

Footwear for Polio Survivors

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People who had polio tend to have problems with their feet; however, there are a lot of things that can be done with footwear to help alleviate these problems.

FOOT PROBLEMS

A variety of foot conditions can be described.

Pes cavus foot is a foot with a high arch, which also tends to be fairly rigid. A normal foot is more flexible and can better handle the stress of walking; therefore, footwear for the pes cavus foot needs to have extra cushioning and shock absorption to make up for the rigidity.

Varus heel is a heel that turns out, causing one to walk on the outside of the foot in the heel area. This causes excess pressure on the heel and up into the midfoot area because one's weight is meant to be spread out over the entire heel and midfoot surface.

Forefoot valgus means that the front part of the foot turns inward, so the outside of the foot is higher off the ground

than the inside. This puts extra pressure on the first metatarsal head. (The metatarsal is the bone that is found just below the toe joint and extends to the middle part of the foot. The metatarsal head is the rounded front section of that bone, found just below the toe. The metatarsals are numbered 1-5, with 1 being at the big toe and 5 at the little toe. The region of the metatarsal head is sometimes referred to as the "ball" of the foot.) The combination of a varus heel and a forefoot valgus creates a kind of twisted foot that can make shoe fitting more difficult.

Metatarsalgia refers to pain (suffix "-algia") in the metatarsal area.

ADDITIONAL PROBLEMS INCLUDE

Toe deformities. The most common toe deformity seen in polio survivors is hammertoes. Instead of being straight, the toes are permanently bent, resembling the head of a hammer.

Mis-mated feet. People who had polio often have feet that are two different sizes, especially if the polio affected only one side.

Leg length discrepancy. Having polio on only one side can also cause one leg to be shorter than the other.

Muscle atrophy. Polio can cause the muscles to become weak and not function properly. A common manifestation of this in the foot is a condition sometimes referred to as "drop foot" where there is little muscle control in the foot and it tends to be in a position where it "drops" off at the ankle. This can often be a cause of falling, because of the lack of muscle control the foot tends to drag along the ground, and it becomes easy to trip and fall.

Loss of sensation. This is fairly rare, but in more severe cases of polio there can be a loss of sensation in the feet.

Falling. People who had polio tend to fall a lot. All of the foot problems mentioned tend to make one less stable on his or her feet, and therefore more likely to fall. But, muscle weakness and atrophy are probably the biggest contributors to falling.

TREATMENT OBJECTIVES Several objectives can be accomplished with appropriate footwear.

Accommodate rigid conditions. Extra cushioning is needed for rigid foot conditions such as pes cavus.

Control flexible conditions. The footwear should provide support and control for flexible foot conditions caused by muscle weakness or atrophy (e.g., "drop foot").



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Mr. Janisse presented at GINI's Eighth International Post-Polio and Independent Living Conference in June 2000.

Accommodate toe deformities. Hammertoes, because they are bent, take up more space in a shoe, so the shoe needs to be deep enough in the toe area.

Relieve excessive pressure. Anytime one has a foot that is not typically shaped, areas of excessive pressure are created. These areas tend to be the outer part of the heel and midfoot and the first metatarsal but, given individual foot variations, are certainly not limited to these.

Provide shock absorption. In addition to extra cushioning needed in specific high pressure areas, it is important to have plenty of shock absorption overall to protect feet that tend to be somewhat fragile.

Prevent falling. There are a variety of things that can be done with footwear to improve stability and to help prevent falling.

Provide a good fit. The goal is to be sure that shoes fit properly; poorly fitting shoes will only cause additional problems.

Improve gait. If the footwear does all of the above, then, ideally, it will improve one's ability to walk.

TYPES OF FOOTWEAR There are four basic types of footwear.

Shoes. Choosing the right shoe in the right size is the first step.

Shoe modifications. Shoes can be modified in a variety of ways to accommodate most feet.

Orthoses. These are sometimes called inserts or insoles or even orthotics, but the proper term in the world of prescription footwear is orthoses (singular is "orthosis"). These are most often custom-made from a model of one's foot.

Custom-made shoes. Because shoes come in such a variety of shapes and sizes and can be modified in many ways, custom-made shoes are needed only in cases of severe foot deformities.

SHOES The most common type of shoe used for polio survivors is called an *in-depth shoe*. It is called an in-depth shoe because it has 1/4 to 3/8-inch more depth throughout the shoe to accommodate an orthosis. A lot of today's athletic shoes can be considered in-depth shoes because they have removable insoles and therefore some extra depth. In-depth shoes also have other important characteristics that are helpful for people with foot problems, including:

Strong counter. This refers to the back part of the shoe that fits around the heel. A strong counter helps control a varus heel and provides stability for the heel area. (See Figure 1 to identify the parts of a shoe.)

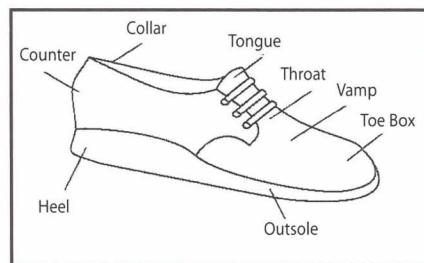


Figure 1

Deep toe box. The toe box is the front part of the shoe where the toes are. The extra depth provides plenty of room for a forefoot valgus or for hammertoes.

Shock-absorbing sole provides the needed shock absorption.

Removable insole. Most in-depth shoes have a removable insole which can also provide shock

absorption or can be replaced with a custom-made orthosis.

Wide range of sizes. Most regular shoes purchased at a shoe store come in a limited range of sizes and only one (medium) width. (This is usually a B for women and a D for men.) In-depth shoes come in a greater range of sizes and in widths from very narrow (AAA) to very wide (EEEE).

Heat moldable. Some in-depth shoes are lined with a material that allows them to be molded when heat is applied.

(A word about shoe fitting – If you have foot problems, it is important to have a pedorthist or other professional shoe fitter help you obtain the right fit. Pedorthists can help you get the right size [length and width] and shape for your foot. And remember – shoe sizes vary by style and manufacturer. You can have your feet measured, but this only gives you a guideline for what size to start with. The right size is the one that fits your foot!)

SHOE MODIFICATIONS There are a variety of shoe modifications available for polio survivors. Here are some of the most common:

Extension. If one has a leg length discrepancy, an extension can be built onto the sole of the shoe to even out the leg length and to help one walk better. An extension can also be built onto the heel section for a foot that is in the "dropped" condition. Figure 2 (page 8) shows a full extension (top) and a heel-only extension (bottom).

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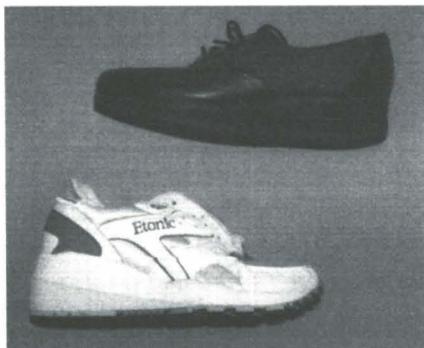


Figure 2

Flare. This is a piece of material that is added onto the side of the sole to help control the varus heel. It might be added only to the heel area or it could go all the way along the side of the shoe, and will help prevent the feeling that the foot is falling off the side of the shoe. When it is built on the outside of the shoe it is called a *lateral* flare. A flare can also be built on the inside of the shoe for people with the opposite problem; this is called a *medial* flare. A flare also gives a greater surface area that is in contact with the ground and will help one feel more stable. (A lateral flare is pictured in Figure 3.)



Figure 3

Heel wedge. This is another way to help control a varus heel. A wedge of sole material is inserted to make the sole better match the slantedness of the heel. (See Figure 4.)

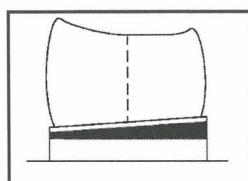


Figure 4

Fiberglass lateral counter. A piece of fiberglass can be added to the outside portion of the counter to further control a varus heel.

Cushion heel. A wedge of shock absorbing material can be added at the heel area to provide additional shock absorption for the heel area.

Rocker sole. This is a specially shaped sole that helps the foot to "rock" from heel to toe during the normal course of walking. (See Figure 5.) Most walking shoes are made with a rocker sole, but one can be added to other shoes. Not only does it help with walking, but when shaped properly, it also helps to take pressure off the metatarsal heads.



Figure 5

Leather tip. When one foot tends to drag along the ground, a leather tip can be added to the toe of this shoe to help it slide better and prevent falling. (If you have this condition, it is also a good idea to stay away from athletic shoes with lots of traction because they tend to stick to the ground and get easily caught, especially on carpeting.)

Velcro closing. If tying shoes is hard work, shoes are available with a velcro closing, or it is possible to modify a pair of regular tie shoes to have a velcro closing but still look like they have ties. (See Figures 6A and B.)

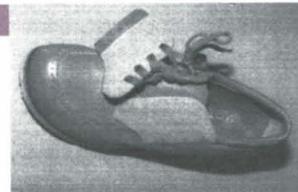


Figure 6A



Figure 6B

ORTHOSES Custom-made foot orthoses are made from a model of the foot, so they match up to the contours of the foot exactly. This is called "total contact" and is especially helpful for eliminating areas of excess pressure – the total contact evens out the pressure over the entire surface of the foot. An orthosis also provides an extra layer of shock absorption and can have special materials added to further customize it. These include: metatarsal pads to relieve pressure on the metatarsals; a soft, spongy material which can be added to specific problem areas to provide extra cushioning; firmer materials to help control varus heel and valgus forefoot; even a heel extension can be built into an orthosis. (Figure 7 shows an orthosis with a metatarsal pad added.)

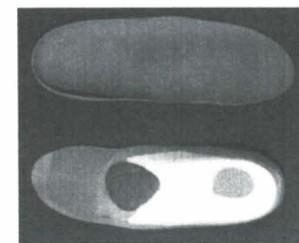


Figure 7

WHERE TO GET FOOTWEAR

There are several places where you can get prescription footwear (sometimes still referred to as "orthopedic shoes"). These include podiatrists, orthotists, specialty shoe stores, shoemak-

ers or shoe repair people, and pedorthists. Podiatrists tend to focus on orthoses; they usually do not have shoes or do shoe modifications. An orthotist specializes in braces, and shoe stores only offer shoes. A shoemaker tends to focus more on repairs but sometimes can do modifications. The best person to go to for the complete range of shoes, modifications, and orthoses is a Board Certified Pedorthist. This person will have the initials "C.Ped." after his or her name. This confirms that he or she has received training in the field of pedorthics, has passed a comprehensive examination, and keeps up-to-date on the latest developments in the field.

A pedorthist is like a pharmacist for footwear; he or she works from a physician's written prescription. A pedorthist is trained in foot anatomy, diseases affecting the foot, shoe construction, materials, modifications, and orthoses. Usually pedorthists have offices that work like doctor's offices where one makes an appointment. A pedorthist will perform a foot examination, talk about foot problems, and discuss footwear needs. He or she does not diagnose problems but can often help the physician to figure out the best combination of shoes, modifications, and orthoses. Pedorthists maintain an inventory of shoes, and can special order whatever type of shoe that might be needed. A full-service facility will also have a lab where shoe modifications are done and orthoses are made.

Follow-up is encouraged. Often, there may be adjustments or modifications necessary once one has worn the footwear for a while. A pedorthist might also

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Milwaukee – South side: 2745 West Layton Avenue, Suite 103, Milwaukee, WI (Wisconsin) 53221 (414-282-8888).

NPS also has locations in Madison, Wisconsin; Downers Grove, Illinois (near Chicago); Saint Louis, Missouri; Muncie, Indiana; and Rochester, New York. Visit the NPS website (www.nps-foot.com) for more information.

Contact the **Board for Certification in Pedorthics** for a certified pedorthist in your area: Pedorthic Footwear Association/Board for Certification in Pedorthics, 9861 Broken Land Parkway, Suite 255, Columbia, MD (Maryland) 21046-1151 (800-673-8446, www.cpeds.org).

For information about a volunteer non-profit organization that "matches up people with their shoe opposites," contact **The One Shoe Crew**, 86 Clavela Avenue, Sacramento, CA (California) 95828-4647 (916-364-SHOE).

be able to spot a problem and make a recommendation for a correction before it becomes a serious problem. As one ages with polio, the feet and footwear needs may also change, so a pedorthist just might become a regular member of the health care team.

The cost of prescription footwear varies depending on what is needed. Most pedorthists do not charge for office calls or follow-up – the cost is built into the footwear. Prices for in-depth shoes vary from approximately \$60 for a simple athletic or walking shoe to \$200-\$250 for a heat-moldable shoe.

Custom-made shoes begin at about \$350 a pair. The cost of external shoe modifications start at about \$20 for simpler modifications such as a heel elevation, and range to \$90-\$130 for a more complicated modification such as custom rocker soles. Orthoses range from \$200 to \$450 a pair. Some insurance companies cover prescription footwear, to varying degrees, if the physician provides a written prescription. ■

This article was first written for the Post-Polio Resource Group of Southeastern Wisconsin.

New Video – A Fight to the Finish: Stories of Polio

The documentary was conceived by Tony Herring, MD, chief of staff of Texas Scottish Rite Hospital for Children (www.tsrhs.com), a hospital that was originally founded in 1921 to treat children with polio. The director and producer is Ken Mandel. The goal in producing the documentary was to increase the awareness and visibility of the history of polio, the defeat of the acute disease in the United States, and the eradication of the disease worldwide.

The 90-minute video weaves together history and personal experiences. It covers the typical "polio story" from the 1916 epidemic in New York, to FDR, Sister Kenny, March of Dimes, Enders, Weller, & Robbins, and Salk & Sabin. The title of the film was taken from a quote by FDR in 1944, "The fight against infantile paralysis is a fight to the finish, and the terms are unconditional surrender."

The film is being shown at film festivals around the USA and is not yet available to the public. IPN will announce details as soon as they are offered. ■