

# Orthotics and Inserts for Wilderness Travel

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An added benefit of orthotics [besides correcting a variety of foot and joint problems] is the way they support the body's natural movements. This reduces the demands placed on the muscles when the body is out of alignment. The result is less work by the muscles, which translates to less fatigue, fewer injuries, and higher performance.

—John Vonhof, “Orthotics,” *Fixing Your Feet: Prevention and Treatment for Athletes*, 4th ed., page 127

It's said by the boot fitting pros that skimping on a good quality footbed in your boots is like building a house and not bothering with the foundations. Fitted foot beds in most boots range from good to very poor indeed, with the best providing a good level of support and longevity, and the worst being little better than a slip of foam that will degrade and fall apart very quickly. Whatever the quality of the foot bed it's never going to be as good as a second party design, as the manufacturer will not be able to provide the same level of quality and sophistication due to the fact that they are always trying to keep the cost of the boot as a whole down.

—unknown author

## **Central Issues Addressed in This Article**

Should serious backpackers invest substantial time and money for custom-fit inserts and orthotics? A closely related question was posed in a *Backpacking Light* magazine article: “Can Arch Support Boost Trail Performance?” A similar question from a different direction: Do those who push the limits of their feet (e.g., ultra trail runners, hikers carrying heavier packs long distances) need more support than what is usually provided by boot and shoe manufacturers? Can quality orthotics and inserts improve upon natural biomechanics?

## No Definitive Answers

There are no definite answers to the above questions *unless* one has frequent or chronic foot, knee, hip or back problems. Then the answer is an unqualified YES. The more serious the pain and discomfort, the more time and money must be spent on inserts. Experts are mostly agreed on this point. The experts also agree that foot problems often cause hip and lower back problems. For these kinds of problems, shoe and boot inserts should be seriously considered along with other potential causes and solutions.

There are no definitive answers to the questions raised at the beginning because each person is different in the structure of the feet, their footwear needs, their comfort levels, their pain tolerance and their performance standards. There are no definitive answers because many examples can be found of serious hikers and backpackers successfully using each of the following options for inserts:

- the insole that came from the manufacturer
- inexpensive off-the-shelf arch supports
- semi-customized and preformed inserts
- fully customized orthotics made by a professional
- ultralight footwear with little or no support

Finally, there are no definitive answers because even the experts don't agree. There is little or no scientific evidence that clearly favors one or more of these approaches over others. This is a controversial topic with many conflicting approaches, especially if one does not have serious foot issues and is interested mainly in comfort and performance.

## Two Recommended Solutions

If there are no definitive answers, what is one to do? The ideal would be to find someone with the following qualifications:

- professionally trained in *podiatric sports medicine*
- would not charge for their services
- is a serious hiker and backpacker.

Finding someone fitting all of these characteristics is unlikely.

A second approach on the other end of the spectrum is to get a solid layman's understanding of this subject (the main purpose of this article) and then experiment a lot, mixing and matching various options. There are obviously many approaches in between these two.

Is the second solution more reasonable? Even though there are no definite answers, my own experience and research says, "Yes" to all of the questions raised at the beginning of this article. Therefore, it would be well worth your time and money to take this topic seriously, learn as much as you can and get some expert assistance, either from a medical professional or from a specialty store for runners and hikers with a knowledgeable staff. If possible, visit several stores. Call ahead and ask when their most knowledgeable staff will be on duty.

The potential benefits of taking this topic seriously and doing your homework are many. Not only is comfortable footwear essential to pleasurable hiking, but well crafted inserts can be beneficial in a number of other ways. These are enumerated in the next section.

### **Potential Benefits of Inserts and Orthotics**

Getting maximum performance from inserts and orthotics can cost a lot of time and money, especially if one does not get them right the first time. But the potential benefits are worth it. Based on my research and experience, inserts and orthotics can:

- Improve the fit and comfort of footwear especially when putting in a lot of trail miles.
- Take up excess space in the boot or shoe, especially for skinny-footed people; keep the foot in place to prevent sore spots and blisters.
- Provide a more stable footbed which helps prevent stumbling or falling which in turn prevents sprained ankles and knees or worse.
- Prevent the foot from elongating and widening as we move (more of a problem as we age) which helps to reduce foot fatigue, since the muscles and tendons have less work to do to maintain balance.

- Support the body’s natural movements, which in turn provides more efficiency and endurance.
- If competing, quality inserts or orthotics will likely provide an edge in performance for the reasons given above; world-class athletes commonly use customized orthotics.
- Provide cushioning and arch support to absorb shock; a flexible rather than a rigid arch support will absorb some shock and prevent injuries.
- Improve posture and prevent long term knee, hip and back problems; correct body alignment problems which have the potential to reduce knee, lower back and hip pain.
- Correct a number of painful foot problems (e.g. plantar Fasciitis; flatfootedness); avoid future foot problems.
- Correct or reduce the consequences of foot and leg abnormalities.
- Provide additional support and stability when used in worn-out shoes (i.e., get more wear from favorite footgear).

The above claims assume *quality* inserts and orthotics. As we shall see in a later section, “quality” is not easy to define in this context. Actually achieving these benefits can take considerable experimentation and expense *and* there are no guarantees. Furthermore, given the subtle and sometimes subjective nature of these devices, it will not always be easy to know when maximum benefits are being obtained. To complicate the situation further, hiking comfort and performance in this area is many-faceted. Inserts and orthotics are only one part of the equation. Others parts are walking style and technique, pack weight, chosen footwear, use of poles and physical conditioning—to name most of the elements in comfort and performance. If you are making changes in more than one area, it will not be easy to separate out cause and effect when significant improvements are noted.

Even with all of these problems and complications, the potential benefits, taken as a group, are great for the serious hiker and backpacker.

## **“If It Ain’t Broke, Don’t Fix It!”**

This old adage is sometimes applied to the subject of inserts and orthotics. In other words, only spend the time and money on inserts and orthotics if one has chronic foot problems. My guess is that this is the tacit philosophy of the majority of hikers and backpackers. But to take this advice seriously would obviously cut one off from several of the potential benefits enumerated above. There are good exceptions to this advice and the issue of inserts and orthotics is one of them.

## **Two Disclaimers and Some Personal Experience**

Before going further, it is appropriate to offer two disclaimers. First, even though I have done much research in this field, I am neither professionally trained nor certified (e.g., as a podiatrist or pedorthist). I do have extensive experience with off-the-shelf inserts plus three customized or semi-customized orthotics, each from a different source. Only one of my orthotics came from a certified expert (a pedorthist). I have done a lot of research on this subject. In short, I have considerable experience and expertise, but I do not claim to be a recognized expert. The second disclaimer, stated at the beginning of this article, deserves repeating: those with frequent or chronic foot problems, or problems with knees, hips or lower back should consult with one or more of the specialists listed below.

## **Definitions for Relevant Medical Specialties**

Since references have been made to professionally trained and certified medical professionals regarding inserts and orthotics, here are some short definitions from the *Wikipedia* website.

A **Podiatrist** is a medical doctor trained to deal with disorders of the foot, ankle, and sometimes knee, leg and hip (collectively known as the lower extremity).

An **Orthopedist** is a medical doctor (usually specializing in orthopedic surgery) trained to deal with problems with the musculoskeletal system.

A **Pedorthist** is a footwear specialist—includes shoes, shoe modifications, foot orthoses (orthotics) and other pedorthic devices—to solve problems in, or related to, the foot and lower limb.

**Physical Therapists** (PTs) are health care professionals who evaluate and manage health conditions for people of all ages. Typically individuals consult a PT for the management of medical problems or other health-related conditions that cause pain, limit their ability to move, and limit the performance of functional activities.

**Physiatrists** are physicians specializing in rehabilitation or “sports” medicine. Typically they take a systems approach in restoring optimal function to people with injuries to the muscles, bones, tissues and nervous system.

### **Operational Definitions and Elaboration of Key Concepts**

One problem for those attempting to develop an in-depth understanding of this subject is that there is little consistency or standardization in the footwear industry and the medical profession regarding the following terminology: footbeds, inserts, insoles, arch supports and orthotics. Since the rest of this article focuses mainly on *preformed* inserts and *custom* orthotics, following are working definitions and clarifications of these key concepts.

An *orthotic* (“orthosis” is the more correct, but less common term) is a device typically prescribed by medically trained and certified professionals. These professionals include podiatrists, pedorthists, chiropractors, physician assistants and physical therapists. These devices can be prescribed either to correct a variety of problems or to enhance comfort and performance or both. The former is the most common use of orthotics while the latter is the main concern of this article.

For the purpose of this article, here is a working definition of *orthotic*: a custom fabricated device typically (but not always) starting from a mold or cast of the individual foot. The essential criteria for an *orthotic*, in my working definition, is whether the device is custom made for an individual foot. On this definition, orthotics can be mail ordered (after providing detailed personal information) or constructed after face-to-face office visits (the more common approach).

Using this operational definition, *orthotics* can then be contrasted with off-the-shelf or over-the-counter preformed inserts (hereafter referred to as “OTC” inserts). The fact that some authors use the term “orthotic” more broadly to include many OTC devices further confuses an already confusing situation. A similar problem exists with those who narrow the term “orthotic” to refer only to those devices custom made by a certified medical professional (e.g., a podiatrist) after a face-to-face office visit.

One complicating factor in deciding between an orthotic and an OTC device is that the latter can be quite sophisticated. This is because OTC devices are often designed by medical professionals to improve footwear comfort and performance for the general population. Theoretically, OTC inserts can provide many (if not most) of the features and benefits of a totally custom device. Furthermore, depending on an individual’s needs, medically trained experts can and often do recommend OTC devices.

OTC devices are commonly structured for specific needs. For example, an OTC device for day hiking with lighter packs and shoes might focus on the stability of the foot. Another model designed for the backpacker carrying heavier packs will have a more aggressive arch support and more cushioning. Another model might focus on high arches and another on flat feet. One example of an OTC insert with many of the features of a custom orthotic is the “PolySorb Total Support Premium Insoles” sold by Spenco. This insole/insert claims the following features:

- (1) heel cup to enhance stability
- (2) cushioning that absorbs shock and helps prevent overpronation
- (3) support cradle that provides advanced arch support
- (4) reverse Morton’s extension that creates a toe-off pad for greater propulsion
- (5) heat moldable layer (heat in the oven) to provide custom fit and to prevent blisters.

Whether these specific claims on the packaging for this model of insert are justified is an open question. The main point here is not to sell Spenco products,

but to explain that OTC devices can be quite sophisticated and have great potential to improve performance and comfort for serious hikers.

One final comment about terminology. The commonly used term “arch support” is usually defined as a device inserted into a shoe or boot that offers significant support for the arch of the foot. Arch supports are often recommended for hikers and backpackers who push the limits of their feet. One problem with this concept is that it only deals with one part of the footwear equation (the arch of the foot). *Orthotics* and the more sophisticated OTC devices usually deal with many parts. Another more serious problem with the term “arch support” is that since all but the cheapest inserts, insoles, and footbeds manufactured today offer some support of the arch, this concept becomes nebulous and not very useful.

### **Six Approaches to Designing and Fitting Over-the-Counter (OTC) Inserts and Custom Orthotics**

In my research, I have found six different and sometimes conflicting approaches to the design and fitting of orthotics and inserts. Understanding these different approaches is critical for a successful analysis of this topic. [Reminder on terminology: OTC stands for “Over the Counter” (or alternatively “Off the Shelf”); an *orthotic* is any insert or footbed that has been customized for an individual foot.] Here are six approaches to designing and fitting inserts and orthotics:

1. OTC inserts sized only for the length of foot, type of shoe and thickness of padding.
2. OTC, semi-customized insert for different foot problems; customer selected sometimes with the help of a knowledgeable sales person at a specialized footwear store (e.g., different inserts to address problems of overpronating or oversupinating feet).
3. OTC semi-customized inserts fitted by a trained professional (e.g., a podiatrist or pedorthist) after a thorough analysis of foot and leg problems, types of shoes, situations of use, etc.
4. OTC “one-model-fits-all” inserts that are designed to retrain or mold the foot into a “natural” or “perfect” foot position. These inserts are usually

constructed by a trained professional (e.g., a podiatrist or pedorthist) and fitted with the help of a knowledgeable sales person at a specialized footwear store. The usual variations for this “one-model-fits-all” insert are limited to foot size and type of shoe (e.g., athletic, dress, boots, sandals). [Note: This unique approach deserves more explanation and will be expanded upon in a later section.]

5. Custom orthotics heat molded in a weight-bearing position for a specific foot or gel-based footbeds that naturally mold to the shape of each foot.
6. Custom orthotics molded from a cast of the foot taken while in a neutral and non-weight-bearing position for a specific foot.

The above six approaches (there may be more) have been simplified for purposes of analysis in this article.



UGG WAS A VISIONARY CAVEMAN WHO DREAMED  
OF A TIME IN THE FUTURE WHEN WE WOULD BE ABLE  
TO ORDER CUSTOM MADE ORTHOTICS.

JIM MORRISON

### **Going Natural: Rejecting Both OTC Inserts and Custom Orthotics**

Before going further, it must be acknowledged that there are those who reject all of the approaches detailed in the previous section. These individuals advocate the “going natural” approach. In other words, go barefoot as much as possible and when not possible, by wearing the lightest shoes possible (e.g., flip flops, moccasins, slippers, sandals). Their rationale is usually twofold: (1) strengthen

the tendons and muscles of the lower leg to enhance performance (i.e., make them work harder); (2) gradually correct any foot and gait problems. This approach is based partly on the belief that the shoes and boots of modern culture (e.g., raised heels, pointed toes, soft and spongy insoles, thick outer soles) have been manufactured for purposes (e.g., aesthetics, uniqueness, latest fad, vanity) other than to maximize health and performance. This approach or philosophy deserves serious consideration. However, it suffers from the same problem as the other approaches: there is little or no definitive scientific research to support it.

### **Author's Recommendations for Most Hikers: Be Situational**

Given my research and experience with the approaches detailed in the previous two sections, my recommendation, for *most* people, is to be situational in this matter. A situational approach is best since there are many factors or variables affecting the choice of an insert or orthotic: genetic makeup of the lower extremities, typical pack weight, roughness of the terrain, distances walked, length of the rest and recovery period between hikes, and the amount of discretionary time and income. Here are four examples of this situational approach:

- (1) The long distance “thru-hiker” carrying a heavy pack day after day on feet that have been problematic in the past will most likely benefit from custom orthotics.
- (2) The weekend warrior carrying a much lighter pack on feet that have not been problematic will probably benefit less from custom orthotics, but should still consider quality OTC inserts to replace the cheap insoles that come with most boots and trail shoes.
- (3) The ultralight hiker with thin, ultralight shoes should still consider some serious arch support.
- (4) If one is young and has a strong genetic makeup (i.e., no chronic problems with the lower extremities), experiment with “going natural” as described in the previous section.

A further recommendation is to obtain different devices for different boots and shoes. If one has the time and money to experiment, seriously consider having custom fabricated orthotics made for both frontcountry and wilderness use (i.e., wear them all the time), even if your feet are not problematic. Even though the situational approach recommended in this section will probably not satisfy those who want definite answers, it is the most defensible position on this complex issue.

### **Author's Preferred Solution: Achieve a "Natural Foot" with Aggressive Orthotics/Arch Supports**

Having offered the above recommendations for *most* people, I personally follow an altogether different approach or philosophy, one that is sometimes referred to as the "Alzner Theory." George Alzner, in the late 1940s, determined that a way to fix the abnormalities that gradually develop with the foot is to restore it to its natural position. To do this, he advocated an aggressive arch support that was designed to reposition the bones, ligaments, muscles and tendons of the foot to their proper place. The theory being that if the foot changes over time in a detrimental way by wearing shoes or boots with cheap insoles (usually with little or no arch support), the bones, ligaments, muscles and tendons can be trained back to their natural positions (sometimes with great difficulty) with an arch support having a "natural" profile. An option for this aggressive approach is to use a modifiable insert of some sort that gradually builds up the arch support over time.

This "natural foot" approach (#4 in the "Six Approaches to Designing and Fitting OTC Inserts and Orthotics" summarized earlier) is a reversal of that used by most podiatrists. Instead of molding the orthotic to the individual foot, the aggressive arch support attempts to mold the foot (also lower leg muscles and tendons) to the insert. Most importantly, it rejects the heat-molded or cast-molded approach to orthotics typically favored by podiatrists (#5 and #6 in the section detailing the six most common approaches). Consequently, the Alzner approach is not widely accepted by most professionals. One reason for this rejection is likely money. The Alzner approach eliminates the detailed intake examination and the trial and error process of fitting customized orthotics. Essentially, the standard approach makes podiatrists and their teachers a good living. Another reason is that of tradition. Most podiatrists have been professionally trained to use the cast-molded and not the "natural foot"

approach. It is somewhat like the situation between traditional (allopathic) and alternative (complementary or naturopathic) approaches to medicine.

Podiatrists also don't recommend the Alzner "natural foot" approach for some practical reasons. *First*, there will be a break-in period to gradually retrain your foot. It usually takes several months before you can wear your aggressive inserts all day. "Retainer" supports are often prescribed with this aggressive approach in order to "retain" the shape of the foot during this break-in period when not wearing the aggressive insert. For heavy-duty exercise (e.g., a high mileage backpack trip with a full pack) it is sometimes necessary to trade off "aggressive" and "retainer" inserts. *Second*, it is recommended that you wear your aggressive arch supports or inserts full time. Some take this approach so seriously that they seldom walk anywhere without their inserts, even around the house. This is especially true for those with highly problematic feet. *Third*, this "wear it all the time" approach quickly becomes a negative with the necessity to change aggressive inserts from shoe to shoe (assuming one wears different shoes for different purposes) or to purchase more than one pair of the usually expensive inserts. *Fourth*, some feet are so broken down or genetically deformed that they are beyond repair; the feet are not moldable enough. In my case, I was guaranteed the services of a podiatrist who would apply more traditional techniques if the "natural foot" approach did not work. For these reasons, my preferred solution is popular neither with professionals nor with the general population. But popularity is not at issue here; understanding the pros and cons of the different approaches is the main issue.

## **Conclusions and Recommendations Summarized**

If you have read this far, you realize that this is a complex subject with no definitive answers. However, to assist the reader in obtaining a clearer understanding, here is my summarizations of the primary conclusions of this article.

1. There is little consistency or standardization in the footwear industry and the medical profession regarding the following terminology: footbeds, inserts, insoles, arch supports and orthotics.
2. Serious hikers and backpackers should invest serious time and money obtaining quality inserts and orthotics.

3. Get a solid layman's understanding of this subject (the main purpose of this article) and then experiment a lot, mixing and matching various options and approaches.
4. Carefully designed and constructed OTC inserts and orthotics will offer numerous and substantial benefits that cheap insoles, which come in most footwear, do not.
5. There are many different approaches and philosophies regarding the design and fitting of OTC inserts and orthotics.
6. There is little or no definitive research that says one approach or philosophy is better than another to enhance comfort and performance (except maybe when one has a chronic foot problem).
7. There is no consensus in the walking, hiking, trail running and adventure racing communities as to the best orthotics or OTC inserts or even whether anything special is needed.
8. Most people should take a situational approach when choosing an insert or orthotic, taking into account the many factors or variables unique to them.
9. OTC devices can be quite sophisticated and have great potential to improve performance and comfort for serious hikers.
10. Custom orthotics, molded from a cast of the foot while in a neutral, non-weight-bearing position (the approach typically used by podiatrists and pedorthists), will generally be superior to those molded in a weight bearing position.
11. Highly advertised brand names and the popularity of an approach or philosophy should not be factors in making these decisions; a solid understanding of this complex subject should play a significant role in decision-making.

12. Prevention and performance is a better strategy than trying to rehabilitate a broken-down foot. Consider purchasing either custom fabricated orthotics or carefully designed OTC inserts and wearing them all the time in the frontcountry and the wilderness, even if your feet are not problematic.