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Hand-Out

**-Do You Need Orthotics or Shoe Modifications-**

07/15/14

***Knowledge is power, and this hand-out offers you tips on why your feet may be causing you pain in your foot, ankle, knee, hip, or back, and why you might need orthotics (orthoses) or shoe modifications!***

***The hand-out also offers suggestions for trying different shoes or over-the-counter products to see if your foot pain can be reduced by this “trial and error” method!***

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**1-Anatomy, physiology, and gait of the 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.” Your 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 foot pain, is due to the foot pronating further than the 4 degrees needed in the adaptive phase of gait.***



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***Pronation of your foot can also be one of the reasons for developing painful plantar fasciitis.***

***And, pronation of your foot, as well as many other problems with your foot, can also be the cause of pain in your ankle, knee, hip, or lower back.***

**2-Is the pain in your lower back, hips, knees, or ankles caused by a problem in that specific area, or by a problem in your foot:**

A proper medical exam of your feet, ankles, knees, hips, or lower back will likely tell you what the cause of the pain is.

***The right doctor and/or test can probably determine if there is a problem with the ankle, knee, hip, or lower back and if physical therapy, a brace, a steroid injection, or some type of surgery is the best approach to correct the problem and minimize the pain.***

If there is a treatment option for the ankle, knee, hip, or lower back, it makes sense to use this treatment option first to see if the pain goes away.

However, if the treatment option is not an option for you, for whatever reason, and/or if you want to explore if your gait can be corrected and relieve the pain, at least to some degree, then you want to have your foot and gait evaluated to ***determine if an orthotic or shoe modification can help reduce the pain.***

**3-Can a corrected gait reduce the pain in your lower back, hips, knees, or ankles with the use of orthotics or shoe modifications:**

***If the pain in your ankles, knees, hips, or lower back is caused by a gait problem and over-compensation of the wrong muscles, then an orthotic or shoe modification will likely help reduce the pain.***



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***You'll need to have your foot/feet and gait evaluated by a podiatrist or pedorthist.***

***A custom-molded foot orthotic, that fits in your shoe, will be made to correct your gait.***

- A mold of your foot will be made when you're sitting in a neutral position and your medial longitudinal arch is relaxed.
- The fabrication of the orthotic will be done using the mold of your foot.
- The materials may vary depending on what the goal of the orthotic is.
- Some podiatrists will do the molding of your foot in their office, but send out the molding for fabrication elsewhere.
- Most pedorthists will do both the molding of your foot in their office and the fabrication in their office.
- A custom-made orthotic may need modifications for a proper fit, and it's easier to get this done if your supplier does the fabrication in the office.
- Make sure to coordinate the custom-made orthotic with the shoe that you plan to wear it in. The insole that the shoe came with from the store will have to be removed. Often, the orthotic will fit in several different shoes.
- In conjunction with a custom-made orthotic, physical therapy may be a good idea to learn how to use and strengthen the proper muscles.

***A shoe modification may be all you need.*** One example is legs of different length where a shoe lift is what you need. A podiatrist or pedorthist can guide you.



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Custom-made orthotics that are made when you step on a mat, that measures the pressure points of your feet, or pre-fabricated orthotics that are pulled of a shelf may not work to correct your gait and reduce pain elsewhere in your body.

However, they may help with pain in the foot, and they will be discussed in the next chapter that focuses on pain in your foot/feet; and not elsewhere in your body.

**4-Should the pain in your foot be reduced with an orthotic or shoe modification that corrects your gait, or is it better to just cushion the areas of pain:**

***If you experience pain only in your foot, you can take the “trial and error” approach in finding a way to reduce the pain.***

***You can try to find a shoe that gives your arch appropriate support if your medial longitudinal arch relaxes too much and causes pronation with subsequent aches and pains in the foot. The pain may be due to plantar fasciitis caused by the pronation.*** Many athletic shoes or tennis shoes are manufactured with an arch that is just right for your foot. It's trial and error to find such a shoe. You'll know if you find a shoe with a proper arch if your aches and pain go away when you walk in the shoe without pain. You can become familiar with the shape of your arch before you go shoe shopping. Sit in a chair with your feet dangling. Use your own eyes or the eyes of another person to look at your arch in this neutral position. Try to find a shoe that has an arch that looks like the arch on your foot. Once again, the best test to determine if the arch of the shoe is good for your foot is comfort when you wear the shoe. Walk around the shoe store in the shoe before you decide to buy it.

- ***For plantar fasciitis, there are various other treatment options, as well.***



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- Furthermore, *you may need a custom-made orthotic to correct plantar fasciitis* and to prevent it from returning if you're unable to find a shoe with a proper arch for your foot.
- *To reduce pain in a specific location of your foot, you can also look into the orthotics that are measured electronically by stepping on a mat that measures the pressure points in your foot, or by stepping on a mat that leaves a visual diagram of the pressure points on your foot.* Such orthotics are usually designed to reduce pain specifically to your foot, rather than correcting your gait to reduce pain elsewhere.
- *Another possibility to reduce pain somewhere in your foot is to purchase different types of “inserts” that you can place inside your shoe.*
  - *You can buy the orthotics that come in your shoe size, that are made for a man or woman, and that are designed for your specific foot diagnosis.* Such orthotics are sometimes called “custom-made,” even though they get pulled off a shelf at the store. They may work very nicely for your specific problem, but they are usually very expensive.
- *You can also buy over-the-counter arch supports to ease aches of your arch.*
- *If you have hammer-toes, you can purchase a hammer-toe crest.* It fits under your 2<sup>nd</sup>-4<sup>th</sup> or 5<sup>th</sup> toes on the foot with toe hammer-toe(-s) and lifts up the toes to prevent rubbing of the tips of the toes into the insole of the shoe. Even if you have hammer-toes on only one foot, it may feel better to wear a crest under the toes of both feet.



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- ***You can also buy various other devices to “temporarily” change the angles of the bones in the foot;*** however, all of them only change the angles of the bones while they are being worn. None of these devices are intended to “fix” a structural problem of the foot, even if you sleep with the device on your foot every night. The moment you remove the device, the previous position of your bones return.
- ***Most other devices are made to cushion bony points on the feet to prevent the formation of corns and calluses, and even underlying ulcers, or to simply reduce pain.*** The devices minimize friction and rubbing from the shoe or ground during standing or walking; or from an adjacent toe.
  - Such devices are both preventive in the formation of corns and calluses; and they also reduce associated pain.
  - The devices include, but are not limited to:
    - heel pads
    - metatarsal pads
    - insoles from beginning of the heel to the end of the toes
    - adhesive corn pads with the center removed
    - sleeves that are open or closed at the end to fit over the toes
    - disks that fit between the toes
    - lamb's wool that can be wrapped around the toes
    - and bunion cushions that direct the pressure away from the bunion
  - Some devices are made from felt, some from cotton-lined foam, some from gel, and some are made with synthetic materials. Most can be hand-washed and used till they wear out.



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### **5-How do you find out what you need to do to get rid of the pain in your foot, your ankle, your knee, your hip, your lower back:**

If the pain is only somewhere in your foot/feet, follow the advice in chapter 4.

If the pain is elsewhere, such as in your ankles, knees, hips, or lower back, follow the advice in chapters 2 and 3.

Our medical system makes it anything but easy to figure out which doctor or specialist you should see, and if the insurance will pay for the evaluation; let alone the treatment needed.

Custom-made orthotics to correct your gait may not be covered by medical insurance, even if the orthotics help reduce pain in the ankles, knees, hips, or lower back from improper gait, or pain from plantar fasciitis.

Protective inserts for diabetics to prevent ulcers are usually covered by insurance; however, they may not be designed to correct a gait problem at the same time.

Surgery may be covered to correct joint problems in the skeletal system, but surgery is also the most risky treatment to have.

### **6-References and links:**

I encourage you to take a look at the other printable educational hand-outs on my web-site, [www.HFHE.us](http://www.HFHE.us). The hand-outs, that complement this one the best, are:

- How to buy the right shoes and socks.
- How to take care of plantar fasciitis at home.
- Where to buy shoes, socks, and foot care supplies.