

Case report



A CASE REPORT FOR PHYSIOTHERAPY PROGRAM IN ADULTHOOD PATIENTS WITH IDIOPATHIC CERVICAL SCOLIOSIS – ANALYSIS AND RESULTS

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ABSTRACT

When scoliosis is inadequately treated during childhood and adolescence, it persists into adulthood, often contributing to more pronounced degeneration of the intervertebral discs and more severe pain. In this study, we investigated the effect of physiotherapy on neck pain and cervical spine mobility in adult patients with idiopathic cervical scoliosis.

Three adult patients diagnosed with adolescent idiopathic scoliosis were included, each presenting with three spinal curvatures. Clinical complaints were related to cervical scoliosis. Treatment comprised paraffin wax application, TENS therapy, and Schroth exercises. Outcome measures included anthropometric assessments and a visual analogue scale for pain. Patients were monitored for three months, with the initial 14 days dedicated to conventional physiotherapy and Schroth exercises, which were continued at home for the remaining 3-month period.

All patients reported a significant reduction in neck pain and improved cervical spine mobility, reflecting short-term benefits for both subjective and objective complaints associated with idiopathic cervical scoliosis in adulthood. Adding Schroth exercises to standard physiotherapy provides further advantages in improving posture among patients with idiopathic cervical scoliosis.

Keywords: Idiopathic scoliosis, Neck pain, Physiotherapy, Schroth exercise

INTRODUCTION

Today, scoliosis remains one of the most common spine deformities [1, 2]. It is a complex three-dimensional spine deformity, usually clinically defined as a lateral curvature of the spine greater than 10 degrees on a coronal plane. According to the Scoliosis Research Society, it is the most common spinal deformity, affecting around 2% to 3% of the pediatric population [3]. Around 80% of scoliosis cases are idiopathic scoliosis. Adult patients usually present with a higher number of complaints than the pediatric population.

From the point of view of biomechanics, the spine's curves absorb the load imposed during the movement of the vertebrae. When these physiological curvatures are changed, unfavorable biomechanical conditions arise for the spine, intervertebral discs, and the other adjacent structures. In individuals with scoliosis, all normal spinal curvatures are altered, causing a significant change in the load distribution on the intervertebral discs [4]. The cervical and lumbar regions bear the greatest load. Typically, intervertebral joints carry 3–25% of the axial load, but this load increases with the progression of arthrosis and narrowing of the intervertebral space. The load on these joints may reach 70% in patients with spondylosis. Intervertebral discs provide essential mobility for the spine, absorbing most of the load and redistributing it in all directions. Ligaments and muscles reinforce and protect the spinal motion segments from excessive stress and limit spinal movements [5, 6].

From an etiological standpoint, back pain is categorized into structural (90%) or non-structural causes, with scoliosis and spondylarthrosis classified as having structural origin of back pain [7]. Degenerative changes in the spine's structures are primarily caused by aging, genetic predisposition, and developmental abnormalities

of the spine. Degenerative changes in the cervical spine region were shown to occur more often than analogous changes in other spine regions.

Scoliosis leads to the earlier development of osteophytes (after 25 years) in the concave regions of the spine, while osteoporosis emerges in the convex areas [8]. Pain most frequently arises from spondylarthrosis, ligaments, and spinal nerve root compression.

The most common sources of pain are spondylarthrosis and compression of both ligaments and spinal nerve roots, producing nociceptive as well as neuropathic pain [9]. In cases of cervical scoliotic deviation, the clinical presentation can resemble disc prolapse or herniation, with corresponding radicular symptoms at the cervical level [10]. Generally, patients with idiopathic scoliosis complain of back pain or radicular symptoms only upon reaching adulthood. These symptoms often occur due to spinal imbalance, facet arthropathy, muscle dysfunction, fatigue, or foraminal stenosis [11].

In this study, we employed the Schroth exercise, originally developed by Katharina Schroth in Germany in 1920 [12]. Due to limited familiarity with the method, its application remains relatively uncommon in Bulgaria. The Schroth method employs exteroceptive and proprioceptive stimuli, enhanced with mirrors, isometric exercises, mobilization techniques, and muscle-strengthening exercises, to address scoliotic deformities while preserving a specific breathing pattern.

The core principles of Schroth include:

- Three-dimensional active and passive correction of the spine in the sagittal, transverse, and frontal planes
- Active, conscious, sensorimotor training to maintain correct posture
- Respiratory 3D breathing techniques
- Muscle activation (strengthening weak muscles) and manual mobilization techniques (relaxing tense muscles)
- Patient self-training for home practice

Each patient was defined according to the Schroth classification, based on the principle of dividing the body into “blocks” [13]. The main curvature was recorded first, then compensatory and available kyphosis and/or pelvic deviation were measured. An individualized chart was created for each patient. The patient’s classification also dictated which exercises were prescribed [14]. These exercises were tailored to each individual patient and their particular curve type.

MATERIALS AND METHODS

The study followed three patients over 30 diagnosed with idiopathic scoliosis (IS). All exhibited three scoliotic curves, with cervical scoliotic deviation as the compensatory curve (with a Cobb angle of 20 degrees). They underwent standard physiotherapy comprising paraffin wax at 44°C applied to the concave side of the curvature for 15 minutes, TENS therapy administered over

the cervical segment of vertebrae for 20 minutes, and one hour of Schroth exercises. Physiotherapy lasted 14 days, after which the patients continued daily Schroth exercises at home until the third month. Each patient received a personalized chart outlining their corrective Schroth exercises, which they had been trained to perform during the initial 14-day period.

During the study, a Sokolow grid was used for inspection, anthropometric measurements of lateral cervical flexion were recorded, and a VAS scale was employed for pain assessment. Patients were followed for three months, with inspection, anthropometric data, and VAS scores recorded at the start of the study and during the third month after completion of treatment.

RESULTS AND DISCUSSION

The purpose of the follow-up was to assess the impact of a standard physiotherapy program enhanced by Schroth therapy in adult patients affected by IS with cervical scoliotic deviation. The aim was to evaluate the improvements in neck and shoulder girdle pain as well as cervical spine mobility. Our rehabilitation program incorporated standard physiotherapy to alleviate pain and increase cervical spine mobility, while Schroth exercises aimed to correct asymmetry and posture over the longer term.

Conservative scoliosis treatment is defined by SOSORT (The International Society on Scoliosis Orthopedic and Rehabilitation Treatment) [3].

Recommendations for scoliosis-specific physiotherapy exercises [15, 16, 17, 18] are:

1. Three-dimensional self-correction
2. Training in activities of daily living (ADL)
3. Maintenance of correct posture
4. Patient Education

Massage, TENS, iontophoresis, and paraffin wax are common physiotherapeutic interventions that could alleviate pain. According to the American Pain Association, effective non-pharmacological treatments for chronic back pain include rehabilitation, manual manipulation, and behavioral therapy. The Schroth exercise program integrates such principles of manual manipulation and behavioral therapy.

After the three patients were examined using a Sokolow grid, they were found to have asymmetry in both shoulders. All three patients had a highly reduced cervical spine lateral flexion range, with a greater difference in lateral flexion range to the convex side of the curvatures. All patients measured VAS score > 6. All patients reported having had scoliosis since school-age, as well as chronic neck and shoulder pain. Before the study, they reported only having had pharmacological therapy and standard physiotherapy without exercise therapy.

Baseline data for the patients is provided in Table 1.

Table 1. Baseline data of the patients.

Baseline data	1st patient	2nd patient	3rd patient
Inspection with Sokolow grid-difference in height of both shoulders	3 cm	3.5 cm	2.8 cm
Anthropometry cervical range of motion-Lateral flexion right/left	7 cm / 9 cm	15 cm / 13 cm	8.5 cm / 9 cm
VAS	6	7	7

At the conclusion of the study, during the third month, a final assessment was conducted, which involved physical inspection, anthropometric data collection, and VAS scoring (Table 2).

Table 2. End-treatment values of the patients.

After 3 months data	1st patient	2nd patient	3rd patient
Inspection with Sokolow grid-difference in height of both shoulders	1.5 cm	2 cm	1 cm
Anthropometry cervical range of motion-Lateral flexion right/left	4 cm / 4 cm	7 cm / 8 cm	4 cm / 4 cm
VAS	0	1	1

Inspection of three patients revealed a significant reduction in asymmetry between both shoulders, with a 50% reduction of cm between the bough of the shoulders. Anthropometry measurements showed a significantly improved lateral flexion range in the cervical spine department. All patients have reported a significant reduction in VAS score (between 0 and 1), which indicates a substantial reduction in neck and shoulder girdle pain.

CONCLUSION

Adult patients with cervical scoliosis who receive physiotherapy followed by home-based Schroth exercises demonstrate short-term improvements in both subjective and objective complaints. An individually tailored Schroth program fosters strict adherence and consistent exercise performance. Monthly, one-on-one supervision by a therapist is crucial to maintaining patient motiva-

tion. We recommended that adult scoliosis patients undergo a minimum of 14 days of standard physiotherapy, supplemented by long-term corrective exercises, which can enhance the quality of life and decrease future disability. We also recommend a longer follow-up period to observe patient progression and for further evaluation. Described therapy is appropriate and could be carried out in an adult patient who has little physical activity and physical endurance.

ABBREVIATIONS:

VAS – Visual Analogue Scale

IS – Idiopathic Scoliosis

SRS – Scoliosis Research Society

SOSORT – The International Society on Scoliosis Orthopedic and Rehabilitation Treatment

ADL – Activities of Daily Living

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Please cite this article as: Madzharova R, Krastanova M, Stoilova I, Mikson V, Simeonov E. A case report for physiotherapy program in adulthood patients with idiopathic cervical scoliosis – analysis and results. *J of IMAB.* 2025 Jan-Mar;31(1):6075-6078. [Crossref - <https://doi.org/10.5272/jimab.2025311.6075>]

Received: 30/08/2024; Published online: 17/03/2025



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