was not made from a standard jumping stone. The athlete starts to swim in and out of the pool. Statistical analysis of the data evaluated by Pearson correlation analysis. Significance level was taken as $p < 0,05$. No statistically significant correlation was found between Wingate fatigue index and 50 m swimming performance, relative anaerobic peak power, anaerobic capacity and anaerobic peak 30 power ($p > 0,05$). There was statistically significant correlation between fatigue index and relative anaerobic capacity, relative minimum anaerobic power and minimum anaerobic power ($p < 0.05$). There was no statistically significant correlation between swimming fatigue index and Wingate fatigue index ($p > 0.05$). In this study, a statistically significant correlation was found between 50 m free swimming performance and lower extremity Wingate anaerobic power and capacity test ($p < 0.05$). There was no statistically significant correlation between fatigue index and swimming fatigue index ($p > 0.05$) (Yapıcı and Cengiz 2015).

Sema A., (2015) in the initial measurements of the athletes participating in the survey, the AOS test averages were 110.92 ± 22.16. In the second measurement, the AOS test averages were 113.28 ± 12.44.

Şahan A. (2003): there are researches that emphasize that athletes who want to be successful in tennis are required to have flexibility and strength in the most appropriate level. The flexibility feature is a feature that is quickly earned and quickly lost. The goodness of this sporting group may be due to their active participation in sports such as gymnastics, athletics, swimming in physical education classes.

4. Conclusions and Recommendations

As a result, it was found that there is no significant relationship between the tennis performance of the limb lengths of male and female tennis players. It can be observed that the same work is done on professional tennis players; the length of the extremities changes the tennis skill.

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Appendix

A. Figures and Tables

Table 1: Descriptive Statistics of Tennis Players

	N	Gender	Min	Max	X	SS
Size (cm)	15	Men	170	90	179,14	5,97
		Women	165	90	170,33	3,47
Weight (kg)		Men	64	83	75	5,79
		Women	53	83	60,60	3,66
Age (year)		Men	22	25	23,57	1,15
		Women	22	25	23,67	1,17
Arm length (cm)		Men	35	40	37,46	1,53
		Women	31,5	40	32,9	1,07
Leg length (cm)		Men	94	102	97	2,21
		Women	84	102	89,40	2,72
Foot length (cm)		Men	26	28	26,71	,72
		Women	22	28	23,20	,77
Hand length (cm)		Men	20	23	21,85	,86
		Women	15,5	18,5	17	,78
AOS Test		Men	144	204	173,85	19,39
		Women	128	204	148,53	11,90

The study involved 15 male and female athletes who are aged between 22-25. The mean height of male athletes participating in the study was 179,14 ± 5,97cm, The average height of female athletes is 170.33 ± 3.47cm. Weight average of male athletes 75,00 ± 5,79kg. weight average of female athletes 60,60 ± 3,66 kg. Average arm length of male athletes is 37.46 ± 1.53cm. Female athlete's arm length average 32,90 ± 1,07cm. The average leg length of male athletes is 97,00 ± 2,21cm. average leg length of female athletes 89,40 ± 2,72cm. The average foot length of male athletes is 26.71 ± 0.72cm. The average length of the foot of female athletes is 23,20 ±, 77cm. The average male athlete of the AOS test 173,85 ± 19,39. AOS test average of female athletes is 148,53 ± 11,90. The average was found age of male athletes 23,57 ± 1,15 and the average age of female athletes 23,67 ± 1,17 years.

Table 2: The Relationship of Extremity Lengths of Tennis Players with Gender

		N	Gender	Weight	Arm length	Hand length	Leg length	Foot length
AOS TEST	r	15	Men	-,178	,030	-,58	,313	,029
			Women	-,107	,222	,103	,026	,378
	p		Men	,543	,919	,843	,276	,920
			Women	,705	,426	,716	,928	,165

There was no significant relationship between tennis performance and Weight, Arm length, Hand length, Leg length, Foot length of male and female athletes. ($p > 0.05$)