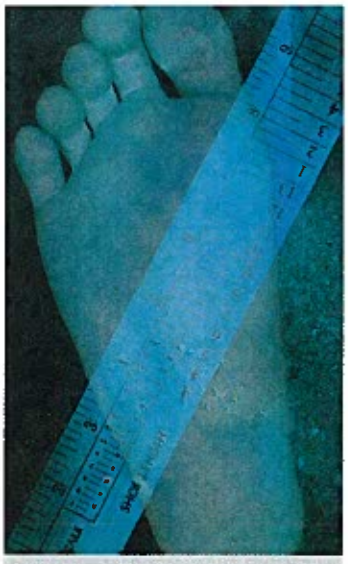
Ask the Pedorthist

Answers by Seamus Kennedy, CPed

1. What is a pedorthist? By strict definition, pedorthics is the design, manufacture, modification and/or fit of footwear, including shoes, orthotics and foot devices, to prevent or alleviate foot problems caused by disease, congenital defect, overuse or injury.



That comes across as a bit of a mouthful! Basically, pedorthists are highly trained professionals in the design, fit and function of shoes and orthotics. They are experts in external below-the-ankle care. I would also like to add that they practice both the "science and art" of making feet comfortable. Proper shoes and orthotics should not only fit your feet but also your lifestyle.

2. What kind of training is required to become a pedorthist?

The Board for Certification in Pedorthics (BCP) is the body that regulates who becomes a certified pedorthist (CPed). For detailed information on the steps involved in becoming certified, you should visit the organization's Web site at www.cpeds.org.

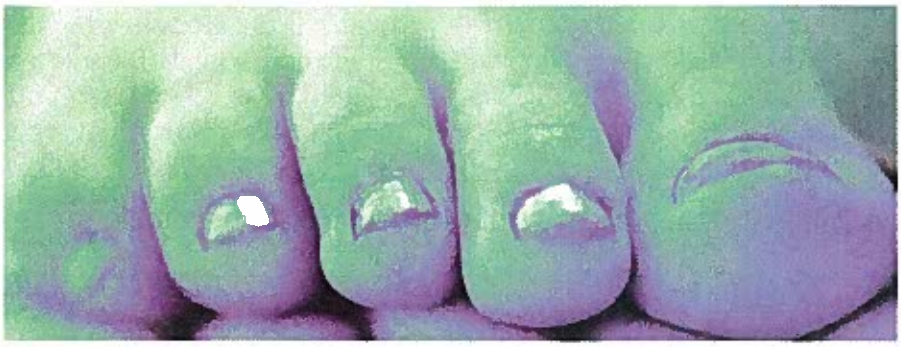
Briefly, to become a certified pedorthist, one needs to complete a four-step process:

1. Obtain some college credits in ancillary courses, such as anatomy, physiology or biomechanics.
2. Complete a minimum of 120 hours of pedorthic education in a program reviewed and approved by the BCP. Many approved courses are given throughout the country several times a year.
3. Gain some practical hands-on work experience in pedorthics.
4. Study the appropriate materials and books about pedorthics and shoe-fitting, and pass the certification exam, which is held twice a year.

The BCP recognizes that this is a lot of work for some applicants so it is now developing a tiered program for potential certified pedorthists that uses three levels to categorize their experience on the way to becoming fully certified.

3. I have diabetes. Why should I wear special shoes? Why can't I just buy my shoes from a local department store like everyone else?

Diabetes is a serious disease that affects



approximately 20.8 million Americans. Unfortunately, a lot of complications are also associated with diabetes, including disruption of the vascular system, which can impair many areas of the body, such as the legs and feet. As a result, people with diabetes should pay special attention to their feet.

Of the 20.8 million Americans with diabetes, about 25 percent will develop foot problems related to the disease. These foot problems often develop from a combination of causes, including poor circulation, which impairs the healing process, and lack of sensation to pain, heat or cold. With lack of feeling in their feet, people with diabetes can develop minor cuts, blisters or pressure sores and not be aware that a wound is developing. If these minor injuries are not noticed and are left untreated, serious complications like skin ulcerations may arise and could eventually lead to the need for amputation.

It is very important, therefore, for those with diabetes to prevent all foot-related injuries One of the best ways to do this is to wear proper-fitting and correctly constructed shoes. Wearing tight-fitting or inappropriate shoes greatly increases the chances that a serious foot complication will develop. In addition, it is recommended that those with diabetes inspect their feet daily to watch for potential problems.

4. Since I have diabetes, do my shoes need to be specially fitted by a pedorthist? I can tell if my shoes fit, can't I?

If you have diabetes, and especially if you have any loss of sensation in your feet, you should have your shoes fitted by a pedorthist. A pedorthist will be able to measure your feet correctly and choose a shoe with the correct last, or model shape, for your foot type. Good, protective shoes will also have soft lining materials and an absence of seams at critical locations inside the shoe.

Two common misconceptions regarding shoe fit are that you know your shoe size and that you can feel when a shoe is right for you. Let a pedorthist measure your feet. Often your shoe size may have changed, especially if you have gotten older or heavier (like most of us). Shoe fit also depends on the last model used to make the actual shoe shape. The pedorthist will know the best shape for your foot. Unfortunately, many people with diabetes have poor feeling in their feet so they are inclined to buy shoes that are too tight and too small. This can lead to the very serious complications discussed in the answer to Question 3.

5. Are pedorthists able to help partial-foot amputees? If so, how?

Pedorthists are able to help partial-foot amputees in the following ways:

1. They can select the appropriate footwear that properly fits and supports the remainder of the foot.
2. They can often design a toe filler that mimics the shape of the old foot. This filler can be incorporated into the shoe as part of a custom foot orthotic so that the foot will appear normal from the outside and so that the shoe's toe box will not collapse.
3. They can add rocker soles, wide flares or wedges to many shoes to help improve an amputee's gait and stability.

6. Aren't therapeutic shoes and foot orthoses expensive? How can I pay for them?

Expensive is a relative term. People with diabetes, who are at risk for ulcers and amputations, must protect their feet at all costs. Allowing an infection to begin can lead to deadly consequences for their overall long-term health. Not everyone needs custom shoes and custom orthotics, but everyone should have proper-fitting and functioning footwear.

In the late 1980s, the government recognized the increased incidence of foot amputations in people with diabetes. As a result, it developed the Medicare Therapeutic Shoe Bill (TSB) to provide protective footwear and orthotics for people with diabetes who are at-risk for amputations. Ask your local pedorthist or podiatrist if you qualify for this program.

7. Is going to all of this extra trouble to get the right type of shoes that fit properly really worth it?

Compromising the quality of your life for cost is too high a price for anybody to pay. For people with diabetes, an ounce of prevention is certainly better than a pound of cure! As pedorthists like to say, "Good health starts from the ground up."

About the Author

Seamus Kennedy, CPed, is president and co-owner of Hersco Orthotic Labs in New York City. He received his degree in mechanical engineering from University College in Dublin, Ireland, in 1988 and became involved in the biomechanics field in 1995.

Ask the Podiatrist

by Neil M. Scheffler, DPM, FACFAS

1. What is a podiatrist? What kind of training is required to become one?

Podiatrists are physicians specially trained in foot and ankle care, including the diagnosis and treatment of problems and diseases of the foot and ankle. They may provide surgical and nonsurgical care.

Podiatrists attend college, followed by four years of podiatric medical school. Most then go on to specialized residency programs. Podiatrists are sometimes referred to as foot doctors, foot and ankle surgeons, or podiatric surgeons.

Most states require completion of a 1- to 3-year postdoctoral residency program and continuing medical education (CME) for license renewal. Certification by the American Board of Podiatric Surgery requires:

- Graduation from podiatric medical school
- Completion of an approved podiatric surgical residency
- Practice experience, including surgical case submissions
- Written and oral examinations.

2. When a person loses a leg because of diabetes or peripheral vascular disease, isn't it likely that the other foot is also already damaged and might soon require amputation?

The remaining limb is certainly at risk. Both nerve damage and poor circulation are generally bilateral, meaning in both feet.

Studies have shown that from 9 to 20 percent of people with diabetes who had already experienced an amputation underwent a second amputation within 12 months of the first surgery. Five years after the first surgery, 28 to 51 percent of amputees with diabetes had undergone a second amputation. But you don't have to be in this group. Common sense and good preventive care can preserve what you have. You must protect that remaining limb!

3. One of my legs has already been amputated as a result of diabetes? I don't want to lose my other leg. What should I do?

Begin by treating your remaining limb as if it were made of gold. That is how valuable that leg is to you.

There are several things you can do to minimize the risk of losing your other leg, but you should at least do the following:

- Establish a relationship with a podiatrist, preferably one who specializes in diabetic foot problems.
- See your podiatrist regularly and follow his or her instructions.
- Examine your foot daily, and report problems, such as ingrown toenails, red spots, cuts, or other wounds, to your podiatrist at once.
- Never walk without a shoe protecting your foot.

If you have vascular disease, nerve damage or deformities, such as a bunion or hammertoes, special care may be needed. Your podiatrist will explain this care and should outline a plan to help you keep your remaining limb healthy. He or she may request consultations with other health professionals, such as neurologists or physiatrists for nerve disorders and vascular surgeons for problems with circulation.

4. I have peripheral vascular disease. Do I need to do anything special to protect my legs from amputation?

Yes. The decrease in blood flow to your feet and legs puts you at an increased risk for amputation. Several things might help you avoid this outcome, however.

It should go without saying that any tobacco use is out of the question since tobacco decreases blood circulation even further.

If your doctors say that it is OK, exercise, such as walking, will help increase circulation or at least maintain the current levels.

Your podiatrist may also ask you to schedule more appointments with him or her than other patients do. In addition, he or she will probably want to cut your toenails rather than have you risk injury by doing this yourself. Appropriate shoe choice is also important, and your podiatrist can help you with this.

Since there are also medications and surgical procedures that may help get more blood to your feet, a consultation with a vascular surgeon may be advisable.

5. I have diabetes, and a small sore has developed on my foot. Do I really need to go to the trouble of seeing a podiatrist? Isn't that overkill?

Stop reading this, and call your podiatrist now! When you call to make an appointment, be sure to say that it is urgent – that you have a wound. Tell the office that you also have other complicating factors (diabetes, circulation problems, a previous amputation). Even doctors with a full schedule of appointments will understand and squeeze you in or at least give you advice over the phone until you can be seen.

A foot ulcer precedes 85 percent of amputations. Appropriate and early treatment of foot wounds increases the likelihood of healing these wounds. Waiting even a few days can be disastrous.

6. Are there any new circulation-enhancement treatments or wound-care therapies that are useful for preventing the amputation of a second leg?

Improvements in medical care seem to occur almost daily.

Advances in the diagnosis of peripheral vascular disease include refined tests, such as digital subtraction angiography, which allows small vessels to be seen. Once these vessels of the feet are viewable, bypass surgery may be possible. Minimally invasive procedures, such as arterial stenting and peripheral plaque excision, are also available to patients whose condition is appropriate.

New wound-care therapies include wound-healing gels, new wound dressings, vacuum pumps to apply continuous suction to the wound, and even artificially grown skin to cover wounds and speed healing.

7. What surgical techniques can help people with diabetes once a nonhealing foot ulcer appears?

Many surgical procedures can be considered for nonhealing wounds.

If a wound is not healing because of pressure from an underlying bony prominence, this piece of bone may be cut out or moved to reduce this pressure. A bunion (an enlargement of bone behind the big toe) with an overlying ulcer would be an example of such a projection.

If a wound is not healing because of a lack of circulation, a vascular surgeon may be consulted to operate on the arteries to bring more blood to the area.

Surgical debridement (cutting away) is often necessary to remove dead or contaminated tissue from a wound. This may convert the wound from a chronic, stalled, nonhealing ulcer to a fresh wound that can now go on to heal.

8. Since I lost a leg to diabetes, my remaining leg is really taking a beating. It has to support the weight of my body more than it did when I had both legs, and it seems that the way I walk now causes more stress on it. Isn't this dangerous? If so, what can I do?

Increased stress upon your remaining limb certainly puts it at greater risk. You need to discuss this issue with your medical team. Your prosthetist may be able to tweak your prosthesis to give you a more normal gait. Your physiatrist (rehabilitation specialist) and physical therapist also may have suggestions. Perhaps physical therapy would help strengthen weak muscles. Your podiatrist will advise you about shoe and sock selection and specialized innersoles for your shoes that can help protect your remaining foot.

9. My father has diabetes and wears open-toe shoes. He also rarely checks his feet for sores. How can I motivate him to follow his doctor's orders for preventing more amputations?

This is a tough one; advice from family members is often ignored. I used to say that my children were not hard-of-hearing; they were hard-of-listening.

Make sure you tell your father's podiatrist the problem and enlist his or her help in emphasizing appropriate shoe gear.

I would also suggest that you give your father a gift – a membership in the American Diabetes Association (ADA) and in the Amputee Coalition of America (ACA) if he isn't already a member. Then, along with the ACA's bimonthly magazine *inMotion*, he will receive the ADA's monthly magazine *Diabetes Forecast*. This publication is always full of valuable information on diabetes management and periodically includes information on foot care and shoes. Sometimes, the repetition of advice from multiple sources is finally heeded.

For Additional Information

American College of Foot and Ankle Surgeons
www.acfas.org

American Podiatric Medical Association
www.apma.org

American Diabetes Association
www.diabetes.org

About the Author

Neil M. Scheffler, DPM, FACFAS, is a podiatrist in private practice in Baltimore, Maryland. He is a fellow of the American College of Foot and Ankle Surgeons and is board-certified in foot and ankle surgery. Dr. Scheffler is a past president, Health Care & Education, Mid-Atlantic Region, American Diabetes Association. He is the attending podiatrist for the Prosthetics Clinic, Sinai Hospital of Baltimore.

To support the ACA or to become a member, call 1-888/267-5669

Dos and Don'ts for People With Diabetes

Do

• Wash feet daily

Using mild soap and lukewarm water, wash your feet daily. Dry carefully with a soft towel, especially between the toes, and dust your feet with talcum powder. If the skin is dry, use a good moisturizing cream daily, but avoid getting it between the toes.

• Inspect feet and toes daily

Check your feet every day for cuts, bruises, sores or other changes that may be less obvious. If age or other factors hamper self-inspection, ask someone to help you or use a mirror.

• Lose weight

People with diabetes are commonly overweight, which nearly doubles the risk of complications.

• Wear thick, soft socks

Socks made of an acrylic blend are well-suited – but avoid mended socks or those with seams, which could rub to cause blisters or other skin injuries. Turn socks inside out with the seams on the outside.

• Give up smoking

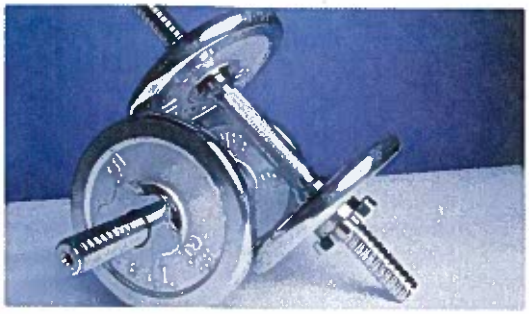
Tobacco can contribute to circulatory problems, which can be especially troublesome in patients with diabetes.

• Cut toenails straight across

Never cut into the corners or taper. This could trigger an ingrown toenail. Use an emery board to gently file away sharp corners or snags.

• Exercise

As a means to keep weight down and improve circulation, walking is one of the best all-around exercises for the diabetic patient. Walking is also an excellent conditioner for your feet. Be sure to wear the appropriate athletic shoe when exercising. Ask your podiatric physician what's best for you.



• See your podiatric physician

Regular checkups by your podiatric physician – at least annually – are the best way to ensure that your feet remain healthy.

• Be properly measured and fitted every time you buy new shoes

Shoes are of supreme importance to people with diabetes because poorly fitted shoes are involved in approximately 50 percent of the problems that lead to amputations. Because foot size and shape may change over time, people with diabetes should have their feet measured by an experienced shoe fitter whenever they buy a new pair of shoes.

New shoes should be comfortable at the time of purchase and should not require a "break-in" period; however, it's a good idea to wear them for short periods at first. Shoes should have leather or canvas uppers, fit both the length and width of the foot, leave room for toes to wiggle freely, and be cushioned and sturdy.

Don't

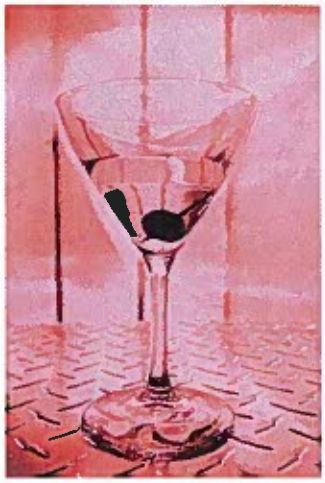
• Don't go barefoot

Not even in your own home. Barefoot walking outside is particularly dangerous because of the possibility of cuts, falls, and other foot injuries on unfamiliar terrain. When at home, wear slippers. Never go barefoot.

• Don't wear high heels, sandals or shoes with pointed toes

These types of footwear can put undue pressure on parts of the foot and contribute to bone and joint disorders or diabetic ulcers. In addition, open-toed shoes and sandals with straps between the first two toes should be avoided.

• Don't drink in excess



Alcohol can contribute to neuropathy (nerve damage), which is one of the consequences of diabetes. Drinking can speed up the damage associated with the disease, deaden more nerves, and increase the possibility of overlooking a seemingly minor cut or injury.

• Don't wear anything that is too tight around the legs

Panty hose, panty girdles, thigh-highs or knee-highs can constrict circulation to your legs and feet. So can men's dress socks if the elastic is too tight.

• Don't try to remove calluses, corns or warts by yourself

Commercial, over-the-counter preparations that remove warts or corns should be avoided because they can burn the skin and cause severe damage to the foot of a person with diabetes. Never try to cut calluses with a razor blade or any other instrument because the risk of cutting yourself is too high, and such wounds can often lead to ulcers and lacerations. See your podiatric physician for assistance in these cases.

Source

American Podiatric Medical Association
www.apma.org

For more information, call 1-800/FOOTCARE

"Knock Your Socks Off" and Save Your Feet!

Diabetes is the leading cause of nontraumatic foot amputations each year. One way you can protect your feet is by catching any problems with them early. That's why the American Podiatric Medical Association (APMA), the nation's leading professional society for foot and ankle specialists, is urging individuals to "knock their socks off" during every visit to their doctor.

If patients would simply take off their socks and ask their doctor to check their feet at every visit, it could reduce diabetic foot amputations by 45 to 85 percent.

Why Is It So Important?

Of the 20.8 million people with diabetes in the U.S., perhaps 60 to 70 percent have diabetic nerve damage, which often includes impaired feeling in the feet and hands. With this impaired sensation, these people often don't feel it when their feet are hurt. As a result, the damage worsens, and they don't even realize it until it's too late and amputation is the only solution.

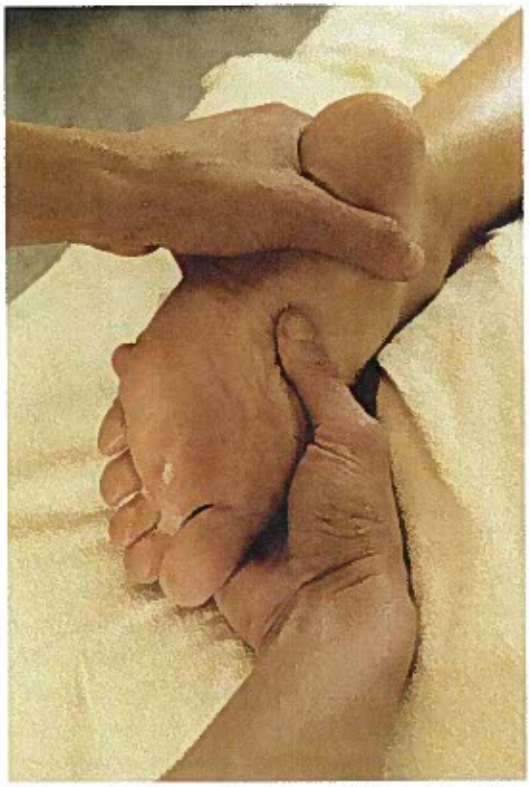
Another problem is that millions of people in the U.S. have diabetes and don't even know it, according to the American Diabetes Association.

Since the feet often show the first signs of severe medical conditions, having them checked at every visit to the doctor could help the doctor determine if a person might have diabetes. Because primary healthcare physicians don't routinely check patients' feet, the APMA's "Knock Your Socks Off" campaign encourages patients to ask their primary healthcare physician to examine their feet as part of their regular checkup.

"Early detection is paramount," says Dr. Lloyd Smith, former president of the APMA.

A Simple Solution

While there are numerous other ways to help protect your feet against amputation, some of them require lifestyle changes, such as changing your diet and exercising regularly. Though these changes are essential for protecting the body against the ravages of diabetes, including amputation, many



people just don't stick with them.

That's the beauty of the "Knock Your Socks Off" campaign. Though it doesn't replace the necessity to take care of your health and your feet on a daily basis, it provides an easy opportunity for you to catch any foot problems early enough to prevent the need for amputation. All you have to do is ask your doctor to look at your feet during every office visit.

It's that simple.

For free foot health information, contact the APMA at 1-800/366-8227 or visit www.apma.org

Keeping the Sound Limb Sound
Foot Issues for Amputees With Diabetes

by Robert Gailey, PhD, PT
Illustrations by Frank Angulo
Illustrations used with the permission of Advanced Rehabilitation Therapy, Inc., Miami, Florida

When planning a rehabilitation program for the lower-limb amputee v diabetes, management of the sound limb plays an important role.

Figure 1. *Poor walking biomechanics increase the forces on the sound foot, creating greater risk for skin breakdown and ulcers.*

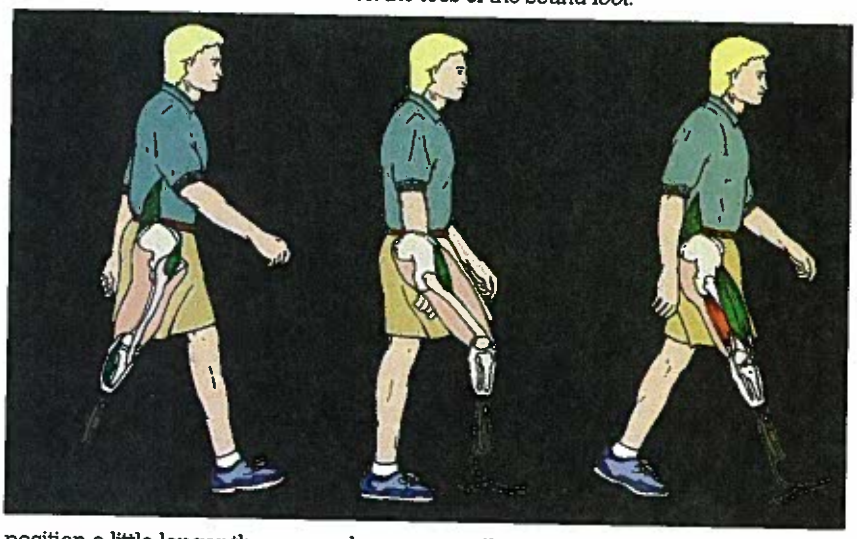
Preservation of the sound limb, in many cases, allows people to continue walking and delays further medical complications that can reduce their quality of life. One main reason for this concern is that the sound limb routinely compensates for the amputee's inability to maintain equal weight distribution between limbs, resulting in altered walking mechanics. Two effects on the nonamputated limb raise concern: The first is the additional forces being placed on the weight-bearing surfaces of the foot, which introduce the soft tissues, such as the skin, to the risk of ulcers, and the second is the change in ground reaction forces throughout the skeletal structures of the limb, which place undue stress on the joints of the foot, knee and hip.

Increased forces placed on the intact limb during ambulation can be of considerable concern since the foot often has neuropathic symptoms, such as loss of sensation, foot deformity and muscle weakness, which make the soft tissues vulnerable to injury or ulcers. The general walking pattern of patients with diabetic neuropathy is tentative, stemming from feeling unsafe when they stand or walk. This conservative walking style is characteristically the product of poor proprioception (sense of where the foot is in space), diminished sensory information, poor balance, and an overall lack of stability. It could, however, lead to slower walking, inconsistent step length and adverse forces or pressure being applied to the foot (Figure 1.) Even nonamputees with peripheral diabetic neuropathy demonstrate alterations in foot biomechanics that could increase peak foot pressures and facilitate foot injuries or ulceration. In some cases, a shuffling gait is adopted that, while reducing peak foot pressures by distributing applied forces greater area, also causes increased fatig stress to the soft tissues of the foot, whic lead to foot ulcers.

Able-bodied people with peripheral d neuropathy have a high risk for develop ulcers on the sole of the foot, and it is be that most of these ulcers develop during Fifty percent of amputees with diabetes also develop sound-foot infections and p amputation within two years of the amp of the first foot; therefore, clinicians work amputees who have diabetes must be al the potential of complications that may a residual foot. The term "sound" limb can misleading. In fact, it is probably just a t fate that one foot became infected befor and, thus, only a matter of time before p begin to arise with the sound limb if the does not take extreme care. The odds a working against the amputee, especially other foot deformity, such as toe clawing feet, is present as the amputee learns to her prosthesis.

Because amputees with diabetic neur will often avoid full weight-bearing throu prosthesis, the sound limb must accept proportion of body weight. Typically, be the amputee unconsciously tries to get prosthetic limb as quickly as possible, t limb swings much faster than normal, s the ground with greater force and causi increased insult to the heel of the foot. the prosthetic foot strikes the ground, t weight often moves rapidly forward ove sound foot to the metatarsal heads (foot and toes (Figure 2). Most amputees hol

Figure 2.
A) Lack of prosthetic stability increases ground reaction forces as the sound anatomical heel strikes the ground.
B) Forces decrease as the body's weight moves rapidly over the sound foot.
C) Increased time of double support as the amputee slowly moves his or her weight onto the prosthesis increases the forces on the toes of the sound foot.



position a little longer than normal as they prepare to put their full weight onto the prosthesis, and this prolonged time on the forefoot can frequently cause calluses at the base of the first three toes. Calluses must be taken seriously because they can create and hide tissue damage, which can lead to foot ulcers. In cases where the great toe has been amputated, stricter precautions must be adhered to since the second and third toes must now accept the body's weight. Because these toes were not designed to accept these increased forces, there is an increased risk of callus formation and tissue damage. It is extremely important, therefore, that daily inspections of the foot are made and any changes to the skin are reported to the physician.

The combination of additional vertical forces and shear stresses placed on the sound foot and the increased possibility of disproportionate weight bearing can result in increased skin lesions, ulcers and/or joint degeneration. This is apparent by the unsettling fact that 50 percent of amputees will have another amputation involving the same or the sound limb within four years after the primary amputation. Without hesitation, new amputees should be made aware of the impending dangers from the onset of rehabilitation. Accordingly, foot care becomes even more critical after amputation for people with diabetes, especially since a high percentage will lose their sound limb within a few years and their chances of achieving functional ambulation as a bilateral amputee will decline. Therefore, the goal of rehabilitation must include regular clinical follow-up, appropriate shoe wear, education, and instructional measures designed to reduce the risk of skin lesions, ulceration, and additional degeneration of the sound limb.

About the Author
(*See page 16.*)

The Importance of Heel Height for Lower-Limb Amputees

by Paddy Rossbach, RN, ACA President & CEO

If you wear a prosthetic foot that does not have an adjustable heel, the heel will be set at a specific height. It is, therefore, very important that you always choose shoes that match that height to keep your prosthesis in the correct alignment.

If the shoe heel is too low, it can cause:

- Difficulty rolling over the toe when walking
- Hyperextension of the anatomical knee in below-knee amputees
- Stress to the prosthetic knee in above-knee amputees.

If the shoe heel is too high, it can cause:

- Pressure on the end of the tibia in below-knee amputees
- Buckling of the prosthetic knee joint in above-knee amputees.

It is not just the height of the heel you have to consider when you choose shoes, however; it is the difference between the thickness of the sole and the thickness, or height, of the heel. For instance, a shoe with a 1-inch sole and 2-inch heel has a difference of 1 inch. A shoe with a 3-inch sole and a 4-inch heel also has a difference of 1 inch even though the second shoe looks much higher. Both of these shoes will work with a foot that is made for 1-inch heels. Use the front of the heel (under the instep), not the back, to measure the height.