Effect Of Schroth Method in Adolescents with Idiopathic Scoliosis: A Scoping Review

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Abstract:

Background: Adolescent idiopathic scoliosis (AIS) is a three-dimensional spine abnormality with an unknown origin. In AIS the spinal curvature is usually greater than 10 degrees in the coronal plane. Scoliosis-specific exercises in physiotherapy, with or without corrective bracing, are part of a conservative treatment strategy to avoid further spinal column deviation. Various scoliosis exercise methods are available, including the Schroth approach. The Schroth method is a type of physical treatment that lengths and strengthens asymmetrical muscles using isometrics and other exercises.

Methods: A thorough search of the AIS literature was conducted to uncover relevant Schroth exercises articles. PubMed, and the Physiotherapy Evidence Database (PEDro) were among the databases examined. The Google Scholar search engine was also investigated. Randomized or clinical control trials were included in the study. All articles were written in English or were translated into English.

Results: Only four of the first eleven articles found met the established search criteria. The ages of the participants in these sources ranged from 10 to 18, with both males and girls included. The Schroth technique was used in the studies that were examined. Cobb's angle effect sizes were shown to be positive across all studies.

Conclusions: The Schroth method is effective in treatment of adolescent idiopathic scoliosis when given for 3 to 6 months. It can therefore be used as a treatment approach alone or with conventional exercises in patients with AIS for better outcome.

Key words: Schroth Method, Adolescent Idiopathic Scoliosis, Cobb’s angle,

I. INTRODUCTION

Adolescent idiopathic scoliosis is a three-dimensional spine deformity with an unknown origin. It is clinically defined as a coronal plane spine curvature more than 10°. 1 AIS is the most common type of scoliosis, affecting 1-3% of adolescents in the United States. Sahyun et al. found a prevalence 2 of 0.93-12% worldwide and an incidence of 0.760%. Females ages 10-14 had highest incidence, and urban populations had greater rates than rural populations. 3 Furthermore, despite unknown reasons, scoliosis is linked to genetic factors, bad posture, and insufficient exercise. Physical problems caused by these factors include spinal column and structure deformation, altered erector spinae muscle characteristics, low back pain, decreased spinal column flexibility, and decreased cardiopulmonary function. 4

Exercise surgery, traction bracing, casting, biofeedback, and simple observation have all been advocated as treatments for adolescent idiopathic scoliosis. 5

AIS treatment is based on a variety of parameters, including patient age, Cobb’s angle, and Risser scale. 6 Worldwide, conservative measures are applied more aggressively compared to the United States. Along with SEAS (scientific exercise approach to scoliosis), FITS (functional individual therapy of scoliosis), and the ASCO (anti-scoliosis Vibration decompression) system the Schroth technique is one such treatment method for scoliosis. 7

Katharina Schroth developed the Schroth method, which is a three-dimensional programme that includes specific posture correction, breathing pattern correction, and postural perception correction. 8, 9 The Schroth approach produces positive outcomes in terms of back muscle strength, respiratory function, delaying curve advancement, improving Cobb's angle, and lowering surgery rates. 10

Therefore the purpose of this current review is to determine quantitative evidence about effectiveness of Schroth method along with other PSSE (Physiotherapeutic scoliosis specific exercises) on Cobb’s angle in patients with AIS.

Objective: In order to provide a comprehensive picture of effectiveness of Schroth method in treatment of idiopathic scoliosis in adolescents this scoping review aims to identify and present available information regarding the Schroth method in terms of its effectiveness in paediatric population.

II. Methods:

Information sources

Published clinical trials and randomized controlled trials examining the effectiveness of Schroth exercises in the treatment of adolescent idiopathic scoliosis were included in this study. Using a predetermined search strategy, PubMed, Pedro, Google Scholar, and the Physiotherapy Evidence Database (PEDro) were all searched from their inception through the years 2015–2021. Idiopathic, adolescent, scoliosis, the Schroth technique, exercise, conservatism, and physiotherapy, as well as different combinations of these phrases, were searched in the databases. Searches were restricted to English-language articles.

III. Eligibility criteria: Randomized controlled or clinical trials, fulfilling the PICO format, studies including Schroth exercises and Cobb’s angle as an outcome measure were included. Studies reporting results of Schroth method on spinal surgery, alternative and integrative medicine, and bracing without exercise intervention, or pharmaceutical therapies were excluded.
Also any duplicate articles case reports case control studies were excluded.

IV. **Data synthesis:** Post intervention effect sizes and their confidence interval were calculated for the mean differences in Cobb’s angles between the experimental and comparison groups.

Mean pre and post intervention Cobb’s angles with standard deviations were extracted for the study group and control group.

V. **Results:** A total 11 articles met the initial search criteria. 5 articles were excluded for not meeting the criteria of controlled trial. 1 article was excluded for not including Cobb’s angle as an outcome measure. 1 article was excluded for duplicate information. Therefore a total of 4 studies were included in this review

VI. **Description of included randomized controlled trials:**

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<th>Author</th>
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2. PNF technique  
Each program was given for 1 hour with 2-min rest period between each exercise, three days a week, for six successive months | Based on the results obtained in this PNF patterns did not show significant improvement in angle trunk rotation, which is a critical aspect in correction of the curve in comparison to the Schroth exercise. |
| Hikmet Kocaman et al (2021)| 28 subjects with AIS | Cobbs angle, trunk rotation, angle spinal mobility, cosmetic trunk deformity, peripheral muscle strength and Qol | 1. Schroth method  
2. Core stabilization exercises  
Both groups performed exercise for 90mins, three days per week for 10 weeks | The study indicated that Schroth exercises are more effective in reducing cobb angle and ATR and in improving spinal mobility and Qol in patients with mild AIS when compared with Core stabilization exercises. |
Sanja Schreiber et al (2016)  
50 patients with AIS  
Cobbs angle and Self efficacy Questionnaire  
1. Schroth method  
2. Conventional treatment  
The six-month supervised Schroth PSSE intervention included five one-hour long private sessions delivered during the first two weeks, followed by weekly one-hour long group classes combined with a 30–45 min daily home exercise program  
Six-months of Schroth PSSE added to standard of care improved curve severity in adolescents with idiopathic scoliosis compared to standard of care.

45 patients with AIS  
Cobbs angle, angle of rotation waist asymmetry  
1. Schroth method  
2. Home program  
1.5 hours a day three days per week for six weeks  
According to the results of this study the Schroth exercise program applied in the clinic under physiotherapist supervision was superior to the home exercise and control groups.

VII. Discussion:  
The Schroth method significantly reduced the Cobb angle. Overall results demonstrate that Schroth method is effective at reducing Cobb’s angle when compared to observation or other modes of exercise. One such study was done by Hikamet Kocaman et al who studied the effectiveness of Schroth exercises vs. core stabilization in patients with AIS. The patients in Schroth group showed greater improvement in Cobbs angle thoracic trunk rotation, cosmetic trunk deformity spinal mobility and QoL than those in core group. Strategies that slow the progression of scoliosis and decrease need for surgery are essential in treatment of AIS. In this study the Cobb’s angle and ATR (Angle trunk rotation) of the scoliotic curve decreased in all participants. However study group demonstrated greater decrease in Cobb angle and ATR. The study demonstrated an effect size of 0.68 for Cobb angle of lumbar spine and an effect size of 0.55 for Cobb angle of thoracic spine.  

R.A. Mohamed et al conducted a study to investigate the effects of PNF and compared its effect with that of Schroth exercises on scoliosis angle, static planter pressure distribution and functional capacity in AIS. This study showed significant improvement in Cobb’s angle in the Schroth exercise group compared with PNF pattern program, which may be attributed to the correction of the curve using active derotation of the curve trunk segment achieved by RAB (rotational angular breathing). Conscious repeated exercises facilitates patient with the help of feedback from the mirror that provided a mental re-education; finally a corrected posture was recognized by a subconscious mind and it could be carried out automatically.

Another study by Tugba Kuru et al. compared with Schroth exercise given as a home program. The results obtained from the study showed that Schroth exercise program applied under the supervision of a physiotherapist is effective and essential to slow or stop the progression of scoliosis decrease the Cobbs angle and rotation angles and improve the cosmetic appearance.

Sanja Schreiber found a significant improvement in Cobb’s angle when Schroth method was added to standard care. Over six months, they provided five one-hour long treatments during the first two weeks followed by weekly one-hour long sessions (about 27 supervised sessions, 27 hours) with a weekly supervision continued till end of six months. In conclusion, based on both the intention-to-treat and the per protocol analysis, six-months of Schroth PSSE added to standard of care improved curve severity in adolescents with idiopathic scoliosis compared to standard of care.

VIII. Scope:  
The Schroth exercise method is primarily conducted on an outpatient basis in the presence of a clinician providing real time patient feedback. The supervised one-on-one approach of Schroth method provides added benefit of routinely ensuring the progress of the patient. From the reviewed articles Schroth method has proven to be effective in improving the scoliosis angle and ATR in patients with adolescent idiopathic scoliosis. However the effectiveness of Schroth method given over different time period of 3 to 6 months should be compared for better understanding.

IX. Conclusion:  
The Schroth method is effective in treatment of adolescent idiopathic scoliosis when given for 3 to 6 months. It can therefore be used as a treatment approach alone or with conventional exercises in patients with AIS for better outcome.

X. Acknowledgement  
I would like to extend my thanks to all faculty members for their contribution in course of this study.

XI. References  


