

Are Your Patients Shoe Savvy?

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In a "perfect" world, shoe designs would be based solely (no pun intended) on protecting the feet from injury and exposure, and providing support while standing and in motion. Throughout much of modern history, however, the dictates of fashion and style have interfered with these original functions. Poorly fitting, "trendy" footwear has frequently been the cause of, or at least a contributor to, many musculoskeletal conditions. In fact, bad shoes have been identified as the principal cause of forefoot disorders in women.¹

Bad Shoes, Bad Results

Improperly fitting shoes can constrict blood circulation, restrict movement in foot and ankle joints, interfere with normal gait patterns, and decrease proprioceptive input and feedback. The muscles, joints, and connective tissues in the feet can all suffer and undergo degenerative changes. Poor shoe fit can also inhibit the proper functioning of custom-made orthotics.

Over the long term, these factors can and usually will affect the entire kinetic chain - from the feet, all the way up through the pelvis and into the spine. How well your patients' shoes fit their feet will contribute either to their health and spinal balance, or to their misery and spinal complaints.

Sizing Up, Shaping Up

Proper shoe fit involves both size and shape characteristics. Correct shoe size accommodates the first metatarsophalangeal (MTP) joint in the widest part of the shoe. This "ball fit" allows for correct functioning of the MTP joints. Since toe lengths vary greatly among individuals, a shoe fitted by overall length may be undersized.

Because the foot lengthens and widens under physiologic loading as the day progresses, all fitting and sizing must be done during weight bearing, preferably in late afternoon or early evening. When standing, there should be three-eighths to one-half of an inch from the longest toe to the end of the shoe.² One landmark survey of women's shoes reported that 88 percent of women tested were wearing shoes that were too small for their feet.³

The second component of proper shoe fit is shoe shape. Several factors combine to make up the overall shape of enclosed footwear. The most important are the last, toe box, vamp, and heel counter.

The last is the "footprint" from which the shoe is designed. Most everyday and dress shoes are built on a "straight" last, while athletic shoes use a "combination" last, which accounts for the normal slight inward curve of the forefoot. A straight last provides more support during pronation, and is recommended for patients using orthotics.

The toe box must be wide, high, and long enough to allow for proper toe movement. A narrow toe box will crowd and pressure the metatarsals and phalanges, while a short toe box will jam the toes and cause nail pressure problems to develop (especially in athletes). An unnaturally narrow shape

will cause calluses and discomfort, with possible deformity and clinical problems.

The vamp is the shoe material that covers the instep. The vamp must be high enough to prevent pressure on the instep. The ideal vamp contains laces for an adjustable fit. Pumps and slip-on footwear often have little or no vamp, requiring a too-tight fit to prevent the shoe from falling off. A vamp that has "rolled over" the edge of the sole is a sign of improper shoe fit and probable biomechanical problems in the foot. A too-narrow vamp forms a "cast" - crowding bones and impairing circulation and joint mobility.

The heel counter supports the calcaneus; it also prevents shoe slipping and helps control rearfoot motion. A straight and solid heel counter can be enough support to prevent excessive pronation in young and lighter-weight patients. When the heel counter breaks down, it gives telltale clues (lateral or medial bulging) of the foot's tendency to pronate or supinate. The vamp and heel counter combine to provide lateral support and prevent rolling over the sole, both medially and laterally.

Shanks for the Support

The shank is the internal part of the shoe, extending forward from the heel. Its purpose is to prevent excessive pressure on the medial longitudinal arch of the foot. A shoe with a weak or nonexistent shank provides poor support, and will contribute to overpronation and eventual breakdown of the longitudinal arch.

Shoe Fit Is a Health Hit

Many of your patients take thousands of steps each day, mostly on hard surfaces. If their shoes do not fit correctly, their entire musculoskeletal systems are in danger of injury, soreness, or stress fatigue. Evaluating shoe type, condition, and fit can frequently provide clues to your patients' problems.

The use of custom-made, flexible orthotics can make up for many lower-extremity biomechanical problems. However, a poorly fitting or nonsupportive shoe will compromise orthotic function and support. The best combination is a custom-made, flexible orthotic with shock-absorbing materials, worn in a ball-fit shoe with a good heel counter and a strong shank. Always keep in mind that custom orthotics are made for the feet, not for the shoes.

References

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3. Frey C, Thompson F, Smith J, et al. American Orthopedic Foot and Ankle Society women's shoe survey. *Foot & Ankle* 1993;14:78-81.

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