# *Recognition and evaluation of specific physiotherapeutic techniques in the conservative treatment of adolescents with idiopathic scoliosis. A literature review*

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## Abstract

*Introduction: Scoliosis is a lateral deformation of the spine in the shape of the letter "S" or "C", which can be located in different segments of it. Idiopathic scoliosis is the most common form encountered in 80% of scoliosis cases. Its nature or cause is not exactly known, so the classification is related to the age at which the deformity is detected.*

*Purpose: Recognition and application of some specific physiotherapeutic methods as part of the international treatment of scoliosis which physiotherapists should include in their practices to improve the conservative management of adolescents with idiopathic scoliosis in Albania.*

*Methodology: The study presents a theoretical-scientific overview, based on evidence. The search in the database PubMed, Google Scholar, Scopus, and guidelines of physiotherapy evidence included the period 2016-2022, using the keywords: 'scoliosis', 'physiotherapy', 'Schroth technique', and 'Lion method'. Articles that were not in the English language were excluded. The basis for data processing for this study was 8 articles, which met all the criteria.*

*Results: Specific physiotherapeutic methods proved to be very efficient in the latest studies by reducing the scoliotic deformity angle (Kob) by 5-10°, improving the posture with symmetry of the scapular and pelvic circumference, increasing the articular amplitudes of the back and improving the functions respiratory.*

*Conclusion: All physiotherapists in Albania should know these methods from a theoretical-practical point of view and include them in their professional practices to improve the conservative management of adolescents with idiopathic scoliosis.*

## Introduction

Scoliosis is a lateral deformation of the spine in the form of the letter "S" or "C", which can be located in different segments of it. This lateral bending of the spine is asymmetrical, and the affected vertebrae are rotated and fixed in an abnormal position relative to their anatomical placement. Scoliosis in its entirety can be divided into three large groups: functional scoliosis, structural scoliosis and idiopathic scoliosis.

Idiopathic scoliosis is the most common form encountered in 80% of scoliosis. Its exact nature or cause is not yet known, so the classification is related to the age at which the deformity is detected. On this basis, it is divided into: infantile idiopathic scoliosis - occurs in young children from birth to 3 years, juvenile

idiopathic scoliosis - the deformity develops in the age group of 3-10 years, adolescent idiopathic scoliosis - occurs from the age of 10 until the end of skeletal growth (1).

Early adolescence, especially between the ages of 11 and 14 years old is the ideal time to check the spine for scoliosis. Control and treatment at an early stage prevents the progression of the deformity and improve posture, the flexibility of movement, and muscle strength. In small scoliotic curves, no corrective manipulation is required. Treatment is recommended to start when the scoliotic deformity angle (Cobb) reaches 20-40°. (2)

This year, a reorganization of all the actors involved in the management of scoliosis has started. On February 8, 2022, the Ministry of Health in cooperation with the Ministry of Education, Sports and Youth launched a pilot project on the detection of abnormal curvatures of the spine that will require further evaluation and treatment by a healthcare specialist, based on the regulation of health service in schools. For adolescents diagnosed with scoliosis, school health personnel should offer support services at school such as physiotherapeutic exercise programs by specialists and counseling between adolescents and parents on these programs. (3)

The Scoliosis Research Society (SRS), founded in 1966, and the International Society of Orthopedic Rehabilitation and Scoliosis Treatment (SOSORT), founded in 2004, promote and encourage conservative medicine based on clinical evidence and provide education, guidelines, and consensus about treatment options for patients with scoliosis. SOSORT uses the term Specific Physiotherapy Exercises for scoliosis about all the schools represented within the organization. (4) The different methods of international treatment of scoliosis worldwide should be recognized and included in the clinical practices of physiotherapists in Albania to improve the management of scoliosis conservatively. These methods according to the historical order of development of each are:

The Lyon Method - The school of physiotherapy in Lyon is one of the oldest in France, which emphasizes physiotherapy as an integral part of scoliosis management in cases of spine stabilization with a brace or cast. The purpose of this technique is to improve joint amplitudes, neuromuscular control, coordination, trunk stabilization, muscle strength, and respiration. The scoliosis treatment protocol according to the Lion method depends on the Cobb angle and the patient's age. (5)

Schroth method- This method was developed by Katharina Schroth in 1920 in Germany and today counts about 3000 cases of scoliosis treated annually. Its objective, in addition to providing effective treatment for patients, is also the education and treatment of physiotherapists for intensive inpatient and outpatient rehabilitation. The method includes mobilization and flexibility of the column and muscle activation associated with inspiration and expiration. (6)

The scientific approach in Italy with exercises for scoliosis - founded in Italy in 1960 by Antonio Negrini and Nevia Verzini, trains and educates patients for active self-correction of posture through individualized programs.

The school of physiotherapy for scoliosis in Barcelona - a method founded by Elena Salva in 1968, is based on the original principles of correction according to Katharina Schroth aiming to improve posture through muscle activation and respiratory techniques.

The Doomed Method - founded in 1979 by Professor Krystyna Dobosiewic based on the mobilization of the primary curves of the column towards correct curvatures with interest in thoracic kyphosis and lumbar lordosis and Individual Functional Therapy founded in 2004 by Marianna Belek, which uses techniques of Proprioceptive Neuromuscular Facilitation and release myofascial for the correction of scoliotic deformity. Both methods are established in Poland.

Lateral displacement technique - founded in England in 1984 by Dr. Min Mehta, which emphasizes the fact of stabilization and correction of scoliosis with exercises with lateral displacement in the opposite direction of the deformity. (7)

## Objectives

We aim to knowledge and apply some specific physiotherapeutic methods as part of the international treatment of scoliosis that physiotherapists should include in their practices., as well as to improve the conservative management of adolescents with idiopathic scoliosis in Albania. More specifically:

1. Reduction of the scoliotic deformity angle (Kob)
2. Pain reduction
3. Improvement of articular amplitudes/flexibility of the vertebral column
4. Improvement of respiratory functions
5. Improving the asymmetry of the back
6. Postural correction

## Methodology

The study presents a theoretical-scientific overview, based on evidence. The search in the database PubMed, Google Scholar, Scopus, and guidelines of physiotherapy evidence included the period 2016-2022, using the keywords: 'scoliosis', 'physiotherapy', 'Schroth technique', and 'Lion method'. The selected articles had to all have in their focus the model of therapeutic management based

on the experiences of the seven largest schools of Physiotherapy specialized in the conservative treatment of scoliosis and the SOSORT guideline. Articles that were not in the English language were excluded. The basis for data processing for this study was 8 articles, which fulfilled all the above-mentioned criteria.

## Results

International scoliosis treatment methods worldwide are based on biomechanical and neurophysiological concepts of the organism and the results of their application are presented in the following table:

| Study | Author | Methods | Results | Duration |
|---|---|---|---|---|
| Effects of the Schroth exercise on idiopathic scoliosis- a meta-analysis (8) | Park JH et.al<br><br>2018<br>[PubMed] | Schroth Methods | Kob angle reduction 10°<br>Increased thoracic expansion<br>Improvement: –balance -column movement amplitudes | 3 months |
| Schroth physiotherapeutic scoliosis- specific exercises added to the standard of care lead to better Cobb angle outcomes in adolescents with idiopathic scoliosis(6) | Sanja Schreiber et.al<br><br>2016<br>[PubMed] | Schroth Methods | Reduction by 3.5° of the Kob angle<br>Improvements in pulmonary activity<br>Improve posture balance and rotation<br>of the trunk Balancing the pressure in the soles. | 6 months |
| The Schroth Method of treatment for a patient diagnosed with scoliosis: A case report (9) | Heather Watters et.al 2016<br>[Google Scholar] | Schroth Methods | Reduction of back pain from 8 to 3 according to VAS<br>Increase in muscle strength in m. latissimus dorsi, gluteal, hip abductors<br>Increased thoracic expansion<br>Improvement in daily life functions | 9 weeks |
| Physiotherapy scoliosis-specific exercises, a comprehensive review of seven major schools (7) | Hagrid Berdishevsky et.al<br><br>2018<br>[PubMed] | Schroth Methods Lion Doomed Ecc. | Reduction by 5-10° of the Kob angle<br>Improvement of pulmonary activity<br>Improving posture, balance, and trunk rotation<br>Reduction of back pain<br>Increase in muscle strength in m. latissimus dorsi, gluteal, hip abductors<br>Improvement in daily life functions | 3-6 months |

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|---|---|---|---|---|
| Review of scoliosis-specific exercises methods used to correct adolescent idiopathic scoliosis (10) | Joseph M.Day et.al 2019 [PuMed] | Schroth Methods Lion Doomed et | Reduction by 5-10° of the Kob angle<br>Improvement of pulmonary activity<br>Improving posture, balance, and trunk rotation<br>Reduction of back pain<br>Increase in muscle strength in m. latissimus dorsi, gluteal, hip abductors<br>Improvement in life functions daily | 3-6 months |
| "Brace technology" thematic series-The Lyon approach to the conservative treatment of scoliosis (11) | Jean de Mauroy et.al 2017 [Google Scholar] | Lion Methods | Combination of immobilization with orthosis and exercises<br>Reduction of Kob angle 5-10°<br>Self-correction and postural symmetry<br>Stability of the scapular and pelvic girdle<br>Decreased pressure in the intervertebral disc | 6 months |
| Scoliosis incidence and treatment methods (12) | Catalin Ionete et.al 2022 [PuMed] | Schroth Methods Lion Doomed Ecc. | Reduction of Kob angle 3-5°<br>Increased thoracic expansion<br>Improvement - balance - column movement amplitudes<br>Symmetrical posture | 3-6 months |
| 2016 SOSORT guidelines: Orthopaedic and rehabilitation treatment of idiopathic scoliosis during growth (13) | S.Negrini<br>2016 [PuMed] | Schroth Methods Lion Doomed Ecc. | Reduction of Kob angle 5-7°<br>Increased thoracic expansion<br>Improvement - balance - column movement amplitudes<br>Symmetrical posture | 3-6 months |

## Conclusion

Based on the recent studies specific physiotherapeutic methods, part of the international treatment of scoliosis, have proven to be very efficient in reducing the angle of scoliotic deformation (Kob) and to improve posture, articular amplitudes, and respiratory functions. These methods should be presented from a theoretical-practical point of view to all physiotherapists in Albania and included in their professional practices to improve the conservative management of adolescents with idiopathic scoliosis.

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