

Short communication

The Schroth method of physical therapy for the treatment of idiopathic scoliosis

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Abstract

The basic principles of the Schroth physical therapy method for addressing patients with idiopathic scoliosis are briefly discussed.

Keywords: Scoliosis, Schroth method, Physiotherapy, Posture correction

Scoliosis is a common orthopaedic condition in children and adolescents¹. It is a complex three-dimensional deformity of the spine, featuring lateral spinal curvature and a rotational deformity of the vertebrae and ribs. According to the Scoliosis Research Society, scoliosis can be classified into functional or organic. Functional scoliosis can be compensatory, antalgic and static. Organic scoliosis can be classified as idiopathic, congenital, and neuromuscular (paralytic)². Idiopathic scoliosis is divided into three sub-groups according to the age of the patient at the time of diagnosis: infantile (age 0-3), juvenile (age 4-9) and adolescent (age 10 up to maturity)^{1,3}. The diagnosis of adolescent idiopathic scoliosis is based on physical and radiological examination (Cobb's angle) and has a prevalence in the general population of 1-3%^{4,5}. Scoliosis can be treated either conservatively or surgically depending on the severity of the disease⁶. Conservative treatment includes the use of a brace and physiotherapeutic scoliosis-specific exercises (PSSE) for mild curves⁷. The brace is recommended for patients with curves between 25° and 40°⁸. The Schroth method is a type of Physiotherapeutic Scoliosis-Specific Exercises (PSSE) program, that involves posture training and exercises effective in reducing pain and improving scoliosis curves, respiratory function, and overall quality of life in scoliosis patients^{7,9-11}. It was developed in 1921 by Katharina Schroth (1894-1985). According to Hans-Rudolf Weiss (2011)¹², Schroth was suffering from scoliosis herself and underwent treatment with a steel brace at the age of 16 years. Consequently, she decided to develop a more functional approach to the treatment herself. Inspired by a balloon, she tried to self-correct by breathing away the deformities of her own trunk by inflating the concavities of her body selectively in front of a mirror¹². In the 1970's, the Schroth method was improved by her daughter Christa

Lehnert-Schroth¹². Together they founded a rehabilitation center in Germany, which provided a specifically designed intensive rehabilitation program for patients with adolescent idiopathic scoliosis. The therapeutic approach in these patients lasted for 6 consecutive weeks performed by certified therapists of the Schroth method¹². It then became known in a broad network of therapists not only in Germany, Russia and other European countries, but also in Canada and the United States, in Australia, and several countries in Asia¹³. The method constitutes of specific exercises of isometric contraction aiming at a three-dimensional self-correction of posture and the extension of the spine (self-elongation). It also endorses the application of rotational breathing (rotational angular breathing) and the education of corrective exercises in daily activities¹³.

Treatment indications and goals of the Schroth method

The main goals of the Schroth method are¹³:

- To reduce or delay the scoliotic deformity,
- to correct the patient's posture,
- to improve the Cobb's angle,

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- to reduce or to eliminate the pain (if any),
- to improve cardiopulmonary function,
- to avoid the application of bracing in small curves,
- to avoid surgery,
- to train the patient about the corrective postures in daily life,
- to encourage the patient to perform an exercise program alone at home.

Classification system of the Schroth method

It consists of a classification of the body called “Blocks Body”. These are:

H = Hip pelvic block, which refers to the lower limbs and the lower lumbar spine,

L = Lumbar block, which extends from the lumbar spine to the inferior vertebra of the thoracic spine,

T = Thoracic block, located between the shoulder block and lumbar block of the thoracic curve,

S = Shoulder block, which includes the chest area¹³.

Principles of correction method Schroth

In the Schroth method there are pelvic corrections that are assumed prior to the execution of exercises that constitute the main principles of correction. These can ensure us that the pelvis is well aligned with the trunk. Particularly, the principles of pelvic correction are: Three- dimensional self-correcting attitude of scoliosis (3D self-correction), (Self) elongation of the spine, rotational angular breathing (RAB) and stabilization¹³.

Exercises include:

The Schroth “**50 x Pezziball**” exercise where the patient sits on a Swiss-ball in front of a mirror and performs active 3D auto self- correction using the wall bar, (which mainly activates core muscles, helps to correct the distortion, since strengthens core muscles),

The **Schroth prone exercise** with activation of the iliopsoas muscle (right hip flexion),

The exercise “**Sail**” (which helps to stretch the thoracic cavity, very good performance - effective dilation of the thoracic muscles),

The exercise **Muscle-cylinder** (this exercise can correct the lumbar curve against gravity)¹³.

The exercises of method Schroth are considered to greatly contribute to the management of adolescent idiopathic scoliosis¹⁴. Schreiber et al (2014)¹⁵, state that the exercises of Schroth method can be helpful in arresting the progression of adolescent idiopathic scoliosis and reducing Cobb’s angle¹⁶, while other authors emphasize the utility of the exercises of the Schroth method at reducing pain and improving quality of life^{17,18}. Schreiber et al (2016)¹⁴, reported decreases of the Cobb’s angle (up to 5°), as long as the treatment lasts for 6 months with intensive home monitoring. Schreiber et al (2015)⁸, previously showed that the Schroth method improved muscle strength, pain and posture. This study involved fifty patients in two groups. In one group, the patients applied only a brace without

performing exercise, while in the second group, the patients combined the brace with exercises and had better results in terms of improved pain, self-image and back muscle endurance⁸.

A recent study by Lebel et al (2016)¹⁶, reported that the Schroth method improved the quality of life of scoliotic patients, because of reducing pain and improving cardiorespiratory function. According to another study by Wibmer et al (2016)¹⁹, patients with scoliosis using a 3D game were able to correct their posture, while recording the quality and frequency of the Schroth exercises performed. Wibmer et al (2016)¹⁹, reported that the exercises of the Schroth method were helpful in order to strengthen the muscles of the trunk and thus stabilize the spine in daily activities¹². Similarly, according to Kuru et al (2016)²⁰, the exercises of the Schroth method are very effective in order to treat the adolescence idiopathic scoliosis.

In conclusion idiopathic scoliosis is a major health problem and once the disease is recognised, effective treatment should be instituted to address the deformity and prevention of its long-term sequelae. The original concept of Katharina Schroth is a useful PSSE programme which can improve the Cobb’s angle, relieve or eliminate pain, correct the patient’s posture and improve cardiopulmonary function.

References

1. Choudhry MC, Ahmad Z, Verma R. Adolescent Idiopathic Scoliosis. *The Open Orthopaedics Journal* 2016; 10:143-154.
2. Kotzailias DA. “Scoliosis”: Physiotherapy in diseases of the musculoskeletal system, University Studio Press, Thessaloniki 2011; 60-66.
3. Yaman O, Dalbayrak S. Idiopathic Scoliosis. *Turk Neurosurg* 2014; 646-657.
4. Thérout J, Stomski N, Hodgetts CJ, Ballard A, Khadra C, May SL, Labelle H. Prevalence of low back pain in adolescents with idiopathic scoliosis: a systematic review. *Chiropractic & Manual Therapies* 2017; 25:10
5. Luo HJ, Lin SX, Wu SK, Tsai MW, Lee SJ. Comparison of segmental spinal movement control in adolescents with and without idiopathic scoliosis using modified pressure biofeedback unit. *PLoS ONE* 2017; 12(7): e0181915.
6. Weiss HR, Moramarco MM, Borysov M, Ng SY, Lee SG, Nan X, Moramarco K.A. Postural Rehabilitation for Adolescent Idiopathic Scoliosis during Growth. *Asian Spine J* 2016; 10(3):570-581.
7. Bettany-Saltikov J, Parent E, Romano M, Villagrana M, Negrini S. Physiotherapeutic scoliosis-specific exercises for adolescents with idiopathic scoliosis. *Eur J Phys Rehabil Med* 2014; 50(1):111-21.
8. Schreiber S, Parent EC, Moez EK, Hedden DM, Hill D, Moreau MJ, Lou E, Watkins EM, Southon SC. The effect of Schroth exercises added to the standard of care on the quality of life and muscle endurance in adolescents with idiopathic scoliosis - an assessor and statistician blinded randomized controlled trial: “SOSORT 2015 Award Winner”. *Scoliosis* 2015; 10:24.
9. Marti CL, Glassman SD, Knott PT, Carreon LY, Hresko MT. Scoliosis Research Society members attitudes towards physical therapy and physiotherapeutic scoliosis specific exercises for adolescent idiopathic scoliosis. *Scoliosis* 2015; 10:16.
10. Lehnert-Schroth C. Introduction to the three-dimensional

- scoliosis treatment according to Schroth. *Physiotherapy* 1992; 78(11):810-15.
11. Bialek M, M'hango A, Kotwicki T. Monitoring of changes in trunk rotation during scoliosis physiotherapy. *Scoliosis* 2007; 2(Suppl 1):S2.
 12. Weiss HR. The method of Katharina Schroth - history, principles and current development. *Weiss Scoliosis* 2011; 6-11.
 13. Berdishevsky H, Lebel VA, Bettany-Saltikov J, Rigo M, Lebel A, Hennes A, Romano M, Bialek M, M'hango A, Betts T, Claude de Mauroy J, Durmala J. Physiotherapy scoliosis-specific exercises- a comprehensive review of seven major schools. *Scoliosis and spinal disorders* 2016; 11:20.
 14. Schreiber S, Parent EC, Khodayari ME, Hedden DM, Hill DL, Moreau M, Lou E, Watkins EM, Southon SC. Schroth Physiotherapeutic Scoliosis-Specific Exercises Added to the Standard of Care Lead to Better Cobb Angle Outcomes in Adolescents with Idiopathic Scoliosis – an Assessor and Statistician Blinded Randomized Controlled Trial. 2016; 11(12):e0168746.
 15. Schreiber S, Parent EC, Hedden DM, Moreau M, Hill D, Lou E. Effects of Schroth exercises on curve characteristics and clinical outcomes in adolescent idiopathic scoliosis: protocol for a multicentre randomised controlled trial. *Journal of physiotherapy* 2014; 234.
 16. Lebel A, Lebel VA. Severe progressive scoliosis in an adult female possibly secondary thoracic surgery in childhood treated with scoliosis specific Schroth physiotherapy: Case presentation. *Scoliosis and Spinal Disorders* 2016; 11:41.
 17. Kim KD, Hwangbo PN. Effects of the Schroth exercise on the Cobb's angle and vital capacity of patients with idiopathic scoliosis that is an operative indication. *J Phys Ther Sci* 2016; 28:923-926.
 18. Lee HJ, Seong HD, Bae YH, Jang HY, Chae SH, Kim KH, Lee SM. Effect of the Schroth method of emphasis of active holding on Cobb's angle in patients with scoliosis: a case report. *J Phys Ther Sci* 2016; 28:2975- 2978.
 19. Wibmer C, Groebl P, Nischelwitzer A, Salchinger B, Sperl M, Helmut W, Holzer H, Saraph V. Video-game-assisted physiotherapeutic scoliosis-specific exercises for idiopathic scoliosis: case series and introduction of a new tool to increase motivation and precision of exercise performance. *Scoliosis and Spinal Disorders* 2016; 11:44.
 20. Kuru T, Yeldan I, Dereli EE, Özdiñçler AR, Dikici F, Çolak I. The efficacy of three-dimensional Schroth exercises in adolescent idiopathic scoliosis: a randomised controlled clinical trial. *Clinical Rehabilitation* 2016; 181:190.