

# **EFFECT OF PILATES-BASED EXERCISES APPLIED WITH HYBRID TEEREHABILITATION METHOD ON RESPIRATORY MUSCLE STRENGTH, FUNCTIONAL CAPACITY AND BALANCE IN ADOLESCENT IDIOPATIC SCOLIOSIS**

## **SUMMARY**

Scoliosis is a general term for all heterogeneous conditions involving changes in the position and shape of the spine, thorax, and trunk. Adolescent Idiopathic Scoliosis (AIS) is defined as a deformity characterized by abnormal spinal curve formation and rotation of the vertebrae in the coronal plane in a healthy individual aged 10 years and older, without any known cause. A spinal curve of more than 10° is seen when measured by the Cobb method. Deformity in patients with AIS can cause problems in many primary and secondary parameters such as respiratory functions, respiratory muscle strength, functional capacity, balance, quality of life, peripheral muscle strength and cosmetic perception. Conservative treatment in AIS includes observation, exercise training and orthotic approaches. The main goals of this treatment are to stop the progression of the curve, to reduce it if possible, to prevent the problems caused by AIS and to improve the existing problems. There are many different exercise training methods used in the treatment of patients with AIS. Pilates-based exercise training is one of these methods.

This study aimed to investigate the effect of pilates-based exercise training applied with hybrid telerehabilitation method on respiratory function, respiratory muscle strength, functional capacity and balance in patients with AIS, including postural corrections and breathing pattern determined by curve type-localization. Within the scope of the study, 32 patients diagnosed with AIS, aged 10-18 years, were randomized and divided into education and control groups. Cobb angle measurement, trunk rotation angle measurement, flexibility, respiratory function test, respiratory muscle strength, functional capacity, postural stability-balance, core muscle endurance, peripheral muscle strength, quality of life and perception of cosmetic deformity were evaluated in all patients. Training and control groups participated in supervised sessions once a week during the first 2 weeks of exercise training processes. During these sessions, the patients were informed about the basics of pilates, the postural corrections determined according to the curve type and localization, and the respiratory principles. For the next 10 weeks, the training group took synchronous online sessions with a physiotherapist 3 days a week, and the exercises were continued at home for 4 days. The control group, on the other hand, continued the same exercises 7 days a week, home-based for 10 weeks. At the end of 12 weeks, all assessments were repeated. SPSS v.26 program was used for data analysis and the level of significance was accepted as  $p < 0.05$  for all analyzes.

At the end of 12 weeks, statistically significant improvements were observed in Cobb angle, trunk rotation angle, flexibility tests, FEV1 and PEF values, MIP and MEP values, ISWT distance, ESWT walking level, all stability limits test parameters except completion time, core muscle endurance, peripheral muscle strength, all quality-of-life scores except mental health parameter, cosmetic deformity perception score in the training group ( $p < 0.05$ ). In the control group, after the treatment compared to the pre-treatment; statistically significant improvements were found in trunk rotation angle, MIP and MEP values, ISWT distance, some parameters of stability limits test, peripheral muscle strength values except right M. Biceps strength parameter, and some parameters of quality of life ( $p < 0.05$ ). When the training and control groups were compared, in the training group, Cobb angle, lateral bending tests, PEF value, MIP and MEP values, ESWT walking level, general score, left and forward/right parameters of the stability limits test, core muscle endurance, left M. Quadriceps strength. and cosmetic deformity perception values were found to be significantly higher ( $p < 0.05$ ).

Considering the literature and the results of our study, it was concluded that the application of pilates-based exercises with the hybrid telerehabilitation method can provide additional developments, that these exercises can be applied with home-based or telerehabilitation methods in patients with AIS and can be added to the routine physiotherapy program.

**Keywords:** adolescent idiopathic scoliosis, pilates exercises, telerehabilitation, pulmonary function test, respiratory muscle strength, functional capacity, balance, postural stability, core muscle endurance, peripheral muscle strength, perception of cosmetic deformity, quality of life