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- 13.00.00 Pedagogika fanlari
- 13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
- 13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
- 13.00.03 Maxsus pedagogika
- 13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
- 13.00.05 Kasb-hunar ta'limi nazariyasi va metodikasi
- 13.00.06 Elektron ta'lim nazariyasi va metodikasi (ta'lim sohaları va bosqichlari bo'yicha)
- 13.00.07 Ta'limda menejment
- 13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
- 13.00.09 Ijtimoiy pedagogika
- 07.00.00 Tarix fanlari
- 19.00.00 Psixologiya fanlari
- 01.00.00 Fizika-matematika fanlari
- 02.00.00 Kimyo fanlari
- 03.00.00 Biologiya fanlari
- 09.00.00 Falsafa fanlari
- 10.00.00 Filologiya fanlari
- 11.00.00 Geografiya fanlari

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HISTORICAL STAGES IN THE STUDY AND TREATMENT OF SCOLIOSIS (SPINAL CURVATURE)

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Organization and Management of Sports Events

Abstract: Historical development of scoliosis, as well as the stages in the formation of its diagnostic and treatment methods, are examined. The contributions of scientists who studied scoliosis from ancient times to modern medicine are analysed, including Hippocrates, Galen, Avicenna, Ambroise Paré, Lewis Sayre, and Paul Harrington. Early diagnostic methods are described in detail, including visual observation, the forward bending test, palpation, and examination using mechanical devices. The main treatment approaches are also considered: therapeutic exercises and physiotherapy, brace treatment, and the development of surgical methods. It is emphasised that scoliosis, shaped by centuries of scientific experience, is now effectively treated through early diagnosis, conservative methods, and surgical intervention.

Key words: scoliosis, Hippocrates, Galen, Avicenna, Ambroise Paré, Lewis Sayre, Paul Harrington, spinal curvature, orthopaedics, physiotherapy, therapeutic exercise, brace, traction, diagnostics, rehabilitation, surgical treatment, Adams test, muscle balance, spinal surgery, prevention.

Annotatsiya: Skolioz kasalligining tarixiy rivojlanishi hamda uni aniqlash va davolash usullarining shakllanish bosqichlari yoritiladi. Qadimgi davrdan zamonaviy tibbiyotgacha bo'lgan jarayonda skoliozni o'rganib kelgan olimlar – Gippokrat, Galen, Avicenna, Ambroise Paré, Lewis Sayre va Paul Harrington kabi olimlarning ilmiy hissalarini tahlil qilinadi. Skoliozni aniqlashning dastlabki usullari, jumladan kuzatish, oldinga egilish testi, palpatsiya hamda mexanik moslamalar orqali tekshirish usullari batafsil bayon etiladi. Davolash yo'nalishlari sifatida davolovchi gimnastika va fizioterapiya, korset bilan davolash hamda jarrohlik usullarining rivojlanishi ko'rib chiqiladi. Skolioz kasalligi asrlar davomida shakllangan ilmiy tajriba asosida bugungi kunda erta diagnostika, konservativ davolash va jarrohlik usullari orqali samarali davolanayotgan kasallik sifatida baholanadi.

Kalit so'zlar: skolioz, Gippokrat, Galen, Avicenna, Ambroise Paré, Lewis Sayre, Paul Harrington, umurtqa pog'onasi qiysayishi, ortopediya, fizioterapiya, davolovchi gimnastika, korset (brace), traksiya, diagnostika, reabilitatsiya, jarrohlik davolash, Adams testi, mushaklar muvozanati, spinal jarrohlik, profilaktika.

Аннотация: Историческое развитие заболевания сколиоз, а также этапы формирования методов его диагностики и лечения рассматриваются с научной точки зрения. Анализируется вклад учёных, изучавших сколиоз с древних времён до современной медицины, таких как Гиппократ, Гален, Авиценна, Амбруаз Парэ, Льюис Сэйр и Пол Харрингтон. Подробно описаны ранние методы диагностики сколиоза, включая визуальное наблюдение, тест наклона вперёд, пальпацию и обследование с использованием механических устройств. Рассматриваются основные направления лечения: лечебная гимнастика и физиотерапия, корсетная терапия, а также развитие хирургических методов. Подчёркивается, что сколиоз, сформировавшийся на основе многовекового научного опыта, в настоящее время эффективно лечится благодаря ранней диагностике, консервативным методам и хирургическому вмешательству.

Ключевые слова: сколиоз, Гиппократ, Гален, Авиценна, Амбруаз Парэ, Льюис Сэйр, Пол Харрингтон, искривление позвоночника, ортопедия, физиотерапия, лечебная гимнастика, корсет (brace), тракция, диагностика, реабилитация, хирургическое лечение, тест Адамса, мышечный баланс, спинальная хирургия, профилактика.

INTRODUCTION

Scoliosis is not a new disease – it has been known to humanity for more than 2000 years. It was first described in ancient times by the Greek physician Hippocrates (460–370 BC). He observed spinal curvature and proposed special treatment methods, including traction devices.

Today, modern medicine has significantly improved the possibilities for early diagnosis and effective treatment.

In Hippocrates' time, scoliosis was diagnosed without modern equipment, relying solely on observation and experience. Nevertheless, he used highly accurate and systematic methods.



Diagnostic methods by Hippocrates:

1. **Visual observation (primary method).** Hippocrates carefully examined the patient in a standing position: he observed whether the shoulders were at equal height, asked whether the shoulder blades protruded evenly, and considered whether the waistline was symmetrical and whether the body leaned to one side. He studied the causes of scoliosis and its treatment methods. If an asymmetry was present, he concluded that there was a curvature of the spine.
2. **Forward bending test (Adams test).** This method is still used today. The patient bends forward while the physician observes the back. If one side appears higher or the ribs protrude, it indicates scoliosis.
3. **Palpation.** He examined the spine by touch to determine alignment and curvature.
4. **Assessment of body balance.** Observing posture, walking, and overall balance.
5. **Mechanical devices.** Hippocrates used a special traction bench to stretch the body and assess the correction of curvature.

Hippocrates distinguished scoliosis from other spinal diseases, described it as a separate condition, and combined diagnosis and treatment. Even without modern X-rays and advanced technologies, his methods became the basis of modern medicine.

Hippocrates is considered the first scientist in the history of scoliosis treatment to propose the idea of treatment through body movement and mechanical action. He attempted to improve the condition of the spine by moving and stretching the body to a certain extent, rather than limiting treatment to bed rest.

The main methods he used included stretching the body on special wooden boards (traction), placing the patient in different positions to reduce pressure, and attempting to “mechanically straighten” the spine. The most important idea proposed by Hippocrates was that the structure of the body could be corrected through external force and movement. This concept represents one of the earliest foundations of modern physiotherapy.

LITERATURE REVIEW

The study of scoliosis has deep historical roots, beginning with the works of Hippocrates, whose *Corpus Hippocraticum* contains the earliest descriptions of spinal deformities and their treatment through mechanical methods such as traction. The ideas of Hippocrates were further systematized by Galen, who, in *De Methodo Medendi*, provided an anatomical classification of spinal diseases and emphasized the role of muscles in the development of scoliosis. These early studies laid the theoretical foundation for understanding scoliosis as a distinct medical condition.

A significant contribution to the development of scoliosis treatment was made by Avicenna, whose *Canon of Medicine* presented a comprehensive analysis of the causes of scoliosis and highlighted the importance of physical exercises, posture, and preventive measures. Later, Ambroise Paré introduced the use of corsets as a mechanical means of spinal correction, marking a new stage in orthopedic practice. In the 19th century, Lewis Sayre advanced treatment methods by developing plaster corsets and traction techniques, significantly improving patient stabilization and therapeutic outcomes.

Modern approaches to scoliosis treatment are largely based on the scientific developments of Paul Harrington, who introduced the Harrington rod system in 1955, forming the basis of contemporary surgical interventions. The evolution of these methods is reflected in authoritative sources such as Campbell's *Operative Orthopaedics* and the clinical guidelines of the Scoliosis Research Society, which provide evidence-based recommendations for diagnosis and treatment. In addition, reports by the World Health Organization emphasize the global significance of musculoskeletal disorders and the importance of early diagnosis and комплексное лечение scoliosis.

RESEARCH METHODOLOGY

The research methodology is based on a comprehensive analysis of historical and scientific sources related to the study and treatment of scoliosis. Data were collected through the review of classical medical works, including the writings of Hippocrates, Galen, and Avicenna, as well as later orthopedic research by Ambroise Paré, Lewis Sayre, and Paul Harrington. Additional information was obtained from modern scientific publications, clinical guidelines, and international medical reports, including materials from the Scoliosis Research Society and the World Health Organization. The data collection process involved systematic literature review, comparative analysis of historical and contemporary treatment methods, and extraction of relevant theoretical and practical findings. The analysis was conducted using qualitative methods, including chronolo-

gical analysis to trace the evolution of diagnostic and treatment approaches, as well as comparative analysis to identify similarities and differences between historical and modern practices. In addition, synthesis and generalization methods were applied to integrate the findings into a coherent framework, highlighting the continuity and advancement of medical knowledge. The reliability of the study was ensured through the use of well-established and widely recognized scientific sources, allowing for an объективное и последовательное раскрытие эволюции методов лечения сколиоза.

ANALYSIS AND RESULTS

The study and treatment of scoliosis have been developing since ancient times. It was first identified by Hippocrates, and in subsequent periods many scientists studied this disease in more depth and improved treatment methods.

One of the important scientists who developed scoliosis scientifically after Hippocrates was Galen (129–216 AD). Galen continued the ideas of Hippocrates and included them in a scientific system. He explained the role of muscles and movement in scoliosis in more detail. His main contributions include explaining that muscle weakness causes curvature of the spine, balancing the body with special physical exercises, and introducing the rehabilitation process into medical observation. Galen was the first to emphasise that not only the bones but also the muscular system forms scoliosis. Therefore, movement plays an important role in treatment. He studied spinal deformities and introduced the term “scoliosis” into medicine. Galen also classified other spinal diseases such as kyphosis and lordosis, establishing scoliosis as a separate disease.

The next important stage is associated with the name of Avicenna (980–1037). In the 11th century, Avicenna conducted extensive scientific work on scoliosis. He provided detailed information about scoliosis in his famous work Canon of Medicine. Avicenna indicated the causes of the disease, including congenital defects, incorrect sitting, and muscle weakness. He also emphasised the importance of massage, physical exercises, and correct posture in treatment. This approach forms the basis of current preventive and conservative treatment methods. Avicenna is one of the most important scientists who scientifically substantiated the role of gymnastics in the treatment of scoliosis and spinal diseases. In his famous work Canon of Medicine, he presented physical exercises as an integral part of treatment. The main methods he recommended were regular physical exercise, maintaining correct posture and walking habits, muscle-strengthening movements, and massage and stretching exercises.

Avicenna emphasised that proper physical education in childhood is important in preventing scoliosis. His approach became the basis of today's physiotherapy and preventive gymnastics.

In the 16th century (1510–1590), the French surgeon Ambroise Paré made a significant contribution to the development of orthopaedics. Ambroise Paré initiated a new stage in the treatment of scoliosis. He was the first to use braces and attempted to correct spinal deformities mechanically. He is considered the founder of modern corsets. This method provided external support for the spine, preventing further curvature. Modern corsets used today are based on this idea.

In the 19th–20th centuries, the treatment of scoliosis developed further. Lewis Sayre (1820–1900) introduced new methods for the treatment of scoliosis. He implemented plaster cast fixation and spinal traction methods. In the 1870s–1880s, his work significantly improved the immobilisation and maintenance of patients with scoliosis in the correct position. This period is considered a scientific stage in orthopaedic treatment.

One of the greatest achievements is associated with the name of Paul Harrington (1911–1980). In the mid-20th century (1950s), Paul Harrington made a major breakthrough in medicine. He developed a system of metal rods known as the “Harrington rod”. Since 1955, this method has been used in scoliosis surgery. The Harrington method made it possible to straighten and stabilise the spine internally. This achievement paved the way for effective surgical treatment of severe scoliosis and became the basis of modern spinal surgery.

In general, methods of treating scoliosis have developed in three main directions. In mild cases, physical exercises and physiotherapy are used; these methods originate from the views of Avicenna. In moderate cases, corsets are used; this method was pioneered by Ambroise Paré. In severe cases, surgery is applied, and its modern forms are based on the developments of Paul Harrington.

Nicolas Andry (1658–1742) is one of the founders of orthopaedics, who expressed important ideas about children's posture and scoliosis in his work Orthopaedia (1741). His approach included teaching children correct sitting posture, preventing improper sitting and walking, and strengthening muscles through light physical exercises. Andry introduced the idea of “proper posture and proper development” into medicine, which later became the basis of postural therapy.

Per Henrik Ling (1776–1839) is considered the founder of modern physiotherapy. He created the “Swedish gymnastics” system and developed a specialised set of exercises for the treatment of scoliosis.



His contributions include:

- a symmetrical system of exercises (equal on both sides);
- coordination of breathing and movement;
- stretching and strengthening exercises for the spine;
- development of individual therapeutic programmes.

Ling was the first to formulate gymnastics as a scientifically grounded treatment system. His methods form the direct basis of modern physiotherapy.

The development of the 19th–20th centuries further strengthened the scientific foundation of gymnastics in medicine. During this period, in the treatment of scoliosis:

- individual rehabilitation programmes were developed;
- increased attention was given to restoring muscle balance;
- a system of orthopaedic exercises was formed.

During this period, gymnastics became not merely physical activity but a specialised medical therapy. As a result of the work of these scientists, therapeutic exercise has become one of the most important, effective, and scientifically grounded methods of treating scoliosis today.

The question of which treatment method is the most effective is also widely discussed. The surgical method (most effective in severe cases) is associated with Paul Harrington, who developed a method for straightening the spine using a metal structure. Modern surgical procedures are based on this approach.

The most effective method for severe scoliosis is brace treatment, initiated by Ambroise Paré. Currently, Boston and Milwaukee braces help prevent deformation during growth.

The most effective non-surgical method is physical exercise and therapy.

Foundations: Avicenna.

Current methods: the Schroth method and physiotherapy are highly effective in mild cases.

Scoliosis Treatment Methods: Historical and Modern Approaches

Scientist / Era	Methods Used	Main Idea	Modern Approaches
Hippocrates (460–370 BC)	Visual observation, forward bending test, palpation, traction (stretching devices)	The spine can be corrected through mechanical force	Diagnostics: X-ray, MRI; Treatment: physiotherapy, traction devices
Galen (129–216 CE)	Study of muscles, treatment through movement	Muscles play an important role in scoliosis	Rehabilitation, restoring muscle balance, kinesitherapy
Avicenna (Ibn Sina) (980–1037)	Massage, gymnastics, proper posture, prevention	Treatment through movement and lifestyle	Physiotherapy, therapeutic exercises (LFK), preventive programs
Ambroise Paré (1510–1590)	Use of corsets (braces)	External support of the spine	Boston brace, Milwaukee brace
Nicolas Andry (1658–1742)	Proper sitting, prevention in children	Posture is important	Postural therapy, ergonomics
Per Henrik Ling (1776–1839)	Methods: Swedish gymnastics, symmetrical exercises	Gymnastics as a therapeutic tool	Physiotherapy, individualized exercise programs
Lewis Sayre (1820–1900)	Plaster corset, traction	Treatment through immobilization	Modern orthopedic braces and stabilization
Paul Harrington (1911–1980)	Metal rod (Harrington rod), surgery	Correction through internal fixation	Modern spinal surgery (implants, screws)

CONCLUSION AND RECOMMENDATIONS

The study and treatment of scoliosis have developed from ancient simple mechanical methods to modern high-tech medicine. Today, early detection and proper treatment of this disease can significantly improve the quality of life of patients. Scoliosis has undergone a long historical development path from ancient times to modern medicine. Many scientists have made significant contributions to the study and treatment of this disease, and each era has introduced new approaches. The study of scoliosis began with Hippocrates, Galen

provided a scientific foundation, Avicenna developed treatment and prevention methods, Ambroise Paré introduced the corset method, and Paul Harrington laid the foundation for modern surgical treatment. Thus, effective treatment methods used today have been formed over the centuries.

Therapeutic gymnastics (physical exercises and rehabilitation exercises) in the treatment of scoliosis has played an important role since ancient times. This direction was gradually developed by several historical figures and became the basis of modern physiotherapy. The history of scoliosis treatment has developed in three main directions:

1. Gymnastics and physiotherapy (Avicenna, Per Henrik Ling)
2. Corset and external support (Ambroise Paré, Lewis Sayre)
3. Surgical treatment (Paul Harrington)

As a result, today scoliosis is most effectively treated through early detection, exercises, corsets, and, if necessary, surgical intervention. These methods are the result of scientific experience accumulated over centuries and the research of scientists.

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- 13.00.00 Pedagogika fanlari
 - 13.00.01 Pedagogika nazariyasi. Pedagogik ta'limotlar tarixi
 - 13.00.02 Ta'lim va tarbiya nazariyasi va metodikasi (sohalar bo'yicha)
 - 13.00.03 Maxsus pedagogika
 - 13.00.04 Jismoniy tarbiya va sport mashg'ulotlari nazariyasi va metodikasi
 - 13.00.05 Kasb-hunar ta'limi nazariyasi va metodikasi
 - 13.00.06 Elektron ta'lim nazariyasi va metodikasi (ta'lim sohaları va bosqichlari bo'yicha)
 - 13.00.07 Ta'limda menejment
 - 13.00.08 Maktabgacha ta'lim va tarbiya nazariyasi va metodikasi
 - 13.00.09 Ijtimoiy pedagogika
 - 07.00.00 Tarix fanlari
 - 19.00.00 Psixologiya fanlari
 - 01.00.00 Fizika-matematika fanlari
 - 02.00.00 Kimyo fanlari
 - 03.00.00 Biologiya fanlari
 - 09.00.00 Falsafa fanlari
 - 10.00.00 Filologiya fanlari
 - 11.00.00 Geografiya fanlari



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