



**Araştırma Makalesi • Research Article**

**Investigation of the Effects of 12 Week Aerobic and Fitness Workouts on Individuals Diagnosed with Scoliosis: A Case Study**

**12 Haftalık Aerobik ve Fitness Çalışmalarının Skolyoz Teşhisi Konmuş Bireylere Etkisinin İncelenmesi: Bir Vaka Çalışması**

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**Abstract:** The study was conducted to examine the effects of aerobic and fitness exercises on scoliosis. A 19-year-old male patient, 1.65 cm tall and weighing 57 kg, with idiopathic S scoliosis was included in the study. The ethics committee report dated 01.07.2021-15974 was received from Muş Alparslan University Ethics Committee. Aerobic and fitness exercises were performed 4 days a week, one day apart, and warm-up exercises were applied before and after. Aerobic and fitness movements such as bench row, reverse butterfly, face pull and low row were included in the exercise program. The exercises were carried out by academics who are experts in their field, under the supervision of an orthopedic doctor. X-rays were used to evaluate the effect of the exercise program on scoliosis. X-rays were taken before and immediately after the exercise program. The orthopedic doctor reported that the scoliosis degree of the patient included in the study was 22.5 degrees before the exercise program, but after the 12-week exercise program, the degree decreased to 21.6 degrees and an improvement of 0.9 degrees was achieved. It was concluded that aerobic and fitness exercises applied specifically to the patient gave positive results in patients diagnosed with scoliosis.

**Keywords:** Scoliosis, Aerobic exercise, Fitness, Physical disability, Medical imaging.

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**Öz:** Çalışma, aerobik ve fitness egzersizlerinin skolyoz üzerine etkisinin incelenmesi amacıyla yapıldı. Çalışmaya idiyoapatik ve S skolyoza sahip 19 yaşında 1,65 cm boyunda ve 57 kg ağırlığında erkek hasta dahil edildi. Muş Alparslan Üniversitesi Etik Kurulu'ndan 01.07.2021-15974 tarih ve sayılı etik kurul raporu alındı. Aerobik ve fitness egzersizleri birer gün ara ile haftada 4 gün olacak şekilde uygulandı. Egzersizlerin öncesinde ve sonrasında; ısınma, açma-germe hareketleri uygulandı. Egzersiz programında bench row, reverse butterfly, face pull, low row gibi fitness hareketlerine yer verildi. Ayrıca; sol kol öne sağ bacak geriye açma, sağ kol öne sol bacak geriye açma, emekleme pozisyonunda sağa doğru sıkıştırma ve düzelme, emekleme pozisyonunda duvardan antrenman lastiği çekme gibi aerobik egzersizler de uygulandı. Egzersizler; alanında uzman akademisyenler tarafından ortopedi doktoru kontrolünde yürütüldü. Egzersiz programının skolyoz üzerindeki etkisinin takip edilebilmesi ve değerlendirilebilmesi için tıbbi görüntüleme tekniklerinden faydalandı. Röntgenler hastane ortamında ve ortopedi doktoru kontrolünde, egzersiz programı uygulanmadan hemen önce ve program tamamlanır tamamlanmaz çekildi. Ortopedi doktoru, araştırmaya dahil edilen hastanın egzersiz programı öncesi skolyoz derecesinin 22.5 olduğunu, 12 haftalık egzersiz programı sonrası skolyoz derecesinin 21.6 dereceye düştüğünü ve 0.9 derecelik bir düzelme sağlandığını raporladı. Hastaya özgü spesifik olarak uygulanan aerobik ve fitness egzersizlerinin skolyoz teşhisi konmuş hastalarda olumlu sonuçlar verdiği sonucuna ulaşıldı.

**Anahtar Kelimeler:** Skolyoz, Aerobik egzersiz, Fitness, Bedensel yetersizlik, Tıbbi görüntüleme.

## Introduction

The vertebral column, a defining feature of healthy humans, contains a complex sensory and reactive system that integrates every aspect of movement and function (Haves & Brien, 2006). Scoliosis is defined as a disorder characterized by one or more lateral curvatures of the spine, which can be accompanied by rotation of the vertebral bodies in the frontal plane (Vutan et al., 2016). Idiopathic scoliosis is a three-dimensional deformity of the spine and trunk and commonly affects adolescents. The probability of occurrence of adolescent idiopathic scoliosis is between 2-3%. One in six patients requires treatment, and 25% of patients may need surgical intervention in the future (Negrini et al., 2014).

Scoliosis can develop at any age, but clinically it tends to be more pronounced during periods of rapid physical growth. Its incidence is one-third higher in women than in men. While the ratio of men and women is approximately 2/1 at a Cobb angle greater than 10 degrees, it increases to 10/1 above 30 degrees (Carrasco et al., 2014; Koumbourlis, 2006).

While scoliosis causes serious health problems throughout the body, the respiratory system is one of the most affected systems. Chronic respiratory failure occurs due to deterioration in the respiratory system. Respiratory disorders such as impaired respiratory muscle functions, restrictive and asymmetric movement of the chest wall, and abnormal ventilation patterns can cause a decrease in exercise capacity even in patients with mild scoliosis (Negrini et al., 2014; Beaton et al., 2003).

One of the most negative factors for patients is the socio-psychological effects of scoliosis on these individuals. These effects negatively affect the individual's quality of life. In the studies conducted, information about how people evaluate the situations related to their diseases and treatments has started to gain importance (Asher et al., 2003; Weiss et al., 2006). Decreased life satisfaction and self-esteem in individuals with scoliosis are often associated with physical impairments. This can cause serious emotional and psychological effects; It can lead to deterioration in physical condition and perception of quality of life (Vital et al., 2001; Zhang et al., 2011).

The treatment options for idiopathic patients with scoliosis are primarily physiotherapy and specific corrective exercises, ensuring correct posture in daily life activities, use of corsets, manipulative approaches, and surgery is the last treatment method (Reichel & Schanz, 2003; Weiss et al., 2006). Specific corrective exercise methods for idiopathic scoliosis have been used for a long time. Corrective exercise methods used in the treatment of scoliosis include postural exercises, stretching exercises, muscle strengthening exercises, breathing exercises and exercises to correct muscle strength imbalance (Asher et al., 2000). These exercises are often used to stimulate stability and symmetrical development of the trunk in order to stretch shortened muscles and strengthen trunk muscles (Kim et al., 2015; Ovadia, 2013).

In addition to all these, the positive effects of specific corrective exercises used in the treatment of scoliosis are discussed in detail in the “International Society on Scoliosis Orthopedic and Rehabilitation Treatment” (Negrini et al., 2014) guideline, which is generally valid worldwide (Freidel et al., 2002). In addition, "Lyon approach" in France, "Schroth method" in Germany and Spain, "SEAS (The Scientific Exercise Approach to Scoliosis)" in Italy, "DOPOMED" and "DOPOMED" in Poland. Corrective exercises called 'FITS (Functional Individual Therapy of Scoliosis)' and in the United Kingdom, 'Side Shift (Functional Individual Therapy of Scoliosis)' are used effectively in patients with scoliosis (Dong et al., 2024; Berdishevsky et al., 2016).

When the literature is examined, it is seen that scientific studies examining the positive effects of regular and special corrective exercise applications on individuals with scoliosis are limited. This research was planned to examine whether a 12-week individual corrective exercise program contributes positively to the spine health of individuals with scoliosis. It is also thought that the findings obtained from the study will be a reference for scientists who will conduct research on the subject and will contribute to the field.

## **Method**

A 19-year-old male adolescent, 165 cm tall and weighing 57 kg, with idiopathic and S scoliosis was included in the study. Before the study, an ethics committee report dated 01/07/2021-15974 was received from Muş Alparslan University Ethics Committee.


A 12-week specific corrective exercise program has been prepared for the patient by a specialist physiotherapist and expert academics in the field, under the supervision of an orthopedic doctor. The patient was prepared for the program by applying general warm-up and stretching movements before and after all exercise applications.

Fitness movements such as bench row, reverse butterfly, face pull and low row were included in the exercise program. In addition, aerobic exercises such as opening the left arm forward and the right leg back, opening the right arm forward and the left leg backward, squeezing to the right in the crawling position, and pulling the training tire from the wall in the crawling position were also performed. Applications were made in the opposite direction to the area where the patient's scoliosis was located. The applications were carried out with the help of a specialist physiotherapist, academics who are experts in the field of exercise and sports for the disabled, and an expert fitness instructor. Aerobic and fitness exercises were performed for 40 minutes a day, 4 days a week, with one day of rest between them.

Medical imaging techniques were used to examine and evaluate the effect of corrective exercise on scoliosis. X-rays were taken in a hospital environment and under the control of an orthopedic doctor, just before the exercise program was implemented and as soon as the program was completed.

## **Case Report**

A 19-year-old male adolescent, 165 cm tall and weighing 57 kg, applied to the orthopedic clinic of a private hospital in Malatya due to a spine disorder. After the medical examination of the specialist orthopedic doctor at the hospital, the patient was diagnosed with scoliosis. The orthopedic doctor used medical imaging during the examination process. Additionally, the Cobb angle method was used to determine the degree of scoliosis during the examination process (Negrini et al., 2014). After the general examination, the doctor recommended 12 weeks of corrective exercise to the patient before the surgery for first intervention, and the patient was started to be worked on.



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08.11.2021

Hasta Adı: CANBERK  
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**İLGİLİ MAKAMA**

1018 TC. numaralı CANBERK HÜ isimli hastaya daha önce GÖZDE HASTANESİ ortopedi kliniğimizde skolyoz teşhisi konulmuştur. Düzeltici tedavi olarak 12 haftalık aerobik ve fitness egzersizleri önerilmiş ve egzersiz programının tamamlanması sonucu skolyozun 22,5 dereceden 21,6 dereceye düştüğü ve 0,9 derecelik bir düzelme olduğu tarafımda gözlemlenmiştir.

Durum bildirir hekim raporudur.

ÖZEL GÖZDE  
Op.Dr.Caner  
Ortopedi ve Tr  
Dok. Tes

**A Physician's Report Informing The Situation**

**Figures Belonging to the Patient**

**Figure 1.**



**15.08.2021, X-ray taken before the study**

**Figure 2.**



**08.11.2021, X-ray taken after the study**

## **Discussion and Conclusion**

The study aimed to examine the effects of aerobic and fitness exercises applied within a regular program on scoliosis. The study concluded that the corrective exercise program regularly applied by experts within the scope of aerobic and fitness exercises is effective in reducing the degree of scoliosis.

Scoliosis is a 3-dimensional rotational disorder found in the sagittal, coronal and transverse planes of the spine. In 80% of patients, the exact cause is unknown and therefore it is called idiopathic scoliosis. The most common type is adolescent idiopathic scoliosis. Its prevalence in Turkey is around 0.2% to 1% (Ovadia, 2013; Sevimli et al., 2018; Yilmaz, 2014). Although the etiology of scoliosis is unclear, it may be neurological, bone, trauma, joint and connective tissue origin. In scoliosis, the cause of postural changes in the body is the rotation and angulation of the spine. Although the abdominal muscles, waist and back extensors are most negatively affected by this situation, serious deformities may also occur in the musculoskeletal system (Greiner, 2002; Cansın, 2023; Kandemir et al., 2024).

All these disorders seriously reduce the patient's quality of life. Physicians can perform surgical intervention in the last stage of scoliosis. However, they often recommend corrective exercise practices as a preliminary stage (Gámiz et al., 2022; Laita et al., 2018). If the degree of scoliosis is advanced, positive results cannot be obtained from exercise practices. However, if the degree of scoliosis is mild, practices such as aerobic and fitness exercises can be greatly benefited from (Vitale et al., 2001; Hawes., 2006).

Aerobic and fitness programs for individuals with scoliosis are more economical and feasible than surgical interventions. In this respect, it is among the alternative treatment options used in the first intervention when scoliosis is recognized (Sperandio et al., 2014; Borysov & Borysov, 2012).

It was observed that the aerobic and fitness training we applied in our study had a corrective effect on scoliosis. When the literature is examined, there are many scientific studies that support the results obtained from our study (Sperandio et al., 2014; Romano et al., 2024; Park & So., 2022). For example, it has been reported that similar results were obtained in the exercise study conducted by Gou et al. (2021) on individuals with scoliosis. Similarly, Xavier et al. (2014) concluded that aerobic and resistance exercise played an important role in alleviating scoliosis and improving breathing in individuals with scoliosis. In another scientific study, the beneficial effects of aerobic training were examined in adolescent patients with idiopathic scoliosis, and as a result of the study, it was determined that there was a significant improvement in the spinal system of the patients (Bas et al. 2011).

When the results obtained from our study and the literature on the subject are examined, it is concluded that aerobic and fitness exercises applied by specialist physicians, physiotherapists and exercise specialists have a positive effect on the recovery of scoliosis (Dong et al., 2024; Alves & Avanzzi 2016; Kim et al., 2015; Berdishevsky et al., 2016).

## **Disclosure Statements**

1. Contribution rate statement of researchers: First author % 30, Second author % 25, Third author % 15, Fourth author % 15, Fifth author % 15
2. No potential conflict of interest was reported by the authors.

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