

## Orthotic Support for Women's Special Needs

Mark Charrette, DC

Disabling foot conditions are quite common, affecting as many as one in six people in the United States at some point during their lifetimes.<sup>1</sup> While disease and injury are responsible for some foot problems, footwear appears to be the major contributing factor in a large percentage of cases.<sup>2</sup> Poorly fitting shoes, combined with heel-strike shock and the gravitational impact of weightbearing, produces a tremendous amount of stress on the feet. Because of a long-term association with constrictive shoes, women over the age of 30 generally suffer more than men from foot pain and pedal deformities.

Two major sources of shoe-related foot disorders - forefoot fit and heel height - confront women.<sup>3,4</sup> Improperly fitting footwear is a major source of disability and high health costs for women. Ill-fitting shoes also contribute significantly to gait difficulties and chronic spinal problems. However, many of these conditions can be prevented with education and awareness, and the symptoms can be treated with a combination of properly fitted shoes and supportive, custom-made orthotics.

### The Historical Heel

Mongolian horsemen wore high heels in the 14th century to keep their feet in the stirrups while riding. In 16th-century Europe, the French wore shoes with elevated heels as a fashion statement. Men gradually reduced the height of their shoe heels, but women did not. Many women today wear heels that plantarflex the ankle and place increased pressure on the forefoot and metatarsal heads. Even a heel as low as three quarters of an inch increases forefoot pressures by as much as 22 percent.<sup>5</sup>

### The Case for Proper Fit

Tight, poorly fitting shoes can magnify the problems high heels present. In addition, a bad fit can create its own list of troubles. A 1993 survey of healthy women found that 88 percent wore shoes that were significantly smaller than their feet.<sup>6</sup> The average difference measured between the shoe and the foot was 1.2 cm. Eighty percent of the women in the study stated they had some foot pain. In those women who reported no foot pain, the average foot-shoe discrepancy was only 0.56 cm. The researchers recommended that women should always buy their shoes by fit, not by size, and that shoes should always be tried on at the end of the day and be fitted to the weightbearing foot.

One easy method to check shoe fit is to trace each foot during standing, then trace the shoe (as was done in the shoe survey). Any significant discrepancy means the foot is cramped when standing, and restricted during gait.

### Locations of Foot Pain

The same study also investigated specific foot symptoms among the healthy women sampled. Of the 88 percent who reported foot problems, the majority (85 percent) had pain in the forefoot, while only 10 percent had arch pain and 5 percent had heel pain. Most forefoot problems are due

to bunions, hammertoes, metatarsalgia or neuromas.

**Bunions.** A bunion is the common term for *hallux valgus*, a deformity at the first metatarsophalangeal joint. There is lateral deviation, callus formation, and eventually an exostosis. While genetic predisposition is known to be a factor, high heels and constrictive shoes will aggravate any tendency for this problem.

**Hammer toes.** Hammer toes are most common in middle-aged women and are almost always the result of poorly fitted shoes. The fifth toe is most frequently involved, since it is pressed inward by the point of the shoe. Calluses that develop from abnormal friction of a curled toe can cause a significant amount of pain.

**Metatarsalgia.** Most cases of metatarsalgia (pain under the metatarsal heads) result from mechanical causes. A longer second toe (present in 20 percent of the population) may be a complicating factor. Conditions such as hallux valgus, a high arched foot, and age-related atrophy of the fat pad under the ball of the foot can exacerbate the increased pressures from high heels or poorly padded shoes. One study of patients with metatarsalgia found that custom-made orthotics with a "metatarsal dome" decreased the plantar pressures by an average of 17 percent and reduced the reported pain by 71 percent.<sup>7</sup>

**Neuroma.** When a sensory nerve gets pinched in the tight space between the metatarsal heads, chronic irritation leads to enlargement and inflammation. Pain or numbness develops that decreases when the shoes are removed. The classic test for a neuroma is to squeeze the forefoot from the sides to elicit increased numbness and pain. An orthotic with a metatarsal pad will spread and separate the metatarsals, relieving the pressure on the interdigital nerve. Of course, there must be room in the shoe to allow this to occur.

### Orthotic Support for Women

The combination of a properly fitted shoe and a custom-made orthotic can dramatically help all of the foot problems listed above. The orthotic should provide support for the arches of the foot in general, and the anterior transverse arch in particular. By supporting the metatarsal heads and allowing for the normal spread of the forefoot, an orthotic can reduce current symptoms and prevent future deformity. A foot that is already developing a bunion must be provided with good support for the medial longitudinal arch. The orthotic should also allow for flexibility and movement of the first metatarsal joint during the dorsiflexion required at toe-off.

In addition, different women's shoes need different orthotics. Nonlacing dress shoes usually require orthotics with dot fasteners, which anchor the orthotics into the shoes' lower heel counters and slimmer lines. Women who wear heels over one inch in height must be supplied with an orthotic that is specifically designed to take the plantarflexed position of the foot into account. Laced shoes (such as women's oxfords, hiking boots and athletic shoes) require full-length orthotic coverage.

Ask your female patients about the shoes they wear, and recommend the appropriate orthotics. You don't want them to get only half the benefit of orthotic support.

### Fit the Feet, Support the Body

All patients should have their footwear checked for fit. This is especially important for women, who often wear shoes that don't fit their feet, and whose heel heights will increase pressure on the forefoot area. More pressure exerted on the forefoot makes proper fit more critical.

A properly designed, custom-made orthotic support should maintain all of the arches, but padding and support for the anterior transverse (metatarsal) arch appears to be especially important for women. However, no orthotic can support the foot correctly if it is placed in an improperly fitted shoe. Shoe size (both length and width) must allow for correct biomechanics during gait. For many women, correction of recurring pelvic and spinal subluxations can only be accomplished when the feet are provided with appropriate orthotic support in shoes that actually fit the feet.

### *References*

1. Gould N, Schneider W, Ashikage T. Epidemiological survey of foot problems in the continental United States, 1978-1979. *Foot Ankle* 1980;1:8-10.
2. Rudicel SA. Evaluating and managing forefoot problems in women. *J Musculoskel Med* 1999;16:562-567.
3. Esenyel M, Walsh K, Walden JG, Gitter A. Kinetics of high-heeled gait. *J Am Podiatr Med Assoc* 2003;93(1):27-32.
4. Lindeman U, Scheible S, Sturm E, Eichner B, Ring C, et al. Elevated heels and adaptation to new shoes in frail elderly women. *Z Gerontol Geriatr* 2003;36(1):29-34.
5. Snow R, Williams K, Holmes G. The effects of wearing high-heeled shoes on pedal pressure in women. *Foot Ankle* 1992;13:85-92.
6. Frey C, et al. American orthopedic foot and ankle society women's shoe survey. *Foot Ankle* 1993;14:78-81.
7. Poon C, Love B. Efficacy of foot orthotics for metatarsalgia. *Foot Int'l* 1997; 1997;7:202-204.

*Mark N. Charrette, DC*  
*Las Vegas, Nevada*

SEPTEMBER 2003