



## **DEVELOPMENT OF A NEW DESIGN OF ORTHOPEDIC SHOES FOR CHILDREN WITH PATHOLOGICAL FOOT DEVIATIONS**

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### **ABSTRACT**

*This article provides information on research work on the study of a new design and manufacturing technology for orthopedic shoes for children with pathological. Orthopedic insoles are best made from a plaster cast of the foot, but it can also be made from a print or computer image. The structural elements of the insoles are made of safe and durable materials such as polyethylene foam. The average lifespan of flat feet insoles is 2 years, but they usually last much longer.*

**KEYWORDS:** *Pathology, deviation, shoe design, technology, orthopedic shoes, flat feet insoles, comfortable shoes, walking time, support, heel deepening, correction,*

### **DISCUSSION**

In recent years, there has been the development of pathological abnormalities in the foot in children of the Republic of Uzbekistan. The reason for this may be uncomfortable shoes. Therefore, the production of high-quality comfortable preventive footwear is an urgent problem today. Currently, prophylactic and orthopedic footwear is produced by individual order. The design of existing preventive and orthopedic footwear is not scientifically substantiated. Flat feet in children is a serious condition consisting in flattening and arches of the feet.

As a result of these changes, such unpleasant phenomena arise as in the feet, ankles and legs. In addition, the spine may suffer, there is pain in the lumbar spine. A very important place in the correction of flat feet is occupied by special orthopedic shoes and flat feet insoles. To solve this problem, research is being carried out on the topic "Development of the design and manufacturing technology of children's preventive footwear for

children with pathological disabilities". This project provides for the development of comfortable footwear for patients with flat feet and other pathological abnormalities in the structure and functions of the foot. For the manufacture of such shoes, separate places are allocated at shoe production enterprises, where modeling and design of shoes are carried out, the design of technological processes for the manufacture of comfortable preventive and orthopedic shoes, and improvement of the quality of products is envisaged.

Orthopedic shoes are intended for medicinal purposes in case of pathological changes in the legs. It helps to correct the initial unstable deformities of the lower limbs, prevents their progression, compensates for the shortening of the limbs, etc. Such shoes should correspond to the shape and size of the diseased foot, be light enough, elastic, durable and not deformed during use. Its inner surface should be smooth, without rough seams with indentations for painful areas of the foot. The upper of such shoes is made of soft leather. For the backs (sometimes for



the sidewalls), hard leather is used, for the insole - leather, duralumin, cork, felt, plastic.

Orthopedic insoles, or orthoses, are advanced shaped inserts that are used to support the arch of the foot. Flat feet insoles perform the following functions:

- improve blood circulation in the tissues of the foot;
- increase stability while walking and standing;
- reduce the stress on the hip, knee and ankle joints;
- prevent the development of pathological changes in the musculoskeletal system (osteochondrosis, osteoarthritis of the joints of the lower extremities, etc.);
- reduce pain and fatigue in the lower limbs.

Thanks to correctly selected insoles, the correct distribution of the load on the foot occurs.

Currently, orthopedic insoles are made from polymer materials or natural leather. Leather insoles are the best option. In the process of wearing, such insoles do not wear out for a long time and acquire the most optimal shape. Silicone insoles have the advantage of being flexible, thanks to which they can adapt to the individual characteristics of the foot. But they also have disadvantages - low elasticity and quick wear, relatively large weight. This leads to rapid leg fatigue while walking. Insoles made for different purposes have roughly the same components:

- Instep support, which is modeled in the projection of the inner arch;
- Deepening in the heel area;
- Metatarsal cushion in the area of the transverse fornx.

The technology of manufacturing orthopedic insoles for flat feet consists of the following stages:

- ❖ Diagnostics of flat feet and formulation of insoles;
- ❖ Making the base of the insoles and its structural elements;
- ❖ Direct Fitting and delivery of the product;
- ❖ Correction of the insoles during use.

Orthopedic insoles are best made from a plaster cast of the foot, but it can also be made from a print or computer image. The structural elements of the insoles are made of safe and durable materials such as polyethylene foam. The average lifespan of flat feet insoles is 2 years, but they usually last much longer.

In the course of corrective therapy, it is often necessary to change the design of the product. For example, you have to raise the metatarsal support or change the roll zone. Instructions for correcting the shape of the insoles are given by the attending physician. In this case, the shape of the insoles and the material will directly depend on the shape and degree of flat feet. In the case of transverse flat feet with varus deformity of the forefoot (it is helically

rotated by the first metatarsal bone upwards), insoles are assigned with an external wedge under the forefoot and a metatarsal cushion. With a significant degree of flat feet, when the deformity of the foot is fixed, the metatarsal pad is raised gradually, which achieves a good effect. After about 10-12 months, new insoles are made, taking into account the achieved correction.

With flat feet, you need to be especially careful about the choice of shoes. The right footwear can help slow the progression of the disease and reduce discomfort. But shoes with high heels and not corresponding to the shape of the foot will only aggravate the deformation and may even provoke complications of flat feet. In a word, the further course of the disease depends on what kind of shoes to wear with flat feet.

In the early stages of flatfoot development, you can get by with just comfortable shoes made of high-quality natural materials. But at the II and even more so the III stage of the disease, you will have to wear orthopedic shoes almost all the time to avoid complications.

What to focus on when choosing shoes:

- ✓ the best material for shoes is genuine leather, it is good if the sole is also leather;
- ✓ a small heel is necessary, which will help to evenly distribute the load; in children, at least one third of the sole should be about 0.5-1 cm high;
- ✓ to prevent hallux valgus, it is important to choose shoes with a wide toe;
- ✓ shoes should not have an unpleasant odor or stain;
- ✓ during fitting, shoes should not rub the skin or press on toes and heels;
- ✓ you should choose shoes with flexible soles that bend easily when walking and do not cause excessive muscle tension.

One of the most important properties of good shoes is comfort. High-quality and comfortable shoes can last a long time and will help to cope with discomfort in the feet after a long day at work. The listed criteria are suitable not only for people with early signs of flat feet, but also as a prevention of the disease. With obvious symptoms of the disease, you can no longer do with ordinary comfortable shoes. In such cases, the orthopedic surgeon prescribes special shoes based on the results of the examination.

It should be remembered that even a short but regular wearing of shoes with high heels, and even more so with stiletto heels, increases the risk of flat feet in women many times over. Platform shoes have a similar effect on the function and shape of the foot.

Orthopedic shoes for flat feet in adults and older children are made individually, taking into account the anatomical features of the foot, the type and



degree of flat feet. For example, with a flat-valgus foot with a deflection of the big toe to the outside of the foot, the shoe should have a high and hard back and a wide nose. Young children sometimes use standard orthopedic footwear. If necessary, orthopedic insoles are also used at the same time. Special footwear performs the following functions:

corrects minor deformities of the foot and compensates for its shortening,

- expands the support area,
- reduces the load on painful parts of the foot,
- masks external defects,
- is the "final support" when walking.

Shoes made to order from a plaster cast of the foot fulfill their purpose most fully. Nowadays, you can order quite beautiful orthopedic shoes, which in appearance are practically no different from ordinary models.

## LITERATURE

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