

Examination of exercise addiction and aggression: A cross-sectional study on university students

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Abstract

The aim of this study was to examine exercise addiction and aggression levels among students at the Faculty of Sport Sciences. This cross-sectional study included 976 university students who responded digitally. Socio-demographic information was collected using a personal information form created by the researcher. Exercise addiction was assessed using the Exercise Addiction Scale, and aggression levels were measured using the Buss-Perry Aggression Scale. After completing the assumptions of the data for analysis, Independent Sample t test was used for pairwise comparisons and One-Way Anova (Tukey HSD) was used for multiple comparisons. Statistically, there were no significant differences in anger and hostility dimensions based on gender ($p>0.05$). However, males showed significantly higher levels of physical, verbal, and general aggression compared to females ($p<0.05$). Gender did not significantly affect exercise addiction dimensions ($p>0.05$). Similarly, field of study did not influence aggression or exercise addiction levels among students (0.05). Students who reported more frequent exercise sessions and longer durations exhibited lower aggression levels and higher exercise addiction scores, with these differences being statistically significant ($p<0.05$). In conclusion, male students in sport sciences faculties tend to exhibit higher aggression levels than their female counterparts. Moreover, increased frequency and duration of exercise appear to mitigate aggression levels effectively.

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Introduction

An individual's uncontrollable urge to repeat a certain behavior in an uncontrollable way even though it harms him/herself is defined as addiction (Yıldız, 2016). Addicted individuals tend to use the harmful substance or continue the action even though they know that it will harm themselves, their family, their environment and social life, and they have difficulty in preventing this desire. World Health Organization (WHO) defines addiction as "a set of physiological, behavioral and cognitive phenomena in which the use of a substance or a class of substances is much higher". With technological innovations and changes, many different types of addiction have emerged. Technology, internet, television, smartphone, smartphone, exercise, and social media addictions are ahead of habits such as drugs, alcohol and cigarettes.

University students face significant demands in both academic and personal development, often turning to structured physical exercise to manage stress. Organized sporting activities—which include essential warm-up and cool-down phases—have been shown to

support mental well-being and assist in managing behavioral as well as physiological addictions. Moreover, extensive research has examined the vital role of physical exercise in promoting health among children and young people, highlighting the risks associated with physical inactivity (Bailey et al., 1995; Blair et al., 1984; Kelly, 2000; Kruk, 2009; WHO, 2019). Thivel et al. 2018 defined physical activity as any body movement that results in energy expenditure above the resting level, which refers to all energy expended by movement and is produced by skeletal muscles. Kruk, (2009) emphasizes that regardless of the type of physical activity, it should include frequency, duration and intensity components in order to be fully evaluated. Although physical activity and exercise are different concepts, they can be considered as the same concept. While exercise is special, planned and continuous muscle movements that can even be included in any sports activity, physical activity is muscle mobility in daily life such as getting up, sitting, showering and traveling (Akyol et al., 2008).

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Exercise is defined as repetitive body movements that are performed in a programmed and planned manner, aimed at maintaining or improving one or more elements of physical fitness (Fox, 2003). Landolfi (Landolfi, 2013) reports that regular exercise increases the quality of life of the individual, improves body functions, reduces resistance to fatigue, increases body flexibility, improves muscle strength and endurance, helps body weight management, contributes to the protection of general health, and can reduce the effects of aging through functionality. In addition to these physical benefits of regular exercise, research has shown that it also protects psychological health by contributing to the reduction of depression and anxiety (Ucar, 2019). While it is known that exercise is beneficial for individuals when practiced regularly, it should not be ignored that it can reach the level of addiction when overdone (Üzgül et al., 2023).

When exercise addiction is defined, it is the prevention of social life by increasing the duration, intensity and periodicity of exercise beyond the control of the individual in order to achieve satisfaction (Adams & Kirkby, 2002). For the diagnosis of exercise addiction, Veale (1995) used the substance addiction criteria in DSM-IV and developed these criteria for exercise addiction. At least 3 of the following symptoms must be present within a 12-month period and must cause clinical distress and impairment. In this case, the criteria for the diagnosis were examined in seven steps (tolerance, effects of exercise cessation, intention effect, loss of control, time, reducing other activities, and continuity) (Vardar, 2012). Accordingly, individuals with exercise addiction are recognized by symptoms such as not being able to stop exercising, feeling the need to exercise more and more every day, experiencing anxiety/nervousness in case of exercise cessation, exercising for longer than thought, spending a long time on exercise, and preferring exercise to socializing with the environment.

Aggression is socially defined as damaging behaviors that are far from sociability (Bandura, 1973).

Aggression is one of the basic instincts and drives of living things and is the source and driving force of the behaviors necessary to sustain life within certain limits (Karataş, 2008). It is seen that individuals who cannot communicate effectively with each other and cannot understand each other turn to aggressive behaviors in order to get what they want or to cope with the obstacles (Gültekin, 2008). Any physical, verbal or symbolic behavior that arises from situations such as

anger, hostility, competition, frustration, fear and aims to harm, stop, prevent or protect oneself is defined as aggression (Budak, 2000). Kurtyılmaz (2005) points out that each individual can develop different types of aggression in the same situations due to their unique personality traits. It is possible to come across different classifications of aggression in the literature. Cüceloğlu (1997) states that aggression is a behavioral pattern in the face of obstacles and can be handled in 2 dimensions: adaptive aggression and displaced aggression. He states that adaptive aggression can make life easier in terms of environmental adaptation and sometimes disrupt harmony, while in displaced aggression, the irritability caused by the blocking behavior and the subsequent lack of expression of emotions indicate that these emotions can be directed to a different variable or individual.

During the critical period of university education when university students seek solutions to social, cultural, and psychological problems and experience orientation issues, they also face challenges related to behavioral addiction arising from the rapid developments in technology. To positively impact students' lives by organizing exercise programs that promote emotional and behavioral regulation, it is imperative to scrutinize all relevant aspects thoroughly. This study aims to shed light on the levels of exercise addiction and aggression among students at the Faculty of Sport Sciences, aiming to contribute to research in broader scopes and dimensions.

Methods

Participants

This cross-sectional study was conducted at the Faculty of Sport Sciences at Gazi University, Düzce University and Selcuk University. To ensure a diverse representation within the sample group, participants were selected using a sampling method supplemented with snowball sampling. The students reached out through convenience sampling and were asked to share the link to the scale with their student friends. The inclusion criteria included in the study were as follows: being a student of sport sciences, not being an athlete, not currently taking psychiatric medication, and not participating in psychotherapy. A total of 976 university students, 365 female and 611 male, were reached. All participants participated by marking on the form that they voluntarily participated in the research.

Procedure

Ethical permission was obtained from the Ethics Committee of Selçuk University, Faculty of Sport Sciences (E-40990478-050.99-525338). The personal information form created by the researcher was used to obtain the sociodemographic information of the students. In this form, gender, department, weekly exercise frequency, and exercise duration were asked. "Exercise Addiction Scale", the validity and reliability study of which was conducted by Tekkurşun Demir et al. (2018), was used to determine exercise addiction, and "Buss-Perry Aggression Questionnaire", the Turkish adaptation of which was conducted by Madran (2012), was used to determine aggression levels.

Exercise Addiction Scale (EAS)

The scale was developed by Tekkurşun Demir et al. (2018) in 2018 and a Turkish validity and reliability study was conducted. The scale is a 17-item Likert-type scale with options ranging from 'strongly disagree' to 'strongly agree'. The scale consists of 3 sub-dimensions: "Over-focus and Emotion Change", "Postponement of Individual-Social Needs and Conflict" and "Tolerance Development and Passion". In the scale, "strongly disagree" is evaluated as 1, "disagree" as 2, "undecided" as 3, "agree" as 4 and "strongly agree" as 5 points. In the Exercise Addiction Scale, "1-17 points are normal, 18-34 points are low risk, 35-51 points are risky, 52-69 points are dependent, 70-85 points are highly dependent" (Tekkurşun Demir et al., 2018).

Buss-Perry Aggression Questionnaire

It was developed by Buss & Perry (1992). The Turkish adaptation of the scale, which was originally created in 1992, was conducted by Madran (2012). The scale has 4 sub-dimensions and consists of 29 items in total. The sub-dimensions are Physical Aggression (9 items), Anger (7 items), Hostility (8 items) and Verbal Aggression (5 items). Questions 9 and 16 of the scale are reverse scored (Madran, 2012). The questions directed to the participants in the scale contain 5-point Likert-type answers. The increase in the scores of the participants means an increase in aggression in the subscale that shows an increase in score (Madran, 2012).

Data Analyses

The analysis was conducted using SPSS version 23. Initially, scales with invalid or missing responses were

excluded from the analysis. Subsequently, the Kurtosis and Skewness values of all scale items were assessed to ensure the normal distribution of the data, with values falling within the range of ± 2.00 for all items, as recommended by George and Mallery (2019). Following the confirmation of a normal distribution, independent sample T-tests were employed for pair-wise comparisons, and One-Way Anova (Tukey HSD) was utilised for multiple comparisons, with $P < 0.05$ considered significant.

Results

No statistically significant differences were observed in the anger and hostility dimensions based on gender. However, it was found that males had significantly higher scores than females in the physical ($p = 0.02$), verbal ($p = 0.002$), and total aggression dimensions ($p = 0.006$; Table 1). Additionally, there was no statistically significant difference in the dimensions of exercise addiction according to gender.

Similarly, no statistically significant differences were observed in the dimensions of aggression and exercise addiction when analyzed by department (Table 2).

When examining the frequency of weekly exercise, it was found that students who exercised 5 or more days per week had significantly lower scores in all aggression dimensions compared to those who exercised 1-2 days or 3-4 days per week ($p < 0.05$; Table 3). While there was no significant difference in the "postponement of needs" dimension of exercise addiction, it was determined that students who exercised 5 or more days per week had significantly higher scores in the other dimensions of exercise addiction compared to those who exercised 1-2 days or 3-4 days per week ($p < 0.05$; Table 3).

Regarding daily exercise duration, no significant difference was found in the verbal aggression dimension. However, individuals who exercised for 5 or more hours per day had significantly lower scores in verbal aggression compared to those who exercised for 1-2 hours or 3-4 hours per day ($p < 0.05$; Table 4). While no significant differences were observed in the aggression dimensions based on exercise duration, the total aggression scores revealed that individuals who exercised for 5 or more hours per day exhibited significantly higher levels of exercise addiction ($p < 0.05$; Table 4).

Table 1
Gender-related changes in aggression and exercise addiction levels.

<i>Aggression Levels</i>												
Gender	n	%	Physical Aggression		Anger		Hostility		Verbal Aggression		Total Aggression	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Female	365	37.40	24.34	3.53	19.17	3.29	21.93	3.57	13.12	2.66	78.15	6.99
Male	611	62.60	24.89	3.75	19.34	3.49	21.96	3.60	13.67	2.77	79.42	6.94
Total	976	100.0	24.69	3.68	19.28	3.42	21.95	3.59	13.47	2.74	78.95	6.98
		t	-2.293		-.742		-.114		-3.050		-2.773	
		p	.020*		.452		.909		.002*		.006*	

<i>Exercise Addiction Levels</i>										
Gender	n	%	Over-focus and Emotion Change		Postponement of Individual-Social Needs and Conflict		Tolerance Development and Passion		Total Exercise Addiction	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD
Female	365	37.40	27.57	3.01	23.79	2.75	15.62	2.34	66.98	4.94
Male	611	62.60	27.89	2.76	23.69	2.68	15.61	2.28	67.19	4.76
Total	976	100.0	27.77	2.86	23.73	2.71	15.61	2.30	67.11	4.83
		t	-1.643		.512		.103		-.648	
		p	.094		.606		.917		.513	

*Significant difference between groups ($p < 0.05$).

Table 2
Changes in aggression and exercise addiction levels depending on the department factor.

<i>Aggression Levels</i>												
Departments	n	%	Physical Aggression		Anger		Hostility		Verbal Aggression		Total Aggression	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Education	290	29.71	24.54	3.41	19.26	3.56	21.46	3.53	13.57	2.74	78.63	6.82
Coaching	246	25.20	24.82	3.88	19.03	3.24	21.80	3.66	13.50	2.77	78.57	7.22
Sport Management	232	23.77	24.51	3.80	19.73	3.31	22.66	3.58	13.56	2.62	79.82	6.86
Recreation	208	21.31	24.92	3.66	19.09	3.53	22.01	3.49	13.17	2.82	78.86	7.02
		F	.707		2.022		5.064		1.039		1.660	
		p	.548		.109		.22		.374		.174	

<i>Exercise Addiction Levels</i>										
Departments	n	%	Over-focus and Emotion Change		Postponement of Individual-Social Needs and Conflict		Tolerance Development and Passion		Total Exercise Addiction	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD
Physical Education	290	29.71	27.80	2.74	23.57	2.76	15.64	2.28	67.01	4.74
Coaching	246	25.20	27.69	3.04	23.81	2.69	15.47	2.35	66.97	4.80
Sport Management	232	23.77	27.85	2.96	23.52	2.66	15.79	2.20	67.16	5.11
Recreation	208	21.31	27.73	2.70	24.09	2.69	15.55	2.41	67.36	4.69
		F	.161		2.081		.832		.305	
		p	.922		.101		.476		.822	

*Significant difference between groups ($p < 0.05$).

Table 3

Changes in aggression and exercise dependence depending on the number of weekly exercises.

<i>Aggression Levels</i>												
Days of Exercise Per Week	n	%	Physical Aggression		Anger		Hostility		Verbal Aggression		Total Aggression	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1-2 Days	336	34.43	24.94	3.45	19.56	3.37	22.22	3.62	13.73	2.74	79.87	6.99
3-4 Days	442	45.29	24.88	3.82	19.54	3.52	22.09	3.62	13.41	2.82	79.57	6.61
5 and +	198	20.29	23.82	3.62	18.21	3.06	21.16	3.34	13.15	2.53	75.99	7.01
			F		12.355		6.204		2.967		23.391	
			p		.000*		.002*		.050*		.000*	

<i>Exercise Addiction Levels</i>												
Days of Exercise per Week	n	%	Over-focus and Emotion Change		Postponement of Individual-Social Needs and Conflict		Tolerance Development and Passion		Total Exercise Addiction			
			Mean	SD	Mean	SD	Mean	SD	Mean	SD		
1-2 Days	336	34.43	27.74	2.93	23.49	2.81	15.60	2.34	66.83	4.76		
3-4 Days	442	45.29	27.50	2.83	23.74	2.69	15.49	2.31	66.72	4.72		
5 and +	198	20.29	28.43	2.71	24.11	2.52	15.92	2.22	68.46	4.97		
			F		3.324		2.403		9.897			
			p		.001*		.091		.000*			

*Significant difference between groups ($p < 0.05$).**Table 4**

Changes in aggression and exercise dependence depending on daily exercise hours.

<i>Aggression Levels</i>												
Daily Exercise Duration	n	%	Physical Aggression		Anger		Hostility		Verbal Aggression		Total Aggression	
			Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
1-2 Hour(s)	450	46.11	24.80	3.68	19.61	3.40	22.20	3.55	13.59	2.69	79.60	6.69
3-4 Hours	378	38.73	24.91	3.71	19.25	3.54	21.95	3.64	13.38	2.89	79.20	6.98
5 and +	148	15.16	23.78	3.48	18.35	2.99	21.18	3.49	13.28	2.51	76.29	7.28
			F		7.668		4.556		.984		13.288	
			p		.000*		.011*		.374		.000*	

<i>Exercise Addiction Levels</i>												
Daily Exercise Duration	n	%	Over-focus and Emotion Change		Postponement of Individual-Social Needs and Conflict		Tolerance Development and Passion		Total Exercise Addiction			
			Mean	SD	Mean	SD	Mean	SD	Mean	SD		
1-2 Hour(s)	450	46.11	27.66	2.88	23.60	2.75	15.52	2.31	66.78	4.90		
3-4 Hours	378	38.73	27.75	2.85	23.76	2.64	15.68	2.31	67.20	4.57		
5 and +	148	15.16	28.13	2.83	24.05	2.73	15.72	2.29	67.90	5.18		
			F		1.601		.689		3.101			
			p		.202		.502		.045*			

*Significant difference between groups ($p < 0.05$).

Discussion

In this study, which aimed to examine the levels of exercise addiction and aggression among students in

the Faculty of Sports Sciences, it was found that there was no significant statistical difference in the dimensions of anger and hostility based on gender. However, in the dimensions of physical, verbal, and

general aggression, the average values for male students were significantly higher than those for female students. This can be attributed to the physiological differences between males and females as well as the status and roles assigned by societal structures. The literature supports this finding, as studies have shown that testosterone levels negatively influence behaviors such as muscular strength and physical aggression in males. O'Connor et al. (2004) reported that aggression tendencies increased in adults administered testosterone, and aggressive criminals were found to have higher salivary and plasma testosterone levels. The association of testosterone with aggressive behaviors may explain the gender differences observed in our study. Additionally, social norms and gender roles may negatively impact male aggression, leading to a higher tendency for physical or verbal aggression. Various studies align with our findings in this regard (Arslan et al., 2010; Bekiroğlu & Şahin, 2019; Borroni et al., 2014; Camadan, 2017; Eagly & Steffen, 1986; Giles & Heyman, 2005; Kahraman & Kurt, 2013; Karataş, 2008; Kelly & Achter, 1995; Ostrov & Keating, 2004; Öcel, 2011; Özgider & Akgün, 2021; Rabiner et al., 2005; Sen, 2009; Seven & Dülger, 2022; Terry et al., 2004; Wonderlich, 2007).

Regarding exercise addiction dimensions, no significant statistical difference was observed based on gender. Similar findings have been reported in other studies (Arslanoğlu et al., 2021; Griffiths et al., 2005; Guzel, 2021; Özcan, 2021; Paksoy, 2021; Uzun, 2020; Üzgü et al., 2023; Yıldızdal, 2022; Zmijewski & Howard, 2003). Zmijewski and Howard (Zmijewski & Howard, 2003) reported that while women's exercise addiction was higher than men's, the risk of primary exercise addiction was higher in men. Berczik et al. (2012) also found that men exhibited more exercise addiction symptoms compared to women. Much of the literature supports the view that exercise addiction levels in men are generally higher than in women (Bardakçı et al., 2016; Beltekin & Kuyulu, 2020; Cicioğlu et al., 2019; Costa et al., 2013; Köse & Bayköse, 2019; Mayolas-Pi et al., 2016; Terry et al., 2004). Changes in sociocultural structures, where gender roles and statuses between men and women have converged, may explain the findings of our research. The sharing of household responsibilities and childcare between men and women, allowing women more time for exercise, may also account for exercise addiction no longer being solely a male phenomenon.

No significant statistical differences were observed in the aggression and exercise addiction values based on the field of study. This may be due to the fact that students in the Faculty of Sports Sciences, despite studying in different fields, are admitted through the same special talent exam and have similar scores, leading to similar levels of aggression and exercise addiction. Studies that report no statistical difference in aggression based on the field of study (Erdoğan & Bahadır, 2016; Erşan et al., 2009; Özkan et al., 2023) are consistent with our findings in this respect. However, Çelik and Kolayış (2023) reported statistical differences in aggression values based on the field of study, while Çakmak et al. (2022) found that students in different departments had varying levels of aggression. The heterogeneous results in the literature may be due to differences in the scope, dimensions, and study groups of the research.

Several studies in the literature report no significant statistical differences in exercise addiction values based on the field of study (Demir, 2022; Demirtaş, 2022; Paksoy, 2021; Uzun, 2020; Uzun, 2019), which is significant as these findings align with our research results. However, Demirtaş (Demirtaş, 2022) reported statistical differences in the dimensions of time and exercise preference and tolerance based on the department variable. Szabo & Griffiths (2007) found that physical education students had higher exercise addiction scores compared to students in other departments. The inconsistency in the literature regarding departments may be due to differences in the scope and dimensions of the research, as well as sociocultural variations.

Students who exercised five or more days per week had lower aggression scores across all dimensions compared to those who exercised 1-2 or 3-4 times per week, and this difference was statistically significant. It is known that regular exercise increases endorphin release, reduces stress, and promotes emotional balance (Warburton et al., 2006). Tekkurşun Demir (2022) reported that individuals who could not participate in exercise felt bad, generally experienced negative emotions, were unhappy, and felt bad about themselves. Hausenblas & Downs (2002) also stated that individuals who could not participate in exercise and showed symptoms of exercise addiction felt anxious. The findings of these studies are significant as they align with the results of our research.

While no significant statistical differences were observed in the dimensions of tolerance development

and passion based on the number of exercise days per week, it was found that students who exercised five or more days per week had significantly higher values in other exercise addiction dimensions compared to those who exercised 1-2 or 3-4 days. As the frequency of exercise increased, so did the exercise addiction scores. Several studies in the literature support the finding that individuals who exercise more frequently have higher exercise addiction scores compared to those who exercise less frequently (Arslanoğlu et al., 2021; Basoglu, 2018; Bavlı et al., 2011; Cicioğlu et al., 2019; Demirel & Cicioğlu, 2020; Erdoğan et al., 2023; Goktas & Güzel, 2023; Özsandıkçı & Baş, 2022). Arslanoğlu et al. (2021) reported that in the dimensions of overfocus and emotional development, individuals who exercised five or more days per week had higher exercise addiction levels compared to those who exercised 1-2 times per week. Basoğlu (2018) reported that as the weekly exercise frequency increased, so did exercise addiction levels. Bavlı et al. (2011) stated that frequent gym attendance might be a factor contributing to the development of exercise addiction symptoms. The observed increase in exercise addiction based on exercise frequency in the literature supports our research findings.

No significant statistical differences were observed in verbal aggression based on daily exercise hours, while in other dimensions, individuals who exercised for 5 or more hours per day had significantly lower values compared to those who exercised for 1-2 or 3-4 hours. Wagner et al. (1999) reported that weight training or participation in voluntary physical activity could effectively reduce aggression levels. Şahinler et al. (2020) found that participants with longer daily physical activity durations had lower aggression levels compared to those with shorter activity durations. The studies by Wagner et al. (1999) and Şahinler et al. (2020) support the observed changes in our study related to the increase in exercise duration and its positive impact on aggression levels.

No significant statistical differences were observed in exercise addiction dimensions based on daily exercise hours. However, individuals who exercised for 5 or more hours per day had significantly higher overall average exercise addiction scores compared to those who exercised for 1-2 or 3-4 hours. Glasser (1976) stated that exercise addiction could be experienced positively or negatively, with individuals experiencing issues such as anxiety, depression, irritability, and insomnia when unable to exercise, which is classified as

negative exercise addiction. In contrast, excessive exercise to cope with life challenges was considered a positive addiction. Numerous studies in the literature report an increase in exercise addiction with an increase in exercise time, consistent with our research findings (Acıkbas, 2021; Arslanoğlu et al., 2021; Basoglu, 2018; Erdoğan et al., 2023; Özsandıkçı & Baş, 2022; Yıldızdal, 2022). Arslanoğlu et al. (2021) reported statistical differences in the dimensions of focus and emotional development and overall exercise addiction scores based on the time allocated to daily exercise, stating that as exercise duration increased, so did exercise addiction levels.

Conclusion

This study sheds light on the nuanced relationship between exercise habits, aggression, and gender among university students. While gender did not significantly influence exercise addiction, the observed differences in aggression levels between male and female students highlight the importance of considering gender-specific approaches in understanding behavioral patterns. Additionally, the lack of significant variation based on the field of study suggests that these dynamics may be more universally applicable across academic disciplines. The findings underscore the potential benefits of regular and prolonged exercise in managing aggression, emphasizing its role in promoting emotional well-being. These insights contribute to a deeper understanding of how physical activity can be leveraged to foster healthier psychological outcomes, particularly among students in sports-related fields.

The research has some limitations. It is a cross-sectional study and only three universities were reached through convenience sampling. It is recommended that future studies should be designed to be more comprehensive.

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Authors' Contribution

Study Design: MA; Data Collection: MA; Statistical Analysis: MA; Manuscript Preparation: MA.

Ethical Approval

The study was approved by the Selçuk University of Faculty of Sport Sciences Ethical Committee (2023/525338) and it was carried out in accordance with the Code of Ethics of the World Medical Association also known as a declaration of Helsinki.

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Conflict of Interest

The authors hereby declare that there was no conflict of interest in conducting this research.

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