Foot orthotic devices are a popular and clinically effective method of managing particular types of lower kinetic chain pathology. The purpose of this article is to provide an overview of the types of foot orthotics, their indications and contraindications, and how athletic trainers and therapists can implement them in their clinical practice. Foot orthotic devices are effective in modifying selected gait parameters, such as maximum pronation and the speed of pronation, that contribute to lower kinetic chain injuries (Bates et al., 1979). In addition, foot orthoses affect proprioceptors on the plantar aspect of the foot and might play a role in decreasing muscle fatigue during activity.

Several studies have shown the positive benefits of foot orthotic devices in treating common athletic injuries including foot and ankle pain, shin pain, and patellofemoral conditions (Donatelli et al., 1988; Gross et al., 1991; James et al., 1978). Foot orthoses are also used for increasing shock absorption, reducing shearing forces, reducing muscle fatigue, and treating specific foot and ankle pathologies (Hunter et al., 1995). Foot orthoses should be prescribed and fabricated after a complete history and examination of the lower kinetic chain of the patient have been completed. As effective as properly prescribed orthoses can be, inappropriate use can lead to increased symptoms and anatomical stresses in other portions of the lower kinetic chain.

Foot orthotic devices are placed in the shoe to reduce or eliminate pathological stresses to the foot or other portions of the lower kinetic chain. Athletic trainers and therapists can use foot orthotic devices as a treatment therapy for the following conditions:

- **Structural and Positional Deformities of the Foot.** The foot is an adaptable unit that can accommodate changes in surface, as well as become a firm lever arm for push-off. Structural and positional deformities of the foot or lower kinetic chain influence the function of the lower limb during gait. Examples of structural deformities include forefoot varus, forefoot valgus, rear-foot varus, tibial varum, and so on. These deformities are not in themselves pathological to the lower kinetic chain unless the foot compensates for them in an abnormal or excessive fashion. Orthoses help maintain “neutral” subtalar joint position, thereby reducing stress and allowing muscle-tendon units to function more efficiently. Decreasing muscle activity and therefore fatigue should result in fewer overuse injuries and increased performance (Nigg et al., 1999).
• **Lack of Shock Absorption.** One of the primary functions of orthotic devices and athletic shoes is to provide shock absorption during walking, running, or athletic activity. Weight-bearing forces during running approach six times a person’s body weight. Lack of shock absorption is often seen in the athlete with a cavus foot who exhibits abnormal supination.

• **Excessive Shearing Forces.** Abnormal or excessive shearing forces can contribute to common conditions of the foot such as blisters, calluses, corns, and more debilitating conditions such as interdigital neuromas. Shearing calluses are associated with abnormal foot function, because the hallux and lesser metatarsals do not share the weight-bearing forces of gait during athletic activity.

• **Specific Athletic Injuries.** Foot orthoses can be used as an adjunct treatment for a variety of common athletic injuries including plantar fasciitis, interdigital neuromas, lateral ankle sprains, and patellofemoral pain.

**Parts of a Foot Orthotic Device**

The major components of a foot orthotic device are the shell, posts (forefoot and rear foot), and covering materials (see Figure 1).

![Figure 1 Components of a foot orthotic device.](image-url)

**Shell**

The selection of the shell material must be based on the individual needs of the athlete. These considerations include the amount of biomechanical control needed, athletic or functional demands, body weight, and types of athletic footwear. The shell is either a full- or three-quarter-length piece that runs from the calcaneus to the metatarsals. The physical properties of the shell determine the classification of the orthotic device. Rigid orthotics are usually made of nonyielding thermoplastics that are manufactured in a laboratory setting.

Semirigid devices are the most common type of device used in treating athletic injuries. They are made of moldable thermoplastics that allow for adequate motion control and provide some shock absorption. Soft orthotics are usually constructed of open- or closed-cell material that is commonly found in athletic training settings. These materials include PPT™, Poron™, and other similar products. Although soft orthotics with posting materials are primarily used for shock absorption, research has shown them to be effective in managing patellofemoral dysfunction when selected physical findings are identified as contributing to excessive subtalar joint pronation (Eng & Pierrynowski, 1993).

**Post**

The post of a foot orthotic device is used to correct or support structural deformities of the foot. Posts are named relative to their location on the shell and for the area of the foot that they support. For example, a rear-foot post is located on the undersurface of the orthotic shell and supports the rear foot at the calcaneus. The forefoot post supports the forefoot at the metatarsals and phalanges and decreases the need for compensatory and abnormal subtalar and midtarsal joint movement.

A post can be either extrinsic or intrinsic. An extrinsic post consists of material added to the bottom of the orthotic, usually in the form of a wedge-shaped piece of foam or cork, to control abnormal movement. This is most commonly used in the fabrication of semirigid orthotics. Semirigid orthotics enable the clinician to increase or decrease the post in response to clinical improvement and patient input. The disadvantage to extrinsic posting is that it can...