THE HARMFUL EFFECTS OF FLATFOOT IN THE MUSCULOSKELETAL SYSTEM OF CHILDREN

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Annotation: *Flatfoot (pes planus) is one of the most common musculoskeletal conditions observed in childhood, which can negatively affect the overall posture, gait, and physical development of a child. The condition is characterized by a decrease in the height of the medial longitudinal arch of the foot, leading to impaired biomechanical balance. If not corrected in time, flatfoot may cause pain, muscle fatigue, gait disturbances, and long-term orthopedic complications such as scoliosis or knee joint deformities. This article discusses the harmful effects of flatfoot in children, its impact on the musculoskeletal system, and the importance of early prevention and treatment strategies in maintaining healthy motor development.*

Keywords: *Flatfoot, children, musculoskeletal system, posture disorders, gait, biomechanics, orthopedic complications, prevention.*

The proper development of the musculoskeletal system in children is an essential factor for their overall health and physical activity. Disorders such as flatfoot (pes planus) can significantly disrupt this development, leading to biomechanical and functional changes in the body. In early childhood, a certain degree of flatness of the feet may be considered physiological, as the foot arch has not yet fully formed. However, in cases where the arch does not develop adequately and the foot remains flat over time, pathological flatfoot occurs.

Flatfoot is not only an orthopedic problem but also a systemic issue, since it directly influences the alignment of the spine, pelvis, and lower extremities. Children with flatfoot often experience fatigue, decreased endurance, and difficulty engaging in physical activity, which in turn may affect their quality of life and psychosocial development.

The prevalence of flatfoot among children varies depending on age, lifestyle, genetic predisposition, and environmental factors. While mild cases may remain asymptomatic, moderate and severe forms of flatfoot may lead to significant musculoskeletal

complications if left untreated. Therefore, the early identification and management of flatfoot are crucial for the prevention of future orthopedic disorders.

This article aims to analyze the harmful consequences of flatfoot in children, highlight its impact on the musculoskeletal system, and provide an overview of preventive and corrective approaches to mitigate its adverse effects.

Flatfoot in children is a condition that requires serious clinical attention due to its widespread occurrence and long-term consequences on musculoskeletal development. While some degree of arch flattening can be considered physiological during early childhood, persistent and progressive flatfoot may cause structural and functional disturbances that extend beyond the foot itself. The musculoskeletal system is interconnected, and any abnormality in the foundation of the body—the feet—has repercussions that extend to the knees, hips, pelvis, and spinal column.

One of the most important harmful effects of flatfoot in children is the alteration of normal biomechanics. The medial longitudinal arch of the foot acts as a natural shock absorber during walking, running, and jumping. When this arch collapses or fails to develop, the distribution of weight shifts abnormally, causing increased pressure on certain areas of the foot. Over time, this uneven load leads to fatigue of the muscles, ligaments, and tendons of the lower extremities. As a result, children with flatfoot frequently report leg pain, especially after prolonged standing or physical activity.

Another negative aspect of flatfoot is its impact on gait and posture. Children with flatfoot often exhibit an altered walking pattern characterized by inward rolling of the ankles, decreased stride length, and imbalance while standing or moving. These deviations can contribute to compensatory postural changes in the knees and hips. In many cases, the knees adopt a valgus position (knock-knee deformity), which further disrupts the alignment of the lower extremities. In the long term, such misalignments may predispose children to early degenerative joint conditions, including osteoarthritis.

Flatfoot also has a direct effect on the spinal column. The abnormal biomechanics caused by foot arch collapse are transmitted upward through the kinetic chain, eventually influencing the pelvis and spine. Children with chronic flatfoot are at greater risk of developing scoliosis, lumbar lordosis, or other spinal deformities. The chronic strain on the paraspinal muscles may also cause frequent back pain, which is uncommon in healthy children. Thus, a seemingly localized problem in the feet may evolve into a systemic issue involving the entire musculoskeletal framework.

In addition to orthopedic problems, flatfoot can negatively affect a child's physical endurance and quality of life. Children suffering from this condition often tire more

quickly than their peers during physical education classes, sports, or daily play activities. Their reduced ability to engage in active movements not only affects their physical fitness but also their social participation. Over time, this may lead to decreased self-esteem, social withdrawal, and psychosocial consequences. Therefore, the harmful effects of flatfoot should not be underestimated, as they extend into both the physical and psychological domains of child development.

The prevalence of flatfoot in children is influenced by several risk factors, including genetics, obesity, improper footwear, and sedentary lifestyle. Children who are overweight place an excessive load on their developing arches, making them more prone to flatfoot. Similarly, the widespread use of non-supportive footwear such as flat sandals or shoes without arch support can prevent the normal development of the foot's anatomical structures. Furthermore, modern sedentary lifestyles with limited outdoor play and reduced barefoot walking hinder the natural strengthening of the intrinsic muscles of the feet. These factors collectively increase the likelihood of children developing persistent flatfoot with harmful consequences.

Early recognition of flatfoot is crucial in order to minimize its negative impact on the musculoskeletal system. Pediatricians, orthopedists, and physiotherapists emphasize the importance of regular screening during early childhood to identify abnormal foot postures. Parents should be educated to observe signs such as frequent tripping, uneven shoe wear, complaints of foot or leg pain, or reluctance to engage in physical activities. Once identified, timely intervention can prevent the progression of flatfoot and its harmful sequelae.

Treatment strategies for flatfoot vary depending on its severity and symptomatic presentation. In mild cases, conservative management is often sufficient. This may include therapeutic exercises aimed at strengthening the intrinsic muscles of the foot, stretching of the Achilles tendon, and balance training. Walking barefoot on natural surfaces such as grass or sand has been shown to stimulate arch development and improve muscle tone. Orthotic insoles with proper arch support can also help redistribute pressure and restore normal biomechanics during walking.

In more severe or symptomatic cases, physiotherapy and medical interventions are necessary. Structured exercise programs designed by rehabilitation specialists play a vital role in correcting muscle imbalances and improving posture. Massage therapy may be recommended to reduce muscle fatigue and enhance blood circulation in the lower extremities. In cases where conservative treatment fails to relieve symptoms or halt

progression, surgical correction may be considered, although this is relatively rare in pediatric populations.

The harmful consequences of untreated flatfoot highlight the importance of preventive measures. Encouraging physical activity, maintaining a healthy weight, and choosing appropriate footwear are fundamental aspects of prevention. Schools and communities should promote environments that allow children to engage in outdoor play, barefoot walking, and sports that enhance foot strength. Public health programs emphasizing musculoskeletal health awareness can also play a role in reducing the incidence of flatfoot and its associated complications.

In conclusion, flatfoot in children is more than a cosmetic or minor orthopedic issue. It represents a condition with potentially widespread harmful effects on the musculoskeletal system, posture, gait, endurance, and overall quality of life. Without proper recognition and intervention, the consequences of flatfoot may persist into adulthood, leading to chronic pain, joint deformities, and spinal disorders. Addressing flatfoot early through prevention, timely diagnosis, and corrective strategies is essential to ensure healthy growth and development of children. The harmful sides of flatfoot, therefore, must be considered a priority not only in pediatric orthopedics but also in general child health and preventive medicine.

Flatfoot in children is a significant orthopedic condition that has far-reaching consequences on the musculoskeletal system and overall development. While it may initially appear as a localized issue of the feet, its harmful effects extend to gait, posture, joint alignment, spinal health, and even psychosocial well-being. Children with untreated flatfoot are more likely to experience fatigue, reduced physical activity, and long-term complications such as scoliosis, knee deformities, and early degenerative joint disease.

The early recognition and management of flatfoot are crucial to preventing these harmful outcomes. Preventive strategies, including regular physical activity, proper footwear, weight control, and early screening, can significantly reduce the risk of complications. For children already affected, timely interventions such as therapeutic exercises, physiotherapy, and orthotic support can correct or minimize the harmful consequences. Ultimately, addressing flatfoot in early childhood ensures not only healthy musculoskeletal development but also an improved quality of life and long-term well-being.

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