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Effectiveness of strauss method exercise in cobb's angle in patient with scoliosis: A single case study

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Abstract
Background: Scoliosis is a spinal deformity affecting three planes: lateral bending in the frontal plane, vertebral rotation in the horizontal plane, and spine flattening in the sagittal plane. Various types of scoliosis can occur throughout a person's life.
Objective: The aim of the study is to determine the effectiveness of the Strauss Method in reducing the Cobb angle in patients with scoliosis**.**
Methodology: A two-week regimen combining Schroth, SEAS, yoga, and stretching exercises was administered. The patient's condition was evaluated using the Cobb angle and a scoliometer both before and after the treatment**.**
Result: There was a notable improvement in both the Cobb angle and scoliometer measurements compared to the pre-assessment, with a significant change observed in the Cobb angle.
Conclusion: The study concluded that the Strauss Method is effective for treating patients with mild scoliosis.

Keywords: Strauss, Schroth, seas, cobb's angle, scoliometer

Introduction
Scoliosis is a spinal deformity affecting three planes: lateral bending in the frontal plane, vertebral rotation in the horizontal plane, and spine flattening in the sagittal plane. Various types of scoliosis can occur throughout a person's life. In adults, Abei identified three primary types: Type I, primary degenerative scoliosis; Type II, progressive idiopathic scoliosis in adults; and Type III, which includes (a) secondary degenerative scoliosis resulting from idiopathic or other scoliosis forms or primary anomalies in the spine, trunk, or extremities, and (b) systemic conditions affecting bone metabolism combined with asymmetrical arthritis or vertebral fractures, such as osteoporosis. Adolescent idiopathic scoliosis is relatively common, with a prevalence of 0.47–5.2% according to current literature. The female to male ratio ranges from 1.5:1 to 3:1, increasing significantly with age.
The Strauss Method is a unique, research-based scoliosis treatment approach developed by Dr. Andrew Strauss. This method involves a thorough examination of each patient, understanding their medical history, and discussing their treatment goals to create a personalized plan. The Strauss Method employs various non-surgical techniques tailored to the specific needs of each patient. It emphasizes five types of individualized, scoliosis-specific corrective home exercises that empower patients to manage their condition. Although bracing may be necessary, it utilizes the latest technology in 3D corrective scoliosis correction. The treatment includes exercises to stabilize weakened areas of the spine and derotate the twisted spine, targeted stretching routines to increase movement in tight and restricted areas, sometimes including nerve tissue that is tight and pulling the spine into the curve. Posture retraining exercises to maintain the corrected curve achieved by other exercises. Active Self Correction exercises to improve posture and stabilize the spine. Modifications to daily activities, such as sitting, sleeping, and carrying bags, to reduce strain on the scoliosis.
The purpose of this case study is to examine the effect of the Strauss Method on the Cobb angle in patients with scoliosis.

Case Presentation
A 24-year-old female patient is experiencing progressively worsening low back pain that is

non-radiating. She had no history of trauma and initially did not take any medication for the pain. Approximately two weeks ago, the pain suddenly worsened, prompting her to visit the outpatient department (OPD) at AJIMS on February 7, 2024. An X-ray taken on the same day revealed mild scoliosis. Currently, the patient is receiving physical therapy (PT) care. Patient now chief complain of pain over the back especially right side with dull aching type of pain. Prolonged lumbar flexion is aggrevating factor. While observing there is no any swelling, wasting. While palpating tenderness present over bilateral paraspinal (grade2). Muscle tightness is present (rightside of hamstring o 10degree). On special test SLR, FABERS, GASLER'S, PIRIFORMIS all are negative. Schober's test is positive with 4cm differences and adam forward bending test is positive with 3.5cm. She was presented with angle of scoliometer 7degree pre and 5 degree post and cobb's angle of 18degree pre and 15degree post.

Physiotherapy management

The patient was scheduled for daily 40-minute physiotherapy sessions on weekdays for two weeks. The short-term goals were to improve posture, reduce pain, and maintain balance. The long-term goals included improving and maintaining posture, making functional activities hassle-free, and enhancing the quality of life. The intervention plan focused primarily on maintaining posture and balance. The patient was instructed to perform Schroth-based exercises, self-hamstring stretching, and yoga. The intervention plan and care primarily focused on maintaining posture and balance. The patient was instructed to perform Schroth-based exercises, self-hamstring stretching, and yoga. Subject was given combination of schroth, seas, yoga and stretching exercise. The schroth exercise like semi hanging, prone on stool seas exercise like iliopsoas on ball, yoga, like, marjariyasa, pavivrathatrikonsana, stretching like multifidus, paraspinal, hamstring. All the exercise were done for 3sets for 30 sec each.

Fig 1: Multifidus stretching

Fig 2: Paraspinal muscle stretching

Fig 3: Hamstring passive stretch

Fig 4: Hamstring self stretching

Fig 5: Semihanging

Fig 6: Bridging

Fig 7: Marjariyasan and cat camel exercise

Fig 8: Pavivratha trikonasa

Fig 9: Pilates (the hundred)

Fig 10: Plank

Outcome measures

Angle of Rotation (Scoliometer): The angle of rotation is measured using a smartphone with a 3D smartphone holder. This method has demonstrated excellent results, boasting the highest validity according to various articles. It is possible for mild scoliosis (Cobb angle of 10 to 25 degrees) to present with a high degree of rotation, and conversely, for severe scoliosis (Cobb angle over 50 degrees) to have minimal rotation for a curve of that magnitude. A reading of 0 degrees indicates a natural curve with no signs of scoliosis**.**

Cobb's Angle: There are various methods to measure and calculate the Cobb angle. It can be done manually by measuring the spinal angle on a posterior-anterior (PA) X-ray film, which is the standard approach. This involves identifying the upper and lower vertebrae of the spinal deformity, drawing lines along the vertebral borders, and measuring the Cobb angle directly or geometrically. Alternatively, the Cobb angle can be measured digitally using a smartphone, a radiographic program, or other tools. According to the Society on Scoliosis Orthopaedic and Rehabilitation Treatment (SOSORT), the current prevalence of adolescent idiopathic scoliosis (AIS) is 2-3% among the general population, varying across different latitudes. When the Cobb angle exceeds the "critical threshold" (30-50 degrees, as recognized by most scholars), patients may experience physical pain, noticeable deformities, and disabilities.

Results and Discussion

The present study shows that there is improvement in cobb angle and scoliometer after the treatment session using combination exercise of schroth, seas, yoga and stretching. A 2 week long program brought the differences in cobb angle in subject with scoliosis. The current study aimed to achieve scoliosis recovery through an integrative rehabilitation program combining Schroth-based exercises, SEAS protocol, yoga, and stretching. A two-week combination treatment was administered, revealing the effectiveness of the Strauss Method particularly for mild scoliosis cases with Cobb angles less than 18 degrees. The exercises resulted in significant improvements in posture and correction of shifted curves.In my own scoliosis case study, a positive outcome was observed where the Cobb angle reduced from 18 degrees to 15 degrees, effectively correcting the scoliosis. Studies conducted by Luis Ceballos-Laita (2023) and others on the Schroth method have shown its effectiveness in reducing Cobb angles, improving quality of life, and reducing trunk rotation angles in adolescent idiopathic scoliosis (AIS) compared to no intervention or other conservative therapies. Similarly, research by Arash Khaledi (2022) indicates that both Schroth and SEAS exercises are effective in correcting AIS, with Schroth showing more pronounced results. Furthermore, MI YOUNG LEE (2022) found that regular participation in yoga helps maintain or improve postural indicators and reduce imbalance in middle-aged women with scoliosis. The use of the scoliometer to measure scoliosis angles in these studies is supported by good reliability and validity, as affirmed by ASHLEIGH PROWSE *et al.*, which concluded that the scoliometer provides reliable measurements for mild to moderate scoliosis deformities in various spinal regions.

Limitation of the study

- The study has included subject with only scoliosis.it can also be done using individuals with associated condition.
- The treatment was performed on a 24years female individual, it can also be performed as a series on a larger number of population for better result.
- Long term effect of this method are unknown.

Table 1: Physiotherapy intervention to improve scoliosis

Intervention	Intensity	Frequency	Duration
Strauss method	3sets of 10 repetation	6 days per week	14 session

Table 2: Changes in the outcome measure

Outcome measures	Pre intervention	Post intervention
Cobb's angle	18 degree	15 degree
Scoliometer	7 degree	5 degree

Conclusion

The present study concluded that strauss method the combination of schroth, seas, yoga, stretching has good result for scoliosis patient with cobb angle less than 18 degree. This method multi-faceted approach addresses different aspects of scoliosis management, potentially leading to better outcome.

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