

In Search of the Perfect Brace with Perfect Fit

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[DeMayo's Q & A Clinic](https://www.papolionetwork.org/demayo-articles.html)

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Proper fit of a custom brace (orthotic) is absolutely essential. Often individuals who are not very knowledgeable about custom orthotics will give up on this treatment option because they are unaware that a good orthotist will continue to modify a brace until it fits perfectly. Ideally, the orthotist, the prescribing physician, and the patient should form a team to decide on the type of brace and postproduction modifications necessary to achieve this goal. I have been blessed to work with outstanding orthotists who work collaboratively. I regularly meet with the orthotist and the patient together. The patient is always at the center of this discussion and is educated from the start regarding all biomechanics and potential functional goals. I never prescribe a brace unless the patient understands



the potential significant improvement they can have by using it. Once the brace has been fabricated, we meet again to discuss modifications that would improve the brace. It is important to remember that modifications created in the office do not always perform perfectly in a community. Therefore, it is essential that the patient be aware and “speak up” in between office visits by calling the orthotist for further adjustments should there be problems with the fit. So to start, let’s list issues with fit that are clearly unacceptable and require intervention by the orthotist. These include:

- Pressure Ulcers
- Gapping (should be total contact)
- Excessive width (difficult to don shoe)
- Skin indentations
- Redness
- Pain



Achieving a perfect fit can be quite a challenge in individuals with foot deformities, atrophy, and excessive muscle tightness (for example calf tightness can cause excess pressure on the ball of the foot due to lack of flexibility). Additionally, gait deviations in polio survivors often require further customization such as lifts, flaring/posting of the heel, decreased or support and metatarsal pads (to address hammer toes or painful metatarsals). The polio survivor should continue to describe any difficulties with the brace so that the prescribing physician and orthotist can address them. This may take multiple trials in a challenging case.



Occasionally the brace needs to be recast in the process and redone from the start. This is often because of unintended movement during the initial casting process (poor position prior to drying of the casting material).

It is important to note that a skilled orthotist can flare a plastic brace, add custom padding, change the alignment, and redistribute weight within the brace. It is not uncommon for a polio survivor, who has perhaps problem solved thousands of times in the past, to try and implement a “do-it-yourself fix”. This is often a mistake. As an example, individuals who experience pressure over a bony prominence will often time try to insert a “pad” between the brace and the sore area. Typically this is a problem since it may cause some transient decrease in pain, but actually increase the pressure between the bone and the brace.



(continued)

Adding any material into a tight space always increases the tightness/pressure in that area. And orthotist will usually heat the brace and move it away and/or pad above and below the painful spot to distribute weight more evenly. There are many other approaches to brace modifications that are beyond the scope of this article yet, are routine for a good orthotist. A patient and physician can develop a relationship with an orthotist over time that allows for an increase understanding of their skills. Armed with this information, the patient will be much more likely to collaborate with the orthotist and call for any problems with fit or function.

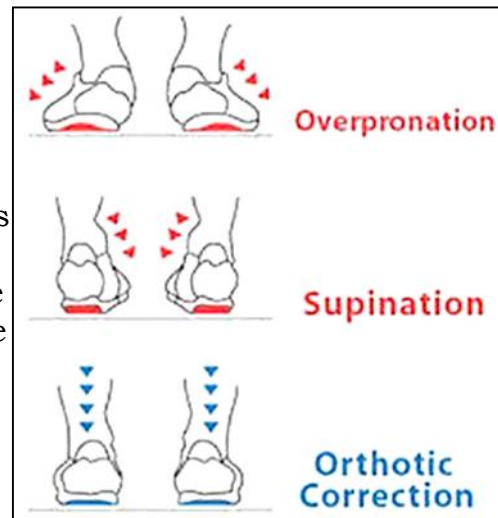
It is important to remember that not all braces are custom. Some braces can be sold as a stock item and improve function in simple cases. This is typically not the case in polio survivors. Also, there does exist a marketing movement towards carbon fiber braces. Proponents speak of and often exaggerate “energy storing function” and other claims, yet they do not discuss a significant disadvantage. The structure of carbon fiber braces cannot be modified once it is fabricated and they are extremely expensive to “redo” if initial casting is not perfect.



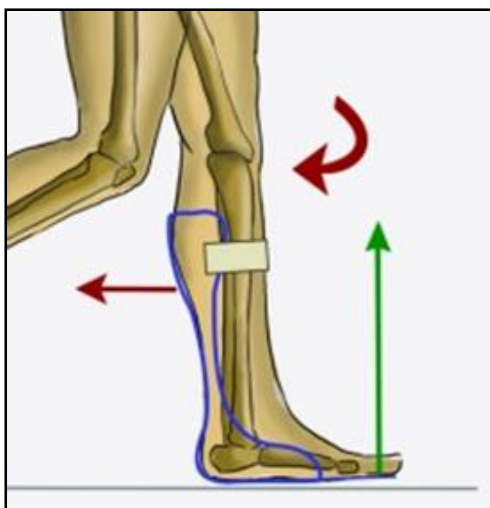
The function of the prescribed custom AFO can vary widely depending on the the individual need and design variations will then impact the fit of the brace. Some braces must control pronation/supination of the foot. This can increase or decrease the likelihood of pressure on certain bones of the foot and ankle. Other braces may be focused on preventing drop foot or stabilizing the knee.

While “Fit” is essential, optimal “Function” is the actual purpose of any brace. Often times, there appears to be a trade-off between the two.

Nevertheless, persistence and collaboration can almost always achieve both. In this light, it is important to remember that polio survivors often times have been using braces for many *many* years. While newer technologies and materials may be optimal for some patients, an individual who has functioned best with a brace that they have used for decades and who is not having any new problems is often best served by re-fabricating the exact same brace. At the same time, lighter/smaller custom plastic braces sometimes provide Additional benefits and should be considered by individuals who are in need of a change. Significant discussion and communication is often needed between the physician, orthotist, and polio survivor to decide on the ideal approach.



The ideal brace will do three things. Meet the functional goal (e.g., preventing foot drop, stabilizing ankle, improving balance, or improving the stability); Be weightless and Be absolutely comfortable.



While this ideal may never be perfectly reached, healthy collaboration between the physician, orthotist and patient usually results in an outcome that comes close.

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