Prescription for performance:

Four keys to athletic shoe fit

by Josh White, DPM, CPed

For professional athletes and weekend warriors alike, having the right shoe and the correct fit can mean the difference between participating and sitting on the sideline. While most podiatrists now fit shoes in their offices, too few are actually experts in this critical aspect of foot care—particularly with respect to the special needs of athletes. Proper shoe selection for active individuals, however, holds great potential for both injury prevention—and for practice expansion.

When podiatrists fit patients with athletic shoes themselves, it fills a void in areas lacking a shoe store with a large inventory and naturally offers greater profitability. Other podiatrists prefer to refer patients to athletic shoe stores. Such an approach typically offers patients a better selection and allows them to try shoes on in a relaxed, comfortable setting. Either way, the podiatrist ultimately needs to assess the functional biomechanics of the lower extremity, identifying its structural requirements and creating a plan to achieve the therapeutic objectives.

Whether podiatrists elect to fit patients in the office or to refer them to a store, they need to consider four simple, yet key considerations to achieve the best clinical outcomes: size, shape, stability and style.

Size

Typically the first consideration when fitting shoes, choosing the right shoe size is deceptively complex. To start, manufacturers do not follow standards for length and width. Sizes vary not only between brands, but also among different styles of the same brand—and even within a particular style if manufactured by different factories.

Despite this inconsistency, fit starts with measuring. Ideally, patients should try shoes that are made in two to four widths per half size at a store that stocks the various choices. Unfortunately, many manufacturers make shoes in only one width, and most stores carry limited inventory. As a result, patients with wider feet frequently wear too-long shoes to get the width they need.

A properly fit shoe should have approximately ½" to 5/8" space, when the patient is standing, from the end of the longest toe to the end of the shoe. The correct width accommodates the foot without bulging on the lateral side and without excess material on top. Customers used to wearing shoes that fit too short often find that the right size feels too large. As long as the shoes don't slip in the heel, a bigger size is better.

Shape

Many shoe specialists often overlook the importance of matching the shape of the shoe to the shape of the foot. Feet come in a variety of shapes, yet shoes are mass-produced using a limited number of forms called "lasts," designed to accommodate common foot shape

characteristics. These factors include forefoot breadth, arch morphology, instep height, toe depth and heel width. Even sized correctly, the wrong shoe shape still results in suboptimal fit.

The following guide to foot shapes and lasts accommodates most patients:

- Most feet have a medium-height arch, with mild curvature in the transverse plane and a broad forefoot. Examples of lasts that best fit such feet include the “SL-1” from New Balance, the “Universal” from Brooks and the “Voyage” from Aetrex.

- Part of the athletic population has feet that curve medially in the transverse plane. These lightweight shoes offer a snug, glove-like fit. An example of such a last is the “Curved” from Brooks.

- Feet with low to flat arches need ample breadth in the shoe midsection. Athletes with these feet do best with shoes made on such lasts as the “Linear” from Brooks, the “SL-2” from New Balance and the “Lenex” from Aetrex.

Stability

Athletic shoe manufacturers have seized on the concept of stability in their marketing and promise everything from limiting excessive foot motion to allowing feet to move as nature intended. Different features combine to balance cushioning and motion control, depending on the needs of an athlete’s gait.

To determine a shoe's stability:

- Squeeze the sides of the heel counter, the rear part of the shoe. Stable shoes resist compression.

- Hold the shoe at the heel and at the toes, and twist. Torsionally stable shoes resist twisting; flexible shoes twist easily.

Neutral. The foot's longitudinal arch helps absorb impact forces in the first half of the stance phase of gait, from heel strike to the middle part of midstance. Later in the stride, the arch rises, helping the foot to push off and the body to move forward with an efficient, smooth gait. When the arch lowers after heel strike and rises during the propulsive phase of gait, the athlete has a biomechanically efficient gait, and the foot itself is described as "neutral." During walking and running, athletes with neutral feet contact on the lateral side of the heel, the foot rolls in towards the medial side and resupinates through propulsion. Old shoes generally reveal wear on the lateral side of the heel and even wear across the ball, sometimes continuing beneath the distal medial aspect.

"Neutral" athletic shoes are recommended for neutral feet. These shoes should be cushioned and flexible enough to allow the foot to progress naturally through the gait cycle without unnecessary correction. Neutral shoes lack extra pronation-control devices, which could injure biomechanically efficient runners, but should provide adequate torsional stability.

Overpronation. Most athletes demonstrate mild to moderate overpronation. Immediately after heel contact, the feet evert past perpendicular. This excessive motion creates strain and outweighs the shock absorption benefits of normal pronation. Athletes with low to normal arches who are mild to moderate overpronators need "stability" shoes, which combine good support and midsole cushioning.

Athletic shoe manufacturers incorporate many features to support the medial aspect of the heel and to prevent compression beneath the plantar medial aspect, which limits rear foot pronation. Sometimes, to save weight, manufacturers cut out the middle part of the midsole and use plastic reinforcing—also known as "stability web"—to restore torsional stability.

Some runners demonstrate severe overpronation. After the lateral heel makes initial ground contact, the foot everts excessively, diminishing the natural shock absorption benefits of pronation. To compensate, the foot and ankle strain to stabilize joint motion. Athletes with this foot type find it hard to walk and run efficiently; they often tire easily and experience such conditions as heel spurs, bunions and knee pain.

Athletes with low arches who are moderate to severe overpronators need "motion-control shoes," which offer maximum rear-foot control and extra support on the medial side. Supportive features include aggressive stabilization and a wider base to provide support. The shoe may integrate a plastic or carbon graphite stabilization piece at the antero-medial aspect

of the calcaneus. This shoe type also works well for larger athletes who need additional support and durability.

Supination or underpronation. Athletes with rigid, normal to high arch feet with minimum pronation are generally well suited for running fast, but possess limited shock absorption. Usually midfoot or forefoot strikers, these runners are more susceptible to impact injuries like shin splints, stress fractures and Achilles tendonitis. Their feet demonstrate minimum pronation and generally lack ankle joint dorsiflexion. Neutral-cushioned shoes typically work best for such feet as they feature maximum midsole cushioning and minimum medial support.

Style

At one time, sneakers with canvas uppers and gum rubber soles worked well for almost any athletic activity. Now, manufacturers design shoes for very specific activities and surfaces, using a slew of high-tech components. Unfortunately, about 90% of the time, people do not wear shoes designed for the activity they're participating in. Foot care providers, therefore, must step in and differentiate the substance of shoe style from the sizzle.

Running shoes. These shoes are lightest in weight and offer maximum cushioning. They are designed for linear activity and should never be worn for court activity. Running shoes are acceptable for walking, but walking shoes are never acceptable for running.

Walking shoes. Similar to running shoes, athletic walking shoes often have more leather in the upper, making them more durable and slightly heavier. These shoes generally are not as boldly designed, making them often more appropriate for everyday wear.

Court shoes. Tennis, basketball and other court sports require quick changes in direction, requiring superior medial and lateral forefoot support. Tennis also entails a lot of forefoot dragging, so this type of court shoe often features extra thickness in the big toe area.

Cross-training shoes. These versatile shoes generally come in two different versions: lighter-weight models similar to running shoes and those similar to court shoes. Lightweight cross trainers are okay for running up to three miles and for use on exercise machines. For basketball, tennis and other court activities, the heavier weight cross trainer, often made from leather, is better.

Hiking shoes. Hiking requires support, durability and protection from the environment. Such shoes feature thicker soles and come up higher on the foot to increase ankle support. Waterproof lining and sealed seams keep the feet dry.

Bottom line: A well-fitting shoe feels good. To ensure the right fit, it's best to take shoes for a test run. While patients should always anticipate a break-in period, a properly fit shoe will generally feel good right away. As mentioned above, when a person has become used to wearing too-small shoes, the correct size usually feel excessively loose. Podiatrists need to encourage patients to try the correct fit if there are no objective signs of looseness, like

slipping in the heel. Fairly soon, the patient will appreciate the normal “wiggle room” of shoes that fit—and the fact that their feet no longer ache at day’s end.

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