



Is pronation really understood?



by

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I played rugby from my 20th to 35th year of life. My place was winger for which you had to start quickly and run very fast. Which I did. Someone once told me that I was sprinting like an Indian runner. Without heel contact, only on the fore-/midfoot; untrained only on the short distance. Now, after being 'foot-active' for almost a whole life, I question the general naming and definition of pronation as an abnormality or illness.

What is pronation?

The construction of the medial length arch is based on the 'Roman arch' (see image), strong ligaments and intrinsic foot muscles, all together able to absorb the increasing medial load in a natural way.



There are several definitions for this. Unanimously, however, one speaks of the 'tilting of the foot after heel strike', which should be visible under the medial arch. After having studied a lot of feet and shoes, but especially studying sand prints on our beaches I have to conclude that the 'average' foot:

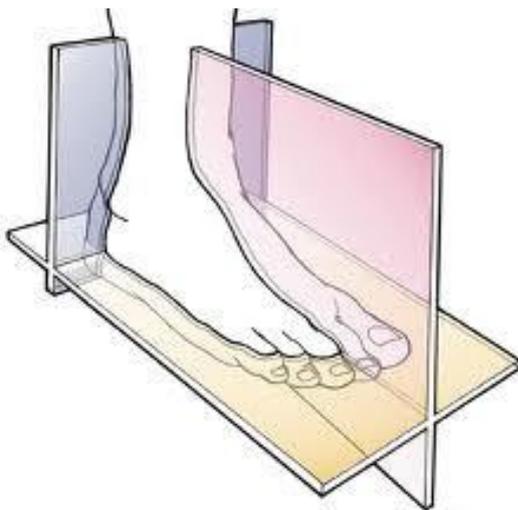
- initiate pronation more at 'metatarsal' than at tarsal level
- prints laterally deeper in the sand at full foot load, than medial!!

Conclusion therefore must be:

- pronation is a natural movement at full foot load, compensating the increasing weight (pressure), after which recovery follows.
- a medial (mechanical) support impedes this suspension.

3 - D (three-dimensional)

Why this difference of insights? Generally we speak of a right and a left foot, a flat or a hollow foot, valgus or varus position, inversion and eversion, always based on the figure two. These paired observations take place in the frontal plane, i.e. 2 - dimensional.



However, we stand on four points: two forefeet and two heels!! Just try to stay on your heels only ...

This means that we need to define and describe the foot in **3 - D**, **thus also and particularly in the sagittal plane:**

- in flexion and in extension
- pronation and supination
- varus and valgus
- inversion and eversion

During the full foot load (stance phase), freedom of movement is limited in the foot and leg joint chain (closed chain), while in the swing phase there is more freedom of movement.

After heel strike (which is ground contact at the rear/outside) the inwards tilt of the rear foot is almost simultaneously followed by dorsiflexion forward of the **m. tibialis anterior**. These combined movements take place within a three-dimensional coordinate system. *Pronation again, is a normal, physiological movement to avoid injuries!!*

Barefoot



I started this article with running. In countries like Kenya and Ethiopia, barefoot running is a technique that is difficult for us to learn. Landing on your midfoot / forefoot you skip the heel strike, which makes you run faster! Originally used in places with long distances and hardly or no transport, nowadays, this method of running with minimal foot protection is being used more and more. A fast growing group of athletes tries to run like this.

Pronation is a normal, physiological phase in walking and running. The inward tilting of the foot and simultaneous dorsal flexion of it (m. tibialis anterior) shifts the pronation towards the metatarsalia.

Excessive or **overpronation** (see image) in which the foot not only tilts inwards but threatens to slide subtalar away from the calcaneus, with the tibia in endorotation and the foot in eversion. Sometimes a 'second ankle' can be observed under the medial malleolus due to the 'sliding off' of the talus. Especially in such a situation, training the intrinsic foot muscles is a must, e.g. Short Foot Exercises (SFE). Support with orthotics only when really needed.

(Children's) shoes

What does this mean for our daily use of footwear? Shoes serve to protect the foot, but should not obstruct the natural movements.

Shoes must therefore:

- fit well, both in length and width
- be flexible
- have a normal heel
- be changed every other day
- have no standard footbed

Children, where and when possible, must go barefoot as much as possible until about six years.

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Research on Posturology

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(Maikel Caarels, podiatrist)

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