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Routine screening for scoliosis in children at primary care level and its significance in the prevention and timely diagnosis of complications

Abstract

Relevance. Scoliosis in children is a common orthopaedic condition that may be accompanied by progressive spinal deformity, impaired function of internal organs and a reduced quality of life. Early detection of postural abnormalities at the primary care level is crucial for timely treatment and the prevention of complications.

Aim. To analyse current approaches to the early detection of scoliosis in children and to assess the importance of routine screening at the primary care level based on a clinical case.

Materials and methods. An analysis of current scientific literature was conducted, along with a clinical analysis of a case of idiopathic scoliosis in an adolescent. The following were assessed: medical history, clinical manifestations, results of laboratory and instrumental diagnostic tests, the progression of the condition, and the effectiveness of treatment and rehabilitation measures.

Results. The presented clinical case demonstrates the progression of spinal deformity in the child, despite the systematic implementation of conservative treatment, which necessitated surgical correction. It has been established that scoliosis in children may be accompanied by multisystem manifestations, which emphasises the need for a multidisciplinary approach involving a paediatrician, orthopaedic surgeon, neurologist, cardiologist and other specialists to ensure comprehensive diagnosis, treatment and rehabilitation. The critical importance

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of the timely detection of early clinical signs of scoliosis at the primary care level has been demonstrated, as this enables the prevention of the progression of the deformity and the development of complications.
Practical significance. It is recommended that the results of this study be applied in the clinical practice of primary care specialists – paediatricians and general practitioners – for the early detection of scoliosis and the timely referral of children for specialist assessment.
Keywords: postural abnormalities; spinal deformity; orthopaedic condition; adolescents; rehabilitation; multidisciplinary approach.

INTRODUCTION

Scoliosis in children is a common orthopaedic condition that may be accompanied by progressive spinal deformity, impaired function of internal organs and a reduced quality of life. Early detection of postural abnormalities in children by primary care specialists is crucial for the timely implementation of treatment and rehabilitation measures and the prevention of complications. The authors S.C. Poon *et al*. [1] noted in their work that early diagnosis of scoliosis in children helps to reduce the risk of progressive spinal deformities and the need for surgical intervention. Researchers J.A. Janicki & B. Alman [2], whilst investigating the problem of scoliosis in children, found that the majority of cases encountered by general practitioners are idiopathic. The severity of the condition depends on the causes and the child's age, and determines the treatment strategy, methods for preventing complications, and quality of life. Therefore, a comprehensive medical history, imaging, early screening, and ultrasound and radiographic examinations are critically important for assessing the presence of abnormalities. It is very important to recognise non-idiopathic scoliosis early in order to identify the cause of the abnormalities and determine the timing and type of intervention. After all, children with congenital scoliosis may already have heart and kidney abnormalities at birth. School-based scoliosis screening is unsatisfactory and is losing popularity. The authors emphasise the importance of outpatient screening programmes, particularly at the primary care level. P. Trobisch *et al*. [3] drew attention to parents' lack of awareness regarding early clinical signs of postural abnormalities in children and the importance of early screening in school-age children at the primary care level. H. Dong *et al*. [4] noted that current research into scientific approaches to the conservative treatment of scoliosis offers somewhat varied perspectives, but the most effective approach is a combination of various evidence-based physiotherapy techniques and exercises specific to scoliosis. C.C. Rymond *et al*. [5] hypothesised that intermittent bracing prevents the progression of the curvature and often leads to a reduction in the degree of curvature in patients, thereby minimising the need for continuous bracing. Analysis of the data revealed that the progression of idiopathic scoliosis in adolescents at the time of peak growth velocity depends on the degree of curvature, the stage of skeletal maturation, and the rate of the pubertal growth spurt. Plotting curvature measurements against height measurements and the stages of ischial tuberosity maturation provides a reliable prediction of the risk of curvature progression in idiopathic scoliosis based on the Risser scale (stages of skeletal maturity based on pelvic radiographs), which assesses the ossification of the iliac crest on a scale from 0 to 5. In other words, if skeletal growth plates are not yet mature and bone growth is continuing, the risk of scoliosis progression is high because of residual skeletal growth potential. Y. Jiang *et al*. [6] recommend using the Schroth method, combined with training to stabilise the trunk muscles, as part of the treatment strategy. The authors consider the application of this method to be the optimal strategy for addressing the problems of idiopathic scoliosis. O.A. Bubenchyk & V.I. Boiko [7] analysed in their work modern innovative approaches to the physiotherapy of idiopathic scoliosis, which is the most common form in children. It is emphasised that the main treatment options are observation, scoliosis-specific physiotherapy exercises (Schroth Method, SEAS, BSPTS, Dobomed, FITS, Side Shift), immobilisation and surgical correction. All other methods are used as supplementary general strengthening measures, etc. The authors have proposed a rehabilitation programme that includes mobilisation of the curved section of the spine, correction of the deformity, and stabilisation of the spine in the corrected position. For each child, a rehabilitation programme is developed based on an individualised approach, regularity and consistency, the integration of general and specific exercises, and a gradual increase in workload, which has a positive effect on preventing the progression of scoliosis in adolescents. V.I. Bondarchuk *et al*. [8] point out that scoliosis is a significant scientific and practical problem in paediatric traumatology and orthopaedics, whilst postural abnormalities in children constitute a multidisciplinary problem, particularly in cases where complications arise involving other organs and systems. Approaches to the early diagnosis of postural abnormalities in children at the primary care level play a key role in prevention, appropriate treatment and rehabilitation. For mass screening of postural abnormalities in schoolchildren, physical examination methods (the Adams forward bend test) and computer-based technologies (scoliometry, topography) can be used. However, existing methods do not fully address the challenges of scoliosis diagnosis; therefore, a thorough search and development of specialised programmes for mass screening of children to

detect postural abnormalities continue, which would meet the requirements of evidence-based medicine: non-invasiveness; safety; standardisation of approaches; ease of implementation; cost-effectiveness; and diagnostic efficacy. The aim of this study was, based on a review of the literature and a clinical case study of a child, to examine current perspectives on scoliosis and to determine the clinical significance of its early diagnosis in children by primary care specialists.

MATERIALS AND METHODS

The study was conducted as a clinical case report incorporating elements of an analytical review of the current scientific literature on the problem of scoliosis in children, its early diagnosis and the importance of routine screening in primary care. The research methodology included an analysis of scientific publications, a clinical and medical history-based approach, a physical examination of the patient, an analysis of the results of laboratory and instrumental diagnostic tests, and an assessment of the condition progression. A search and analysis were conducted of scientific sources indexed in PubMed and Google Scholar, focusing on the aetiology, pathogenesis, clinical manifestations, screening and treatment of scoliosis in children and adolescents. Publications primarily from the last 3-5 years were used for the analysis. The search for sources was carried out using keywords.

The clinical part of the study was based on a case analysis of patient D., aged 15, who had been diagnosed with progressive idiopathic scoliosis. As part of the study, an assessment was carried out of the patient's medical history and personal history, physical examination findings, laboratory findings, and the results of electrocardiography, echocardiography, and ultrasound examinations of the abdominal organs and kidneys, as well as the consultative opinions of relevant specialists. During the assessment of the clinical case, general clinical examination methods were applied: taking a history of complaints and medical history, examination, palpation, percussion, auscultation, and laboratory and instrumental diagnostic tests in accordance with current clinical approaches to the management of children with musculoskeletal disorders. The analysis of the clinical case was conducted taking into account the specific features of the clinical course of scoliosis, the presence of complications, and a multidisciplinary approach to the patient's management and treatment.

The study was conducted in accordance with the principles of bioethics and deontology. Written informed consent was obtained from the patient's parents and the patient herself for participation in the study and for the use of clinical data and photographic material for scientific purposes. During the study, international ethical standards for conducting medical research involving human subjects, as set out in the World Medical Association's Declaration of Helsinki [9] and Ethics and data protection [10], were adhered to in order to ensure the confidentiality of personal data and the ethical conduct of the research.

RESULTS

Understanding of the prevalence and early prognostic factors of scoliosis in children and adolescents is limited, which poses challenges for the development of preventive strategies. These are essentially healthy children who do not complain of any symptoms. The prevalence of scoliosis among children and adolescents is high (mostly concentrated in the 10°-19° range), with an upward trend, and occurs in 2-4% of children, most commonly between the ages of 10 and 16. The incidence is roughly the same among boys and girls; however, in girls, scoliosis is significantly more likely to be progressive and to be accompanied by the development of complications [11-12].

Scoliosis is a lateral curvature of one or more segments of the spine combined with rotation of the vertebrae, leading to a deviation of the spine. Severe spinal curvatures lead to alterations in the position of the organs within the thoracic and abdominal cavities, a reduction in their functional capacity, chronic pain and psychological distress [13-14]. The development of scoliosis may be associated with various factors, including genetic and environmental ones; the most common of these are: hereditary factors, connective tissue dysfunction, congenital developmental anomalies, trauma, metabolic disorders, excess body weight, and so on [15-16]. At the same time, in a significant proportion of patients, the cause remains unknown, allowing the condition to be classified as idiopathic scoliosis. Consequently, the predictors of scoliosis development include: gender, age, body mass index, ethnicity, environmental factors and lifestyle [17].

The pathogenesis of scoliosis is characterised by the development of a three-dimensional deformity of the spine: a frontal deviation of the spinal axis, which gave rise to the term "scoliosis"; horizontal rotation of the vertebrae about the vertical axis, usually towards the convex side of the curve – a pathological rotation that is most pronounced at the apex of the spinal deformity; in the sagittal plane – flattening of the physiological curves, primarily thoracic kyphosis, leading to the formation of a so-called "flat back" [18-19]. The classification of scoliosis is based on a number of criteria: by aetiology: congenital – associated with developmental abnormalities of the vertebrae, ribs and connective tissue dysplasia; acquired – resulting from diseases, injuries and other causes [20-21]. Depending on the location of the pathological process, the following are distinguished: cervical, thoracic, lumbar and mixed (thoracolumbar, lumbosacral, etc.). Taking into account static function, a distinction is made between compensated and uncompensated scoliosis. Based on the shape of the spinal deformity, the following types

are distinguished: with a single curve (C-shaped); with two curves – S-shaped; with three curves – Z-shaped. Radiographic classification is based on the angle of lateral curvature and is expressed in four degrees of severity. Based on the age of onset, the following types are distinguished: infantile: occurring in children under 3 years of age; juvenile: occurring in children aged 4 to 10 years; adolescent: occurring in children aged 11 to 18 years. Idiopathic scoliosis in adults: diagnosed at any time after the age of 18, once skeletal growth is complete.

Congenital scoliosis – arises as a result of vertebral abnormalities present at birth. This is a consequence of improper vertebral formation during embryonic development [22]. Neuromuscular scoliosis – is caused by specific mechanisms associated with insufficient muscular support and nervous control. It can be caused by various conditions or diseases affecting the functioning of the muscles and the nervous system, such as trauma, cerebral palsy, spina bifida, myodystrophies and other neuromuscular disorders. Neuromuscular scoliosis often progresses and causes serious problems, such as respiratory and cardiac dysfunction, back pain, restricted movement and physical deformities [23].

Degenerative scoliosis in adults (usually after the age of 40-60) is also recognised, associated with age-related changes in the spine. It can often develop as a consequence of mild scoliosis in childhood, but is usually linked to age-related changes in the spine, such as degenerative changes in the intervertebral discs (disc degeneration), osteoporosis, osteoarthritis (arthritis) or osteochondrosis (degeneration of cartilage and bone). These changes lead to a deterioration in the structure of the spine, resulting in the development of scoliosis. Symptoms and their severity may appear as the body ages and vary depending on the degree of scoliosis and the patient's individual characteristics [24-25].

The most commonly diagnosed form is idiopathic scoliosis. In most children, it is asymptomatic in the early stages; however, as the deformity progresses, symptoms such as back pain, muscle weakness, rapid fatigue, pain in the limbs or paraesthesia may develop. Phenotypic features include asymmetry of the shoulder girdle and shoulder blades (winged), abnormal positioning of the head relative to the pelvis, an uneven waistline, pelvic tilt, limb length discrepancy, a constant lean to one side, and sometimes skin markers along the spine, such as dimples, patches of hair, or changes in skin colour. These changes become more pronounced as scoliosis progresses [26].

Mild forms of scoliosis often go unnoticed. Initial symptoms may include mild back pain or stiffness following prolonged sitting or standing. It is therefore vital that parents and teachers are aware of the early clinical signs of the condition to ensure timely screening and referral of the child for specialist assessment. To determine the subsequent management strategy for the patient – in particular, to confirm the diagnosis, assess the degree of deformity, and select treatment and rehabilitation measures – a consultation with an orthopaedic surgeon is essential. This is due to a number of factors that increase the risk of scoliosis progression: the greater the angle of curvature, the higher the likelihood of further deformity, particularly during periods of rapid growth and puberty [27].

In most children, spinal curvature does not tend to progress significantly and remains consistently mild; however, even in such cases, regular monitoring by a specialist is necessary. Severe forms of scoliosis can lead to secondary changes in internal organs, in particular displacement of mediastinal organs, lung deformation, and impaired heart and kidney function. Consequently, early treatment significantly increases the chances of preventing the development of serious complications and reducing the negative impact of the condition on the child's body [28]. Thus, a review of current scientific literature on the problem of scoliosis in children demonstrates that idiopathic scoliosis does not always have a clear cause, genetic determinant or triggering factor. Early detection of scoliosis at the primary care level helps to reduce the incidence of severe deformities and the need for surgical treatment.

CLINICAL CASE

A 15-year-old girl, D., was admitted to the paediatric ward for treatment of obstructive bronchitis against a background of acute respiratory infection. On admission, she complained of a headache, a rise in body temperature to 39.7°C, a cough and shortness of breath, which had developed the night before her admission. The illness began one day prior to admission with hyperthermia, headache and a cough. The medical history indicates that the child had developed in line with age-appropriate norms, had suffered from upper respiratory tract infections from time to time and had received outpatient treatment. She was vaccinated in accordance with the immunisation schedule and has no history of allergies. Previous infections include chickenpox and rubella at the ages of 3.5 and 6 years, respectively.

At the age of 8-9 years, the first signs of scoliosis appeared: slight asymmetry of the shoulder girdle; the right shoulder was slightly higher than the left, but this did not bother the child. Subsequently, the spine began to curve to the right, and later to the left as well. During puberty (aged 10-12), progression of the spinal deformity was noted, with a pronounced abnormal curvature and protrusion of the right shoulder blade. At the same time, the child began to suffer more frequently from acute respiratory infections and periodically complained of headaches and stabbing pains in the heart region.

The patient was seen several times by an orthopaedic surgeon and systematically followed the recommended treatment measures, including courses of manual therapy, massage, physiotherapy exercises

and physiotherapy. Despite a slight positive effect, the spinal deformity gradually progressed, necessitating surgical correction, which was carried out in several stages from the age of 12. The photographs show the child's condition before (Fig. 1) and after (Fig. 2) surgical correction.

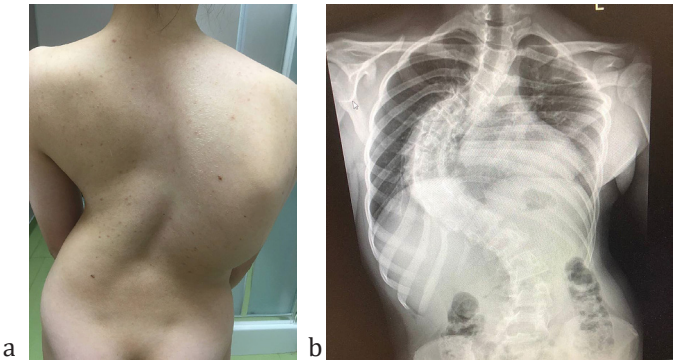

Figure 1. The child before surgical correction
Note: a) – photograph of the patient; b) – radiograph
Source: provided by the authors

Figure 2. The child after surgical correctionn
Note: photograph of the patient following surgical treatment
Source: provided by the authors

The child was screened for genetic predisposition, but the result was negative. The child's general condition was assessed as moderate. Blood pressure was 105-110/70 mm Hg. The skin was pale, breathing was laboured, and wheezing was auscultated. On physical examination of the respiratory system, auscultation revealed weakened, laboured breathing with numerous dry wheezing sounds. On percussion, the cardiac borders were unaltered; heart sounds were rhythmic and resonant; heart rate was 78 beats per minute. The abdomen was soft, painless and accessible to palpation; the liver and spleen did not protrude beyond the costal margin, and the bowel showed no pathological changes. Pasternatsky's sign was negative on both sides. Urination was unimpeded and painless, with adequate diuresis, and bowel movements were regular.

According to the results of laboratory tests, the full blood count revealed no significant abnormalities: haemoglobin level – 125 g/L, red blood cells – 4.8×10^{12}/L, white blood cells – 4.5×10^{9}/L: e – 2%; p – 4%; s – 63%; l – 22%; m – 9%, erythrocyte sedimentation rate (ESR) – 13 mm/h. Blood biochemical parameters were within the age-appropriate range: total protein 67 g/L; albumin 54%; globulins 46% (α1 – 4%; α2 – 10%; β – 12%; γ – 20%); creatinine – 0.46 mmol/L; urea – 6.7 mmol/L; ALT – 18 mmol/L; AST – 21 mmol/L; cholesterol – 4.7 mmol/L; glucose – 4.15 mmol/L; potassium – 4.2 mmol/L; sodium – 128 mmol/L; total bilirubin – 14.7 μmol/L; inflammatory markers (CRP, ASL-O) were negative. Urinalysis showed no abnormalities. The ECG showed sinus arrhythmia with a normal electrical axis of the heart. Echocardiography: satisfactory myocardial contractility (ejection fraction – 66%), abnormal chordae in the left ventricle.

Ultrasound of the abdominal organs and kidneys revealed no abnormalities: the liver was not enlarged, with a homogeneous structure; the gallbladder showed an anatomical bend, with a wall thickness of 0.2 cm

and homogeneous contents. The pancreas had clear contours and a homogeneous structure. The spleen was unaltered. Right kidney: 11.7 × 6.2 cm; left kidney: 12.4 × 6.4 cm. The renal pelvis is not dilated; echogenicity is unremarkable. Consultations with an otolaryngologist and an ophthalmologist revealed no abnormalities. Thus, this clinical case demonstrates that, despite the absence of a genetic determinant, significant causes, constant dynamic monitoring by an orthopaedic surgeon, and the systematic implementation of recommendations – in particular, manual therapy, massage, physiotherapy exercises and physiotherapy – the girl's spinal deformity gradually progressed, necessitating surgical correction.

A review of recent scientific literature on the problem of scoliosis in children and the clinical case of an adolescent patient with idiopathic scoliosis demonstrates that early detection of the problem at the primary care level and timely treatment prevent the progression of idiopathic scoliosis and the development of its complications. In particular, J. Li *et al*. [29] highlight the increasing prevalence of scoliosis among children and adolescents today, which necessitates more thorough research into the causes, as well as the development and refinement of screening methods for this condition by primary care specialists. Paediatric and adolescent idiopathic scoliosis occupies a special place in research, representing a pressing medical and social problem due to the rising incidence of cases, the increasing severity of the condition, and the progression of complications.

The aetiopathogenesis of paediatric scoliosis remains a topical area of research that requires thorough scientific investigation. The authors T.N. Aulia *et al*. [30] regarded scoliosis as a multifactorial condition in which genetic, hormonal, neuromuscular and biomechanical factors play an important role. It has been established that the progression of the deformity depends on the complex interaction of hereditary and environmental factors. Particular attention is paid to the early detection of the condition and the refinement of diagnostic methods. According to A.H. Jinnah *et al*. [31], early diagnosis allows conservative treatment to be initiated in a timely manner and prevents the development of severe forms of the condition. The progression of idiopathic scoliosis is most commonly observed during periods of rapid growth in children, particularly in adolescent girls. The clinical case presented here confirms that idiopathic scoliosis does not always have a clear genetic link, a significant cause or trigger. It is evident from the clinical case presented that the first clinical signs were detected in the child as early as the age of 8-9 years; however, the gradual progression of the deformity persisted even despite conservative treatment, and the most pronounced progression of the deformity was observed at the age of 10-12 years. Furthermore, C. Shere & E.M. Clark [32] found a correlation between joint hypermobility and the development of adolescent idiopathic scoliosis, which implies a higher risk of developing scoliosis in children with undifferentiated dysplasia of the body's connective tissue framework, i.e. an additional risk factor for the onset of scoliosis. Y. Fan and Q. Zhan [33], as well as J.A. Morcuende *et al*. [34], highlight the importance of an individualised approach to each child and emphasise the importance of the general practitioner's involvement in screening for postural abnormalities in school-age children. The clinical case presented here also confirms the need for general practitioners to be more vigilant regarding the early signs of scoliosis.

Scientific research suggests that the effectiveness of conservative treatment methods for patients with adolescent idiopathic scoliosis remains a matter of debate and requires an in-depth study of the interaction between the factors influencing the course of pathological changes. At the same time, modern technologies for monitoring spinal deformities are designed to reduce radiation exposure. A literature review by T.P.C. Schlösser & R.M. Castelein [35] highlights the potential of using three-dimensional surface topography, digital photogrammetry and other non-invasive methods for assessing posture. An important area of current research is the evaluation of the effectiveness of various methods of treatment and rehabilitation measures for children with scoliosis. A meta-analysis by M. Mangone & M. Vanadia [36] confirms that scoliosis-specific physiotherapy exercises help to reduce the angle of curvature and improve patients' functional status. Similar results were obtained by Y. Chen & X. Yuan [37], who demonstrated the positive impact of individualised, specialised rehabilitation programmes on the progression of scoliosis. Of particular interest is the correlation between the level of physical activity and the risk of developing scoliosis, as reported by X. Qi *et al*. [38]. It has been demonstrated that regular physical activity can have a positive effect on patients' functional status and contribute to an improved quality of life, as shown by E. Hannink *et al*. [39]. Further data on the effectiveness of various types of specialised exercises are presented in the study by J. Miao *et al*. [40], where Schroth exercises and active self-correction techniques demonstrate the best results in controlling the progression of the deformity. Equally important are the consequences of scoliosis for the quality of life of children and adolescents. Patients also frequently complain of pain, restricted physical activity and psychological distress, which necessitates a multidisciplinary professional approach to treating the condition.

Thus, the findings of recent international studies and the clinical case presented here confirm that scoliosis in children is a complex, multifactorial condition that requires routine screening at the primary care level. It is the paediatrician or general practitioner (GP) who may be the first to detect early clinical signs of postural

abnormalities and refer the child to an orthopaedic surgeon in a timely manner. Early detection of the condition will allow treatment to begin promptly and reduce the risk of severe deformities and complications. Scoliosis is a condition that requires early diagnosis, the widespread implementation of modern non-invasive monitoring methods, and the use of evidence-based physiotherapy and rehabilitation programmes to prevent the progression of spinal deformity and complications affecting other organs and systems.

CONCLUSIONS

1. A review of the literature has revealed that scoliosis in children is a complex, multifactorial condition, and the clinical case presented here demonstrates that even with regular monitoring and the implementation of conservative treatment and rehabilitation measures, spinal deformity may progress and require surgical correction. Raising awareness of the issue of scoliosis among primary care specialists – paediatricians and general practitioners (GPs) – will facilitate the early detection of signs of scoliosis and the timely referral of children to specialists such as orthopaedic surgeons, vertebrologists and others.

2. This clinical case confirms the multidisciplinary nature of the problem of scoliosis, as the child's treatment involved a paediatrician, an orthopaedic surgeon, a neurologist, a cardiologist, a cardiac surgeon and other specialists. This highlights the need for a comprehensive approach to the diagnosis, treatment and rehabilitation of children with scoliosis. The insidious nature of scoliosis lies in the fact that even with early detection, timely rehabilitation measures and appropriate conservative treatment, it is not always possible to fully prevent severe deformities and complications, as demonstrated by this clinical case.

3. Postural abnormalities primarily result in a cosmetic defect and non-physiological dysmorphism, which in turn leads to a reduction in physical activity and functional capacity, as well as the suppression of the child's individual physical abilities. Over time, pain develops. As the biomechanics of the spine change, children as young as those in primary school may be diagnosed with degenerative-dystrophic changes, osteochondrosis and even intervertebral disc herniation. Furthermore, the progression of scoliosis leads to changes in the topography and functional capacity of the internal organs of the thoracic and abdominal cavities, as well as the central nervous system.

4. The principles of an individualised approach to a child's rehabilitation programme are based on regularity and consistency, a combination of general and specific exercises, and a gradual increase in physical activity, which has a positive effect on preventing the progression of scoliosis and its complications. A lack of awareness among parents, nursery staff and teachers regarding the early signs of postural abnormalities can lead to delays in seeking medical help for the child. The use of simple visual criteria for assessing a child's posture allows even a non-specialist to suspect spinal deformity at an early stage. The high risk of early disability and impaired quality of life highlights the urgency of the problem of scoliosis and calls for an intensive search for new methods of diagnosis, correction and prevention of complications.

5. Prospects for further research lie in studying the effectiveness of early screening programmes, personalised rehabilitation approaches and multidisciplinary models for monitoring children with scoliosis, with a view to preventing the progression of the deformity, the development of complications and a reduced quality of life in a timely manner.

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CONFLICT OF INTEREST

None.

REFERENCES

[1] Poon SC, Nguyen C, Badkoobehi H, Cho RH. Adolescent idiopathic scoliosis overview and management. Indian J Orthop. 2025;60:854–62. DOI: 10.1007/s43465-025-01627-8

[2] Janicki JA, Alman B. Scoliosis: Review of diagnosis and treatment. Paediatr Child Health. 2007;12(9):771–6. DOI: 10.1093/pch/12.9.771

[3] Trobisch P, Suess O, Schwab F. Idiopathic scoliosis. Dtsch Arztebl Int. 2010;107(49):875–83. DOI: 10.3238/arztebl.2010.0875

[4] Dong H, You M, Li Y, Wang B, Huang H. Physiotherapeutic scoliosis-specific exercise for the treatment of adolescent idiopathic scoliosis: A systematic review and network meta-analysis. Am J Phys Med Rehabil. 2024;104(1):14–25. DOI: 10.1097/phm.0000000000002524

[5] Rymond CC, Sinha R, Taha O, Weintraub M, Givens R, Elfilali MM, et al. Brace yourself (part-time): Part-time bracing leads to curve improvement in juvenile idiopathic scoliosis. Spine Deform. 2026;14(1):67–75. DOI: 10.1007/s43390-025-01162-4

[6] Jiang Y, Peng H, Song Y, Huang L, Chen H, Li P, et al. Evaluating exercise therapies in adolescent idiopathic scoliosis: A systematic review with Bayesian network meta-analysis. PeerJ. 2025;13:e19175. DOI: 10.7717/peerj.19175
[7] Bubenchyk OA, Boiko VI. Effectiveness of physical rehabilitation in preventing the progression of scoliosis in adolescents. Nursing. 2024;4:38–42. DOI: 10.11603/2411-1597.2024.4.15044
[8] Bondarchuk VI, Myndziv KV, Guley AO. The role of massage in physical therapy of patients with scoliotic posture. Rehabil Recr. 2023;17:32–8. DOI: 10.32782/2522-1795.2023.17.4
[9] World Medical Association. World Medical Association Declaration of Helsinki: Ethical principles for medical research involving human subjects. JAMA. 2013;310(20):2191–4. DOI: 10.1001/jama.2013.281053
[10] European Commission. Ethics and data protection. Brussels: European Commission; 2021. 22 P.
[11] Guillaume TJ, Truong WH, Harding D, Hingtgen M, The VanGoethem Family. Idiopathic scoliosis. Understanding and managing the condition: A practical guide for families. St. Paul: Gillette Children's Healthcare Press; 2024. 230 P.
[12] Hresko MT, Talwalkar VR, Schwend RM, AAOS, SRS, POSNA. Early detection of idiopathic scoliosis in adolescents. J Bone Joint Surg. 2016;98(16):e67. DOI: 10.2106/jbjs.16.00224
[13] Otomo N, Khanshour AM, Koido M, Takeda K, Momozawa Y, Kubo M, et al. Evidence of causality of low body mass index on risk of adolescent idiopathic scoliosis: A Mendelian randomization study. Front Endocrinol. 2023;14:1089414. DOI: 10.3389/fendo.2023.1089414
[14] Rinonapoli G, Pace V, Ruggiero C, Ceccarini P, Bisaccia M, Meccariello L, et al. Obesity and bone: A complex relationship. Int J Mol Sci. 2021;22(24):13662. DOI: 10.3390/ijms222413662
[15] Catanzariti JF, Rimetz A, Genevieve F, Renaud G, Mounet N. Idiopathic adolescent scoliosis and obesity: Prevalence study. European Spine Journal, 2023;32(6):2196–202. DOI: 10.1007/s00586-023-07709-1
[16] de Sèze M, Cugy E. Pathogenesis of idiopathic scoliosis: A review. Ann Phys Rehabil Med. 2012;55(2):128–38. DOI: 10.1016/j.rehab.2012.01.003
[17] Peng Y, Wang SR, Qiu GX, Zhang JG, Zhuang QY. Research progress on the etiology and pathogenesis of adolescent idiopathic scoliosis. Chin Med J. 2020;133(4):483–93. DOI: 10.1097/cm9.0000000000000652
[18] Chopra S, Larson AN, Kaufman KR, Milbrandt TA. Accelerometer-based assessment of daily physical activity and sedentary time in adolescents with idiopathic scoliosis. PLoS One. 2020;15(9):e0238181. DOI: 10.1371/journal.pone.0238181
[19] Chen Y, Zhang Z, Zhu Q. The effect of an exercise intervention on adolescent idiopathic scoliosis: A network meta-analysis. J Orthop Surg Res. 2023;18(1):655. DOI: 10.1186/s13018-023-04137-1
[20] Wang F, Wang X, Medina O, Yong M, Lin G, Sun X, et al. Prevalence of congenital scoliosis in infants based on chest-abdomen X-ray films detected in the emergency department. European Spine Journal, 2021;30(7):1848–57. DOI: 10.1007/s00586-021-06779-3
[21] Lacroix M, Khalife M, Ferrero E, Clément O, Nguyen C, Feydy A. Scoliosis. Semin Musculoskelet Radiol. 2023;27(5):529–44. DOI: 10.1055/s-0043-1772168
[22] Gou Y, Lei H, Zeng Y, Tao J, Kong W, Wu J. The effect of pilates exercise training for scoliosis on improving spinal deformity and quality of life: Meta-analysis of randomized controlled trials. Medicine. 2021;100(39):e27254. DOI: 10.1097/md.0000000000027254
[23] Glavaš J, Rumboldt M, Karin Ž, Matkovic R, Bilic-Kirin V, Buljan V, et al. The impact of physical activity on adolescent idiopathic scoliosis. Life. 2023;13(5):1180. DOI: 10.3390/life13051180
[24] Dou Q, Zhu Z, Zhu L, Wang W, Guo L, Ru S, et al. Academic-related factors and daily lifestyle habits associated with adolescent idiopathic scoliosis: A case-control study. Environ Health Prev Med. 2023;28:23. DOI: 10.1265/ehpm.22-00243
[25] Gargano G, Oliva F, Migliorini F, Maffulli N. Melatonin and adolescent idiopathic scoliosis: The present evidence. Surgeon. 2022;20(6):e315–21. DOI: 10.1016/j.surge.2021.07.008
[26] Bondar K, Nguyen A, Vatani J, Kessler J. The demographics and epidemiology of infantile, juvenile, and adolescent idiopathic scoliosis in a Southern California integrated health care system. Spine. 2021;46(21):1468–77. DOI: 10.1097/brs.0000000000004046
[27] Sung S, Chae HW, Lee HS, Kim S, Kwon JW, Lee SB, et al. Incidence and surgery rate of idiopathic scoliosis: A nationwide database study. Int J Environ Res Public Health. 2021;18(15):8152. DOI: 10.3390/ijerph18158152
[28] Li D, Mo H, Yang S. From a biomechanical perspective: Pathogenesis, clinical manifestations and treatment strategies of adolescent idiopathic scoliosis. Front Pediatr. 2025;13:1649483. DOI: 10.3389/fped.2025.1649483
[29] Li J, Yuan T, Yang Z, Wang L. Letter to the Editor Concerning "The role of liposomal bupivacaine in multimodal pain management following posterior spinal fusion for adolescent idiopathic scoliosis" by Changoor et al. Spine. 2025;50(2):E36–37. DOI: 10.1097/brs.0000000000005128

[30] Aulia TN, Djufri D, Gatam L, Yaman A. Etiopathogenesis of adolescent idiopathic scoliosis (AIS): Role of genetic and environmental factors. Narra J. 2023;3(3):e217. DOI: 10.52225/narra.v3i3.217
[31] Jinnah AH, Lynch KA, Wood TR, Hughes MS. Adolescent idiopathic scoliosis: Advances in diagnosis and management. Curr Rev Musculoskelet Med. 2025;18(2):54–60. DOI: 10.1007/s12178-024-09939-2
[32] Shere C, Clark EM. Systematic review of the association between isolated musculoskeletal hypermobility and adolescent idiopathic scoliosis. Arch Orthop Trauma Surg. 2023;143(6):3055–76. DOI: 10.1007/s00402-022-04508-z
[33] Fan Y, Zhan Q. Letter to the Editor concerning "Radiation-free 3D assessment of back height differences via three-dimensional depth sensing in adolescent idiopathic scoliosis: Prospective, single-center, observational study" by S. Chen, et al. (Eur Spine J [2025]; doi:10.1007/s00586-025-09154-8). European Spine Journal, 2026;35(1):307–8. DOI: 10.1007/s00586-025-09482-9
[34] Morcuende JA, Minhas R, Dolan L, Stevens J, Beck J, Wang K, et al. Allelic variants of human melatonin 1A receptor in patients with familial adolescent idiopathic scoliosis. Spine. 2003;28(17):2025–8. DOI: 10.1097/01.brs.0000083235.74593.49
[35] Schlösser TPC, Castelein RM. Reply to the Letter to the Editor of Zehao Jing et al. concerning "Scoliosis convexity and organ anatomy are related" by T.P.C. Schlösser et al. European Spine Journal, 2018;27(2):521. DOI: 10.1007/s00586-017-5251-z
[36] Mangone M, Vanadia M. Answer to the second letter to the Editor of J. Padulo et al. concerning: "Vertebral rotation in adolescent idiopathic scoliosis calculated by radiograph and back surface analysis-based methods: correlation between the Raimondi method and rasterstereography" by Mangone M, Raimondi P, Paoloni M, Pellanera S, Di MA, Di RS, Vanadia M, Dimaggio M, Murgia M, Santilli V (2013) Eur Spine J 22:367–371. European Spine Journal. 2014;23:924–6. DOI: 10.1007/s00586-014-3183-4
[37] Chen Y, Yuan X. Letter to the editor concerning "Epidemiological trends and predictive factors of adolescent scoliosis in qingdao: Insights from a large-scale screening program (2022-2024)" by du X, et al. European Spine Journal, 2025;34(12):5843–4. DOI: 10.1007/s00586-025-09426-3
[38] Qi X, Peng C, Fu P, Zhu A, Jiao W. Correlation between physical activity and adolescent idiopathic scoliosis: A systematic review. BMC Musculoskelet Disord. 2023;24:978. DOI: 10.1186/s12891-023-07114-1
[39] Hannink E, Toye F, Newman M, Barker KL. The experience of living with adolescent idiopathic scoliosis: A qualitative evidence synthesis using meta-ethnography. BMC Pediatr. 2023;23:373. DOI: 10.1186/s12887-023-04183-y
[40] Miao J, Niu S, Wang J. Letter to the editor concerning "Presence of compensatory curve predicts postoperative curve progression in congenital scoliosis after thoracolumbar hemivertebra resection and short fusion" by Xu Y, et al. European Spine Journal, 2024;33:4024. DOI: 10.1007/s00586-024-08466-5

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Рутинний скринінг сколіозу у дітей на первинній ланці та його значення в профілактиці та своєчасній діагностиці ускладнень

Анотація

Актуальність. Сколіоз у дітей є поширеною ортопедичною патологією, що може супроводжуватися прогресуючою деформацією хребта, порушенням функції внутрішніх органів та зниженням якості життя. Раннє виявлення порушень постави на первинній ланці медичної допомоги має важливе значення для своєчасного лікування та профілактики ускладнень.

Мета. Проаналізувати сучасні підходи до раннього виявлення сколіозу у дітей та оцінити значення рутинного скринінгу на первинній ланці на основі клінічного випадку.

Матеріали та методи. Проведено аналіз сучасних наукових джерел та клінічний аналіз випадку ідіопатичного сколіозу у дитини підліткового віку. Оцінювалися анамнестичні дані, клінічні прояви, результати лабораторних та інструментальних досліджень, динаміка перебігу захворювання та ефективність лікувально-реабілітаційних заходів.

Результати. У представленому клінічному випадку продемонстровано прогресування деформації хребта у дитини, попри систематичне виконання консервативного лікування, що зумовило необхідність хірургічної корекції. Встановлено, що сколіоз у дітей може супроводжуватися мультисистемними проявами, що підкреслює необхідність мультидисциплінарного підходу із залученням педіатра, ортопеда-травматолога, невролога, кардіолога та інших спеціалістів для забезпечення комплексної діагностики, лікування та реабілітації. Показано критичну важливість своєчасного виявлення ранніх клінічних ознак
сколіозу на первинній ланці медичної допомоги, що дозволяє попереджати прогресування деформації та розвитку ускладнень.

Практичне значення. Результати дослідження рекомендується застосовувати в практичній діяльності фахівців первинної медичної допомоги – педіатрів та сімейних лікарів для раннього виявлення сколіозу та своєчасного направлення дітей на спеціалізоване обстеження.

Ключові слова: порушення постави; деформація хребта; ортопедична патологія; підлітки; реабілітація; мультидисциплінарний підхід.