



FOOT CARE

## Ankle / Foot Overpronation

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After 45 years of clinical observation and several thousand patients, I now believe that overpronation of the ankle and foot is the most commonly overlooked orthopedic problem in both children and adults.

Not to be confused with “flat foot” (pes planus), although they often exist simultaneously, the condition tends to be familial in nature. The oversight of recognition of this problem is most egregious in children and teenagers, as this is when the most long-term good can be achieved with proper orthotic support and lower leg-strengthening exercise.

### Progressive Problems

As you may remember, the human gait consists of four phases: foot strike, pronation, recovery of pronation, and then toe-off. In a well-aligned and fully functioning ankle/foot, toe-off results in the body's weight being carried down the middle of the forefoot.

In overpronation, the foot does not recover from the pronation phase and most of the body's weight rolls medially onto the great and second toe. Because of this, most eventually develop bunion exostosis due to the body's response to the abnormal loading on the distal first metatarsal (Wolf's Law).

Progressed far enough, this often causes valgus deformity of the toes; and one can even see cases in which the great toe is subducted under the second toe, making each step very painful. With enough years, medial collapse of the ankle and abnormal wedging of the talotibial joint begin to adversely effect the anterior tibialis tendon and ligamentous ankle band around it, creating chronic painful tendonitis at the medial malleolus.

As many of us were also taught, this orthopedic problem is not just limited in its effect to the feet and ankles, but also includes biomechanical and postural stress on the knees (genu valgum), femoral anteversion, anterior pelvic tilt and increased Ferguson sacral base angle. This results in a chronic

hyperlordosis of the lumbar spine.

Above this, there often develops either hyper- or hypokyphosis of the thoracic spine and chronic forward head carry. This combination of anomalies distorts the normal load balance of the spine and frame in the A-P plane. This loss of plumb balance commonly tends to destabilize biomechanical function in the spine, leading to the formation of multiple areas of biomechanical lesion formation (subluxation).

In a worse-case scenario, this combination of anomalies has been described and illustrated by Frank Netter in the *CIBA Collection* and is known as a “malicious malalignment syndrome,” with these unfortunate individuals suffering a lifetime of chronic and increasing foot, knee, hip and low back pain; and an associated extremely advanced process of degenerative joint disease in the affected structures.

### Diagnosis and Treatment

Diagnosing ankle/foot overpronation is relatively easy. Have the patient stand barefooted with their back to you and look for medial bowing of the Achilles tendons. The tendons should be perfectly plumb vertical in a healthy, normal alignment.

If pronation is suspected, to get an idea of the intensity of the overpronation and medial collapse of the arch one can instruct the patient to roll their body weight to the outer edge of the feet, then slowly allow the foot to relax - stopping them when the tendons are vertical. Then have them relax completely to see how far is the medial drop. I grade this intensity from one to four.

Once a clear diagnosis is made, the question becomes: How best to correct it? The very earliest arch support devices were of the “paste-and-stick” kind. The technician began with a flat piece of leather and added various thicknesses of material to try and give the arch some support. They also often pasted a medial wedge under the calcaneus to tilt the weight-bearing load of the body laterally, closer to the midline.

Regrettably, I have seen some orthotics using this antique paste-and-stick method that have so little support under the arch that the only real benefit they provide is a result of the attached medial wedge. Fortunately for those of us who suffer marked overpronation, pedorthists have made great strides in fabrication and molding methods of orthotics in subsequent years.

Many podiatrists, orthopedists and osteopaths once used a plaster of Paris cast method to obtain a good, non-weight-bearing impression of the foot, and many of us continue to utilize this messy, but excellent method of casting. Now, however, it seems an overwhelming majority of practitioners use the crush box method to obtain a foot form.

At the lab, the hollowed impressions are then filled with plaster of Paris to get a positive foot shape. The technician then uses a vacuum molding machine to fabricate the orthotic.

Very recently, there has been the invention of a 3D-laser process to fabricate orthotics. One advantage of custom-made orthotics is that any heel lift needed for true leg-length inequality (LLI) can be added at the lab (see: <https://dynamicchiropractic.com/article/51091-the-lowdown-on-short-legs>).

As to materials, polyethylene foam like Pelite is a common material used because it is firm enough to give good support, but also has some compressible component that allows for the second phase of gait

(pronation), and this is the choice of the orthotic lab I have used for years. The only caveat is that the material will compress over time (4-5 years) and require replacement.

There are any number of other materials that may be used, keeping in mind that the success of an orthotic depends on the patients weight, shoe style and lifestyle. There are also many good off-the-shelf orthotics available that are sufficiently supportive and offer a good bargain for patients whose overpronation is not too severe.

#### Another Important Consideration: Shoe Choice

Very often patients have to buy new shoes that are a bit wider to accommodate orthotics. The most important aspect of a good shoe is that it gives good support to the medial side of the foot. Orthopedic shoes at one time were available with a strong medial counter, but I no longer see these commonly offered.

I advise quality lace-up shoes or pull-on boots with good support for my patients. Even the best orthotic device is much less effective if worn in cheap, soft shoes with no medial support. Since I find many patients these days who have not been properly measured for shoes, I utilize a [Brannock device](#) to recommend the right shoe size.

Women in particular don't like wearing these "clunky shoes," but I tell them, "If you wear them most of the time, you can get away with not wearing them some of the time."

#### Practical Take-Home Points

It has been very disappointing to note that more health care physicians and physical therapists do not give sufficient importance to the skeletal foundation of the human frame - the ankle, foot and arches. Children, by my observation, do not "grow out" of the problem. An old orthopedic axiom seems most appropriate to keep in mind here: "As the tree is bent, so it grows."

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