

Pes planovalgus

Pes Planovalgus (*children's longitudinally flat foot*, German *Plattfuß*, English *flat foot*) is a **deformity of the foot** during the growth period. Due to the laxity of the ligaments, there is a flattening of the medial part of the longitudinal arch of the foot and an increased valgusness of the calcaneus. It is the most common orthopedic diagnosis.

Etiology

The exact **cause is unknown**. The disability is usually **inherited in the family**. Ligament laxity is often part of various generalized syndromes. Examples include Down Syndrome, Ehlers–Danlos syndrome, Marfan syndrome. Other causes of laxity of the ligaments can be muscle weakness, the presence of the *os tibiale externum* muscle weakness, the presence of *the os tibiale externum* or also a violation of the peripheral nerves. It can also occur in Poliomyelitis, in Cerebral Palsy in Children or in Juvenile idiopathic arthritis.

also contributes significantly to the laxity of the ligaments, general illness, wearing inappropriate shoes or Malnutrition.

Clinical manifestations

- There is an abnormal **lowering of the longitudinal arch of the foot** to the point of complete **disappearance**.
- The position of the heel is valgus. The talus is in both plantar and medial depression. Forefoot abduction also appears.
- The axis of the ankle joint is in internal rotation. There is supination and pronation of the 1st ray.
- The medial vault becomes apparent in the 2nd year of life.
- **Flexible flat feet** are mostly asymptomatic (cosmetic problem), problems only occur in older and often obese children. These difficulties can be manifested by fatigue, pain in the medial wound of the leg when standing for a long time, or they have pain in the calves.
- The heel is in excessive eversion during loading. The forefoot is usually in abduction, so the head of the talus and the navicular axis touch the mat.
- The medial column of the foot (i.e. *talus, os naviculare, ossa cuneiformia, metatarsals*) appears to be longer than the lateral column.
- The beam moves medially. The medial border of the foot is overloaded;
- An initial toe-in compensation will often occur.
- also appears in Myostatic contracture of the triceps surae muscle *Musculus triceps surae*.



Flat Foot

Functional examination

In the ankle and subtalar joints, movement is normal, when standing on tiptoes the arch is corrected and the heel changes from valgus to slight varus. There is a limitation of movement, weakness or lack of arching when standing on the toes. Assessment of flat feet is done using **plantogram** or **podoscope**. However, it is always necessary to distinguish Congenital steep talus.

According to the finding, we divide the flat foot into several stages:

1. degree - Flattening of the vault is only when loaded, when the load is relieved, the vault flattens out. The examination is done using a plantogram, which shows that the arch is flattened, but still visible.
2. degree - The arch is padded even if the foot is light. We can passively transform the leg into a normal shape. When examined by plantogram, the longitudinal arch is completely absent.
3. degree - Here the medial edge of the foot is convex. We cannot passively correct the arch of the foot. On the plantogram we will see that the head of the talus protrudes plantarly and medially.

X-ray image

On the lateral image of a normal loaded leg, the axes of the talus, navicular bones, sphenoid bones and the 1st metatarsus lie in the first line. As the arch of the foot falls, this line breaks differently. The angle between the heel bone and the horizontal is around 25° in a normal foot, it decreases in a flat foot.

Treatment

Prevention is important – we don't encourage children to get up early and walk (until the muscles have strengthened so that they can do it themselves), we don't overload children with standing and walking until they get tired. When choosing shoes, the toe must be wide. It must not squeeze or hinder the movement of the toes in the shoe. Prevention also includes correction of excess weight.

Conservative treatment

Conservative treatment is started with **a flexible flat foot** . However, opinions on the course of treatment may be inconsistent. A significant number of legs are often modified spontaneously by growth.

Treatment procedure:

- Flat feet can be cured by exercising the short leg muscles and stretching the calf muscles.
- Walking barefoot on rough terrain is recommended.
- Orthopedic insoles or shoes individually made according to the plantogram also contribute to the treatment. According to the plantogram, this is done to prevent heel deflection.

Operative treatment

For **pain** and in children **older than 13 let.**

- ***Triple deza sub talo*** – the most effective.
- ***Prolongation osteotomy of the calcaneum*** ((today, *Evans a Mosca*) near the CC joint – the calcaneum is shortened in relation to the talus, the lateral column of the leg is lengthened by inserting a graft from the iliac blade after a transverse osteotomy of the calcaneus in the place between the anterior and middle articular facet.

Links

Related Articles

- Congenital steep talus
- Hallux valgus
- Plantography

External links

- Pes planovalgus (Czech wikipedia)
- Flat feet (English wikipedia)
- Flatfoot.com (<http://ww1.flatfoot.com/>)
- Footphysicians.com (<https://www.foothealthfacts.org/conditions/pediatric-flatfoot>)

References

- DUNGL, P.. *Ortopedie*. 1. edition. Grada Publishing, 2005. ISBN 80-247-0550-8.
- SOSNA, A. – VAVŘÍK, P. – KRBEC, M.. *Základy ortopedie*. 1. edition. Triton, 2001. ISBN 80-7254-202-8.



X-ray image of a flat foot in a 10-year-old child