

Diabetics demand footwear that fits

Every year average citizens learn about new ways to preserve their health or even save their own lives: ways that don't require a medical degree or million-dollar hospital equipment. More than 11,000 people in America save themselves each year by buckling the seatbelts in their cars. Lifelong smokers are finally putting out their cigarettes to cut the odds of developing lung cancer. Salad-dodging carnivores are eating more broccoli and spinach to ward off Alzheimer's. Retirees are popping an aspirin a day to keep the heart attacks away. And for diabetics, an unassuming piece of everyday apparel has emerged as a potentially critical life-saving tool: the humble shoe.

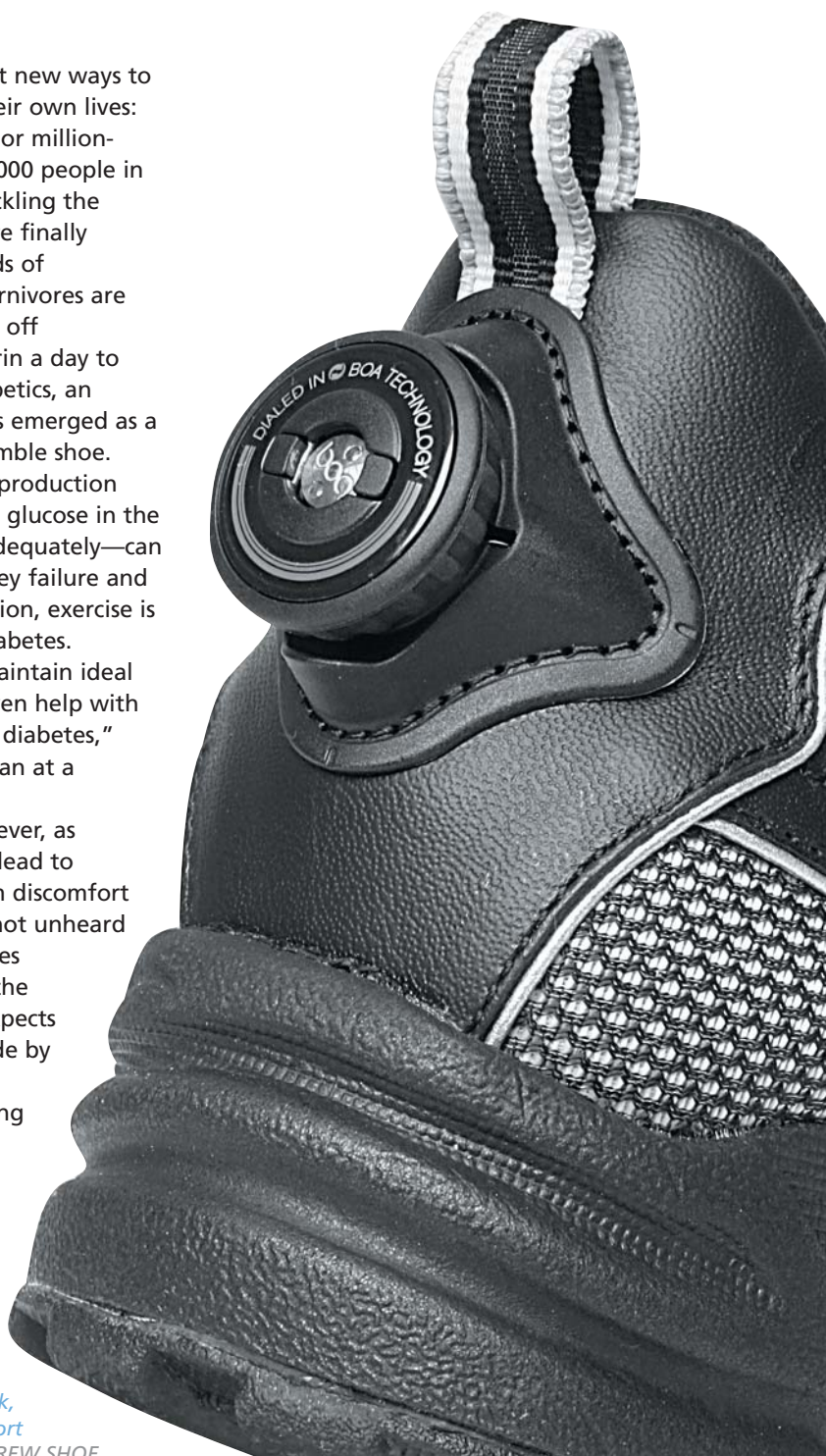
People with diabetes struggle with the production and supply of insulin. As a result, levels of glucose in the blood increase, which—if not managed adequately—can lead to serious complications such as kidney failure and blindness. In addition to diet and medication, exercise is considered a key element in managing diabetes. "Regular exercise can help achieve and maintain ideal weight, control blood sugar levels, and even help with heart disease—another common result of diabetes," says Michelle Suddath, a registered dietician at a dialysis centre in Houston, Texas.

Exercise can prove to be a liability, however, as inadequate footwear (and foot care) can lead to complications resulting in everything from discomfort to amputation or even—in extreme, but not unheard of, cases—death. In a world where diabetes currently affects 246 million people (and the International Diabetes Federation [IDF] expects that figure to rise to 380 million worldwide by 2025), the market for specialist diabetic footwear is both an important and growing one.

Why the foot is vulnerable

Higher levels of glucose in the blood can damage a whole range of body ➤

The Energy model from Drew has a dial that makes adjusting the tightness of the shoe quick, easy and safe to make sure of continued comfort as feet expand throughout the day. PHOTO: DREW SHOE



tissues and organs, but the foot is particularly affected by diabetes because of how easily nerve damage can occur there without detection. "Diabetics suffer from peripheral neuropathy, which causes loss of blood flow, and subsequently numbness, to the extremities. A diabetic could be walking outside and cut his feet on a piece of glass and not even know that damage has been done," says Ms Suddath. "Then, he's not getting the circulation to his foot needed to heal the wound." Even seemingly unconnected ailments can affect the foot: kidney disease, for example, affects the proteins involved in wound healing, and a diabetic with eye disease simply can't see the foot to check for damage.

The numbness that is so common to diabetics means that infection may go entirely unnoticed until it has spread beyond repair. Ultimately, this can mean amputation is the only effective way to stop the spread of infection. In fact, according to IDF, diabetes is the most common cause of amputations (other than those resulting from an accident); people with diabetes are 15 to 40 times more likely to require lower-limb amputation compared to the general population.

Prevention, then, is paramount. The wrong pair of shoes can literally knock a diabetic off his or her feet, whereas the right pair can ensure a comfortable means of maintaining a mobile, healthy lifestyle.

The right shoe

Dating back to 1875, when founder Irving Drew first started hand-making extra fine welt shoes for women along the Ohio River, Drew Shoe Corporation today distributes women's and men's therapeutic footwear and accessories to medical providers, retail shoe stores and mail order catalogue companies throughout the US and around the world. The company's lines include shoes designed for people suffering from everything from bunions to arthritis.

Scott Williams, a former pedorthist (a health expert who uses footwear to heal foot ailments) who is now vice president of sales for the company, looks back several decades to the genesis of the diabetic footwear movement. "Back in the seventies, we didn't know that much about diabetic foot complications. If a customer got an ulcer that wouldn't heal, the treatment was bed rest," he says. "We were starting to develop shoes that would take customised orthotics in 1977 or 1978, but studies into this area [only] began in the eighties." By the end of that decade and the beginning of the nineties, Drew Shoe was developing its own line of specialised diabetic footwear.

The complex designs address the needs of a diabetic's foot—removable foot beds; mouldable contoured urethane cushioned footholds; rocker bottoms; wide, steel shanks; seamless tongues; and heel stabilisers (to name a few)—while appearing stylish and contemporary. "We have about 60 styles that are beneficial to diabetics, to give customers a choice.

Specialist footwear for diabetics still has to look attractive, otherwise people will refuse to wear it.
PHOTO: DREW SHOE



Certainly there is a lot of diabetic footwear out there, but it looks like orthopaedic footwear—because it is. We try to make our shoes look nice using different leathers, different colours, with enough choices and styles that the end user will be willing to wear the footwear," says Mr Williams. "If a diabetic is not willing to wear the proper footwear, he or she is at risk. I've known ladies who have had amputations because they said, 'I'll lose my foot before I'll wear that shoe.'"

Released at the end of last year, Drew Shoe's latest designs include a feature heretofore unseen in any footwear other than ski boots: a dial. Available in "Blaze" for women and "Energy" for men, the dial offers a no-lace closure that replaces traditional laces. "You put the shoe on, push in the dial and dial in how tight you want the shoe to fit," explains Mr Williams. "As your feet swell during the day, you release it and tighten it to the fit you want." He adds that the shoe is particularly suited to individuals with limited hand mobility: "The footwear can be tightened or loosened with a simple pull or turn of the hand."

These shoes are not inexpensive, ranging in price from \$120-\$220; however, because of the medical and financial toll diabetes can take on a person and the healthcare industry, the US Medicare programme offers a therapeutic shoe benefit to qualifying customers. "The Medicare Therapeutic Shoe Bill allows a person who fits certain criteria—they've had ulcers in the past or peripheral neuropathy, poor circulation—to get a prescription for footwear and custom made inserts," Scott Williams continues. For a shoe to qualify for reimbursement, the government requires various features, such as being available in at least three widths, to have a removable foot bed (for customised inserts), and to have a closure such as Velcro or laces; slip-ons are not considered adequate.

Both the industry and the government are working to make suitable footwear available to diabetics, and diabetics also have a significant role in the exchange. "Whether the customer is 45-years-old or 70-years-old, we want to give them shoes that are sensible and ➤

DIABETICS DEMAND FOOTWEAR THAT FITS

“...technically speaking...”

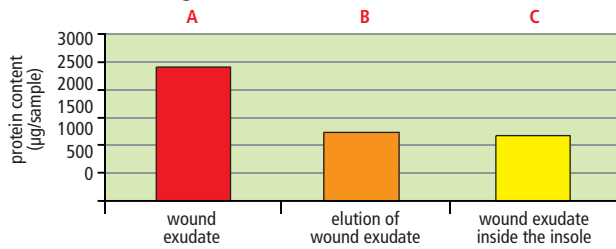
HELPING THE HEALING PROCESS

If a diabetic develops a foot ulcer due to pressure, the problem then becomes one of healing and the inside of a shoe is not conducive to the best place for this to take place. In the majority of cases, the dressings applied to the wound will allow it to discharge into the shoe and create a septic environment prejudicial to the cure. French company I.P.C. has developed a patented triple-layered insole that can absorb this so that the foot remains in a healthy environment and therefore heals more quickly. More importantly however, an antibacterial additive is also incorporated that allows the insole to be totally

decontaminated. Treatment time is reduced, costs are lower and the patient is far more comfortable. This is called the DS2 Drying Sweat System.

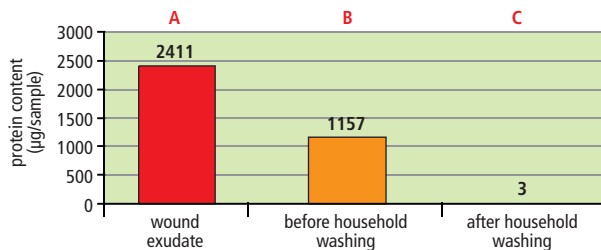
The material contains a membrane filled with high absorption and fast drying silica. The decontaminating antibacterial additive is widely used in dental surgery and is highly efficient against a broad spectrum of bacteria. The fact that the membrane also dries very rapidly prevents the development of bacteria almost entirely. Its effectiveness can be seen in the following graphs produced by the Hohenstein Institute.

Figure 1: Protein content of wound discharge after contamination of insole and washing out with artificial sweat solution



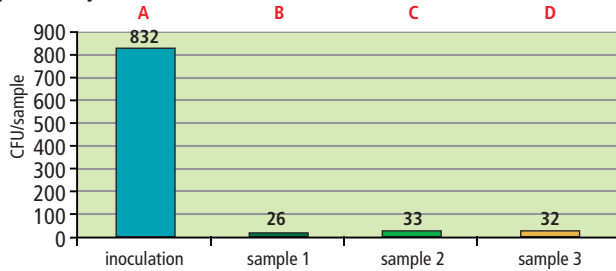
A shows number of proteins contained in the wound's discharge, B how many were removed from the membrane after washing out with sweat solution and C the number remaining.

Figure 2: Protein content of wound discharge after contamination of insole and after household washing



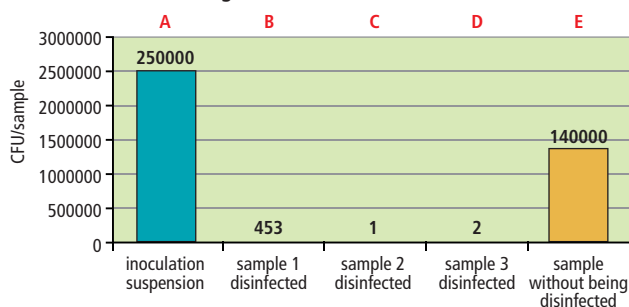
A shows number of proteins contained in the wound discharge, B the number remaining after washing out with sweat solution but before typical household washing and C the number remaining after household washing.

Figure 3: Inoculation with pseudomonas aeruginosa and contact plate analysis



Here, the insole has been inoculated with a germ population of 832 cfu. Once in contact with the insole an average of only 30 cfu (3.65%) escapes, indicating that most were absorbed by the insole.

Figure 4: Inoculation with pseudomonas aeruginosa, Calbenium disinfection and washing the insole



Now, in Figure 4, A shows how many germs are contained in the suspension. B, C and D show how many remain after disinfecting with Calbenium, while E shows how many were contained in the insole before disinfecting. This indicates that the antibacterial disinfectant is extremely efficient and has reduced the number of bacteria by a factor of 10,000.

The DS2 membrane can be heat formed and so can be used for medical inserts moulded to the same contours used for podiatric and diabetic inserts. There will be no change to fit or comfort, while the medical advantages aid the healing process on any open wounds.

Data and images courtesy of I.P.C., France.

protect the foot, but also look the way they want them to," says Mr Williams. "But the patients should take some responsibility; they need to wear the right shoes and check their feet at least once a day."

The right lifestyle

For Maribeth Bunch, fitting diabetics with proper footwear is not just a business—it's a mission. After losing both her father and her father's mother to diabetes-related foot complications, and having embarked on her own painful (literally) weight-loss journey, Ms Bunch found herself struck by the vital importance of being able to walk regularly and comfortably. "My doctor prescribed walking as the only form of exercise due to my body mass," she says, "but walking hurt! Thus began my journey to understand why our feet hurt so much and how we can prevent foot pain to help us go the distance."

The journey, which included Ms Bunch's own loss of 77 kilograms, resulted in www.walk2bfit.com, a website that sells specialist footwear products and provides education, resources and tools for diabetics (and overweight people, for—as she points out—there is a strong link between the two) who are trying to establish or maintain a more healthy, active lifestyle. A panel that includes a podiatrist, a pedorthist, an athletic trainer and a skincare specialist answers questions and produces blogs to create an interactive and informative experience: topics, such as what to look for in a shoe, what to avoid, and recommendations for daily foot care, endeavour to inspire visitors to get moving safely and effectively.

Ms Bunch cites a 2001 US National Institutes of Health study that found people with diabetes who engage in at least two hours of any leisure-time physical activity a week had a 29% lower mortality risk compared with people who are inactive. Yet, she says: "If walking hurts, people stop walking. Most diabetics are not aware of the importance of properly fitted shoes or the types to buy."

Impediments to effective shoe shopping can range

from budget constraints to the diabetic's own ailments. "Most people on fixed incomes will buy a pair of shoes from a discount store and their decision is based more on the price tag. Diabetic shoes usually do cost two to three times more than you will find in retail stores," Ms Bunch says. "And if a diabetic who has neuropathy is trying on shoes, he or she can't tell if the shoe is tight because of having lost feeling in the feet; there is then a high risk of purchasing improper fitting shoes."

Attempting to address both of these obstacles, wk2bfit.com has several online partners with whom the website can offer specialty products at reduced cost. Hants White arch supports, whose competitors retail for around \$250 in stores, are offered for free with other purchases through the website or \$20 retail. Ms Bunch points out that these arch supports are not "cheap knock-offs" and come with lifetime warranties; their affordability is partly due to the manufacturer's support for walk2bfit.com's objectives. "Dean Lawrence [grandson of founder Hants White] allows us to sell online below his cost ... there is much integrity that goes behind the nearly 40 years of the orthotics manufacturing that he stands behind." Similarly, SmartKnit's diabetic socks are sold for half the cost found in retail stores. "Chris Vering, the executive vice president and chief operating officer of SmartKnit, gave me a very good break since he believes in my vision and the need for diabetics to be educated and wearing the right products," she adds.

The website also sells Própet shoes, which Ms Bunch feels are ideal for walking. Designed to be worn with orthotics, the shoes redistribute body weight to relieve pressure from the feet, ankle, joints, knees and back. "Place your hand into a [regular] shoe; you can feel seams in the interior toe box where the shoe is sewn together. A shoe like this will cause abrasions by 'rubbing' back and forth on the sensitive diabetic foot," she says. "Própet diabetic shoes have a velvety finish without seams and a toe box for wiggle room providing a very healthy foot environment." She adds that, regardless of the type of shoe, diabetics should take their footwear to a podiatrist for his or her inspection.

Selling more than shoes

Launched in 2007, www.walk2bfit.com saw approximately one million visitors in its first six months. "That may not seem like much, but over time it makes a difference. In my vision, if I am helping one single person learn about diabetic foot care and perhaps saving a life—that one person is who I am targeting," Ms Bunch says. She believes there is a moral imperative here for the market as a whole: "The footwear industry is counting on healthy feet to sell product, but as responsible business people I think it's our responsibility to not only sell great, affordable, quality product to our customers, but to also help them make informed choices."

If IDF's prediction of a global diabetes explosion holds true, Ms Bunch's vision may very well become a necessity for specialist shoe retailers. 🌐



Public health authorities are working hard to raise awareness of the threat to health that diabetes can present, as this campaign bus outside the Busch Stadium in St Louis, Missouri, shows.