



## Video Oyun Bağımlılığının Postür Sağlığı Üzerine Etkisi

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### Özet

Bu çalışmada, ortaokul öğrencilerinde video oyunu bağımlılığı düzeyinin torasik kifoz eğriliği üzerinde nasıl bir etkiye sahip olduğunun belirlenmesi amaçlanmıştır. Çalışmanın örneklem grubunu, amaçlı örnekleme yöntemi ile Çınarcık Firuzan Kınal İlkokulu-Ortaokulunda öğrenim gören 5, 6, 7 ve 8. sınıf öğrencileri oluşturmuştur. Veriler, hem başlangıç hem de sonraki ölçümlere katılan 87 öğrenciden (47 kız, 40 erkek) toplanmıştır. Öğrenciler gönüllülük esasına göre seçilmiş ve anket sorularını eksiksiz olarak tamamlamışlardır. Veriler kişisel bilgi formu, çocuklar için video oyunu bağımlılığı ölçeği ve esnek cetvel kullanılarak toplanmıştır. Verilerin değerlendirilmesinde SPSS 21 paket programı ve kifoz indeksi ( $KI=(TW/TL)\times 100$ ) kullanılmıştır. Elde edilen sonuçlara göre çocuklarda video oyun bağımlılığının kifoz indeksi üzerinde istatistiksel olarak anlamlı bir etkisinin olmadığı, rekreasyonel aktivitelere katılan çocukların bağımlılık puanlarının ( $p=0,01<0,05$ ) ve günlük dijital oyun oynama süresi değişkenine göre bağımlılık puanlarının [ $F(3,83)=6,918$ ,  $p=0,000<0,05$ ] istatistiksel olarak anlamlı olduğu ancak kifoz indeksinin her iki değişken açısından da anlamlı sonuçlar göstermediği belirlenmiştir ( $p>0,05$ ). Sonuç olarak rekreasyonel aktivitelere katılan çocukların bağımlılık düzeylerinin anlamlı olarak daha düşük olduğu ve omurga sağlıklarının daha iyi olduğu belirlenmiştir. Ayrıca video oyun bağımlılığının bu yaş grubundaki çocukların omurga sağlığı üzerinde doğrudan bir etkisinin olmadığı tespit edilmiştir.

**Anahtar kelimeler:** Rekreasyonel aktiviteler, Bağımlılık, Omurga sağlığı.

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## **The Impact of Video Game Addiction on Spinal Health**

### **Abstract**

This study aimed to determine how the level of video game addiction has an effect on thoracic kyphosis curvature in secondary school students. The sample group of the study consisted of 5th, 6th, 7th and 8th grade students studying in Çınarcık Firuzan Kınal Primary-Secondary School by deliberate sampling method. The data were collected from 87 students (47 females, 40 males) who participated in both the initial and subsequent measurements. The students were selected on the basis of volunteerism and completed the questionnaire questions entirety. The data was collected by using the Personal Information Form, the Video Game Addiction Scale for Children and the flexicurve. The SPSS 21 package programme and the kyphosis index ( $KI = (TW/TL) \times 100$ ) were used to evaluate the data. According to the obtained results, it was determined that video game addiction did not have a statistically significant effect on the kyphosis index in children, the addiction scores of children who participated in recreational activities ( $p=0.01<0.05$ ) and the addiction scores according to the variable of daily digital game playing time [ $F(3,83)=6.918, p=0.000<0.05$ ] were statistically significant, but the kyphosis index did not show significant results in terms of both variables ( $p>0.05$ ). As a result, addiction level of children who participated to recreational activities were significantly lower and their spinal health were better. Moreover, it was detected that video game addiction had not a direct effect on spinal health of children in this age category.

**Keywords:** Recreational activities, Addiction, Spinal health.

## **Introduction**

Games, which used to be seen as a kind of leisure activity or a means of entertainment, nowadays negatively affect the life habits of young people who spend a lot of time and frequently use video arcades, phones or tablets. Video games have become a popular entertainment activity in the last few years, especially among children and young people. With the rapid development of technology, the fact that young people in different parts of the world connect and interact with each other through games has attracted the attention of many other people. It is normal to play these games in moderation in regular life, and they even have positive contributions such as psychological relaxation. However, if the person's desire to play these games cannot be controlled, if this situation affects his/her emotions and thoughts and disrupts his/her social life, it can be said that addiction occurs at this point.

Addiction is explained as the situation of repeating behaviours that are not beneficial for the individual against his/her will (Yıldız, 2016). As a matter of fact, this concept, which affects the individual, the individual's environment and society in a broad perspective (Ögel, 2015), is a factor that can be evaluated in different types. These addictions include shopping, gaming, internet, telephone, gambling, drug, alcohol, etc. (Terry, Szabo, & Griffiths, 2004; Sezer & Nacar, 2024). However, the concept of addiction is divided into two. These are; substance addictions and behavioural addictions (Nazlıgül & Yılmaz, 2019; Delibaş, 2019;). Substance addiction is defined as physiological craving for the substance (Yıldız, 2016); Behavioural addiction is defined as the repetition of harmful behaviour (Köknel, 2016; Starcevic, 2016). Therefore, it can be said that the difference between substance addiction and behavioural addiction is only due to the substance use factor (Bozkurt, Şahin, & Zoroğlu 2016).

Recently, video game addiction, which is one of the behavioural addictions, has been increasing significantly among young people (Wang et al., 2014). Video game addiction is mainly characterised by withdrawal when the game is not played, lack of control in determining the duration of the game, and conflicts within the environment and oneself (Lemmens, Valkenburg, & Peter, 2011; King et al., 2013; Hull, Williams, & Griffiths, 2013). Besides, addiction is associated with negative outcomes such as psychological problems, decreased academic achievement, depressive and anxious thoughts (Gentile, 2009; Schmitt & Livingston, 2015; Saquib et al., 2017; Aziz et al., 2021; Rosendo-Rios, Trott & Shukla, 2022; Satılmış et al., 2023). In this context, while it can be mentioned that video game addiction, which is widespread among young people, can cause mental, social and psychological problems, when the literature is examined, it is seen that it can also cause physical problems to a significant extent. Supporting studies also indicate that video game addicts have higher rates of physical health problems (hand-wrist pain, visual impairments, spinal

problems, sleep disturbance; posture disorders, obesity, etc.) than non-addicts (Breen et al., 2007; Ballard et al., 2009; Jacobs, Hudak, & McGiffert, 2009; Horzum, 2011; Hellström et al., 2015; UNICEF, 2017; Mustafaoğlu et al., 2018; Ekinçi et al., 2021; Şenol et al., 2023). It can be said that the reason for this situation is that people stay in the same position for a long time and remain immobile. As a matter of fact, this limitation of movement causes pain in the neck, back and shoulder area due to the load on the spine and the resulting spinal flatness (Mcroberts, Cloud & Black, 2013; Harris & Straker, 2000; Jacobs, Hudak, & McGiffert, 2009; Mustafaoğlu & Yasacı, 2018; Özdiñçler et al., 2019).

In addition to the negative effects of video game addictions, it can be mentioned that there are also positive effects on young people when played in moderation. Studies have emphasised that video games are a potential factor in managing stress and anxiety, logic and prediction, strategic thinking and reflex development (Young, 2009; Prot et al., 2014; Kim & Smith, 2017; Plante et al., 2019; Doğan-Keskin & Aral, 2022).

This study aims to evaluate the specific effects of video game addiction on spinal health. It mentions that video game addiction may have physical effects as well as psychological and social effects on individuals. In this context, the study is remarkable in terms of evaluating the physical effects of video game addiction on spinal health. As a matter of fact, the concept of video game addiction being included in behavioural addictions, which are important in the literature, can be considered as a priority in the examination of the concept.

## **Methods**

### ***Sample***

The sample group of the study consisted of 5th, 6th, 7th and 8th grade students studying in Çınarcık Firuzan Kınal Primary-Secondary School by purposeful sampling method. The data were collected from 87 students [between the ages of 12 to 16 years, 47 females (%54), 40 males (%46)] who participated in both the initial and subsequent measurements. The students voluntarily participated and completed the questionnaire in its entirety.

### ***Instruments***

#### **Videogame Addiction Scale for Children (VASC)**

VASC developed by Yılmaz, et al. (2017) comprised 21 items. All items were scored on a five-point scale by the children (never = 1, rarely = 2, sometimes = 3, often = 4, very often = 5). Total scores were obtained by summing the children's response scores and total scores range from 21 to 105. The score above 90 indicated a possible addiction to videogames. This scale was not a

diagnostic tool but only an indicator that a child might have an addiction to videogames. Only an in-depth clinical assessment could provide such a diagnosis.

### **Flexicurve**

Studies regarding the measurement of flexible kyphotic curvature have been conducted since the 1950s, Takahashi & Atsumi (1955). The Kyphosis Index (KI) was measured with a flexicurve ruler (Flexicurve ruler, Alvin®, CT, U.S.A). The flexicurve ruler, is a 60- cm-long flexible piece of lead covered in durable plastic that can be molded to the contour of the spine when gently pressed onto the back, adapts to the thoracic contours of the subjects in the sagittal plane. The researcher then traces the ruler's retained shape onto paper to calculate the flexicurve kyphosis index (Figure 1).

Several investigators have established the validity of flexicurve postural measures by correlating them with measures of kyphosis and vertebral wedging taken from spinal radiographs and other instruments, such as goniometers, kyphometers and inclinometers (Burton, 1986; Tillotson, 1991).



Fig. 1. Flexicurve Measurement Technique

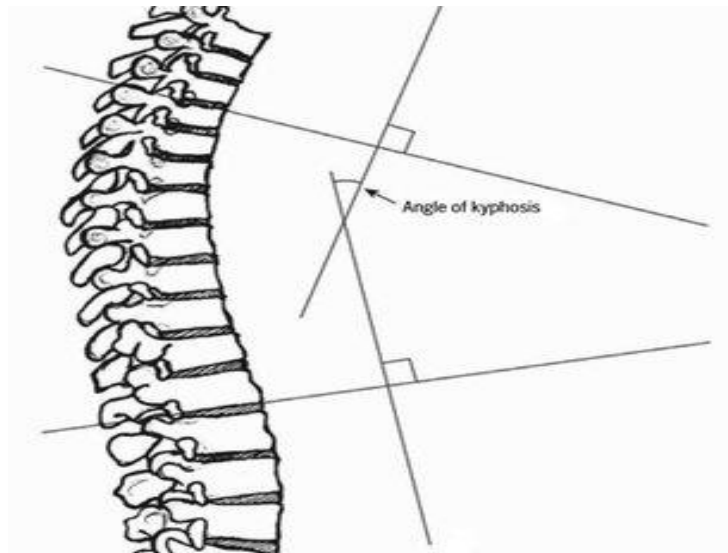
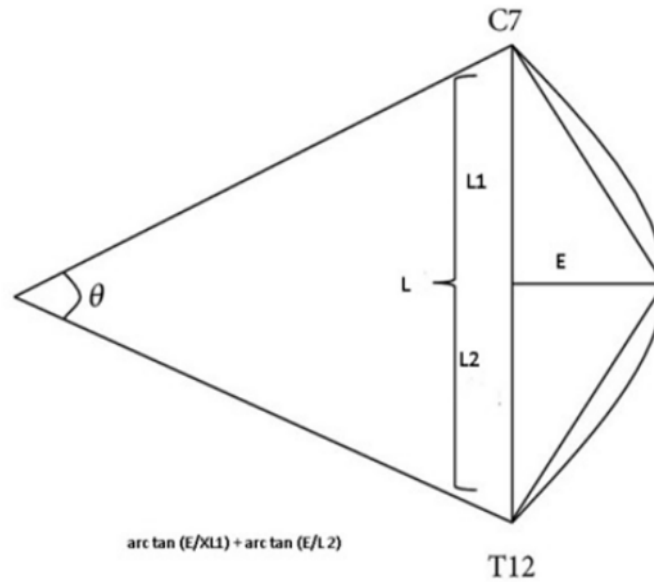


Fig. 2. Flexicurve Calculation for the Index of Kyphosis (IK):  $IK = TW/TL \times 100$ .



Mathematical formula showing how kyphosis angle is calculated (C7 represents 7. cervical vertebrae, T12 represents 12. Thoracic vertebrae,  $\theta$  represents the thoracic kyphosis angle, A represents the most protruding point (Apex) of the thoracic part of the spine).

## Findings

Table 1. Distribution of Scale Scores

Dependent Variable	Item Number	N	Mean	Skewness	Kurtosis	Cronbach Alpha
Video Game Addiction Scale for Children (VASC)	21	87	2.49	,121	-,561	0.853
Kyphosis Index	-	87	7,23	-,630	,227	-

When Table 1 was examined, it was seen that the total mean score of the participants from the Video Game Addiction Scale for Children was 2.49. Cronbach Alpha reliability coefficient was

calculated as 0.853. When the skewness and kurtosis values of the sample group were examined, it was seen that the data were suitable for normal distribution. It was accepted within the range of +1.5/-1.5.

Table 2. Demographic Characteristics of the Participants

Variables		N	%
Gender	Girl	47	54.0
	Boy	40	46.0
	Total	87	100,0
Kyphosis Index	No Posture Disorder	30	34.5
	Posture Disorder	57	65.5
	Total	87	100,0
Participation in Recreational Activities	Yes	69	79.3
	No	18	20.7
	Total	87	100,0
Daily Digital Game Play Time	0-1 hour	26	29.9
	2-3 hours	35	40.2
	4-5 hours	13	14.9
	6 hours and more	13	14.9
	Total	87	100.0

When Table 2 was analysed, it was determined that 54% of the children were girls, 65.5% of them had posture disorder according to the kyphosis index and 79.3% of them participated in recreational activities. When the daily digital game playing time was analysed, it was determined that 40.2% of the children played games for 2-3 hours.

Table 3. Comparison of Scale Scores by Gender

Dependent variable	Gender	N	Mean	Standard Deviation	t	df	p
VASC	Girls	47	2.38	0,722	-1,566	85	.121
	Boys	40	2.62	0,670			
Kyphosis Index	Girls	47	6.69	6,69	-1,732	85	.087
	Boys	40	7.78	7,86			

In Table 3, it was determined that the scores of the VASC and the Kyphosis Index did not show a significant difference in terms of gender variable ( $p>0.05$ ).

Table 4. Comparison of the Scores Obtained from the Scales According to the Participants' Participation in Recreational Activities

Dependent variable	Participation in Recreational Activities	N	Mean	Standard Deviation	t	df	p
VASC	Yes	69	2.40	0,654	-2,449	85	.016
	No	18	2.84	0,795			

Kyphosis Index	Yes	69	7.05	3,053	-2,185	85	.303
	No	18	7.92	3,734			

In Table 4, participation in recreational activities of the participants showed a significant difference in terms of the total mean score of VASC ( $p=0.01<0.05$ ). It was determined that the kyphosis index did not show a significant difference ( $p>0.05$ ).

Table 5. Comparison of the Participants' Scores from the Scales According to Children's Posture Disorders and Evaluation of Dependency Scores

Dependent variable	Kyphosis Index	N	Mean	Standard Deviation	t	df	p
VASC	No Posture Disorder	30	2.60	0,69	1,046	85	.298
	Posture Disorder	57	2.43	0,71			

According to the results of the Independent Groups T Test in Table 5, the total mean scores of video game addiction of children did not show a significant difference according to the kyphosis index ( $p>0.05$ ).

Table 6. Regression Analysis Results for the Effect of Video Game Addiction on Kyphosis Index

Model	Std. Error	$\beta$	t	p
(Constant)	.189		13.397	.000
Kyphosis Index	.024	-.026	-.240	.811
$R^2=.001$ , $adj.R^2=-.011$				
$F=.057$ , $p=.811$				
Dependent Variable: Video Game Addiction Scale for Children				

Linear regression analysis was performed to determine the effect of video game addiction on the kyphosis index. As a result of the analysis, it was determined that video game addiction did not have a significant effect on the kyphosis index of children in this age category ( $\beta=-.026$ ,  $p>.811$ ).

Table 7. Anova Test Results Comparison of the Scale Scores of the Participants According to the Duration of Daily Digital Game Playing

Dependent variable	Digital Game Play Time	N	Mean	F	p	Difference Between Groups
VASC	1-) 0-1 hour	26	2.12	6.918	.000	1-3 1-4
	2-) 2-3 hours	35	2.44			
	3-) 4-5 hours	13	2.89			
	4-) 6 hours and more	13	2.96			
Kyphosis Index	1-) 0-1 hour	26	3.18	1.003	.396	-



2-) 2-3 hours	35	3.29
3-) 4-5 hours	13	1.94
4-) 6 hours and more	13	3.18

In Table 7, the ANOVA results related to the daily digital game play time variable showed a significant difference in terms of the VASC. ( $p < 0.05$ ) When analysed in terms of the Kyphosis Index, it was determined that there was no significant difference ( $p > 0.05$ )

## Discussion and Conclusion

Nowadays, interest in video games has increased even more and this situation has brought along an uncontrolled interest at a level that can cause addiction. Video games, which are expressed as dangerous as substance-related addictions, constitute a major risk factor for these age groups because they can more easily influence children and adolescents (Keskin & Aral, 2021). In this part of the study, which was conducted to determine the effect of video game addiction on spinal health in children, dependent and independent variables were discussed with examples in the literature. Video game addiction and kyphosis index of children were analysed in terms of gender variable and it was concluded that there was no significant difference. The study conducted by Taş et al. (2014) concluded that game addiction did not show a significant difference in gender variable. In another study conducted by Dinçer and Kolan (2020) in secondary school students, it was concluded that there was a significant difference according to the gender variable. There are studies in the literature with different results according to gender variable. The studies observed that mostly boys were under the risk factor for video game disorder (Andreassen et al., 2016; Durkee et al., 2012). In the study conducted by Çelik et al. (2017), posture disorders were examined in terms of gender variable and concluded that there was no significant difference. A similar result was obtained by Kılıç et al. (2021) according to gender variable. Supporting the results obtained from the current study, it was determined that the thoracic kyphosis angle of boys was higher than that of girls.

Compared to the variable of children's participation in recreational activities, video game addiction levels showed a significant difference, while the kyphosis index did not show a significant difference. Children who did not participate in recreational activities had higher addiction scores and higher kyphosis levels. Nowadays, which leisure activities individuals are interested in is a matter of concern. Especially video games carry the risk of addiction when examined by nature (Jensen & Bengtsson, 2023). Video games, which have become a popular leisure activity, bring various problems as a result of uncontrolled and excessive interest (Wittek et al., 2016). It is known that children show problematic game-playing behaviours to fill the gap they encounter in their leisure time (Zhu et al., 2021). Individuals place passive participation at the centre of leisure instead

of recreational activities in which they can actively participate, and this is becoming an increasingly common preference (Brooks et al., 2016). The impact of industrial changes on society has led to a passive lifestyle not only in adults but also in children and young people (Hricková & Junger, 2016). Spinal deformities that may occur especially in children occur as a result of acquired improper behaviours. Lack of physical activity, passive lifestyle and bad habits acquired in childhood lead to an increase in deformities (Zećirović et al., 2021). Awareness studies on this issue should be created in children and recreational activity participation should be supported with leisure time education. Yaşın and Usgu (2021) stated that regular exercise practices were effective in reducing postural kyphosis, especially in adolescents. In the study conducted by Elpeze (2022), exercise practices were performed in adolescents for 12 weeks. It was found that these applications led to a decrease in the degree of kyphosis. In the study, it was determined that corrective and thoracic region-oriented exercises performed for thoracic kyphosis increased the quality of life. It is known that periodic corrective exercise practices significantly affect the kyphosis degrees of individuals in a positive direction. These practices have ameliorative effects on abnormal posture (Moon et al., 2014). To improve the alignment and balance in the spine curve, it is recommended to perform combined exercise practices regularly (Park et al., 2022). Physical exercise practices to be performed in leisure time will be important in reducing postural disorders (Sirajudeen et al., 2022).

In the present study, it was observed that there was no significant difference when posture disorders of children were evaluated according to video game addiction. In the study conducted by Bomen and Kulkarni (2022), it was found that there was no significant difference between addiction and forward head posture, long shoulder and thoracic kyphosis, which supported the current findings. When the literature was examined, there were also studies emphasising that posture disorders occur when the average usage of individuals increases. In excessive use, individuals cannot maintain proper posture and posture disorders occur. These disorders lead to the formation of thoracic kyphosis. Karacan et al. (2021) examined internet addiction and thoracic kyphosis angle and reported that excessive use had negative effects on posture. Betsch et al. (2021) found that excessive use caused significant changes in the thoracic and lumbar spine. In the study conducted by Çankaya et al. (2024) on adolescents, it was determined that as the addiction level of individuals increased, their postural awareness increased.

When the results obtained according to children's daily digital game playing time variable were analysed, it was determined that video game addiction showed a significant difference, but there was no significant difference in the kyphosis index. Moreover, the effect of video game addiction on the kyphosis index was examined and it was concluded that video game addiction did not have a significant effect on the kyphosis index of children in the age category in the study. In

the study conducted by Çankaya et al. (2024) on adolescents, it was determined that the level of addiction increased as the duration of usage increased. Mitova et al. (2014) evaluated spinal disorders as a result of reasons such as spending time in front of the computer for a long time and decreased physical activities as one of the most common disorders that occur in childhood and adolescence. Long-term use causes postural changes in the cervical region (Fontenele et al., 2023). Long desk hours, poor posture and inactivity can cause degenerative changes in people (Migliore & McGee, 2021). With modern technology, new devices in daily life have gained an important place in children's lives. Children trying to adapt to modern devices spend long periods with atypical postures and this causes a damaging effect on children's upper body posture (Shimaa & Abdelazeim, 2022). To prevent this situation, children's leisure awareness and postural awareness should be increased. Parental approaches should be evaluated and necessary awareness programmes should be implemented, including the families of the children.

### **Ethics Committee Permission Information**

The ethics committee permission for this research was obtained by the Yalova University Ethics Committee with the decision numbered 2024/99 dated 16.05.2024.

### **Conflict of Interest Statement**

The authors have no conflict of interest declaration regarding the research.

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