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Investigation of the Effect of Doing Sports Frequency on Fear of Covid-19

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Abstract

Examining the novel type of corona virus (COVID-19) fear levels of female and male athletes constitutes the purpose of this study. The screening method, which is one of the quantitative research models, has been adopted in the study. The population of the research is composed of volunteer individuals (n=139) who are actively engaged in sports in the various sports clubs and different disciplines in the districts of Istanbul province, on the European coast (Küçükçekmece, Bakırköy, Zeytinburnu). All the data have been collected in an online environment by applying the questionnaire technique. The COVID-19 Fear Scale of athletes has been utilised as a data collection tool. T-test and single-way ANOVA analyses have been utilised as statistical procedures since it has been determined that the data are normally distributed. No significant discrepancy is found between the fear of COVID-19 levels of athletes according to their gender, age, education level, chronic disease level, training status, financial level of their families, sports branch and years of participation in sports. Depending on the number of training days per week of the athletes, a significant difference has been identified between the levels of fear of COVID-19. The weekly training frequency affects the level of fear of COVID-19. For instance, the decrease in fear levels in people who train 5 or more days a week may be due to the fact that the people concerned are exposed to COVID-19 more as they go out and thus their anxiety decreases. People who maintain a routine may also be less afraid of COVID-19 than those who socialise less. That is because such persons go out 5 or more days a week, maintain their routines and socialise at the same time, which may have an adverse effect on their level of fear and cause them to feel less fear.

Keywords: COVID-19, level of fear, athletes

INTRODUCTION

The COVID-19 pandemic, originating in Wuhan, China in December 2019, has rapidly spread and affected throughout China (20). In accordance with the preliminary assessments conducted by Chinese doctors, it has been concluded that COVID-19 is a potentially fatal disease, as the symptoms are similar to those of severe acute respiratory syndrome (SARS) (27). The symptoms of COVID-19 in individuals have been identified as diarrhoea, fever, shortness of breath, cough, headache and muscle pain (26).

Soon after the outbreak in China, the pandemic began to affect the rest of the world (16). Announcing that the globe is encountering a significant challenge, the World Health Organisation (WHO) has declared the outbreak as a pandemic (28). The virus has infected nearly 52 million individuals worldwide and caused more than 1.28 million fatalities, despite the measures such as distancing between people and the remote attendance of education and training institutions worldwide to prevent the spread of the virus (WHO Coronavirus Disease (COVID-19) Dashboard, n.d.). As the world struggles with the COVID-19 pandemic, the sports community has also been affected by the crisis caused by COVID-19. Many adverse events such as athletes in quarantine due to the social distancing rule, cancelled competitions and postponed important events have been encountered (14).

As Kilcigil (1985) states, sports; It is defined as all of the socio-cultural, cognitive and physical activities, including struggle, performed individually or as a team, using many recreational and competitive materials with certain rules (5,18). The fact that athletes are mentally fit for the competitions and contests they have participated in so as to optimise their physical and cognitive conditions and skill capacities against all kinds of challenges are among the key factors that lead to achievement in sports (25). Furthermore, the cancellation or rescheduling of sports events has adversely impacted the athletes participating in the competitions both socially and psychologically (24).

For the duration of the pandemic, the cancellation of the events to be conducted during the pandemic and schedule changes caused concern for the athletes. They also wondered how their opponents were training during the pandemic. During the pandemic, the state of anxiety varies from individual athletes. The state of anxiety is much more frequent in adolescents and underachieving athletes. Throughout the pandemic, irregularities in conditions such as sleep, and nutrition have been observed in athletes. Regular, planned and scheduled physical activities are reported to have positive effects in reducing psychological problems such as stress, depression, anxiety, and fear (6).The fact that the training areas of the athletes are closed and that they mostly spend their time in the home has caused irregularities in their nutritional habits (11). In such an adverse course of events, it has become nearly inconceivable not to experience fear.

The fear is labelled as an undesirable emotional state that is induced by the perception of a threatening stimulus (10). In contrast, Apaydın describes fear as a fundamental impulse that can be encountered by all and as an affective reactivity to a physical or psychological condition that emerges abruptly (3). Along with the physical impacts of the COVID-19 pandemic, its psychological impacts are known to be significant (21). COVID-19 induced fear heightens the distress of people who are physically and psychologically sound, and further exacerbates the disorders of people with pre-existing psychological disorders (23). Where individuals who are not affected by the pandemic may tend to feel unwell and to be suicidal in cases caused by fear. 15).

Furthermore, there are no accurate projections regarding the length of the pandemic, the exact number of people infected with the disease worldwide, or the severity to which it will disrupt the lives of individuals (29). This may naturally provoke psychological conditions such as loneliness, anger, sadness, anxiety, frustration, guilt, helplessness and fear, as well as material and moral repercussions of the condition, such as quarantine, social distancing and isolation. Such circumstances constitute the major commonly shared attributes of psychological distress that people may face before and after unusual events (2).

It has become crucial determining the fear levels of athletes against COVID-19 pandemic by considering the COVID-19 pandemic on top of the physical and psychological phases they have been undergoing. In the light of such considerations, the disruption of the training processes, the fear of lack of performance, the distress suffered during the pandemic, and the emotional complexity perceived during the COVID-19 pandemic will affect the fear states. Over the course of the pandemic, numerous activities and athletes have been affected. Therefore, examining the fear states of athletes during the epidemic period remains essential. This study was conducted with the aim of examining the COVID-19 fear status of athletes.

MATERIAL AND METHOD

Research modelling

Screening method, of quantitative research models, has been utilised in this study. The situations and events in quantitative research are quantified in a way that different people can agree on by consensus, by making them available to the common senses (7), and moreover, the study can be illustrated with numerical data through this method (8). The screening method can be defined merely as a method aiming to depict the present situation with no modifications (17).

Population and Sample of the Study

The population in our study, which has been carried out to identify the fear levels of athletes to the novel type of corona virus (COVID-19), is composed of individuals who are actively engaged in sports in various sports clubs and different branches in Bakırköy Zeytinburnu and Küçükçekmece districts of Istanbul province. A total of 139 athletes, 41 women and 98 men, volunteered to participate in the study.

Scale for Fear of COVID-19

A personal information form consisting of nine questions was compiled by the researcher after

reviewing the relevant literature on the subject and included questions about demographic characteristics (gender, age, education level, number of years of sport, financial status of the family, sport branch, whether there is any chronic disease, whether they train or not, how many days a week they train).

For the purpose of identifying the fear levels of the participants regarding COVID-19, the fear of COVID-19 scale designed by Ahorsu et al. (2) and adapted by Satıcı et al. (22) for the Turkish society has been adopted in the study.

The scale comprises 7 items and is single scaled. The scale items ranged from 1 (strongly disagree) to 5 (strongly agree). The maximum scale score is 35 while the minimum is 7. A high score indicates an excessive fear of COVID-19, while a low score indicates a low fear of COVID-19. Cronbach alpha internal consistency coefficient for the Turkish form of the scale is .84. For the current study, it is calculated as .87.

Statistical Analysis

In the analysis, using the SPSS25.0 package programme, the data collected from the personal information form and the data on the athlete's fears of contracting the new coronavirus (COVID-19) are processed and analysed through the programme. The participants' personal information was presented with frequency (f) and percentage (%) values. For groups larger than 50, the normal distribution curve, skewness and kurtosis values and histograms were analysed to check the normal distribution curve. Since the data are statistically conformed to normal distribution, T-test and One-way ANOVA analyses have been utilised to test the hypotheses formulated for the purpose of the research.

FINDINGS

Table 1. Demographic Characteristics of Participants

Personal Details	Variables	F	%
Your Gender	Female	41	29,5
	Male	98	70,5
Your Age	18-20	26	18,7
	21-23	42	30,2
	24-26	23	16,5
	27-29	18	12,9
	30 and higher	30	21,6
Your Educational Background	Primary	1	0,7
	Secondary	1	0,7
	High School	22	15,8
	Undergraduate	105	75,5
	Postgraduate	10	7,2
For how many years have you been practising sport?	1 to 3 years	19	13,7
	4 to 6 years	23	16,5
	7 to 9 years	28	20,1
	10 to 12 years	25	18,0
	13 and higher	44	31,7
Can you describe your family's financial situation?	Poor	1	0,7
	Middle	83	59,7
	Good	53	38,1
	Very Good	2	1,4
What is the branch of sport you do?	Volleyball	40	28,8
	Football	81	58,3
	Basketball	18	12,9
Do you have any chronic illnesses?	Yes	9	6,5
	No	130	93,5
Do you train?	Yes	87	62,6
	No	52	37,4
If yes, how many days a week do you train?	1 to 2	84	60,4
	3 to 4	35	25,2
	5 and higher	20	14,4

It can be observed in Table 1 that 70.5% of the athletes participating in the study were male and 29.5% were female. Analysing the data regarding the age variable, 18.7% of the athletes were 18-20 years old, 30.2% were 21-23 years old, 16.5% were 24-26 years old, 12.9% were 27-29 years old and 21.6% were 30 and over. Considering the data on the educational background of the participants, it can be observed that 0.7% of the athletes are primary school graduates, 0.7% are secondary school graduates, 15.8% are high school graduates, 75.5% are university graduates and 7.2% are postgraduate graduates. Examining the data on the variable "For how many years have you been practising sport?", it can be observed that 13.7% of the athletes have been doing sports for 1-3 years, 16.5% for 4-6 years, 20.1% for 7-9 years, 18.0% for 10-12 years, and 31.7% for 13 and more years. As regards the family financial status variable, it can be observed that 0.7% of the athletes were at a poor condition, 59.7% were at a medium condition, 38.1% were at a good condition and 1.4% were at a very good condition. Based on the branch variable, it can be observed that 28.8% of the athletes were volleyball, 58.3% were football and 12.9% were basketball. Examining the athletes according to the variable "Do you have any chronic illnesses?", it can be observed that 6,5% of them have chronic diseases and 93,5% of them do not have any chronic diseases. Regarding the variable of training, it can be observed that 62.6% of the athletes were engaged in sports while 37.4% of the athletes were not. Based on the variable of how many days a week the athletes train, it can be observed that 60,4% of the athletes train 1 to 2 days, 25,2% of the athletes train 3 to 4 days and 14,4% of the athletes train 5 or more days a week.

Table 2. T-Test Analysis Findings of Fear Levels of Novel type Corona Virus (COVID-19) Based on Gender Variables of Athletes

Gender	N	X	Ss	T	P
Male	98	16,60	6,68	-.402	.68
Female	41	16,14	5,83		

*P<0.05

It can be observed upon the examination of Table 2 that there is no significant difference between the novel type of corona virus (COVID-19) fear levels of the athletes and between men and women (p>0.05).

Table 3. T-Test Analysis Findings of Fear Levels of Novel Type Corona Virus (COVID-19) Based on the Variable of Whether Athletes Have Chronic Diseases

Do you have any chronic illnesses?	N	X	Ss	T	P
Yes	9	14,5	6,62	-.976	.33
No	130	16,6	6,04		

*P<0.05

It can be observed upon the examination of Table 3 that there is no significant difference between the novel type of corona virus (COVID-19) fear levels of the athletes according to the variable of whether the participants have a chronic disease (p>0.05).

Table 4. T-Test Analysis Findings of Fear Levels of Novel type Corona Virus (COVID-19) Based on the Variable of Training Status of Athletes

Training Status	N	X	Ss	T	P
Yes	87	16,64	6,01	.441	.66
No	52	16,17	6,23		

*P<0.05

It can be observed upon the examination of Table 4 that there is no significant difference between the novel type of corona virus (COVID-19) fear levels of the athletes according to the training status variable of the participants (p>0.05).

Table 5. ANOVA Test Findings of Fear Levels of Novel type Corona Virus (COVID-19) Based on Age Variables of Athletes

Extent	Age Group	N	X	Ss	F	P	Significant Difference
Athletes' Fear of COVID-19	18-20	26	15,42	7,15	.641	.63	-
	21-23	42	16,24	6,89			
	24-26	23	16,17	5,15			
	27-29	18	18,28	5,55			
	30 and higher	30	16,83	4,78			

*P<0.05

It can be observed upon the examination of Table 5 that there is no significant difference between the novel type of corona virus (COVID-19) fear levels of the athletes and their education backgrounds according to the age variable of the participants (p>0.05).

Table 6. ANOVA Test Findings of the Fear Levels of Novel type Corona Virus (COVID-19) Based on the Educational Status Variable of Athletes

Extent	Educational Background	N	X	Ss	F	P	Significant Difference
Athletes' Fear of COVID-19	Primary	1	20,00	.	1,959	.10	-
	Secondary	1	25,00	.			
	High School	22	14,18	1,23			
	Undergraduate	105	16,56	,59			
	Postgraduate	10	19,30	1,76			

***P<0.05**

It can be observed upon the examination of Table 6 that there is no significant difference between the novel type of corona virus (COVID-19) fear levels of the participants and the variable of educational background (p>0.05).

Table 7. ANOVA Test Findings of Fear Levels of Novel type Corona Virus (COVID-19) Based on Sports Branch Variables of Athletes

Extent	Sport Branch	N	X	Ss	F	P	Significant Difference
Athletes' Fear of COVID-19	Volleyball	40	17,12	6,81	.331	.72	-
	Football	81	16,17	5,73			
	Basketball	18	16,33	6,11			

***P<0.05**

It can be observed upon the examination of Table 7 that there is no significant difference between the novel type of corona virus (COVID-19) fear levels of the participants and the variable of sports branch (p>0.05).

Table 8. ANOVA Test Findings of Fear Levels of Novel type Corona Virus (COVID-19) Based on the Variable of Athletes' Year of Practising Sports

Extent	For how many years have you been practising sport?	N	X	Ss	F	P	Significant Difference
Athletes' Fear of COVID-19	1 to 3 years	19	15,16	7,40	2,377	.06	-
	4 to 6 years	23	14,22	5,47			
	7 to 9 years	28	15,96	6,73			
	10 to 12 years	25	19,04	5,91			
	13 and higher	44	17,06	4,94			

***P<0.05**

It can be observed upon the examination of Table 8 that there is no significant difference between the novel type of corona virus (COVID-19) fear levels of the participants and the year of doing sports (p<0.05).

Table 9. ANOVA Test Findings of Fear Levels of Novel type Corona Virus (COVID-19) Based on Financial Status Variable of Athletes

Extent	Financial Status	N	X	Ss	F	P	Significant Difference
Athletes' Fear of COVID-19	Poor	1	20,00	.	.846	.47	-
	Medium	83	17,05	6,25			
	Good	53	15,58	5,87			
	Very Good	2	14,00	,0			

***P<0.05**

It can be observed upon the examination of Table 9 that there is no significant difference between the novel type of corona virus (COVID-19) fear levels of the participants and the financial status variable (p>0.05).

Table 10. ANOVA Test Findings of Fear Levels of Novel Type Corona Virus (COVID-19) Based on Weekly Training Frequency Variable of Athletes

Extent	Sport Branch	N	X	Ss	F	P	Significant Difference
Athletes' Fear of COVID-19	1 to 2	84	17,03	6,08	4.755	.01	+
	3 to 4	35	17,26	1,01			
	5 and higher	20	12,70	1,13			

***P<0.05**

It can be observed upon the examination of Table 10 that there is a significant difference between the novel type of corona virus (COVID-19) fear levels of the participants and the training frequency variable ($p<0.05$).

DISCUSSION AND CONCLUSION

There have been some setbacks in sports activities, occupying an important place in the daily lives of individuals in such times with restrictions in some aspects of our lives due to the COVID-19 outbreak. Such setbacks have not only affected individuals but also many sports, which has become an important sector in the whole world and in our country. It has also impacted the audience profoundly as well as those who are engaged in sports activities. Subsequent to the spreading of the outbreak, in order to ensure that individuals involved in sports are not affected by the outbreak, sports events have been halted for a period of time. The resumption of sports events during the period when the conditions of the epidemic continued caused fear among individuals. Thus, it has caused discomfort both among individuals who do and do not engage in sports accordingly.

The purpose of the study conducted in the light of the information we have provided is to analyse and assess the COVID-19 fear levels of male and female athletes in terms of some variables, as the COVID-19 pandemic has affected the whole world.

Depending on the gender variable of female and male athletes, it can be observed that there is no significant difference between the novel type of corona virus (COVID-19) fear levels of athletes and female and male athletes. The mediating role of gender in fear of COVID-19, intolerance of uncertainty, depressive state, anxiety and stress has been evaluated in the literature, and the research has been undertaken with the participation of 960 people aged between 18-76 years. The study found that women's fear of COVID-19 was higher than men's fear of COVID-19 (4).

A significant difference was not determined in the corona virus fear levels of the participants compared to the presence or absence of a chronic disease in female and male athletes as a result of the research. Individuals with chronic diseases had higher coronavirus fear levels in the study of Bakioğlu, Korkmaz, and Ercan (2020). It has also been established in a study conducted to evaluate situations such as anxiety, fear, worry and loss of health during the COVID-19 outbreak in our country that accompanying chronic diseases pose a risk for health anxiety (19).

There are similar and moderate levels of fear of COVID-19 in male and female athletes. Another study conducted during the pandemic period showed no significant difference between the COVID-19 anxiety levels of male and female teachers (9).

When the educational status variables of female and male athletes were compared, the difference between the fear levels of the variables between primary education and postgraduate educational background were not found to be significant. Postgraduates were not found to have a significant difference between the fear levels of athletes with primary, secondary, high school, undergraduates and postgraduates. Educational background was not found to affect the level of fear in the study.

Regarding the fear levels of female and male athletes for COVID-19 according to the age variable, no significant difference was observed. In the study conducted by Erbaş and Küçük (2012) on elite basketball players, they examined the ages of the athletes in a chronological order and found that there was no significant difference in this regard (13).

The COVID-19 fear levels of female and male athletes based on the sport branch variable did not show a significant difference. The fact that the fear and anxiety states of athletes differ according to the sports branches they have done is a scientific phenomenon. According to the study conducted by Ağduman (2021) on the anxiety of athletes regarding

contracting COVID-19, it has been concluded that individuals who are engaged in team sports have higher anxiety levels than individuals who are engaged in individual sports (1).

Given the variable of training status of female and male athletes, it was observed that there was no difference between COVID-19 fear levels according to whether they were training or not. The fact that those who do not train have a higher level of fear than those who do is a scientific fact. Extraordinary circumstances such as the large-scale cancellation or rescheduling of major tournaments and competitions due to the pandemic have occurred. Such extraordinary developments resulted in the suspension of the training facilities and the cancellation of the training sessions. The athletes are uncertain about the time when the pandemic ends and when the social transition will take place. Therefore, athletes have continued their training by utilising outdoor spaces instead of indoor facilities.

The weekly training frequency variable of female and male athletes showed a significant difference between the novel type of corona virus (COVID-19) fear levels and the training frequency variable. This may be due to the fact that the frequency of weekly training varies in COVID-19 fear levels and the least fear level is observed in those who train 5 or more times a week, as people are more exposed to COVID-19 as they go out, thus their anxiety decreases. It may also be that people who maintain their routine are less afraid of the Coronavirus than those who are less likely to socialise. This may be explained by the fact that people who go out 5 or more days a week and keep their routines and engage in social activities at the same time may have a reverse effect on their level of fear, causing them to feel less fear.

Gender of female and male athletes does not differ between the levels of fear of COVID-19 according to their gender, and there is no difference between the fear levels of women and men. No difference was observed between the level of fear of COVID-19 according to the education level of the athletes, and athletes with high education levels did not show variability compared to athletes with low education levels. The athletes' level of fear of Covid-19 did not differ according to whether or not they had a chronic disease. No difference between the levels of fear of COVID-19 depending on whether the athletes are training or not, and those who do not train do not have a change in their fear levels compared to those who train. A difference was not revealed between the COVID-19 fear levels of the athletes with respect to their age, sports branch and years of engaging in sport activities.

All in all in conclusion, it should be noted that the fear of COVID-19 generates numerous adverse feelings and behavioural patterns in individuals. Uncertainty in mood regulation can also lead to overwhelming emotions, which tend to be outwardly expressed (12). Consequently, to be able to reflect on the demanding circumstances of the COVID-19 pandemic and to make such a situation much more favourable, it would be crucial to conduct training programmes in addition to exploring the fear levels of the athletes and providing the necessary psychological guidance.

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UEFA EURO 2020: An Analysis on The First Goal and The First Half Lead in Football Matches

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Abstract

This study was carried out in order to analyze the goals scored in the competitions played in the UEFA EURO 2020 tournament and to examine how finishing the first half affects the outcome of the matches.In the research, a total of 142 goals scored in 51 matches played in the tournament, the distribution of goals in 15-minute periods, the contribution to the score by starting in the first 11 and coming from the bench, and the effect of finishing the first half ahead on the results of the matches were examined.The time interval for the most goals scored in competitions is 46-60. minutes (30 goals - 21.13%).In all the matches played in the tournament, the majority of the goals scored, such as 88.9%, were scored by the players who started the matches in the first 11.In all the matches played in the tournament, 73.33% of the teams that finished the first half ahead and 71.43% of the teams that scored the first goal left the matches with victory.As a result, based on the findings of the research, it can be said that reaching the first goal in the competitions and finishing the first half of the match emerge as a very important criterion in high-level tournaments such as the European Championship, where competitions with high difficulty levels are played.

Keywords: Football, EURO 2020, Competition, Analysis, Goal.

UEFA EURO 2020: Futbol maçlarında ilk gol ve ilk yarıyı önde bitirme üzerine bir analiz

Özet

Bu çalışma, UEFAEURO 2020 turnuvasında oynanan müsabakalarda atılan gollerin analiz edilmesi ve ilk yarıyı önde bitirmenin maçların sonucuna nasıl bir etki ettiğinin incelenmesi amacıyla yapılmıştır. Araştırmada, turnuvada oynanan 51 karşılaşmada atılan toplam 142 gol, gollerin 15'er dakikalık periyotlar halindeki dağılımı, ilk 11'de başlayıp ve yedekten gelip skora katkı sağlama ve ilk yarıyı önde bitirmenin maçların sonucuna etkisi açısından incelenmiştir. Müsabakalarda en fazla golün atıldığı zaman aralığı, 46-60.dakikalar (30 gol - 21.13%) arasındaki periyottur. Turnuvada oynanan tüm müsabakalarda, atılan gollerin %88.9 gibi çok büyük bir çoğunluğu maçlara ilk 11'de başlayan oyuncular tarafından atılmıştır. Turnuvada oynanan tüm maçlarda, ilk yarıları önde tamamlayan takımların %73.33'ü, ilk golü atan takımların ise %71.43'ü müsabakalardan galibiyetle ayrılmıştır. Sonuç olarak, araştırmada ortaya çıkan bulgulardan hareketle, zorluk düzeyi yüksek müsabakaların oynandığı karşılaşmalara sahne olan Avrupa Şampiyonası gibi üst düzey turnuvalarda, müsabakalarda ilk gole ulaşmanın ve karşılaşmanın ilk yarısını önde bitirmenin çok önemli bir kriter olarak ortaya çıktığı söylenebilir.

Anahtar Kelimeler: Futbol, EURO 2020, Müsabaka, Analiz, Gol.

INTRODUCTION

Football is a team sport played with other parts of the body, excluding the hand, within the framework of certain rules and under certain field conditions, and the result is determined by goals scored or conceded (15). Today, FIFA (Federation Internationale de Football Association) has more member countries than the United Nations, in football, which has turned from a small sport to a worldwide popular phenomenon(25).Football is the most popular sport in the world and football performance depends on numerous factors.In football, players may not need to have outstanding capacity in any of these performance areas, but they should have a reasonable level in all areas (26).

In football, high-level tournaments such as the World Cup and the European Championship are held.The sample of this study is EURO 2020.EURO 2020 is the 16th European Football Championship tournament.In EURO 2020, national teams of 24 countries competed.The champion of the tournament was Italy, who defeated England with a penalty shootout in the final match (27).

Analysis methods based on scientific foundations have gained importance in football, which is an indispensable sport of today. From this point of view, it is clearly seen that match analysis is an indispensable performance evaluation method in football in terms of increasing the field performance and achieving success (8). Competition analysis can be mentioned as a tool developed in order to objectively record the data emerging in the competitions, to determine what the movements are and to obtain accurate statistical results (22).

The purpose of competition analysis is to increase the efficiency of our team and "how can we be successful?" is to answer the question. The measurement, evaluation, analysis and interpretation of the goals of athletes and team performances is an integral part of the scientific training and development of top-level teams. It is useful to analyze the data obtained from the competitions for the success of our team and to prepare a plan-program according to the result(13).

Aguado-Méndez et al 2021 states that when analyzing rival teams in matches, the most important elements to be studied are the phases of the competition and the analysis of strengths and weaknesses.On the other hand, Zileli et al 2017 states that it is an undeniable fact that the statistics obtained as a result of the competition analyzes do not fully explain the score and provide information about the process. At this point, they emphasize that the important thing is that the coach and his team set out from a correct analysis and what they see and how they benefit from the analysis in this process.

One of the biggest benefits of competition analysis is that many parameters that make up football are separated and recorded on a regular basis while evaluating the performance, and it makes it possible to evaluate the team's movements during the match numerically (6).Scored goals have always been very important variables for analyzing the performance of teams in sports games, tournaments and championships (19). In low scoring sports like football, scoring the first goal in a match can be very important to winning the match (24). From this point of view, the aim of this study is to analyze the goals scored in the competitions played in the UEFA EURO 2020 tournament and to examine how the first half has an effect on the outcome of the matches.

Method

In this paper, UEFA EURO 2020 competitions were analyzed and examined with respect to diverse variables. The data which was used in analysis for this research was gathered from the UEFA's (Union of European Football Associations) official web site (https://www.uefa.com/).

The parameters taken into consideration were:

a) Time periods of goals (Divided into 15 minutes long 6 periods: 1st-15th min., 16th-30th min., 31th-45th min., 46th-60th min., 61st-75th min., 76th-90th min.)

b) Starting in first 11 or contribution to score joining from the bench

c) The effect of scoring the first goal on the outcome of the match

d) The effect of leading the first half on the outcome of the match

Time periods of goals, contributing to score joining from the bench, starting in first 11 or contribution to score joining from the bench, the effect of scoring the first goal on the outcome of the match, the effect of leading the first half on the outcome of the match were manually analyzed with the pen and paper method. The obtained data were coded into the table with the manually. Data gathered was saved into the SPSS program, statistically interpreted with frequency and percentage calculations.

RESULTS

In this research, 51 (UEFA EURO 2020) competitions were analyzed and studied with respect to diverse variables. Goals scored are found as shown below in tables according to the goals' time periods, players starting in first 11 or joining from the bench and contributing to the score, the effect of scoring the first goal on the outcome of the match,the effect of leading the first half on the score of the match.

Table 1: Time Periods of Goals Scored

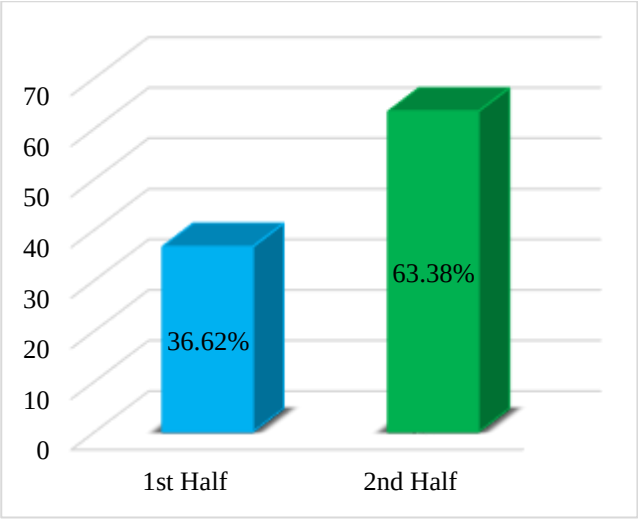
Times	1-15 min.		16-30 min.		31-45 min.					
1st Half	Number of Goals	%	Number of Goals	%	Number of Goals	%				
	13	9.15	16	11.28	23	16.19				
Times	**46-60 min.**		**61-75 min.**		**76-90 min.**		**Extra Time +91-105**		**Extra Time +106-120**	
2nd Half	**Number of Goals**	**%**	**Number of Goals**	**%**	**Number of Goals**	**%**	**Number of Goals**	**%**	**Number of Goals**	**%**
	30	21.13	24	16.90	29	20.42	5	3.52	2	1.41
Total	43	30.28	40	28.18	52	36.61	5	3.52	2	1.41

In the all 51 games of tournament, 142 goals were scored in total, with an average of 2.78 goals per game.It has been reached to the highest number of goals (30 goals - %21.13) during the 15-minute time periodsbetween the 46th – 60th mins.

Table 2: Half of Goals Scored

1st Half		2nd Half		Total	
Number of Goals	**%**	**Number of Goals**	**%**	**Number of Goals**	**%**
52	36.62	90	63.38	142	100

Most of the 142 goals scored in the matches played in UEFA EURO 2020 (90 goals - 63.38%) occurred in the second half of the matches.



Graphic 1. Half of Goals Scored

Table 3: In winner and loser teams; contribution to score by players starting in first 11 or joining from the bench

	Winner Teams		Defeated teams		Draw matches		Total	
	n	**%**	**n**	**%**	**n**	**%**	**n**	**%**
Scoring by players starting in first 11	74	88.1	17	85	24	88.9	115	87.8
Scoring by players joining from the bench	10	11.9	3	15	3	11.1	16	12.2
Total	84	100	20	100	27	100	131	100

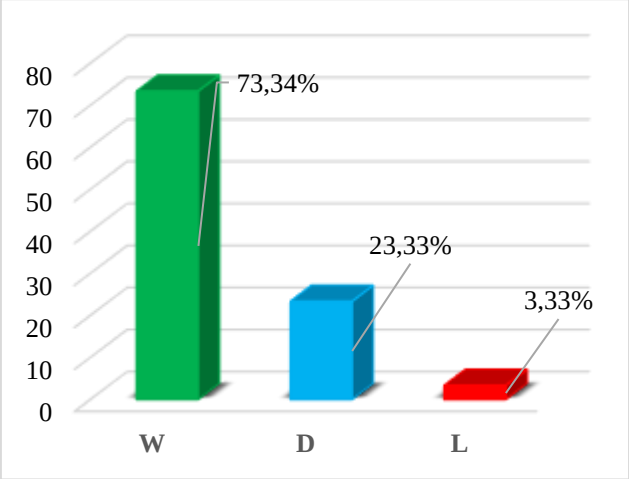
Note:11 goals (%7.74) were scored in the games as own goal.

In all the matches played in the tournament, while the majority of the goals scored, such as 88.9%, were realized by the players who started the matches in the first 11, it was determined that only 11.1% of the goals scored were scored by the players from the bench. Players who started in the top 11 of the winning teams contributed to the score with 74 goals (88.1%), while players from the bench contributed 10 goals (11.9%). In the defeated teams, these rates were determined as 17 goals (85%) for the players who started in the first 11, and only 3 goals (15%) for the players who joined from the bench.

Table 4: The effect of leading the first half on the score of the match

Rounds	Win	%	Draw	%	Loss	%	Total	%
Group matches	17	77.27	4	18.18	1	4.55	22	100
Second Round	2	33.34	1	33.33	0	0	3	100
Quarter Final	3	75.00	1	25.00	0	0	4	100
Semi Final	0	0	0	0	0	0	0	0
Final	0	0	1	100	0	0	1	100
Total	22	73.34	7	23.33	1	3.33	30	100

When all the competitions played in the tournament are examined, 73.34% of the teams that finished the first half of the matches left the match with a win, 23.33% of them left the match with a draw, while only 3.33% of the teams that finished the first half left the field with a loss.



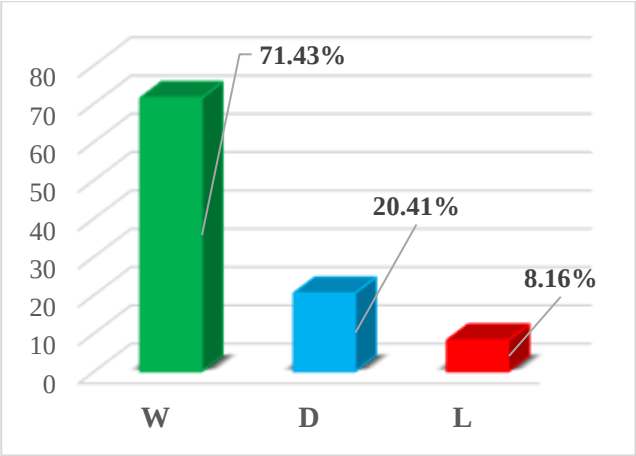
W: Win D:Draw L:Loss

Graphic 2. The effect of leading the first half on the score of the match

Table 5: The effect of scored first goal on the score of the match

Rounds	Win	%	Draw	%	Loss	%	Total	%
Group matches	26	76.47	6	17.65	2	5.88	34	100
Second Round	6	75.00	1	12.50	1	12.50	8	100
Quarter Final	3	75.00	1	25.00	0	0	4	100
Semi Final	0	0	1	50.00	1	50.00	2	100
Final	0	0	1	100	0	0	1	100
Total	35	71.43	10	20,41	4	8.16	49	100

While 71.43% of the teams that scored the first goal in the competitions played in the tournament left the competitions, 20.41% of the matches ended in a draw. In the tournament, only 8.16% of the teams that scored the first goal in the competitions left the field in defeat.



Graphic 3: The effect of scored first goal on the score of the match

DISCUSSION AND CONCLUSION

This study was carried out in order to analyze the goals scored in the competitions played in the UEFA EURO 2020 tournament and to examine how finishing the first half affects the outcome of the matches.While a total of 142 goals were scored in 51 games played in the tournament, the most goals scored in the competitions is between the 46th and 60th minutes. Goals scored have always been very critical variables to analyze teams' performances in sport games, tournaments and championships (20). In the literature, in many studies examining the time intervals of goals scored in football, it is seen that the second half (2,3,9,10,11,28) and final periods (2,3,9,10,11,16) of the matches are the sections where the most goals are scored.

In the study by Michailidis et al. 2013 in which the goal analysis of the 2012 European Football Championship was made, the majority of the goals scored (57.9%) were scored in the second half of the matches.In the study conducted by Çobanoğlu and Terekli 2018, the majority of the goals (61.2%) scored in the 2016 European Football Championship were scored in the second half of the matches.In the study in which the analysis of the 2010 World Cup was made by Njororai 2013, it was observed that the most goals were scored between the 76th and 90th minutes according to the time periods.

Armatas et al. 2009 found that the majority of the goals (54.1%) scored in the Greek League were scored in the second half of the matches, and the highest number of goals occurred between the 76th and 90th minutes according to the time periods.In the study by Gürkan et al. 2018, in which the goals scored in the Turkish Super League were examined according to time periods, it was observed that the most goals were scored between the 76th and 90th minutes according to the time periods.

In the study in which the analysis of the 2012 European Football Championship was made by Leite 2013, the rate of winning the matches of the teams that scored the first goal was 70.97%. In the study by Bilgin and Müniroğlu 2022, in which the 2018 World Cup was analyzed, it was concluded that the teams that scored the first goal were the winners with 86%.

Molinuevo and Bermejo 2012 found that 74.45% of the matches in the Spanish Football League La Liga were won by the team that scored the first goal. Pratas et al. 2016 found that the teams scoring the first goal in the Portuguese Premier League generally won 70% of the matches.According to a study conducted by Göral et al. 2021, the home teams won 61.11% of the matches in the TFF 1st League and 72.97% in the Super League after their first goal in the competitions played in the 2019-2020 season. As a result, after the first goal scored in the matches played in both the Super League and the 1st League, the rate of leaving the match with a win was quite high.

In all the matches played in the tournament, 73.33% of the teams that finished the first half ahead and 71.43% of the teams that scored the first goal left the matches with victory.As a result, based on the findings of the research, it can be said that reaching the first goal in the competitions and finishing the first half of the match emerge as a very important criterion in high-level tournaments such as the European Championship, where competitions with high difficulty levels are played.

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Demonstrating the Irridation and Reinforcement Effects of Proprioceptive Neuromusculer Facilitation Technics

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Abstract

Pupose of the study is demonstrate the irradiation and reinforcement principle of the proprioceptive neuromuscular facilitation (PNF) technique, which was expected to occur through the use of body segments together. Volunteers aged between 18 and 30 who did not have any orthopedic or neurological problems that could affect handgrip strength were included in the study. Using a hand dynamometer (Jamar), dominant-side handgrip strength was evaluated via two different methods, expressed as control and experimental. The control group measurement was done as a standard unilateral handgrip strength test and the experimental one included bilateral handgrip strength. Three consecutive repetitive measurements were taken for both control and experimental methods, and the average values were compared with the dependent t-test. Fifty-four individuals participated in the study. Sixteen (29.6%) of the participants were male and 38 (70.4%) were female, and the dominant side was the right for all participants. The means of hangrip strength was 27.08 ± 8.67 kg for control measurement and 29.08 ± 8.89 kg. for experimental measurement. The experimental handgrip strength was significantly higher than the control ($p < 0.001$). As a result of the study, we can the grip strength obtained by bilateral activity is more than that of unilateral activity; therefore, it supports the PNF irradiation effect principle. In addition, this information highlights the bilateral treatment approach in training programs for strengthening weak muscles and increasing skills in motor activity.

Keywords: Exercise Therapy, Handgrip Strength, Physiotherapy, Rehabilitation

Özet

Bu çalışmanın amacı, vücut segmentlerinin birlikte kullanımı ile gerçekleştiği ifade edilen Proprioseptif Nöromuskuler Fasilitasyon (PNF) tekniklerinden kuvvet yayılımı prensibinin araştırılmasıdır. Araştırmaya, 18 -30 yaşları arasında, kavrama kuvvetini etkileyebilecek herhangi bir ortopedik veya nörolojik problemi olmayan gönüllüler dahil edildi. El dinamometresi kullanılarak (Jamar), dominant taraf kavrama kuvveti, kontrol ve deneysel olarak ifade edilen, iki farklı yöntemle değerlendirildi. Kontrol kavrama kuvveti, unilateral kavrama kuvvetini, deneysel olan ise bilateral kavrama kuvvetini kapsamaktaydı. Aynı örneklem grubunda, önce kontrol, sonra deneysel olmak üzere ardışık 3 tekrarlı ölçüm yapılarak, ortalamaları alındı ve bağımlı gruplarda t testi ile karşılaştırıldı. Araştırmaya 54 gönüllü katıldı. Katılımcıların 16 (% 29.6) 'sı erkek, 38 (% 70.4)' i kadındı ve tamamı sağ dominanttı. Kontrol kavrama kuvvet ortalaması; 27,08±8,67 kg, deneysel kavrama kuvvet ortalaması; 29,08±8,89 kg idi. Deneysel kavrama kuvveti belirgin şekilde daha fazlaydı ($p< 0.001$). Bu çalışmanın sonucu olarak, bilateral aktivite ile elde edilen kavrama kuvvetinin unilateral aktiviteye oranla daha fazla olduğunu söyleyebiliriz. Dolayısıyla kuvvet yayılımı prensibini (İrridation effect) destekler niteliktedir. Ayrıca bu bilgi, zayıf kasların güçlendirilmesine ve motor aktivitede becerinin arttırılmasına yönelik verilen eğitim programlarında, bilateral yaklaşımı ön plana çıkartmaktadır.

Anahtar Kelimeler: Egzersiz Tedavisi, El Kuvveti, Fizyoterapi, Rehabilitasyon

INTRODUCTION

Proprioceptive neuromuscular facilitation (PNF) is a rehabilitative approach that physiotherapists use in a variety of conditions, and this approach is included in the physiotherapy curriculum in many countries, including Turkey. This method stimulates proprioceptive organs in muscles and tendons to improve function (1), and it was first used in individuals with impaired motor activity to facilitate motor performance. PNF involves stretching, traction, and approximation (2). It also promotes a larger neuromuscular response in proprioceptors, thereby facilitating the biarticular muscle by applying maximum resistance to movement in a spiral and diagonal direction. As a result of synergistic muscle activation, extremities follow a three-dimensional diagonal movement axis in the PNF patterns (3-5). PNF patterns include functional movements based on activities of everyday living. This is based on the neurophysiology principles of successive induction, innervations, reciprocal inhibition, and irradiation (6).

Movement is the way to interact with the environment. There are five basic principles of the philosophy of PNF that aim to improve movement: (a) the positive approach, (b) the functional approach, (c) mobilizing reserve, (d) the highest functional level, and (e) the use of motor learning and motor control principles (7, 4).

The PNF method is used in patients with various motor problems and offers several methods and techniques. The PNF concept is applied in a variety of indications in clinical practice (8-10), such as low back pain, respiratory rehabilitation, dynamic balance, gait disorders, and muscle weakness and shortness (9-11). Studies that examine the effectiveness of the PNF technique mostly focus on muscle activity (8). The intensity can be adapted to prevent the causing of pain and fatigue while mobilizing reserve.

One of the basic processes used in the mobilization of potentials is a technique called irradiation and reinforcement. This technique is practiced in two ways. The first way increases the response of weak muscles by applying appropriate resistance to the stronger muscles to produce facilitation or inhibition effect of the synergistic muscles. The second is based mainly on the notion that normal motor activities in our life require the combined use of body segments (4,7). PNF is also used to produce a contraction of the weak muscles and to promote strength by applying resistance to the stronger muscles. Treatment methods intended to promote the muscles of the weaker side by applying exercise training on the stronger side are referred to as irradiation. The mechanism of irradiation is still unknown. It is based on research that finds that an exercise training on one side promotes the opposite side, and it is also known as the cross-training effect or contralateral effect (12).

Our study aimed to prove the force irradiation principle of the PNF technique, which was expected to occur through the use of body segments together.

Although the PNF concept is included in the physiotherapy education curriculum, scientific studies in this field and the level of evidence are very limited (4,7).

We believe that this research will contribute to filling the gaps in the literature and will be a reference for applications in bilateral, exercise-based treatment approaches and different rehabilitative study.

MATERIALS AND METHODS

This study was carried out on healthy young participants and with students of the Physiotherapy and Rehabilitation Department. We performed the study between September and December 2018. It was approved by the Trakya University Faculty of Medicine Scientific Research Ethics Committee (approval # TÜTF/BAEK 2018/254). Informed consent was obtained from the participants.

We included participants between the ages of 18 and 30 who volunteered to participate in the study and who did not have any orthopedic or neurological problems that could affect grip strength.

After the participants were informed about the study, their demographic information was recorded. Their dominant-side grip strength was evaluated using two different methods with a valid and reliable hand dynamometer (Jamar hand dynamometer, Sammons Preston, Rolyon, Bolingbrook, IL) (13,14).

The measurement sequence was in the form of standard (control) and then experimental measurement. The grip part of the hand dynamometer was wiped with wet and dry wipes after each volunteer. To prevent possible soft tissue injury, we performed a pre-grip warm-up application using a handgrip strength test, a reliable and valid method for muscle strength measurement. It produces a measure of isometric strength that allows for the identification of not only muscle weakness of

the upper limb, but also indications of overall strength, an important health indicator. (14-16).

Standard (Control) Measurement Method

The participant sat in a chair with back support, with hips and knees flexed about 90 degrees and feet in contact with the ground. The dominant-side elbow was in 90 degrees flexion, the forearm and wrist in the neutral position and the nondominant extremity extended at the side of the body. The participant was asked to grip the Jamar hand dynamometer with his or her maximum force, and the grip strength was recorded in kilograms (kg). We took three consecutive repetitive measurements with a one-minute interval, and we recorded the average of the three measurements (13,14).

Experimental Measurement Method

The participant was placed in the same starting position as the control measurement. Alternatively, the nondominant upper extremity was also placed in the same position as the dominant side, and a tennis ball was placed in the nondominant hand. In this position, the participant was asked to squeeze the ball on the nondominant side and the hand dynamometer on the dominant side at the same time with maximum force. The grip strength was recorded in kilograms. We took three consecutive repetitive measurements with a one-minute interval, and we recorded the average of the three measurements (13,14).

Statistical Analysis

We carried out analyses using IBM SPSS Statistics 21.0 (IBM Corp. Armonk, NY). The variables were investigated using the Kolmogorov–Smirnov test to determine whether they were normally distributed. We calculated descriptive statistics for all variables, and the data were shown as mean ± standard deviation, minimum-maximum, frequencies, and percentages.

The handgrip strength test results were normally distributed for experimental and control measurements. Therefore, to compare the results of two different measurement methods, we used a dependent t-test. The statistically significant level was set as $p < 0.05$. Also, a post hoc analysis was performed using G*Power software (version 3.1.9.4, Düsseldorf, Germany) to assess the power of the study.

RESULTS

Fifty-four individuals participated in the study. Sixteen (29.6%) of the participants were male and 38 (70.4%) were female, and the dominant side was the right side for all participants. The mean BMI of the participants was 21.87 ± 3.13 kg/m2. Table 1 shows the demographic data. The average grip strength was 27.08 ± 8.67 kg for the control measurement and 29.08 ± 8.89 kg for the experimental measurement. When comparing the differences for the experimental and control measurements results; the experimental grip strength was significantly higher than the control grip trengt ($p < 0.001$) (shown in Table 2) .

"A post hoc analysis was performed using G*Power software (version 3.1.9.4, Düsseldorf, Germany) to assess the power of the study. With an effect size of 0.83 for hand grip strength, 54 sample size, and 0.05 margin of error, the power of the study was found to be 99%."

DISCUSSION

Facilitating weak muscles by stimulating strong muscles is based on the irradiation principle of PNF (18). The definition of reinforce is “to strengthen by fresh addition, make stronger.” The therapist directs the reinforcement of the weaker muscles by the amount of resistance given to the strong muscles (4). There are different approaches in PNF techniques to generate irridation and reinforcement effects;

It is emphasized that irridation and reinforcement can be generated as follows: 1.Within the same pattern between relatively weak and strong muscle groups. 2. by combining patterns or body parts (between relatively weak and strong patterns or body parts). 3. Using timing for emphasis.

It is based on the premise that the brain directs the movement as a whole, not the muscles one by one (17). So that, effort on one side promotes the opposite side. For facilitation purposes, it can be used alone or in combination with PNF facilitation techniques. So that, this principle is a useful aspect for patients with muscle weakness in areas that cannot be directly worked (strengthened). Thus, these weak muscles can develop an increase in the duration and/or intensity by the spread of the response to stimulation or by the synergistic muscle inhibition (18). Although there are not many publications on PNF approaches, in the limited number of publications related to the irritation principle, there is no consensus on which muscle groups (agonist and/or anatagonist) occurs (10,18,19).

In this study, we measured grip strength with two different methods (control and experimental). Grasping force reflecting peripheral muscle strength is a fast, easy, and inexpensive evaluation method. Because of these features, it has a wide range of applications from use in healthy people to use in individuals with critical illness in intensive care [16]. In the current study, the experimental handgrip strength was significantly higher from the control measurement and effect size (cohen's d for paired samples t test) was 0,825. Cohen's d value of 0.8 and above is considered a strong effect (21). We think that results of the current study was be an indicator of the irradiation and reinforcement principle of the PNF technique. Also, in our study, that effect is shown to occur between bilateral and agonist muscle groups.

It was demonstrated with electromyograms that resistance training on one side of the body similarly increased the muscular strength of the other side (10).

Morales et al. examined the muscle irradiation effect in the upper limb after using PNF and found increased electrical activity of the contralateral muscles on electromyography. These studies provide a scientific basis showing that the possible effects related to irradiation are not only in the muscles of the trained side but also in the bilateral activation of the anatomical structures (10).

In a study examining the effect of trunk movements on the strength of ankle muscles, increased dorsiflexion with trunk flexion and increased plantarflexion strength with trunk extension were shown. This information further strengthened the direct treatment effect and the irradiation principle of PNF (22).

A study by Nakada et al. revealed that the coping pattern on the right side increased dorsiflexion activity on the right side but not on the left side. On both the right and left sides, the flexion-abduction-external rotation pattern of PNF was shown to increase dorsiflexion activity on both sides (20).

The results of the above literature and the results of this study show that the movements of body parts together and in certain directions reveal force transfer to each other and facilitation in goal-directed movement. This information should always be remembered in rehabilitation studies because we think that it can be adapted to many different situations. However, research and information on the neurophysiological basis of the irradiation and reinforcement principles is insufficient (22). Further research is required to establish more concrete information on this subject.

CONCLUSSIONS

As a result of our study, we showed that the bilateral grip strength was higher from unilateral grip strength, which therefore provides evidence for the PNF irradiation principle. In addition, this information highlights the bilateral approach as a treatment option in training programs aimed at strengthening muscles and increasing skills in motor activity.

Conflicts of interest and Funding

The authors declare no conflict of interest and funding.

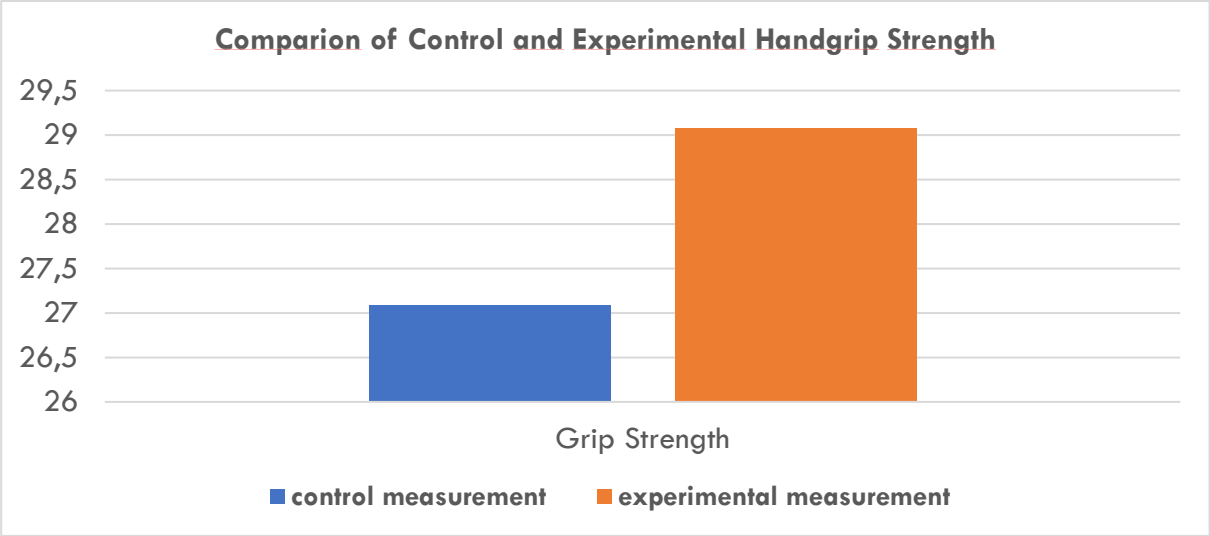

Figure 1. Comparison of control and experimental handgrip strength.

Table 1. Characteristics of the study sample (N= 54)

	X±SD	(Minimum-Maximum)
Age (years)	20. 53 ±1.56	19.0-26.0
Weight (kg)	63.20 ±11.27	45-93
Height (m)	1.69±0,08	1.55 - 1.90
Body Mass Index (kg/m2)	21.87±3.13	17.57- 32.56

Table 2. Comparison of control and experimental handgrip strength

	Mean±SD	Min-Max	t	P**
Standard Grip Strength (kg)	27,08±8,67	12,67- 49,33		
Experimental Grip Strength (kg)	29,08±8,89	16,00 -56,00	-6,06	<0.001

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The Effect of Vertical and Horizontal Core Trainings on Core Strength, Agility and Speed

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Abstract

The aim of this study is to investigate the effect of core training in vertical and horizontal planes on core strength, speed and agility. Handball players aged 15-18 participated in the study (n=36); are divided into 3 groups as vertical core training group, horizontal core training group and control group. The vertical core training experimental group handball players participating in the study performed core training in the vertical plane in addition to the normal training, while the horizontal core training experimental group handball players performed core training in the horizontal plane in addition to the normal training for 8 weeks. The control group, on the other hand, do not participate in any extra training and continued their normal handball training. Experimental and control group handball players are given speed tests (5,10,20,30 meters), agility tests (505-T Test, Hexagon, Illinois), core strength endurance (core stability performance test) in order to determine their levels before and after this 8-week training. tests are applied. In the study, it is observed that vertical core training positively affected agility tests (505, Illinois, Hexagon and T test), while horizontal core training improved core strength, and both horizontal and vertical training improved 20 meters speed. As a result, it is concluded that core training in the horizontal plane affected core strength, while core training in the vertical plane affected speed and agility more than horizontal core training. In addition, in the tests involving running mechanics, it is concluded that vertical core training has a more significant effect than horizontal core training.

Keywords: Core Training, Handball, Agility, Speed

Dikey ve Yatay Core Antrenmanlarının Core Gücü, Çeviklik Ve Hız Üzerindeki Etkisi

Özet

Bu çalışmanın amacı dikey ve yatay düzlemde yapılan kor antrenmanların kor kuvveti, sürat ve çevikliğe etkisinin araştırılmasıdır. Araştırmaya katılan 15-18 yaş hentbolcular (n=36); dikey kor antrenman grubu, yatay kor antrenman grubu ve kontrol grubu olmak üzere 3 gruba ayrılmıştır. Çalışmaya katılan dikey kor antrenman deney grubu hentbolcuları normal antrenmanlara ek olarak dikey düzlemde, yatay kor antrenman deney grubu hentbolcuları ise normal antrenmanlara ek olarak yatay düzlemde 8 hafta boyunca kor antrenmanlar yapmıştır. Kontrol grubu ise ekstra bir antrenmana katılmamış normal hentbol antrenmanlarına devam etmiştir. Deney ve kontrol grubu hentbolculara bu 8 haftalık çalışmanın öncesi ve sonrasında seviyelerini belirlemek amacıyla sürat testleri (5,10,20,30 metre), çeviklik testleri (505-T Test, Hexagon, İllionis), kor kuvveti dayanıklılığı (kor stabilite performans testi) testleri uygulanmıştır. Çalışmada dikey kor antrenmanların çeviklik testlerini (505, İllionis, Hexagon ve T testi) olumlu yönde etkilediği, yatay kor antrenmanların ise kor kuvvetini geliştirdiği, hem yatay hem dikey antrenmanların özellikle 20 metre sürati geliştirdiği görülmüştür. Sonuç olarak yatay düzlemde yapılan kor antrenmanlarının kor kuvvetini etkilediği, dikey düzlemde yapılan kor antrenmanlarının ise sürat ve çevikliği yatay kor antrenmanlarına göre daha çok etkilediği sonucuna varılmıştır. Ayrıca koşu mekaniğinin bulunduğu testlerde dikey kor antrenmanların yatay kor antrenmanlarına göre daha önemli bir etki yarattığı sonucuna ulaşılmıştır.

Anahtar Kelimeler: Kor Antrenman, Hentbol, Çeviklik, Sürat

INTRODUCTION

In recent years, the core muscles, which are frequently applied in combined training and attract great attention, have started to become a basic part of training plans (1). The core area, which is also called the muscular box containing the core muscles of the body, the power area and the area where all movements begin, focuses on the strength and condition of regional and superficial muscles in training (2).

Core exercises have taken their place among the exercises commonly used in many sports branches and gyms. Core exercises are recommended for the development of the athletic structure of individuals and a more functional body (3).

Core training, which allows the development of arm and leg strength, is a dynamic concept that is constantly changing to adjust body composition or to provide resistance to external force. The stronger the core muscles, the more power production in the arms and legs (4). Core training may differ from weight training. However, core trainings are also studies aimed at increasing muscle strength. These studies focus on the strength and condition of regional and superficial muscles (2).

In the study examining the effect of core training on anaerobic power and balance in female handball players, significant changes are found in the anaerobic power and balance data of the experimental group at the end of 8 weeks, and it is stated that core training would positively affect sportive performance (5). An 8-week core training program is applied to examine the effect of core training on speed, balance and agility in male football players between the ages of 14-16 and agility, balance and strength parameters are improved (6). In the study examining the effects of static and dynamic core training on swimming performance and motoric properties in swimmers, it is found that dynamic core exercises provide more improvement on motoric properties than static core exercises (7). In a study examining the effects of static and dynamic core exercises on speed and agility performance on football players, it is found that no significant results are found in speed and agility, and it do not affect body composition, but increased core stability (8). In a study examining the effect of 8-week core training applied to female wrestlers on agility, quickness and acceleration, a significant improvement is found in the quickness, agility and acceleration first-post-test values of the group in which core training is applied in addition to the training, and it is seen that core training applied in addition to the training provided improvement in motor skills (9). In studies comparing different branches and different leagues, it has been seen that core strength is an important criterion and there is no significant difference when the core strength values of the athletes in the upper and lower leagues are compared (10, 11).

When the literature is examined, it is stated that the relationship between core stabilization and motoric characteristics in handball is an important factor in sportive success (4, 10, 12-15). However, it is seen that there are no studies in the literature on the effects of horizontal and vertical core training on core strength, speed and agility. The aim of this study is to investigate the effect of core training in vertical and horizontal planes on core strength, speed and agility.

METHOD

The research is designed as a pretest-posttest control group model, one of the real experimental models. In the research design, the dependent variable is the tests and measurements that determine core strength, speed and agility in young handball players between the ages of 15-18, and the independent variable is vertical and horizontal core training applied 3 days a week for 8 weeks. A total of 36 male handball players between the ages of 15-18 participated in the study.

Working Groups; Group 1 (n=11): Vertical Core Training Group, Group 2 (n=11): Horizontal Core Training Group, Group 3 (n=14): Control Group.

A total of 18 movements are determined to be applied in the vertical and horizontal planes, taking into account the ages and training levels of the participants. After the research and control groups have the necessary warm-up exercises, the pre-test is taken. The movements to be applied and the proper forms of the movements are shown to the athletes in the research group. It is applied as 24 units of training with the study groups for 8 weeks, 3 training sessions per week. It is applied for 20 minutes in the first two weeks, 30 minutes in the 3rd and 5th weeks, and 40 minutes in the 6,7th and 8th weeks. The rest period is given as 1x1. The control group trained for two hours, 3 days a week, on the other hand, do not do any extra core training and continued their routine handball training.

Training Program

VERTİCAL CORE TRAİNİNG	HORİZONTAL CORE TRAİNİNG
Oblique Twist	Plank
Planör	Side Plank(Right)
Pulling Theraband(Right Leg)	Side Plank(Left)
Pulling Theraband(Left Leg)	Hip Raises
Hanging Leg Raise	Cobra
Bosu Squat	Boat Pose
Throwing Ball in Bosu	Bicycle Crunch
Rotation Press	Spiderman Plank
Side Bend	Mountain Climber

Data Collection and Applied Tests

The prepared tests are applied in Konya Metropolitan Municipality and Ankara Spor Toto gyms. A total of 36 people from three groups participated in the study.

Publication Ethics of Research

For the research, the ethical compliance approval of the study is obtained with the decision number 2020/119 dated 18.12.2020 of the Social and Human Sciences Ethics Committee of Necmettin Erbakan University.

Anthropometric Measurements

Height Measurement And Body Weight

Desis B5 height measuring device was used for height measurement. Measurements were taken from the athletes with their feet bare, heels together, head in a frankfort plane, arms hanging freely from shoulders (16).

Body Weight Measurement

Desis B5 device was used for body weight measurement. Participants gave measurements in bare feet and anatomical posture with appropriate sportswear and the obtained values were recorded in 'kg' (17).

Body Mass İndex (BMI) Measurement

It was calculated by dividing the body weight by the square of the height in meters.

Performance Tests

In the study, speed and agility tests (excluding hexagon) were carried out with a WITTY Microgate brand (model: WIT001) photocell.

Speed Tests

5-10-20-30 meters speed tests are applied and the value obtained by the athlete from 2 attempts is recorded in seconds.

Agility Tests

T Drill Agility Test

In the test where A, B, C, D cones are placed and the athletes start with the whistle command, the athlete first runs from the A cone, touches the B point, goes to the C cone with sliding steps, and then touches the C cone with his left hand. The athlete then touches the D cone with his right hand, with sideways sliding steps. He then touches cone B with his left hand and goes back to cone A, where the stopwatch is stopped when he crosses the line. The athlete tries to do this as quickly as possible. The distance between funnel A and funnel B is 9.14 meters. The distance between funnel B and funnels C and D is 4.57 meters. Athletes are made 3 repetitions. Rest between repetitions is complete rest. The best grade made is considered (18).

505 Test

This test consists of running a distance of 10 meters and then traveling a distance of 5 meters without stopping. Photocell stopwatches fixed above the 5 meter line are placed at both the start and finish gates. In the direction of the approach run, the first door is the stop and the second door is the start. The round-trip time of the distance of 5 meters was recorded in seconds. Athletes are given 2 repetitions and their best scores are recorded (19).

Illinois Test

Four rectangular cones are placed at the corners of an area 5 meters wide and 10 meters long. These four cones are the starting, ending and two turning points. The area is divided lengthwise in two (2.5 meters). Medium error 4 cones are placed. The distance between these 4 cones is 3.3 meters. With the start command, the athlete starts the movement in the test and tries to complete the distance between the start and the finish at the highest speed (20).

Hexagon Test

A hexagon with sides of 66 centimeters (cm) is created on the ground. The participant faces the A line in the middle of the hexagon line. During the test, the participant will face the A line. With the start command, the stopwatch is started. The participant jumps with both feet outside the B line and back to the centre, then jumps to the C line and back to the centre, then D and so on. A lap is counted when the participant jumps over the A line and returns to the centre. After the participant completes 3 laps, the stopwatch is stopped and the time is recorded.

Core stability performance measurement

The 'Sport-specific core strength and stability plank test' protocol, consisting of 8 steps and a total duration of 3 minutes, is applied. The stages of the test are as follows;

1. Standard plank position forward (60 sec)
2. Raise right arm in plank position (15 sec)
3. Raise left arm in plank position (15 sec)
4. Right leg raise in plank position (15 sec)
5. Left leg raise in plank position (15 sec)
6. Raise left leg and right arm in plank position (15 sec)
7. Raise right leg and left arm in plank position (15 sec)
8. Taking the plank position again (30 sec)

It has been requested that in the starting position, only the tips of the toes, elbows and forearms are in contact with the ground, while the participants are lying on the ground in the starting position, taking a line parallel to the ground in such a way that the head, neck, shoulders, back, waist, hips and legs are straight like a rope and maintain this posture without disturbing. The time taken by the participant from this position to breaking his posture is written and recorded in seconds.

Analysis of Data

ANOVA test was used in mixed measurements in order to examine the existence of the difference between the posttest values of the control group, vertical core training group and vertical core training group (21). Before the analysis, the assumptions of the ANOVA test were checked. The first of the assumptions is the normal distribution. The normal distribution of the data was checked with kurtosis-skewness values and the values are expected to be between -1.5 and +1.5 according to (22). When the findings were examined, it was determined that the data set showed a normal distribution. Another assumption is that the participants show a homogeneous distribution, the homogeneity assumption is checked with Levene's test. Levene's test findings ($p>.05$) are expected. The Levene's test findings obtained showed that the groups showed a homogeneous distribution. Eta squared ($\eta 2$) value was used to determine to what extent the independent variable had an effect on the dependent variable. The eta squared formulation was used as (0.01) small effect, (0.06) medium effect, and (0.14) large effect (23, 24).

FINDINGS

Tablo 4.1. Average values of the study groups.

	N	Minimum	Maximum	Mean
Age	36	15	18	16,61±1,02
Height (cm)	36	164,5	189,0	177,68±7,04
Weight (kg)	36	45,4	97,2	73,89±13,20
BMİ (kg/cm²)	36	15,7	30,8	23,29±3,57

36 people took part in the research. The averages of the athletes in all groups participating in the research; age is 16.61±1.02, height is 177.68±7.04, weight is 73.89±13.20, and BMI is 23.29±3.57.

Table 4.2. Speed test in-group values table of study groups

		Group					
		Vertical Core Training	Horizontal Core Training	Control	F	p	η^2
5 Meters run	Pre-test	.97 ± .08	.99 ± .091	.95 ± .07	3.20	.08	.09
	Post-test	.96 ± .07	.96 ± .05	.93 ± .05			
10 Meters run	Pre-test	1.73 ± .17	1.75 ± .17	1.73 ± .11	.24	.63	.01
	Post-test	1.75 ± .17	1.76 ± .12	1.71 ± .13			
20 Meters run	Pre-test	3.06 ± .24	3.23 ± .28	3.09 ± .17	5.61	.02*	1.15
	Post-test	3.04 ± .23	3.18 ± .25	3.05 ± .13			
30 Meters run	Pre-test	4.40 ± .40	4.67 ± .42	4.40 ± .29	3.75	.06	.10
	Post-test	4.42 ± .39	4.56 ± .38	4.36 ± .23			

When Table 4.2 is examined, a significant difference is observed between the pre-test and post-test values of the groups in the 20-meter running (F(1, 33)=5.61, η2=1.15, p<.05) variable of the athletes.

5 meters run (F(1, 33)=3.20, η2=.09, p>.05), 10 meters run (F(1, 33)=.24, η2=.01, p>.05), and 30 In the meters running (F(1, 33)=, η2=.10, p>.05) variables, no statistically significant difference is found between the pre-test and post-test values.

Table 4.3. Table of speed test values between study groups.

	Group					
	Vertical Core Training	**Horizontal Core Training**	**Control**	**F**	**p**	**η²**
5 Meters run	.96 ± .07	.96 ± .05	.93 ± .05	1.17	.32	.07
10 Meters run	1.75 ± .17	1.76 ± .12	1.71 ± .13	.21	.81	.01
20 Meters run	3.04 ± .23	3.18 ± .25	3.05 ± .13	1.82	.18	.10
30 Meters run	4.42 ± .39	4.56 ± .38	4.36 ± .23	1.57	.22	.09

When Table 4.3 is examined, 5 meters running (F(2, 33)=1.17, η2=.07, p>.05), 10 meters running (F(2, 33)=.21, η2=.01, p>.05), 20 meters running (F(2, 33)=1.82, η2=.10, p>.05) and 30 meters running (F(2, 33)=1.57, η2=.09, p>.05) variables. No statistically significant difference is determined between the post-test values of the groups.

Table 4.4. Intragroup values table of the agility and core strength variables of the study groups.

		Group					
		Vertical Core Training	**Horizontal Core Training**	**Control**	**F**	**p**	**η²**
505	Pre-test	2.53 ± .19	2.70 ± .19	2.44 ± .19	9.45	.00**	.22
	Post-test	2.43 ± .18	2.65 ± .18	2.44 ± .16			
T-Test	Pre-test	10.18 ± .86	10.78 ± .86	10.25 ± .42	14.17	.00**	.30
	Post-test	9.79 ± .93	10.51 ± .60	10.04 ± .56			
Plank	Pre-test	83.18 ± 33.14	61.73 ± 28.48	106.64 ± 25.03	30.43	.00**	.48
	Post-test	100.45 ± 39.76	108.64 ± 47.78	106.07 ± 19.53			
Hexagon	Pre-test	13.77 ± 1.93	14.45 ± 1.78	13.40 ± 1.01	38.59	.00**	.54
	Post-test	13.14 ± 1.83	12.88 ± .84	12.83 ± 1.15			
İllionis	Pre-test	17.62 ± 1.69	18.45 ± 1.32	16.98 ± .78	58.87	.00**	.64
	Post-test	16.47 ± 1.34	17.38 ± 1.27	16.57 ± .82			

505 (F(1, 33)=9.45, η2=.22, p<.05), T-test (F(1, 33)=14.17, η2=.30, p<.05), plank (F(1, 33)=30.43, η2=.48, p<.05), hexagon (F(1, 33)=38.59, η2=.54, p<.05) and illionis (F(1, 33) =58.87, η2=.64, p<.05), the pretest values of the 3 groups are found to be significantly higher than the final values. When the effect size findings are examined; 505 (η2=.22), t-test (η2=.30), plank (η2=.48), hexagon (η2=.54) and illionis (η2=.64) are found to have great effect.

Table 4.5. Table of values between groups for agility and core strength variables of study groups

	Group					
	Vertical Core Training	**Horizontal Core Training**	**Control**	**F**	**p**	**η²**
505	2.43 ± .18	2.65 ± .18	2.44 ± .16	6.28	.01*	.28
T-Test	9.79 ± .93	10.51 ± .60	10.04 ± .56	2.88	.07	.15
Plank	100.45 ± 39.76	108.64 ± 47.78	106.07 ± 19.53	1.58	.22	.09
Hexagon	13.14 ± 1.83	12.88 ± .84	12.83 ± 1.15	.50	.61	.03
İllionis	16.47 ± 1.34	17.38 ± 1.27	16.57 ± .82	3.14	.06	.16

In Table 4.5, a statistically significant difference is determined between the 505 (F(2, 33)=6.28, η2=.28, p<.05) post-test values of the study groups. When the effect size findings are examined, it is determined

that it has a large effect with 505 (η2=.28). According to the Bonferroni follow-up test, in the 505 variable, the horizontal core training group is found to be significantly higher than the vertical core training group. It is observed that the group that received horizontal core training is also higher than the control group. There is no statistically significant difference between the vertical core training group and the control group.

T-test (F(2, 33)=2.88, η2=.15, p>.05), illionis (F(2, 33)=3.14, η2=.16, p>.05), plank (F(2, 33)=1.58, η2=.09, p>.05) and hexagon (F(2, 33)=.50, η2=.03, p>.05), no statistically significant difference is observed.

DISCUSSION and CONCLUSION

In this study, the effects of horizontal and vertical core training on core strength, speed and agility are investigated. In the study, core strength, agility and speed values are determined and evaluated by applying different tests.

The average of the participants in all groups participating in the research; age is 16.61±1.02, height is 177.68±7.04, weight is 73.89±13.20, and BMI is 23.29±3.57. In different studies, the mean age of male athletes belonging to similar age groups is 16.80±.42 years, and the average height is 175±9.16 cm (25). In another study, it is found that the mean height of the control group is 187.1±7.84 cm, and the mean body weight is 71±6.07, while the athletes in the experimental group are 189.3±4.52 cm and their weight is 71.26±6.66 kg is reported (26). It is seen that the physical characteristics of the general handball players in the age range of the athletes in the study are similar to the studies in the literature.

In the study, it is determined that horizontal and vertical core trainings have a significant positive effect on the 20-meter speed. In addition, it is seen that core trainings affected the speed development of 5,10 and 30 meters, but this improvement is not significant. In the literature, in studies investigating the effects of core training at different ages on speed development, it is seen that speed is affected by core training. It is determined that 8-week core training applied to 13-15 age group badminton players (27), 8-week core training applied to football players (28), and 12-week core strength training applied to the central region for 12-14 age group children (29), decreased the 20m sprint time and showed a positive development. However, it is stated that 10-week core training do not affect the 30-meter sprint performance in female volleyball players aged (30). Although this is not an expected result, it shows parallelism with the findings of our study. It has been determined both in our study and in the literature that core training does not affect the 30 m speed. It is thought that the most important reason why horizontal and vertical core trainings do not significantly affect the 5, 10 and 30 m speed is due to the fact that speed is a difficult motoric feature that needs to be developed at an early age. However, in the above studies (27-29) and in our study, it is seen that horizontal and vertical core training directly affects 20 meters speed significantly. When the speed findings are examined, the studies in the literature also support our study.

In the results of the study, it is determined that horizontal and vertical core trainings affect agility significantly. According to the agility tests in vertical core training, 505 test improved 4%, T test 3.8%, hexagonal 4%, Illinois 6.5%, while in horizontal core training the 505 test improved 1.8%, T test 2.5%, hexagonal 10%, Illinois 5.8%. development has been found. On the other hand, in the control group, who practiced Norman handball, it is observed that the agility development rates remained around 2% on average. It is seen that there are similar results in studies of core training conducted in the literature. It has shown that in the T test and pro agility tests of 8 weeks, it is found that 17-19 age group football players (31), young female volleyball players (32) and 10-12 age football players (33) caused a significant increase in speed and agility levels. In other studies, it has been reported that core strength training has a significant effect on quickness, agility and acceleration in female wrestlers (9) and tennis players (34), and all three parameters have improved significantly. However, although there are many studies in the literature showing that core training positively affects agility, there are also studies showing that it does not affect agility. It is determined that core training applied to 28 tennis players aged 11-15 for 10 weeks do not affect the speed and agility scores (35). In the agility tests applied in the study, it is seen that horizontal and vertical core exercises significantly improve this feature and when the effect size findings are evaluated, it has a great effect. When the literature is examined, it has been reported both in the literature and in the current study that the duration of experimental studies on agility varies between 6 and 12 weeks, and agility has improved significantly during this period. In the study, it is determined that 8-week horizontal and vertical core training increased agility significantly. It is seen that vertical core training is more important in sports

branches based on running such as handball, basketball and football, especially if the tests involving running mechanics are accepted as more important tests for handball.

In addition, the improvement in the control group in the Hexagon, Illinois and T test is the result of general handball training, and accordingly, it shows how important training is for handball. It is thought that better coordination of the working core muscles is effective on the results, so that the core muscles that are trained provide better body resistance and balance, and that the movement is carried out smoothly in the kinetic movements.

In the study, it is observed that core training has a great effect on the central region both in the vertical and horizontal planes. There are also studies on the cor plank relationship in the literature. In the study investigating the effect of 8-week core training on the development of some motoric features in 18-year-old football players, a significant difference is found in the plank value after the training (36). As a result of the 10-week core training program applied to tennis players aged 11-15, an increase of 13.8% in the shuttle test score and a 13.6% improvement in the plank test score is observed (35). It was found that combined trainings for the age group similar to our study group had a positive effect on core strength (37). Core strength is also an important element in combined training. It has been observed that not doing regular core strength training exercises significantly reduces core strength (38). Studies in the literature support our study. In the study, a significant improvement is observed in the plank test, which determines the core strength, and it is determined that this improvement has a great effect. Looking at the plank test data, it is determined that the vertical core training group improved by 20.7% and the horizontal core group by 76%. No improvement is observed in the control group. It is thought that the fact that the muscle groups trained in the training are also directly active in the plank movement is effective in this result.

In the findings of the study, it is determined that the trainings in the horizontal and vertical planes have effects on agility, speed and core strength. It has been observed that vertical core training has a positive effect on agility tests (505, Illinois, Hexagon and T test), horizontal core training improves core strength, and both horizontal and vertical training has a positive effect on 20 meters speed.

As a result, it has been determined that core training done in the horizontal plane improves core strength, while core training done in the vertical plane affects speed and agility more than horizontal core training. In addition, in the tests involving running mechanics, it is concluded that vertical core training has a more significant effect than horizontal core training.

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Evaluation of Status and Constant Anxiety Levels in Basketball Players According to League Ranking

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Abstract

The aim of this study, is to evaluate the link between anxiety level and the ranking situation teams at the 2008-2009 Beko Basketball Legue. The documents, which are created by Spielberg and his friends, for evaluating normal and anormal people?s state and anxiety level, in the year 1964 and adapted into Turkish by Öner and Le Compte (1983) is used. 8 teams and 72 sportman of Beko Basketball League which has 16 teams, participated into this study. These inventories are applied to the teams at outher zones, except Selcuk University. The points of state and continuous anxiety level of teams which participated in the research are given in the tables, below.

Variables	Sum of SquaresAverage	Average of Squares	F	P
State Anxiety	Between Teams	676,579	96,654	1.126	0.358
Continuous Anxiety	Between Teams	403.429	57,631	0,743	0,637

It has not been detected any significant differences between the teams that participated in research in statistical means, when they compared in order to their points of ranking in the league and their continuous anxiety level

Keywords: Sport, Anxiety Level, Basketball Players

Basketbolcularda Durumluk ve Sürekli Kaygı Düzeylerinin Lig Sıralamsına Göre Değerlendirilimesi

Özet

Bu çalışmada 2008?2009 Beko Basketbol Liginde yer alan takımların kaygı düzeyleri ve lig sıralamasındaki durumları arasındaki ilişki incelenmiştir. 1964 yılında Spielberg ve arkadaşları tarafından normal ve normal olmayan bireylerin sürekli ve durumluk kaygı düzeylerinin ölçülmesi amacıyla geliştirilen Türkçeye Öner ve Le Compte (1983) tarafından uyarlanan envanterler kullanılmıştır. Çalışmaya 16 takım olan Beko Basketbol Liginden 8 takım ve ve 72 sporcu katıltmıştır. Selçuk Üniversitesi hariç çalışmaya katılan diğer takımların Durumluk ve Sürekli kaygı puanlarının istatiksel karşılaştırılması aşağıdaki tabloda verilmiştir.

Değişkenler	Kareler Toplamı	Ortalama Kare	F	P
Durumluk Kaygı	Takımlar Arası	676,579	96,654	1.126	0.358
Sürekli Kaygı	Takımlar Arası	403.429	57,631	0,743	0,637

Araştırmaya katılan takımların ligde bulundukları sıralama bakımından durumluk ve sürekli kaygı puanları karılaştırıldığında takımların ligdeki sıralamaları arasında istatistiksel olarak anlamlı bir farklılık tespit edilmemiştir (P>0,05).

Anahtar Kelimeler: Spor Kaygı Düzeyi, Basketbolcular

INTRODUCTION

Basketball, which is one of the sports branches with the highest popularity after football, is one of the branches where the costs such as transfer fees are also the highest. Companies that provide sponsorship support to the basketball branch want to reflect the value of their sponsorships on the scores of the teams they invest in. Depending on the fact that many companies sponsor clubs in order to increase their recognition and sales figures, it is observed that there are extremely serious Decouples between the teams. In the high-excitement, contentious matches, the pressure is constantly high because the teams want to win during the season, the audience is in demand and attracts the attention of the regional and national media depending on which league they are in. The difference between the benefits of winning of the club, the players and the sponsors and the costs of losing are huge and quite large. The fluctuation between these extreme points increases the level of anxiety. There is no doubt that in order to win, the motivation level of the players needs to increase. The augmentation in anxiety levels leads to the release of high-intensity energy potentials. However, the teams that are afraid of this high intensity energy potential reduce the chances of success; the teams that manage to use the energy potential correctly can reflect these successes on the score.

High levels of stress, mismanagement practices, fear of making mistakes, and inability to predict what will happen cause a sense of inadequacy in basketball players. Basketball players should be always high-motivated to succeed. These highly motivated athletes do not stop fighting when difficult conditions (league ranking, sponsor and fan pressure, oppressive management ...) occur and they fight ambitiously in the competition. Motivation is one of the most powerful qualities of a basketball player who wants to achieve. In order to achieve high sportive performance under these conditions, it is related to the motivation of the athlete to endure long and tiring trainings patiently and to perform the performance that was achieved under difficult competition conditions (competitor, spectator, weather conditions, field conditions, etc.).

Nowadays, sports clubs need to use many methods to mentally train athletes, including sports psychologists, mentors, in order to increase their performance in order to get more sponsor support by increasing their success. By means of these methods to be used, the probability of achieving the aimed achievements will increase depending on the rising performance graph.. Various strategies and skills associated with sports psychologists and mentors teach to athletes the method of stress, concentration, self-confidence, mental training, goal setting, psycho-energy method and similar subjects. Athletes; how to deal with the distress of the day, they can use their time effectively,how to make the training more effective and efficient and most importantly before,during and after the competition dealing with anxiety that might occur can help them to decide how they organise their lives.

As a result, the increasing usage of rapidly developing communication tools and social media, increase the desire of large companies to take advantage of the popularity of sports to reach their potential customers. This triggers them to increase their sponsorship budgets to higher amounts depending on the increasing desire.In order to receive a share of these large sums of money, clubs will play an important role in increasing the performance of athletes in various studies that increase the performance of athletes. And with this success, the doors will be opened to provide more sponsor and fan support, which is one of the ultimate goals for a club.

1.Definition of Anxiety, State-Trait Anxiety

In the Dictionary of Psychology Terms published by the Turkish Language Society, Dr. Mithat Enic defines the anxiety. -Anxiety is an anxious feeling that appears in situations where it seems that a strong desire or impulse will not achieve its goal (4).

Apprehension is expressed as anxiety in Turkish and anxiety in English. In a certain sense, it is synonymous with the terms anxiety and doubt. But anxiety is a different phenomenon apart from all of them. This state of anxiety is sometimes confused with fear. However, while the term fear is used in cases where the cause is known, anxiety arises from fear whose cause is unknown (3).

In other words, anxiety; sometimes it is seen that stimuli that would not normally evoke a sense of fear evoke a sense of fear and reactions in some people. Thus, anxiety can be mentioned in the fear reactions that occur in the face of a number of events or stimuli that should not actually be feared, then it is fear that is felt without a clearly defined reason (9). Anxiety is a concept that is considered synonymous with excitability and stress and is often used in this way. According to Cox, anxiety is an increased physiological excitability and subjective anxiety (3).

One of the most important contributions to the understanding of the concept of anxiety has been by Karen Homey. Homey touched on the affinity between fear and anxiety and Decried the fact that both are enhanced emotional responses to danger, but fear he noted that there is a significant difference between anxiety. According to Horney, fear is an emotion proportional to the danger felt in the face of a real danger, while anxiety is an emotion felt in a situation perceived as dangerous (18).

1.1.State anxiety, it is the subjective fear that an individual feels due to the stressful situation they are in. Physiologically, physical changes such as sweating, yellowing, flushing and trembling as a result of a 7 stimulation that occurs in the autonomic nervous system are indicators of the individual's feelings of tension and restlessness. At times when stress is intense, there is an increase in the state anxiety level, and when stress disappears, there is a decrease (2). In other words, a state anxiety indicates an emergency that is characterized by anxiety, distress. State anxiety is like kinetic energy. When there is a sufficient level of stimulus, a kinetic reaction occurs (19). People who have higher state anxiety levels, face situations that they perceive as dangerous or threatening more, and threatening or dangerous situations that they face state can react with more intense levels of anxiety (7). Trait anxiety is an individual's predisposition to experience anxiety. This can also be referred to as perceiving the person's compartment as generally stressful or interpreting it as stress. Discontent and unhappiness, which are formed as a result of the perception of situations that are neutral according to objective criteria by the individual as dangerous and threatening to his essence, are constant anxiety. It is observed that individuals with a high level of such anxiety are easily hurt and turn into pessimism. These individuals also experience state anxiety more frequently and intensely than others (16).

1.2.Trait anxiety, It cannot be directly observed in the behavior of the individual. However, it can be referred from the severity and frequency of situational anxiety reactions detected at different times and conditions. According to this, individuals with a high level of trait anxiety get hurt more easily and more often in the face of stress than those with a low level of constant anxiety. They state anxiety occurs both more frequently and more severely (11). Undoubtedly, there are also those among athletes who have developed a constant sense of anxiety. Dec. Because of this personality string they have, can be anxious in almost any environment 8 and can live in a constant state of restlessness. This condition, which mostly concerns psychiatrists and clinicians, is nothing more than trait anxiety. However, individuals who do not experience anxiety as an established personality pattern, such as these, also experience a state of anxiety in the face of certain stimuli (17). When it comes to sporting environments, athletes who are worried before the competition and in various situations related to sports should be dealt with within the scope of trait anxiety. In other words, it can be said that many athletes are often faced with trait anxiety. In studies conducted on athletes, it has been found that state anxiety levels increase before a contest or competition (7).

On the other hand, it is stated that individuals with a high level of constant anxiety will show symptoms of state anxiety more quickly and frequently in another environment (for example, before and after a competition).

2.MATERIALS and METHODS

2.1.The Model of the Research There are a total of 16 (sixteen) teams in the Turkish Basketball League. Since they are high-level teams, not all of the teams could be included in the study. In this research, when selecting the teams, their economic levels, staff structure and their performances in the previous season were not taken into account. In this research, it was aimed to determine the state trait anxiety levels of basketball players in the teams and to investigate the relationship between the ranking of the teams at the end of the league.

2.2.Universe and Sample

8 (eight) teams from the Turkish Basketball League and a total of 72 (seventy-two) subjects participated in our research. Teams make up our universe. The eight teams were taken as a sample. The matches of these teams on the outside courts of other teams, except for the Selcuk University Basketball Team, were evaluated. 2.3. State Trait Anxiety Inventories The scale developed by Spielberg and his colleagues in 1964 to measure the levels of constant and state anxiety of normal and abnormal individuals was adapted to Turkish by Oner and Le Compte (1983). It is a self-assessment type scale consisting of short statements. While the state anxiety form only provides information about what is felt at that moment, the SKE was developed to measure what has been felt for the last 7 days. The SKE-DKE is a Likert-type scale consisting of 20 items and graded between 1-4.

2.3.1.Scoring of State and Trait Anxiety Inventories

State Anxiety Scale answer options collected in four classes, (1) Never, (2) Somewhat, (3) and (4) Totally shaped; the options on the trait anxiety scale (1) Almost Never (2) Sometimes, (3) time, and (4) almost always in the form. There are two kinds of expressions on the scales. We can call these (1) direct or straight (direct) and (2) reversed (reverse) expressions. Direct statements express negative 40 emotions, while reversed statements express positive emotions. When scoring these second types of expressions, those with a weight value of 1 turn into 4 ‗e, and those with a weight value of 4 turn into 1. Answers with a value of 4 in direct statements indicate high level of anxiety. In reversed expressions, answers with a value of 1 indicate high anxiety, and those with a value of 4 indicate low anxiety. ―The expression I am restless‖ is direct, -I feel calm‖ expression can also be shown as an example of reversed expressions. In this case, if a 4―measured option is selected for the expression -I am restless‖, and a 1-measured option is selected for the expression -I feel calm‖, these answers reflect high anxiety. There are ten reversed expressions on the state anxiety scale. These are 1, 2, 5, 8, 10, 11, 15, 16, 19 and 20. Articles. On the Trait anxiety scale, the number of reversed expressions is seven, and these are 21, 26, 27, 30, 33, 36 and 39. Articles. Scoring is made in two ways: manually or by computer. Manual Scoring: Two different keys are prepared for each of the direct (direct) and reversed (reverse) statements. Thus, the total weights of direct expressions with one key and reversed expressions with the second key are calculated. The total weighted score of the inverse statements is subtracted from the total weighted score obtained for the direct statements. A predetermined and unchanged value is added to this number. For the state anxiety scale, this constant value is 50, and for the continuous anxiety scale, it is 35. The last value obtained is the individual's anxiety score.

2.3.2. The Validity of State and Trait Anxiety Inventories

The validity of the Turkified inventory was determined by two different techniques. These are experimental concept validity, structure validity and criterion validity in the structure. In the validity study, the increases and decreases in state Anxiety Scores were determined consistently by Le Comte and Öner (1976) in multiple applications made over a period of time ranging from ten days to one year. 92 Necla Öner, Ayhan Le Comte, a.g.e. S. When calculating 15-16 points, the value of indirect statements is subtracted from the value of direct statements. 50 (fifty), which is determined as a base score, is added to the found result and a state anxiety score is found. In different times and applications, Oner found that the correlations between the state anxiety scores were on average around 0.62 and 41 significant levels; in this way, he saw that the second theoretical expectation was also confirmed. All these data were found to reinforce the theoretical construct validity of the state anxiety scale (Öner 1983).

2.3.3.Reliability of the State and Trait Anxiety Inventory

Kuder-Richardson formula 20 reliability coefficients Alpha for the scale of trait anxiety correlation identified with improved formula 83 and 87%; between state Anxiety Scale were between 94 to 96. The reliability Decisions of the form in Item Remainer reliability are between 71 and 86 for the Continuous Anxiety Scale and between 43 and 86 for the State Anxiety Scale. In the Test-Retest reliability, it was found that the reliability factors were between 71 and 86 for the Trait Anxiety Scale and between 26 and 68 for the State Anxiety Scale. These situations indicate that the Turkified articles are reliable (Öner 1983).

2.3.4.Implementation of Inventories

While the State and Trait Anxiety Scales are answered with the self–assessment method and pen–paper technique, these scales can be applied individually or in a group. Spielbereger's Trait Anxiety Inventory was applied to the subjects one (1) day before the competition, and the State Anxiety Inventory was applied 20 minutes before the competition. Research has been conducted on this topic using the method of scanning domestic and foreign sources. A preliminary interview was held with the coaches and the necessary assistance and permission were obtained for the implementation of the inventories.

2.4.Assumptions

The following assumptions will be made in the research, that the sample group taken by hand has the ability to represent the universe, that the questionnaires and inventories applied to the sample group are valid and reliable, that the information obtained from the sources and institutions reflect the truth, that the statistical methods to be applied are

valid and reliable, It is assumed that they correctly perceive the questionnaire.

2.5.Limitations

The research was limited to one measurement in the 2008 - 2009 season. The research was limited to 8 (eight) teams. The research was limited to 72 (seventy-two) people playing in 8 (eight) teams.

2.6 Statistical Analysis

SPSS 16.0 statistical program was used to evaluate the data and find the calculated values. The data were summarized by giving the mean and standard deviations. The One-Sample Kolmogorov-Smirnov test was used to test whether the data showed a normal distribution and it was determined that the data showed a normal distribution. ANOVA test was used to compare the anxiety scores of the teams according to their ranking in the league. In this study, the error level was taken as 0.05.

3. FINDINGS

Table 3.1. The average of the state and continuous anxiety scores of the teams participating in the research.

Variables		N	Average	Ss
Mutlu AKü SÜ	Age	7	23,71	3,498
	State Anxiety	7	40,29	9,214
	Continuous Anxiety	7	41,71	5,187
Beşiktaş CT	Age	11	23,00	2,720
	State Anxiety	11	38,64	12,699
	Continuous Anxiety	11	35,64	9,036
Darüşşafaka CT	Age	10	22,40	2,914
	State Anxiety	10	43,30	9,592
	Continuous Anxiety	10	37,40	9,913
Oyak Renault	Age	6	23,17	2,137
	State Anxiety	6	33,00	4,648
	Continuous Anxiety	6	37,33	11,308
T. Telekom	Age	8	23,25	2,816
	State Anxiety	8	38,12	6,958
	Continuous Anxiety	8	41,25	7,459
Mersin BŞB	Age	10	26,80	4,077
	State Anxiety	10	35,00	7,803
	Continuous Anxiety	10	39,90	9,219
Aliağa Pektim	Age	12	24,00	3,618
	State Anxiety	12	36,25	11.046
	Continuous Anxiety	12	36,92	10,766
Pınar Karşıyaka	Age	8	23,12	4,190
	State Anxiety	8	34,63	5,423
	Continuous Anxiety	8	34,38	2,264

Table 3.1. The average age of Mutlu Akü Selçuk University basketball team, one of the teams participating in the study, was found to be 23.71±3.498 years, the average state anxiety score was 40.29±9.214 and the average trait anxiety score was 41.71±5.187. Besiktas CT basketball team's average age was 23.00±2.720 years, the mean state anxiety score was 38.64±12.699 and the trait anxiety score was 35.64±9.036. The average age of the Daruşşafaka CT team was 22.40 ±2.914 years, the mean state anxiety scores were 43.30±9.592 and the mean trait anxiety scores were 37.40 ±9,913. The average age of the Oyak Renault team was 23.17±2.137 years, the average state anxiety score was 33.00 ±4.648 and the average trait anxiety score was 37.33±11.308.

Average age of the Telekom team was 23.25±2.816 years, the average state anxiety score was 38.12±6.958 and the average trait anxiety score was 41.25±7.459. The average age of the Mersin BSB team was 26.80±4.077 years, the mean state anxiety scores were 35.00±7.803 and the mean trait anxiety scores were 39.90±9.219. The average age of Aliağa Petkim team was found to be 24.00±3.618 years, the average State anxiety scores were 36.25±11.046 and the average Trait anxiety scores were found to be 36.92±10.766. The average age of the Pınar Karsiyaka team was 23.12±4.190 years, the mean state anxiety scores were 34.63±5.423 and the mean trait anxiety scores were 34.38±2.264.

Table 3.2. Comparison of the state and trait anxiety scores of the teams participating in the research

Variables		Total of Square	Mean of Square	F	p
State Anxiety	Between Teams	676,579	96,654	1,126	0,358
Continuous Anxiety	Between Teams	403,420	57,631	0,743	0,637

Table 3.2. when examined, when the state and trait anxiety scores of the teams participating in the research were compared in terms of the ranking they were in the league, no statistically significant difference was found between the teams' league rankings (P>0,05).

4. ARGUMENT

In this study, the relationship between the anxiety levels of the teams in the 2008-2009 Beko Basketball League and the league rankings were examined using the State and Trait Anxiety inventories translated into Turkish by Necla Öner and Le Compte, developed by Spielberk and his friends in 1964. The results that have been revealed coincide with the results that have been revealed in previous studies on Sports and Anxiety. Table 3.1. As can be seen, as a result of the findings obtained, the averages of the State and Trait Anxiety scores of the 8 teams participating in the study were taken and the average age was shown. In his research on taekwondo athletes, Yucel came to the conclusion that the low or high level of State and Trait anxiety of

athletes does not depend on the age of the subjects (19). —In a study on the State and Trait Anxiety Levels‖ in the Students of the School of Physical Education and Sports; While there was no difference between State Anxiety according to gender, Trait Anxiety scores were found Decisively higher in girls. The researcher argued that this situation is due to the difficulties of female students' learning lives, as well as their tendency to engage in intense exciting reactions such as distrust of others, possessiveness, restlessness, excessive emotionality and showing too much sensitivity under stress due to being away from their families (14). When the State and Trait anxiety scores of the teams participating in the study were compared in terms of the ranking they were in the league (table 3.2), no statistically significant difference was found between the teams' rankings in the league (P>0,05). —In a study on the Post-Competition State Anxiety Scores of Female Athletes Engaged in Team Sports, a statistically significant relationship was not found between the state anxiety scores of basketball players in terms of training age and team presence time(1).

The Effect of Success Motivation on State Anxiety Levels in Elite Athletes‖ As a result of the research of 55 female, 224 male and a total of 279 athletes participating in the study, no statistically significant differences were found when state anxiety levels were compared according to gender (5). -As a result of the study named‖ Comparing the Level of Constant Anxiety and Self-Esteem in Sports, there was no differentiation between the total score of Trait anxiety and Decency (15). In Engür's study, in which 279 athletes participated, the experiences of the athletes in the sport they were interested in were evaluated in terms of the average score of "State Anxiety" levels, and as a result, it was determined that there was no statistically significant difference in the average score of "State Anxiety" when it comes to the experiences of the athletes. 5). In another study, the athletes examined according to the training age and no significant difference was found between the two groups formed according to the training age (6). There was no statistically significant difference between the biological age, training age, gender, education level of the family, the level of participation in the competitions, the environment in which they grew up, and state anxiety and trait anxiety of the athletes (19).

	Teams	P	W	D	T	A	Av	P
1	Efes Pilsen	30	28	2	2615	2156	459	58
2	T. Telekom	30	22	8	2489	2319	170	52
3	Fenerbahçe Ü.	30	22	8	2558	2124	434	52
4	Galatasaray CC	30	20	10	2321	2196	125	50
5	Beşiktaş CT	30	18	12	2485	2398	87	48
6	Antalya BŞB	30	17	13	2466	2529	-63	47
7	Mersin BŞB	30	15	15	2496	2425	71	45
8	Darüşşafaka CT	30	14	16	2239	2319	-80	44
9	Pınar Karşıyaka	30	13	17	2324	2440	-116	43
10	Oyak Renault	30	13	17	2268	2308	-40	43
11	Erdemir	30	12	18	2178	2269	-91	42
12	Banvit	30	12	18	2536	2626	-90	42
13	Kepez Belediye	30	11	19	2299	2479	-180	41
14	Aliağa Petkim	30	10	20	2321	2459	-138	40
15	Mutlu Akü SÜ	30	10	20	2303	2517	-214	40
16	Casa TED	30	3	27	2058	2392	-334	33

Figure 4.1. 2008-2009 Beko basketball end of season ranking

4.1.Evaluation of the Anxiety Levels of the Players According to the Teams 4.1.1.Evaluation of Anxiety Levels of Mutlu Akü Selçuk University Players: The average age of Mutlu Akü Selçuk University basketball team was found to be 23.71±3.498 years, the average state anxiety scores were found to be 40.29±9.214 and the average Trait anxiety scores were found to be 41.71±5.187. When we look at the place of Mutlu Akü Selcuk University, whose State Anxiety level is below normal, and whose Trait Anxiety level is normal, we see that it finished the league in the 15th rank and was relegated. Selçuk University, which started the league with a small budget, caught the feeling of being a team with the successful transfers it made, but especially towards the end of the season, it lost motivation and was relegated.

4.1.2.Besiktas CT. Assessment of Players' Anxiety Levels: Besiktas CT basketball team's average age was 23.00±2.720 years, the mean state anxiety score was 38.64±12.699 and the trait anxiety score was 35.64±9.036. Beşiktaş CT, whose State Anxiety average is low and Trait Anxiety average is normal, finished in 5th place. As at the beginning of every season, he started the league with big goals and had the opportunity to play the playoffs, but he could not manage the aimed goals.

4.1.3.Assessment of Anxiety Levels of Darüşşafaka CT Players The average age of the Daruşşafaka CT team was 22.40 ±2.914 years, the average State anxiety levels were 43.30±9.592 and the average Trait anxiety levels were 37.40 ±9.913. Darüşşafaka CT, whose State Anxiety was below normal, and whose Trait Anxiety was at a normal level. started the league with the financial support of a big company and finished the season in 8th place by playing the playoffs.

4.1.4. Assessment of the Anxiety Levels of Oyak Renault Players: The average age of the Oyak Renault team was 23.17±2.137 years, the average state anxiety score was 33.00 ±4.648 and the average trait anxiety score was 37.33±11.308. Oyak Reno, who has a low State Anxiety level and a normal Trait Anxiety level, started the league with big goals by backing the financial power of the world giant company, but finished the league in 10th place.

4.1.5. Assessment of Anxiety Levels of Türk Telekom Players: The average age of the Türk Telekom team was 23.25±2.816 years, the average State anxiety score was 38.12±6.958 and the average Trait anxiety score was 41.25±7.459. With a low State Anxiety level and a normal Trait Anxiety level, Türk Telekom made very good transfers using its financial strength and tried to reach its goals in the league with the support of its fans. Finishing the regular season in the 2nd place, Türk Telekom won the right to play in the semi-finals in the playoffs.

4.1.6.Assessment of Anxiety Levels of Mersin Büyük Şehir Players: The average age of the Mersin BSB team was 26.80±4.077 years, the mean state anxiety scores were 35.00±7.803 and the mean trait anxiety scores were 39.90±9.219. The team with a low level of State Anxiety and a normal level of Trait Anxiety signed agreements with major sponsors in the league, and the team that struggled with well-established clubs with the support of the local government and local industry groups achieved very successful results in the league. It finished the regular season in 7th place and qualified for the playoffs and was eliminated in the first round.

4.1.7. Assessment of Anxiety Levels of Ali Ağa Pektim Players: The average age of Aliağa Petkim team was found to be 24.00±3.618 years, the average State anxiety scores were 36.25±11.046 and the average Trait anxiety scores were found to be 36.92±10.766. The İzmir team, which has a low level of State Anxiety and a normal level of Trait Anxiety, started the league with big goals, taking by the support of a big company. The team, which finished the regular season in the 14th place, could not raise the motivation of the team to the desired level due to the problems with the sponsor company throughout the league, and they prevented their relegation from the league with the successful matches they played in the last weeks.

4.1.8. Assessment of Anxiety Levels of Pınar Karsiyaka Players The average age of the Pınar Karsiyaka team was 23.12±4.190 years, the average State anxiety scores were 34.63±5.423 and the average Trait anxiety scores were 34.38±2.264. The well-established Izmir team, whose State Anxiety level is low and Trait anxiety level is normal, finished the regular season in 9th place, remaining below the expected targets of the ardent supporter group and the sponsor company. In the statistical values obtained as a result of the study, we see that although the State and Continuity anxiety levels of Mutlu Akü Selçuk University team and Türk Telekom team are very close to each other, Türk Telekom's league is in the second place and Selcuk University's Beko Basketball league has fallen. Although the places of these two teams in the league rankings are not so different, it has been revealed that Anxiety is not a determining factor in terms of the league rankings of the teams in this study, by looking at the statistical results. As it can be understood, it should be taken into consideration that there may be many factors that can be effective in the place of the teams in the league ranking, together with the anxiety. This study that we have done coincides with the results of previous studies on Sports and Anxiety.

5. CONCLUSIONS AND RECOMMENDATIONS

All this has shown that; In this study, in which the state and trait anxiety levels of the teams in the 2008–2009 BEKO Basketball League were examined, and their status in the league rankings, when the state and trait anxiety scores of the teams participating in the research were compared in terms of their league rankings (Table 3.2), no statistically significant difference was found between the league rankings of the teams. ($p>0.05$). Knowing the physical, psychological and technical characteristics of athletes are indispensable elements in determining training and competition strategies. Today's basketball requires appropriate technique, physical structure and psychological characteristics. There is no doubt that at the beginning of the league, each team sets big goals within its possibilities, some teams aim for the top eight, while some teams aim for leadership and success in Europe, and some aim only to stay in the league. These goals should be in proportion to the

characteristics of the athletes, the opportunities offered by the club to the players, and goals that cannot be achieved with the characteristics they have should not be created.

In order to eliminate or minimize the fear of winning and losing, which prevents them from achieving success by creating anxiety, it is necessary to identify the reasons that increase the anxiety level in the athlete one by one. This is possible with good observation and the use of tests to determine the level of anxiety. However, giving the athlete the necessary techniques and tactics before training and competition can reduce the anxiety. Knowing the physical, psychological and technical characteristics of athletes are indispensable elements in determining training and competition strategies. Today's basketball requires appropriate technique, physical structure and psychological characteristics. Anxiety is a subject within the psycho-social dimension of sports and it has a direct and sometimes indirect connection with performance. However, in order to fully associate performance with anxiety, more valid results can be obtained with more subjects by making frequent long-term measurements. It is thought that technical staff should give importance not only to the development of physical skills, but also to programs for the development and acquisition of psychological skills. At the same time, it was concluded that optimal anxiety is necessary for the athlete to achieve the aimed performance.

As a result; Table 3.2 In our study on the Assessment of State and Trait Anxiety Levels of Basketball Players by League Ranking, when the table is examined, when the state and trait anxiety scores of the teams participating in the research are compared in terms of their league ranking, no statistically significant difference was found between the league rankings of the teams. (P>0.05). According to the results obtained in this study, we can make these recommendations. Purpose of the study, managers of the teams that will be included in the study and their participation in the study by explaining to the athletes should be short and concise in a way that ensured each of our clubs and athletes to have a sports psychologist on site should psycho – social problems in the solution of player, coach and continuous communication between a psychologist must review. While evaluating the performances of the players, the anxiety levels of the players should also be evaluated together with the performance analyzes. In order to obtain healthier results, measurements should be made at frequent intervals and with a large number of subjects.

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Sports Participation Motivation in Disabled Individuals

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Abstract

With this research, it was aimed to measure the motivation levels of individuals with disabilities studying at Selçuk University to participate in sports. In the study, the "Motivation Scale for Participation in Sports for Individuals with Disabilities" developed by Tekkurşun et al. (17) was used and applied to a total of 87 volunteer participants, 35 women (40.2%) and 52 men (59.8%). In the study, the scanning method was used and in order to determine the differences between the variables, the Mann Whitney U test was used to compare the differences between two independent groups, and the Kruskal Wallis test was used to compare more than two independent groups. As a result of the analysis, no significant difference was observed in the motivation levels of disabled individuals for participation in sports in terms of gender and age factors. On the other hand, as a result of the analysis of the individuals' types of disabilities and the types of sports they do, there was a significant difference in the motivation levels of participation in sports. It has been determined that the extrinsic motivation levels of visually impaired individuals are significantly lower than those of physically disabled and hearing impaired individuals. In addition, it was found that the internal and external motivation levels of individuals who do individual sports are significantly higher than those who do not do any sports. As a result, the concept of motivation has a very important place in every aspect of human life. The concept of motivation is much more important for individuals with a disability, which sometimes arises due to genetic factors and sometimes by being exposed to various negative situations in the ordinary course of life. It is a very valuable phenomenon for them to express themselves in daily life, to be valued and respected, to hold on to life, and to increase their life expectancy. One of the biggest factors that gather people under one roof and support the individual both emotionally and physically in sports. It is a known fact that individuals who live their lives in a limited way are physically and psychosocially motivated by participating in various physical activities, and their situation of seeing themselves as inadequate or inadequate to other people is somewhat eliminated. With this power of sports, the life expectancy of individuals who feel inadequate will increase and their inadequacies will be felt to a lesser extent.

Keywords: Motivation , Persons with Disabilities, Types of Disability, Sports

Engelli Bireylerde Spora Katılım Motivasyonu

Özet

Bu araştırma ile Selçuk Üniversitesi'nde öğrenim gören engelli bireylerin spora katılım motivasyon düzeylerinin ölçülmesi amaçlanmıştır. Araştırmada Tekkurşun ve ark (17) tarafından geliştirilen "Engelli Bireylerde Spora Katılım Motivasyonu Ölçeği" kullanılmış ve 35 kadın (%40,2) ve 52 erkek (%59,8) olmak üzere toplam 87 gönüllü katılımcıya uygulanmıştır. Çalışmada tarama metodu kullanılmış olup değişkenler arası farkları belirlemek amacıyla bağımsız iki grup arasındaki farkların karşılaştırılmasında Mann Whitney U testi, ikiden fazla bağımsız grupların karşılaştırılmasında ise Kruskal Wallis testi uygulanmıştır. Yapılan analizler sonucunda engelli bireylerin spora katılım motivasyon düzeylerinde cinsiyet ve yaş faktörlerinde anlamlı düzeyde farklılık görülmemiştir. Ancak bireylerin engel türlerine göre ve yaptıkları spor türlerine ilişkin analiz sonucunda spora katılım motivasyon düzeylerinde anlamlı şekilde farklılaşma ortaya çıkmıştır. Görme engelli bireylerin dışsal motivasyon düzeylerinin bedensel engelli ve işitme engelli bireylere göre anlamlı düzeyde düşük olduğu tespit edilmiştir. Ayrıca bireysel spor yapan bireylerin hiç spor yapmayan bireylere göre içsel ve dışsal motivasyon düzeylerinin anlamlı olarak yüksek olduğu ortaya çıkmıştır. Sonuç olarak motivasyon kavramı insan hayatının her alanında oldukça önemli bir yere sahiptir. Bazen genetik faktörlere bağlı olarak bazen de hayatın olağan akışı

içerisinde çeşitli olumsuz durumlara maruz kalarak ortaya çıkan engellilik durumuna sahip bireyler için motivasyon kavramı çok daha fazla önem arz etmektedir. Nitekim günlük yaşam içerisinde kendilerini ifade edebilmeleri, değer ve saygı görmeleri onların hayata tutunmaları ve hayat beklentilerini artırmaları açısından oldukça değerli bir olgudur. İnsanları tek bir çatı altında toplayan ve bireye hem duygusal hem de fiziksel olarak destek veren en büyük etkenlerden birisi de spordur. Hayatı kısıtlı şekilde yaşayan bireylerin çeşitli fiziksel aktivitelere katılarak fiziksel ve psikososyal olarak motive oldukları ve kendilerini diğer insanlardan eksik ya da yetersiz görme durumlarının bir nebze ortadan kalktığı bilinen bir gerçektir. Sporun bu gücüyle birlikte kendini yetersiz hisseden bireylerin hayat beklentisi artacak ve yetersizlikleri de bir nebze olsa az hissedilecektir.

Anahtar Kelimeler: Engelli Bireyler, Engel Türleri, Motivasyon, Spor

INTRODUCTION

Some individuals in society have been exposed to some inadequacies due to developmental factors, sometimes congenital and sometimes due to environmental reasons brought by life, and they have chosen to maintain their lives in this way. Restriction of movements, lack of limbs, and sensory, emotional, or mental losses directly or indirectly affect people's social lives (19). The fact that individuals are affected by deficiencies and experience mental or physiological losses by being classified according to the degree of these deficiencies makes them different from other individuals in society (4). Several organizations have been established so that disabled people can lead a better quality of life, struggle with the problems they face, and overcome their difficulties, and the opportunities offered by these organizations have become very important for them to lead a more comfortable life (19).

According to data from the World Health Organization (WHO), the number of disabled people in the world is more than 1 billion and individuals can encounter a temporary or permanent disability at any stage of their lives. This number is increasing day by day due to demographic trends and chronic health conditions. In addition, it is known that the immune systems of disabled individuals are weaker than other healthy individuals and the risk of contracting diseases is higher. Especially today, with the Covid-19 epidemic, it is seen that disabled people are at more risk. For this reason, it is necessary to provide quality services for people with disabilities in health systems, especially in primary health care units (5, 26). The World Health Organization draws attention to the fact that the most important element among the services offered to society is physical activities, and every living thing that can survive needs to act instinctively. Physical activity has an important place, especially in the health sector, and contains many psychological factors and constitutes an important source of motivation for people with disabilities (1).

Motivation is a phenomenon that is used to determine the needs, behaviors, and desires of individuals, arouses desire and excitement in the fulfillment of the actions necessary for success, provides action for the action to be taken, and pushes individuals to action. The concept of motivation (20), which is known to derive from the root of "movere", "motum", which means action in Latin, generally includes wishes, needs, and interests, as well as directs the energy of action-oriented behavior. The concept of motivation is a broad concept that has an impact in every field that aims to explain the behavior of individuals, and it has undoubtedly found a wide place in the field of sports (25).

Disability is seen as a major disadvantage that individuals face in adapting to actions. Adaptation is another concept related to the extent to which individuals can fulfill their social requirements, and adaptation is a fundamental phenomenon that makes their lives easier by making individuals feel less of a disability. Sports are seen as one of the biggest mechanisms that are effective in enabling individuals with disabilities to adapt to social life and to carry out activities in unity and solidarity on equal terms with other members of society without any difference (17). In addition, sport is a concept that helps individuals to perform their actions in social life and is directly related to harmony and motivation.

While acting, individuals are sometimes motivated by external reasons such as reward, pressure, and punishment, or by internal reasons such as curiosity, interest, and need. Therefore, motivation is experienced in two different ways as intrinsic and extrinsic motivation (13, 19).

Sport is an important element that enables people to interact with other people individually and socially, and it is also a very comprehensive gain due to the physical and social contributions it will bring to the person. When we consider the income that an elite athlete can earn from his achievements, sports are also a good economic gain. The statement in

Article 59 of the 1982 constitution that "The State takes measures to improve the physical and mental health of Turkish citizens of all ages and encourages the spread of sports to the masses" has great meaning for the development of sports. Based on the principle that every individual can do sports, this situation has a very important position for disabled and non-disabled individuals (25). It is possible to see the positive effects of sports in individuals with normal development, but it is possible to see the same effects in individuals with disabilities with correct and personalized training, accompanied by expert trainers, and community and family support. Every organization held is an experience and a social interaction for people with disabilities. In addition, sports organizations and sports fields directly affect individuals and add value to them in terms of personal and social development (17).

The participation of people in physical activity provides physiological, mental, and psychological benefits and plays an important role in balancing the energy necessary for a healthy life in daily life. In addition, it is seen that body mass indexes are high in individuals who do not regularly engage in physical activities and do not do sports. The fact that this rate is high brings with it physical and psychological problems (3). Body mass index by the World Health Organization (WHO); 18.5 kg/m² and below are underweight, 18.5-24.9 are normal, 25-29.9 are overweight and 30-34.9 are I degree obese, 35-39.9 are II. If the degree is obese, 40 kg/m² and above, III. It is classified as grade (morbid) obese (27).

No matter what sport they are in, raising good athletes is subject to great effort and a long work process (7). The increase in the age categories in the competitions and the more competitive structure of the organizations cause individuals to need more motivation in every branch. However, the increase in diversity in social activities that individuals can participate in with advancing age causes them to spend their time in different areas, so their participation and motivation levels in sports decrease (15). In the research, it has been stated that the competitive performance of individuals with high motivation levels is also high. It is thought that individuals with high motivation to participate in sports, especially among the disabled, will both increase their continuity in sports and have positive reflections on themselves, their environment, and their families. Sport means communication, socialization, and interaction for individuals with disabilities. With planned exercises, people's life energy increases, and their self-confidence increases (16, 17).

As a result, taking part in sports or any physical activity should be seen as a different identity, another personal design for each individual with or without a disability, and by creating the necessary motivational conditions, sports can make life healthy, fit, in society rather than being a necessity. It should express an inner necessity to live with society. In particular, it may be possible (although very few) to remove some people with disabilities from the world they have established by isolating themselves from society and living in isolation, by participating in sports or physical activity and to ensure their motivation toward life and success. In addition, a positive connection will be established between them and life thanks to the status and self-confidence they will gain through sports. Therefore, in almost all countries of the world, sports and physical activity are among the top sources used for the improvement, reintegration, and re-motivation of disabled people. The research, "Motivation of Participation in Sports of Individuals with Disabilities", whose importance and impact area is growing day by day, has been discussed and tried to be supported by literature studies.

MATERIAL METHOD

The aim of this study is to examine the motivation of individuals with disabilities studying at Selcuk University to participate in sports. In the report announced by Selcuk University Disabled Students Unit Coordinator, it is stated that there are 256 disabled students studying in 2022. Due to the fact that there are students studying in the districts, the research was carried out in the center of Selcuk University. (29)

This research was approved by the ethics committee report numbered 121 of the Faculty of Sports Sciences of Selcuk University.

Model of the Research

In the research, the "Scale of Motivation to Participate in Sports for Persons with Disabilities" was used. (17). A scanning method was applied in the study, in which the questionnaires applied to disabled individuals were evaluated together with gender, age, types of disabilities, and the types of sports they did. In this study, the scanning method was used to reveal what the current situation is. The screening method is a research method that aims to describe an existing situation as it is (9).

Universe and Sample

While the population of the research consists of disabled individuals studying at Selcuk University, the sample group consists of 87 disabled individuals, 35 women and 52 men, who participated voluntarily. Physically, mentally, visually and hearing impaired individuals participated in the study. In addition, there are those who do individual sports or team sports among those who participate.

Data Collection Tools

Demographic Information Form:

The demographic information form developed to collect data about the participants' gender, age, disability types, and the type of sports they do was prepared by the researchers.

The scale of Motivation to Participate in Sports for Persons with Disabilities (ESKMÖ):

"The Scale of Motivation to Participate in Sports for Persons with Disabilities" is a scale consisting of 22 items and 3 sub-dimensions developed by Tekkurşun et al. (17). "Intrinsic motivation", "extrinsic motivation" and "non-motivation" shows the three sub-dimensions of the scale. Intrinsic motivation and extrinsic motivation contain positive items. Since the sub-dimension of motivation contains negative items, it should be scored in reverse coding. Scoring on the 5-point Likert-type scale ranges from 1 to 5 and is arranged as "1 = Strongly Disagree", "2 = Partially Disagree", "3 = Moderately Agree", and "4 = Agree", "5 = Strongly Agree". As the scores on the scale increase, the motivation of individuals to participate in sports increases.

Analysis of Data

"Statistical Package for Social Sciences" (SPSS) Version 22.0 statistical program was used in the statistical analysis of the data obtained from the study. Since Kolmogorov-Smirnov values were $p<0.05$ in the analysis of the normality test, nonparametric tests were applied to the data obtained. Significance was accepted as $p<0.05$. (21).

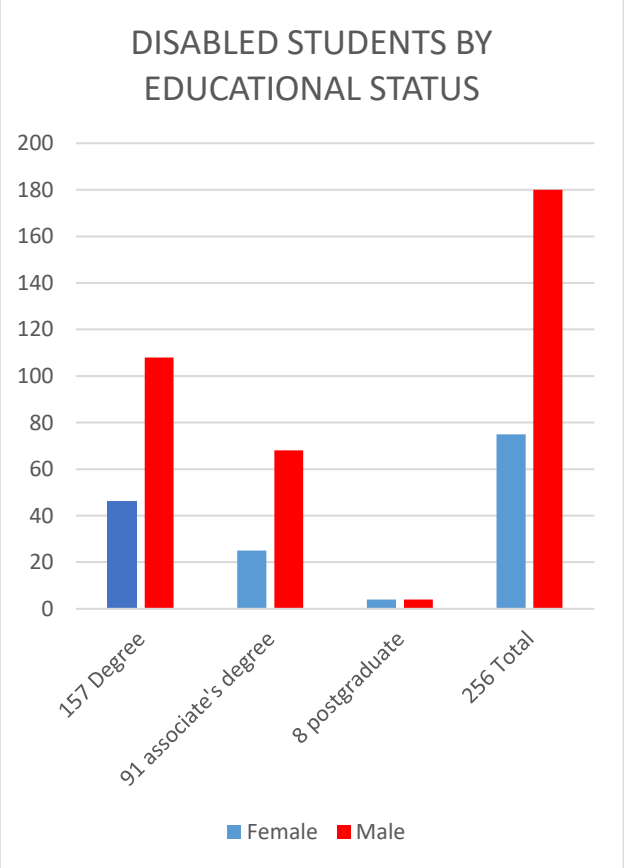
Table 1. Results of Normality Test

	Kolmogorov-Smirnov			Shapiro-Wilk		
Variables	Statistic	df	Sig.	Statistic	df	Sig.
Intrinsic Motivation	,141	87	,000	,891	87	,000
Extrinsic Motivation	,097	87	,044	,960	87	,009
Lack of motivation	,146	87	,000	,914	87	,000
p<0.05						

Descriptive statistics were used to define the characteristics of the participants, the Mann-Whitney U test was used to compare the differences between two independent groups, the Kruskal Wallis test was used to compare more than two independent groups, and the Tukey posthoc comparison test was used to determine between which groups the difference was.

RESULTS

In the research, the number of students studying in 2022, announced by Selçuk University Disabled Unit Coordinator, is given.In this part of the study, the results of the analysis of the data obtained following the general purpose of the research are given.



Graphic 1. Educational Status of Persons with Disabilities (29).

Table 2. Descriptive Statistics Results of the Data

		N	%
Gender	Female	35	40,2
	Male	52	59,8
Age	10-20	18	20,7
	21-30	50	57,5
	31-40	9	10,3
	41 and above	10	11,5
Obstacle Type	Physically Handicapped	18	20,7
	Blind	18	20,7
	Hearing İmpairment	26	29,9
	Mentally Handicapped	25	2,3
Sport Type	Individual Sports	40	46,0
	Team Sport	13	14,9
	Not Doing Sports	34	39,1
Total		87	100,0

The analyses obtained by applying ESKMÖ are given as a descriptive statistical table in Table 2. In the table, it is seen that 40.2% (35) of the participants are women and 59.8% (52) are men.

Table 3. Comparison of Data According to Gender Variable

Variables	Gender	Average Number of Rows	Mann-Whitney U	Z	p
Intrinsic Motivation	Female (N=35)	47,36	792,500	-1,019	,308
	Male (N=52)	41,74			
Extrinsic Motivation	Female (N=35)	44,11	906,000	-,035	,972
	Male (N=52)	43,92			
Lack of Motivation	Female (N=35)	44,96	876,500	-,291	,771
	Male (N=52)	43,36			
p<0.05					

Deciphering Table 3, it was found that there was no significant difference between the motivational values of the male and female participants participating in the research (p>0.05).

Table 4. Comparison of Data According to Age Variable

Variables	χ2	p
Intrinsic Motivation	2,927	,403
Extrinsic Motivation	7,386	,061
Lack of Motivation	3,223	,359
p<0.05		

When the analysis results of the individuals participating in the study were examined according to the age variable, there was no significant difference in the dimensions of intrinsic motivation, extrinsic motivation, and unmotivated (p>0.05).

Table 5. Comparison of Data According to the Types of Disabilities of Individuals

Variables	χ2	p
Intrinsic Motivation	6,077	,108
Extrinsic Motivation	13,295	,004*
Lack of Motivation	5,395	,145
p<0.05		

In Table 5, the results of multiple comparisons of disabled individuals according to their disability types are given. No significant difference was found in the dimensions of intrinsic motivation and motivation (p>0.05). On the other hand, in the results obtained, a significant difference was found in the extrinsic motivation dimension according to the disability types of the individuals (p<0.05). The multiple comparison analysis showing the differences between the participants is given in Table 6.

Table 6. Multiple Comparison Results by Disability Types of Individuals

Tukey HSD				
Dependent Variable	Disability Situation	Disability Situation	Mean Difference	Sig.
Extrinsic Motivation	Physically Handicapped	Blind	4,66667*	,015*
		Hearing İmpairment	,25641	,998
		Mentally Handicapped	3,15333	,120
	Blind	Physically Handicapped	-4,66667*	,015*
		Hearing İmpairment	-4,41026*	,012*
		Mentally Handicapped	-1,51333	,705
	Hearing İmpairment	Physically Handicapped	-,25641	,998
		Blind	4,41026*	,012*
		Mentally Handicapped	2,89692	,113
p<0.05				

When the results of the multiple comparison analysis made according to the disability types of the individuals in the extrinsic motivation dimension are examined, it is seen that there is a significant difference between the visually impaired individuals and the physically and mentally disabled individuals (p<0.05). The mean values of visually impaired

individuals were found to be quite low compared to individuals with physical and auditory disabilities.

Table 7. Comparison of Data by Types of Sports

Variables	χ2	p
Intrinsic Motivation	11,071	,004*
Extrinsic Motivation	12,171	,002*
Lack of Motivation	1,984	,371
p<0.05		

When the multiple comparison results obtained according to the type of sport that the individuals participating in the study were doing were examined, the dimensions of intrinsic motivation and extrinsic motivation were significantly different (p<0.05). There was no significant difference in the demotivation sub-dimension (p>0.05). The multiple comparison analysis results showing the differences between the individuals according to the types of sports are given in Table 8.

Table 8. Multiple Comparison Results According to the Sport Type Variable

Tukey HSD				
Dependent Variable	Type of Sport	Type of Sport	Mean Difference	Sig.
Intrinsic Motivation	Individual Sport	Team Sports	4,78462	,388
		Not Doing Sports	7,51765*	,016*
	Team Sports	Individual Sport	-4,78462	,388
		Not Doing Sports	2,73303	,742
Extrinsic Motivation	Individual Sport	Team Sports	3,46731	,052
		Not Doing Sports	3,51029*	,004*
	Team Sports	Individual Sport	-3,46731	,052
		Not Doing Sports	,04299	1,000
p<0.05				

The results of the analysis of the participants according to the types of sports are given in Table 8. Participants in individual sports, team sports, or any other sports aren't the results when we examined the size of individual intrinsic motivation who don't do any sports with individuals who play sports no significant difference was observed between individuals (p<0.05). It was found that the average values of the participants who did individual sports were higher than the participants who did not do sports at all. On the other hand, when the exogenous motivation dimension was examined, it was seen that there was a significant differentiation between those who do individual sports and those who do not do sports at all (p<0.05). This differentiation shows that the average values of the participants who do individual sports are higher than the participants who do not do sports at all.

Discussion and Conclusion

The study, which was conducted to investigate the motivations of disabled people to participate in sports, was conducted with 18 physically disabled, 18 visually impaired, 26 hearing impaired, and 25 mentally disabled individuals.

There was no significant difference in terms of gender in the findings obtained as a result of our research (Table 2). Abdullah et al. (1) conducted a study on the levels of participation in physical activity of hearing impaired individuals and as a result, there was no significant difference in the findings between the sexes. In a study Deciphering the motivation levels of physically disabled elite athletes to participate in sports, no significant difference was found between male and female participants (25). In addition, in a study conducted by Çakır (3), in which individuals' motivations for participating in physical activity were measured, it was found that the gender factor did not make a significant difference. These results are consistent with the findings of our study.

In their study, Tekkurşun and Ilhan (19) assessed in terms of gender and concluded that the demotivation scores of visually impaired female athletes were significantly higher than male athletes. It has been found that the scores of women differ Decisively compared to men in the dimensions of extrinsic motivation and intrinsic motivation in the gender variable among hearing impaired individuals. In another study in which the motivations of tennis athletes to participate in sports were examined, it was concluded that there was a significant gender-related difference in the motivation of athletes to participate in sports, and it was found that the level of significance was in favor of female athletes in the competition sub-dimension (7). On the other hand, in the study conducted by Şirin et al (15), a statistical difference was found in the dimensions of entertainment, competition, and movement /activity. It has been observed that the average of men is higher than women in the dimensions of entertainment and movement/activity, and the average of women is higher than men in the competition dimension.

In a study that examined the awareness of the effects of sports in individuals with mental disabilities, a significant level of difference was found in favor of women in the gender factor (4). Also Yalçın (22), individuals with hearing impairment futsal athletes by sport-specific achievement motivation are examined in the study, it was observed that there are differences in terms of gender, female and male participants according to participants, and it was determined that the average scores were higher.

As is known, life is a turbulent process that brings with it several problems that increase with age, and the most basic need that allows you to survive and hold on to life in this process is motivation. Although motivation is a fairly general concept that can be adapted to any age and field, it is the main force that provides movement on the way to success. The fact that no significant differences were found when the age variable was taken into account in our research increases the importance of showing a motivated tendency to cope with problems and obstacles. As age progresses, the time allocated for leisure activities increases in individuals, while the time allocated for participation in sports decreases due to several internal or external factors. However, one of the basic building blocks that guide the health, time, and physical and psychological well-being of individuals in sports. When the research in the literature is examined, Şirin (14) stated that there is no relationship between age and motivation to participate in sports in the direction of positive significance. Yaşar (23) handicapped athletes by sport-specific achievement motivation that is evaluated in another study, significant findings were obtained according to the age variable and showed significant differentiation between the age group 24-29 age group 36-41. On the other hand, Tekkurşun and Ilhan (18) found a moderate positive difference between the Deficiency and intrinsic motivation dimensions in their study. In a study that examined the motivation levels of individuals to participate in physical activity, a low level of positive difference was found between age and the environmental causes sub-dimension (12). In another study in which the motivations of individuals to participate in sports were examined, a significant difference was observed in the success status and competition sizes according to the age variable (7).

In our study, in which the motivations of disabled individuals to participate in sports were investigated, the motivations of contributing individuals to participate in sports were examined according to the types of disabilities, and it was found that there was a significant difference in the dimension of extrinsic motivation (Table 5). A multiple comparison test was applied to Decipher which types of obstacles caused the difference (Table 6). It has been found that there is a significant difference in the dimension of extrinsic motivation between visually impaired individuals and physically Decimated and hearing impaired individuals. The average values of visually impaired individuals gave very low results compared to individuals with auditory and physical disabilities. The results show that visually impaired individuals maintain their social lives with much greater difficulties compared to individuals with hearing disabilities or any physical disabilities. At this point, a conclusion such as characterizing one obstacle as different or easier than the other should never be drawn. In one case, it may be about not being able to hug your loved one, in another, not being able to see what you love, or in another, not knowing the voice of your favorite, while perhaps not knowing at all. Each organ or limb has important tasks that are separated to meet the requirements of social life. However, it is more difficult for individuals with visual disabilities to continue their lives by touching or hearing only than other individuals. Based on this situation, it should be easier for them to achieve their goals with more advanced technology by taking measures to facilitate their lives in society, in their social lives, and their own living spaces. A world in which they can live on equal terms with other individuals in a society due to their losses at various levels in their physical, mental, spiritual, or sensory abilities will offer a positive way of life among other individuals in society. Article of Law No. 5378 “the fundamental rights and freedoms of disabled people by providing and promoting the benefits of and respect for the inherent dignity of individuals by strengthening their full and effective participation of social life on equal terms with other preventive measures to be taken to ensure the necessary arrangements to be made and disability,” he says, and the article people with disabilities, their families, agencies, and organizations which provide services for the disabled covers and other related products (28). In the literature reviews, results were found that support the findings of our research. In the findings of the study conducted by Tekkurşun and Ilhan (19), multiple comparison results were examined according to disability types and it was seen that significant and different results were reached in the

dimensions of intrinsic motivation, extrinsic motivation, and unmotivated. More studies about individuals with disabilities and disabled individuals have identified lack of motivation as a significant difference in the size of the existing diversity levels in visually impaired individuals was higher than the stated lack of motivation (11). In addition, Çelenk (5) in his study on participation in physical activity by disability type, found a statistically significant difference in the total scores of physically, visually, and hearing impaired individuals in the levels of difference in disability type and in the sub-dimensions between individuals who do sports and those who do not.

The positive effects of doing sports in human life are quiet a lot. It is possible to see these positive effects in individuals participating in both individual and team sports. In our study, the results of the analysis were examined according to the type of sports performed by disabled individuals. According to the results obtained, there was a significant difference in the dimensions of intrinsic motivation and extrinsic motivation (Table 7). A multiple comparison test was applied to Decipher between which groups this difference is (Table 8). There was a significant difference between individuals who do individual sports and individuals who do not do sports at all in the intrinsic motivation dimension. In addition, in the dimension of extrinsic motivation, differentiation has been Deciphered between individuals who do individual sports and individuals who do not do sports at all. Field-related studies examined Tekkursun and Ilhan's (19) size of individual intrinsic motivation of individuals who play sports handicapped, visually impaired, and hearing impaired individuals have revealed that significantly differed compared to. In addition, they stated that visually impaired individuals make a significant difference in the dimension of extrinsic motivation compared to physically disabled and hearing impaired individuals. When the results of individuals who play team sports are examined, it is seen that physically disabled individuals differ in the intrinsic motivation dimension compared to visually impaired and hearing impaired individuals. On the other hand, it has been determined that the scores of physically disabled individuals who play team sports are significantly higher in the dimension of lack of motivation compared to visually impaired and hearing impaired individuals. In a study conducted between hearing impaired individuals who play sports and hearing impaired individuals who do not play sports, significant differences were found in the assertiveness of individuals who play sports and those who do not, and the average values of individuals who play sports Decisively differed (24). In another study in which the self-esteem of hearing impaired individuals were investigated, it was found that athletes and non-athletes differ significantly. The values of athlete individuals were found to be quite high compared to non-sport individuals (8). In addition, the motivation levels of physically disabled elite level athletes to participate in sports were examined and it was found that individuals who have a second branch at the elite level differ significantly compared to those who do not. When the results of the analysis were examined, a significant difference was found in the levels of intrinsic motivation and extrinsic motivation (25). The results obtained from this reveal that a second sports branch can make a difference even between individuals who play sports. In a study investigating the effect of sports on life skills, a statistically significant difference was found between those who practice sports and those who do not Çelenk (5) in the average and sub-dimensions of the total scores of physically, visually, and hearing impaired individuals. On the other hand, Polat et al. (13) examined competitive athletes and individuals who play sports recreationally. When the results of the analysis were examined, it was found that the motivation of the competitive athletes in sports differed significantly compared to the individuals who play sports recreationally. In a study in which the motivations of individuals to participate in physical activity were examined according to their playing status in the school team, it was observed that those who did not play in the school team differed significantly compared to the individuals who played in the school team (12).

In a study conducted by Çar et al (4), individuals were compared according to their sports playing status, but there was no difference.

The concept of motivation is very important in all areas of life, especially in the areas that individuals do on a daily routine basis. Sometimes genetic factors, and sometimes congenital or subsequent adverse conditions can force individuals to live a limited life. It is a well-known fact that individuals who are forced to live life with restrictions are physically and psychosocially motivated by participating in physical activities, and their situation of seeing themselves as deficient or inadequate by other people disappears to some extent. Sports have

the power to bring all individuals under the same roof under equal conditions. With this power, the life expectancy of individuals who consider themselves inadequate will also increase. However, some situations that keep individuals busy in daily life may reduce the participation rate in sports or the time allocated to sports. In their study, Esatbeyoğlu and Karahan (6) considered the barriers of disabled people to participate in physical activities primarily in two groups, environmental and individual and identified the sub-causes as social, physical, economic, psychological, and disability status. In general, when we look at the literature and the results obtained from the findings of our research, it is seen that the motivation of individuals with a low level of participation in sports is also low. As a matter of fact, in our research, it has been revealed that individuals who do individual sports differ significantly compared to individuals who do not do sports at all. Based on the results, it is seen that the motivation levels of individuals who can motivate themselves individually, find psychological strength in themselves, do not see their deficiencies as an obstacle, and can fight back in response are much higher than individuals who have never played sports. Being in different social environments, playing sports, receiving support or providing support, and interacting with others gives individuals the motivation to stand on their own feet, so individuals' intrinsic motivation levels also increase. In addition, when the positive effects of sports on physical appearance are noticed by people's social circles, the individual will be appreciated and rewarded with praise. This situation will affect extrinsic motivation just as it does intrinsic motivation. For this reason, the meaning and value attributed to sports express the same importance and value for disabled individuals as it means for healthy individuals. The range of opportunities offered by sports to individuals affected by various disabilities is quite wide. In addition to the physical benefits, there are also very important benefits such as making you feel good psychologically, improving problem-solving skills, and providing effective communication. These factors can acquire various dimensions over time. The sport appears as a very complementary element for disabled people to compensate for the inadequate and weak aspects they see in themselves. Kumcağız and Çayır (10) have revealed the importance of providing environmental support and familial support to individuals with physical disabilities to increase their participation in sports in their study. In addition, Aslan et al (2) stated that sports support the individual in all areas and that individuals who play sports have high self-esteem compared to those who do not play sports. Based on this, it is important to raise the awareness of families, to determine the branch that is most suitable for individuals, direct them to that branch, and to do sports routinely. It is expected that the study, which will support the participation of people with disabilities in sports, will also be supported in the literature among athletes, national athletes, and other individuals who receive education and training in the field of sports sciences.

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Examination of Wrestling Referees' Self-Efficacy Levels

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Abstract

This study was carried out to measure the self-efficacy levels of wrestling referees who are active in wrestling competitions in our country. 150 wrestling referees with different refereeing levels, included in the Visa Referee List of the Turkish Wrestling Federation, participated in the study. The personal information form developed by the researchers to reach the data of the study and Myers et al. The 18-question "Referee Self-Efficacy Scale" (HÖYÖ), which was developed in 2012 and adapted into Turkish by Karaçam and Pulur 2017 with the addition of the physical proficiency factor, was used. According to the results of the research; The inter-variable relations of all participants are presented as correlation coefficients. In addition, in the age variable game knowledge scores and decision-making sub-dimensions, the participants in the 25-35, 36-45 and 46-year-olds group were against the participants in the 18-24 group, against the high school graduate participants in terms of decision-making sub-dimension scores according to the educational status variable, against the candidate referees in terms of all sub-dimension scores of the self-efficacy scale according to the refereeing level variable, in favor of the 6-10 and 11-15 group participants in terms of game knowledge scores and decision-making sub-dimension scores according to the number of tasks variable, against the 1-5 year group participants in terms of game knowledge scores, decision making, pressure scores and communication sub-dimension scores according to the refereeing experience variable, There is a significant relationship in favor of former athletes in the sub-dimension of game knowledge scores according to the status of playing sports before in the sports branch where he is the referee(p>0,05).

Keywords: Referees, wrestling referees, referee self-efficacy

Güreş Hakemleri Öz-Yeterlilik Düzeylerinin İncelenmesi

Özet

Bu çalışma, ülkemizde faal olarak güreş müsabakalarında, hakemlik görevini yürüten güreş hakemlerinin öz yeterlilik düzeylerini ölçmek amacıyla yapılmıştır. Çalışmaya Türkiye Güreş Federasyonun, Vizeli Hakem Listesi 'nde yer alan farklı hakemlik kademelerine sahip 150 güreş hakemi katılmıştır. Araştırmanın verilerine ulaşmak için araştırmacılar tarafından geliştirilen kişisel bilgi formu ve Myers ve ark. 2012 yılında geliştirdiği, Karaçam ve Pulur (2017) tarafından fiziksel yeterlik faktörü de eklenerek Türkçe uyarlamasını yaptığı 18 soruluk "Hakem Öz Yeterlik Ölçeği (HÖYÖ)" kullanılmıştır. Verilerin analizinde; özyeterlik düzeylerini belirlemek ve demografik değişkenlere ait tanımlama yapmak için betimsel istatistiklerden faydalanılmıştır. Araştırma sonucuna göre; tüm katılımcıların değişkenler arası ilişkileri korelasyon katsayıları olarak sunulmuştur. Ayrıca yaş değişkeni oyun bilgisi puanları ve karar verme alt boyutlarında, 25-35, 36-45 ve 46 yaş ve üzeri grubu katılımcıların, 18-24 grubu katılımcılar aleyhinde, eğitim durumu değişkenine göre karar verme alt boyut puanları açısından lise mezunu katılımcılar aleyhinde, hakemlik seviyesi değişkenine göre öz yeterlilik ölçeği tüm alt boyut puanları açısından aday hakemler aleyhinde, görev sayısı değişkenine göre oyun bilgisi puanları ve karar verme alt boyut puanları açısından 6-10 ve 11-15 grubu katılımcılar lehinde, hakemlik tecrübesi değişkenine göre oyun bilgisi puanları, karar verme, baskı puanları ve iletişim alt boyut puanları açısından 1-5 yıl grubu katılımcılar aleyhinde, hakem olduğu spor branşında daha önce spor yapma durumuna göre oyun bilgisi puanları, alt boyutunda önceden sporcu olanlar lehine, anlamlı bir ilişki bulunmaktadır (p>0,05).

Anahtar Kelimeler: Hakemler, güreş hakemleri, öz yeterlilik

INTRODUCTION

In recent years, people, communities and even countries have been following the sports closely, watching the athletes, and seeing sports competitions as a symbol representing athletes and referees. Developed countries around the world prefer sports fields, not battlefields, to prove their superiority over each other (2). In our age, sports have socializing, integrating, developing spirit and physique, competitive and solidarity aspects (8). Sports fields, which cause the discharge of suppressed emotions, that is, discharge of individuals, are shown by many psychiatrists as a kind of hospital or treatment place (24).

Today, the elements that make up the phenomenon of sports can be handled under three main headings in general, athletes, spectators and referees. Every single factor mentioned here is undoubtedly very important. Referees, who fight on the field with the athletes and control the fate of those competitions, are the most basic elements of sports (17). In arbitration, the application of the rules equally, impartially and fairly to everyone is a priority. It is very important that the rules of the game are fully reflected in the competitions and that the sport can become popular in the eyes of the society in terms of bringing the human factor to the fore (11).

In addition to the physical competence of the referee, his psychological readiness is also vital. For this reason, referees should have the ability to make the right decision in competitions by controlling psychological factors such as self-efficacy, which includes situations such as anxiety, fear and stress (18). Due to the limited time of the competition, the referees must maintain a high level of focus and perform well without missing any details. To be successful referees, a number of qualifications are required; While there may be innate qualities such as good instincts, fairness, mental toughness, confidence and determination, acquired qualities require experience such as attention to detail, alertness and quick but firm reactions (6).

Referee self-efficacy is expressed as the degree of belief that referees have the capacity to perform their jobs successfully (12). The influence of the physiological and psychological states of the referees, who are believed to have a great influence on the score and course of the competition, on the decisions they make gains great importance (19). Measuring referee performance is quite difficult and complex. It is critical to identify referee performance and know the variables that affect it (20). For all these reasons, the subject of self-efficacy, which is thought to affect referee performance, which is one of the positive psychology terms, is discussed.

The aim of this research is to measure and interpret the self-efficacy levels of the wrestling referees who are active in wrestling competitions in our country. The comparison of wrestling referees in terms of demographic characteristics and self-efficacy levels constitutes the focus of the research.

METHOD

This study was approved by Selcuk University Sports Sciences Ethics Committee (Approval number: E.402928).

Working Group:

A total of 150 Wrestling Referees voluntarily participated in this study. In addition to the personal information form developed by the researchers, the Referee Self-Efficacy Scale adapted to Turkish by Karaçam and Pulur 2017 was applied.

Analysis of Data:

The data obtained from the participants were transferred to the SPSS 25.0 program and it was determined whether there were missing and incorrect data entries. After the analysis of the data, the total scores of the participants' referee self-efficacy levels were calculated and parametric tests were preferred because the obtained data showed normal. Descriptive statistical analysis was made for the demographic information of the referees participating in the research, and independent groups t-test was used for two independent groups. One-way analysis of variance (ANOVA) for multiple groups, and Tukey's multiple comparison test were used to determine which groups caused this difference in cases where there was a significant difference in multiple comparisons.

FINDINGS

The fact that the referees train themselves, gain experience, and have knowledge about the rules and human management greatly affects the competitions. It is very important for the referee to feel confident and competent. The referee's feeling of competence affects his own behavior, satisfaction, stress, performance, athlete rule violations and many behaviors (18). Referees are a very important part of competitive sports, not only because of their influence on the behavior of the players and the results of the game, but also because they ensure that

competitions are run safely according to certain rules (7).

In many situations, which we can describe as internal factors, the referees have an obligation to correctly evaluate the actions that take place during the match under adverse conditions and pressure according to their experience, level of knowledge, to take quick decisions, to manage the game, to pay attention to multiple aspects of the game, to maintain order and to resolve disputes that they are trying to fulfill (21). It has been seen that one of the factors that have an important place in meeting the high performance expectation while fulfilling these obligations is the concept of self-efficacy. It has been stated that the concept of self-efficacy based on Social Learning Theory provides an effective motivation and power for the formation of behaviors (4). Referee self-efficacy is defined as the degree of belief that referees have sufficient capacity to perform their duties successfully (12). More positive feelings of self-efficacy can help referees increase their confidence in performing their duties (16).

In cases where the level of self-efficacy increases, it can be said that it nourishes a positive body image, reduces physiological and psychological stress, and improves feelings of pleasure and entertainment (23). Although refereeing in sports fields is practiced with technical knowledge, it is certain that being an effective and successful referee is an art. A large part of the artistic skill that the referee displays in the field of competition depends on his personal characteristics and level of self-efficacy (22).

Table 1. Frequency and percentage distributions of the research group

Variables		n	St
Age	18-24 age	25	16,7
	25-35 age	58	38,7
	36-45 age	42	28,0
	46 age and older	25	16,7
Education Status	High school	28	18,7
	Licence	84	56,0
	Graduate	38	25,3
Refereeing Level	Applicant	28	18,7
	National	81	54,0
	International	41	27,3
Number of Season Missions	1-5	56	37,3
	6-10	42	28,0
	11-15	52	34,7
Sportsmanship Before Refereeing	Yes	133	88,7
	No	17	11,3
Experience	1-5 years	45	30,0
	6-10 years	40	26,7
	11 years and older	65	43,3

Physical adequacy scores according to age variable in one-way analysis of variance (ANOVA) and Tukey Test results in Table 2 [F=1.457; p>0.05], pressure scores [F=2.051; p>0.05] and communication subscale scores [F=1.829; p>0.05] there was no significant difference between the groups in terms of, game knowledge scores [F=9.052; p<0.05] and decision making [F=8.870; p>0.05], there is a significant difference in terms of sub-dimension scores, In terms of game knowledge scores and decision-making sub-dimensions, there is a significant difference between the 25-35, 36-45, and 46-year-old and over participants, against the 18-24 group participants.

Table 2. Comparison of Referee Self-Efficacy Levels by Age Variable

		N	Mean	Ss	F	p
Physical Adequacy	18-24 age	25	22,7600	2,96198	1.457	0.229
	25-35 age	58	23,7759	1,96498		
	36-45 age	42	23,1667	2,07090		
	46 age and older	25	23,2400	1,96384		
Game Information	18-24 age	25	12,6800	2,39305	9.052	**0.000****
	25-35 age	58	14,1034	1,32042		
	36-45 age	42	14,5000	,99388		
	46 age and older	25	14,3600	1,18603		
To decide	18-24 age	25	12,0400	2,26348	8.870	**0.000****
	25-35 age	58	13,5862	1,54505		
	36-45 age	42	13,9762	1,27811		
	46 age and older	25	13,8800	1,30128		
Oppression	18-24 age	25	12,5600	2,80000	2.051	0.109
	25-35 age	58	13,9138	2,12161		
	36-45 age	42	13,6429	2,29338		
	46 age and older	25	12,9600	3,44577		
Communication	18-24 age	25	17,6400	2,46441	1.829	0.144
	25-35 age	58	18,5862	1,92886		
	36-45 age	42	18,5000	1,91592		
	46 age and older	25	17,8000	2,19848		

In the results of one-way analysis of variance (ANOVA) and Tukey Test in Table 3, physical adequacy scores according to the variable of educational status [F=1,254; p>0.05], game knowledge scores [F=3.066; p>0.05], pressure scores [F=0.354; p>0.05] and communication sub-dimension scores [F=0.417; p>0.05], while there was no significant difference between the groups, decision making [F=6.622; p>0.05], there is a significant difference in terms of sub-dimension scores. It is seen that there is a significant difference in total self-efficacy scores according to education level against high school graduates.

Table 3. Comparison of Referee Self-Efficacy Levels According to Educational Status Variable

		N	Mean	Ss	F	p
Physical Adequacy	High school	28	23,2143	2,18339	1.254	0.288
	Licence	84	23,5833	2,14649		
	Master	38	22,9211	2,30606		
Game Information	High school	28	13,5714	1,77281	3.066	0.050
	Licence	84	13,9524	1,67119		
	Master	38	14,5000	1,00673		
To decide	High school	28	12,5714[b]	2,26779	6.622	**0.002***
	Licence	84	13,5357[a]	1,58644		
	Master	38	14,0526[a]	1,16125		
Oppression	High school	28	13,1429	2,54899	0.354	0.702
	Licence	84	13,4524	2,68151		
	Master	38	13,6842	2,37220		
Communication	High school	28	17,9643	2,47180	0.417	0.660
	Licence	84	18,3810	2,00544		
	Master	38	18,2632	1,98214		

In the results of one-way analysis of variance (ANOVA) and Tukey Test in Table 3, physical adequacy scores according to the variable of educational status [F=1,254; p>0.05], game knowledge scores [F=3.066; p>0.05], pressure scores [F=0.354; p>0.05] and communication sub-dimension scores [F=0.417; p>0.05], while there was no significant difference between the groups, decision making [F=6.622; p>0.05], there is a significant difference in terms of sub-dimension scores. It is seen that there is a significant difference in total self-efficacy scores according to education level against high school graduates.

Table 4. Comparison of Referee Level and Referee Self-Efficacy Distributions

		N	Mean	Ss	F	p
Physical Adequacy	Applicant	28	22,2857[b]	2,71971	7.166	**0.001****
	National	81	23,9136[a]	1,86546		
	International	41	22,9512	2,10892		
Game Information	Applicant	28	12,3929[b]	2,13158	24.222	**0.000****
	National	81	14,3580[a]	1,15443		
	International	41	14,4634[a]	1,09767		
To decide	Applicant	28	11,6786[a]	2,17824	25.823	**0.000****
	National	81	13,8765[b]	1,26869		
	International	41	13,9512[b]	1,26395		
Oppression	Applicant	28	11,9643[a]	2,61735	6.773	**0.002****
	National	81	13,9630[b]	2,21045		
	International	41	13,4634	2,85567		
Communication	Applicant	28	17,0714[a]	2,43324	9.164	**0.000****
	National	81	18,8519[b]	1,74005		
	International	41	17,9512	2,08508		

In the results of one-way analysis of variance (ANOVA) and Tukey Test in Table 4, physical proficiency scores according to the variable of refereeing level [F=7.166; p>0.05], game knowledge scores [F=24.222; p>0.05], decision making [F=25.823; p>0.05], pressure scores [F=6.773; p>0.05] and communication subscale scores [F=9.164; p>0.05], it is seen that there is a significant difference against the candidate referees.

Table 5. Comparison of Season Duty Number and Referee Self-Efficacy Distributions

		N	Mean	Ss	F	p
Physical Adequacy	1-5	56	23,3750	2,34763	0.463	0.630
	6-10	42	23,5714	2,15432		
	11-15	52	23,1346	2,08664		
Game Information	1-5	56	13,4107[b]	1,93322	7.300	**0.001****
	6-10	42	14,4286[a]	1,19231		
	11-15	52	14,3462[a]	1,18627		
To decide	1-5	56	12,8393[b]	2,10434	7.000	**0.001****
	6-10	42	13,9286[a]	1,33239		
	11-15	52	13,8269[a]	1,24808		
Oppression	1-5	56	13,0714	2,44099	1.004	0.369
	6-10	42	13,7381	2,22030		
	11-15	52	13,6346	2,94411		
Communication	1-5	56	18,1607	2,26256	0.421	0.657
	6-10	42	18,5238	1,92845		
	11-15	52	18,1923	2,02957		

Physical proficiency scores according to the number of tasks variable in the one-way analysis of variance (ANOVA) and Tukey Test results in Table 5 [F=0.463; p>0.05], pressure scores [F=1.004; p>0.05] and communication subscale scores [F=0.421; p>0.05], there was no significant difference between the groups. Game knowledge points [F=7,300; p<0.05] and decision making [F=7,000; p>0.05], there is a significant difference in terms of sub-dimension scores. It is seen that there is a significant difference in favor of the 6-10 and 11-15 group participants in the game knowledge scores and decision making sub-dimensions.

Table 6. Comparison of Referee Experience and Referee Self-Efficacy Distributions

		N	Mean	Ss	F	p
Physical Adequacy	1-5 year	45	22,8667	2,62505	2.792	0.065
	6-10 year	40	23,9750	1,73187		
	>11 year	65	23,2923	2,06703		
Game Information	1-5 year	45	12,9111[b]	2,06510	20.042	**0.000****
	6-10 year	40	14,5000[a]	,96077		
	>11 year	65	14,4923[a]	1,01740		
To decide	1-5 year	45	12,3111[b]	2,04297	19.290	**0.000****
	6-10 year	40	13,8500[a]	1,33109		
	>11 year	65	14,0769[a]	1,18990		
Oppression	1-5 year	45	12,6889[b]	2,88272	4.078	**0.019***
	6-10 year	40	14,2500[a]	1,17124		
	>11 year	65	13,4923	2,83462		
Communication	1-5 year	45	17,6000[b]	2,34908	5.037	**0.008****
	6-10 year	40	19,0000[a]	1,56893		
	>11 year	65	18,2923	2,04422		

Physical proficiency scores according to refereeing experience variable in one-way analysis of variance (ANOVA) and Tukey Test results in Table 6 [F=2.792; p>0.05], while there was no significant difference between, ame knowledge points [F=20.042; p>0.05], decision making [F=19.290; p>0.05], pressure scores [F=4.078; p>0.05] and communication [F=5.037; p>0.05], there is a significant difference in terms of sub-dimension scores. According to the refereeing experience, it is seen that there is a significant difference in the sub-dimensions of game knowledge, decision making, pressure, and communication against the 1-5 year group participants.

Table 7. Comparison of Self-Efficacy Distributions of the Referee with the Status of Doing Sports Before in the Sports Branch where the Referee is

		N	Mean	Ss	t	p
Physical Adequacy	Yes	133	23,3910	2,18408	0.669	0.492
	No	17	23,0000	2,34521		
Game Information	Yes	133	14,1729	1,34565	2.160	**0.045***
	No	17	12,8235	2,53069		
To decide	Yes	133	13,5564	1,68061	1.405	0.162
	No	17	12,9412	1,85306		
Oppression	Yes	133	13,4662	2,50015	0.170	0.865
	No	17	13,3529	3,16111		
Communication	Yes	133	18,2632	2,15637	0.225	0.824
	No	17	18,3529	1,45521		

In the Tukey Test results of the one-way analysis of variance (ANOVA) in Table 7, the physical adequacy scores in the sports branch where he was the referee were compared to the previous sports status [F=0.669; p>0.05], decision making [F=1.405; p>0.05], pressure scores [F=0.170; p>0.05] and communication sub-dimension scores [F=0.225; p>0.05], while no significant difference was, found game knowledge points [F=2.160; p>0,05], there is a significant difference in sub-dimension. It is seen that there is a significant difference in favor of former athletes in the sub-dimension of game knowledge according to the status of doing sports in the sports branch where he is the referee.

DISCUSSION AND CONCLUSION

While there was no significant difference between the groups in terms of physical competence, pressure and communication sub-dimension scores according to the age variable of the referees, it was seen that there was a significant difference against the 18-24 group participants in the game knowledge scores and decision-making sub-dimensions. Myers et al., (15), Karaçam and Pulur (12), Karaçam and Adıgüzel (13) found similar results between self-efficacy sub-dimensions and age variable in their studies. As the age of the referees progresses, it can be interpreted that they have experienced the techniques and rules before, and that their technical command of the rules has a positive effect on the decisions they will make during the competition (13), and accordingly, their self-confidence level increases. In this respect, the study shows parallelism with other studies in the literature.

While there was no significant difference between the groups in terms of physical competence, game knowledge, pressure and communication sub-dimension scores according to the educational status of the referees, it was observed that there was a significant difference in the decision-making sub-dimension scores against the high school graduates. Yiğit (25), Dereceli, Ünlü, and Erbaş (4) also found similar results between the sub-dimensions of self-efficacy and the educational status of the referees in their studies. He stated that people with a high level of education use a more logical decision-making strategy when making decisions compared to people with a medium or low level of education, and people with a low level of education show more hasty decision-making behavior than people with a high level of education (9).

It is seen that there is a significant difference against the candidate referees in terms of all sub-dimensions of self-efficacy (physical competence, game knowledge, decision making, pressure and communication) according to the refereeing level

variable. According to Nazarudin et al. (16), Aksu (1), Dinc (5), Diotaiuti et al. (7), Degreeli, Ünlü, and Erbaş (4) also found similar results between the sub-dimensions of self-efficacy and the level of refereeing. Since competitions of different difficulty are managed at each refereeing level, it can be interpreted as increasing the self-efficacy levels by positively affecting the competence of referee levels. These findings support our study.

There was no significant difference between the groups in terms of physical competence, pressure and communication sub-dimension scores according to the number of tasks variable. It is seen that there is a significant difference in favor of the 6-10 and 11-15 group participants in the game knowledge scores and decision making sub-dimensions. Karçam and Adıgüzel (13) found a positive and significant relationship between the sub-dimensions of self-efficacy in the variable of the number of refereeing matches during a season. This situation can be interpreted that as the self-efficacy of the referees increases, the number of matches increases and as the number of matches increases, their self-efficacy increases. In this respect, our study shows parallelism with other studies in the literature.

While there is no significant difference between the physical competence scores of the referees according to the experience variable, there is a significant difference in terms of game knowledge, decision making, pressure and communication sub-dimension scores. According to the refereeing experience, it is seen that there is a significant difference in the sub-dimensions of game knowledge, decision making, pressure, and communication against the 1-5 year group participants. It has been determined that referees with professional experience between 1-5 years have lower referee self-efficacy and game knowledge self-efficacy levels than referees with 6-10 years and 11 years or more of refereeing professional experience. Pulur and Karaçam (12), Sarıdede (18) revealed that there is a positive and significant difference between the self-efficacy sub-dimensions and the experience variable in their study on the self-confidence levels of the referees. Since experience is related to the match managed during refereeing, referees with more than one refereeing year can manage the match well with their knowledge and experience (10). These results support our study. It can be interpreted that the number of cases encountered in refereeing increases as the duration of the match management increases, which will increase the level of readiness of the referee for the match.

When the sub-dimensions of physical competence, decision making, pressure and communication of the referee self-efficacy scale were compared according to the variable of wrestling before wrestling referees, there was no significant difference, but when compared with the game knowledge sub-dimension, a significant difference was found. The difference detected is in favor of the participants who wrestled before they started refereeing, and it can be interpreted that the game knowledge self-efficacy of the referees who wrestled before they started refereeing is higher than the referees who did not wrestle. Referees who wrestle before they start refereeing should have information about what kind of performance they should display in the competition itself, and they should learn the techniques and rules of the competition before their refereeing career, due to their wrestling, the fact that they apply the technique and rules before in the competition and then have a good command of the rules has a positive effect on the decisions they will make in the competition, and thanks to the pressure they are exposed to during the wrestling match, it can be interpreted that they feel less pressure or are more resistant to pressure compared to the referees who have not wrestled before. Koçak (14), Demirtaş and Yıldız (3) found similar results between the sub-dimensions of self-efficacy and the variable of wrestling before starting refereeing.

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Examination Of Physical Activity and Body Composition Levels of Adolescents

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Abstract

Purpose of the Study: The study aimed to examine adolescents' physical activity and body composition levels according to various variables. Materials and Methods: The participant group of this study consisted of a total of 1104 children (551 girls and 553 boys between the ages of 10-14, enrolled in primary schools in Ankara. In our study, physical activity questionnaire for children (PAQ-C) scale was used to determine the weight, height, BMI measurements, and physical activity level. Result: According to the findings, a significant difference was found in the physical activity levels of boys according to the types of transportation to school ($p<0.05$). When children's sleep duration is examined, boys' and girls' BMI and physical activity levels are similar ($p>0.05$). Significant differences were found in the BMI and physical activity levels of both boys and girls during the daily use of the technological device ($p<0.05$). A negative correlation ($p<0.05$) was found between the daily use of technological devices, sleep duration, and physical activity levels of boys and girls, and a positive correlation with BMI ($p<0.05$). Conclusions: Prolonged screen time is thought to affect body Composition and physical activity level negatively. It is thought that the sleeping time should be 8 hours and the screen time should be less in order for BMI and physical activity level to be at appropriate levels.

Keywords: Physical Activity; Body Composition; Sleep; Television; Smartphone

Ergenlerin Fiziksel Aktivite ve Vücut Kompozisyon Düzeylerinin İncelenmesi

Özet

Araştırmanın Amacı: Araştırmada adölesanların fiziksel aktivite düzeylerini çeşitli değişkenlere göre incelemek amaçlanmıştır. Materiyal ve Metod: Çalışmanın örneklemini Ankara ilindeki okullardan randomize yöntem ile seçilmiş 10-14 yaş arasındaki 551 kız ve 553 erkek olmak üzere toplam 1104 çocuk oluşturmuştur. Katılımcılara kişisel bilgi formu, Çocuklar için fiziksel aktivite (ÇFAA) ölçeği uygulanarak vücut ağırlığı, boy uzunluğu ve vücut kitle indeksi (VKİ) ölçümleri alınmıştır. Grupları karşılaştırmak için tek yönlü varyans analizi (ANOVA) kullanılmıştır. Bulgular: Elde edilen bulgulara göre erkek çocukların okula ulaşım türlerine göre fiziksel aktivite düzeylerinde anlamlı farklılık bulunmuştur ($p<0.05$). Çocukların uyku süreleri incelendiğinde erkek ve kız çocukların BKİ ile Fiziksel aktivite düzeyleri benzerlik göstermektedir ($p>0.05$). Teknolojik cihazı günlük kullanma süresinde ise hem erkek hem kız çocukların BKİ ve fiziksel aktivite düzeylerinde önemli farklılıklar tespit edilmiştir ($p<0.05$). Erkek ve kız çocukların teknolojik cihaz günlük kullanma süreleri ve uyku süreleri ile fiziksel aktivite düzeyleri arasında negatif yönde ($p<0.05$), BKI ile pozitif yönde ilişki bulunmuştur ($p<0.05$).
Sonuç: Sonuç olarak, teknolojik cihazların uzun süreli kullanımının beden kompozisyonunu ve fiziksel aktivite düzeyini olumsuz yönde etkilediği düşünülmektedir. BKİ ve fiziksel aktivite düzeyinin uygun seviyelerde olması için uyku saatinin 8 saat olması ve teknolojik cihazlara ayrılan sürenin daha az olması gerektiği düşünülmektedir.

Anahtar Kelimeler: Fiziksel aktivite, Vücut Kompozisyonu, Uyku, Televizyon, Akıllı telefon

INTRODUCTION

Adolescence is defined as the period between 10-19 by the World Health Organization (WHO). The amount of fat, hormones, and water in the body changes rapidly in adolescence when the fastest development is seen after infancy (19). These changes increase the need for nutrients and energy. Overeating and fast eating habits also occur during this period. While spending a long time in front of the computer and television, snacking is also common. These behaviors pave the way for a sedentary lifestyle and a tendency to gain weight during adolescence (32). Malnutrition and physical activity habits gained in adolescence can be permanent and affect the individual's health for life (23).

It is believed that the proliferation of screen time negatively impacts children, especially as they become an indispensable part of children's daily lives and gradually reduce outdoor playgrounds (35). Screen time has been associated with attention problems, aggressive behavior, physical inactivity, obesity, and sleep problems in preschool and school-age children. Excessive screen time causes the misuse of time that needs to be allocated for playing games, eating, and sleeping (5). The motor skills of children in developing age develop with a wide variety of activities, in this period, when technological devices are not used under suitable conditions, with appropriate software, and children's motor development is delayed for an appropriate period. Spending time with technological devices without movement for a long time negatively affects their gross and fine motor development, such as large and small muscle skills, hand and eye coordination (21).

There is growing research showing that the use of digital technology negatively affects sleep. It has been reported that sleep time decreases with the increased habit of having a television, computer, or mobile phone in the bedroom in early childhood (6, 8, 27, 22). Because poor or inadequate sleep habits negatively affect children's mental state, behavior, academic achievement, and growth and development rates, it is crucial to take care of sleep quality in children (28).

Worldwide, it is stated that 11% of children are obese, which is a significant health problem that continues to increase (15). Many clinical programs have been developed to combat this problem. Many focus on weight gain prevention rather than weight loss, allowing the child to become thinner over time as they grow in height (1). The child obesity rate has tripled in the last 20 years. To determine the most appropriate way of measuring adiposity changes, we need to know how BMI varies over time in normally growing children (10.). Nowadays, children travel by vehicle rather than walking and use elevators instead of stairs. With digital games, children's lives are becoming more automatic; as a result, children are less active in daily life. Children require 3-4 hours of physical activity and social interaction a day to develop healthily (20). It has been found that there is a low but significant relationship between excessive screen time in the preschool period and the increase in BMI, and it has been reported that it paves the way for more weight gain in the future (12). It has been suggested that the limit of screen time in preschool children is 2 hours, and every hour that this limit is exceeded is associated with an increase in BMI (44).

Regular physical activities and the body Composition of children are critical in being healthy individuals in their later years. Nowadays, children's most significant obstacles to becoming healthy individuals are the long periods of sleep, television, smartphone, and computer use, which drag children to a sedentary lifestyle and negatively affect their body Composition. Since no comprehensive study was conducted in this way before in the 10-14 age group in Turkey, the study was the first considering the number of participants.

This study aimed to examine adolescents' physical activity and body composition levels and body mass indexes according to various variables.

METHOD

Participant Group and Ethics

The participant group of this study consisted of a total of 1104 children, 551 girls and 553 boys between the ages of 10-14, who study and train in primary schools in Ankara (Table 1). The necessary permissions for the research were obtained from the Ministry of Education, Primary School Principals, and their families. Girls and boys between the ages of 10 and 14 have been included in research on a volunteer basis. This research was supported with the permission of Muğla Sıtkı Koçman University Human Research Ethics Committee with the number 190106 and with the permission number 14588481-605.99-E.1343045 of Ankara Governorship Directorate of National Education.

The inclusion criteria for the study were determined as the children participating in the study are of primary school age, are between the ages of 10-

14, have no health problems, voluntarily participate, have or use technological devices (mobile phone, computer, tablet, etc.), have parental consent. The exclusion criteria were determined as the child not being in primary school age, not between the ages of 10-14, having any health problems, not being voluntary, not using technological devices, and not obtaining permission from their parents.

Determination of Sample Size

G * Power 3.1.9.4 software was used to determine the sample size in the study. In the power analysis, the alpha significance level (Type I error) was taken as $\alpha = 0.05$, and the power value we want to obtain (Type II error) was taken as $\beta = 0.95$. The effect width was taken as $| \varrho | = 0.1$ for the high validity of our study. As a result, the number of people included in the study was determined to be at least 1084.

Bodyweight and Height: Body weight was measured with a Seka brand electronic scale with an accuracy of 0.1 kg, while the height was measured with a Seka brand digital height meter with an accuracy of 0.01 cm. Individuals were measured by barefoot or wearing socks. In measurements, the head was upright, the soles of the feet were flat on the scale, the knees were stretched, the heels were together, and the body was taken in an upright position (39).

Body Mass Index: It was evaluated according to the Body Mass Index (BMI) criteria determined by Cole et al. In their study on children aged 2-18. Body Composition was calculated using the formula kg/cm2 (9, 11). Body mass index is a method used to assess the risk of health problems at the population level and developed by Adolphe Quetelet in 1970 based on data and reports from 7 different countries.

Information Form: Information on the daily sleep and technological device (television, computer, smartphone) usage times of the children was collected with the information form created by the researcher. According to the consensus statement of the American Academy of Sleep Medicine (33) and the Canada 24-Hour Movement Guide for Children and Young People's Integration of Physical Activity, Sedentary Behavior and Sleep study (42), the importance of 8 hours of sleep in the age group of our study group is stated for optimal health. Paruthi et al. stated in their study that 8 hours of sleep had positive health outcomes, and less than or more than 8 hours of sleep had negative health consequences (33). The reference intervals we use for sleep duration were designed according to this study.

Physical Activity Questionnaire for Children (PAQ-C): In this study, The Physical Activity Questionnaire for Children-PAQ-C scale, which was developed for children, was used because interventions were planned directly for children. The reliability study (13) and validity study of the scale has been performed (26), and the Cronbach alpha reliability coefficient is 0.80. Psychometric analysis of the Turkish form of the questionnaire was performed, and the Cronbach alpha coefficient of the questionnaire was found to be 0.86 (16). A PAQ-C scale is a form developed to evaluate the physical activities of primary school children between the ages of 8 and 14, from the fourth grade to the eighth grade, and filled by the child. It consists of 10 questions that assess physical activity for the last seven days (17).

Implementation of Data Collection Techniques: While implementing the measurements and the questionnaire, the children who participated in the study were informed about the research measurement and techniques. The children answered the questionnaires in the classroom where they studied. Height and body weight measurements and questionnaires to determine the level of physical activity were administered to the children and their classroom teachers.

Analysis of Data: The data obtained were evaluated in the SPSS 25 package program. Normality analysis of the data was made, and it was determined that the distributions showed normal distribution. In our study, the arithmetic mean and standard deviation values of the descriptive data were calculated. One-way analysis of variance (ANOVA) was used to compare the groups. The differences were determined by the Tukey HSD test. In addition, correlation analysis was used to determine the relationship between the data. The level of significance was set at $p < 0.05$.

RESULT

Table 1. Characteristics of The Participants

Variables	Gender	N	$\bar{x}$	SD
Height (m^2)	Boy	553	1.55	0.10
	Girl	551	1.54	0.09
Weight (kg)	Boy	553	45.52	11.54
	Girl	551	43.43	11.10
BMI (kg/height m^2)	Boy	553	18.76	3.51
	Girl	551	18.02	3.38
Age (years)	Boy	553	12.08	1.18
	Girl	551	11.96	1.16

BMI: Body mass index, SD: Standard deviation

Table 2. Comparison of Physical Activity and BMI Values of Boys and Girls Depending on Transportation Type

Gender	Variables	Groups	N	$\bar{x}$	SD	F	Tukey HSD
Boys	BMI (kg/height m²)	By car or service	281	18.97	3.61	1.108	
		On foot	257	18.52	3.35		
		By bike or skate	15	18.83	4.29		
	Physical Activity Level (steps)	By car or service	281	3.36[a]	0.81	3.428*	1-2*
		On foot	257	3.24[b]	0.73		
		By bike or skate	15	3.33[a]	0.48		
Girls	BMI (kg/height m²)	By car or service	226	18.14	3.35	0.309	
		On foot	325	17.93	3.40		
	Physical Activity Level (steps)	By car or service	226	3.25	0.83	1.781	
		On foot	325	3.13	0.82		

[a,b] Means within the same column with different superscripts differ significantly BMI: Body mass index, SD: Standard deviation

No significant difference was found between BMI values of children according to school transportation. However, it is seen in table 2 that the BMI value of children who travel to school on foot is lower. A statistically significant difference was found in the physical activity levels of boys according to their transportation to school $p < 0.05$. This difference is due to those who go to school by car or shuttle bus and those who walk to school. No significant difference was found between BMI and physical activity levels of girls according to the type of transportation to school. However, it is seen in the table that the BMI value of girls who travel to school on foot is lower.

Table 3. Sleeping Hours of Children

Gender	Variables	Groups	N	$\bar{x}$	SD	F
Boys	BMI (kg/height m²)	Over 8 hours	198	18.96	3.66	0.646
		8 hours	238	18.58	3.18	
		Lower than 8 hours	117	18.78	3.87	
	Physical Activity Level (steps)	Over 8 hours	198	3.31	0.86	1.214
		8 hours	238	3.34	0.71	
		Lower than 8 hours	117	3.21	0.70	
Girls	BMI (kg/height m²)	Over 8 hours	178	18.06	3.20	0.495
		8 hours	239	17.87	3.42	
		Lower than 8 hours	134	18.22	3.55	
	Physical Activity Level (steps)	Over 8 hours	178	3.21	0.80	1.303
		8 hours	239	3.14	0.84	
		Lower than 8 hours	134	3.29	0.85	

**=Significant at the 0.05 level, BMI: Body mass index, SD: Standard deviation*

According to Table 3, no statistically significant difference was found between the BMI and Physical activity levels of both boys and girls according to their sleep time.

Table 4. Daily Screen Time of Children

Gender	Variables Group	N	$\bar{x}$	SD	F	Tukey HSD
Boys	BMI (kg/m²)	I do not use	204	18.36[a]	3.30	6.733*	1-4* 1-3* 2-4* 2-3* 3-4*
		1-2 hour	207	18.50[a]	3.09		
		3-4 hour	77	18.78[a]	3.71		
		5-6 hour	35	20.97[b]	4.43		
		7 hours and over	30	20.61[b]	4.49		
	Physical Activity Level (steps)	I do not use	204	3.17[b]	0.74	4.088*	1-3*
		1-2 hour	207	3.37[b]	0.75		
		3-4 hour	77	3.41[a]	0.84		
		5-6 hour	35	3.17[b]	0.74		
		7 hours and over	30	3.63[a]	0.66		
Girls	BMI (kg/m²)	I do not use	265	17.82[a]	3.37	2.927*	1-4* 2-4*
		1-2 hour	180	17.95[a]	3.42		
		3-4 hour	73	18.15[a]	2.80		
		5-6 hour	27	20.12[b]	4.03		
		7 hours and over	6	17.90[a]	4.07		
	Physical Activity Level (steps)	I do not use	265	3.11[b]	0.84	4.347*	1-3* 2-3*
		1-2 hour	180	3.17[b]	0.81		
		3-4 hour	73	3.50[a]	0.85		
		5-6 hour	27	3.33[a]	0.62		
		7 hours and over	6	3.83[a]	0.40		

[a,b] Means within the same column with different superscripts differ significantly BMI: Body mass index, SD: Standard deviation

According to Table 4, a significant difference was found between the daily screen time in both boys and girls and the level of BMI and physical activity ($p<0.05$).

Table 5. Correlation Analysis of Variables

Gender	Variables	BMI	Physical Activity Level
Boys	Technological Device Usage Duration (hours)	.136*	-.118*
	Sleep Duration (hours)	.009	-.038
Girls	Technological Device Usage Duration (hours)	.100*	-.151*
	Sleep Duration (hours)	.031	-.029

**=Significant at the 0.05 level, BMI: Body mass index*

A significant positive low correlation was found between the boys' average screen time and BMI. Also there is significant negative low correlation was found between and the physical activity level of boys ($p<0.05$). When the data of girls are examined, a significant negative correlation was found between girls' average screen time and physical activities ($p<0.05$). Additionally significant relationship was found between the girls' average screen time and BMI ($p < 0.05$). It was determined that there was no significant correlation in terms of sleep duration of girls and boys ($p>0.05$).

DISCUSSION AND CONCLUSION

This study aimed to investigate the effect of transportation type, sleep duration, and technological device usage duration on physical activity level and body composition in healthy Turkish children between 10 and 14 years old. For this purpose, we researched 1104 healthy children. It is seen in Table 1 that the height, body weight, BMI, and age values of boys and girls in the study show homogeneous distribution. Saygın and Ceylan stated that the mean age of boys was 12.61 ± 1.23 years, height value was 155.67 ± 10.96 cm, weight was 47.63 ± 12.81, and BMI was 19.42 ± 3.77, the mean age of girls was 12.41 ± 1.15 years, height was 153.62 ± 8.38 cm, weight as 46.00 ± 10.81 kg and BMI as 19.37 (38). Dağcı and Saygın found that the body mass index values of 12-year-old children were 19.63 ± 3.79 kg / cm2 (14). Estrogen in girls and androgen hormones in boys initiate puberty. Depending on these hormones, gender differences between boys and girls become clear. At this age, girls have more subcutaneous fat layers in some parts of their bodies than boys. Thus, a rapid increase in height and body weight is observed due to puberty and rapid growth (7).

Today, children travel more by vehicle than on foot (30) and cycling (45) and use elevators instead of stairs. As a result, children are less active in daily life (31), and their physical activity level and BMI are negatively affected. Although there is no statistically significant difference between male children's BMI in our study, it is seen that the BMI of children who travel to school by car and shuttle bus is higher. On the other hand, a significant difference was found between the levels of physical activity $p < 0.05$. Children who go to school by shuttle and bicycle have higher levels of physical activity. There was no significant difference in BMI and physical activity variables of girls. Physical activity decreases as societies become modern. Children today tend to use vehicles rather than walking or cycling (45). Yılmaz et al. stated in their study that children who walk to school walk less than 15 minutes and use transportation as the distance gets longer (46). Karadeniz stated in his study that the way children go to school (bus, bicycle, walking) does not affect their physical activity status and BMI (24.). Ulutaş stated that walking to school and attending physical education classes did not significantly affect obesity (43).

Sleep is a necessity for health. Despite this requirement, children's daily sleep duration directly affects their physical activity level and BMI. It is stated in the literature that 8 hours of sleep time contributes to general health, cardiovascular health, mental health, metabolic health, development of the immune system, performance (25), and longevity. They reported that sleep less than or more than 8 hours had negative health consequences (28; 33, 42). In our study, no significant difference was found between boys' and girls' physical activity levels and BMI values according to their sleep duration. In Table 3, it is seen that the physical activity levels and BMI levels of both boys and girls who have 8 hours of sleep are at a better level. Our table shows that a sleep duration of more than 8 hours or less negatively affects the level of physical activity and BMI. While sedentary behavior increases in children with poor sleeping habits, their level of participation in physical activity decreases (41). Ulutaş et al. determined the daily sleep time of children as 8.99 hours in their study (43). Although it was emphasized that short sleep duration increases the risk of obesity in students, Sancak et al. found in their study that the rate of obesity increased with the increase of sleep time (36, Dündar C, Totan M.). In a study conducted by Metinoğlu et al., no significant relationship was found between sleep duration and BMI in children aged 10-12 years (29). Ulutaş determined that the sleep time was more in the obesity group, and the difference was statistically significant (43).

Children need 3-4 hours of physical activity and social interaction a day to develop healthily. Ample screen time has been identified as an essential behavior associated with weight and obesity in children (20). In the study, a significant difference $p < 0.05$ was found between the BMI and physical activity levels of both boys and girls according to the daily screen time. It is seen in Table 4 that BMI levels and physical activity levels of boys and girls are negatively affected as the screen time increases. In a study of children aged 6 to 17 years, it was found that those with low levels of physical activity and who used technological devices (watching television or video and playing computer games) for a long time were two times more likely to be obese than those who did not use (40). Screen time has been reported as a typical sedentary activity, and the increase in watching time has been suggested to be associated with decreased physical activity in children (37). It has been suggested that excessive screen time is associated with lifetime obesity and cardiovascular risk (4, 8, 40), and this association now begins in early childhood (3).

It has been reported that there is a low but significant relationship between excessive screen time in childhood and BMI and that it paves the way for more weight gain in the future (1,10; 12, Fuller-Tyszkiewicz M, Hardy LL, 34). A significant relationship at $p < 0.05$ was found between age and physical activity in boys and between age and BMI and physical activity level in girls. A significant relationship at $p < 0.05$ was found between screen time, BMI, and physical activity in boys and girls. Studies have proven that modern technological devices such as computers, tablets, and smartphones, which have become widespread in recent years, pose health risks for children. Children who misuse technological devices for an unsuitable period and frequency appear to pose health risks such as physical inactivity, obesity, and poor sleep quality (34, 2).

As a result: The fact that most young people frequently use technological devices in their daily lives shows that digital life is an integral part of modern society. As a result of the findings of our study, it is thought that the prolongation of screen time negatively affects body composition and physical activity level. It was deduced that sleep time should be 8 hours and screen time should be less for BMI and physical activity level to be at appropriate levels. Therefore, the results of the study can be used to raise public awareness on how to maintain the healthy use of screen-based electronic devices. In addition, it is thought that the type of electronic device use (frequency, duration, content, location, time of day, etc.) will draw attention to the poor health consequences of how it affects sleep, body composition and physical activity level throughout life. It is anticipated that the results of the study can also be used for individual primary prevention strategies in the future.

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Evaluating Tactical Skills of Amateur Soccer Players with Respect to Their Positions

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Abstract

The aim of this study is to evaluate tactical skills of amateur soccer players with respect to their positions. A total of 255 amateur soccer players were examined. These soccer players are playing in different amateur leagues of Turkey. The tactical skill Inventory was used for soccer players. Forwards and Central Defenders had higher tactical skills than did External Defenders, Central Midfielders, and External Midfielders in the positioning and deciding (P<0.05). Also, Forwards had higher tactical skills than did External Defenders, Central Midfielders, and External Midfielders in the knowing about ball actions (P<0.05). Central Defenders had higher tactical skills than did Goalkeepers, Central Midfielders, External Midfielders, and Forwards in the acting in changing situations (P<0.05). The knowing about others soccer players were not statistically significant in the case of all positions (P>0.05).In conclusion, it is considered that the tactical skills of the stoppers and forward players are better than the other players. However, it is seen that the tactical understanding of the players has not changed in terms of the knowing about other soccer players.

Keywords: Team performance, factors in sport performance, tactical skills, team tactic, sport

INTRODUCTION

In team sports tactical skills means the skill of a player to realize the right actions at a right time, and to adapt rapidly to the new game configurations and circulation of the ball (7, 10). In order for a player to give a successful performance at the right time or to realize the right action with the result, the game should be understood in a right way. Elite players are athletes that have not just well developed physiological and technical properties but also improved tactical skills (8, 17, 24, 26, 33). As the environment is continuously changing in sports branches, they mandate that the decision are made fast and accurately and require improved tactical skills. This mandate is especially valid for contest sports like football where there is a completion on the same action field (20). A football player needs, besides the skill to realize necessary movements, the skill to realize these movements at the right time, i.e. perfect tactical skill (23). Tactical skills are based on a series on cognitive competences including game knowledge, skills and knowledge to monitor goals and actions, and knowledge of action regarding the game (28). These cognitive skills are typically are categorized as declarative and procedural knowledge (1, 29, 30). Declarative knowledge: the declarative in the quality of declaration, is acquired to indicate the knowledge on the game rules and purposes and thus means "to know what to do" (8, 22, 34). Procedural knowledge: is defined as the selection of a proper action regarding the game, in other words "to do this" (22). In football, cognitive processes underlying the tactical skills and decision making are considered as fundamental requirements for perfection in sports performance. During a game of which the frequency, chronological order and complexity cannot be

estimated, there shall many situations that occur. At every stage of the game, according to the tactics of the rival team, the players and teams are expected to show great adaptation skills and momentary responses (12, 3). The tactical situations in a football match are rather distinct: Taking in account the motions of the ball, the motions of the teammates and opponents according to their alternatives and the conditions of the match, they can be observed via regional organization of the players on the field.(6, 3).This tactical approach especially emphasize the movements and positioning on the field that highlight the skills of the players to close gaps and/or create gaps according to the appropriate tactic principles for that moment (3). In football, the optimum improvement of the skills, controlling the opponents for each player and the efficient organization of the team for a successful resolution of a game are mandatory. Therefore, the players are selected for specific positions in order to fulfill specific duties (13). Each player position has different functions and purposes during a match (33). Defense organization is structured more normative compared to attack formation. Due to the emphasis on flexibility, creativeness and improvisation, probably the attacking game is much less structured. It is reported that each position in football has different technical and tactical aspects (11, 27). In this regard, this study aims to examine the tactical skills of the amateur football players based on their positions.

METHODS

Participants

Amateur male soccer players (N = 255) of Goalkeepers (Goalkeepers, n = 35, mean (SD) age was 28.54±6.86 years, height was 183.51±5.71 cm, and BW was 79.06±8.59 kg), Central Defenders (Central Defenders, n = 40, mean (SD) age was 28.78±6.68 years, height was 182.43±4.88 cm, and BW was 75.25±10.62 kg), External Defenders (External Defenders, n = 43, mean (SD) age was 26.47±7.01 years, height was 174.91±5.05 cm, and BW was 66.86±6.15 kg), Central Midfielders (Central Midfielders, n = 54, mean (SD) age was 28.46±6.89 years, height was 176.50±5.47 cm, and BW was 70.65±6.46 kg), External Midfielders (External Midfielders, n = 41, mean (SD) age was 27.44±6.73 years, height was 174.66±4.97 cm, and BW was 67.68±9.29 kg), and Forwards (Forwards, n = 42, mean (SD) age was 28.19±6.86 years, height was 178.81±5.44 cm, and BW was 75.05±7.11 kg) positions playing participated in this study. The participants were part of fifteen different amateur teams, training and competing regularly in the Turkey local competition (2018/2019 season).After a detailed explanation of the goals, benefits, and risks involved in this investigation, all participants signed a written informed consent. Additionally, soccer players were informed that they were free to withdraw at any time without any penalty. The study protocol conformed to the Declaration of Helsinki and was approved by the ethics committee of the Sport Sciences Faculty (Osmaniye, Turkey).

Procedure

The Sport Tactical Skills Inventory:

The inventory developed by Elferink-Gemser et al. (7) and was adapted to Turkish version Yarayan et al. (31) examining tactical skills Inventory for sports used four skill factors: The positioning and deciding, the knowing about ball actions, the knowing about others, and the acting in changing situations.

Table 1. Descriptive statistics and internal consistencies (α) of four subscales of the tactical skills inventory for sport (Elferink-Gemser et al. 2004).

Scale Factors	Mean±SD	α
1. Positioning and deciding	3.79±0.61	0.89
2. Knowing about ball actions	4.11±0.62	0.75
3. Knowing about others	3.74±0.67	0.74
4. Acting in changing situations	4.15±0.69	0.72
∑of Scales	3.95±0.51	0.91

Table 2. For our study, descriptive statistics and internal consistencies (α) of four subscales of the tactical skills inventory for sport (N = 255).

Scale Factors	Mean±SD	α
1. Positioning and deciding	39.01±7.252	0.70
2. Knowing about ball actions	18.44±3.242	0.79
3. Knowing about others	13.33±2.700	0.81
4. Acting in changing situations	17.32±3.779	0.80
∑of Scales	88.10±14.653	0.81

Statically Analysis

Mean scores and standard deviations for the four subscales and physical characteristic of soccer players were calculated. To explain differences between tactical skills in positions playing, one-way analysis of variance was used according to the results of the test of normality, and Tukey test from post hoc multiple comparisons tests was used according to the results of the homogeneity of variance. We used reliability analysis for tactical skills scale. The significance level was taken as 0.05.

RESULTS

Table 3.Age, height, BW (mean ± SD) and number according to players' playing positions.

Variables	Age (y) Mean±SD	Height (cm) Mean±SD	BW (kg) Mean±SD
Goalkeepers(N = 35)	28.54±6.86	183.51±5.71	79.06±8.59
Central defenders (N = 40)	28.78±6.68	182.43±4.88	75.25±10.62
External defenders (N = 43)	26.47±7.01	174.91±5.05	66.86±6.15
Central midfielders (N = 54)	28.46±6.89	176.50±5.47	70.65±6.46
External midfielders (N = 41)	27.44±6.73	174.66±4.97	67.68±9.29
Forwards (N = 42)	28.19±6.86	178.81±5.44	75.05±7.11

The mean (SD) age was 28.54±6.86 years, height was 183.51±5.71 cm, and BW was 79.06±8.59 kg for the 35 goalkeepers; the mean (SD) age was 28.78±6.68 years, height was 182.43±4.88 cm, and BW was 75.25±10.62 kg for the 40 central defenders; the mean (SD) age was 26.47±7.01 years, height was 174.91±5.05 cm, and BW was 66.86±6.15 kg for the 43 external defenders; the mean (SD) age was 28.46±6.89 years, height was 176.50±5.47 cm, and BW was 70.65±6.46 kg for the 54 central midfielders; the mean (SD) age was 27.44±6.73 years, height was 174.66±4.97 cm, and BW was 67.68±9.29 kg for the 41 external midfielders; the mean (SD) age was 28.19±6.86 years, height was 178.81±5.44 cm, and BW was 75.05±7.11 kg for the 42 forwards (Table 3).

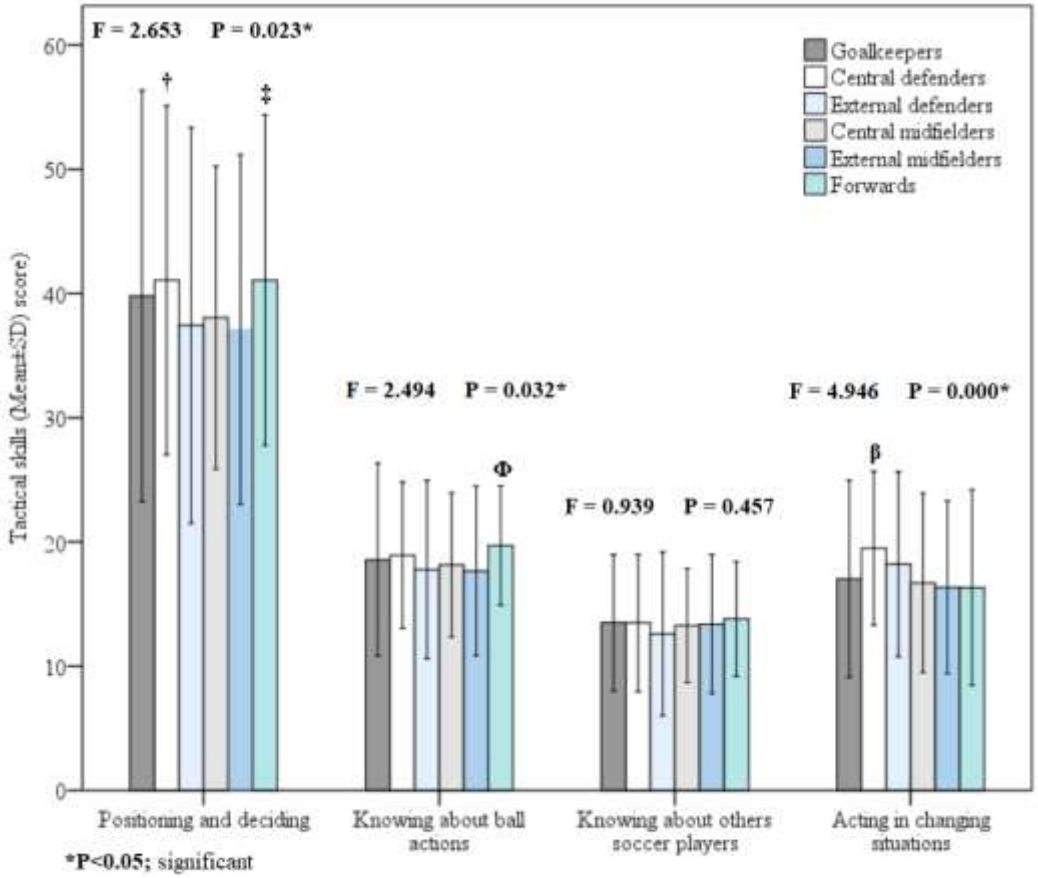

Figure 1. Comparison of tactical skills factors of soccer players, classified according to their playing positions (analysis of variance)

Forwards and Central Defenders had higher tactical skills than did External Defenders, Central Midfielders, and External Midfielders in the positioning and deciding (P<0.05). Also, Forwards had higher tactical skills than did External Defenders, Central Midfielders, and External Midfielders in the knowing about ball actions (P<0.05). Central Defenders had higher tactical skills than did Goalkeepers, Central Midfielders, External Midfielders, and Forwards in the acting in changing situations (P<0.05).The knowing about others soccer players were not statistically significant in the case of all positions (P>0.05) (Figure 1).

DISCUSSION

In this study conducted to assess the tactical skills in amateur football players based on their positions, it is seen that the positioning skills of the stoppers and forward players are better than the defensive players, side middle field and central middle field players. Regarding the knowledge on the movements of the ball, it is seen that forward players are better than the defensive players, side middle field players and central middle field players. Regarding being familiar with the opponents, no difference was found between the positions. Regarding the actions based on changing situations it is seen that stoppers are better than goal keepers, side middle field players, central middle field players and forward players.

Soccer requires from players not only strength and velocity, but also coordination and, particularly, that the behavior presents tactic intelligence. This one is expressed in the relation of cognitive processes of perception and decision-making, necessary to the solution of match problem. These elements appear during the matches in individual actions, in small groups' actions and in tactic equip actions as a whole. These last are particularly complex, because individual actions in the group request dynamic strategies of this equip that need to be rearranged to counter to the strategies adopted by the opponent equip (9).

Tactical skill is an important parameter that affects performance as well as physical and physiological factors for athlete performance. In line with this, athletes with a good understanding of tactical skills do not make a positional mistake as they make a quick decision during the game and think more quickly. Tactical knowledge involves not only the ability to determine what strategy is most appropriate in a given situation, but also whether the strategy can be successfully executed within constraints of the required movements. Thus, tactical expertise in sport is quite different than nonmotor performance domains in that physiological and technical limitations constraint the strategic options available to performers (18).

In a study aimed to analyze tactical behaviors performed by youth soccer players of different age groups according to ten core tactical principles of the game, in order to understand characteristics of each age group and their differences. It was found that as the age group increased, the players had a greater participation in the game, namely by performing of more tactical actions. In addition, the U15 and U17 groups presented no statistical differences in the efficiency of their tactical behaviors, while the U17 and U20 groups exhibited the biggest differences in the tactical performance indices (4). In a previous study shown that variability of tactical performance measures within and between games was similar for Under-17 and Under-19 (25). In a study, a model to assess whether tactical skills change over time in each field position was developed using multilevel analysis. The models indicated that defenders and midfielders did not improve their tactical skills, whereas attackers increased their tactical skills from ages 14 to 18 years. The representing part of tactical skills for defenders is "Acting in Changing Situations", for midfielders Positioning and Deciding, whereas "Knowing About Ball Actions" was the qualifying factor for attackers. Possible explanations for these differences in tactical skills among elite youth soccer players are the selection procedures at a younger age and task-specific experiences (21).Positioning and deciding appeared to be the tactical skill that best predicts adult performance level ($P<0.05$). This is especially true for midfielders, with the correct classification of elite youth players in the range of 80%. For players scoring high on this skill, the odds ratios indicated a 6.60 times greater chance that a player became a professional than players scoring low ($P<0.05$) (19). In a study aimed to explore the influence of the affective decision-making on tactical behavior in soccer players under the age of 15 years old. The low (≤25%) and high (≥75%) groups, according to offensive, defensive and game tactical behavior, were compared and shown to be different. Statistically significant differences between the groups were observed for Defensive Tactical Behavior ($Z=-3.133$; $p=0.002$; $r=-0.355$) and Game Tactical Behavior ($Z=-2.267$; $p=0.023$; $r=-0.260$) (5). Else a study, signal detection skills were found to affect the tactical behavior efficiency of young soccer players (16). Other a study compared the visual search strategy and anticipation between two groups of young players of different efficiencies in tactical behavior. The soccer players were divided into two groups based on their tactical behavior results into those more efficient and those less efficient. The results showed that soccer players with higher efficiency in tactical behavior were better at anticipating and performed a higher number of shorter visual fixations and a greater average amount of fixations per location (32). A study showed that no differences were found between declarative tactical knowledge

and positions field (p = 0,902), but differences at coaches' subjective evaluation for all categories. There were moderate positive correlations (r = 0,412) between declarative tactical knowledge and age. The results suggest that age increase implies a higher declarative tactical knowledge performance (2). Other a study, taking the results into account we can take into consideration the following aspects: from the comparison of the Declarative Tactical Knowledge per category, the differences shown by the sub-14 category, for the sub-15 category (p=0,001) and category sub-14 (p=0,003), however significant differences between the sub-15 category (p=0,001) and the sub-17 category were not found. When soccer players got into groups for specific positions, significant differences of Declarative Tactical Knowledge were not found between them, even though there was an advantage by the descriptive scores for middle-field players and forward players (15). Gonzaga et al. (14) based on the results in their study, it is possible to conclude that the under-15 soccer players from different positions did not show differences in tactical behavior, demonstrating that their level of tactical knowledge does not vary significantly depending on the different positions. Furthermore, it is possible to state that players in this category are not yet specialized by positions, being able to perform tactical actions and functions inherent to different positions. In conclusion, it is considered that the tactical skills of the stoppers and forward players are better than the other players. However, it is seen that the tactical understanding of the players has not changed in terms of the knowing about other soccer players.

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The Effect of Students' Trust in Instructors on Students' Class Participation and School Engagement: Example of Faculty of Sports Sciences

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Abstract

Trust in instructors is one of the most important variables affecting university reform and students' college life. The research focused on the trust in the instructors which is considered to have an influence on class participation and school engagement. Accordingly, the aim of this study is to examine the relationship between trust in faculty members and class participation and school engagement with regard to faculty of sport sciences. The study group in this research consisted of 552 students (194 female, 358 male) – voluntary participation - who were studying in the physical education and sports teaching, sports management, coaching education, and recreation departments in the Faculty of Sports Sciences at Selcuk University. The study was carried out through a quantitative approach. Student Trust in Instructors Scale, Student Engagement Scale and School Engagement to Higher Education Scale were used in order to collect data in the study. Study data were analyzed via arithmetic mean, standard deviation, confirmatory factor analysis, correlation analysis and structural equation modeling. As a consequence of this study, positive relationship was found between students' trust in the instructors and students' participation in the class and their school engagement. Moreover, the study shows that the positive effect of students' trust in the instructor on school engagement is more effective than its effect on their participation in the class.

Keywords: Class participation, school engagement, students' trust in instructors, students in faculty of sport sciences

INTRODUCTION

Universities within educational organizations are structures where interpersonal relations are intense. In these organizations, whose main input and output are people, multidimensional human relations are experienced. These relations consist of a wide range of family relations as well as institution administrators, lecturers, students. Human relations are considered very important in the success of universities (49). In this respect, trust is an important factor in the healthy structure of these relations in universities (70). When the inevitable effect of trust in interpersonal relations is evaluated, it can be said that the perception of trust is also an important social capital for universities. Students' trust in their instructors represents the quality of the relationship between students and instructors and indicates the nature of interpersonal relationships. Trust is one of the main components of social capital, which plays an important role in promoting cooperation, decision making and adherence to group rules, improving teaching and learning processes, improving students' academic performance, and increasing the efficiency and effectiveness of the university (4). To clarify the relational nature of trust, Bryk and Schneider (15) pointed out that social changes during training are organized around a different set of role relationships, where "each party understands their role obligations and has expectations about the role". Colleagues, principals, parents and students are generally known

as groups related to teacher trust (1,15,92). However, although studies with other groups are frequently encountered in the relevant literature, the issue of trust from a student perspective is limited (2).

Studies have shown that trust between teacher and student is one of the important indicators for learning and academic success (21,30,53,62). In addition, its positive effects on students' learning and its undeniable contribution to school reform have been supported by many studies (15,41,42,86,87,89). Studies show that trust between teacher and student as well as trust in institution administrators, teachers, students, and family relations improves the work in the school and educational organization and the school performance (88), and that it has a pioneering effect in education reform and an important driving force in increasing the academic achievement of students (13,15). In addition, the trust-based structuring of the relations between school administrators and families, teachers and students is very important and closely related to the academic and intellectual development of students (15).

When the studies on trust in educational organizations are examined, it is stated that trust between teacher and student contributes to student success (1,8,15,43,53,84), teacher-student cooperation (31), communication (7), learning (76), reduction of absenteeism and drop-outs (18), positive school climate (27), and increase of problem-solving skills (72), and that it is one of the elements that have a positive effect on student motivation. It was stated that the lack of trust in the teacher led to a decrease in the interest in learning (23,86). In addition to the fact that the quality of student-teacher relationship is important in student participation in the class (58), it was stated that the trust in the teacher is effective on the attitude towards school (5). This existing literature suggests that trust can promote school engagement and behavioral adjustment, and that establishing trust-based student-teacher relationships can be a critical step in eliminating undesirable negativities in the educational environment (33,69).

In line with these studies, it is clear that trust in instructors is an important and undeniable element in universities. For this reason, it is of great importance for the above-mentioned variables that students trust their instructors in universities as well. As in other disciplines, the failure of trust theory to have a holistic structure in the field of education, this deficiency in organizational behavior is also felt in educational organizations and it is argued that there are still many issues that cannot be associated with trust (91). In addition, trust is a multidimensional structure that should be perceived in relation to different stakeholders in academia (47).

Trust, which also affects many concepts related to students' school life (42,43), is also effective on students' class participations. Class participation, which is generally examined in three dimensions as cognitive, behavioral, and affective participation, is a multidimensional concept (6,24,28,93,95). Student participation (6,19,25,64,73), which is considered as one of the most remarkable research areas of educational research in recent years, brings with it interest, attention, and effort in students' learning as a psychological process (56). In this study, student class participation was evaluated as the level of psychological and physical energy spent in academic development. In this respect, it can be said that university students (behavioral, affective and/or cognitive) who take care to attend classes in higher education have high interactions with their instructors and classmates, spend or participate in tasks and studies, and spend more time on the faculty/school/university campus. Students tend to participate more when they are supported and trusted by the instructors they interact with (16). A student's trust in a teacher/instructor is seen as an important factor in the student's participation in that lesson (58,65,74). In a study, it was stated that teacher trust scores explained nearly half the variance in students' participation scores (64). Similarly, in a different study, a significant relationship (positive moderate level) was determined between trust in the teacher and participation in the lesson (58). In a qualitative study (83), it was revealed that classroom participation was affected by personal, instructor and classroom environment reasons. Similarly, in a study conducted on student's class participation (29), positive effects of students' teacher-friend relationships and school engagement on their participation were determined. Studies show that a trust-based student-teacher relationship is based on the teacher's consistent warm approach and clear expectations, and the high-quality participation of the student in the classroom (33,78,). In this context, it can be said that the trust-oriented relations between the student and the instructor may have important effects on the participation of university students in the class. Based on this information, the following hypotheses were developed:

H1. Students' perceived trust in the instructors positively affects their participation in the class.

Another variable that is thought to have an effect on the trust in the instructors is the student commitment to the school. The concept of university commitment is used as "okula baglılık" (school commitment) in Turkish literature, and it can be evaluated as similar with the concept of "school engagement", which focuses on the class participation and academic success, in terms of having outputs such as making an effort for school and setting common goals (37,57).

School engagement, which cannot be observed directly, refers to the psychological state of students regarding school activities, learning or learning processes (79,82). Newmann (65) states that students who attribute school engagement make a psychological investment in learning. In a different way, students who are committed to school are individuals who are highly motivated, not grade-oriented, aim to learn and love this process, and put a lot of effort into it. School engagement has been defined as a combination of psychological processes such as interest, importance and effort that students show to school activities. Therefore, engagement emphasizes both affective and behavioral participation in the learning process (56). School engagement can be briefly evaluated as the quality of learning-oriented actions, participation and effort (51). School engagement refers to the identification of students with the school in line with their experiences, the bond they establish or their affective reactions (20).

Many theories have been used to explain school engagement. Based on the control theory of Hirschi (38), the first of these, it was stated that committed students avoid risky behaviors in order to meet the expectations of the society and develop positive relationships with their students/peers and teachers. This theory argues that the social bond between the society and the person is formed by four elements. The first of these elements is “commitment” (to family, friends and teachers), the second “engagement” (educational and vocational), the third “participation” (in activities necessary to achieve socially valued goals of success and status) and finally “belief” (that society's moral values or traditional norms are necessary). The second theory in this regard is the self-system model (22,82), which provides a motivational framework for self-determination theory. According to this model, individuals have three basic motivational needs: autonomy, competence, and belonging. Students will have higher levels of school engagement if schools meet these motivational needs of students. The sense of belonging, which is one of these motivational needs, is met by the supportive and caring attitudes of friends and teachers, while autonomy needs will be met when they are motivated by internal factors (such as the right to choose) compared to external factors and a sense of competence will be met when they feel that they can achieve the set goals (28) and all these will affect school engagement.

In addition, positive student-teacher relationships are effective on students' school engagement (75). In the study of Nichols (68), it was stated that the positive relationship established with the teachers in the school positively affected the level of the school engagement. Mentioning seven characteristics that are effective in school engagement, Blum (12), Hirschi (38) and Deci and Ryan (22) identified seven characteristics consisting of school belonging, love, support (teacher) perception, friendship, academic achievement, fair and equal discipline and extracurricular activities, which are similar to their models and theories, and emphasized that the school engagement and class attendance of students who do not have these characteristics will be negatively affected.

Related to this issue, in a study on the relations between student and instructor (34), it was revealed that the benefit of the class perceived by the student and positive instructor relations are closely related to the university engagement. In this direction, Beck and Milligan (11) confirmed on distance education students that institutional commitment is affected by the interaction between classes, instructors, and peers/friends. In another study, university student engagement was examined in a sample of graduate students studying in China and it was determined that it was affected by the performance, image, and reputation of the university (67). In addition to the studies conducted with university students, it was figured out that Lee (53) conducted a study on Korean middle school students, and it was seen that students' trust in their teachers affected their attitudes towards school, that Mitchell et al. (61) found a direct and positive relationship between identification with school and trust in teachers in their study with 8256 students at school located in the eastern states of the USA, and that Hongwidjojo et al. (40) in their study on high school students in North Jakarta, determined that student-teacher trust has a significant and positive relationship with school well-being, and therefore the higher the student-teacher trust, the higher the school well-being (40). In this

respect, trust in the teacher is very important in terms of the efficiency of the educational environment and the highest level of benefit. In studies, trust, which is seen as one of the important factors in the formation of a positive school climate, has been emphasized in educational organizations (60). In this context, it can be said that trust-based relationships between students and instructors can have significant effects on school engagement. Based on this information, the following hypotheses were developed:

H2. The perceived trust of students in the instructors positively affects their school engagement.

In this study, which benefited from the engagement-trust theory and the common identity-common bond theory, trust in the instructors was considered as a premise that improves school engagement and students' participation in the class. Hallinan (36) stated that supportive teacher- student relationships based on trust are important in developing positive attitudes that contribute to class success related to both classes and school. Increasing class participation and school attendance positively affects students' learning (15,46). Similarly, as a result of their study, Ryan and Patrick (77) emphasized that understanding and help of teachers had an effect on the reduction of undesirable behaviors in the classroom.

The faculty members working in the faculties of sports sciences in universities have the privilege to communicate with the student relatively easily compared to the other faculty members. These instructors can be closer to the students and gain their trust easily since they have the opportunity to play together in the lessons, have the privilege of being together outside the university due to training or sports competitions related to sports branches, travel together, eat together, share common excitement, sadness and joy. Therefore, in the research, it is thought that the faculty of sports sciences is an effective group that can be researched on the subject of trust. However, considering the perspectives for universities where students are considered as customers (54) or group members (39) and the unique structure of universities from other organizations, studies on student engagement, students' participation in the classes, and their trust in the instructors, which are thought to affect them, are considered as important as the studies in the relevant literature. No studies focusing on the relationships of these variables were found in the literature. Although the study seems quite interesting in this field, it is thought to be useful for completing university education in the most effective way, especially for faculties of sports sciences.

METHOD

Research Model

The main purpose of this research is to investigate the effect of the feeling of trust of the students studying at the Faculty of Sport Sciences in the instructors on student participation and engagement to the faculty through SEM. In line with the research, Structural Equation Modeling (SEM), one of the analysis techniques frequently used in relational research, was used. The main purpose of SEM is to determine whether the expected relations are observed in terms of the theoretical framework that forms the basis of the examined structure (84).

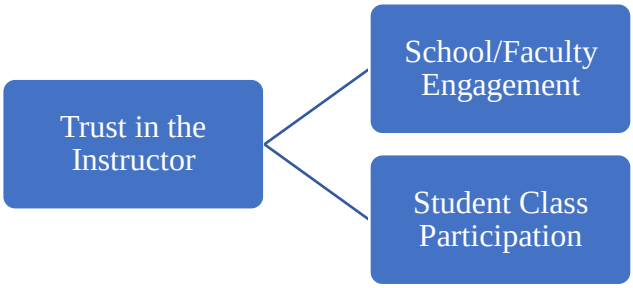

Figure 1. Research Model

Population-Sample (Research Group)

Research data consists of students studying at Konya Selcuk University Faculty of Sport Sciences in the fall semester of the 2021-2022 academic year. The students who participated in the survey were included in the study with the convenience sampling method. Convenience Sampling method, one of the Non-Probability Sampling methods, provides the opportunity to reach the participants who make up the study group of the research in an easy way and collects the necessary data for analysis (17). On the other hand, while determining the sample number of the research, the rule of 10 times the number of expressions of the scales was taken into consideration, as stated by Hair et al. (35).

Table 1. Sample information

General View of Participants: N=552		N	%
Gender	Female	194	35.1
	Male	358	64.9
Department of Education	Physical Education and Sports Teaching	113	20.5
	Sports Management	167	30.3
	Coaching Training	139	25.2
	Recreation	133	24.1

Data Collection Process

In order to collect data in the study, the ethics committee of Selcuk University Faculty of Sport Sciences was applied to and approval of the ethics committee dated 11/08/2022 and numbered E-40990478-050.99-336375-117 was obtained. After the necessary permissions were obtained from the Selcuk University Sports Sciences Faculty administration, the data were collected for the research. After the researchers informed the students about the study between the dates specified by the administration, the data were collected by face-to-face data collection method, which is the safest data collection method.

Data Collection Tools

The data of the study were collected in two stages. In the first stage of the data collection tools, expressions such as gender, age, department of education, class were included in order to determine the demographic characteristics of the participants. In the second stage, the Trust in the Instructor Scale, the Student Participation Scale and the School Engagement to Higher Education Scale were included. Necessary permissions were obtained via e-mail for the scales used in this section.

Trust in Instructors Scale: The scale was developed by Özer and Atik (71) on a university student, inspired by the scale of Adams and Forsyth (3). In order to determine the construct validity of the scale, explanatory factor analysis (EFA) was applied on the data set they collected from 1023 university students and confirmatory factor analysis (CFA) was applied with the data collected from 817 university students. As a result of the EFA performed with the data collected in the first stage, a scale with 22 expressions and one sub-dimension emerged. While the scale expressions explained 51.91% of the total variance, the factor loads of the expressions were stated as the lowest .62 and the highest .79. The Cronbach Alpha coefficient of the scale was calculated as .96. It was stated that the compliance values of the CFA results made with the data collected in the second stage were within acceptable limits (71). The scale is rated in a five-point Likert type. The high score to be obtained from the scale can be expressed as the trust that students have in academics.

Student Participation Scale: For the scale developed by Özer and Atik (71), data was collected in two stages and EFA analyses were carried out with the data collected in the first stage and CFA were carried out with the data collected in the second stage. First, the 11-item and one-sub-dimension structure that emerged as a result of the EFA conducted with the data collected from 1023 students explains 43,507% of the total variance. The lowest factor load of the expressions in the scale was .58 and the highest was .72. The Cronbach Alpha coefficient of the scale was found to be .87. In the second stage, it was stated that the compliance values of the data collected from 817 university students and the CFA results were within acceptable limits (71). The data were collected using a 5-point Likert-type rating.

School/Faculty Engagement to Higher Education Scale: In the literature review, the student engagement scale was used by different researchers on university students (9,10,52,57). In this study, it is the organizational commitment scale of which the validity and reliability of Meyer and Allen (59) was ensured and the adaptation of the scale to Turkish culture was carried out by Wasti (94) in order to measure the faculty engagement of university students. As a result of the analysis of the scale, three sub-dimensions (emotional, attendance and nominative engagement) were determined. Each sub-dimension consists of 6 items and the scale consists of a total of 18 items. The scale is rated as a 5-point Likert type.

Data Analysis

The SEM model created for the research was tested in line with the data obtained from the 552 participants who formed the sample of the research. To test the validity of SEM, scales consisting of three variables and 51 items were analyzed by Confirmatory Factor Analysis (CFA) using the AMOS program. As a result of the CFA, although all scale expressions in the analysis data were significant ($p <$

.05; t >1.96), due to the fact that the factor loadings of the Normative sub-dimension (Nor4) item and the Emotional sub-dimension (Emo5) of the scale of the faculty engagement were lower than the lower limit value of .32 (80) stated in the literature, they were excluded from the analyses performed (80). Subtraction of the specified items was carried out one by one, considering the removal of the lowest value statement. After removing the items, the analysis was performed again.

FINDINGS

As a result of the analyses made, the lowest standardized factor load of the items was found to be .41 and the highest factor load to be .85. Since the goodness of fit values determined as a result of CFA were not at the desired level at the first stage (χ^2/df =3.26, RMSEA = .064, SRMR = .049, CFI = .88), School Engagement to Higher Education Scale e41-e42, Trust in Instructor Scale e1-e2 , e19-e20 and Student Participation Scale e32-e34 items were corrected by adding covariance between the error terms. According to the results of the correction process, the CFA goodness-of-fit index values were found to have acceptable (χ^2/df = 2.92, RMSEA = .059, SRMR = .048, CFI = .90] values of goodness of fit suggested by Hu and Bentler (44). CFA results are given in Table 2.

Table 2. CFA goodness of fit values

Model Fit Index	Perfect Range	Acceptable Range	Scale Value
X2/df	0<X2/df<2	2<X2/df<5	**2.92**
RMSEA	.00<RMSEA<.05	.05<RMSEA<.08	**.059**
CFI	.95<CFI<1.00	.90<CFI<.95	**.90**
SRMR	.00<SRMR<.05	.05<CFI< .10	**.048**

Table 3. Confirmatory factor analysis results

Variables & Expressions	βa	t	R2
Trust in Instructor Scale			
Instructors in our faculty are ready to help students.	.74		.55
Instructors in our faculty do what is expected of them.	.76	23.49	.57
Instructors in our faculty listen carefully to students.	.79	19.56	.63
Instructors in our faculty are honest with students.	.79	19.41	.62
Instructors in our faculty do their job perfectly.	.80	19.69	.64
Students in our faculty trust what their instructors say.	.80	19.84	.65
Instructors in our faculty carry out their lessons very well.	.78	19.05	.60
Students learn a lot from the instructors in our faculty.	.76	18.72	.58
When students need help, they can count on the instructors in our faculty.	.82	20.24	.69
Instructors in our faculty care about students.	.82	20.31	.67
Instructors in our faculty are consistent with what they say and what they do.	.82	20.28	.67
Instructors in our faculty are deeply concerned with students' concerns.	.77	18.90	.59
Instructors in our faculty are open to divergent views from students.	.81	20.02	.66
Instructors in our faculty do their best to help students learn.	.82	20.41	.68
Instructors in our faculty are cordial with students.	.81	19.98	.65
What instructors in our faculty say is convincing to me.	.82	20.25	.67
When I have any problems, I can find an instructor in my faculty that I can ask for help.	.73	17.87	.54
Instructors in our faculty treat students fairly.	.79	19.56	.63
Instructors in our faculty are considerate of students.	.82	20.43	.68
Instructors in our faculty have time to listen to the students.	.81	20.03	.66
Instructors in our faculty treat students with respect.	.81	19.92	.65
Instructors in our faculty make students feel valued.	.81	20.11	.66
Student Participation Scale			
I try to learn more in the classes.	.63		.40
I try to learn a subject that I do not understand in the class.	.61	17.09	.37
I take notes in class.	.63	12.52	.40
While studying for the class, I do research from various sources.	.64	12.69	.41
I try not to be late for class.	.50	10.30	.25
I listen carefully to the lecture.	.67	13.05	.45
I have the resources related to the class with me.	.69	13.40	.48
I attend classes regularly.	.60	12.04	.36
I do not come to class until I complete the homework given in the class.	.65	12.73	.42
I study regularly for my lessons.	.68	13.28	.47
I make an effort to do the homework given.	.72	13.78	.51
School/Faculty Engagement to Higher Education Scale			
Attendance Sub-dimension			
I feel a strong sense of belonging to this faculty.	.75	9.37	.56
When I think that I will spend the rest of my education life at this faculty, I feel very happy.	.81	9.57	.66

I try to solve the problems of my faculty as my own personal problem.	.76	9.39	.57
This faculty deserves my loyalty.	.84	9.65	.70
I don't think about changing my faculty because I feel responsible to the faculty.	.74	9.34	.55
If I didn't have a duty of loyalty to this faculty, I would have transferred to another faculty.	.40		.16
Emotional Sub-dimension			
I feel "emotionally connected" to this faculty.	.76		.57
Studying at this faculty means a lot to me personally.	.80	19.47	.64
I feel "like a member of the family" in this faculty.	.85	20.71	.71
I would feel guilty if I changed my faculty now	.62	14.68	.39
If I change my current faculty, my life will be turned upside down.	.48	11.00	.22
Normative Sub-dimension			
I owe a lot to this faculty.	.82		.68
I feel responsible to my faculty.	.84	23.33	.70
Even if I could go to a department of another faculty right now, I would not want to change my current faculty.	.63	15.85	.40
I do not believe that there is a faculty that offers better opportunities than my own faculty.	.54	13.04	.29
Even if I wanted to, it would be very difficult for me to change this faculty right now.	.48	11.62	.24

In the study, the convergent and divergent validity features of the scales were examined. Average explained variance (AVE) for convergent validity and composite reliability (CR) coefficients for significance of factor loadings for convergent validity were checked. When Table 3 is examined, it is seen that the factor loadings of all items belonging to the scales are significant and the CR value in Table 4 is above .70. Although the average explained variance (AVE) value is expected to be above .50, if the composite reliability (CR) value is above .70, it can still be stated that the structures have divergent validity within themselves (26). Also, AVE is a strict calculation method. Researchers suggest that these constructs have divergent validity based on CR alone (55).

Tablo 4. Convergent and Divergent Validity (AVE-CR-CA values)

Variables	AVE	CR	CA
Trust in Instructor Scale	.63	.97	.97
Student Participation Scale	.41	.88	.88
School/Faculty Engagement to Higher Education Scale			
Attendance sub-dimension	.53	.87	.86
Emotional sub-dimension	.51	.83	.82
Normative sub-dimension	.46	.80	.80

Not. AVE= Average explained variance, CR = Convergent reliability, Cronbach Alfa=CA

According to Table 4, the CR values of the factors in the study ranged between .80 and .97, and the AVE values between .41 and .63. In addition, the Cronbach's alpha coefficients of the scales are between .80 and .97. In this case, it is possible to say that the variables in the measurement model have divergent validity. When evaluated together with these findings, the measurement model of the research was confirmed, and it was revealed that the scales had construct validity.

Evaluation of Structural Model and Testing of Hypothesis

After validation of the measurement model, research hypotheses were tested on the implicit variable structural model to test the relationship between trust in the instructor, student engagement, and faculty engagement.

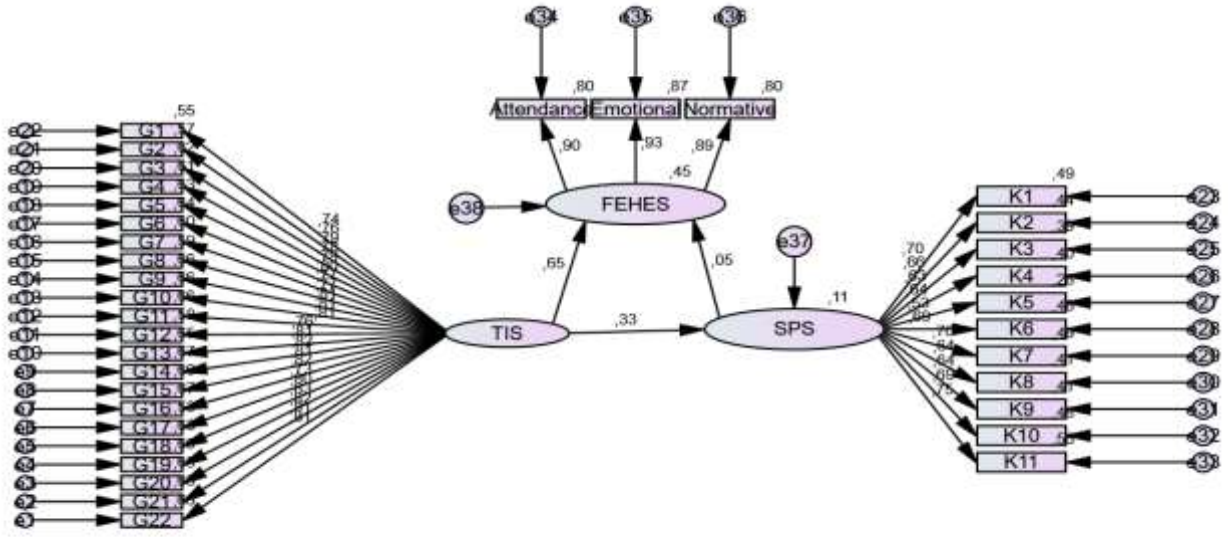

Figure 2. Structural Equation Model Path

As a result of the analysis of the structural model, it was revealed that the model's goodness-of-fit values are in accordance with the acceptable goodness-of-fit evaluations by Hu and Bentler (44) [χ^2 (591, N = 552) = 2029,319 p < .00, χ^2/df = 3.42, RMSEA =.068, SRMR = .047, CFI = .90].

Table 5: Structural Equation Model fit values

Model Fit Index	Perfect Range	Acceptable Range	Scale Value
χ^2/df	0<χ^2/df<2	2<χ^2/df<5	**3.54**
RMSEA	.00<RMSEA<.05	.05<RMSEA<.08	**.068**
CFI	.95<CFI<1.00	.90<CFI<.95	**.90**
SRMR	.00<SRMR<.05	.05<CFI< .10	**.047**

When Table 5 is examined, it is seen that the values obtained for the structural equation model are in the acceptable range. All these values show that the established model is compatible.

Table 6: Results of the structural model

Causal Relationships	Standardized β	z-statistics	p
TIS -> FEHES	0.65	13.782	<0.00
TIS-> SPS	0.33	6.591	<0.00

Table 6 shows the results of the structural equation model. First, a statistically significant positive correlation was found between the variable of trust in the instructor and the faculty engagement (β = .65, p < .00). A statistically significant positive correlation was found between trust in the instructor and student participation (β = .33, p < .00).

DISCUSSION AND CONCLUSION

In this study, it is aimed to determine the appearance of the relationship pattern between the perceptions of the students' trust in the instructors, participation in the class and school engagement according to the opinions of the university students studying in the faculties of sports sciences, especially in the faculty of sports sciences.

In university education, faculty of sports sciences is one of the faculties where more teacher-student communication is experienced compared to other faculties. The applied courses in the curriculum of the faculties of sports sciences are the courses where teacher-student communication is seen more than the relationships in the classroom courses. From this point of view, the trust in the instructors can be an important factor in attendance and faculty engagement in these schools. Within the scope of this research, the relationship between the trust in the instructors, which is effective on the sports sciences students' class participations and their faculty engagement and the effect of trust in the instructors on the participation and the faculty engagement were examined through the SEM created.

In the research, the model constructed/created with related studies and theoretical models (engagement-trust, common identity-common bond) has been verified. Considering the goodness-of-fit values obtained as a result of structural model analyses in the research, it was found to be acceptable. The findings obtained as a result of the analyses within the scope of the research can be

interpreted as follows: It can be stated that the increase in the level of trust of the students in the instructors will positively affect their participation in the class and their faculty engagement. Here, it was also determined that trust in the instructors predicted faculty engagement more effectively than participation in the class.

The first hypothesis of the study was that "the students' perceived trust in the instructor positively affects their participation in the course". As a result of the analysis, this hypothesis was accepted. When evaluated in terms of student outputs, one of the most strategic elements in universities is instructors. Perhaps one of the most important people in the lives of university students who continue their education in different universities or different cities, after their families, is the instructors in the faculties they study. The relationships that university students have with their instructors are not only effective in class participation, but also extremely important for the future of the student. According to Hoy et al. (42) and Hoy et al. (43), trust in teachers also affects many concepts related to school life. Estepp and Roberts (25) confirmed in the sample of university students that teacher-student closeness is also effective on motivation and class participation, which are among these concepts. Trust in the interacting instructor is an important factor in students' participation in the class (15,58,66,74). Therefore, the fact that students are supported and trusted by the instructors they interact with results in their tendency to participate more in that class. This situation (interaction) has a great contribution to the participation of the student in the learning process (50). While Rotter (76) emphasized the importance of trust on human learning, Özer and Tül (72) emphasized that trust between teacher and student helps students cope with school-related problems and display positive attitudes towards school and lessons. In this study, it was concluded that the trust of the students in the instructors directly affects their participation in the classes and the trust in the instructors explains approximately 33% of the coefficient estimate value in the participation in the class. This result obtained in the study was similar to the studies in the related literature (15,16,29,33,50,58,64,73,74,77,78,83,93). Therefore, it can be said that the trust of university students, which is formed in line with the interaction between the instructor and the student, has a positive effect on the participation of the students in the learning processes, especially in the faculties of sports sciences.

The second hypothesis of the study was "the students' perceived trust in the instructor positively affects their school engagement". As a result of the analysis, the hypothesis was accepted. School, which has a great role in the holistic development of students and is the temple and most important criterion of the learning process, contains much more than a physical element. One of the most important elements and support resources that contribute to its role and meaning on students is the teachers/instructors. The relationship that students will establish with their friends, teachers and school administrators is effective on school engagement. The sharing of students with the instructors and the financial, emotional, academic, and informational supports provided by the instructors in school problems will strengthen the evaluation of the feeling of being valuable and cared, while ensuring the trust of the instructor. The positive relationships s/he will establish with other people in the school ensure that s/he has a positive reaction about the school (48). Therefore, it is expected that the student who believes in the trust of the instructors will have a high level of school engagement. The feeling of trust in the instructors will also increase the student's the school engagement. In the research, it was seen that the trust of the students in the instructors directly affects the faculty engagement and the result of the trust in the instructors explaining approximately 65% of the coefficient estimation value in the faculty engagement. Therefore, it can be said that trust in the instructors provides important inferences about the school/faculty engagement of university students. The faculty engagement of university students, whose trust in the instructors increases, also increases, and it can be said that active participation in educational activities comes with it. In a study conducted on university students (45), it was reported that school engagement is the most important factor in the academic and personal development of students. The role played by the trust in the instructors in the current research at the level of school engagement was also seen in the study of Günüç (34). In the study conducted on university students, it was stated that the student-teacher relationship and the perception of the lesson as useful affect the university engagement. Similarly, Green et al. (32) stated that positive attitude and strong school engagement are related to teacher and student relations as well as different variables (in-class teaching activities, out-of-school learning, avoidance of crime). Along with these studies supporting the findings of the study, the relevant literature

determined that students' trust in teachers/instructors is an important variable in school engagement (11,34,63,67,68,75). Universities are an environment where students' social and psychological needs are met, self-confidence and self-expression are provided in addition to their educational role. For this reason, the trust in the instructors can allow students to feel good and at the same time increase their motivation towards the school.

As a result of the analysis of the model created by this research using SEM, it was concluded that trust in the instructors directly affects the school/faculty engagement and participation in the class. In addition, the coefficient estimate value for the effect of trust in the instructors on school/faculty engagement was found to be 0.65, and the coefficient estimate value for its effect on participation class was found to be 0.33. The positive effect of trust in instructors on school/faculty engagement is seen as an important result. This finding means that if the trust in the instructor increases by 1 unit, the school/faculty engagement will increase by 0.65 units. It is seen that trust in the instructors is of great importance for the school/faculty engagement. Similarly, considering that participation in the class is affected by many factors such as academic achievement, learning environments, student characteristics, course methods and assessment, motivation, anxiety, self-confidence, and introversion/extraversion, it can be stated that an effect coefficient of 0.33 is a very important result.

RECOMMENDATIONS AND LIMITATIONS

As a result, the research has shown that trust in the instructor is important in the university students' faculty engagement and their participation in the class, especially in the faculty of sports sciences. For this reason, shaping and increasing the trust in instructors in universities should be considered important for universities. In order to increase the trust in the instructors, an effective guidance system should be established with the students as well as developing the strategies that will increase the level of in-class and extra-curricular relationship between the instructor and the student. In addition, it is thought that it may be beneficial for the instructors to show that they care about students, to be open to criticism and communication, and to be accessible and honest, to make the students feel their expertise, to provide the opportunity to work together and to provide academic assistance, to make the students feel that success is supported as well as encouraging to participate in views and discussions about the core values, vision and mission of the faculty/school/department.

It should not be forgotten that this study brings with it some important limitations. The research was carried out only on Selcuk University Faculty of Sport Sciences students. The results can only be interpreted for the population represented by this sample. More comprehensive results can be obtained from the studies to be carried out with the students of different sports science faculties. In addition, when the research sample group (sports sciences faculty students) is considered, these relations, which were determined at very high levels as a result of the research, may be due to the fact that participation in extracurricular activities (sports events, competitions, social activities.,) is quite effective in these faculties. In this direction, more comprehensive results can be obtained from the studies to be carried out on the students of different faculties and can be compared with the faculties of sports sciences.

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Muscle Activity of Core Muscles During Plank Exercise on Different Surfaces

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Abstract

Determining the effects of different instability devices on core muscle activation gives important information for practitioners when prescribing strength exercise. This study aimed to compare electromyographic responses of core muscles during plank exercise performed with and without instability devices. Twenty-five subjects (age = 21.5 ± 2.66 years; height 179 ± 0.5 cm; weight 74.28 ± 4.27 kg; Body Mass Index (BMI) = 22.98 ± 1.11 kg/m2) performed plank exercise on stable surface, BOSU ball, Swiss ball, and TRX Suspension Trainer (TRX) in a crossover design. Plank exercise consisting of isometric contractions was performed two times. Surface electromyography (sEMG) was used to determine the amplitude of rectus abdominis (RA), external oblique (EO), erector spinae (ERS) muscles during the exercise. The sEMG amplitude has been normalized against the maximum voluntary contraction (MVC) trial that yielded the highest peak torque value during isometric contractions of the related muscles. In the RA and EO muscles, significantly higher normalized sEMG amplitude (%MVC) values were detected in TRX and Swiss ball compared to a stable surface and BOSU ball ($p<0.05$). On the other hand, TRX exhibited more sEMG amplitude than on Swiss ball ($p<0.05$). A significantly higher sEMG amplitude value was detected on TRX than the Swiss ball in the ERS muscle ($p<0.05$). However, there was no significant difference between the BOSU ball and the Stable surface. In conclusion, the TRX may be a good option for those who want more challenges for the anterior and lateral core muscles. However, plank exercise, whether on a stable surface or an instability device, seems trivial for strengthening the ERS muscle.

Keywords: EMG, Instability, BOSU Ball, TRX, Swiss Ball, Core Muscle

INTRODUCTION

The importance of the core region muscles in daily activities and athletic performance has increased in recent years. Thus, core training has begun to be commonly performed in strength exercises (1,3,4,6,8). Core training provides benefits in daily life, such as preventing and rehabilitating low back pain and reducing the risk of fall-related injuries. It also supports force production by providing trunk stabilization and plays a vital role in transferring the generated force to the extremities in athletic performance (1,21,31). According to its regions and attachment points, the core muscle is called as the global and local core muscle (2). The local core muscle is located close to the spine and takes part in precise spinal movements, and helps the global core muscle to produce more force. In contrast, the global core muscle is the sizeable superficial muscle responsible for both spine stability and actions of the trunk and extremities (6). Being the surface and large size of these muscles provides ease of measurement, and the activation measurement of these muscles was preferred in previous core region muscle activation studies (2). It was stated that the

enhanced function and strength of the rectus abdominis (RA), external oblique (EO), and erector spinae (ERS) muscles, which are among the most important global core muscles, improve stability and muscle coordination, thus reducing the risk of injury (10).

Since it is claimed that spinal flexion exercises (i.e., Sit-ups) performed in core training may cause deformations due to overloading the lumbar region, plank exercise, an isometric exercise, has become more preferred in core training (23–25). The traditional plank exercise is an important bodyweight exercise that puts minimal load on the spine, designed to increase the muscle strength, endurance, and stability of the core muscles (28). In recent years, the frequent use of the Plank exercise has led to the manipulation of the Plank exercise by the trainers who demand more muscle development. One of the most trend manipulation techniques is plank exercise carried out with instability devices (13,21,22,29).

One of the most important usage purposes of instability devices is to activate more muscles by creating a less and unbalanced contact area, thus increasing the training intensity (29). Although a few studies examining the effects of instability on training stated that instability did not affect core muscle activation (17,32), some studies reported opposite results (5,7,15,28,33). The most used instability devices are BOSU ball, Swiss ball (4), and TRX Suspension Trainer (TRX), which has been popular recently (3,7,13). Previous studies have mainly focused on comparing exercise on an instability device with exercise on a stable surface. In plank studies comparing Swiss ball and TRX with a stable surface, it was stated that core muscle activation was higher in instability devices (6,13). However, the number of studies comparing instability devices in plank exercise is limited in the literature. To the best of our knowledge, only one study compared instability devices in plank exercise, and the BOSU ball was not included in that study (28). Significant differences were found in the different exercises performed with the BOSU ball compared to the stable ground. In addition, in exercises performed on the floor with body weight, such as Plank exercise, muscle activations may vary according to the angle of the body to the ground. As far as we know, angular differences caused by the height of the instability devices were ignored in previous studies (3,28).

This study aims to compare the electromyographic activations of RA, EO, and ERS muscles during plank exercise carried out with and without different instability devices. Based on previous studies, firstly, it was hypothesized that plank exercise performed on instability devices would generate more activation than on a stable surface. Secondly, among the instability devices, it was thought that due to the structure of the suspension device, it was composed of two independent parts so that it would generate more movement area, which would cause more mechanical stress. Therefore, it was hypothesized that the most significant muscle activation would be in TRX.

METHOD

Experimental Approach

In this study, a repeated measurement method was used to examine the changes in muscle activation during plank exercise applied on four different surfaces (Stable, BOSU ball, Swiss ball, TRX). Surface electromyography (sEMG) was used to determine the amplitude of rectus abdominis [RA], external oblique [EO], erector spinae [ERS] muscles. The sEMG amplitude has been normalized against the maximum voluntary contraction (MVC) trial that yielded the highest peak torque value during isometric contractions of the related muscles. The plank exercise carried out on each surface consists of two repetitions lasting five seconds with a rest interval of 120 seconds. All details of this study are described in the subsequent sections.

Subjects

The sample size was calculated by analyzing the G Power 3.1.2 (Franz Faul, University of Kiel, Kiel, Germany) program. The analysis indicated that a minimum of 24 participants were required to achieve f = 0.25, α = 0.05 (5% probability of type 1 error) and β = 0.80 (80% power) values. In case of possible exclusion of participants during the study, a 25 % larger sample size (n = 30) than specified in the power analysis was planned. Since 5 of the participants left the study for various reasons, the study was completed with 25 male volunteer athletes. The participants' mean age, height, weight, body mass index (BMI), and body fat was 21.5 ± 2.66 years, 179 ± 0.5 cm, 74.28 ± 4.27 kg, 22.98 ± 1.11 kg/m2 and 10.72 ± 2.07 %, respectively (Table 1). Participants who had a sports background between 1-5 years and continued training and competitions related to the branch they are interested in (football, wrestling, athletics) were selected for the study. Those who had any pain, injury, or illness that could affect the exercises were excluded from the study.

A meeting was held with the participants one week before the start of the study to introduce the exercises and give information about the study. An "Informed Voluntary Consent" form was collected from each subject during the meeting. The research was conducted with the approval of the Bursa Uludağ University Clinical Research Ethics Committee.

Table 1. Descriptive characteristics of subjects

Variable	Mean± *SD*
Age (yr)	21.5 ± 2.66
Height (cm)	179 ± 2.05
Mass (kg)	74.28 ± 4.27
BMI (kg/m^2)	22.98 ± 1.11

Procedures

The research consists of two sessions, an introduction, and an experimental session. In the introduction session, after measuring height, weight, BMI, and fat percentages (Tanita model BF-350; Tanita Corp., Tokyo, Japan), the participants were familiarized with the exercises and devices they would use in the research. In the experimental session, the participants were prepared for EMG measurements first. All electrodes were attached to the dominant side of the participants. Electrodes were attached parallel to the direction of the muscle fibers, where the muscles were most prominent, according to the recommendations of SENIAM. Before the electrodes were placed, the hairs on the skin were shaved and cleaned with isopropyl alcohol. The skin was sanded with sandpaper to keep the inter-electrode impedance below 2000 Ω and to minimize the skin impedance. Bipolar Ag-AgCl coated surface electrodes (Kendall-Arbo electrodes with 1 cm silver-silver chloride discs; Tyco Healthcare, Neustadt/Donau, Germany) were used to obtain EMG recordings from the muscles. The distance between the centers of the electrodes was determined as 20 mm. All EMG data were collected using a portable 8-channel surface EMG instrument (ME6000, Mega Electronics, Kuopio, Finland). Raw EMG data were sampled at 1,000 Hz and analyzed by calculating the Root Mean Square (RMS) with MegaWin v3.1 software. MVC measurements of the RA, EO, and ERS muscles were performed to normalize the EMG data amplitude after the electrodes were attached. Muscle activations in the exercises applied in the study were expressed as the percentage of the MVC reference value (%MVC). During MVC measurements, participants were asked to contract with a maximum effort against a manual resistance applied by the researchers. The MVCs consisted of two isometric contractions, each lasting for 5 seconds, and 180 seconds resting between contractions.

• Rectus abdominis: Subjects were placed in a supine position on a mat with the arms crossed over the chest and the knees flexed to 90 degrees. Subjects performed a sit-up movement against the researcher's manual resistance to generate isometric force.

• External Oblique: Subjects performed lateral spinal flexion against the researcher's resistance in the side-lying position with their hips and legs stabilized.

• Erector Spinae: Subjects performed a back extension movement against manual resistance applied from the scapula region in the prone position with their legs stabilized.

Following the MVC measurements, the participants performed the plank exercise on four different surfaces in a randomized block design (Figure 1). The plank exercise carried out on each surface consists of two repetitions lasting five seconds with a rest interval of 120 seconds. During plank exercise, subjects were asked to get a plank position with their elbows flexed to 90 degrees with only the forearms and toes in contact with the surface. Subjects were asked to rigidly lift the whole body to form a straight line with equal width of shoulders and both feet. Participants were asked to contract their core and gluteal muscles to stay stable. In instability devices, the elbows were placed on the devices, and the feet were placed on a stand adjusted at the height of the devices.

Statistical Analysis

SPSS version 23.0 (Armonk, NY: IBM Corp) package program was used to analyze the data. Shapiro-Wilk test was used to test the normality of the data distribution. Repeated measures analysis of variance (ANOVA) test was used to examine the differences in EMG activation in RA, EO, and ERS muscles in plank exercises performed on four different surfaces. Statistical significance level was determined as $p<0.05$. A Bonferroni post hoc was used for a follow-up procedure. Cohen's d effect size (ES) values were determined to assess the magnitude of changes in muscle activation. ES were evaluated according to <0.40 small, 0.40–0.70 medium, and >0.70 large effect criteria.

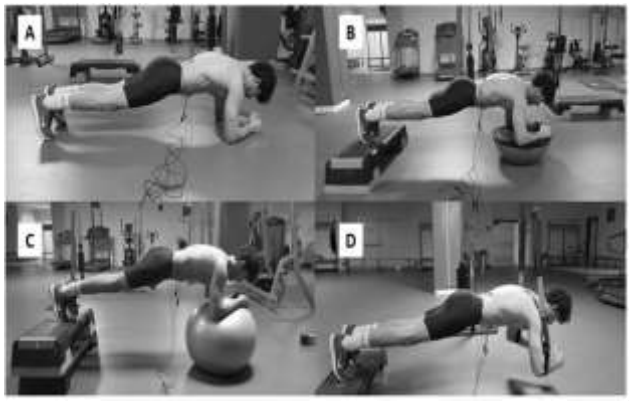

Figure 1. Plank on 4 different surfaces. A: Plank on Stable Surface, B: Plank on BOSU Ball, C: Plank on Swiss Ball, D: Plank on TRX

RESULTS

All participants (n=25) successfully completed the exercise trials, and all data were included in the statistical analysis process. The normalized EMG amplitude values (%MVC), p values, and effect sizes of muscle activations during the plank exercise applied on four different surfaces are shown in Table 2. The %MVC values of the RA, EO, and ERS muscles are shown in detail in Figures 2, 3, and 4, respectively.

Table 2. Comparison of the normalized EMG activity (%MVC) of RA, EO, and ERS muscles during plank on four surfaces.

	Mean ± *SD*	*p*, ES		
	RA (%MVC)	Stable	BOSU Ball	Swiss Ball
Stable	31.8 ± 17.4			
BOSU Ball	35.3 ± 17.0	1.000, 0.205 Small		
Swiss Ball	63.4 ± 32.6	0.000, 1.211 Large	0.000, 1.081 Large	
TRX	88.3 ± 37.3	0.000, 1.942 Large	0.000, 1.827 Large	0.000, 0.710 Medium
	EO (%MVC)			
Stable	40.0 ± 21.5			
BOSU Ball	49.2 ± 21.8	0.080, 0.426 Medium		
Swiss Ball	66.8 ± 33.0	0.000, 0.960 Large	0.002, 0.626 Medium	
TRX	83.3 ± 38.3	0.000, 1.396 Large	0.000, 1.094 Large	0.000, 0.463 Medium
	ERS (%MVC)			
Stable	7.6 ± 2.4			
BOSU Ball	7.8 ± 2.4	1.000, 0.066 Small		
Swiss Ball	7.6 ± 2.6	1.000, 0.016 Small	1.000, 0.080 Small	
TRX	8.5 ± 2.4	0.211, 0.382 Medium	0.278, 0.316 Small	0.041, 0.388 Medium

MVC: Maximum Voluntary Contraction; ES: Effect Size

In the RA and EO muscles, significantly higher normalized muscle amplitude (%MVC) was detected in TRX and Swiss ball compared to a stable surface and BOSU ball ($p<0.05$). Furthermore, a significantly higher normalized muscle amplitude was found in TRX than on Swiss ball ($p<0.05$). However, no significant difference was found between the BOSU ball and the Stable Surface (Figure 2 and 3) ($p<0.05$).

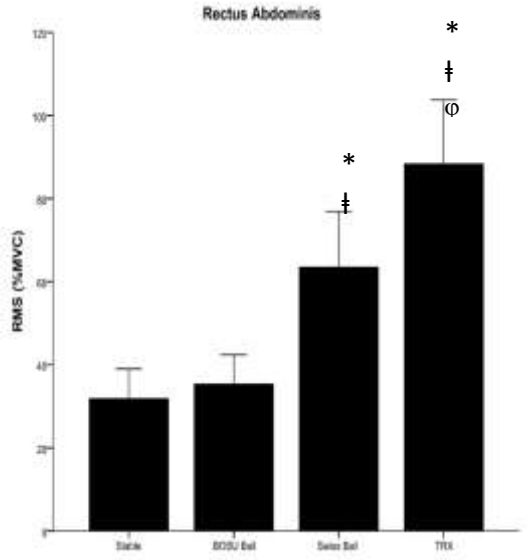

Figure 2. Normalized electromyographic activity (%MVC) of the rectus abdominis on stable surface and instability devices.

*Significantly greater compared with stable surface ($p<0.05$), ǂ Significantly greater compared with BOSU Ball ($p<0.05$), φ Significantly greater compared with Swiss Ball ($p<0.05$).

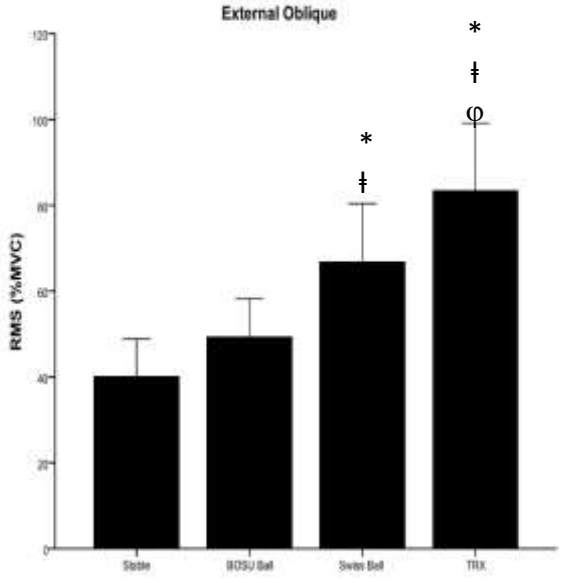

Figure 3. Normalized electromyographic activity (%MVC) of the external oblique on stable surface and instability devices.

*Significantly greater compared with stable surface ($p<0.05$), ǂ Significantly greater compared with BOSU Ball ($p<0.05$), φ Significantly greater compared with Swiss Ball ($p<0.05$).

In the ERS muscle, a significantly higher normalized muscle amplitude (%MVC) was detected in TRX compared to the Swiss ball ($p<0.05$). However, no significant difference was found between the other surfaces (Figure 4).

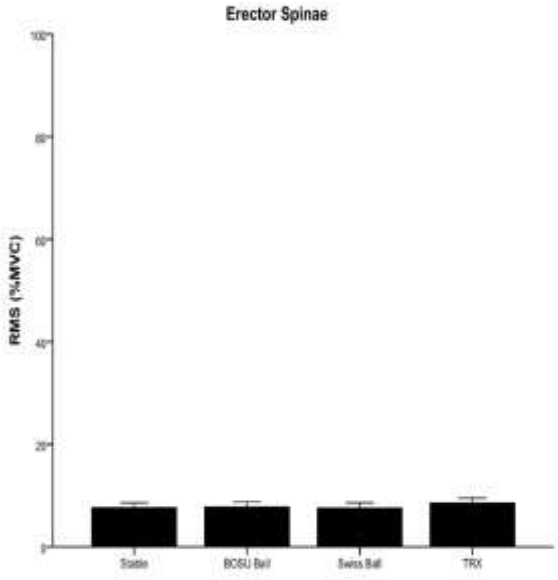

Figure 4. Normalized electromyographic activity (%MVC) of the erector spinae on stable surface and instability devices.

φ Significantly greater compared with Swiss Ball ($p<0.05$).

DISCUSSION

In recent years, instability devices have been trendy in the fitness industry. Determining muscle activation levels during core exercises on these devices can guide the selection of the appropriate surface for practitioners. Therefore, the aim of this study was to determine the electromyographic responses of RA, EO, and ERS muscles during plank exercise performed on a stable surface or various instability devices. The main findings of this study were: a) Instability devices like Swiss ball and TRX generated more activation in RA and EO muscles than the stable surface and BOSU ball, b) BOSU ball and stable surface exhibited no significant difference, c) the most muscle amplitude in all the muscle groups was in TRX among the instability devices, d) the muscle amplitude was not significantly different in the ERS muscle between the instability devices and stable surface, e) muscle amplitude in the ERS muscle was higher in TRX than in the Swiss ball. Thus, our hypothesis that there is more muscle activity in the instability devices than in the stable surface was

partially confirmed in the RA and EO muscles. Our second hypothesis that the most activation among the instability devices was in the TRX, was also confirmed.

Many studies reported that muscle activities for the core region in different exercises such as Crunch, push up, etc., are higher in instability devices compared to a stable surface (13,22). In the same way, our findings were similar to the results of the studies in the literature comparing the stable surface and instability devices in plank exercise. In a study performed with the suspension device in different variations, significant increases were found in the activities of the RA and EO muscles in all three different suspension variations in the front plank exercise compared to the stable surface (6). Similarly, it has been reported that RA and EO muscles are more activated during plank exercise in Swiss ball and TRX than on a stable surface (27). Another study presented significant increases in RA in the TRX compared to the stable surface during prone plank exercise (20). In the study by Czaprowski et al. (11), although muscle activities were not significantly different in any abdominal muscle group (RA, EO, Internal oblique (IO)) between BOSU ball and stable surface during prone plank exercise, muscle activities in all these muscle groups increased significantly in Swiss ball compared to the stable surface. Similar to these studies, no significant difference was found between BOSU ball and stable surface in our study. The fact that the BOSU ball is structurally stable on one side limits instability during exercises performed on this device. However, a study suggests that having the dome side of the BOSU ball on the floor during exercise may increase instability (30). In the study of Czaprowski et al. (11), subjects performed the plank exercise with the elbows on the BOSU ball and the stable side of the BOSU ball on the ground. In our study, exercise was carried out with the dome side of the BOSU ball on the floor. Muscle activity responses were similar in both studies. Thus, the claim that the dome side of the BOSU ball on the ground causes more instability may be limited for plank exercises. However, in different exercises, a significant increase was found in the BOSU ball with the dome side on the ground compared to the stable surface (29). These results show that different muscle activity responses occur in different exercises performed with the BOSU ball compared to the stable surface.

When instability devices were compared, the results of the present study demonstrated that the Swiss ball and TRX cause more muscle activity in RA and EO muscles than the BOSU ball. In addition, significantly more muscle activation was detected in TRX than Swiss Ball in all muscles. Czaprowski et al. (11) reported that the Swiss ball produces significantly more muscle activation in all the muscle groups than the BOSU ball during elbow plank exercise. Another study determined more muscle activity in the RA, EO, and ERS muscles with TRX than Swiss ball during plank exercise where elbows were placed on the instability devices (28). Nevertheless, the designs of these three instability devices were different. The instability level in the BOSU ball is less than the Swiss ball and TRX due to one side stability of the BOSU ball. While the Swiss ball is a single unit and provides instability with its rolling tendency, the TRX provides instability with its structure consisting of 2 independent straps that can move in different directions. It is emphasized that the TRX has fewer degrees of freedom in which the upper body can move so that the focus is on the RA to resist spinal movement (28). While agreeing with this consideration, it was suggested in another study that the activity of synergist abdominal muscles is necessary to keep the whole body in a stable and correct position in instability devices (7). In the present study, the primary muscle of the core area, RA, and its synergist EO muscle might have been more active to provide spinal straightness on the Swiss ball and TRX.

One of the unusual findings of our study was that the ERS muscle, which is of great importance for general postural stabilization (2,16), showed a low activity response during plank exercise regardless of surfaces. However, our findings are similar to previous studies (8,18,27). Although the elbow plank is used to develop the entire core region, it should not be forgotten that it is more suitable for the anterior core muscles as an "anti-extension" exercise (26). Our findings showed a statistically significant increase in TRX compared to Swiss ball. Besides, although more activation was in TRX than the stable surface and the other instability devices, the activation in TRX remained at a low activity level according to the muscle activation classification (12). Thus, this exercise is considered unsuitable for strengthening the ERS muscle, and the activity increase in TRX is practically worthless.

There were some limitations in the study. Firstly, BOSU, Swiss ball, and TRX were used as instability devices. Nevertheless, in the fitness industry, Dyna disk, balance board, etc., are other popular devices, and study findings should not be warranted to these

devices. There is a need to prefer other instability devices that are frequently used in the fitness industry in future studies. Likewise, how the position of the feet on the devices affects EMG activity should also be evaluated in future studies. Secondly, EMG measurements were performed while only the elbows were placed on the device. It is also necessary to investigate and determine how the situation where the feet are placed on the device affects muscle activity. Thirdly, healthy young men were included in this study, and the sample size was small. Therefore, our results may not be generalizable to other populations like elderly, females, with low back pain, etc. Finally, muscle activities were measured on the dominant side of the participants in the RA, EO, and ERS muscles. We recommended that the activity of other core muscles, non-dominant side muscles, and other auxiliary muscles can be measured in the future.

CONCLUSION

We compared electromyographic activities of RA, EO, and ERS muscles during plank exercise performed on stable and three different instability devices. The activity of the RA and EO muscles was more prominent in the TRX than on the other devices and stable surface. Therefore, the TRX may be a good choice for those who want more challenges for the anterior and lateral muscles of the core area. However, it should be noted that Swiss ball, which creates another high activity in areas where TRX cannot be used, can also generate significant difficulty for the abdominal muscles. On the other hand, plank exercise may not be the right choice in training sessions to strengthen the ERS muscle, whether on a stable surface or instability device.

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Investigation Of Glenohumeral Internal Rotation Deficit Tendency of Adolescent Female Volleyball Players During Passive and Dynamic Movements

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Abstract

Objectives: This study aims determining the glenohumeral internal rotation deficit tendency of the competitor volleyball players non-invasively through measuring passive physiological and active range of motion of the shoulder joint during overhead movements. Twelve age matched adolescent female players (age of 17.6±0.4, BMI of 21.11±1.08 and height of 170.6±1.7cm) performed jump serve, strike of the ball, horizontal internal- external rotation and internal- external rotation movements and group-based data were analyzed. Bilateral kinematic data were collected from dominant and non-dominant shoulders with Xsens MVN. Each movement was performed five times and the average value was calculated for each participant. T-test paired sample results indicated that ROM did not vary during flexion (dominant: 170.2°±4.5; non-dominant: 171.3°±6.1; p=0.086) and Shoulder Horizontal External Rotation was not significantly different (dominant: 92.7°±4.1 non-dominant: 89.3°±6.3 p=0.052). Contrarily significant differences were obtained during Shoulder Horizontal Internal Rotation (dominant: 27.5°±8.3; non-dominant: 36.8°±7.9; p=0.0053), Shoulder Internal Rotation (dominant: 54.3°±9.0; non-dominant: 65.2°±11.2; p=0.0000) and Shoulder External Rotation (dominant: 98.6±2.5 non-dominant: 90.3°±6.36.7, p=0.0032). This study determined the differences between dominant and nondominant shoulders' passive ROM and investigated the dominant shoulder ROM during overhead movements by using an IMU based wearable motion caption system. The outcome of the investigation might be used as one of the practical and non-invasive early-detection techniques for GIRD tendency. Future research should determine if these findings are correlated with MR arthrographic imaging observations of posterior capsular thickening.

Keywords: shoulder, glenohumeral internal rotation deficit, jump serve, ball strike, Xsens MVN

Adolesan Bayan Voleybol Oyuncularının Pasif ve Dinamik Hareketler Sırasında Glenohumeral İç Rotasyon Eksikliği Eğilimlerinin İncelenmesi

Özet

Amaç: Bu çalışma, voleybol oyuncularının omuz ekleminin baş üstü hareketler sırasında pasif fizyolojik ve aktif hareket açıklığını ölçerek non-invaziv olarak glenohumeral iç rotasyon eksikliği eğilimini belirlemeyi amaçlamaktadır. On iki yaşça benzer adolesan kadın voleybol oyuncuları (yaş 17,6±0,4, VKİ 21,11±1,08 ve 170,6±1,7 cm boy) servis atışı, topa vuruş, yatay iç-dış rotasyon ve iç-dış rotasyon hareketleri grup bazlı uygulandı ve veriler analiz edildi. Bu deneysel çalışmada kinematik veri Xsens MVN ile baskın ve baskın olmayan omuzlardan topladı. Her hareket beş kez gerçekleştirildi ve her katılımcı için ortalama değer hesaplandı. Baskın ve baskın olmayan omuzdan kinematik veri ortalamaları t-testi kullanılarak kişi bazlı olarak analiz edildi. Sonuçlar omzun sagittal düzlem hareket eklem açıklığının (baskın: 170,2°±4,5; baskın olmayan: 171,3°±6,1; p=0,086) ve yatay dış rotasyonunun (baskın: 92.7°±4.1 baskın olmayan: 89.3°±6.3 p=0.052) baskın ve baskın olmayan omuzlar için istatiktiksel olarak farklı olmadığını gösterdi. Omuz Yatay İnternal Rotasyon (baskın: 27.5°±8.3; baskın olmayan: 36.8°±7.9; p=0.0053), Omuz İç Rotasyon (baskın: 54.3°±9.0; baskın olmayan: 65.2°±11.2; p=0.0000) ve Omuz Dış Rotasyonunda ise (baskın: 98.6±2.5 baskın olmayan: 90.3°±6.36.7, p=0.0032) istatistiksel olarak anlamlı farklılıklar

elde edildi. Bu çalışma, voleybol oyuncularının baş üstü hareketler sırasında baskın ve baskın olmayan omuzlarının pasif ve aktif eklem açıklıklarını belirledi ve IMU tabanlı bir giyilebilir hareket analizi sistemi kullanarak araştırdı. Araştırmanın sonuçları bu yöntemin GIRD yatkınlığının hızlı ve invaziv olmayan yöntemlerle erken teşhis edilmesinde kullanılabilecek yöntemlerden biri olabileceğini gösterdi. Bu bulguların arka kapsül kalınlaşmasının MR artrografik görüntüleme gözlemleriyle korele olup olmadığı ileriki çalışmalarda araştırılacaktır.

Anahtar Kelimeler: omuz, shoulder, Glenohumeral İç Rotasyon Eksikliği, zıplama servisi, top vuruşu, Xsens MVN

INTRODUCTION

The shoulder girdle has a primary function to position the upper extremity in space to allow the hand to perform its tasks. The coordinated and complex biomechanical interactions of the shoulder girdle structures allow functional movements in a wide range in three axes of motion that lie in the cardinal planes of the body. Upper extremity injuries are common in volleyball players due to the magnitude of the impact applied to the shoulder during overhead and throwing movements. This frequent force exposure causes chronic shoulder pain, sport- specific adaptations such as shoulder joint hypermobility, alterations in strength and flexibility that eventually results in upper extremity injuries such as rotator cuff injuries, scapula fractures and glenohumeral internal rotation deficit (GIRD) (5,9,11). In this population, the dominant shoulder develops gradual decrease in internal rotation, which is known as GIRD. GIRD is related to multiple factors such as osseous adaptation, musculotendinous and capsular tightness (2,3) that is defined as a loss of 20° and more of internal rotation compared to the non-dominant shoulder. Individuals with less than 18° of GIRD and corresponding symmetry of total range of motion within 5° of the non-dominant side are considered anatomic GIRD, while a pathological GIRD represents athletes with values beyond that amount (4,6,7,10,13,15,16,17-19).

Athletes with a pathological GIRD may be at high risk for possible shoulder injuries. Stiffness and decreased velocity during movement and pain at the shoulder are the major indications of GRID. As a result of these initial indications, volleyball players change their movement strategies and kinematic parameter unintentionally during overhead movements. This adaptation and hypermobility are unavoidable among volleyball players, therefore, early detection of this risk by using noninvasive, fast and practical methods is critical for this population.

Wilk et al. (12) demonstrated that pitchers with GIRD are almost twice as likely to be injured compared to those without GIRD. Additionally, they showed that pitchers with total rotational motion deficit of more than 5° had an increased injury rate. Recent studies indicated that volleyball and baseball players have GIRD on their dominant side with an average mean of approximately 10° for volleyball players and 20° for baseball players (8,12,14,16).

Wearable technology applications in healthcare can be defined as those products worn on the body of the user for specific period to collect physiological, biomechanical and cognitive information. This information can be investigated in real time or later. Wearable technologies have been widely used in healthcare for individualized self-care, early diagnosis, practical and timely data collection and disease management, therefore they significantly improve the efficiency of the treatment and help manage the disease. They facilitate easy and practical data collection in any setting; therefore, they do not require a lab environment. Wearable motion capture technologies are emerging devices that are frequently used in sports research. The athletes can perform their sportive activities and biomechanical, cognitive, and physiological data can be collected, analyzed, and evaluated anytime and anywhere. This advantage provides the natural environment for athletes from almost all sport branches.

The purpose of this study is to practically identify GIRD and examine the potential injury risk of competitor adolescent female volleyball players non-invasively by using a wearable motion capture system with the aim of potentially improving the performance of the athlete, reducing the injury risk, and guiding the coach to design and implement player-specific training and exercise programs. This study hypothesizes that GIRD leads to an increased risk for pathologic conditions of the shoulder and elbow in overhead athletes and kinematic data obtained during dynamic movements such as jump

serve and strike of the ball will reveal the risk for potential injury through proposing a rapid and non-invasive methodology.

MATERIAL AND METHOD

Participants

Randomized controlled trial was carried out between January 2021 and March 2021. Dominant and non-dominant shoulder joint kinematic data during strike, flexion in the sagittal plane, Shoulder Horizontal Internal- External Rotation and Internal-External rotation of 12 competitor adolescent female volleyball players (age of 17.6±0.4, BMI of 21.11±1.08 and height of 170.6±1.7cm) who did not have orthopaedic surgery history and did not show any obvious postural abnormalities, collected. Determination of the sample size was done with G-Power (GPower - Universität Düsseldorf) version 3.2.1 and 12 participants satisfied 0.80 power ratio and 0.8 effect size (10% standard deviation, 95% accuracy rate (z=1.96)). Participants were excluded from the study if they reported neurologic, systemic, peripheral, or rheumatic pathologies, disease or injury that might affect the musculoskeletal system, any history of musculoskeletal injury in the past year, any type of surgery that may have affected the musculoskeletal system. With a sample size of 12, we had 95% confidence that the population mean would be within approximately ±5% of the sample mean. Each participant performed strength and conditioning exercises along with routine trainings twice a week during the competitive season and three times a week during the preseason. Trainings were planned and coordinated by the same volleyball coach for each participant. All participants followed strength training program during the season and preseason. The program focused on building lean body mass, increasing power and work capacity by improving volleyball-specific endurance. Prior to testing, each participant read and signed an informed consent that was approved by the Institutional Review Board.

Methods

Xsens MVN (Xsens Technologies BV®, The Netherlands) is a commercial, inertial sensor-based and portable motion capture system for full body motion analysis. Seventeen wireless sensors, (MTw2, range of measurement of angular velocity: ±1200 °/s, sampling rate: 100 Hz) which comprise accelerometer, gyroscope, and magnetometer, are attached to the key areas of the axial and appendicular body. Battery powered sensors communicate wirelessly with the host computer. Real time data is displayed on the main computer screen and this data is recorded for later analysis. The specially developed modular motion trackers detect all activities- from the smallest motion in the body to the dynamic motions. All types of motion are detected by the sensors, and the biomechanical data are collected and recorded in real time. Thanks to its wireless design, it provides a fast and easy installation and allows motion analysis to be done in the desired environment. Inertial sensors are useful in movement and balance cases with the advantage of their small size and portability that also made them popular recently with the advantage of suitability for use outside laboratory set-up. It allows an unrestricted, 3D and spontaneous gait analysis. The system allows spontaneous gait analysis and has been validated against optical motion capture systems (7, 10, 20). In these studies authors used optical based motion capture and Xsens MVN concurrently during various daily activities and investigated the validity and reliability of the biomechanical data collected. Results showed that wearable motion capture system successfully collected precise and accurate kinematic data. Zhang et al (2013) reported that during slow, normal and fast walking conditions, the Xsens system most accurately determined the flexion/extension joint angle (coefficient of multiple correlation > 0.96) for all joints when the results were compared with optical motion capture system. The system was used to collect kinematic data from participants.

A standard patient testing protocol was developed, and the same methodology was followed for each participant. The testing program included bilateral kinematic data collection during jump serve, strike of the ball, flexion in the sagittal plane, shoulder horizontal internal-external rotation and shoulder internal- external rotation from both dominant and non-dominant shoulder joints of the participants. Each movement performed five times and the average value was calculated for each participant. Each player performed 5 strikes from the middle of the court and the sideline. The ball was served to the player, passed to the setter and the strike was performed afterwards. All strikes during data collection were performed from the left side of the court. Data collection was performed over a single session while the participants were in sitting position and data were collected on the same day for each participant. All ROM measurements were performed within 2 hours. All subjects completed a

demographic and patient characteristic form that included questions such as age, height, and weight.

Data processing and outcome measures

Twelve age matched healthy female competitor volleyball players' shoulder joint range of motion data for dominant and non-dominant upper extremity were collected during strike of the ball, jump serve, flexion in the sagittal plane, Shoulder Horizontal Internal- External Rotation (Shoulder at 90 degrees of abduction and elbow at 90 degrees of flexion) and Shoulder Internal- External Rotation (Shoulder at 90 degrees of abduction and elbow at 90 degrees of flexion) movements. Kinematic data were collected at 60 Hz with Xsens MVN wearable motion capture system. Spatial/temporal kinematic parameters were collected for both shoulder joints. Lengths of the body segments, using the landmark locations as references, were manually measured, along with subject height, weight, and foot length. MATLAB (The MathWorks, Inc. USA) was used for data analysis. The statistical analysis was performed using SPSS (version 12, Chicago, IL). All analyses used a confidence interval of 95% and a significance level of <0.05.

RESULTS

Twelve players completed the investigation. According to the results not a statistically significant difference was elicited within participants (mean: 152.4° ± 6.3 ($Z = 2.51$, $p = 0.012$) during strike of the ball movement. Strike kinematics is extremely complicated compared to the passive goniometric range of motion measurements. At ball contact moment, the trunk and the upper arm continue to alter trunk flexion; and at the same time shoulder and glenohumeral joint extension, scapular tilt, and horizontal adduction and internal rotation of the shoulder are observed. Hence isolated shoulder flexion during strike provides reduced glenohumeral movement capacity but the high velocity at the ball contact moment and the high impact that the whole body is exposed to causes glenohumeral instability and limited movement capacity of shoulder due to the tightening of posterior capsule. Similarly, maximum shoulder external rotation was 160.2° ± 2.6 ($F(2, 9) = 2.787$, $p = 0.088$) during jump serves and no significant difference was elicited among participants. Mean flexion values in the sagittal plane movement did not differ for dominant and non-dominant shoulders of the participants (Shoulder ROM: 170.2°±4.5 and 171.3°±6.1 respectively, p= 0.977 (p>0.05)). Mean Shoulder Horizontal Internal Rotation ROM values for dominant and non-dominant shoulders differed significantly (Shoulder Horizontal Internal Rotation ROM: 27.5°±8.3 and 36.8°±7.9 respectively, p=0.005 (p<0.05)). Correspondingly, Mean Shoulder Horizontal External Rotation ROM values for dominant and non-dominant shoulders did not differ significantly (ROM: 92.7°±4.1 and 89.3°±6.3 respectively, p= 0.052). Mean Internal rotation ROM values for dominant and non-dominant shoulders differed significantly (ROM: 54.3°±9.0and 65.2°±11.2 respectively, p=0.0011 (p<0.05)), similarly mean external rotation ROM values for dominant and non-dominant shoulders differed significantly (ROM: 98.6°±2.5 and 90.3°±6.36.7respectively, p=0.0011 (p<0.05)).

DISCUSSION

This study demonstrated that young female volleyball players present significantly different shoulder ROM, which is the expected result of and adaptation to frequent overhead movements, between dominant and non-dominant sides. This is the first study to present a nominal set of kinematic data -during a wide range of both static and dynamic activities- of adolescent, similarly experienced, female volleyball players. The aim was to propose a practical, timely and non-invasive early detection for GIRD tendency of competitor volleyball players.

This investigation presents both static anatomical and dynamic movements' kinematic data, which is collected in a volleyball court so that the movements of the players were not restricted due to the laboratory conditions. Passive goniometric investigation of both shoulders' ROM during internal and external rotation and the asymmetry between two extremities is the clinical approach for GIRD diagnosis. It is known from recent literature that overhead athletes present imperative adaptations in the glenohumeral joint due to repetitive and high impact shoulder movements, which cause eventual injuries in this joint (4,5,18). Our static measurements coincide with the most recent literature. However, this methodology fails in investigating GIRD during dynamic movements such as jump serve and strike of the ball. This investigation proposes an early prediction method for competitor volleyball players' GIRD tendency non-invasively and practically and most importantly rather than in a clinical setting, in athletes' natural settings. Hence, on time MR screening and specific training programs for the

athletes, who have significant GIRD risk, might be planned to prevent potential injuries.

The relatively small sample size (n=12) is a limitation of this study. Nevertheless, small but significantly homogenous population- female adolescent competitor volleyball players, who have similar training apprenticeship- participated in this study. Additionally, this study did not obtain retrospective epidemiological information on previous injuries that the participants have experienced. However, we have excluded players who reported serious shoulder pain, fracture and/or surgery that limited the time of their practice over the past six months. Future research should determine if these findings are correlated with MR arthrographic imaging observations of posterior capsular thickening. Additionally, a complete set of overhead movements (float service and spike) will be added to the investigation.

The findings of the study clearly demonstrated that adolescent female volleyball players are prone to GIRD due to frequent overhead throws. Since overuse-related pathology often begins perniciously, it is important to utilize practical innovative engineering applications for identifying injury risk of the athletes. Pain and altered range of motion in shoulder joint is common among volleyball players (1). Limited range of motion is a clear parameter for impairment-risk analysis and performance evaluation. The findings indicate that even young players are prone to GIRD at the beginning of their careers, mature players should be consistently controlled to predict the injury risk and plan personalized, appropriate training and rehabilitation program for each player in a very practical and time efficient way. Therefore, the biomechanical parameters reported in this study are associated with potential injury risk and should be validated through prospective investigation.

TABLES

Table 1. Anthropometric parameters, age, and training apprenticeship of individual players

Player	Height (cm)	Weight (kg)	Training apprenticeship (years)
1	175	57	4
2	172	52	5
3	169	63	4
4	181	68	3
5	177	62	4
6	170	59	4
7	167	56	3
8	172	62	5
9	170	59	4
10	182	69	4
11	176	61	5
12	174	59	4
Mean ± SD	173.8 ± 4.7	60.6 ± 4.8	4.1 ± 0.7

Table 2: Passive and dynamic range of motion data of the dominant (hitting) and non-dominant (contralateral) shoulders in female adolescent volleyball players

Movements (n, 12)	Mean Dominant Shoulder Range of Motion (°)	Mean Non-Dominant Shoulder Range of Motion (°)	P value
Strike of the ball	152.4 ±6.3	n/a	n/a
Jump serve	160.2±2.6	n/a	n/a
Flexion in the sagittal plane	170.2±4.5	171.3±6.1	0.086
Shoulder Horizontal Internal Rotation	27.5±8.3	36.8±7.9	<0.05*
Shoulder Horizontal External Rotation	92.7±4.1	89.3±6.3	0.052
Shoulder Internal Rotation	54.3±9.0	65.2±11.2	<0.05*
	GIRD: 10.9°		
Shoulder External Rotation	98.6±2.5	90.3±6.36.7	<0.05*
	Increase in External Rotation: 8.3°		

Data are presented as mean ± standard deviation. *Significant difference between hitting and contralateral shoulders (P<0.05)

FIGURE CAPITONS

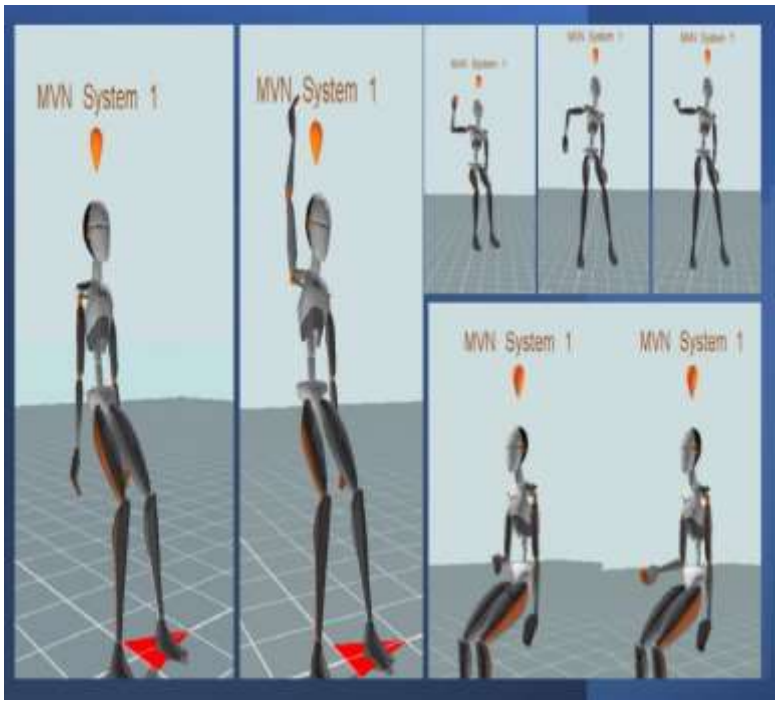

Figure 1. (1) Xsens MVN avatar demonstrating the

"flexion in the sagittal plane" movement (dominant arm): For flexion movement inspections subjects were asked to elevate their arms- with keeping the arm straight, lifting it forward and up, above their head as far as is comfortable. (2): Xsens MVN avatar demonstrating the "internal- external rotation" movement (dominant arm): For Internal rotation, participants were asked to rotate their arms inwards, still with the elbow at 90° flexion so that the flat of their hands touched the stomach if there is a full range of movement. (3): Xsens MVN avatar demonstrating the "Shoulder Horizontal Internal- External Rotation" movement (dominant arm): test participants were asked to slowly lower their arm -bent from their elbows- and do the opposite movement.

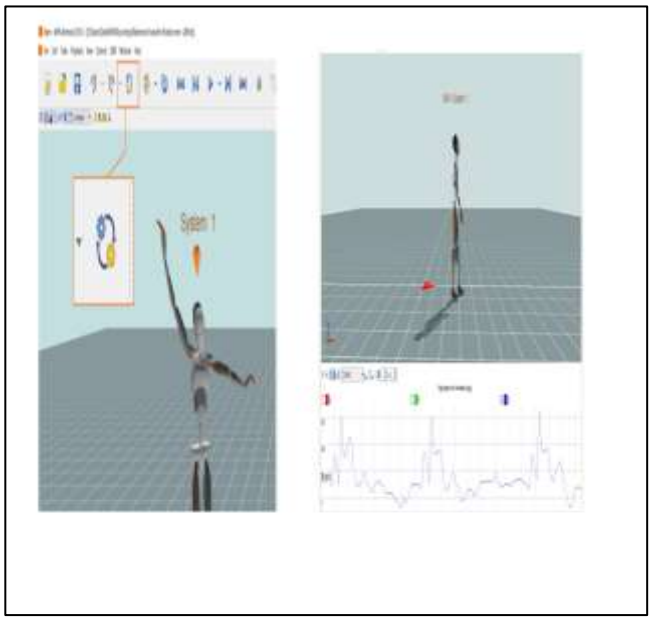

Figure 2. Shoulder motion during strike of the ball and jump serve

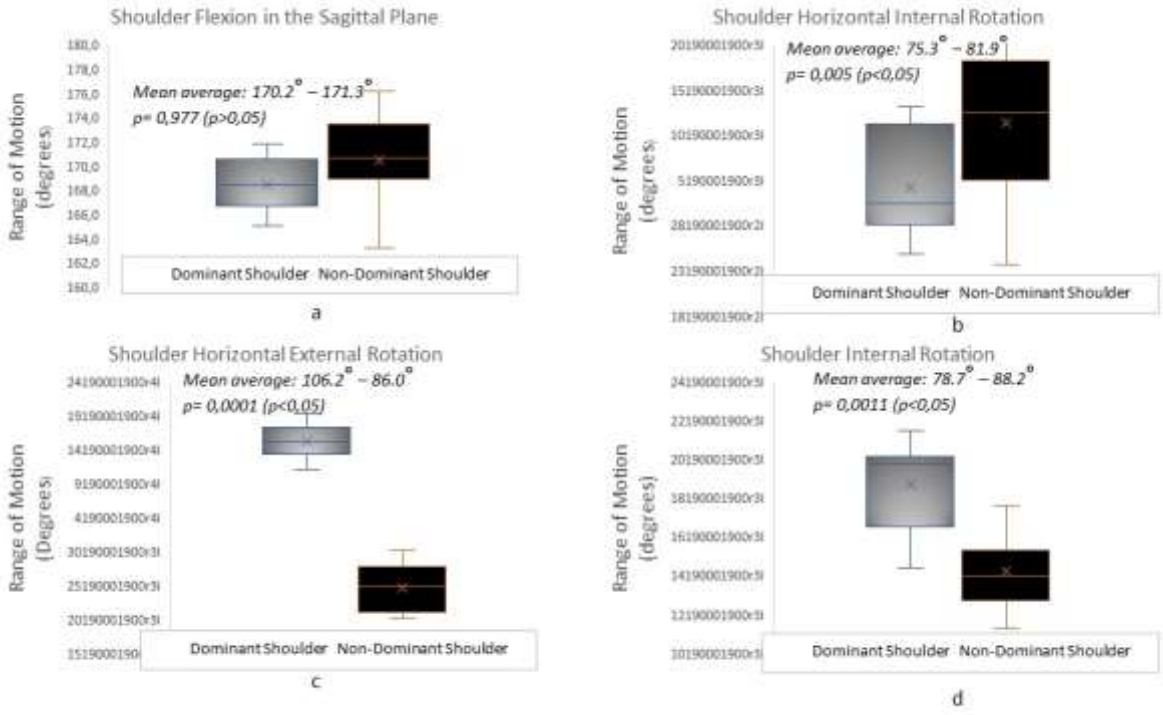

Figure 3. Shoulder Range of Motion during (1) Shoulder Flexion in the Sagittal Plane, (b) Shoulder Horizontal Internal Rotation (c) Shoulder Horizontal External Rotation (d) Shoulder Internal Rotation

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Investigation of the Effects of 8 Week Technical Explosive Strength Training Programme on Physical Property Technical Skills of Wrestlers

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Abstract

The purpose of this study is to investigate the effect of an 8 week quick strength training program related to the technique on the physical properties and technical capacities of the wrestlers. A total of 30 male wrestlers, 15 in the experimental group and in 15 control group, aged 18-25, who have been actively wrestling for 6-8 years, participated in this study. Measurements of the experimental and control group wrestlers taken before and after the training. The test results of the experimental group wrestlers, differences between the measurement values of aerobic capacity, cross-buttock, fireman's lift, shoulder throw and double arm hip throw technique foundstatistically significant ($p>0.05$). The differences between the body weight, hand grip and back strength of the experimental and control group wrestlers and aerobic capacity, cross-buttock, fireman's lift, shoulder throw and double arm hip throw technique application measurement values of the control group wrestlers not been significant ($p>0.05$). As a result, has been obtained that the training program provided improvement in the physical and physiological characteristrics of the experimental group wrestlers.

Keywords: Explosive strength, wrestling, hand grip strength, physical, physiological properties

8 Haftalık Teknik Patlayıcı Kuvvet Antrenman Programının Güreşçilerin Fiziksel Özelliklerine, Teknik Becerilerine Etkisinin İncelenmesi

Özet

Bu çalışmanın amacı; 8 haftalık teknikle bağlantılı çabuk kuvvet antrenman programının güreşçilerin fiziksel özellikleri ve teknik kapasiteleri üzerine etkisinin araştırılması. Çalışmaya, aktif olarak 6-8 yıl güreş yapan, 18-25 yaşları arasında, 15'i deney, 15'i kontrol grubu olmak üzere toplam 30 erkek sporcu gönüllü olarak katıldı. Deney ve kontrol grubu güreşçilerin ölçümleri çalışma öncesi ve çalışma sonrası alındı.
Test sonuçları deney grubu güreşçilerde antrenman programına bağlı olarak aerobik kapasite, kafakol, danabağı, tekkol ve çipe tekniği uygulama ölçüm değerleri arasındaki farklar istatistiksel açıdan anlamlı bulunurken, deney ve kontrol grubu güreşçilerin vücut ağırlığı, el kavrama ve sırt kuvveti ile kontrol grubu güreşçilerin aerobik kapasite, kafakol, danabağı, tekkol ve çipe tekniği uygulama ölçüm değerleri arasındaki farklar istatistiksel açıdan anlamlı bulunmamıştır ($p>0,05$). Sonuç olarak yapılan antrenman ve antrenman program deney grubu güreşçilerin fiziksel ve fizyolojik özelliklerinde gelişim sağlandığı görülmüştür.

Anahtar Kelimeler: Çabuk Kuvvet, Güreş, El Kavrama Kuvveti, Fiziksel, Fizyolojik Özellik

INTRODUCTION

The reason for the significant increase in the performance of the athletes can be shown as the presence of superior ability as early as possible as well as the best training of talented athletes. A wrestler has to use his strength while pushing, pulling, lifting, turn and oppose his movements (22). While applying wrestling techniques, especially back strength, hand grip strength and leg strength gain importance. Knowing the effect of the physiological and physical characteristics of athletes on success has

led scientists working on training science to research on sports (7). Wrestling is a sport that requires complete performance. A uniform physical structure cannot be considered in such a branch (15). In order to be successful in wrestling, which is a very difficult branch, it is necessary to ensure the maximum development of physiological characteristics as well as all motoric features. Wrestlers' body structure, shape, type and ratio of limbs to each other are effective in their performance (9). Strength is one of the most important motoric features for sportive success (19). Strength is an important factor for success, especially in individual sports such as wrestling (21). In wrestling, which is one of the most common individual sports in the world, coordination, high aerobic and anaerobic power, and tactical intelligence are extremely important in success (5,23). The training methods to be used in a sport branch depend on the energy systems that play a role in that sport branch. In wrestling, the share of both anaerobic alactacid and anaerobic lactic acid mechanism is very high (10). Anaerobic capacity is extremely important for branches that require short-term explosive power (8). In exercises that continue at a maximum level of approximately 2-3 minutes, energy is the more provided based on this way and is formed together with ATP, ATP-PC and lactic acid system. The most used energy system in wrestling is the ATP-CP-LA system.

This energy path is very important as wrestling match consists of two 3-minute periods. In wrestling, important features such as physical and physiological parameters, hand grip strength, back strength, aerobic capacity, cross-buttock, fireman's lift, shoulder throw and double arm hip technique need to investigate. Body composition, physical and physiological characteristics, which are thought to be effective on all styles of wrestling, are of great importance in determining high-level athletes.

METHOD

A total of 30 male wrestlers, 15 in the experimental group and in 15 control group, aged 18-25, who have been actively wrestling for 6-8 years, and have achieved national degrees, voluntarily participated in this study. The first measurements of the wrestlers were made before the training program started, and the second measurements were made after the 8-week training program area and laboratory tests were applied to determine the physiological and technical capacities of the wrestlers. The t-test was applied to the dependent groups to determine the differences between the experimental and control group wrestlers with the SPSS program, and the $p<0.05$ value was considered significant. Both groups were subject to normal daily training programs. In addition to normal training, a quick power strength training program related to the technique has been applied to the experimental group wrestlers. Our research was carried out with the decision of the ethics committee dated 30.03.2022 and numbered 2022/03.

Measurement Methods:

Height Measurement: The heights of the wrestlers participating in the study were measured with a Holtain Limited (Holtain Ltd. U.K.) brand height measuring device while standing in an upright position with bare feet, the heels were together and the head was upright, the caliper sliding on the scale was adjusted and read by touching the subject's head.

Body Weight Measurement: The body weight measurements of the wrestlers participating in the measurement were weighed with an Angel brand electronic scale (Accuracy 0.01 kg), provided that only shorts and t-shirts were worn on them.

Hand Grip Strength Measurement: The hand dynamometer was adjusted according to the subject's hand measurements. The wrestlers tried to tighten the dynamometer with all their strength with their right and left hands. The best score was recorded after two trials (10).

Back Strength Test: Athletes placed their hands on the back and leg dynamometer bench with their knees bent. Athletes grabbed the dynamometer stick with both hands and pulled it vertically upwards as much as possible. The test was repeated twice and the best value was recorded in kg (20)

20 m Shuttle Run Test: A mp3 player was used for the shuttle run test, with signal intervals increasing by 0.5 km/h per minute. Participants in the study were asked to touch the line at the end of 20 m at each signal. When the signal came, the test was ended for the wrestler who could not reach the lines one meter in front of the lines determining 20 m twice in a row, (18).

Technical Test : Cross- buttock, fireman's lift, shoulder throw, double arm hip throw test .Athletes was told to do the techniques by holding for 30 seconds, and the techniques that were done correctly during this time were counted and saved.

Statistical Method

SPSS program was used to organize the data and perform statistical tests. In the evaluation of the data obtained, t-test was applied for two independent groups to determine the differences between the experimental and control group wrestlers. The standard deviations and averages of the measurements taken from the wrestlers were analyzed and evaluated. The significance level of the results has been accepted at the p<0.05 level.

Training Program Applied to Experimental and Control Group Wrestlers

The experimental group wrestlers were given quick strength training three days technical related quick power training a week on Monday, Wednesday and Friday, and on Tuesdays, Thursdays and Saturdays, jumping, push-ups, sit-ups, piolet, rope climbing, paired squats, pull-ups and somersaults in the wrestling hall were performed. İntensity were made at 75-100%, duration 25-30 sec, rest 60-90 sec, tempo explosive. Control group wrestlers had six days a week doing jumps, push-ups, sit-ups, piolet, rope climbing, paired squats, pull-ups in the pull-ups and somersaults. Quick-strength training was applied such that the loading was 75-100%, the duration was 25-30 seconds, the rest was 60-90 seconds, the tempo was explosive.

RESULTS

Table 1. Physical and Physiological Measurement Values of Subject Group Wrestlers

Parameters	Pre-exercise Test	Post-exercise Test	P
Body weight (kg)	83.21±18.06	78.26±16.92	,431
Right hand grip strength (kg)	47.94±8.79	53.78±7.87	,057
Left hand grip strength (kg)	44.56±6.45	50.31±7.15	,023
Back strength (kg)	161.43±44.39	188.73 ± 49.90	,192
20 m Shuttle Run Test	40.52±4.60	44.72±3.13	,005
Cross-buttock 30 sec	11.93±1.52	14.06±1.76	,001
Fireman's lift 30 sec	11.37±1.31	13.37±1.70	,001
Shoulder throw 30 sec	11.62±1.20	13.18±1.64	,005
Double arm hip throw 30 sec	10.93±1.12	13.50±1.67	,000
(p<0,01)			

Table 2. Physical and Physiological Measurement Values of Control Group Wrestlers

Parameters	Pre-exercise Test	Post-exercise Test	P
Body weight (kg)	78.53±10.15	77.82±9.80	,832
Right hand grip strength (kg)	45.56±6.37	45.75±6.42	,928
Left hand grip strength (kg)	43.89±5.47	44.03±5.49	,938
Back strength (kg)	169.51±31.74	170.03 ± 31.67	,961
20 m Shuttle Run Test	41.40±3.33	41.30±3.40	,934
Cross- buttock 30 sec	12.05±2.38	12.77±2.69	,400
Fireman's lift 30 sec	11.11±1.49	11.72±1.99	,305
Shoulder throw 30 sec	11.88±1.27	12.61±1,28	,101
Double arm hip throw 30 sec	11.27±1.74	12.05±2.26	,256
(p<0,01)			

DISCUSSION

The mean body weight measurement results of the wrestlers in the experimental group before the 8-week explosive strength training were 76.31±11.87kg, and 75.47±10.63kg after the 8-week explosive strength training. The mean pre-test body weight measurement results of the control group wrestlers were 78.91±8.11kg, the posttest body weight measurement results were 79.61±11.82kg. The differences between the pre-training and post-training body weight measurements of the experimental and control group wrestlers were not statistically significant (p>0.05).

Akkuş & İnal (1) measured the body weight of Selcuk University wrestlers as 74.50±21.40kg. In his study, Ocak (17) found the body weight of physical education and sports school students were 68.61±7.13 kg when they started their first grade, and 76.92±6.76 kg in the fourth grade.

The mean of the right hand grip strength measurements of the experimental group wrestlers were 44.88±8.79kg before the training, 48.72±9.34kg after the training, the right hand grip strength measurement results of the control group wrestlers were 36.22±4.70kg before the training and 43.10±24.12 kg after the training. The differences between the right hand grip strength measurement values obtained from the experimental and control group athletes before and after the training were not statistically significant (P>0.05).

The mean of the left hand grip strength measurement results of the experimental group wrestlers were 44.50±8.27kg before the training, 48.78±9.08kg after the training, and the left hand grip strength measurement results of the control group wrestlers were 35.83±4.36kg before the training and 36.02±4.46kg after the training. The differences between the left hand grip strength measurement values obtained from the experimental and control group athletes before and after the training were not statistically significant (P>0.05).

Akkuş & İnal (1) found the grip strength of wrestlers 51.96±9.49kg, the average grip strength of basketball players 49.96±3.59kg, and the grip strength of volleyball players 46.87±7.88 kg in a study they conducted on Selcuk University teams.

Aydos and Kürkçü (3), in their study, measured the right hand grip strength of the 13-18 age group of secondary school youth doing sports as 37.73±10.36kg and the left hand grip strength as 32.64±11.3kg. Ateş (2), in his study, determined the right hand grip strength values of Turkish men's national biathlon team athletes, and the left hand grip strength values of 44.7±6.83 kg and 43.8±6.02 kg. Bağcı (4) measured the right hand grip strength as 38.90±7.50 kg and the left hand grip strength as 38.45±7.32 kg in his study on wrestlers aged 12-14. These results of the research support the findings obtained in this study.

The mean back strength measurement results of the experimental group wrestlers were 161.43±44.39kg before training, 188.73±49.90 kg after training and the mean back strength measurement results of the control group were169.51±31.74kg before training and170.03±31.67 kg after training. The differences between the back strength measurement values obtained from the experimental and control group wrestlers before and after the training were not statistically significant (P>0.05).

Kalkavan et al. (11) measured the back strength of football players as 79.52±17.21kg, and the back strength of sedentaries as 64.5±14.5kg. Kaya (13) found the back strength of the wrestlers as 155.20±24.94kg in his study.

The mean maximum oxygen consumption of the wrestlers in the experimental group were 40.52±4.60 ml/kg/min before training and 44.72±3.13 ml/kg/min after training. The mean maximal oxygen consumption of the wrestlers in the control group were 41.40±3.33 ml/kg/min before training and 41.30±3.40 ml/kg/min after training. While the differences between the measurement values of the experimental group wrestlers before and after the training were statistically significant (p<0.05), the differences between the measurement values of the control group wrestlers were not statistically significant (P>0.05).

Kutlu & Cicioğlu (16) measured the maximum oxygen consumption of National Team wrestlers as 49.69±4.02 ml/kg/min in the Stars category. Ziyagil et al. (22) measured the maximum oxygen consumption of Turkish national wrestlers as 48.84±3.77 ml/kg/min in the Stars category. Cicioğlu (6) found the maximal oxygen consumption of 12-17 age group wrestlers as 43.48±4.21 ml/kg/min.

The mean head-arm technique of the experimental group wrestlers were 11.93±1.52 before training, 14.06±1.76 after training, and the mean head-arm technique of the control group wrestlers were 12.05±2.38 before training and 12.77±2.69 after training.

The mean calf tie technique of the experimental group wrestlers were 11.37±1.31 before the training, 13.37±1.70 after the training, and the mean calf tie technique of the control group wrestlers were 11.11±1.49 before the training and 11.72±1.99 after the training.

The mean single-arm technique of the experimental group wrestlers were 11.62±1.20 before the training, 13.18±1.64 after the training, and the mean single-arm technique of the control group wrestlers were 11.88±1.27 before the training and 12.61±1.28 after the training.

The mean chipping technique of the experimental group wrestlers were 10.93±1.12 before the training, 13.50±1.67 after the training, and the mean chipping technique of the control group wrestlers were 11.27±1.74 before the training and 12.05±2.26 after the training.

While the differences between the head-arm, calf tie, single-arm and chipping techniques measurement values of the experimental group wrestlers before and after the training were statistically significant (P<0.05), the differences between the measurement values of the control group wrestlers were not statistically significant (P>0.05).

Kilic et al. (14) determined that the 10 repetitions of the head-arm technique of the 14-16 age group wrestlers were 30.63 seconds and 27.39 seconds for the calf tie technique. Kaya et al. (12) determined that

the number of applications of the one-minute single arm technique of freestyle wrestling youth national team wrestlers was 17.00±3.29, and the Greco-Roman wrestling team was 13.25±3.72. The findings obtained in this study are in parallel with the findings of the literature.

As a result, the findings obtained at the end of the 8-week explosive strength training program showed that depending on the quick strength training, the technical performances and maximal oxygen consumption capacities of the wrestlers increased.

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Performance Analysis of 2022 Women's European Football Champion England National Team

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Abstract

After big organizations in football or at the end of the season, researchers definitely examine the game systems of successful teams, the technical-tactical parameters of successful and unsuccessful teams, the differences and the performances of the athletes. In this direction, this study was conducted to analyze the England National Team, which was the champion in the 2022 Women's European Football Championship, in terms of different variables. Research data were obtained from the UEFA official website.

The number of goals scored and conceded in competitions, the distribution of goals according to time periods, the region of the goal scored, the way the goals occurred. The position of the player who scored the goal, the percentage of ball possession in the first half and throughout the match, the duration of the ball in the game, the number of passes, the number and percentage of successful passes technical-tactical parameters and the average total distance travelled by the team were analyzed. The data obtained were recorded in SPSS 23 package program, frequency and percentage values were calculated and interpreted. It was determined that the England national team scored a total of 22 goals with an average of 3.67 goals per match, and 2 goals were scored in their own goal with an average of 0.33 goals per game. Considering the time period in the match, the England National Team scored 45.5% (10 goals) of the 22 goals in the first half, 45.5% (10 goals) in the second half, and the remaining 2 goals in the 1st and 2nd overtime periods; It has been revealed that he conceded 2 of his goals in the second half. It was determined that 86% of the goals scored were scored from inside the penalty area and most of the goals were scored from the number 3 area of the penalty area (13 goals, 59.1%); 54.5% of these goals (12 goals) were scored as a result of organized attacks; and the players who scored the most goals (8 goals, 36.4%) were the wingers. The England national team, which had 57% possession per match, kept the ball in the game for 29 minutes and 33 seconds in 90 minutes; the successful pass percentage was 84% and the average percentage of ball possession is 57%. In addition, the total distance travelled by the team per match was 116.6 km. Based on these results coaches; use the 3rd zone, which is the critical zone in the penalty area in terms of offense, more effectively; in terms of defense, it can be suggested that these regions be defended more effectively. In addition, considering that the most important factor determining the result in football is goals and that these goals are the result of organized attacks, it is thought that both the contribution of the players other than the strikers to the score and the organization activities are important and therefore it would be useful to plan the technical-tactical activities of the teams accordingly.

Keywords: Analysis, women, football, technical, tactical, UEFA

2022 Kadınlar Avrupa Futbol Şampiyonu İngiltere Milli Takımının Performans Analizi

Özet

Futbolda büyük organizasyonlardan sonra veya sezon sonlarında araştırmacılar başarılı takımların oyun sistemlerini, başarılı başarısız takımların teknik-taktik parametrelerini, aradaki farkları ve sporcuların performansları gibi durumları mutlaka incelerler. Bu doğrultuda bu çalışma, 2022 Kadınlar Avrupa Futbol Şampiyonası'nda şampiyon olan İngiltere Milli Takımının farklı değişkenler açısından analiz edilmesi amacıyla yapılmıştır. Araştırma verileri, UEFA resmi internet sitesinden elde edilmiştir. Müsabakalarda atılan ve yenilen gollerin sayısı, gollerin zaman dilimlerine göre dağılımı, atılan golün bölgesi, gollerin oluş şekli, gol atan oyuncunun mevkisi, ilk yarı ve müsabaka boyunca topa sahip olma yüzdeleri, topun oyunda kalma süresi, pas

sayısı, başarılı pas sayısı ve yüzdesi teknik-taktik parametreleri ile takımın ortalama kat ettiği toplam mesafe analiz edilmiştir. Elde edilen veriler SPSS 23 paket programına kaydedilmiş, frekans ve yüzde değerleri hesaplanarak yorumlanmıştır. İngiltere milli takımının, maç başına 3.67 gol ortalaması ile toplam 22 gol attığı, maç başına 0.33 gol ortalaması ile 2 golü de kendi kalesinde gördüğü belirlenmiştir. Müsabakalarda zaman dilimi göz önüne alındığında, İngiltere Milli Takımının, attığı 22 golün %45.5'ini (10 gol) ilk devre, %45.5'ini (10 gol) ikinci devre, geri kalan 2 golü 1. ve 2. uzatma devrelerinde attığı; yediği gollerin 2'sini de ikinci devre yediği ortaya konmuştur. Atılan gollerin %86'sının ceza sahası içinden ve en çok golün ceza sahasındaki 3 numaralı bölgeden atıldığı (13 gol, %59.1); bu gollerin %54.5'inin (12 gol) organize atak sonucu kaydedildiği; en çok gol atan oyuncuların ise (8 gol, %36.4) kanat mevkisindeki oyuncular olduğu belirlenmiştir. Maç başına %57 oranında topa sahip olan İngiltere milli takımının 90 dakikalık sürede topu oyunda 29 dakika 33 saniye tuttuğu; başarılı pas yüzdesinin %84, topla oynama yüzdesi ortalamasının ise %57 olduğu tespit edilmiştir. Ayrıca, takımın maç başına kat ettiği toplam mesafenin 116.6 km olduğu ortaya konmuştur. Bu sonuçlara dayanarak antrenörlere; hücum bakımından ceza sahası içindeki kritik bölge olan 3. bölgeyi daha etkin kullanmaları; savunma açısından da yine bu bölgeleri daha etkin savunmaları önerilebilir. Ayrıca, futbolda sonucu belirleyen en önemli etkenin gol olduğu ve bu gollerin de organize ataklar sonucu olduğu göz önüne alınırsa, gerek forvet oyuncuları dışında kalan futbolcuların da skora katkı yapmasının gerekse de organizasyon çalışmalarının önemli olduğu, bundan dolayı da takımların teknik-taktik çalışmalarını buna göre planlanmasının faydalı olacağı düşünülmektedir.

Anahtar Kelimeler: Analiz, kadın, futbol, teknik, taktik, UEFA

INTRODUCTION

In competitive sports, especially in football, the level of performance is determined by a number of interrelated skills and abilities such as technique, tactics, psychological factors and finally fitness (24). Although football is a complex sport, coaches should be able to control all factors that my affect club success (42) and increase the strengths of the team during the competition. For this purpose, the coach should be able to comprehend the game strategies, identify the opponent's strengths and weaknesses during the match, make critical decisions during the match, adapt to the different games encountered, and adjust the harmony between the game strategy and the team's abilities (13). At this point, match analysis helps this adjustment and reveals different types of data (14). The main aim of the analysis is to determine the weaknesses of the team that need to be improved and the strengths that can be developed (5). Match analysis, which is widely used in many sports, helps coaches to collet objective information that can be used by coaches to provide feedback in terms of performance (6), match-related statistics of various actions of players, useful data on the performance parameters of successful or unsuccessful teams (31) and helps coaches to Access detailed information about the performance of their players (29).

Although football is considered a male sport, the development of women's football has reached a level that few people can imagine (33). Recently, many young girls and women participated in football organizations, leagues are organized, and World and European Championships are organized (4). Finally, the Women's European Football Championship was organized by UEFA at the A team level, hosted by the champion England. In general, after such big organizations in football or at the end of the season, researchers examine the game systems of successful teams, the technical-tactical parameters of successful and unsuccessful teams, the differences between them and the performances of athletes. In the literature, there are many studies on match analysis that support this idea. However, almost all of these studies were conducted in the light of data obtained from tournaments, leagues, or teams in which male football players participated (22; 14; 2; 8; 24; 25; 29; 32; 42; 15; 7; 16; 35; 1; 18; 20; 43; 10; 19; 31; 32; 9; 17; 23; 24; 39; 3; 34; 11). There are fewer studies on tournaments or leagues involving women than men in the literature on this subject (4;27;40;28;30).

Due to the development of the game style of football day by day, the need for continuous recording and evaluation of competitions is increasing. In addition to helping to meet this need, it is thought that the results of such scientific studies on women's football will increase the development speed and quality of women's football. In addition, the information collected through these studies is very important for coaches to organize appropriate training plans for their teams and to follow current football trends that have been implemented recently. In this context, the aim of this study is to analyses the tournament performance of the 2022 European Women's Football Championship champion England national team in different categories.

MATERIAL AND METHOD

Research Group: A total of 6 match played by the England national team, the champion of the 2022 Women's European Football Championship, during the championship constitute the Sample of the study. All matches were included in the study and the analysis was carried out in 10 different categories (1. the number of goals scored and conceded, 2. the time of goals, 3. the area of goals, 4. the way the goals occurred, 5. the position of goal scorer, 6. the percentage of possession, 7. the time the ball was in play, 8. the number of passes, 9. the number and percentage of successful passes, 10. total distance travelled).

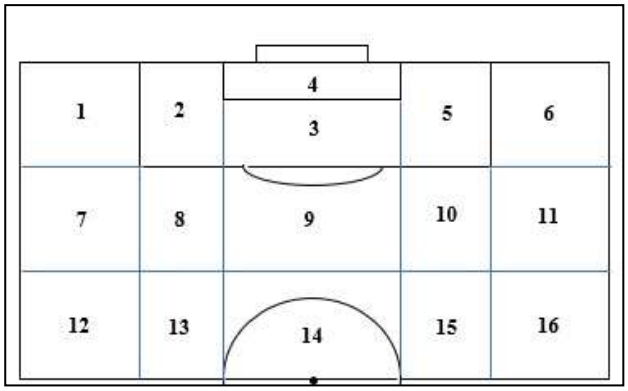


Figure 1. Defined goal regions

Data Collection Tools: The data of the study were collected by the researcher by watching and recording the 6-match played by the champion England national team. Goals scored in 45+ and 90+ minutes were included between 31-45 minutes and 76-90 minutes, respectively. 1 goal was determined as an own goal scored by the opponent and analyzed by including it in the appropriate category according to way the goal occurred. In addition, the players who scored the goal were evaluated and analyzed according to their regions and positions in that match.

Procedure: In the 2022 European Women's Football Championship, the data of the England national team were obtained from the official website of UEFA (https://www.uefa.com/). A total of 6 matches played by the England national team were included in the analyses and the data were analyzed in 10 parameters (the number of goals scored and conceded in the matches, the distribution of goals according to time periods, the region of the goal scored, the way the goals occurred, the position of the player who scored the goal, the percentage of possession in the first half and throughout the match, the time the ball was in play, the number of passes, the number and percentage of successful passes). However, this parameter was analyzed over 5 matches due to the missing data on running distances in the semi-final match against Sweden. All goals were analyzed by a football coach (UEFA B) who is also o match analysis coach.

Data Analysis: The data were analysis in SPSS 23.0 package programme and frequency and percentage distributions analysis were used among descriptive statistics.

RESULTS

Table 1. Distribution of goals scored and conceded according to the competitions

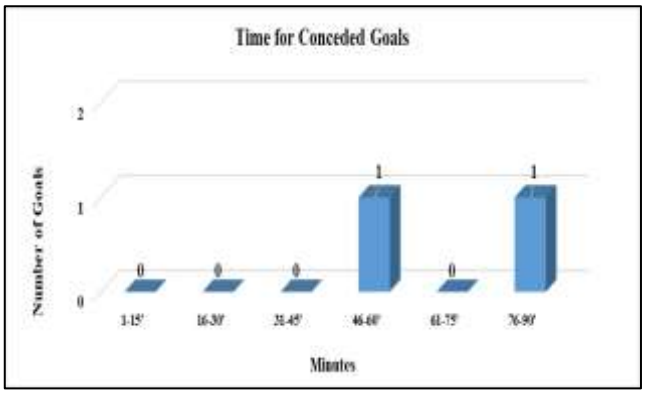
	Times	Group Matches		Quarter, Semi-Final and Final Matches	
Goals Scored	First Half	**Goal**	**%**	**Goal**	**%**
		9	40.9	1	4.55
	Second Half	**Goal**	**%**	**Goal**	**%**
		5	22.7	5	22.7
	First Overtime	**Goal**	**%**	**Goal**	**%**
		0	0.00	1	4.55
	Second Overtime	**Goal**	**%**	**Goal**	**%**
		0	0.00	1	4.55
	Total	**14**	**63.6**	**8**	**36.4**
Defeated Goals	First Half	**Goal**	**%**	**Goal**	**%**
		0	0.00	0	0.00
	Second Half	**Goal**	**%**	**Goal**	**%**
		0	0.00	2	100.0
	First Overtime	**Goal**	**%**	**Goal**	**%**
		0	0.00	0	0.00
	Second Overtime	**Goal**	**%**	**Goal**	**%**
		0	0.00	0	0.00
	Total	**0**	0.00	**2**	**100.0**

England national team scored 22 goals and conceded 2 goals during the tournament. Of the 22 goals scored, 14 (63.6%) were scored in group matches and 8 (36.4%) in quarter-final, semi-final and final matches. 10 (45.5%) of this 22 goals were scored in the first half, 10 (45.5%) in the second half, 1 (4.5%) in the first overtime period and 1 (4.5%) in the second overtime period. The England national team, which did not conceded a goal in the group matches, conceded 2 goals (100.0%) in the second half of the quarter-final and final matches (Table 1).

It was determined that 10 of the total 22 goals recorded in the organization with an average of 3.67 goals pere match were scored in the first half (45.5%), 10 in the second half (45.5%) and the remaining 2 goals (9%) were scored in the Overtime periods, the most goals were scored between the 31-45th minutes of the match (6 goals; 27.3%) and the least goals were scored between the 16-30th, 91-105th and 106-120th minutes (1 goal each; 13.6% in total) (Graph 1).

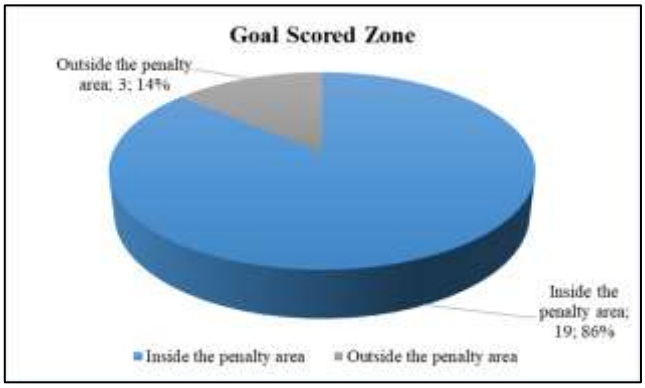
Graph 1. Distribution of goals scored according to time periods

In the organization, with an average of 0.33 goals per match, 2 of the 2 goals conceded were scored in the second half; 1 goal was scored between the 46th and 60th minutes and 1 goal was scored between the 76th and 90th minutes (Graph 2). The England national team conceded 2 goals as a result of organized attacks and these goals were scored zones 3 and 4 inside the penalty area.



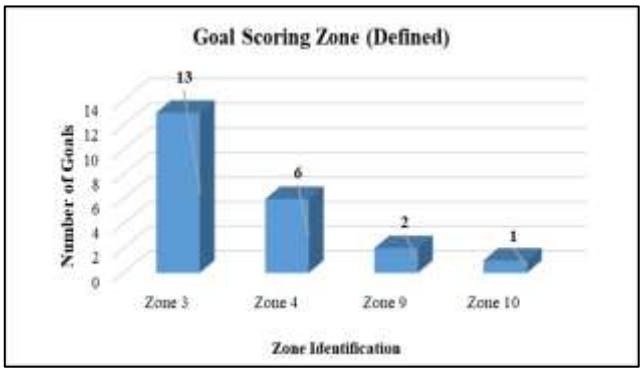
Graph 2. Distribution of conceded goals according to time periods

When Graph 3 is analyzed, it is seen that the most goals were scored from inside the penalty area with 19 goals (86.4%), while 3 goals (13.6%) were scored from outside the penalty area.



Graph 3. Goal scoring area

According to the definition made by dividing the half-court into 16 parts and used in the goal area analysis (Figure 1), it is observed that most of the goals (13 goals, 59.1%) were scored from the zone 3 inside the penalty area, followed by 6 goals (27.3%) from the zone 4 inside the penalty area. In addition, 2 goals (9.1%) were scored from zone 9 and 1 goal (4.5%) from zone 10. No goals were scored from other areas (Graph 4).



Graph 4. Goal scoring area (defined)

When Graph 5 is analyzed, it is seen that most of the goals scored in the matches were scored when the ball was in play and these goals were scored as a result of organized attacks (12 goals, 54.5%). The least number of goals were scored from corners and free-kicks (1 goal each; 9.1% in total). Transitions with the ball in play (attacking by snatching the ball from the opponent), which is another form of goal formation, was found to be the category in which most goals were scored after organized attacks (8 goals, 36.4%). The England national team did not score from set-pieces and free-kicks.

Graph 5. Formation of goals

Graph 6 shows the distributions of the remaining 21 goals, excluding the 1 own goal scored by the opponent, according to positions. With 8 goals (36.4%), the players playing in the wing position scored the most goals, with 6 goals each (12 goals in total, 54.6%), the players playing in the forward and midfield positions scored the most goals after the wingers; the players who scored the least number of goals were the players playing at fullback with 1 goal (4.5%).

Graph 6. Position of goal scorers

Table 2: Percentage of possession and time in possession in the first half and throughout the match

	Matches	(%)	Game Duration (min + sec)
During the Match	Match 1 (group)	59	33′ 14″
	Match 2 (group)	61	31′ 01″
	Match 3 (group)	68	35′ 24″
	Quarter Final	44	23′ 69″
	Semi-Final	60	31′ 46″
	Final	50	23′ 81″
	Art. Average	**57**	**29′ 23″**
	Matches	**(%)**	**Game Duration (min + sec)**
First Half at Last	Match 1 (group)	60	17′ 45″
	Match 2 (group)	54	12′ 02″
	Match 3 (group)	69	16′ 40″
	Quarter Final	46	12′ 55″
	Semi-Final	66	18′ 25″
	Final	45	10′ 28″
	Art. Average	**57**	**14′ 33″**

*Calculation is based on 90 minutes duration.

In the matches held in organization, it is seen that the possession percentage of the England team was 57% throughout the match and this percentage is similar to the possession percentage in the first half (57%). Based on 90 minutes, the team managed to keep the ball in play for 29 minutes on average (Table 2).

Table 3: Shots scored, shots on target, number of passes, number of successful passes

Parameters			Average per Matches
Number of Passes (Number)		3095	516
Number of Successful Passes (Number)		2608	435
Passing Accuracy (%)	Group Match 1	87	83.7
	Group Match 2	89	
	Group Match 3	90	
	Quarter Final	79	
	Semi-Final	83	
	Final	74	

Throughout the organization, the England national team threw a total of 3095 passes, of which 2608 (84%) were accurate, averaging 435 successful passes per match (Tablo 3).

Table 4. Distance travelled by the team during the tournament (km)

Matches	Minutes	Distance travelled (km)
Group Match 1	90	106.1
Group Match 2	90	106.3
Group Match 3	90	98.9
Quarter Final	120	141.8
Final	120	130.1
Art. Centre.	**102**	**116.6**

*The semi-final match against Sweden was not included in the calculation due to lack of data.

At the end of the 5 matches played by the England national team, it was determined that the team travelled 116.6 km in an average of 102 minutes (Table 4).

DISCUSSION

5% (10 goals) were scored in the first half, 45.5% (10 goals) in the second half, 54.5% (12 goals) as a result of an organized attack, 86.4% (19 goals) from inside the penalty area and 59.1% (13 goals) from the third zone defined inside the penalty area. At the same time, the England national team scored the most goals (6 goals, 27.3%) between the 31-45th minutes, while the players who scored the most goals were the players playing on the wing with 8 goals (36.4%), the team possessed the ball 57% on average throughout the tournament, kept the ball in play for an average of 29 minutes 33 seconds, had a successful pass percentage of 84% and travelled a distance of 116.6 km.

When the studies on match analysis in the literature are examined, it is seen that almost all of these studies consist of matches in leagues, tournaments, or championship in which male football players take part. The studies on such organizations in which women football players take part are less than the studies on male football players. However, recently, due to the increasing interest in women's football leagues and championships and the increasing performance of women footballers, some studies have started to be conducted in the literature to determine technical and tactical parameters other than physical performance and demands (4;40). Baskaya ve Senturk (4) analyzed the performance of the 2015 FIFA Women's World Cup Champion USA national team with different variables. As a result, the researchers determined that the USA national team played with an average of 2.00 goals per match, scored a total of 14 goals and conceded 3 goals; and had a ball possession percentage of 52.86%. They also determined that the players who contributed the most to the score throughout the tournament were the midfielders (10 goals in total) and stated that in order for a team to leave the field successfully, it is necessary to score goals and in this direction, it is important that the players other than the strikers contribute to the score, so it would be useful for the teams to plan their technical-tactical activities accordingly. In the matches held during the organization, it was determined that the average possession percentage of the USA national team was 52.86%, the actual playing time was 26.29 minutes, and the average percentage of possession was similar to the values obtained in the first half (53.71%). Wang and Qin (40) analyzed the goals scored and shots taken in the 2019 Women's World Cup and found that 79% of the 146 goals scored were scored from inside the penalty area (from the area between the penalty spot and the goal area). In the same study, 57.5% of the goals were scored in the second half, the most goals were scored in the last 15 minutes of the match and the most goals were scored by forwards (63.1%).

According to Michailidis et al. (29) goals scored constitute a key role for the success of teams and a Good analysis in sports games and organizations such as tournaments. From this point of view, in this study, in which we also analyzed the goals scored by the team, similar results were obtained with the results of studies conducted on male football players. Goral (15) reported that the number of goals per match in Germany, whose national team was the 2014 World Cup champion, was 2.57. Gurkan et al. (18) analyzed the goals scored in UEFA Champions League according to time periods and found that the number of goals scored per match was 2.7. In a study analyzing goals scored in the 2010 World Cup, the researcher found that 2.27 goals were scored per game in the tournament (32).

Studies on competition analysis have also examined the timing of goals scored in tournaments or leagues, and most studies have found that more goals are scored in the second half of the match (25;16;10;37;9). On the other hand, in one of the studies that analyzed goals by dividing the competition into 15-minute periods, 3614 goals scored in the Turkish Super League over 5 seasons were analyzed and it was determined that most goals were scored between the 76th and 90th minutes (221 goals, 21.7%) (7). Similarly, Imamoglu et al. (22) reported that the highest number of goals occurred between these minutes with 24.8% in the 2010 World Cup. Njororai (32) also found in his study that 35 goals (24.14%) were scored in the last 15 minutes of the 2010 World Cup, more than in any other 15-minute period. In another study, Goral and Saygin (14) reported that 12 (25.5%) of a total of 47 goals scored came between the 76th and 90th minutes and this period was the 15 minutes in which the most goals were scored. Akgül and Pepe (1) analyzed the goals scored in the Süleyman Seba Season (873 goals) and found that teams were more likely to score between the 76th and 90th minutes. Kubayi and Toriola (23) also found that the most goals were scored in the last 15 minutes of the competitions (196

goals, 24.7% of the total number of goals scored) in all the world cup organizations organized by FIFA between 1998-2014. Ertetik and Müniroglu (11) found statistically significant differences in the 15-minute periods of the goals scored in 40 matches and determined that the most goals were scored between the 76th and 90th minutes with 27%. In another study, the distribution of 3426 goals scored in the UEFA Champions League in the last 10 years was analyzed in 15-minute periods, and it was found that most goals were scored between the 76th and 90th minutes (635 goals, 18.53%) (18). Researchers have attributed this to increased fatigue and loss of concentration on the part of the teams, but also to the defensive risks taken by the defeated teams at the end of the match. In another study in line with this idea, researchers stated that the best performance in competitions is directly related to physical performance, and the less physical wear and tear, the higher the performance. Therefore, they argue that in the first minutes of the match, players are better able to perform certain actions and face the same conditions as their opponents. Based on this, they reported that the more frequent occurrence of goals in the second half of the game may be due to a team's better resistance to the decline of its physical, psychological and technical performance and tactical organization (12). In our study, findings that relatively support these results were obtained. As a result of our study, goals scored between 76-90th minutes (4 goals) ranked second after goals scored between 31-45th minutes (6 goals). In a study supporting the results of our study in the literature, Tousios et al. (38) found that most goals were scored in the 31-45th and 46-60th minutes (19% each) and 18% of the goals were scored in the 76-90th minutes in Euro Cup 2016. From a different perspective, the fact that more goals were scored in the last 15 minutes of the first and second halves may be a critical indicator that in a football match that lasts at least 90 minutes, it is important to spread the struggle and game discipline over the entire time period. All these results may also suggest that it is due to the fact that both male and female football players did not break their desire to win and their game discipline, that they had the fitness to spread their struggle for 90 minutes and that they concentrated well in all time periods of the match.

In addition to analyzing the goals scored according to time periods, it is also important to analyze the areas of the pitch from which these goals were scored. In one of the studies related to this issue in the literature, the 3rd zone offensive organizations of teams in 4 different football leagues were analyzed and it was revealed by the researchers that most of the goals scored were from the penalty area (43). Akgül and Pepe (1) found that 83% of the 873 goals they analyzed were scored from inside the penalty area. Çobanoğlu (9) stated that 133 of the goals scored in the 2018 World Cup were scored from inside the penalty area and 60.5% (95 goals) of these goals were scored from the number 3 area. Similarly, Çobanoğlu and Terekli (10) found that 83.3% of the goals scored in their study were scored from inside the penalty area and 61.1% of these goals were scored from the number 3 area within this area. Imamoglu et al. (22), reported that 82% of the goals scored in the 2010 World Cup were scored from the penalty area. Tokul and Mulazimoglu (37) analyzed 97 goals in EURO 2016 excluding own goals and penalty goals and found that 72.22% of these goals were scored from inside the penalty area. The results of these researchers regarding the penalty area are similar to the results of our study. The reason for this may be that football players want to increase the accuracy of their kicks closer to the goal and teams want to create more disadvantages for goalkeepers.

When we analyzed how the goals were scored in our study, it was found that the majority of the goals were scored as a result of an organized attack while the ball was in play and studies supporting this finding were also found in the literature. Leite (25) found that the goals scored in the 2012 European Championship were more often the result of organized attacks (54%). Cerrah et al. (7) emphasized that 2594 goals (71.8%) in their study were scored after an organized attack. In other studies, the rate of goals scored as a result of organized attack was found to be 53.3% by Cobanoglu and Terekli (10), 63.69% by Cobanoglu (9) and 77.9% by Imamoglu et al. Similarly, Akgul and Pepe (1) found that 41.6% of the 873 goals scored by the teams in the Suleyman Seba Season in 306 matches were scored by organized attack. The results of our study and these results in the literature show that organized attacking practices are important in goal scoring pathways.

In addition to the time, place and location of the goal, the position of the player who scored the goal is also an important category of analysis studies. In the majority of the studies in the literature, it has been determined that the majority of goals scored in matches are scored by forwards (22;10;9). There are also studies in the literature that emphasize that wingers contribute to goals scored as much as

forwards. Gursakal et al. (20) also found at the end of their research that the players who play a key role in the offense are wingers. In our study, it was determined that wingers scored the most goals after forwards. Considering the results of these studies, this finding supports the researchers.

One of the important parameters for teams in a competition is the time they can keep the ball in play and another is the percentage of possession. Goral (15) determined the average possession percentage of Germany national team as 56.71% during the tournament. Araya and Larkin (2) found the average possession percentage of the teams ranked in the top ten at the end of the league as 53.48±4.96%. Castellano et al. (6) found this average to be 51.6±6.8% in their study and determined that there was a significant difference between the possession percentages of the winning teams and the possession percentages of the defeated and tied teams. In a study analyzing Turkish teams participating in European cups, it was reported that the winning teams had higher positive passing averages and possession percentages than the defeated teams (11). In his study, Collet (8) emphasized that there is a strong link between more possession of the ball and the number of goals scored and successful passes made, and also that there is a significant relationship between team success and passing. From this point of view, the fact that the champion England women's national team had a high ball possession percentage of 57% throughout the tournament, that their actual playing time was longer than the other teams, and that their passing rate was at a very important level of 84% suggests that their success was not a coincidence.

Recently, in addition to technical and tactical analysis, movement and performance analysis have also started to be performed in competition analysis. In a related study, the competitions in the Turkish Spor Toto Super League 2016-2017 season were analyzed and it was determined that the league average in terms of distance traveled was 110.1 km (34). Yang et al. (41) found that the total distance traveled by the top 4 teams in the Chinese Super League was 108 km on average; 107.6 km for teams ranked 5th to 8th; 107.9 km for teams ranked 9th to 12th; and 109.1 km for teams ranked 13th to 16th. The data in these studies were obtained at the end of 90 minutes of football matches on average, and in our study, it was revealed that the England national team covered a distance of 116.1 km in an average of 102 minutes. Taking this data into account, it can be said that the team covered an average distance of 102 km in a 90-minute football match. This is in line with the results of studies in the literature. Although there are studies reporting that running performance alone is not sufficient to win competitions and that these values are similar in winning and losing teams (17;21;36), it is thought that running distance values are important for developing women's football, especially in terms of physical performance and movement analysis. The champion England women's national team's successful performance throughout the tournament was determined by the fact that not only the forwards, but also all players in other positions made an effort to score goals and contribute to the score.

As a result, it can be said that competition analysis is the best source for coaches to obtain objective information about the performances of their own team and athletes, as well as their opponent teams and athletes in the healthiest way, to increase the current performance of their athletes, to make the right decision and to determine what can be done in the next practice and tactical understanding. In organizations such as the European Championships, where performances are displayed at the highest level, there are multiple performance indicators that must be achieved in order to reach the set targets. It can be said that the England national team's success was also due to the high rate of possession in the first half and throughout the match, and that these factors positively affected the other performance elements and led to a successful performance. One of the important results of this study is the goals scored from the third zone inside the penalty area, which leaves the defenders ineffective. Based on these results, it can be suggested to the coaches to use the third zone, which is the critical zone in the penalty area, more effectively in terms of offense and to defend these zones more effectively in terms of defense. In addition, considering that the most important factor that determines the result in football is the goal and these goals are the result of organized attacks, it is thought that it is important for the players other than the strikers to contribute to the score and organizational activities, and therefore it would be useful to plan the technical-tactical activities of the teams accordingly.

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Examination of Wrestling Referees' Self-Efficacy Levels

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Abstract

The aim of the study is to examine the relationship between the mental toughness of national and non-national cyclists and the rankings they achieved. A total of 100 athletes, 50 national and 50 non-national, participated in the study in which the quantitative research model was used. In the study, the Scale of Mental toughness in Sports was used as a data collection tool. In the study, t-test, anova test and tukey tests were used. It was determined that the mental toughness of the older athletes was higher than the younger athletes. In addition, while a significant difference was found between the mental toughness scores of non-national athletes, no significant difference was found in the scores of national athletes. As a result, it can be said that athletes with a certain level of experience have more mental toughness, and cyclists with higher self-confidence achieve better results in national competitions.

Keywords: Cyclist, National cyclist, Mental toughness

INTRODUCTION

Cycling races have started with the gradual development and modernization of the two-wheeled bicycle, forming their spectators over time. The first cycling race, "Amiens Road Race", was held at a distance of 17 km in France in 1865. Another trial cycling race was held in Saint Cloud in 1868. This race was won by the English James Moore (2). Bicycle production started in 1869 in the United States, another country where bicycles became widespread. It was determined that more than 1 million bicycles produced by 300 different companies were used in this country until 1896. Cycling races in the USA began to be organized in 1878. Cycling races became the most popular summer sport in many European countries in the 1890s (28). The first resistance race suitable for contemporary conditions was held in France in 1890. In 1891, the Bordeaux-Paris race, which was the first example of long-stage tours, was held, followed by the Paris-Brest-Paris race (2).

Mental toughness , which is generally defined as a process of success or adaptation (14), is a factor that reduces the negative effects of stress and supports compliance (15). It is also possible to define mental toughness as the strength of one's recovery in the face of difficult life experiences (10) or the ability to overcome change or disasters (32). Although human beings initially experience negative emotional states in negative situations, over time, they can adapt to stressful events and situations that can change their lives. The most basic factor in ensuring this adaptation is the phenomenon of mental toughness, which is a continuous process that requires effort and time, and which makes it necessary for people to take some steps (10,22,23,24,33).

Mental toughness, which is one of the issues that sports psychologists have focused on in recent years, is of great importance for athletes and coaches, especially during competition periods (5,18,19,30). Mental toughness, which has many definitions in the literature, includes concepts such as coping effectively with pressure, being psychologically strong, being commited, high concentration ability, high level of determination and strong self structure (9,12,13,27,30).

Today, it is an accepted fact that psychological competence of the athlete, in addition to the physical competence, is important in order to achieve high performance in the sports (16). The concept of mental toughness, which was initially accepted as a part of

personality (4,21), has started to be considered as a psychological performance indicator for athletes over time (5,17,18,19).

In this context, it was aimed to examine the relationship between gender, age and mental toughness scores of national and non-national athletes engaged in cycling.

METHOD

Research Model

Relational screening model, which is a quantitative model, was used in the study. Quantitative model is a research approach that enables to reveal a situation, object, case encountered in the past or present in line with certain criteria (20). Relational screening is a method which detects the change shown by two or more variables at the same time (3).

Research Group

A total of 100 cyclists, 50 national and 50 non-national, actively engaged in sports in their own federations, were included in the study. The criteria determined by the researchers are related to the research problem and represent the qualifications of the people to be included in the study (20). After necessary information was given to the athletes, the questionnaire form was applied personally by the researcher. Athletes participated in the study voluntarily. With the Ethics Committee Decision of Selçuk University, Faculty of Sport Sciences, dated 14/01/2019 and numbered 2019/09, it was unanimously decided that the study is in compliance with the Ethics Committee Directive. Demographic variables of the athletes participating in the study are given in Table 1.

Table 1. Demographic variables of the athletes

		f	%
Gender	Female	13	13,0
	Male	87	87,0
Age	20 and younger	39	39,0
	Between 21-30	36	36,0
	31 and older	25	25,0
National classification	National classification	50	50,0
	Classification A	9	9,0
	Classification B	22	22,0
	Classification C	19	19,0
National Ranking	Doesn't have a ranking	15	15,0
	Has a rank	85	85,0
International Ranking	Doesn't have a ranking	53	53,0
	Has a rank	47	47,0

As seen in Table 1, a total of 100 athletes, mostly male athletes, participated in the study. While a significant number of the participants are under the age of 30, those who have ranked in national competitions are the majority. The number of athletes who have ranked in international competitions is almost equal.

Data Collection Tools

The Personal Information Form developed by the researcher to reach the demographic information of the cyclists participating in the study and the 14-item Scale of Mental toughness in Sport were used in the study. Detailed information about the scale is given below.

Scale of Mental toughness in Sport: The scale (SportMentalToughness Questionnaire-SMTQ-14) developed by Sheard et al. (29) was adapted into Turkish by Altıntaş and Kuruç in 2016 (1) to examine the mental toughness in training and competitions. This is a 4-point Likert-type scale consisting of three sub-dimensions (Confidence, Continuity and Control) and general mental toughness (1=Totally False; 4=Totally True). The Cronbach Alpha values determined for the sub-dimensions of the original scale were 0.81 for the confidence sub-dimension, 0.74 for the continuity sub-dimension and 0.71 for the control sub-dimension (30).

The explanation of the three sub-dimensions in the Inventory of Mental Toughness in Sports is given below (Sheard 2013).

Confidence: Believing in your abilities and thinking that you are better than your opponents to achieve the goal in difficult situations that require struggle (Items 1, 5, 6, 11, 13, 14).

Control: Keeping composure, being in control and calm under pressure or in unexpected situations (Items 2, 4, 7, 9).

Continuity: Taking responsibility, concentrating and struggling in line with the determined goals (Items 3, 8, 10, 12).

Analysis of Data: In order to determine whether parametric analyzes should be performed for this study, it was first examined whether the data of the scales showed a normal distribution. As a result of the analysis, kurtosis and skewness values were calculated. The results are given below.

Table 2. The kurtosis and skewness values obtained as a result of the normal distribution analyzes of the sub-dimensions of the scale of mental toughness in sports

	Skewness	Kurtosis
Confidence Dimension	-0,672	0,965
Control Dimension	-0,562	0,644
Continuity Dimension	0,602	1,164

RESULTS

The results of the normal distribution analysis are given in Table 2. Kurtosis and skewness values obtained for the mental toughness scale in sports are between -2 and +2. It can be said that the research data show a normal distribution (11).

In this part of the study, the findings related to the personal variables obtained as a result of the analysis of the data obtained from the athletes participating in the survey, the findings of the mental toughness of the athletes and statistical analyzes are included.

Table 3. Mental toughness levels of the participants by age

Dimension	AGE	N	$\bar{X}$	SS	F	P	DIFFERENCE
Confidence Dimension	20 and younger	39	2,88	0,64	3,695	0,028 *	1 - 2
	between 21-30	36	3,20	0,42			
	31 and older	25	3,00	0,36			
Control Dimension	20 and younger	39	2,80	0,59	0,095	0,910	
	between 21-30	36	2,74	0,65			
	31 and older	25	2,77	0,43			
Continuity Dimension	20 and younger	39	2,54	0,37	0,865	0,424	
	between 21-30	36	2,62	0,38			
	31 and older	25	2,67	0,41			

*P<0,05

The results of the analysis of the Anova test, in which the mental toughness levels of the cyclists participating in the study were evaluated according to the age variable, are given in Table 3. It was observed that the level of mental toughness in the confidence dimension of the athletes in the 21-30 age range ($\bar{X}$=3,20±0.42) is significantly higher than the athletes under the age of 20 ($\bar{X}$=2.88±0.64).

Table 4. Mental toughness levels of the participants by the year of doing sports

Dimension	How many years has s/he been doing sports?	N	$\bar{X}$	SS	F	P	DIFFERENCE
Confidence Dimension	5 years and below	38	2,76	0,54	9,790	0,000 **	1 - 2
	between 6-15 years	46	3,22	0,44			
	16 years and above	16	3,09	0,41			
Control Dimension	5 years and below	38	2,80	0,64	0,100	0,905	
	between 6-15 years	46	2,77	0,57			
	16 years and above	16	2,72	0,45			
Continuity Dimension	5 years and below	38	2,51	0,41	2,240	0,112	
	between 6-15 years	46	2,64	0,31			
	16 years and above	16	2,72	0,47			

** Indicates a significant difference at the P<0.05 level.

The results of the analysis of the anova test, in which the mental toughness levels of the cyclists participating in the study were evaluated according to the variable of how many years they have been doing sports, are given in Table 4.

In the confidence dimension, the mental toughness levels of the athletes doing this sport for 6 to15 years ($\bar{X}$=3.22±0.44) are significantly higher than the levels of the athletes doing this sport for 5 years or below ($\bar{X}$=2.76±0.54).

Table 5. Mental toughness levels of the participants by the ranking they achieved in national competitions

		Continuity Dimension	Confidence Dimension	Control Dimension	Best national Ranking
Best national Ranking	PearsonCorrelation	1	-,371**	,147	-,155
	Sig. (2-tailed)		,000	,145	,124
	N	100	100	100	100
Confidence Dimension	PearsonCorrelation	-,371**	1	,018	,099
	Sig. (2-tailed)	,000		,860	,326
	N	100	100	100	100
Control Dimension	PearsonCorrelation	,147	,018	1	,030
	Sig. (2-tailed)	,145	,860		,769
	N	100	100	100	100
Continuity Dimension	PearsonCorrelation	-,155	,099	,030	1
	Sig. (2-tailed)	,124	,326	,769	
	N	100	100	100	100

** Correlation is significant at the level of 0.01 (bidirectional).

Pearson correlation coefficients were calculated in the correlation analyzes conducted to determine the relationship between the mental toughness levels of the cyclists participating in the study and their performance levels in national competitions. As seen in Table 5, it was determined that there was a weak negative correlation between the mental toughness levels of the athletes in the confidence dimension and their best national ranking.

Table 6. Mental toughness levels of the participants by the ranking they achieved in international competitions

		Confidence Dimension	Control Dimension	Continuity Dimension	Best National Ranking
Confidence Dimension	PearsonCorrelation	1	,018	,099	-,128
	Sig. (2-tailed)		,860	,326	,203
	N	100	100	100	100
Control Dimension	PearsonCorrelation	,018	1	,030	,013
	Sig. (2-tailed)	,860		,769	,898
	N	100	100	100	100
Continuity Dimension	PearsonCorrelation	,099	,030	1	-,102
	Sig. (2-tailed)	,326	,769		,314
	N	100	100	100	100
Best National Degree	PearsonCorrelation	-,128	,013	-,102	1
	Sig. (2-tailed)	,203	,898	,314	
	N	100	100	100	100

Pearson correlation coefficients were calculated in the correlation analyzes conducted to determine the relationship between the mental toughness levels of the cyclists participating in the study and their performance levels in international competitions. As seen in Table 6, there was no significant relationship between the mental toughness levels of the athletes and their international ranking.

DISCUSSION AND CONCLUSION

The aim of this study is to determine whether there is a relationship between the mental toughness of national and non-national cyclists and the ranking they have achieved, and to detect the mental toughness levels of the participants according to their age and the year of starting sports.

In the first finding of the study, while a significant difference was found in the confidence sub-dimension of the athletes engaged in cycling according to the age variable, no significant difference was found in the control and continuity sub-dimensions. Anova test was applied in order to determine between which groups these significant differences were, and it was determined that cyclists in the 21-30 age group showed significant differences compared to the cyclists aged 20 and younger. According to these results, it can be said that the athletes in the middle age group have more mental

toughness in the confidence sub-dimension than the athletes aged 20 and younger. When the literature was examined, studies that were similar to our study were found. Yarayan et al (31) found a significant difference between the age variable and mental toughness in the control subgroup and reported that mental toughness increases with age. Marchant et al (25), Nichools et al (26), and Crust et al (6) found positive parallelism between the ages of athletes and their mental toughness.

When the findings obtained in our study were examined, a significant difference was found between the cyclists' age of doing sports variable and the total scores of the confidence sub-dimension. No statistically significant differences were found in the control and continuity sub-dimensions. Anova test was conducted to determine between which groups the significant change in the confidence sub-dimension was, and it was determined that the athletes engaged in cycling for 6-15 years had a more significant mean than those engaged in cycling for 5 years or less. Nicholls et al (26) stated that experienced athletes have higher mental toughness. Connaughton et al (8) also found that as the age of doing sports increases, mental toughness also increases. Crust and Swann (7) examined the relationship between mental toughness and optimal performance mood on 135 athletes with an average age of 20, and revealed that there is a significant and positive relationship between general mental toughness and optimal performance mood. Nicholls et al. (26) indicated that athletes with high training age got high scores in mental toughness sub-dimensions such as challenge and life control. In a different study, Gucciardi (2010), after researching 214 Austrian football players, revealed that task-oriented athletes have high levels of intrinsic motivation, and that their mental toughness scores are similarly high. Yarayan et al (31), on the other hand, found a significant difference in the control sub-dimension of individual athletes and the continuity sub-dimension of team athletes as the number of years of doing sports increased. In the light of these results, it can be said that the athletes with a certain level of experience have more mental toughness and can display positive performances even in the face of the difficulties, challenges and obstacles they encounter during the competitions.

As a result of the statistical analyzes, a significant relationship was found in the confidence sub-dimension and the best national ranking achieved by the athletes engaged in cycling. Accordingly, it can be said that the cyclists, whose self-confidence increased, achieved better results in national competitions. No significant difference was found between the control and continuity sub-dimensions of mental toughness and the best national ranking achieved. There was no significant difference between the international rankings achieved by the cyclists participating in the study and any of the sub-dimensions of mental toughness .

Including different sample groups in this study, which was carried out with a limited sample group, making comparisons with cyclists from other countries and examining the differences between athletes engaged in individual and team sports are among the suggestions of the researchers of this study.

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Effect Of Home-Based Physical Activity on Older Adults' Well-Being In COVID-19 Pandemic

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Abstract

COVID-19 pandemic has altered the way many people live their life, isolating many who were formerly more social. The lack of access to community services and activities has had a significant negative impact on life, and every individual, including older persons, finding it difficult to cope with the pandemic, leading to increasing anxiety and depression. Subsequently this isolation leads to decrease physical activity and increase sedentary behaviour which has several consequences on older adults' life. Though older adults need to remain at home because they are more likely to contract COVID-19, on the other hand, there is a need to avoid sedentary lifestyle and engage in physical activity. Undoubtedly, the pandemic has imposed a drastic impact on older adults participating in physical activity programmes in groups. Despite that, many older adults continue to engage in physical activity within their confined home spaces. They pointed out, that incorporating physical activity into their daily lives necessitates the adoption of a new culture that are available within limited home spaces. In that regard older adults should be aware about availability of free online physical activity videos and workout materials. Beside applications for home-based meditation and mindfulness-based stress reduction that are free should also be marketed targeting older adults. Physical activity trainers should collaborate with community organisations that serve senior citizens to provide awareness about online physical activity tools. Moreover, programs such as 30-days home-based physical activity challenge can be organised for older people to foster social opportunities and support by giving participants a weekly online check-in as part of the program. However, most importantly experts should engage in teaching and/or facilitating digital technology education classes for older people to utilize online physical activity resources. The role of government and non-profit organization is certainly important in orienting older people with digital technology to avail online physical activity free services. Lastly, creating awareness through social media at the national and provincial level is significantly important to encourage older adults to enhance their activity level within home-based surroundings.

COVID-19 Pandemisinde Ev Temelli Fiziksel Aktivitenin Yaşlı Yetişkinlerin İyi Olma Hali Üzerindeki Etkisi

Özet

COVID-19 salgını, birçok insanın yaşam biçimini değiştirdi ve daha önce daha sosyal olan birçok kişiyi izole etti. Toplum hizmetlerine ve faaliyetlerine erişimin olmaması, yaşam üzerinde önemli bir olumsuz etki yarattı ve yaşlılar da dahil olmak üzere her birey, pandemi ile baş etmekte zorlanarak artan kaygı ve depresyona yol açtı. Daha sonra bu izolasyon, fiziksel aktivitenin azalmasına ve yaşlı yetişkinlerin yaşamı üzerinde çeşitli sonuçları olan hareketsiz davranışların artmasına neden olur. Yaşlı yetişkinlerin COVID-19'a yakalanma olasılıkları daha yüksek olduğu için evde kalmaları gerekse de, diğer yandan, hareketsiz yaşam tarzından kaçınmaya ve fiziksel aktiviteye katılmaya ihtiyaç vardır. Kuşkusuz, pandemi, gruplar halinde fiziksel aktivite programlarına katılan yaşlı yetişkinler üzerinde ciddi bir etki yarattı. Buna rağmen, birçok yaşlı yetişkin, kapalı ev alanlarında fiziksel aktiviteye katılmaya devam ediyor. Fiziksel aktiviteyi günlük yaşamlarına dahil etmenin sınırlı ev alanlarında mevcut olan yeni bir kültürün benimsenmesini gerektirdiğine dikkat çektiler. Bu bağlamda, yaşlı yetişkinler ücretsiz çevrimiçi fiziksel aktivite videolarının ve egzersiz materyallerinin mevcudiyetinin farkında olmalıdır. Ücretsiz olan ev tabanlı meditasyon ve farkındalık temelli stres azaltma uygulamalarının yanı sıra, yaşlı yetişkinleri hedef alarak pazarlanmalıdır. Fiziksel aktivite eğitmenleri, çevrimiçi fiziksel aktivite araçları hakkında farkındalık

sağlamak için yaşlılara hizmet veren toplum kuruluşlarıyla iş birliği yapmalıdır. Ayrıca, programın bir parçası olarak katılımcılara haftalık çevrimiçi check-in vererek sosyal fırsatları ve desteği teşvik etmek için 30 günlük ev temelli fiziksel aktivite yarışması gibi programlar düzenlenebilir. Bununla birlikte, en önemlisi uzmanlar, yaşlıların çevrimiçi fiziksel aktivite kaynaklarını kullanmaları için dijital teknoloji eğitim sınıflarını öğretmek ve/veya kolaylaştırmakla meşgul olmalıdır. Devletin ve kar amacı gütmeyen kuruluşun rolü, yaşlıları dijital teknolojiyle çevrimiçi fiziksel aktivite ücretsiz hizmetlerden yararlanmaya yönlendirmede kesinlikle önemlidir. Son olarak, sosyal medya aracılığıyla ulusal ve il düzeyinde farkındalık yaratmak, yaşlı yetişkinleri ev tabanlı ortamlarda aktivite düzeylerini artırmaya teşvik etmek için oldukça önemlidir.

INTRODUCTION

COVID-19 pandemic has altered the way many people live their life, isolating many who were formerly more social. The lack of access to community services and activities has had a significant negative impact on life, and every individual, including older persons, finding it difficult to cope with the pandemic, leading to increasing anxiety and depression. (1-3). Subsequently this isolation leads to decrease physical activity and increase sedentary behaviour which has several consequences on older adults' life (4). Though older adults need to remain at home because they are more likely to contract COVID-19, on the other hand, there is a need to avoid sedentary lifestyle and engage in physical activity.

Undoubtedly, the pandemic has imposed a drastic impact on older adults participating in physical activity programmes in groups (5). Despite that, many older adults continue to engage in physical activity within their confined home spaces. They pointed out, that incorporating physical activity into their daily lives necessitates the adoption of a new culture that are available within limited home spaces (5). This reflects that pandemic has broadened the horizon of utilizing home spaces to promote physical activity and decrease sedentary behaviour.

Home space is a major contributing factor of health, and better housing conditions have been linked to improve general and psychosocial health (6, 7). Given that, with increasing age, older adults spend large proportion of their time in their house (8). Therefore, older community-dwellers should enhance their physical activity levels and preserve their health during this unprecedented time which in turn will increase their quality of life and reduce personal and societal burden of physical inactivity and associated ill health (9).

Different studies have shown the impact of COVID-19 on older adult's physical activity level. A study conducted in Spain among older adults during the COVID-19 pandemic showed that older adults who performed moderate to vigorous physical activity on regular basis during the home isolation reported higher resilience scores and fewer depressive symptoms (10). Similarly, a study done on 165 Japanese participants showed that around 23% of older adults became more active and 29.7% maintained their physical activity level within their home environment whereas, older adults who were less physically active have reported decrease in subjective well-being (11). This highlighted that even mild physical activity during the COVID-19 pandemic assist to mitigate some of the negative mental health effects that older persons may be experiencing as a result of social distancing (1). Thus, to avoid negative repercussion of pandemic older adults should be indulge in physical activity using their home space (12, 13).

Evidence showed that limited outdoor physical activity options in pandemic have resulted in detrimental effect on life style pattern; preliminary finding also showed a drop of 5% to 20% in total steps across the world (14). This certainly directs the older adults about shifting to inexpensive home-based physical activity. Moreover, home space utilization and availability of home equipment were found to be significant predictors of moderate to vigorous physical activity during the pandemic (15, 16). Thus, there is need of raising proper awareness which in turn will help to enhance physical activity level and wellbeing of older adults, thereby empowering them to maintain their active participation within the community. Therefore, the implementation of important steps to promote older people's physical activity within their home space is warranted.

In that regard older adults should be aware about availability of free online physical activity videos and workout materials. Beside applications for home-based meditation and mindfulness-based stress reduction that are free should also be marketed targeting older adults. Physical activity trainers should collaborate with community organisations that serve senior citizens to provide awareness about online physical activity tools. Moreover, programs

such as 30-days home-based physical activity challenge can be organised for older people to foster social opportunities and support by giving participants a weekly online check-in as part of the program. However, most importantly experts should engage in teaching and/or facilitating digital technology education classes for older people to utilize online physical activity resources. The role of government and non-profit organization is certainly important in orienting older people with digital technology to avail online physical activity free services. Besides, a proper campaign to adopt behavioural change by motivating older adults to perform physical activity within home surroundings is certainly important. Lastly, creating awareness through social media at the national and provincial level is significantly important to encourage older adults to enhance their activity level within home-based surroundings which is an emergent priority in the present context.

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