



## EFFECTS OF ATHLETE PERSONALITY ON VARIABLES RELATED TO TENNIS INJURIES

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### Abstract:

This research aims to investigate how tennis players' personality structures affect some variables related to the injuries they experience in sports. The research population consists of tennis players between the ages of 10-18 in Turkey. A total of 158 (female: 87, male: 71) tennis players between the ages of 10-18 who had at least one tennis-specific injury participated in the study. Demographic questions (gender, age, height, weight, time of sports injury, repetition of the same injury, and injury measure) used in the study were created by the researchers. The personality of the athlete was determined by the athlete himself, and the survey questions were determined by using the survey questions used in Kirişçi's (2011) study. Data from tennis players were collected online via 'Google Form'. There is a low level of statistically positive correlation between re-experiencing the sports injury and the time of the sports injury ( $r=0.18$ ,  $p=0.03$ ). There is a low level of statistically positive correlation between the gender of the participants and taking precautions for sports injury ( $r=0.20$ ,  $p=0.01$ ). There is a low negative correlation between the gender of the participants and their athlete personality ( $r=26$ ,  $p=0.001$ ). There is no statistically significant difference between the participants' re-experiencing the same injury, taking precautions in sports injury, and athlete's personality ( $r=-0.013$ ,  $p=0.87$ ,  $r=0.010$ ,  $p=0.90$ ). It can be said that the sports injuries experienced by tennis players are related to their personality types and their gender. It can be said that injuries seen in tennis sports are more common during matches and women take more precautions for sports injuries than male athletes. In addition, it can be said that female athletes have both courageous-attentive and emotional-calm personality types, while males have the most courageous-active personality type.

**Keywords:** tennis, athlete personality, protection from injuries

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## 1. Introduction

Tennis (Valleser & Narvasa, 2017), played in more than 200 countries affiliated with the International Tennis Federation, is one of the most widely played sports branches in the world, as it can reach individuals of all ages and all skill levels (Chung & Lark, 2017). The high level of professional and recreational participation in tennis increases the risk of injury caused by the physiological requirements, biomechanical factors, and material use of tennis (Pluim, Staal, Windler, & Jayanthi, 2006). In tennis, unlike other sports, the matches are not played at a certain time and usually take a few hours (Kovacs, 2006).

Tennis is a versatile sport characterized by a one-sided movement pattern that requires repetitive high effort within 5-10 seconds of attack and 10-20 seconds of recovery (Fernandez-Fernandez, Sanz-Rivas, & Mendez-Villanueva, 2009). Although today's tennis game is at the forefront with its power and high ball speed, traumatic injuries are seen due to overuse as a result of the repetition of strong hits (Abrams, Sheets, Andriacchi, & Safran, 2011). In most of the studies on racquet sports in the literature differences in upper extremity and racket kinematics are mentioned, but kinematic analysis of lower body work has limitations (Yanar ve Karakoç, 2021). Although the incidence of injuries in tennis varies according to age, gender, and training year, studies on tennis athletes; reported that the incidence of injury varies between 0.05-2.9 per athlete (Pluim et al., 2006).

Participation in sports at an early age causes not only acute injuries but also injuries from overuse (Wojtys, 2017). It can be said that the psychological characteristics of the athlete are also effective among the factors that increase the risk of overuse injury (Martin, Johnson, McCall, & Ivarsson, 2021). Among the risk factors for injury in adolescent and adult athletes are; mood, sleep states, negative life experiences, and stress (Ivarsson & Johnson, 2010). In a study conducted in 2018, a relationship was found between tennis elbow and psychological characteristics (Aben et al., 2018).

In general, personality traits are an important predictor of sports participation (Levitch et al., 2020), and according to the stress injury model (Williams & Andersen, 1998), the high level of stress that causes injuries to athletes may be due to the personality type of the athlete (Madigan, Stoeber, Forsdyke, Dayson, & Passfield, 2018). In this context, our study aimed to reveal how the personality type of tennis players affects some variables related to sports injury.

## 2. Material and Methods

### 2.1. Research Model

The research is quantitative research in the relational screening model. The research population was determined by using a convenient sampling method.

### 2.2. Research Group

The sample of the study consisted of athletes between the ages of 10-18 in Turkey who played tennis and had at least one sports injury. A total of 158 (female: 87, male: 71) tennis

players between the ages of 10-18 who had at least one tennis-specific injury participated in the study.

### 2.3. Data Collection Tool

Demographic questions (gender, age, height, weight, time of sports injury, repetition of injury, and injury measure) used in the study were created by the researchers. The questionnaire questions that the athlete's personality determined by the athlete himself was determined by using the questionnaires used in Kirişci's (2011) study. Data from tennis players were collected online via 'Google Form'.

### 2.4. Research Ethics

The necessary permission to start the study was obtained from Karamanoğlu Mehmetbey University Scientific Research and Publication Ethics Committee on 04.03.2022 (Document no: 60501).

### 2.5. Analysis of the Data

In the study, "frequency (f), percentage (%), arithmetic mean ( $\bar{x}$ ), and standard deviation (S)" were used for personal information. To examine the normality distribution of the data, it was determined that "the skewness and kurtosis coefficients of the data were/were not in the range of +1.5 to -1.5" by looking at the skewness and kurtosis coefficients of the data. "This situation is interpreted as the scores obtained from the study do not show normal distribution (Tabachnick & Fidell, 2013)". From this point of view, Spearman's correlation test, One-Way ANOVA (Welch's), and Games-Howell test were used as post hoc in relational screenings.

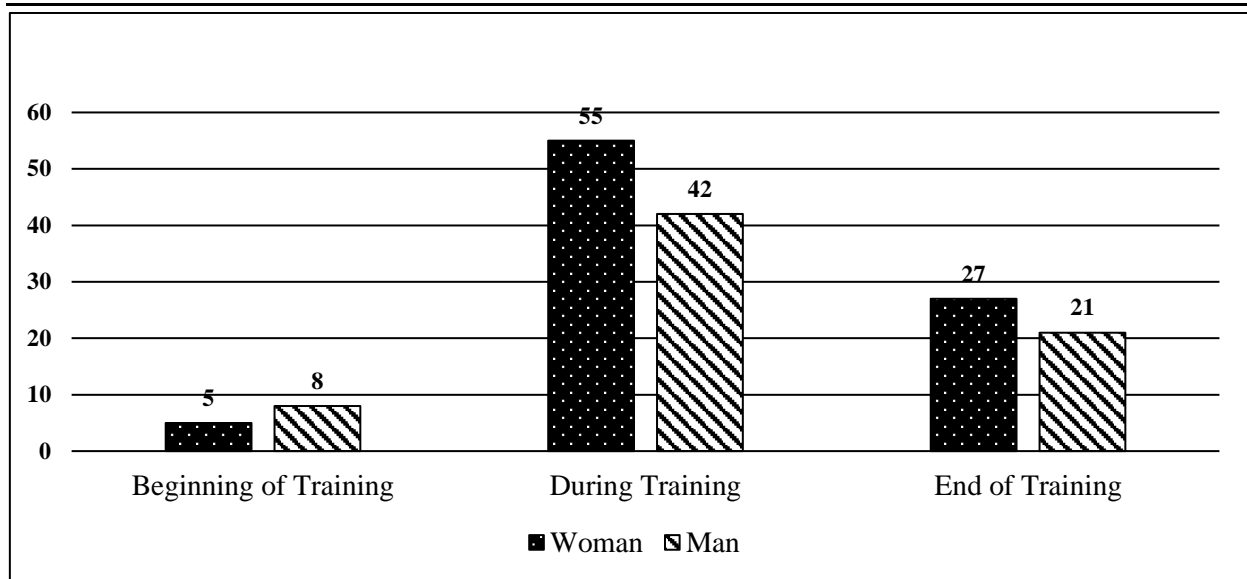
## 3. Results

The average age of the participants was (13.9±1.75), the average height (169±11,1) and the average weight (56.9±10,4). Descriptive statistics of the participants by gender are given below (Table 1).

**Table 1:** Descriptive Statistics of the Participants by Gender

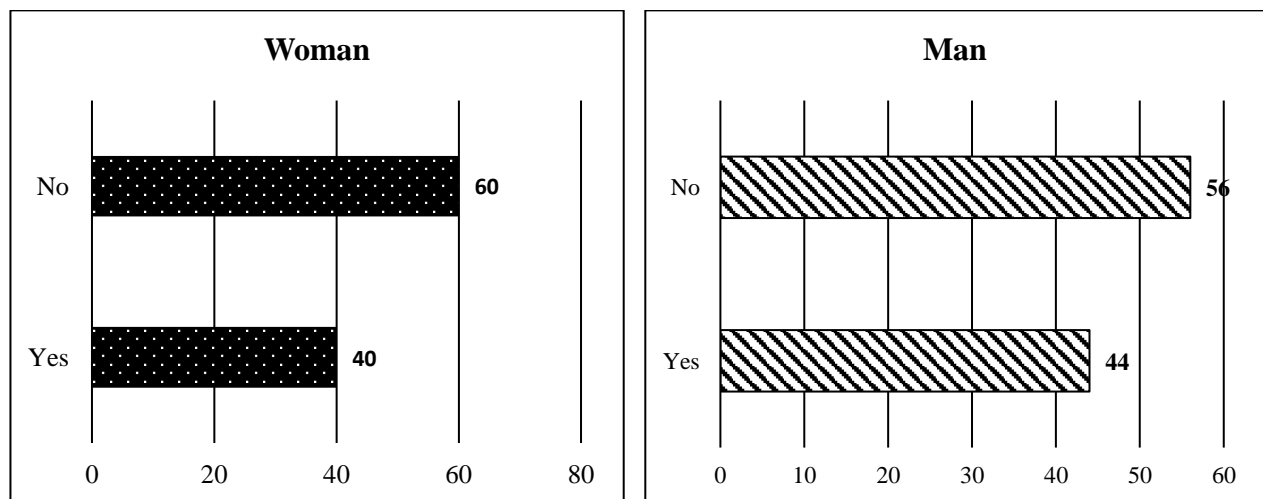
		n	$\bar{x} \pm s$
Age	Woman	87	13.6 ±1.83
	Man	71	14.3±1.57
Height	Woman	87	166±9.89
	Man	71	173±11.3
Weight	Woman	87	53.7±8.55
	Man	71	60.8±11.2

When Table 1 is examined, it is seen that the average age of females is (13.6±1.83) and that of males is (14.3±1.57). The average height of females is (166±9.89) and the average height of males is (173±11,3). The average weight of females is (53.7±8.55) and of males (60.8±11.2).



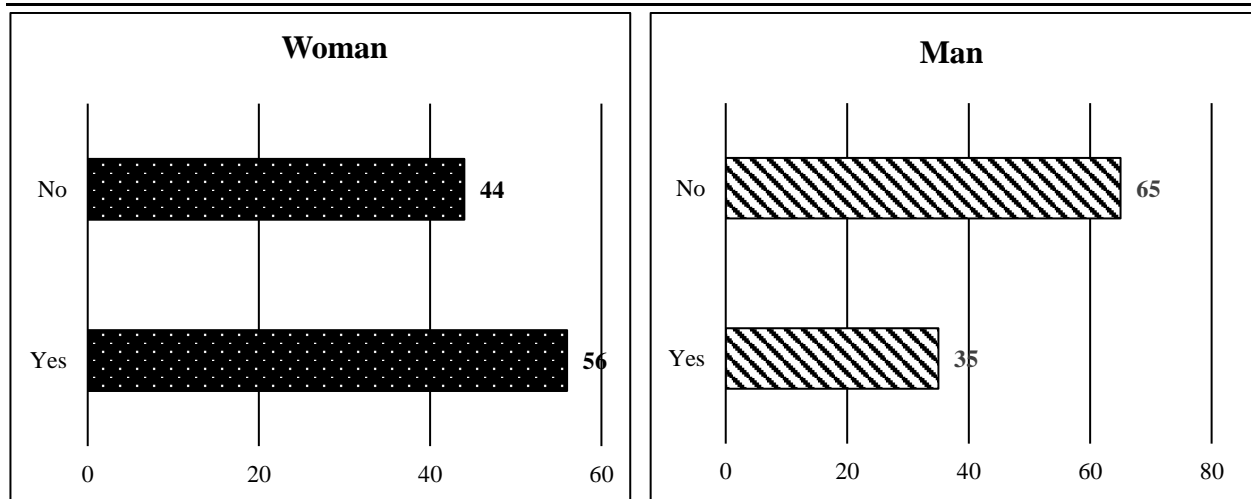
**Figure 1:** Percentage (%) and frequency (f) values of the answers given by the participants to the question 'When did the sports injury occur?'

When Figure 1 is examined, 63% (f:55) of the females experienced sports injuries during training and match, 31% (f:27) at the end of training and match, and 6% (f:5) at the beginning of training and match. Of the males, 59% (f:42) experienced sports injuries during training and matches, 30% (f:21) at the end of training and matches, and 11% (f:8) at the beginning of training and matches.



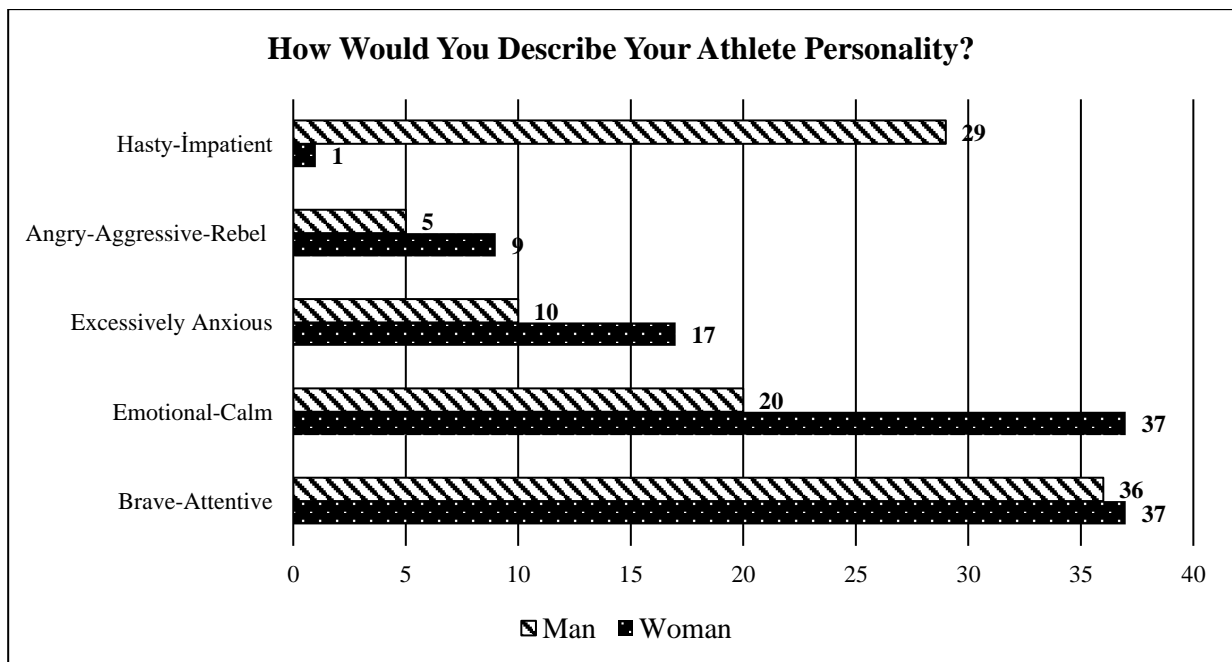
**Figure 2:** Percentage (%) and frequency (f) values of the answers given by the participants to the question "Have you experienced the same injury again?"

When Figure 2 is examined, it is seen that 60% (f:52) of the females have not experienced the same injury again and 40% (f:35) have experienced the same injury again. It is seen that 56% (f:40) of the males have not experienced the same injury again and 44% (f:31) have experienced the same injury again.



**Figure 3:** Percentage (%) and frequency (f) values of the answers given by the participants to the question "Do you take precautions to protect yourself from sports injuries?"

When Figure 3 is examined, it is seen that 55% (f:48) of females take precautions to protect themselves from sports injuries, and 45% (f:39) do not. It is seen that 65% (f:46) of males do not take precautions to prevent sports injuries, and 35% (f:25) take precautions.



**Figure 4:** Percentage (%) and frequency (f) values of the answers given by the participants to the question "What is your athlete personality?"

When Figure 4 is examined, 37% (f:32) of the females are emotional-calm, 37% (f:32) brave-attentive, 17% (f:15) excessively anxious and 9% (f:7) angry-aggressive-rebel and %1(f:1) hasty-impatient think that they have personality type. 36% (f:26) of the males are brave-attentive, 29% (f:21) hasty-impatient, 20% (f:14) emotional-calm, 10% (f:7)

extreme anxious, and 5% (f:3) think that they have an angry-aggressive-rebel personality type.

**Table 2:** Participants' Spearman's Correlation test results

		Sport Injury Prevention	Athlete's Personality	Injury Time
Repeating the Same Injury	r	-0.013	0.01	0.18
	p	0.087	0.90	0.03*
Gender	r	0.20	-0.26	
	p	0.01*	0.001**	

\*=p<0.05, \*\*=p<0.01

When Table 2 is examined, there is a low level of statistically positive correlation between re-experiencing the same sports injury and the time of the sports injury (r=0.18, p=0.03). There is a low level of statistically positive correlation between the gender of the participants and taking precautions for sports injury (r=0.20, p=0.01). There is a low negative correlation between the gender of the participants and their athlete personality (r=0.26, p=0.001). There is no statistically significant difference between the participants' re-experiencing the same injury, taking precautions against sports injuries, and athlete's personality (r=-0.013, p=0.87, r=0.01, p=0.90).

**Table 3:** One-Way ANOVA (Welch's) test results by gender of participants

	Variables	Source of Variance	Sum of Square	df	Mean Square	F	p	Dif.
Injury Time	Woman (1)	Bet. Groups	0.701	3	0.234	0.938	0.4	
	Man (2)	Wit. Groups	0.701	3	0.234			
		Total	38.394	154	0.249			
Repeating the Same Injury	Woman (1)	Bet. Groups	0.047	1	0.047	0.187	0.6	
	Man (2)	Wit. Groups	0.047	1	0.047			
		Total	39.048	156	0.250			
Sport Injury Prevention	Woman (1)	Bet. Groups	1.55	1	1.551	6.44	0.01*	1>2
	Man (2)	Wit. Groups	1.55	1	1.551			
		Total	37.54	156	0.241			
Athlete's Personality	Woman (1)	Bet. Groups	9.61	5	1.923	9.91	0.00***	2>1
	Man (2)	Wit. Groups	9.61	5	1.923			
		Total	29.48	152	0.194			

\*=p<0.05, \*\*\*=p<0.001, Bet: Between, Wit: Within, Dif: Difference, df: Degrees of Freedom,

When Table 3 is examined, there is a statistically significant difference in favor of females in taking precautions for sports injuries (F=6.44, p=0.01). There is a statistically significant difference in favor of males in the athlete personalities of the participants (F=9.91, p=0.00). There is no statistically significant difference according to gender at the time of injury and re-experience of the same injury (p>0.05).

**Table 4:** Participants' ANOVA post hoc (Games-Howell) test results

Sport Injury Prevention		MD.	SE.	df	t	p	$\eta^2$
No	Yes	0.199	0.078	156	2.54	0.01*	0.40
Athlete's Personality							
Hasty-Impatient	Extreme Anxious	0.680	0.129	152	5.28	0.00***	0.25
	Angry-Aggressive-Rebel	1.000	0.191	152	5.23	0.00***	
	Brave-Attentive	0.546	0.111	152	4.91	0.00***	
	Emotional-Calm	0.696	0.114	152	6.09	0.00***	

\*=p<0.05, \*\*\*=p<0.00, MD: Mean Difference, SE: Standart Error, df: Degrees of Freedom

When Table 4 is examined and compared whether the participants take precautions for sports injuries or not, a statistical difference was found in favor of the group that did not take any precautions ( $p<0.05$ ). A statistically significant difference was found in favor of the hasty-impatient group in the comparison of the hasty-impatient group and the extremely anxious group ( $p<0.001$ ). A statistically significant difference was found in favor of the hasty-impatient group when the hasty-impatient group was compared with the irritable-aggressive-rebel group ( $p<0.001$ ). A statistically significant difference was found in favor of the hasty-impatient group when the hasty-impatient group was compared with the courageous-impatient group ( $p<0.001$ ). When the hasty-impatient group was compared with the emotional-calm group, a statistically significant difference was found in favor of the hasty-impatient group ( $p<0.001$ ).

#### 4. Discussion

The following results were obtained in the study in which the effects of athlete personality on the variables related to injuries seen in tennis were investigated.

##### 4.1. Results of Variables Related to Sports Injury of Participants

In our study, both female and male participants suffered the most injuries during training and match, at the end of training and match, and at the beginning of training and match, respectively. Although it is variable, in tennis matches, which can sometimes last up to 3-5 hours, athletes are physiologically challenged by making more effort to keep their performance at the same level (Kibler & Safran, 2005). At the same time, players participate in both singles and doubles matches during the tournament. In this case, players may have to play two matches in one day (Fu, Ellenbecker, Renstrom, Windler, & Dines, 2018). In a study, it was reported that injury rates in adolescent tennis players could be between 2-20 per 1000 hours of tennis training-match (Silva, Takahashi, Berra, Cohen, & Matsumoto, 2003). In a study investigating the injury cases of 162 tennis players during a season, it was concluded that most of the injuries occurred during the match (Moreno-Pérez, Hernández-Sánchez, Fernandez-Fernandez, Del Coso, & Vera-Garcia, 2018). When the injury percentage of tennis athletes in the 2016 Rio Olympics was examined; we encounter an injury rate of 86% during competition and 14% during training (Soligard et al., 2016). In a longitudinal study, the 'Wimbledon' championships from 2003 to 2012 were examined; it was determined that 39% of athlete injuries occurred

acutely during the match (McCurdie, Smith, Bell, & Batt, 2017). These results support the result of our study.

#### **4.2. Results of Variables Related to Participants Experiencing the Same Injury**

In our study, it was seen that both females and males mostly have not experienced the same injury again. In addition, a positive correlation was found between re-experiencing the same injury and the time of injury. As you go from the beginning of the match through the end of the match, the probability of experiencing the same injury decreases. Most tennis-related injuries are treated without surgery, and rehabilitation principles should be functional and specific to tennis players' shortcomings and adaptations (Jayanthi & Esser, 2013). It is thought that at younger ages, high-volume, tournament-oriented play may not be necessary for elite success later on and may actually increase injury (Jayanthi & Esser, 2013). A high training load may increase the injury rate, but it is also a fact that training has protective effects against injuries (Gabbett, 2016). In a study, it was determined that athletes between the ages of 7-18 who have experienced injuries were specialized in a particular sport and experienced overuse injuries (Jayanthi & Esser, 2013). Some changes that occur during adolescence (such as a growth spurt) have been associated with an increased risk of both traumatic and overuse injuries (Kemper et al., 2015; Van der Sluis, Elferink-Gemser, Brink, & Visscher, 2015). Considering the average age of the participants in this study, they are in adolescence. It can be thought that the continuous repetition of the strokes made in the tennis game (such as service, forehand and backhand) causes the athletes to get tired towards the end of the match and reduces the situation of experiencing the same injury.

#### **4.3. Results of the Variables Related to Taking Precaution in Sports Injuries of Participants**

In our study, it was concluded that most females took precautions for sports injuries, while the majority of males did not take precautions for sports injuries. A positive relationship was found between sports injury and gender. Looking at gender, there is a statistically significant difference in favor of females in taking precautions. It is known that successful athletes can concentrate better, have high self-confidence, and have lower anxiety (Gould, Eklund, & Jackson, 1993). Males and females may experience different levels of stress and develop different psychological skills for good performance (Anshel, Kim, & Henry, 2009). Emotional experiences of athletes and their genders are associated with the anxiety-coping status of athletes (Hagan Jr, Pollmann, & Schack, 2017). When the tennis branch is considered, it is known that the rate of overuse injuries is high because male athletes exhibit more risky behaviors than female athletes (Van der Sluis et al., 2015). It can predict future performance results in coping with the effects of positive and negative emotions such as anxiety (such as prevention) in any competition (Lazarus, 2000). Kayhan et al., (2019) also showed in their study that female players have more injury anxiety than male players. In another study, it was reported that female players had higher anxiety about suffering and losing their talent compared to male players (Ünver, Şimşek, İslamoğlu, & Arslan, 2020). When these studies are taken into



consideration, it can be thought that women players take more precautions to avoid injury because they have more anxiety.

#### **4.4. Results Related to the Relationship Between Personalities of Participants and Sports Injuries**

In our study, it was determined that females had the most emotional-calm and brave-attentive personality types, while males had the most brave-attentive personality type. A negative correlation was found between athlete personality and gender. There was a statistically significant difference in favor of males in the personality of the athlete. In males, the hasty-impatient personality type is statistically significant compared to other personality types. However, in our study, there was no difference in the amount of injury among the players with other character structures, including the group with excessive anxious character. It is known that psychological factors such as motivation, self-confidence and positive personality of Olympic athletes affect sports performance positively by facilitating the reactions of athletes (Fletcher & Sarkar, 2012). Although there are few studies in the literature investigating the number of injuries experienced by athletes due to their character structure or stress factor, these studies mostly included team sports (Junge, 2000; Petrie, 1992). When the results of this study are examined, it has been shown that players who have a stressful life (Kelley Jr, 1990) and character and low ability to cope with stress are more likely to be injured in sports activities as well as have problems in social life (Gunnoe, Horodyski, Tennant, & Murphey, 1999). 2001; Petrie, 1992; Steffen, Pensgaard, & Bahr, 2009). Steffen et al., (2009) in their study investigating the number of injuries experienced by football players with and without a stressful life; reported that players with stressful lives are at greater risk of injury. In a study investigating the relationship between players' personality structures and injury, it was shown that low self-esteem increases the risk of injury (Smith et al., 1993). On the other hand, Andersen and Williams (1999) reported that the risk of injury increases in athletes with reduced perceptual abilities (Andersen & Williams, 1999). It has also been argued that there may be differences in injury among players who have different personality types along with anxiety (Hardy & Crace, 1991). In a study conducted in line with this idea, it was reported that players with sensitive and shy characters may be more prone to injury compared to players with tough characters (Nor, 2001). Hardy and Crace (1991) asserted that players with a low responsibility structure are more prone to acute injury. On the other hand, overuse injuries were more common in players with a high level of dedication and responsibility. Steffen (2009) advocated the common idea of having different characteristics in the occurrence of different injuries (Grove, 1993; Rodin & Salovey, 1989). Contrary to all these results, Junge (2000) suggested that the stress arising from competition during the competition may cause injury and an athlete's character prone to an injury cannot exist (Junge, 2000). These results support the personality and injury findings in our study.

## 5. Conclusion

As a result, it can be said that the sports injuries experienced by tennis players are related to their personality types and their gender. It can be said that injuries seen in tennis sports are more common during matches and females take more precautions for sports injuries than male athletes. In addition, it can be said that female athletes have both brave-attentive and emotional-calm personality types, while male athletes have the most brave-attentive personality type.

## 6. Limitations

The limitation of this study is that the questions about the personality types and variables we used in our study were taken from another study. Another limitation of our study is that the injuries suffered by the athletes are based on remembering their past injury situations. The last limitation of our study is the small number of studies examining the relationship between athlete personality and sports injury.

## 7. Recommendations

In this respect, it can be recommended to use a valid and reliable measurement tool to measure athlete personality in future studies. In addition, it can be said that it would be useful to investigate acute injury and retrospective injury cases separately in future studies.

## Acknowledgements

Both authors contributed equally to the article.

## Conflict of Interest Statement

There is no conflict of interest between the authors. In addition, the authors thank the anonymous reviewers and editors for their comprehensive and constructive feedback that guided us to improve the article.

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