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First Metatarsal Subluxation

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A dorsal or posterior subluxation of the first metatarsal, often found bilaterally, is one of the most common, hidden, and often asymptomatic problems in the exercising individual. It most often creates or aggravates problems elsewhere. The origin is usually the result of wearing shoes that are too small, a fact seen frequently in over 50% of the athletic population.

Like weight, many people think that their shoe size should be as small as possible - the smaller the better. In addition, people often think that the dimensions their feet have attained by age 20, 25, or even 30 will remain the same throughout life. This is not true. In many individuals, the foot will change in size in later years regardless of their age.

An increase in foot size can occur for several reasons. Normal compensatory changes, resulting from weight gain or loss, gait problems, muscular imbalance, or pregnancy, take place naturally in the body. As a result, the foot size will sometimes become larger. This is apparently due to the relaxation of the ligamentous and tendinous attachments, followed by an expansion of the bones in the foot. These delicate changes may cause a profound increase in size of one or, as is usually the case, both feet. In individuals who spend all day on their feet, and especially in athletes who train many hours in the course of the year, this is an important factor. Generally, the more active the person the greater the likelihood that the feet will become larger after the age of 25.

As many as 52% of the new athletic patients seen in our clinic over an eighteen month period were found to be training in shoes too small. Once the problem was diagnosed these patients were found to require a change in shoe size ranging from 1/2 to 1 1/2 sizes larger. Many needed a larger shoe immediately. Some, after finally wearing the proper shoe, had a foot which continued to increase for six months after the initial diagnosis, eventually ending with a total difference of up to 2 1/2 sizes.

Many of these changes which take place are normal compensations. Troubles are compounded, however, when the individual is unaware that one of the changes taking place is an increase in the size of the foot. After a certain age, people no longer have their feet measured when buying new shoes, as they do not realize their feet could be any different. As a result, the same shoe size is worn for years, or even decades.

First Metatarsal subluxation

This problem of the exercising foot in a short shoe typically leads to a slow "jamming" of the toes, characteristically precipitating a dorsal or posterior subluxation of the first metatarsal into the medial cuneiform. The calcaneal bone is often involved as part of a whole cycle of mechanical problems, often leading to a tarsal tunnel syndrome. Other ankle subluxations, including the talus, navicular and cuboid bones, can develop secondarily. In time, the toes become "spring-like," and when a shoe too small is slipped on, the toes spring in, and the tightness of the shoe is often never realized. The first metatarsal, however, is not as permissive as the other digits and therefore, takes most of the abuse. Ultimately, this may result in any number of foot related problems such as hammer toes and bunions.

Any problem in the structural, chemical, or mental triad of the body may relate, via the nervous system, directly or indirectly to that subluxated metatarsal. It is interesting to note that because of the slow onset of the problem, the first metatarsal is often asymptomatic - people usually don't complain of pain in that first toe joint. More often the stress is transmitted upward, and the symptom, whether pain or dysfunction, is seen in the ankle, leg, knee, hip, low back, and at times even in the cervical spine or temporal mandibular joint. Some patients, however, will complain of pain in this area, but it is usually a second thought only after protesting other symptoms.

Diagnosing the Problem

Even though the first metatarsal is frequently asymptomatic, the problem is relatively simple to diagnose:

1. Observation

Visual examination of the feet will reveal trauma, or micro-trauma, to the front of the foot, including discoloration of the nail bed (the all-too-common black toenail), blistering or callousing of the toes, first metatarsal swelling or any deviation from the normal anatomy. In more extreme cases, inspection of the shoe will reveal wear and tear, from inside out, as a result of the nail trying to push out of the shoe. This is common in certain athletic shoes. In more classic cases, this may not be seen from the outside but can be palpated from the inside of the shoe.

2. Measuring

Another means of identifying this problem is by simply measuring the foot. With a metatarsal jamming, the person usually shows the need for shoes at least a half size larger than is presently being worn. Sometimes the length is correct but the width is too narrow. Have the feet measured in a competent shoe store, being sure they are measured in a standing position on a hard floor. Occasionally, with some individuals, it may be necessary to have the feet measured two or even three times during the day, due to normal size fluctuations. (Of course, any meaningful **daily** size fluctuations must be differentiated from abnormal changes that may take place such as edema, and certain pathological changes.) Simply compare the actual size of the foot with the shoe size (measured) presently being worn. There is, however, one major drawback to this method: the shoe manufacturers' sizes are not consistent with the standard measuring devices used by the shoe stores. Also, yesterday's size nine may be today's eight and tomorrow's eight and one half.

An easy way to evaluate a patient's shoe that may be too small is to take out and observe the insert often found in many types of athletic footwear. Look at the wear pattern (the indentation made from the toes) on this insert, and see if the areas compressed by the toes are not completely on the insert. A foot that overlaps the bottom of the shoe obviously is in the wrong size shoe.

Shoe store salespersons have often said that people frequently refuse to wear a larger shoe size, even if they fit better, than they have worn in the past. This is a cosmetic problem which can be dealt with through education, and is a component of the mental aspect of the person.

3. Palpation

A patient with a first metatarsal subluxation will often have palpable tenderness on the dorsum of the joint. Occasionally, only minimal tenderness is experienced until passive movement of the joint is added with palpation. At times, minimal palpable tenderness is detected.

4. A.K. Evaluation

A simple challenge of the first metatarsal, using a standard muscle test, will quickly evaluate a first metatarsal subluxation. The direction of the challenge is usually straight posterior, but occasionally the vector is more medial and/or caudal. Rarely is it in other directions, but it is certainly possible, depending on the origin of the problem.

Testing the shoe for improper fit can be easily done with the patient standing. Again, using a standard muscle test, have the patient stand without their shoes on and test the indicator muscle to be sure of its status. Have the patient put their shoes on, wearing the same type of socks they normally wear with the shoe laced the same way as during exercise. Then test the muscle indicator. An inhibition of the muscle is merely a general indicator that something, probably with those shoes, is not normal. It is typically the fit, although other problems can exist such as the shoe support, the lacing technique, or poor foot/shoe compatibility.

Correction

Treating the problem is twofold:

1. Correct the actual subluxation.
2. Instruct the patient of proper footwear.

Correcting the first metatarsal is a simple manipulation. Adjust the metatarsal in the opposite direction of the weakness created during the challenge. This is usually straight

anterior and is done, for example, with the right hand while the left stabilizes the ankle at the lower end of the leg. When the proper manipulation is accomplished, as well as proper nutritional support and patient education as discussed below, taping or other structural support is rarely required. Be sure to re-challenge the joint to be sure the proper adjustment was made.

Nutritional Factors

Follow-up nutritional support may be an important aspect of preventing a recurrence. Using accepted oral nutrient testing, it may be found that a particular vitamin or mineral will abolish the positive challenge of the first metatarsal. More often, this nutrient is zinc, and only occasionally has manganese been found to be a factor. The proper supplement, given three or four times per day for approximately one month, will help in the recurrence of the problem.

Patient Education

One of the most important aspects of treating the first metatarsal subluxation are the instructions to the patient. They must be made aware of the importance of properly fitting shoes. The remainder of this chapter pertains to both doctors and patients.

There are a number of ways to choose the right size shoes:

1. Spend adequate time trying on shoes in the store. Find a hard surface rather than the thick soft carpet found in many shoe stores, where almost any shoe will feel good. If there is no sturdy floor to walk on, ask if you can walk outside. (If you can't, shop elsewhere). Try on the size you normally wear. Even if that feels fine, try on a half size larger. If that one feels the same, (or even better), try on another half size larger. Continue trying on larger half sizes until you find the shoes that are obviously too large. Then go back to the previous half size and usually that's best one. You may need to try different widths if you can't get a perfect fit, which is what you should strive for. Don't let anyone say that you will have to "break them in" before they feel good. Even though you may develop the reputation of being a nuisance at your local shoe store, your body will benefit. It would also be worth educating the salespeople if they are unaware of these types of problems.

2. For those people who have a significant difference of more than a half size between their two feet, it would be best to wear two different size shoes. If this is the case with you, then write the shoe company whose shoes you like, and explain your situation. Eventually, they may cater to the health needs of the thousands who have this problem. If the difference between the two feet are less than a half size, fit the larger foot.

3. In the many years of caring for active people and their foot needs, it has become obvious that, when it comes to athletic shoes, more women fit and function better in men's shoes than in women's. Rule number one, though, is that the shoe must fit. Some women don't fit into men's shoes, and some stores do not carry men's shoes in sizes that are small enough for some women. (Many companies do not even make men's shoes that small.) For the sportswomen, men's shoes usually work best, if they fit.

4. Remember, the manufacturer makes new shoes based on trends of style, color, and what fancy gimmicks can be used to market the shoe through advertisements. That is why many shoes come and go in the market so frequently. So if you finally find the shoe that works great for you, buy several pairs. Just be sure to try them all on, as the same shoe may even vary in size.

In summary, there are many potential problems hidden within the body's structure which can cause unnecessary obstacles affecting a person's health. A posterior subluxation of the first metatarsal joint from shoes that are too small is a very common, yet easily diagnosable and correctable one. Put health before style and trends, by buying shoes that fit properly.

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