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Turkish Studies

eISSN: 1308-2140

Research Article / Araştırma Makalesi



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Examination of Visual and Audial Reaction Periods of National Team Football Players in terms of Gender Variance

Futbol Milli Takım Sporcularının Görsel ve İşitsel Reaksiyon Sürelerinin Cinsiyet Açısından Değerlendirilmesi

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Abstract: Although there are many studies on the physical and physiological characteristics of football players, it can be said that studies describing the reaction characteristics of football players especially compare the genders are quite limited. The aim of this study is to determine the visual, auditory reaction times of male and female football national team athletes. Male (n=30; age 16.54±2.10years; height length 176.60±6.81cm; body weight 69.20±8.97kg) and woman (n=18; age 17.44±1.81) playing in the U 17 Men's and Women's Football National Team. Height length 163.72±5.45cm; body weight 54.23±6.48kg) player participated. The data obtained are presented as arithmetic mean, standard deviation, minimum and maximum. All statistical evaluations were made with the help of SPSS 21 package program. Visual reaction values of male players in the examination conducted right hand: 193.46±15.37ms; left hand: 191.10±23.55ms; auditory reaction values on the right hand: 171.40±26.45ms; left hand was detected as 165.23±27.37ms. The female players; visual reaction values right hand: 187.66±47.14 ms; left hand: 210.44±47.96 ms; audial reaction values right hand: 217.72±69.30ms; left hand was determined as 204.05±49.13ms. It has been determined that the visual and auditory reaction times, which are the main determinants of the performance, are lower in favor of men than in women in the U 17 Football National Team. Different results were obtained according to gender in different sports branches at elite level in the literature and the reaction did not change according to gender.

Structured Abstract: 'Reaction time', defined as the time elapsed between the time when the stimulus begins and the time when the reaction begins, is one of the determinants of performance in modern football and is closely related to the ability of the players who are under the pressure of the field, time and opponent to have quick decision making (İmamoğlu and Kılıçgil, 2007) is an indication of how quickly athletes can think, plan and do their actions. It is known that athletes with a short reaction time have great advantages in responding to their rival attacks in order to think fast and make decisions quickly (Kaplan et al., 2018).

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Cite as/ Atf: Söyler, M. & Zileli, R. (2020). Examination of visual and audial reaction periods of national team football players in terms of gender variance. *Turkish Studies*, 15(8), 3703-3709.

<https://dx.doi.org/10.7827/TurkishStudies.46342>

Received/Geliş: 14 September/Eylül 2020

Accepted/Kabul: 20 December/Aralık 2020

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Published/Yayın: 25 December/Aralık 2020

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Reaction time is the determining factor in most sports and can be improved with regular training (İmamoğlu ve Kılıçgil, 2007).

High level performance in terms of physiological and motor characteristics of the athlete for success in sports must exhibit. Especially for the footballer, in actions that require short distance speed, it will be advantageous to arrange the events before and to move before the opponent. One of the parameters that will ensure this is the reaction time. Reaction time is the amount of time it takes from the arrival of a signal that appears suddenly to the response to that signal. Stimuli can be auditory, visual, and tactile. Reaction time, which is defined as the time between the start of the stimulus and the time between the start of the reaction, is one of the determinants of performance in modern football and is closely related to the ability of players who are under the pressure of the area, time and opponent to make quick decisions. Reaction time is the determining factor in many sports, and studies for many years have shown that the reaction time can be shortened with training. Although there are many studies on the physical and physiological characteristics of football players, it can be said that studies describing the reaction characteristics of football players are quite limited. The aim of this study is to examine the differences in visual and auditory reaction times of national team football players. This research was realized with 30 male football players with an average age of 16.54 ± 2.10 years, height 176.60 ± 6.81 cm, body weight 69.20 ± 8.97 kg, playing in the U 17 Men's and Women's Football National Team; their average age was 17.44 ± 1.81 years, their height was 163.72 ± 5.45 cm; It was completed with 18 female footballers with a body weight of 54.23 ± 6.48 kg. Ethics committee report was received from Bilecik Şeyh Edebali University Ethics Committee before the study started (2020/8/25). After all volunteers were verbally informed before they were included in the study, their voluntary permissions were taken in written paper. Height was measured with "Holtain, England" device. Body weight was determined by Tanita MC-780 (Japan) brand body fat analyzer. Visual and audial reaction time measurements of volunteers were performed on the instrument with their right and left hands (Newtest 1000), which they used dominantly. After all volunteers were verbally informed before they were included in the study, their voluntary permissions were taken in written paper.

The data obtained are presented as arithmetic average, standard deviation, minimum and maximum. All statistical evaluations were made with the help of SPSS 21 package program. The purpose of this study is to determine the visual and audial reaction times of male and female football national team athletes and to evaluate them in terms of gender in different sports branches among elite level athletes in the literature. For this purpose, studies conducted with different sports branches (football, volleyball, handball, hockey, skiing, athletics, fencing, karate) in the literature and using the same measuring instrument (Newtest) were discussed.

According to our research findings, the average of the reaction values of male footballers was 193.46 ± 15.37 ms for the right and 191.10 ± 23.55 ms for the left; The auditory reaction mean is 171.40 ± 26.45 ms, 165.23 ± 27.37 ms for the right. The visual reaction values of the female football players participating in the research were 187.66 ± 7.14 ms for the right, 210.44 ± 47.96 ms for the left; Audial reaction average was found 217.72 ± 69.30 ms for the right and 204.05 ± 49.13 ms for the left (Table 2).

As a conclusion, in our study, it was determined that the visual and audial reaction times, which are the main determinants of the performance, are lower in favor of males than in females in the U 17 Football National Team Athletes. Besides these, it has been reviewed that the reaction in which different sports branches at elite level in the literature have different results by gender did not change according to gender. The reaction time, which is also considered as the intuition ability to act before the opponent in the action according to the opponent, is one of the determining factors in most sports and is considered to be developed by regular training.

Keywords: Sport, Gender, Visual Reaction, Auditory Reaction, Football

Öz: Futbolcuların fiziksel ve fizyolojik özellikleriyle ilgili çok sayıda çalışma olmakla birlikte, futbolcuların reaksiyon özelliklerini anlatan özellikle de cinsiyetleri karşılaştıran çalışmaların oldukça sınırlı olduğu söylenebilir. Bu çalışmanın amacı erkek ve kadın futbol milli takım sporcularının görsel ve işitsel reaksiyon sürelerinin cinsiyet açısından değerlendirilmesidir. Bu araştırmaya U 17 Erkek ve Kadın Futbol Milli Takımında oynayan erkek (n=30; yaş 16.54 ± 2.10 yıl; boy uzunluğu 176.60 ± 6.81 cm; vücut ağırlığı 69.20 ± 8.97 kg) ve kadın (n=18; yaş 17.44 ± 1.81 yıl; boy uzunluğu 163.72 ± 5.45 cm; vücut ağırlığı

54.23±6.48 kg) futbolcu katılmıştır. Katılımcılara görsel ve işitsel reaksiyon testleri uygulanmıştır. Elde edilen veriler aritmetik ortalama, standart sapma, minimum ve maksimum olarak sunulmuştur. Tüm istatistiksel değerlendirmeler SPSS 21 paket programı yardımıyla yapılmıştır. Yapılan incelemede erkek futbolcuların görsel reaksiyon değerleri sağ el: 193.46±15.37 ms; sol el: 191.10±23.55 ms; işitsel reaksiyon değerleri ise sağ el: 171.40±26.45 ms; sol el 165.23±27.37 ms olarak tespit edilmiştir. Kadın futbolcuların ise; görsel reaksiyon değerleri sağ el: 187.66±47.14 ms; sol el: 210.44±47.96 ms; işitsel reaksiyon değerleri sağ el: 217.72±69.30 ms; sol el 204.05±49.13 ms olarak tespit edilmiştir. Sonuç olarak, performansın temel belirleyicilerinden olan görsel ve işitsel reaksiyon sürelerinin U 17 Futbol Milli Takım Sporcularında kadınlara göre erkekler lehine daha düşük olduğu tespit edilmiştir. Ayrıca, literatürdeki elit düzeydeki farklı spor branşlarında da cinsiyete göre farklı sonuçlar elde edildiği, reaksiyonun cinsiyete göre değişmediği görülmüştür.

Anahtar Kelimeler: Spor, Cinsiyet, Futbol, Görsel Reaksiyon, İşitsel Reaksiyon.

Introduction

Sporting performance is the whole effort of the athlete to fulfill his sporting duty in the face of many internal and external factors. Parameters such as sports performance and fitness of the athlete to the sport and the position played in sports, effectiveness and efficiency of the training program are evaluated (Bayraktar and Kurtoğlu, 2009).

'Reaction time', defined as the time elapsed between the time when the stimulus begins and the time when the reaction begins, is one of the determinants of performance in modern football and is closely related to the ability of the players who are under the pressure of the field, time and opponent to have quick decision making (İmamoğlu and Kılıçgil, 2007) is an indication of how quickly athletes can think, plan and do their actions. It is known that athletes with a short reaction time have great advantages in responding to their rival attacks in order to think fast and make decisions quickly (Kaplan et al., 2018). Reaction time is the determining factor in most sports and can be improved with regular training (İmamoğlu and Kılıçgil, 2007).

The reaction speed is affected by factors such as age, gender, nutrition, physical activity level and fatigue. It is stated that the athletes in different branches differ and the athletes have a better reaction speed than the sedentary ones (Bavlı, 2011). The reaction time differs according to gender, depending on the sport and work done (Keçelioğlu and Akçay, 2019). Compared to gender in terms of reaction times, men have lower values than women (Adam et al., 1999). However, regular exercises eliminate the difference between genders (Jain et al., 2015). Visual and auditory tests and researches have been carried out regarding the reaction time. Although mostly differences between men and women were seen as better in favor of men, different results appeared on the significance (Gürsoy et al., 2017).

Based on the above information, the purpose of this study is to determine the visual and auditory reaction times of male and female football national team athletes.

Material and Method

This research was realized with 30 male football players with an average age of 16.54±2.10 years, height 176.60±6.81 cm, body weight 69.20±8.97 kg, playing in the U 17 Men's and Women's Football National Team; their average age was 17.44±1.81 years, their height was 163.72±5.45 cm; It was completed with 18 female footballers with a body weight of 54.23±6.48 kg. Ethics committee report was received from Bilecik Şeyh Edebali University Ethics Committee before the study started (2020/8/25). After all volunteers were verbally informed before they were included in the study, their voluntary permissions were taken in written paper.

Height Measurement

Height was measured with "Holtain, England" device. The measurements were taken with bare feet in the "Frankfort Horizontal Plan" position, with the arms on the side of the body, with the palms facing the legs, while the person's body weight was evenly distributed on both legs (Akin et al. 2004).

Weight

Body weight was determined by Tanita MC-780 (Japan) brand body fat analyzer. Measurements were taken before breakfast, without any nutrients. Measurements were held while the participants were wearing shorts and T-shirts. The metal and ornaments on the volunteers were removed and the player to be measured was asked to grasp the hand electrodes by standing in the vertical position by pressing the aluminum insoles of the analysis tool with a bare foot, wearing a light suit. Before each player is on the platform, the metal parts of the platform that are in contact with the hands and feet are wiped with a moist duster (Özer, 2001).

Reaction Time

Visual and audial reaction time measurements of volunteers were performed on the instrument with their right and left hands (Newtest 1000), which they used dominantly. After the trials, each measurement was repeated three times and the best grade was calculated. Measurements were made with an accuracy of 0.01 sec (Hasdemir et al., 2003).

Statistical Analysis

The data obtained are presented as arithmetic average, standard deviation, minimum and maximum. All statistical evaluations were made with the help of SPSS 21 package program.

Findings

Table 1: Physical Characteristics of Football Players

Variances	Gender	n	$\bar{x} \pm sd$	Min.	Max.
Age (year)	Male	30	16.54±2.10	16.00	17.00
	Female	18	17.44±1.81	15.00	17.00
Height (cm)	Male	30	176.60±6.81	163.00	193.00
	Female	18	163.72±5.45	152.00	173.00
Body Weight (kg)	Male	30	69.20±8.97	57.00	72.00
	Female	18	54.23±6.48	41.00	59.00

\bar{x} : average, sd: Standard deviation, min: minimum, max: maximum

When Table 1 is examined; The average age, height and body weight of male football players (n: 30) are 16.54±2.10 years, 176.60±6.81 cm, 69.20±8.97 kg, respectively; The average of age, height and body weight of female football players (n: 18) are 17.44±1.81 years, 163.72±5.45 cm, 54.23±6.48 kg respectively.

Table 2: Reaction Measurement Values of Female Football Players

Variations	Gender	Hand Choice	n	$\bar{x} \pm sd$	Min.	Max.
Visual Reaction (ms)	Male	Right	30	193.46±15.37	170.00	235.00
	Female	Right	18	187.66±47.14	54.00	249.00
	Male	Left	30	191.10±23.55	129.00	235.00
	Female	Left	18	210.44±47.96	80.00	318.00
Audial Reaction (ms)	Male	Right	30	171.40±26.45	123.00	240.00
	Female	Right	18	217.72±69.30	84.00	377.00
	Male	Left	30	165.23±27.37	126.00	277.00
	Female	Left	18	204.05±49.13	134.00	336.00

\bar{x} : average, sd: Standard deviation, min: minimum, max: maximum

When Table 2 is examined, the average visual reaction values of male football players participating in the study were 193.46±15.37 ms for the right and 191.10±23.55 ms for the left; Audial reaction is 171.40±26.45 ms, 165.23±27.37 ms for average for right. The visual reaction values of the female football players participating in the research were right 187.66±47.14 ms, 210.44±47.96 ms for the left; audial reaction average is 217.72±69.30 ms for right and 204.05±49.13 ms for left.

Discussion and Conclusion

The purpose of this study was to determine the visual and audial reaction times of male and female football national team athletes and to compare them in terms of gender in different sports branches among elite level athletes in the literature. For this purpose, studies conducted with different sports branches (football, volleyball, handball, hockey, skiing, athletics, fencing, karate) in the literature and using the same measuring instrument (Newtest) were discussed. According to our research findings, the average of the reaction values of male footballers was 193.46±15.37 ms for the right and 191.10±23.55 ms for the left; The auditory reaction mean is 171.40±26.45 ms, 165.23±27.37 ms for the right. The visual reaction values of the female football players participating in the research were 187.66±47.14 ms for the right, 210.44±47.96 ms for the left; Audial reaction average was found 217.72±69.30 ms for the right and 204.05±49.13 ms for the left (Table 2).

In a study with male and female athletes in different sports branches; it has been observed that in the branches of Basketball, Volleyball, Football, Handball, Hockey, female footballers perform similarly with men in all other branches and reaction times, except for auditory reaction times (Kaplan et al., 2018).

In the visual and auditory reaction values of Alpine Discipline Ski National Team athletes with an average age of 19, consisting of 37 males and 37 females (Male right hand light 33.83±10.29 sl, left hand light 40.48±14.24 sl, right hand sound 37.13±15.68 sl, left hand sound 32.67±10.78 sl; Female right hand light 32.43±8.55 sl, left hand light 35.75±9.85 sl, right hand sound 33.40±13.51 sl, left hand sound 26.89±8.38 sl), no difference has been reported according to gender, but females appear to reach lower values (Musabaşoğlu, 2008).

When the reaction values of the average 16-year-old elite 16 male and 15 female athletes skiing and athletics at the National Team Level are examined (Ski Female right hand light 16.12±2.53 sl, left hand light 17.25±4.62 sl, the best average of both hands against sound 16.25±5.44 sl; Athletics Female right hand light 18.85±4.74 sl, left hand light 18.00±4.16 sl, best average of both hands against sound 17.42±2.43 sl; Ski Male right hand light 14.14±2.79 sl, left hand light 15.14±2.96 sl, The average of both hands against the sound is 15.00±1.63 sl; Athletics Male right hand light is 16.22±3.70 sl, the left hand light is 16.55±4.47 sl, the average of both hands is 15.88±2.26 sl), but there is no difference between skiers. As a result; females' appear to have lower values (Zepak, 2018).

They revealed that the average reaction time of 18 elite fencers (9 females and 9 males), consisting of stars and young people aged 14-19 years old, was 204.11 ± 16.04 ms in females at rest, and 171.00 ± 16.06 ms in males, and reported that males had a lower reaction average (Duvan et al., 2010).

In the study completed on the athletes in the Fencing and Karate National Team, the reaction time average of male fencers was 356.49 ± 38.50 ms, the reaction time average of female fencers was 397.11 ± 32.11 ms, the average of male karate players' reaction time was 399.00 ± 72.50 ms, female karate players' reaction time They determined the average as 396.84 ± 30.23 ms and reported better reaction averages of males in fencing and females in karate (Kocahan et al., 2018).

The visual reaction time of the Turkish National Badminton Team under the age of 19 in women is 126.6 ± 15.00 ms, left is 135.00 ± 20.7 ms; Audial reaction times right 118.3 ± 11.6 ms, left 126.6 ± 16.3 ms; in men, the reaction time of the right 135.6 ± 15.01 ms, left 130.00 ± 10.6 ms; Audial reaction times were found to be 118.7 ± 13.5 ms right and 131.2 ± 13.5 ms left, and females were reported to have lower reaction values (Şenel et al., 1998).

As a conclusion, in our study, it was determined that the visual and audial reaction times, which are the main determinants of the performance, are lower in favor of males than in females in the U 17 Football National Team Athletes. Besides these, it has been reviewed that the reaction in which different sports branches at elite level in the literature have different results by gender did not change according to gender. The reaction time, which is also considered as the intuition ability to act before the opponent in the action according to the opponent, is one of the determining factors in most sports and is considered to be developed by regular training.

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