

DOI:10.2478/tperj-2020-0012

Back pain secondary to idiopathic scoliosis in adolescents

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Abstract

Introduction: Back pain in adolescents has become an increasingly common cause of presenting oneself for examination at the medical recovery service for diagnosis and appropriate therapeutic conduct, sometimes being the first and only symptom present. *Purpose:* We conducted a retrospective study that took into consideration the quantification of the number of adolescents suffering from back pain secondary to idiopathic scoliotic deviation for a 3-year period, and the identification of favoring/determining factors of this pathology, as well as highlighting the importance of the rehabilitation treatment applied to them. *Methods:* 67 adolescents with back pain secondary to idiopathic scoliosis participated in medical rehabilitation programs of 10 daily sessions, every 6 months in the Medical Rehabilitation Department of the "Louis Țurcanu" Emergency Clinical Hospital for Children in Timișoara for a period of 12 months (from 02.2019 to 01.2020) and daily at home - individualized/adapted exercise programme. *Results:* We emphasize the importance of the medical rehabilitation team in the management of back pain secondary to idiopathic scoliosis in adolescents, and the identification and fight against the factors that favor it.

Conclusions: Physical exercise must be performed on the long-term; it must be started as soon as the condition is diagnosed, with periodic evaluations and its periodic adjustment according to results and disease evolution.

Key words: back pain, idiopathic scoliosis, adolescents, rehabilitation

Rezumat

Introducere: Durerea de spate la adolescent a devenit o cauză tot mai frecventă de prezentare la consultație în cadrul serviciului de recuperare medicală, pentru diagnostic și conduită terapeutică corespunzătoare de specialitate, uneori fiind primul și singurul simptom prezent. *Scop:* Am efectuat un studiu retrospectiv ce a avut în vedere cuantificarea numărului de adolescenți care suferă de durere de spate secundară unei deviații scolioțice idiopatice, într-o perioadă de 3 ani și identificarea factorilor favorizanți/determinanți ai acelei patologii, precum și evidențierea importanței tratamentului de recuperare medicală aplicat acestora. *Metode:* 67 adolescenți cu durere de spate secundară scoliozei idiopatice, au urmat programe de reabilitare medicală 10 ședințe zilnic, la 6 luni în cadrul Compartimentului de Recuperare al Spitalului Clinic de Urgență pentru Copii „Louis Țurcanu” Timișoara pe o perioadă de 12 luni (02.2019-01.2020) și zilnic la domiciliu program individualizat/adaptat de kinetoterapie. *Rezultate:* Subliniem importanța echipei de reabilitare medicală în managementul algiiilor vertebrale secundare scoliozei adolescenților, identificarea factorilor favorizanți și combaterea acestora. *Concluzii:* Kinetoterapia trebuie să fie una de lungă durată, începută imediat ce afecțiunea este diagnosticată, cu evaluări periodice și ajustarea periodică a acesteia în funcție de rezultate și evoluție.

Cuvinte cheie: algii vertebrale, scolioză idiopatică, adolescenți, recuperare

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Introduction

Back pain in adolescents has become an increasingly common cause of presenting oneself for consultation in the medical recovery service for diagnosis and appropriate specialized therapeutic approach, sometimes being the first and only symptom present.

Adolescent idiopathic scoliosis (AIS) affects between 0.47% and 11.1% of the world's population [1], accounting for 80–90% of all types of scoliosis in this population category [2] and is more common in girls [3].

The purpose of our study was to quantify the number of adolescents suffering from back pain secondary to a scoliotic deviation of the spine over a 3-year period. Another objective was to identify the favoring/determining factors of back pain in adolescents with idiopathic scoliosis, and to highlight the importance of the specific medical rehabilitation treatment applied over a period of 12 months, as well as of the exercise programs performed daily at home by this population category.

Material and methods

We conducted a retrospective study for a period of 3 years (between February 2017 and January 2020) at the Medical Rehabilitation Department of the “Louis Țurcanu” Emergency Clinical Hospital for Children in Timișoara, which aimed to quantify the number of adolescents that suffer from back pain secondary to idiopathic scoliosis, and who addressed to our department for consultation, diagnostic and specialized treatment.

In our research we also included a prospective study carried out for a period of 12 months (between February 2019 and January 2020) at the Medical Rehabilitation Department of the “Louis Țurcanu” Emergency Clinical Hospital for Children in Timișoara. There, a number of 67 adolescents with back pain secondary to idiopathic scoliosis participated in the medical rehabilitation programs, being selected out of the 207 patients identified and included in the retrospective study aiming to record the effects of medical rehabilitation in reducing back pain in adolescents with this pathology.

For all 207 patients, the following demographic and clinical characteristics were collected: age, gender,

environment, location, number and degree of curve/curves.

The 67 patients that were included in the prospective study participated in a medical rehabilitation programme at the Medical Rehabilitation Department of the “Louis Țurcanu” Emergency Clinical Hospital for Children in Timișoara, with 10 daily sessions every 6 months (3 times: initially, after 6 months, after 12 months), consisting of individualized treatment schemes according to age, type, and location of scoliosis, intensity and nature of pain. As appropriate, there were included: special hydrothermal therapy techniques, electrotherapy, manual massage, and physical therapy. Affirmatively, the patients also executed at home, during the period between the sessions, an adapted daily exercise programme, of approximately 50 minutes/day, for 12 months.

The rehabilitation objectives depended on the type of scoliosis (mild, moderate, and severe), but also on the location of the curve, in order to decrease/prevent pain, correct posture and scoliotic deviation, re-educate muscles and respiration, but also in terms of measures related to back care and orthopedic hygiene, as well as the correct learning of adapted, individualized exercises to be performed daily at home.

Upon inclusion in the rehabilitation programme, adolescents were clinically evaluated and answered questions related to their general health, emotional status, or the favoring/precipitating factors of back pain, but also in terms of pain intensity (using the visual analogue scale - VAS for pain assessment). The patients also underwent X-rays of the spine (front and profile incidence) and the location of the scoliotic curve was identified; the Cobb angle was measured and the position of the vertebral bodies was assessed, with/without the presence of vertebral rotation.

Results

During the 3 years, the retrospective study recorded a number of 207 adolescents with idiopathic scoliosis. 67% of cases came for the first time to be examined in the medical rehabilitation department, for diagnosis and treatment, presenting back pain as the only symptom.

The age of adolescents varied from 10 to 18 years old; 50.2% of them were part of the group of 13 to

15 years, the girls being numerically superior (67.1%). The demographic characteristics of the patients are presented in Table I.

Table I. Demographic characteristics of patients

Variables	Number of patients
Gender	
Girls (%)	139 (67.1%)
Boys (%)	68 (32.9%)
Environment	
Urban	130 (62.8%)
Rural	77 (37.2%)
Age group	
10-12 years	30 (14.5%)
13-15 years	104 (50.2%)
16-18 years	73 (35.3%)

Data related to the type of scoliosis, location of the scoliotic curve and number of scoliotic curves are presented in Table II.

Table II. Characteristics of idiopathic scoliosis

Variables	Number of cases
Type of scoliosis	
Mild scoliosis (%)	79 (38.1%)
Moderate scoliosis (%)	68 (32.8%)
Severe scoliosis (%)	60 (29.1%)
Location of scoliotic curve	
Thoracic	15 (7.2%)
Lumbar	62 (30%)
Thoracolumbar	130 (62.8%)

Of the 207 adolescents identified with back pain and included in the statistical analysis of the retrospective study, most of them had both thoracic and lumbar scoliosis (62.8%), mild to moderate degree, in terms of severity based on the value of the Cobb angle.

The intensity of the pain assessed by the patient himself/herself using the VAS scale decreased substantially with the initiation of the rehabilitation treatment in the case of the 67 adolescents included in the prospective study, from an initial mean value of 6.3 points to a final mean value of 0.8 points. Moreover, we observed that the pain threshold was higher in patients suffering from scoliotic deviation with a double location (thoracic and lumbar).

With regard to the evaluation of the general health condition due to pain and discomfort, initially, in 92% of cases, their daily/sport/recreational activity was affected largely, but after one year of sustained

therapeutic behavior, 12% state that they are still affected to a small extent, but without being hindered in carrying out their activities.

Due to the pain felt in the back, restless sleep and limitation in carrying out age-specific activities, initially, 67% of those evaluated felt mentally affected, compared to 4% at the end of the 12 months.

Regarding the identification of factors that favor/precipitate/determine back pain in adolescents with idiopathic scoliosis, when questioned about lifestyle and back care measures, most subjects answered that they had an inappropriate position when sitting at their desk at school, when they studied or did their homework. 54% confirmed that they often do their homework in bed; they use their phone, tablet, and sit at the computer for a long time, compared to the time spent outdoors. 87% spend more than 6 hours a day at the desk and only 12% spend more than 2 hours a day outdoors.

In relation to the school bag, 78% stated that it weighs more than 10% of their body weight and 46% carry it improperly on one shoulder. 18% of the 67 monitored adolescents do not participate in physical education classes at school, as they believe that sports will further affect their deviation.

Discussions

Rehabilitation treatment and a sustained long-term physical exercise programme have an important role in fighting pain in adolescents with back pain secondary to idiopathic scoliosis. The early identification and neutralization of the factors determining/favoring the condition are decisive in the evolution of this type of pathology that is becoming more and more common among the population, from an early age.

The study performed by Yunus Atici and collaborators (2017) conducted on 40 adolescents with back pain due to idiopathic scoliosis, divided into two homogeneous groups (one group performed physical exercise at home for 1 month and the other group did not have any physical therapy) has shown - as in our observations - an obvious positive effect of sustained physical exercise performed at home, pain relief and increased quality of life [4].

Early identification of idiopathic scoliotic deviation can prevent back pain in adolescents and future adults. Early therapeutic conduct and combat of determining factors have an important role in the prophylaxis of secondary diseases that may appear, as Weinstein SL (2019) points out in an article where he emphasizes that untreated scoliosis can lead to increased back pain and lung disease. He also states that a substantial deformity has an impact on the cosmetic appearance, aspects that are not to be neglected at this age [5].

In 2019, Arnold Y L Wong and collaborators conducted a study on a number of 1097 adolescents with idiopathic scoliosis, with a Cobb angle of >10 degrees. The age of the subjects was between 10 and 18 years, and they assessed the level of physical activity, the intensity of pain back using the VAS scale, but also its location and duration, as well as the level of daytime sleepiness, night-time insomnia, anxiety, and depression. They concluded that biopsychosocial factors are associated with the presence and severity of back pain in the AIS population, which could play a key role in the long term management of this type of pathology [6].

In our study, we observed a high addressability of adolescents with back pain due to scoliotic deviation to the medical rehabilitation department, as well as a very good multidisciplinary collaboration, a complex team consisting of

rehabilitation specialist, pediatrician, pediatric cardiologist, pediatric orthopedist, physical therapist, psychologist, being the key to success in treating these patients.

Conclusions

Back pain in adolescents due to idiopathic scoliosis is a topical issue in the rehabilitation medicine. Many times it is not timely diagnosed, it is incorrectly treated, or there is no treatment at all. It is an increasingly common pathology among the population, by perpetuating the determining or favoring factors. The impact of modern lifestyle is highly felt in this category of population. The role of the medical rehabilitation treatment is essential; a multidisciplinary team and a long-term approach and monitoring are recommended. The short and long-term effects generated by this pathology are not only medical but also socio-economical; the costs for treating possible secondary cardio-pulmonary, musculoskeletal, or psychological disorders are significant, also affecting the work capacity of the future adult.

The physical exercise programme should be sustained, performed daily for a long time until the growth is completed, and started as soon as the condition is diagnosed, with periodic evaluations and periodic adjustment according to results and disease evolution.

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