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 Board-Certified Nursing Foot Care & Teaching
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Hand-Out

-How to Buy the Right Shoes and Socks-

07/15/14

Knowledge is power, and this hand-out offers you tips on buying shoes that are appropriate for your feet and your gait; and, thereby, protecting not only your feet, but also your ankles, knees, hips, and lower back.

The hand-out also discusses appropriate socks and their importance for the health of your feet.

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1-Anatomy and physiology of your foot:

Your foot has to bear your weight and be able to propel your body forward in gait. Good general body health, regular exercise, and proper foot-wear are all important.

Your foot has 26 bones, 33 joints, 107 ligaments, and numerous tendons holding it together. The ligaments connect bones to each other, whereas the tendons connect muscles to bones. The muscles of your foot and legs allow movement of the bones in your foot, as the muscles contract and relax. Your foot has several arches that hold the bones of your foot together in a proper shape and with a proper tension. The arches are created by tendons and ligaments attaching to various bones in the foot. The medial longitudinal arch in your foot is resting on top of the plantar fascia which is a thick fibrous band across the bottom of the foot, starting at the heel bone and fanning forward towards the toes. The plantar fascia acts like a “bowstring” to support the medial longitudinal arch of the foot.

Your medial longitudinal arch, spanning from your heel to your toes on the inside bottom of your foot, has to be loose and flexible when your heel strikes in the gait cycle. This is called the “adaptive” phase. It allows your foot to adapt to the surface that you walk or run on, and the flexibility prevents injuries to your foot. Your foot “pronates” up to 4 degrees to allow this flexibility. Pronation means that the medial longitudinal arch is relaxed, allowing your arch to flatten out.

When your foot is flat on the ground and your leg is 90 degrees perpendicular to the foot, the “propulsive” phase of gait starts. The medial longitudinal arch tightens up and locks your foot into place, causing it to “supinate;” the opposite of “pronate.” The foot becomes rigid, allowing your body to propel forward.

A common cause for the development of hammer-toes, bunions, protruding metatarsal joints, and subsequent corns and calluses, and pain, is due to the foot pronating further than the 4 degrees needed in the adaptive phase of gait.



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2-What qualities should a proper shoe have:

Some people get away with wearing low-quality shoes in their younger days; however, as various chronic health conditions set in with age, the shape of the foot, toes, and nails may change, and circulatory and nervous systems may deteriorate. As a middle-aged or older adult, you usually have to consider wearing high-quality shoes for comfort, to prevent aggravation of existing problems, and to prevent new injuries to your feet.

A good quality shoe needs to have the following characteristics:

- The sole needs to be thick enough so that it doesn't bend excessively in the middle as you step down on the front of your foot.
- The shoe needs to have a built-in arch that is adequate for the specific needs of your foot and your gait. The arch of the shoe especially needs to support the medial longitudinal arch of your foot to prevent excessive pronation in the adaptive phase of gait.
- The shoe needs to be big enough in all the right places to prevent pressure and rubbing on your foot, heel, toes, and nails. This includes length, width, and height. Allow approximately 1/2" space from the tip of your toes to the tip of the shoe. New reddened areas that are present on your foot after the shoe is removed is a sign of the shoe being too tight in those areas. New pain in your foot could also be a sign that the shoe is too tight. If your skin is wrinkled after the shoe is removed, that's also a sign that the shoe is too tight. However, the shoe also needs to be snug enough in the heel to give your foot proper support, to prevent shearing and rubbing from your foot sliding around, and to prevent the shoe from falling off.



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- If your foot swells easily or is chronically swollen, then a larger shoe size needs to be used all the time for chronically swollen feet, or be available, as needed, when the swelling sets in.
- There should be no seams or edges that cause undue pressure and redness.
- The shoe needs to be easy to put on and take off. Use shoes with velcro fasteners, if needed.
- A good sturdy heel is needed for people who have a weak ankle joint, causing their gait to be unsteady and wobbly.
- The material of a good-quality shoe will allow your skin to breathe. Shoes made of plastic or other artificial materials should be avoided. If the shoe additionally serves the purpose of protecting your skin and foot from injuries caused by falling objects or bumping your foot into an object, then the material needs to be firm and strong. Leather may be the best choice.
- The insole of a good-quality shoe can be removed if custom-made orthoses (orthotics) are needed.

3-How to measure your foot for a properly-fitted shoe:

- Make sure to measure both the left and the right foot.
- Measure for length from the beginning of the heel to the end of the toes, and do another measurement from the beginning of the heel to the ball of the foot, which is the widest part of your foot. Do another measurement of the width across the ball of the foot. Try to find a shoe that has the same measurements, adding about 1/2" in the length past the end of the toes.

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- You can trace your feet in advance. Stand on a piece of paper in your bare feet. Have another person trace your feet on the paper. Make sure to mark the stencils “left” and “right.” Clip the two foot images out and take them along for the shoe shopping. Hold the stencil up to the bottom side of a shoe and see if the entire stencil fits inside the sole of the shoe; allowing extra room as the sole is always bigger than the shoe itself. If the stencil goes outside the sole of the shoe, you'll know that the shoe is too tight in that area.
- Allow 1/2” extra room at the end of the shoe past the toes.
- If the shoe is a perfect fit with a proper arch, it should feel comfortable the moment you put it on and start walking around. The shoe should stay in place, support your foot, not be too tight or too loose, and you should have no pain, or even discomfort, while walking. Never buy a pair of shoes that don't meet the above criteria with the notion that “you can wear it in.”
 - You may think that your new shoes have a proper arch for your feet; however, if you later on develop ankle, knee, hip, or lower back problems, it may be due to your arch causing gait problems. A pedorthist or podiatrist can evaluate your gait and determine if you'll need custom-made orthotics to correct your arch and gait.
- Many women need a wider shoe than they can purchase in the women's section. Try to find a similar men's shoe that will provide the extra width.
- And finally: Use your knowledge and common sense, and not your emotions, when buying shoes. Hopefully, your comfort is more important than a fashion statement or the world-wide notion that a woman's feet should look small and pretty, forcing her to wear shoes that are much too tight.



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4-Does your foot have special concerns:

Hammer-toes and/or bunions:

A hammer-toe causes the affected toe to point the end of the toe down into the insole of the shoe, whereas the first joint of the toe points up into the top of the shoe. The metatarsal joint on the bottom of the foot might also point into the insole of the shoe. All three points are at risk for calluses, corns, ulcers, and pain.

- A shoe can accommodate hammer-toes better if the toe box is extra high or deep; if the upper shoe material is soft; if the insole is soft; or if a custom-made orthotic removes the pressure from the pointy metatarsal joints.
 - Open or closed toe sleeves of foam or gel can be purchased and applied over the affected toes to cushion the bony joints. Lambs wool can also be circled around the toes to cushion. Adhesive corn pads with a hole in the middle can be applied over a corn on the metatarsal pad to cushion. A hammer-toe crest can be purchased and worn under the toes on the affected foot. It'll lift up the toes and prevent the tip of the toe(-s) from rubbing into the sole of the shoe. The trick is to avoid the undue pressure from the pointy joints rubbing against the shoe or against another toe.

A bunion is caused by the first or fifth metatarsal bone deviating off to the side, causing the metatarsal joint to protrude heavily outward. A tendon is attached to the inside of the affected toe and it causes the affected toe to turn towards the other toes, often overlapping the adjacent toe. Bunions are also caused by arthritis in the metatarsal joint. Most bunions affect the metatarsal joint of the great toe.



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- It can be difficult to find a shoe that is wide enough in the metatarsal area to accommodate a large bunion. A shoe with an extra deep toe box can often be used if the upper material is soft and stretches to increase the width.
 - A bunion cushion can be purchased to fit over the toe above the bunion, and it cushions the protruding metatarsal joint by redistributing the pressure away from the protruding metatarsal joint to the surrounding area.

High arch:

A foot with a high arch is likely to cause excessive pressure in the metatarsal pad of the foot. It will be a trial-and-error experience finding a shoe that both supports the arch to prevent it from collapsing, but also cushions the metatarsal pad to prevent too much pressure in that area. A person with a high arch will likely need a custom-made orthotic to accommodate both problems.

Flat arch (born with):

People born with a flat foot is a rare occurrence. Such people usually don't develop plantar fasciitis, as the inflexible plantar fascii has developed in-uterus to be the same length as the collapsed flat foot. Therefore, no extra tension will affect the plantar fascii and cause inflammation. A shoe or an orthotic with a proper arch may be necessary, though, to protect the knees and hips while walking on the pronated foot. You can often find a tennis shoe with an arch that is adequate.

Flat arch (newly acquired) or pronated foot:

If the medial longitudinal arch weakens and collapses, the foot pronates during the entire gait cycle. This can cause tension on the inflexible plantar fascii, which may



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become inflamed with painful plantar fasciitis. A pronated foot can also cause hammer-toes and bunions. Finally, a pronated foot can cause the wrong muscles to compensate during gait, causing problems with the ankle, knee, hip, or lower back. A newly acquired collapsed arch is collapsed while the foot is weight-bearing; but, the foot may still have an arch in a neutral sitting position. Often, a tennis shoe with an adequate arch can be purchased and used successfully. Otherwise, a custom-made orthotic should be used. The casting of the foot should be done in a neutral sitting position while the foot is not weight-bearing.

Collapsed foot (charcot foot):

A person with long-standing diabetes, peripheral neuropathy, and often complete numbness in the foot and lower legs, may develop a charcot foot where the medial longitudinal arch completely collapses and the bones of the mid-foot start deteriorating, allowing the big bones of the mid-foot to rest on the ground. During the acute phase of the development of the charcot foot, off-loading of the foot is very important. Once the damage is done, the person will need a specialty shoe and orthotic where the protruding bony points of the mid-foot are protected and cushioned as much as possible. Pressure ulcers in the mid-foot will be a continuous problem for these people.

Swelling:

Swelling of the feet and lower legs can be caused by leaky valves in the veins, called dependent edema; by a blocked or damaged lymph vessel or lymph node above the area of swelling; or by heart, liver, or kidney failure, among the most important reasons. If the swelling is caused by dependent edema, resting with the legs up and/or pumping the muscles of the calf or thigh with walking reduce the swelling. The swelling usually gets worse during the day and goes away at night. Swelling caused by heart, liver, or kidney failure affects the whole body and does not go away until the cause is fixed. Lymph edema affects only one extremity.



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Always wear a shoe that's big enough to allow for the swelling of your foot and ankle. Extra pressure on your swollen foot from a shoe that's too tight will cause excess pressure on your nerve endings and severe pain. You may need to buy shoes of several sizes to accommodate the varying degrees of swelling of your feet.

Arthritis in your feet:

Arthritis causes swollen joints, stiffness, and pain. Try to find a shoe with a proper size, a proper arch, and proper support; but, also of a soft, stretchy material to prevent undue pressure and further pain.

5-Do you have diabetes, neuropathy, and/or poor arterial circulation:

Diabetes can cause poor health of your cells; numbness; and limited arterial circulation with limited nutrition and oxygen to your cells. You can also have poor arterial circulation without diabetes and numbness. Poor arterial circulation with limited nutrition and oxygen to your cells put your feet at risk for ulcers. Pressure from a bone in your foot and a shoe that aggravates this pressure increases the chance of an ulcer developing. Numbness in the foot prevents the signal of pain to alert the person that an ulcer is developing in the foot.

If a person is at risk for foot ulcers for any or all of the above reasons, a specialty shoe and/or orthotic are necessary to reduce the possibility of pressure points. Medical insurance will often cover the cost of a specialty shoe and/or orthotic for a diabetic; however, while such a shoe and/or orthotic cushion the pressure points, they may not be able to also correct the gait, if this is needed. It may be necessary to pay out of pocket for a custom-made orthotic that addresses both problems at the same time; if it's even possible to address both problems simultaneously.



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6-What shoes to avoid:

Once you read chapter 2, starting on page 3, you'll know what to look for in a high quality shoe.

However, you may not be aware that certain shoes can create new, acute problems with your feet. See below for examples:

- If your heels tend to be dry, to build-up calluses, and to crack, wearing an open sandal is a bad choice. Both a sock and a shoe covering the whole foot protect the skin on your heels and prevent excessive drying of the skin.
- Wearing high heels is another bad choice. For each inch that your heel is raised, the pressure on your metatarsal pad is increased by roughly 25%.
- Don't wear pointed shoes. They cause pressure and pain on your toes.
- Flat shoes with no arch are only acceptable if your foot has an arch that is strong enough to support itself. People who wear flat shoes are generally more likely to develop a pronated gait as their medial longitudinal arch starts collapsing due lack of arch support from the shoe.
- Don't buy shoes made of plastic or other artificial materials. Your skin will not be able to breathe, and moisture and heat will build up on your skin and inside the shoe. This environment is very opportunistic for a fungal infection, such as athlete's foot or fungal nails.
- Pumps are generally not manufactured to stay on your foot, unless you compensate by using extra muscles to change to shape of your foot to fit into the shape of the pump. Your feet will get tired and aching very quickly.



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7-Why a proper body weight is important:

The pounds per square inch of an average-size adult is approximately 25,000. This number increases with increased body weight. As mentioned above, for each inch that the heel is raised, an additional 25% is added to the p.s.i. The heavier the body and the higher the heel, the more pressure and pain the person will endure in the metatarsal pad of the foot.

There's also a possibility that a high heel, combined with gravity, will cause the first metatarsal bone to move sideways, away from the foot, as the great toe reaches the end of the shoe and can't move forward any longer. This is another reason for the creation of a bunion.

8-Who can get away with walking barefoot or in flat sandals:

If you're generally healthy, with a good body weight, and with good arterial, venous, and lymph circulations, as well as intact nerves, due to good nutrition, a habit of regular exercise, and lack of smoking and excessive alcohol consumption, you may have healthy soft skin, strong arches supporting the structure of your foot, and no bunions and hammer-toes. You'll be an exception from the norm, but you'll also be one of the few who can enjoy walking barefoot and in flat sandals without causing any acute damage to your feet.

If you've been able to enjoy this freedom and suddenly start feeling aches in your feet, ankles, knees, hips, or lower back, it's time to have a specialist look at your feet and gait to see if the time has come to graduate into shoes of a higher quality.



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9-What to look out for when you buy socks:

Do you realize that your socks need to be of a proper fit, of an even thickness, and of a proper material to promote free arterial, venous, and lymph circulation, to protect your skin, to cushion your feet, to keep your feet warm and dry, and to provide comfort?

- Buy socks of a soft cotton knit or a cotton-blend that will wick away moisture and keep your skin dry.
- Buy socks that are big enough to prevent pressure onto your foot and lower leg; not just at the top edge, but all the way down to the toes. A sock that's too tight will push fluids up above the top edge of the sock. The nerve endings in the foot will be squeezed by the pressure and produce pain, and excess swelling will take place above the top of the sock. Cut a slit in the top edge of the sock if you're unable to find a sock that is wide enough at that place.
- Socks can be turned inside-out if pressure from the seam bothers your skin.
- If you're diabetic, use white socks. This suggestion is not because the dye in colored socks is dangerous, unless you have a true allergy to the dye. Rather, it's easier to see blood, serous fluids, or puss from a wound, that you may not be able to feel due to diabetic neuropathy and numbness, on a white sock.
- Change your socks frequently if your feet have a tendency to sweat.
- Only Ted hose or compression hose should be tight. This is meaningful as the tightness has an even pressure all the way from the toes to the knees or hips. The tightness prevents dependent edema before it sets in.



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10-Links and references:

My biggest inspiration to this hand-out has been “The Salon Professional's Guide to Foot Care” by Godfrey Mix, DPM, published by Milady SalonOvations in 1999.

Please view the other hand-outs on my website, www.HFHF.us for additional information.

- The most important hand-out is likely the one on “vendors, socks, shoes, and foot care supplies.”