Annals of Clinical and Medical Case Reports

Historical Article

ISSN 2639-8109 | Volume 11

External Support Arch of the Feet

Valentyn G*

President, Member of Pedorthic Association of Canada, Canada

***Corresponding author:**

Gusyev Valentyn,
President, Member of Pedorthic Association of Canada, Canada

Received: 28 Sep 2023
Accepted: 01 Nov 2023
Published: 10 Nov 2023
J Short Name: ACMCR

Citation:

Valentyn G, External Support Arch of the Feet. Ann Clin Med Case Rep. 2023; V11(10): 1-4

1. Historical Article

Doctors do not have knowledge in the field of biomechanics, and therefore cannot understand the kinematics of the pairing of the bones of the skeleton of the feet (Figure 1). Speaking of flat feet, no one thinks about the presence of supporting arches, from which all deformations begin. This is the outer longitudinal and transverse vaults of the arched form. It is they that provide the spring function of the feet, dampen shock loads, protecting the brain from concussion. According to the laws of mechanics, it is these vaults that rest on three points, forming a reference triangle (Figure 2). The General Center of Gravity (GCG) of the body must be projected into the Center of Gravity (CG) of this triangle, into the area of its support to ensure the stability of the body, its vertical position.

In geometry, the surface is usually denoted by two coordinates X and Y (Figure 3). The angle between them is 90 degrees. This angle exists between the outer and transverse arches, which indicates their supporting function, regardless of the type of feet: narrow and long, or short and wide. The Center of Gravity of the supporting triangles in both types of feet lies at the intersection of the medians dividing the sides of the triangle in the middle. These are the tops of the vaults through which the load passes (Figure 4). So, in the external arch it falls on the cuboid bone. The cuboid bone forms a joint with the calcaneus that allows it to descend to the support, pushing forward the metatarsal bones with the 4th and 5th fingers. So, the large and peroneal muscles, plantar fascia are stretched.

The contact of the cuboid bone of the support is the moment that determines the beginning of the turn of the internal arch, which is taken for flat feet. When the support bone touches, an overturning moment of forces arises between the direction of movement (Figure 5) of the body's bct and the resulting fulcrum. The internal arch does not descend vertically, but describes an arc trajectory relative to the subtalar joint on the calcaneus. This is a long deceleration path of damping the speed of transfer of the leg to zero to start the step from the other limb (Figure 6). To lift and fill the gap under the inner arch means to turn it into a flat-footed one. This is the merit of medicine in such a rapid increase in the number of people with flat feet.

In the subsequent step cycle, when the heel breaks away from the support (Figure 7 and 8), the muscles lift the cuboid bone up, the internal arch returns to its original position at the subtalar joint. So, the foot turns into a rigid lever, allowing you to stand on your fingers to perform a roll and a push (Figure 9). If the internal arch does not return to its original position, then this is a deformation, this is flat feet. Classical flat feet, like 60 years ago, is observed in 6-9% of individuals. This is the state of the external arch, when it touches the supporting surface, but the cuboid bone has not descended, does not perceive the load, as can be seen in the given planograms (Figure 10).

The appearance of a support under the cuboid bone, or another point on the line of the external arch leads to other forms of pronation of the internal arch on the subtalar joint, both with strong and weak muscles (Figure 11 and 12).

With hollow feet, deformities of the outer arch can develop from the heel to the apex of the arch when shoes with a low heel are used that keep the arch below the neutral balanced position (Figure 13 and 14). In this case, the calcaneus is overloaded. With an overestimated height of the heels, the forefoot is overloaded and the

deformation develops from the heads of the metatarsus towards the top of the arch.

To determine the difference in the lengths of the legs and the height of the heels of shoes, at which the arches will be in a neutral position (Figure 15 and 16), blood circulation in the limbs will be restored only by the hydrostatic method in a standing position on the diaphragms of the communicating vessels.

The reasons why the internal arch does not return to its original position:

- hypotonicity, weak muscle tone, a small gap under the top of the external fornix less than 1 mm (Figure 17);

- the calcaneus is turned inward on a long limb, bevelled heel heels of shoes. So, the long limb is functionally shortened. Without compensation for the shortening of the limb, scoliosis cannot be corrected, and deformities of the arches of the feet cannot be eliminated (Figure 18 and 19);

- walking with the feet turned outward, when the GCG of the body goes beyond the area of the support triangle of the feet (Figure 20 and 21);

- Sagging cuboid bone due to the use of shoes with incorrectly located support points (Figure 22 and 23).

All these are concrete real reasons, in contrast to those given by medicine, which are in no way a real reason and only contribute to the wrong taking of actions to eliminate foot deformities.

• weakness of connective tissue;

• heavy physical activity;

• genetic diseases;

• great weight;

• family predisposition;

• pregnancy.

Figure 1:

Figure 2:

Figure 3:

Figure 4:

Figure 5:

Figure 6:

Figure 7:

Figure 8:

Figure 9:

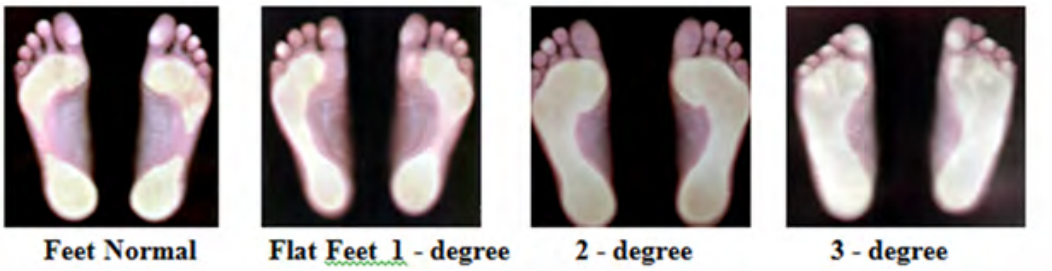

Figure 10:

Figure 11:

Figure 12:

Figure 13:

Figure 14:

Figure 15:

Figure 16:

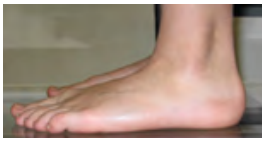

Figure 17:

Figure 18:

Figure 19:

Figure 20:

Figure 21:

Figure 22:

Figure 23: