

When a Rigid Orthotic Becomes a Source of Pain From immobilization to controlled mobility

The primary stabilization for the foot's three arches comes from proper bony alignment, supported by the plantar fascia and other ligaments. Secondary stabilization depends on healthy, coordinated muscular control. When the ability of these structures to respond to stress is overwhelmed, pain often develops in the foot or lower extremity.

Some providers have found that immobilizing the foot and ankle can effectively allow the body to heal at a rate that keeps up with the trauma. However, just as a cast, crutch, collar, or brace is only helpful while the body heals, a rigid orthotic used beyond the recovery period can create a new set of problems. This information will help you determine when to upgrade a patient to flexible orthotic support and help you make this transition a smooth one.

Rigid orthotics are often prescribed for the **acute** phase of plantar fasciitis, achilles tendonitis, and shin splint therapy. In addition to providing the foot with a "crutch", the provider will likely give activity or lifestyle modifications. Unfortunately, when the pain is relieved, patients are often less inclined to return for continued care or to comply with the doctor's orders. Furthermore, rigid orthotic systems can cost between \$350-\$500. As a result, many patients are hesitant to discontinue wearing the rigid orthotics in which they have invested and risk having the pain return. Unfortunately, the body will often experience disuse atrophy and structural compensations, as the patient becomes truly dependent on the rigid orthotics.

There is no doubt that restricting movement of the foot and ankle can relieve pain in these areas, but the relief comes with a cost. Normal ranges of movement of the foot and ankle are important for healthy posture and shock reduction throughout the body. The development of pain and dysfunction elsewhere in the body within six months of rigid orthotic use is a warning that stresses have shifted from the foot and ankle to distant areas of the closed kinetic chain—knees, hips, pelvis, and spine.

Consider the process of atrophy, both in the intrinsic foot muscles and the muscles of the leg, which support the bony arches. Disuse atrophy can begin within days of immobilization. Guyton points out that "atrophy is particularly likely to occur when limbs are placed in casts, thereby

preventing muscular contraction. As little as one month of disuse can sometimes decrease the muscle size to one-half normal.”¹ After several months, the patient may experience the inability to walk pain free for any extended period without the rigid orthotic in place.

Furthermore, rigid orthotics stop ankle pronation, which is responsible for normal shock absorption at heel strike.² Flexible orthotics enhance shock absorption because they can help normalize ankle pronation and accompanying internal leg motion.³ Most importantly, flexible orthotics encourage normal muscular contraction and remove stress from the pelvis and spine by balancing the pelvis.

Patients may be unaware that the development of pains in the knees, hips or spine may be related to the use of a rigid orthotic, and continued use of the orthotic may interfere with their response to chiropractic treatment. When it's time to make the transition to a flexible orthotic, these simple procedures can make the process a simple one.

Before the transition:

1. Golf ball roll. Not only do muscles atrophy but ligaments and joint capsules also constrict. Have the patient begin to roll the plantar surface of the foot on a ball, while seated, ten minutes per foot, three times a day. This action will help break micro-adhesions and desensitize the foot to movement. This should be followed by an ice massage.
2. Towel scrunch exercise. The patient will place a hand towel flat on the floor and use the bare foot, allowing the toes to grab at the material and bunch it up under the foot. This will strengthen the intrinsic foot muscles and prepare them to bear weight once again.
3. Theraciser ankle series. Foot Levelers theraciser comes with color photos demonstrating the exercises necessary to strengthen the lower extremity. Although all exercises should be included, concentrate on exercises to strengthen the tibialis muscles—supporters of the medial arch.

After the transition:

1. The foot should now be able to accommodate the flexible orthotic with a minor accommodation period of 2-3 weeks. Mild plantar and achilles tendon discomfort is to be expected as tissues are recruited once again to perform their intended functions. Home icing will keep inflammation to a minimum.

2. Extended break-in. If the patient has worn the rigid orthotic for more than two years, muscle atrophy will be extensive and regeneration will take time. It may be necessary to build up the medial longitudinal arch of the flexible orthotic with athletic tape or some similar adhesive material. Create a pad approximately two inches long by layering pieces of tape. Secure the pad to the **underside** of the orthotic below the medial longitudinal arch support. Each week, reduce the height of this added support, by removing a layer of the tape. After about twelve weeks of gradual reduction, the patient should be better prepared to use the flexible orthotic, including full range of motion. Exercises should be continued during the break-in process.
3. Reassure the patient. Just like many treatments produce positive, although uncomfortable results, the process of regaining full use of the foot and ankle will require patience. Highlight the improvements the patient experiences in maintaining adjustments.

Of course there are many legitimate foot conditions that will require continued support with rigid orthotics. Some cases, which come to mind, include those where the patient remains in a subacute situation; for example, uncontrollable obesity, atrophy due to denervation, or severe deformity conditions, whether congenital, traumatic, or pathological. However, in general, once the patient has been aided through the acute phase of healing, the body will be maintained in a healthier situation if the structures that form the body's foundation are allowed to function normally, with the use of custom-made flexible orthotics.

References

1. Guyton AC. Textbook of medical physiology 6th ed. WB Saunders Co., Philadelphia. 1976, 136.
2. Gastwirth BW, et. Al.: *Electrodynamic Study of Foot Function in Shoes of Varying Heel Heights*. Journal of American Podiatric Medical Association 1991; 81(9):463-472.
3. Root ML, William PO, Weed JH: *Normal and Abnormal Function of the Foot, Vol. II*. Los Angeles, Clinical Biomechanics Corporation, 1977.