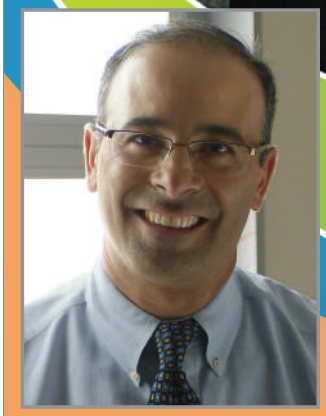
Accuthotix™ Special Report



Confused about foot orthotics?

The answer is revealed by understanding how orthotics are fabricated

By Dr. Joseph J. Frasco

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The foot is an anatomical marvel with 26 bones; together, 2 feet comprise 25% of all the bones in the human body. Except for the spine, the foot is the anatomical region that contains the greatest number of specialized proprioceptive nerves. The nerves interact with the central nervous system via afferent and efferent tracts that help coordinate all of the innate messages which control our body movements, our posture and our ability to balance on two feet.

The utilization of custom foot orthotics is common among various health professions however there is a great deal of confusion about different orthotic types, casting methods and the use of foot scanners. In this article, I will attempt to educate you about the pros and cons of different techniques being used today. With this information, you can make an informed decision about which method makes the most scientific and pragmatic sense to you.

Full Weight

Full Weight-Bearing Polystyrene Foam Step-In Method

This technique is simple and is done by asking the patient to stand in a tray of 1 inch polystyrene foam with full-weight equally distributed. Orthotic labs using this technique claim that by taking "16 different measurements" they can calculate how to fabricate the correct orthotic devise. One must recognize that casting in this manner captures the foot in its fully compensated or abnormal position. Trying to measure how much correction is necessary at best can only be a guess. Without the patient's foot in front of the person fabricating the orthotic, there is no way to assess whether we are correcting a foot with a rigid deformity, such as a senior patient with severe osteoarthritis or a young soccer player with a flexible deformity.

The materials used to fabricate the orthotic in each case, and the degree of correction for each of these patients could be drastically different.

The disadvantage is that the orthotic lab has no idea where the ideal neutral position of the foot is and must guess at the amount of correction used. This increases the risk of under correction i.e. the patient doesn't feel that the orthotic did anything and wasted their money, or even worse, overcorrection, where you may cause iatrogenic injury to the patient. Orthotics fabricated in this manner are <u>not</u> considered to be "functional orthotics", rather they would be defined as "accommodative orthotics". Accommodative orthotic devises can help to distribute weight more evenly in the foot and can reduce shear forces and pressure points however, they do very little to control the abnormal biomechanics of the foot.

Also, orthotics fabricated by this technique are not "custom molded" and therefore, the doctor should not code (L3020) and (L3030) as such for insurance purposes.

DO YOU KNOW IF YOUR CURRENT LAB IS MANUFACTURING CUSTOM MOLDED FOOT ORTHOTICS FOR YOUR PATIENTS?

Neutral Position

Neutral Position Semi-Weight Bearing Polystyrene Foam Technique

Doctors should remember that the primary goal of orthotic therapy is to allow for optimal biomechanical function for all the joints in the foot and ankle during all phases of gait.

In order for this to occur, the laboratory must receive a mold of the patient's foot in its neutral position. The golden standard for capturing the foot in its neutral position is casting the foot using plaster slippers or wraps in a non-weight bearing position or casting the patient in polystyrene foam in a semi-weight bearing position. Foam casting is fast replacing the plaster slippers or plaster wrapping methods used in the past because is saves so much time and avoids the mess of using plaster. Casting in a semi-weight bearing position using two and one half inch polystyrene foam is becoming the most popular technique used by Doctors of Podiatric Medicine, Orthopedists, Orthotists, Chiropractors and Pedorthists. With the patient sitting and with the knee and ankle at 90 degrees, a tray of polystyrene foam is placed under the patient's foot. The Doctor wraps one hand around the ankle mortise and supports the talocalcaneal articulation in its neutral position. The other hand is placed on the patient's knee and then simultaneously pressure is applied downward, pushing the rearfoot and forefoot into the foam box.

The idea here is to make an impression of the patient's foot in its most neutral optimal position. It is critical to have the impression at least two inches into the foam, so that the lab can pour enough plaster into the cast and create what is known as the "positive".

The advantage of this technique is that it is simple, fast and effective in capturing the patient's foot in its optimal position. This is the most widely used technique to fabricate true "custom molded" orthotics, and can be coded as such for insurance reimbursement. The only drawback to using this technique is that the cast or negative impression must be accurate. The most common cause of orthotic failure is the incorrect positioning of the patients foot during casting.

THE IDEA HERE IS TO MAKE AN IMPRESSION OF THE PATIENT'S FOOT IN IT'S MOST OPTIMAL NEUTRAL POSITION.

When the plaster is hardening, the positive will be modified by removing any rough edges and creating a smooth contour. To fabricate the shell of the orthotic, (the part of the orthotic which supports the arches of the foot), a heat moldable material is chosen, put into an infrared industrial oven, and vacuumed or "molded" onto the positive. This shell is now the perfect contour of the patient's foot in its sub-talar neutral or optimal position. Next, the orthotic will be posted, grinded and top covered to the appropriate size. Orthotics made in this manner are considered "functional" in that the therapeutic goal is to control the abnormal biomechanics of the patient's foot.

Flat Plate Scanning

Full Weight-Bearing Flat Plate

Scanning Technique

This technique involves having the patient stand with full weight-bearing onto a flat pressure sensing plate. This technique is popular in chiropractic practices and retail establishments like a Walgreens or Walmart. The flat plate scanning technique is a great marketing tool and can also be useful as a diagnostic tool. By identifying the plantar pressure profile and discrepancies between the left and right feet, the quantitative data can be visualized by the patient or customer and used by the doctor to support a diagnosis and recommended treatment. In the case of a neuropathic foot, this technique does allow you to observe what might not be felt by the patient – potential ulcers or pressure sores. This technology captures barefoot plantar pressures and has some benefits and some drawbacks. Just like the full weight-bearing step in foam method, when we have the patient in a weight bearing position, we are analyzing the foot in its fully compensated or abnormal position. This creates the problem of trying to figure out what is the optimal position of the foot for that patient if we are using that information to create an orthotic. Once again, orthotics fabricated from the data collected from a flat plate scanner would be considered "accommodative" type orthotics. Please be aware that there are many companies advertising scanners with 3D technology that are really full weight-bearing 2D flat plate scanners. In essence the computer software mathematically converts the 2D image into a 3D image. These flat plat scanners are usually priced between one to two thousand dollars. True 3D surface scanners are available however; they can run upwards of twenty thousand dollars and therefore are not usually seen in private practices.

True 3D Scanner - Neutral Position

Many labs are now investing in true three dimensional surface scanners. These sophisticated systems can scan the following:

1) The true 3D image of the foot in its neutral, non-weight bearing position.
2) The semi-weight bearing foam cast from the doctors office and mill the positive or mill the shell of the orthotic directly.

The software can modify the three dimensional image as per the doctor's prescription. The technician can than either mill the positive out of some material like wood or actually mill the shell of the orthotic directly. These systems, which include true 3D surface scanners, the software that runs the program and the milling equipment, can easily run into hundreds of thousands of dollars. This is probably the future of all orthotic labs, however at this point most labs that fabricate functional custom molded orthotics are still pouring plaster to form the positives. The process takes many steps and usually about three to four days to finish the orthotic.

Conclusion

In conclusion, I hope this report has educated you about different casting techniques and fabrication techniques used today. I cannot emphasize enough how important it is to provide the orthotic lab with a quality foam impression or the digital information from a true 3D scanner. Foam impressions and scanners which can capture the foot contours in the sub-talar neutral position are the only way to fabricate real functional foot orthotics. Functional foot orthotics designed with great attention to detail will give your patients the most control and comfort.

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