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# Comparative analysis of traditional and comprehensive methods of flatfoot treatment in children

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**Abstract:** Relevance. Flatfoot is a common orthopedic pathology in children that disrupts foot biomechanics and gait. Its highest prevalence is observed at the age of 4–7 years, requiring early diagnosis and timely correction.

Objective. To assess the prevalence, clinical characteristics, and effectiveness of treatment methods for pediatric flatfoot.

Results. Among 1,427 examined children, 12.8% were diagnosed with flatfoot, with 62.8% of cases occurring between 4 and 7 years of age. Comprehensive treatment (physical therapy, massage, physiotherapy, orthopedic devices) proved more effective (54.5% improvement) compared to traditional methods (39%). In children over 8 years old, treatment effectiveness declined.

Conclusion. Early diagnosis and a comprehensive treatment approach yield better outcomes, slowing disease progression and reducing the risk of complications.

Findings. Flatfoot is most frequently diagnosed at 4–7 years, highlighting the need for active prevention and early therapy. Comprehensive methods outperform traditional approaches, especially for moderate and severe cases.

**Keywords:** Flatfoot, children, diagnosis, treatment, orthopedics, physiotherapy, prevention.

**Introduction:** Flatfoot in children is one of the most common orthopedic pathologies, affecting the musculoskeletal system and overall physical development of the child. According to conducted studies, among 1,427 examined children aged 1 to 14 years, flatfoot was identified in 12.8% of cases, indicating a significant prevalence of this condition [1,7].

Early diagnosis and timely treatment of flatfoot are crucial, as the lack of correction can lead to severe consequences, including persistent gait disorders, deformation of the lower limb joints and spine, chronic pain development, and reduced quality of life for the child [2,3].

This study is particularly relevant in the context of selecting the most effective diagnostic and treatment methods [4]. A comparative analysis of traditional and comprehensive treatment approaches allows for the assessment of their effectiveness based on the child's age and the severity of the pathology [5,6,8].

Additionally, studying the age-related characteristics of the disease is of great importance. It has been found that the highest incidence of flatfoot occurs between the ages of 4 and 7, highlighting the need for special attention to preventive and therapeutic measures during this period [3,7]. It is essential to consider that flatfoot correction is most effective at an early age, whereas treatment in older age groups becomes more challenging and requires prolonged rehabilitation [2].

Thus, the study of flatfoot in children, its diagnosis, age-related progression, and the effectiveness of various treatment methods are pressing issues in modern pediatric orthopedics. These efforts aim to enhance prevention, early detection, and correction of this pathology.

**Research Objective**

The aim of this study is to examine the characteristics of diagnosis, frequency, and severity of flatfoot in children, as well as to evaluate the effectiveness of various treatment methods to optimize the correction

of this pathology.

## METHODS

The study was conducted between 2014 and 2024 in medical and educational institutions, including the clinic of the Tashkent Pediatric Medical Institute. A total of 1,427 children (aged 1–14 years) who underwent orthopedic examinations were included in the research.

The diagnosis of flatfoot was based on a clinical-functional examination, which included visual foot assessment, gait analysis, the use of plantography, podometry, and radiography. Patients with flatfoot (n=182) were divided into two groups: 94 children received traditional treatment (massage, therapeutic exercises, orthopedic footwear), while 88 underwent comprehensive therapy with individualized correction methods.

The effectiveness of treatment was assessed based on clinical progress, symptom regression, and the degree of deformity correction, considering the child's age and severity of the pathology. A control group (n=1,245) consisted of orthopedically healthy children. Statistical analysis was used to identify patterns in flatfoot development, evaluate treatment effectiveness, and determine optimal prevention strategies.

## RESULTS

In this study, 1,427 children aged 1–14 years were examined, of whom 182 (12.8%) were diagnosed with flatfoot of varying severity. Gender distribution analysis showed that the condition was slightly more common in boys (56.6%, n=103) than in girls (43.4%, n=79). The highest prevalence was observed in children aged 4–7 years (62.8%, n=59), corresponding to the period of arch formation, highlighting the need for timely diagnosis and prevention. In the 1–3-year-old group, flatfoot was diagnosed in 12.8% of cases (n=12), while in children aged 8–14 years, the prevalence was 24.4% (n=23).

The assessment of disease severity revealed that Grade I flatfoot was present in 25.5% of patients (n=47), Grade II in 50.0% (n=91), and the most severe Grade III in 24.5% (n=44). With increasing age, there was a trend toward more severe pathological changes, associated with progressive musculoskeletal deformation and reduced compensatory mechanisms.

To evaluate the effectiveness of different treatment approaches, patients were divided into two groups: 94 children received traditional treatment (massage, therapeutic exercises, orthopedic insoles, and footwear), while 88 underwent comprehensive therapy, including physiotherapy, individualized exercises, and manual correction. Treatment effectiveness was assessed in three age categories: 1–3 years, 4–7 years, and 8–14 years.

1–3 years: Traditional therapy showed positive results in 25% of cases, while 41.7% of patients improved from Grade III to Grade II. However, 33.3% showed no significant improvement. The most effective methods in this group were massage, physiotherapy, and vitamin therapy, which contributed to the proper development of the foot arch.

4–7 years: Complete resolution of flatfoot was observed in 39% of children, while 32.2% showed improvement by progressing to a milder grade. In 6.8% of cases, patients with Grade III improved to Grade II. However, 22% of children showed no significant improvement. The best results were achieved through a combination of therapeutic exercises, orthopedic insoles, and massage.

8–14 years: Treatment effectiveness was the lowest in this age group. Complete correction was observed in 84.6% of children with Grade I flatfoot. Among those with Grade II, 66.7% showed improvement, though not full recovery. In contrast, 66.7% of patients with Grade III exhibited no significant changes. This can be attributed to the decreased plasticity of bones and ligaments in older children, making correction more challenging and requiring longer treatment durations.

The overall assessment of effectiveness showed that in the traditional treatment group, positive dynamics were observed in 39% of patients, while 22% showed no improvement. In the comprehensive treatment group, 54.5% of children experienced improvement, whereas 16.7% showed no significant effect. Comprehensive methods proved to be more effective, particularly in younger patients, confirming the importance of early detection and correction of flatfoot.

Additionally, 51.6% of children with flatfoot (n=94) had associated orthopedic disorders, including joint hypermobility (n=21), hallux valgus (n=16), calcaneal osteochondropathy (n=8), and talus subluxations (n=6), requiring additional corrective measures.

Thus, the study confirmed that flatfoot is a common pathology among children, most frequently diagnosed between the ages of 4 and 7. The highest treatment effectiveness is achieved with early detection and correction, especially before the age of 7, when active foot arch formation is still possible. Comprehensive treatment methods demonstrated better outcomes compared to traditional approaches, particularly in cases of Grade I and II flatfoot. In older children, treatment requires a longer duration and rarely results in complete deformity correction, emphasizing the importance of preventive measures and timely

orthopedic intervention.

**Conclusion**

The results of this study confirmed the high prevalence of flatfoot among children, especially between the ages of 4 and 7, due to active growth and musculoskeletal development processes. The identified prevalence rate (12.8%) highlights the need for early detection and a comprehensive diagnostic approach to determine the severity and nature of foot deformities.

An analysis of age-related disease progression demonstrated that the highest treatment effectiveness is achieved in younger age groups when the anatomical and functional structures of the foot remain highly plastic. In children aged 1–3 years, timely correction can prevent persistent changes, while in children aged 4–7 years, the use of therapeutic exercises, orthopedic devices, and massage yields positive results in most cases.

In the 8–14 age group, treatment effectiveness decreases due to significant morphological changes in bones, ligaments, and joints, necessitating prolonged rehabilitation. These findings underscore the importance of preventive measures and timely orthopedic interventions to improve the outcomes of flatfoot management in children.

A comparative assessment of therapy methods demonstrated that traditional approaches, including massage, therapeutic exercises, and the use of orthopedic footwear, were primarily effective for Grade I flatfoot. In contrast, comprehensive methods that combined individualized exercise therapy programs, physiotherapy procedures, and biomechanical foot correction achieved better outcomes, especially for more severe forms of flatfoot.

Thus, the study confirmed the importance of early diagnosis and timely treatment of flatfoot in children, as well as the need to develop individualized therapeutic programs considering the child's age and the severity of the pathology. Optimizing treatment strategies and implementing a comprehensive approach to the correction of this orthopedic condition can significantly improve treatment effectiveness, reduce the risk of complications, and enhance patients' quality of life.

**CONCLUSIONS**

The conducted study confirmed the high prevalence of flatfoot in children, with a peak incidence between the ages of 4 and 7, highlighting the need for early diagnosis and timely correction. A comprehensive approach, including therapeutic exercises, massage, physiotherapy, and orthopedic devices, demonstrated the highest effectiveness, particularly for Grade II and III flatfoot.

It was established that children aged 1–3 years respond best to correction, whereas treatment for patients aged 8–14 years requires a more prolonged and intensive approach. The study also identified associated orthopedic conditions, emphasizing the importance of comprehensive examination.

The obtained data justify the necessity of individualized preventive and therapeutic programs to reduce the risk of persistent foot deformities and improve gait biomechanics.

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