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Scoliosis in infancy

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Abstract

Background: Improper posture is one of the main causes of scoliosis, a common spinal condition. While scoliosis can develop at any age, this review focuses on infantile scoliosis and aims to organize therapeutic thinking around the treatment of infantile scoliosis and to report modern therapeutic approaches with physical therapy as the main focus.

Methods: A comprehensive literature review was conducted to gather relevant research articles on the effectiveness of exercise methods in managing infantile scoliosis. The included studies provided data on various outcome measures, including the Cobb angle, trunk rotation angle, spinal flexibility, vital capacity, posture, and respiratory function. The researchers reviewed and synthesized the findings from these studies, noting significant results and discrepancies between different exercise methods.

Results: The results of this study demonstrate that the Schroth method effectively improves the Cobb angle, reduces trunk rotation angle, increases spinal flexibility, enhances vital capacity, and promotes improved posture. Furthermore, exercises with the Dobomed method have shown significant improvements in respiratory function, while the Side Shift method did not yield significant differences compared to other exercise methods. Additionally, Niederhofferv exercises have been found to be crucial for improving posture, muscle strength, maintaining mobility, and facilitating respiratory function.

Conclusion: These different exercise methods provide a range of benefits in the management of scoliosis, targeting various aspects such as spinal alignment, respiratory function, and overall musculoskeletal well-being. The applicability of the mentioned exercise methods to toddlers wearing a guardian has not been clarified in the available data.

Keywords: Infantile scoliosis, spine, guardians, breathing exercises, rehabilitation methods

Introduction

The term "scoliosis" originates from the word "scolios," which means crooked. It refers to the three-dimensional deformity of the spine, characterized by lateral inclination and rotation of the vertebrae (organic forms). According to the Scoliosis Research Society (SRS), scoliosis is defined as a spinal curvature exceeding 11 degrees, accompanied by vertebral rotation from the average anatomical position. Scoliosis is categorized based on its anatomical location (cervical, thoracic, lumbar, cervicothoracic, thoracolumbar) and its convexity (right or left). It is a form of spinal deformity that manifests in various ways during human development. In severe cases, bracing may be necessary when the deformity reaches 14 degrees, while surgical intervention is required for severe scoliosis (over 55 degrees). Idiopathic scoliosis, as described by Symeonidis (1997) [36], is a spinal condition characterized by abnormal deviation from the midline of the vertebral column, resulting in lateral, anteroposterior, and rotational deformations.

Infantile scoliosis specifically occurs in children before the age of 3, predominantly affecting boys. It is characterized by spinal curvatures that form an S or C shape, either to the left or right. Most cases of infantile scoliosis resolve spontaneously, but some can progress to severe deformities. Severe cases often coexist with hip dysplasia and plagiocephaly (Lampiris, 2007) [20]. Infantile scoliosis accounts for only 1% of children with idiopathic scoliosis, and the prognosis is worse when it occurs in girls in the right thoracic region. Interestingly, the prevalence of infantile scoliosis is higher in Europe compared to the United States. Notably, many children with minor curvatures lead normal lives. The curvatures develop within the first 6 months of life, appearing as S- or C-shaped curves.

Around 85% of these curvatures resolve spontaneously when scoliosis occurs before the first year of life. The remaining 15% worsen and present significant distortion, often resulting in a hump that typically projects to the left and develops during the first half of the child's year. Infants with left-sided curvature tend to have a better prognosis compared to those with right-sided curvature (Hatzipavlou, 2005) [7]. Compensatory curves are rare in infantile scoliosis, and their presence is considered a poor prognostic factor. Infantile scoliosis often coexists with other conditions such as inguinal hernia, congenital heart disease (2.5% prevalence), congenital hip dysplasia (3.5% prevalence), and mental retardation (13% prevalence). Approximately 83% of cases with infantile idiopathic scoliosis exhibit breech, where the newborn's head tilts either to the right or left alone, and 50% of affected individuals have deformities of the pectoral ribs. Difficult cases of occipital cranium (plagiocephaly) are often associated with hip dysplasia, and hearing problems may also be observed in newborns (Hatzipavlou, 2005) [7]. As further discussed in this paper, scoliosis is a multisystem disorder that leads to numerous structural and functional abnormalities (Marek & Rozek, 2014) [12]. The purpose of this study is to organize therapeutic approaches for the treatment of infantile scoliosis, with a focus on physical therapy. The prevailing scientific view recognizes scoliosis as a three-dimensional deformity that worsens over time, motivating early and effective interventions.

Klapp Method

The Klapp exercises have been utilized as a physical therapy method in the treatment of infantile scoliosis. These exercises are performed from the quadrupedal and kneeling positions and serve to strengthen the muscles of the spine while stretching the muscles on the concave side. The Klapp exercises also aim to correct and elongate the spine, providing improved breathing function and strengthening the respiratory muscles. Additionally, these exercises enhance the flexibility and mobility of the lateral aspect of the spine, restoring balance and reducing curvatures, pain, and deformities (Kotzailias, 2011) [16].

In a recent study conducted by De Assis *et al.* (2017) [9], paraspinal muscle strength assessment was performed using a manual dynamometer. Preschool-aged children assumed a standing position with slightly bent knees, flexed trunk, and outstretched arms holding the instrument bar. Clear instructions were provided regarding the operation of the dynamometer and the protocol for measurement, emphasizing the exertion of maximum force. The participants executed a partial contraction to engage the muscles in the lumbar region. This process was repeated twice with a one-minute interval, and the mean values were calculated. The group of children included in the study underwent the Klapp method, consisting of twenty sessions, three times a week, each lasting fifty minutes. During each session, a sequence of eight postures from the Klapp method was performed. The children were appropriately attired to facilitate the execution of therapeutic exercises for spinal control. The results indicated significant improvements in flexibility and increased muscle strength in the extensor muscles of the spine, highlighting the effectiveness of the Klapp method (De Assis *et al.*, 2017) [9].

Furthermore, a study conducted by Iunes in 2010 included sixteen children, seven of whom were toddlers, who underwent Klapp exercises as part of a specific exercise program. The outcomes demonstrated improvements in shoulder symmetry (acromioclavicular, sternoclavicular) as

well as increased flexibility in the hip and ankle joints. The implementation of the Klapp method in the therapy program contributed to the strengthening of the extensor muscles of the spine (Dantas *et al.*, 2017) [9].

Schroth Method

The Schroth method, discovered by Katharina Schroth in 1921, is a physical therapy approach used in the treatment of infantile scoliosis. Katharina Schroth, who herself suffered from scoliosis, developed the method as a means to address the condition at different ages (Vilanakis and Mosxos, 2018) [38]. These exercises aim to improve the overall condition and symmetry of the trunk. Patients are trained to understand the symmetrical positioning of their bodies within space. The method involves corrective rotation of the shoulder girdle to bring it back to the frontal plane, just above the pelvis, thereby improving postural alignment. It also encompasses a comprehensive movement scheme that the physical therapist utilizes to teach symmetrical posture (Kotzailias, 2011) [16]. The Schroth method is based on five important principles, including self-elongation, deflection, deviation, rotational breathing, and stabilization of the backbone. These principles ensure better alignment between the pelvis and trunk. Through the application of these principles, patients learn to "unstick" the shortened areas of the trunk and "reduce" the stretched areas that contribute to the curvature (Berdishevsky *et al.*, 2016) [3-4].

The primary goals of the Schroth method in infantile scoliosis are as follows: correcting the spinal curvature, improving lung function (increasing vital capacity), achieving balanced posture, reducing or eliminating pain associated with scoliosis, strengthening the trunk muscles in the correct position, training to maintain corrected posture, and improving spinal mobility (Methimakis, 2021) [23]. These exercises in toddlers aim to lengthen the trunk and correct body imbalances. Physical therapy focusing on muscle symmetry, isometric exercises for body alignment, and breathing techniques on the concave side of the body contribute to achieving better results (Park *et al.*, 2017) [30]. The Schroth exercise program involves correcting scoliotic posture through correct breathing patterns, proprioceptive stimuli, and the use of mirrors. The effectiveness of Schroth exercises may be more significant in scoliosis patients with a Cobb angle between 10 to 30 degrees compared to those with a Cobb angle exceeding 30 degrees. The exercises should be performed for at least one month to yield the best possible outcome (Park *et al.*, 2017) [30].

Studies have shown positive effects of the Schroth method, including improved back muscle strength, enhanced respiratory function, reduced pain, improved quality of life, increased self-esteem, better prognosis, improved Cobb angle, and a potential reduction in the need for surgical intervention (Berdishevsky *et al.*, 2016) [3-4]. A study conducted by Vrecic *et al.* (2020) [39] with six young children (aged one and two years) demonstrated significant reduction in trunk rotation angles, increased lateral trunk bending, improved respiratory index, enhanced body posture, and increased spine flexibility following the implementation of individualized Schroth exercises. Additionally, studies by Schreiber (2016 and 2018) [34, 26] involving children aged 2 to 16 years, with and without bracing, showed improvement in primary hunchback and posture, although this improvement was not directly related to the Cobb angle (Methimakis, 2021) [23].

In conclusion, the Schroth method in the treatment of infantile scoliosis has shown positive outcomes in various aspects,

including spinal correction, improved respiratory function, pain reduction, enhanced quality of life, and increased self-esteem. Moreover, it has demonstrated potential benefits in terms of prognosis, Cobb angle improvement, and a potential decrease in the number of patients requiring surgery.

Dobomed Method

The Dobomed method, developed since 1979, is a conservative approach for managing idiopathic scoliosis that addresses trunk deformity and respiratory dysfunction through three-dimensional self-correction. It combines elements of Klapp's kyphotic position for the thoracic spine and Schroth's approach for active asymmetric breathing (Methimakis, Aigio, Greece, 2021) [23]. The Dobomed method consists of three phases: the preparatory phase involving physical therapy and exercises, the basic technique of active three-dimensional self-correction, and the final phase.

The core technique of the Dobomed method is active three-dimensional correction, focusing on mobilizing the primary kyphosis with emphasis on the thoracic spine's kyphotic posture and/or the lumbar spine's lordotic posture. This correction is performed through closed kinetic chain exercises, maintaining a symmetrically positioned pelvis and shoulders (Methimakis, Aigio, Greece, 2021) [23]. Throughout the exercises, the pelvis and shoulders are initially positioned and then kept stable during the inhalation and exhalation phases. This symmetrical positioning of the pelvis and shoulders is a unique aspect of the Dobomed method (Berdishevsky *et al.*, 2016) [3-4].

The Dobomed method can be used to treat small, moderate, and large scoliosis cases, although its effectiveness depends on the flexibility of the curve and patient compliance (Dobosiewicz *et al.*, 2008). It is recommended to undergo treatment five days a week, supervised by a specialized physical therapist, for a period longer than three weeks (Saltikov *et al.*, 2014). Studies have shown that the exercises of the Dobomed method result in significant improvements in respiratory function compared to other methods while also improving the condition's morphology (Berdishevsky *et al.*, 2016) [3-4]. The stabilization of scoliosis curves in children following the Dobomed method can also be observed through imaging (Methimakis, Aigio, Greece, 2021) [23].

Side Shift Method

The Side Shift method, based on the principles of the Schroth method, focuses on using lateral movements to stabilize a flexible hunchback and correct trunk deviation in the frontal plane. This method specifically trains patients to self-correct in the frontal plane, aiming to correct the Cobb angle, stabilize the spine through exercises targeting the abdominal, gluteal, and scapula muscles, and improve breathing, posture, and balance (Methimakis, Aigio, Greece, 2021) [23].

Dr. Min Mehta first described the Side Shift method in 1985 and published case reports of 35 patients with idiopathic scoliosis to demonstrate the clinical and imaging improvements achieved by patients who followed this method. Subsequent studies from Japan in 2002 and 2008 further supported the effectiveness of the Side Shift method as a valuable treatment option for scoliosis (Mehta MH, 1985) [22].

Niederhofferv

Symmetrical exercises targeting the pectoral, abdominal, and hip joints are crucial in developing balanced strength on both the left and right sides. Additionally, exercises that

specifically strengthen the extensor muscles of the back are essential. These exercises work towards improving posture, maintaining mobility, and compensating for spinal deformities (Kokkaridas, 2010; Angelopoulou, 2004) [15, 1]. It is important to avoid exercises that encourage excessive anterior flexibility of the spine or those that may cause injury. The overall goal of these exercises is to enhance flexibility by stretching the concave side of the scoliosis, increase trunk muscle strength, improve rotational movements of the upper and lower limbs, alleviate muscle spasms and pain, enhance cardiorespiratory function, and provide psychological support (Angelopoulou, 2004; Negrini, 2006) [1, 28]. When planning an exercise program for individuals with scoliosis, the physical therapist should consider factors such as the person's age, the specific location of the scoliosis (cervical, thoracic, or lumbar), and the severity of the curvature (Angelopoulou, 2004; Negrini, 2006) [1, 28].

Discussion

Based on a comprehensive review of recent and authoritative sources, it is evident that infantile scoliosis can manifest from birth, often due to hereditary factors. While spontaneous resolution is common as the child grows older, intervention by a physical therapist may be necessary if the condition worsens. However, it is important to approach scoliosis as a three-dimensional spinal deformity and not limit the therapeutic approach to the confines of the clinic. Continued exercises at home, guided by a tailored program provided by the therapist to the child's parents, are crucial. In some cases, surgical intervention may be required based on observations.

The combined approach of parental guidance and specialized physical therapy exercises has shown significant potential in improving the cosmetic appearance and functional abilities of toddlers with severe scoliosis. The Klapp and Schroth exercises have been identified as the most effective methods for addressing curvature.

The Klapp method primarily focuses on improving the strength of the spine's extensor muscles, increasing flexibility in the hip and ankle joints, and enhancing shoulder symmetry. However, it does not directly impact the Cobb angle, which measures spinal curvature.

The Schroth method recognizes the imbalance and asymmetry of spinal muscles in scoliosis. By addressing abnormal twisting and muscle tension, it aims to restore balance and symmetry. The Schroth method typically involves three sessions per week and has been found to positively impact the Cobb angle, reduce trunk rotation, improve spinal flexibility, vital capacity, and posture.

Other exercise approaches, such as the Dobomed method, Side Shift, and Niederhofferv exercises, can be applied in infants with scoliosis. Manual massage can also help relax muscles and alleviate pain.

Considering the young age of infants, their ability to cooperate with therapists may be limited. Therefore, specialized techniques like Physiotherapeutic Scoliosis Specific Exercises (PSSE) and the SEAS method may not be suitable. However, as the child grows older and develops a better understanding of their scoliosis, they can gradually engage in more specialized exercise programs.

Overall, the primary goal of all exercises should be to improve the psychological well-being of the child and their parents. Addressing emotions such as anxiety, frustration, and indifference is crucial, as these negative emotions can contribute to the progression of spinal deformity.

Conclusion

Indeed, the Schroth method has been found to effectively improve the Cobb angle, reduce trunk rotation angle, enhance spinal flexibility, increase vital capacity, and promote improved posture. Additionally, there are other exercise methods such as the Dobomed method, Side Shift, and Niederhofferv exercises that can be applied to infants with scoliosis. The Dobomed method is particularly notable for its ability to bring about significant improvements in respiratory function compared to other methods. On the other hand, the Side Shift method, as per research, did not show a significant difference between patients who exclusively used it under the guidance of guardians and those who incorporated exercises from this particular method. Lastly, Niederhofferv exercises are essential for children with scoliosis as they contribute to improving posture, strengthening muscles to maintain mobility and compensatory spinal posture, facilitating respiratory function, maintaining flexibility, and preventing the progression of the curvature.

These different exercise methods provide a range of benefits in the management of scoliosis, targeting various aspects such as spinal alignment, respiratory function, and overall musculoskeletal well-being. The applicability of the mentioned exercise methods to toddlers wearing a guardian has not been clarified in the available data. If it is indeed possible to implement a specialized exercise program with the assistance of a guardian, it is important to understand the potential outcomes and the feasibility of such an approach. Additionally, the existing research suggests that the specific exercises employed thus far have not yielded significant improvements in respiratory function, except for the Dobomed method, which primarily focuses on this aspect. It is worth acknowledging that there may be challenges associated with managing a young child and coordinating physical movements alongside controlled breathing, which could contribute to certain concerns. Consequently, further studies should be conducted to address this issue and provide potential solutions.

Moreover, the results of the research appear to vary depending on the gender (male or female) of the child, which is reasonable to consider. The exercise programs implemented differ based on the location of scoliosis within the spine (thoracic or lumbar). As infantile scoliosis is more prevalent in boys, the mentioned methods have been predominantly applied to boys, resulting in corresponding outcomes. Consequently, the understanding of how these methods impact girls with scoliosis remains limited.

Overall, it is important to note that there is a statistical predominance of boys in terms of frequency, which aligns with existing knowledge. It is recommended that children in any region undergo a trunk bending test at the beginning of each semester as a routine examination. This would aid in gathering more comprehensive information and insights into scoliosis management.

Moving forward, future research in the field of scoliosis management should aim to address several important aspects that have emerged from the preceding discussions. Firstly, there is a need for more comprehensive studies that investigate the applicability and effectiveness of specialized exercise programs, such as the Klapp, Schroth, Dobomed, Side Shift, and Niederhofferv methods, specifically in toddlers who require the assistance of a guardian. Understanding the potential outcomes, challenges, and feasibility of implementing these programs in such cases would greatly contribute to developing tailored interventions

for this population. Furthermore, it is crucial to conduct further investigations focusing on respiratory function improvement in scoliosis, as previous findings have shown mixed results, except for the Dobomed method. By exploring and refining exercise protocols that specifically target respiratory function, researchers can enhance the overall management and treatment outcomes for scoliosis patients. Additionally, future studies should strive to address the gender disparity observed in existing research, with a particular focus on evaluating the effectiveness of exercise methods in girls with scoliosis. This would provide a more comprehensive understanding of treatment outcomes across different demographic groups. Overall, by undertaking these areas of research, we can advance our knowledge, refine treatment approaches, and ultimately improve the quality of care for individuals with infantile scoliosis.

Conflict of Interest

Not available

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Not available

References

1. Angelopoulou-Sakandami N. Special treatment, developmental and chronic disorders ailments. Thessaloniki: University of Macedonia Publications; c2004.
2. Bartleson JD, Deen HG. Diseases of the Spine; c2011.
3. Berdishevsky H, Lebel VA, Bettany-Saltikov J, Rigo M, Lebel A, *et al.* Physiotherapy scoliosis-specific exercises—a comprehensive review of seven major schools. *Scoliosis and Spinal Disorders*. 2016;11(1):1-52.
4. Berdishevsky H, Lebel VA, Bettany-Saltikov J, Rigo M, Lebel A, Hennes A, *et al.* Physiotherapy scoliosis-specific exercises – a comprehensive review of seven major schools. *Scoliosis and Spinal Disorders*. 2016;11(1):20. DOI:10.1186/s13013-016-0076-9
5. Bettany Saltikov J, Parent E, Romano M, Villagrasa M, Negrini S. Physiotherapeutic scoliosis-specific exercises for adolescents with idiopathic scoliosis. *European Journal of Physical and Rehabilitation Medicine*. 2014;50(1):111-121.
6. Bodetsi A. (Bachelor thesis). Idiopathic scoliosis and rehabilitation. Technological Educational Institute of Western Greece.
7. Chatzipavlou D, *et al.* Spine-What you need to know. Athens: Medical Publications B.X. Paschalidis; c2005.
8. Dandy DJ, Edwards DJ. Basic Orthopedics and Traumatology; c2010.
9. Dantas DDS, De Assis SJC, Baroni MP, Lopes JM, Cacho EWA, Cacho RDO, *et al.* Klapp method effect on idiopathic scoliosis in adolescents: blind randomized controlled clinical trial. *Journal of Physical Therapy Science*. 2017;29(1):1-7.
10. Dobosiewicz K, Durmala J, Kotwicki T. Dobosiewicz method physiotherapy for idiopathic scoliosis. *Studies in Health Technology and Informatics*. 2008;135:228.
11. Drake RL, Vogl W, Mitchell AWM. GREY'S ANATOMY [Translated from English by D. Tousimis, Surgeon]; c2005.
12. Fabian KM, Rożek-Piechura K. Evaluation of Functional Condition in Young Females with Idiopathic Scoliosis. *Rehabilitacja Postępy Rehabilitacji*. 2014;2:13-22. DOI:10.2478/rehab-2014-0034

13. Grivas TB. Idiopathic scoliosis: current views. *Scientific Chronicles/Epistimonika Chronika*; c2019, 2.
14. Iunes DH, Cecílio MBB, Dozza MA, Almeida PR. Quantitative photogrammetric analysis of the Klapp method for treating idiopathic scoliosis. *Brazilian Journal of Physical Therapy*; c2010 Apr, 14(2). <https://doi.org/10.1590/S1413-35552010005000009>
15. Kokkaridas D. Exercise and disability. Thessaloniki: Christouulidis Publications; c2010.
16. Kotzailias DA. Physiotherapy in musculoskeletal diseases system; c2011.
17. Kuru T, *et al.* The effectiveness of three-dimensional Schroth exercises in adolescent idiopathic scoliosis: a randomized controlled clinical trial. *Clinical Rehabilitation*; c2015.
18. Kwan KYH, Cheng AC, Koh HY, Chiu AY, Cheung KMC. Effectiveness of Schroth exercises during bracing in adolescent idiopathic scoliosis: results from a preliminary study-SOSORT Award 2017 Winner. *Scoliosis and Spinal Disorders*. 2017;12:1-7.
19. Kwan MK, Chiu CK, Gani SMA, Wei CCY. Accuracy and safety of pedicle screw placement in adolescent idiopathic scoliosis patients. *SPINE*. 2018;42(5):326-335.
20. Lampiris IE. Orthopedics and Traumatology. Athens: Medical Publications B.X. Paschalidis; c2007.
21. Lee WH, Hu W, Jei X, Ye S, Song H, Ninq X, *et al.* Effect of a combined traditional Chinese medicine treatment on adolescent idiopathic scoliosis: a randomized controlled trial; c2015.
22. Mehta MH. Active correction by side-shift: An alternative treatment for early idiopathic scoliosis. *Scoliosis Prevention*; c1985. p. 126-140.
23. Methimakis G. An article review on effectiveness of strengthening exercises in the treatment of scoliosis during adolescence [Bachelor dissertation, University of Parta, School of Health Rehabilitation Sciences]; c2021.
24. Miller MD. Miller's Review of Orthopaedics; c2010.
25. Morel B, Moueddeb S, Blondiaux E, Richard S, Bachy M, Vialle R, *et al.* Dose, image quality and spine modeling assessment of biplanar EOS micro-dose radiographs for the follow-up of in-brace adolescent idiopathic scoliosis patients. *European Spine Journal*. 2018;27:1082-1088.
26. Negrini S, Donzelli S, Aulisa AG, Czaprowski D, Schreiber S, DE Mauroy JC, *et al.* 2016 SOSORT guidelines: Orthopaedic and rehabilitation treatment of idiopathic scoliosis during growth. *Scoliosis and Spinal Disorders*. 2018;13:3. DOI:10.1186/s13013-017-0145-8
27. Negrini S, Donzelli S, Lusini M, Minnella S, Zaina F. (Year). The effectiveness of combined bracing and exercise in adolescent idiopathic scoliosis based on SRS and SOSORT criteria: A prospective study.
28. Negrini S, Hawes MC, Rigo M, Kotwicki T, Grivas TB, Maruyama T. Physiotherapeutic exercises in the treatment of idiopathic scoliosis at risk of brace treatment. *Scoliosis Research, Scoliosis*; c2006.
29. Netter FH. Atlas of Human Anatomy; c2005.
30. Park JH, Jeon HS, Park HW. Effects of the Schroth exercise on idiopathic scoliosis: A meta-analysis. *European Journal of Physical and Rehabilitation Medicine*. 2017;54(3):440-449.
31. Romano M, Negrini A, Parzini S, Tavernaro M, Zaina F, Donzelli S, *et al.* SEAS (Scientific Exercises Approach to Scoliosis): A modern and effective evidence-based approach to specific physiotherapy exercises for scoliosis; c2015.
32. Romano M, Minozzi S, Zaina F, *et al.* Exercises for adolescent idiopathic scoliosis: A systematic review. *Cochrane Database of Systematic Reviews*; c2013.
33. Sandra J, *et al.* Review of Musculoskeletal Disorders; c2009.
34. Schreiber S, Parent EC, Khodayari Moez E, Hedden DM, Hill DL, Moreau M, *et al.* 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. *PLoS ONE*. 2016;11(12):e0168746. DOI:10.1371/journal.pone.0168746
35. Staheli LT. *Pediatric Orthopedics*; c2011.
36. Symeonidis P. *Epitomy Orthopaedics*. Thessaloniki: University Studio Press; c1997.
37. Tan KJ, Moe MM, Vaithinathan R, Wong HK. Curve progression in idiopathic scoliosis: Skeletal maturity follow-up study; c2009.
38. Vilanakis A, Moscow K. Commentary and Schroth Method [Bachelor thesis, Technological Educational Institute of Western Greece]; c2018.
39. Vrečić A, Glišić M, Živković V. Significance of Schroth Method in the Rehabilitation of Children with Structural Idiopathic Scoliosis. *MedPodml*. 2020;71(1):33-38. DOI:10.5937/mp71-22170

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