



## Diabetes and Barefoot Science: Practicing Prevention

Diabetes mellitus and its complications are the sixth leading cause of death in the United States.<sup>1</sup> In fact, many cancers including prostate, breast and colon cancer have lower mortality rates - but a diagnosis of diabetes is still considered less life-threatening than a diagnosis of cancer. Among the most common complications of this chronic disease is the diabetic foot ulcer - a condition that can lead to amputation and death. Five-year mortality rates after new onset diabetic ulceration have been reported are between 43 and 55 percent and up to 74 percent for patients with lower-extremity amputation.<sup>2</sup> Ulceration is, however, a final result of many poor habits, poor diabetes management and a lack of preventative action.

Exercise, healthy eating, regular blood sugar monitoring, quitting smoking, taking the correct medication and taking it properly, and practicing good foot health all aid in the prevention of diabetic foot ulcers and generally increase the good health of the Type 1 or Type 2 diabetic. Diabetics are also regularly cautioned to always wear protective footwear to aid in the prevention of cuts, scrapes and potential infection for which diabetics are more at risk. Diabetics are told to avoid tight-fitting shoes and socks which can impede circulation and to regularly inspect their feet for calluses and dry skin.

But research has shown that foot ulcers occur as part of the final stages of diabetic neuropathy and muscle atrophy in the feet. Research has also shown that small muscle atrophy is present in diabetics before clinical peripheral neuropathy can be detected using standard clinical techniques. This atrophy is believed to be the main factor responsible for the development of an imbalance between the flexor and extensor muscles, which results in clawing of the toes, prominent metatarsal heads, and the development of high foot pressures that play a direct role in the development of foot ulcerations.<sup>3</sup> Because small muscle atrophy is the main process that leads to the anatomic changes in the foot which are directly related to the development of foot ulcerations, the direct evaluation - and prevention - of muscle changes rather than the evaluation of nerve function may prove more helpful.<sup>4</sup> The key, therefore, is to address the health of the small foot muscles through preventative action before atrophy and neuropathy have a chance to take hold, and it is here that Barefoot Science steps in.

In any shoe wearing society, by age eight or nine, the toes of most children have lost up to 50 percent of their natural prehensile and capacity.<sup>5</sup> Essentially everyone that wears shoes is negatively affected by the devices that are built in to the shoe and disguised as support, cushioning, pronation control, supination control, motion control, and so on. In fact, the greater the degree of devices built in, the greater the degree of foot muscle

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<sup>1</sup> KUNG H-S, HOYERT DL, XU J, ET AL: Deaths: final data for 2005. National Vital Statistics Reports. Available at: [http:// www.cdc.gov/nchs/fastats/lcod.htm](http://www.cdc.gov/nchs/fastats/lcod.htm). Accessed October 6, 2008.

<sup>2</sup> "Mortality Rates and Diabetic Foot Ulcers" in Journal of the American Podiatric Medical Association, Vol 98, No 6, November/December 2008

<sup>3</sup> "Foot Small Muscle Atrophy is Present Before the Detection of Clinical Neuropathy" in Diabetes Care, Volume 28, Number 6, June 2005

<sup>4</sup> "Foot Small Muscle Atrophy is Present Before the Detection of Clinical Neuropathy" in Diabetes Care, Volume 28, Number 6, June 2005

<sup>5</sup> Dr. Rossi

atrophy, dysfunction and neuropathy. Those labeled “diabetic shoes” are the worst offenders with the greatest number of devices, most shoe stiffness, and cushioning.

In essence, a proactive approach must be taken towards diabetic limb amputation - an approach of prevention, starting with children who are predisposed genetically to diabetes. It's never too late to rehabilitate a muscle and healthy adult feet start with healthy children's feet. Diabetics should begin using the Barefoot Science Foot Strengthening System insoles as soon as possible and have the soft tissue, muscular rehabilitation and alignment changes monitored by a physician.

The Barefoot Science Foot Strengthening System offers full length and  $\frac{3}{4}$  length insoles with a unique muscle activation and stimulation centre designed to use the body's own sensory perception and bio-feedback to activate the small foot muscles. Traditional attempts to address the small foot muscle issues inherent in diabetic feet have been based on artificially cushioning the foot or bracing the foot in an attempt to reduce pressure hotspots. These have all seen limited success, reinforcing the efficacy of intervention and prevention at an early stage through the encouragement of motor, sensory and autonomic neuron involvement which has shown to have more profound preventative effects.

The Barefoot Science insoles naturally and gradually introduce a muscle activation stimulus to the sole of the foot which subconsciously begins a series of muscle contractions resulting in the gradual and natural strengthening of the foot's supporting musculature through repeated exposure. Stronger muscles and increased blood flow to the extremities assist in lowering blood sugar levels and the continuous stimulation of the nerves and circulatory systems of the extremities may decrease the onset and magnitude of neuropathy in the distal portions of the leg.

Using the system is simple, comfortable and foot altering:

Week 1-2 Wear Barefoot Science with level one in your existing shoes.

Week 2-3 wear Barefoot Science with level two in your existing shoes

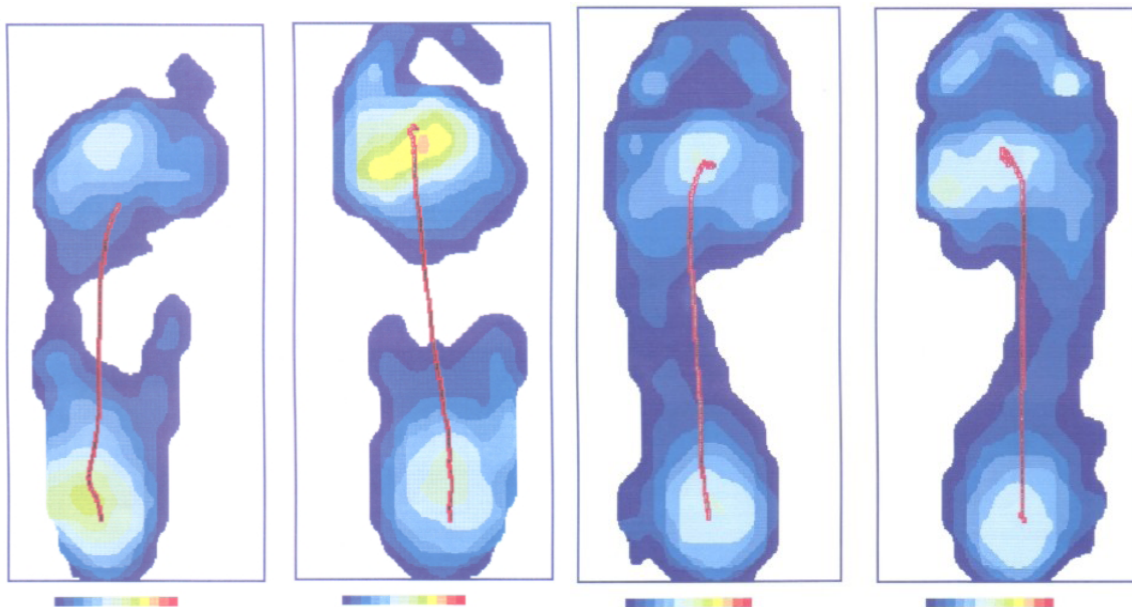
Week 3-4 Wear Barefoot Science with level three in a semi flexible shoe

Week 4-5 Wear Barefoot Science with level four in a semi flexible shoe

Week 5-6 Wear Barefoot Science with level five in a semi flexible shoe

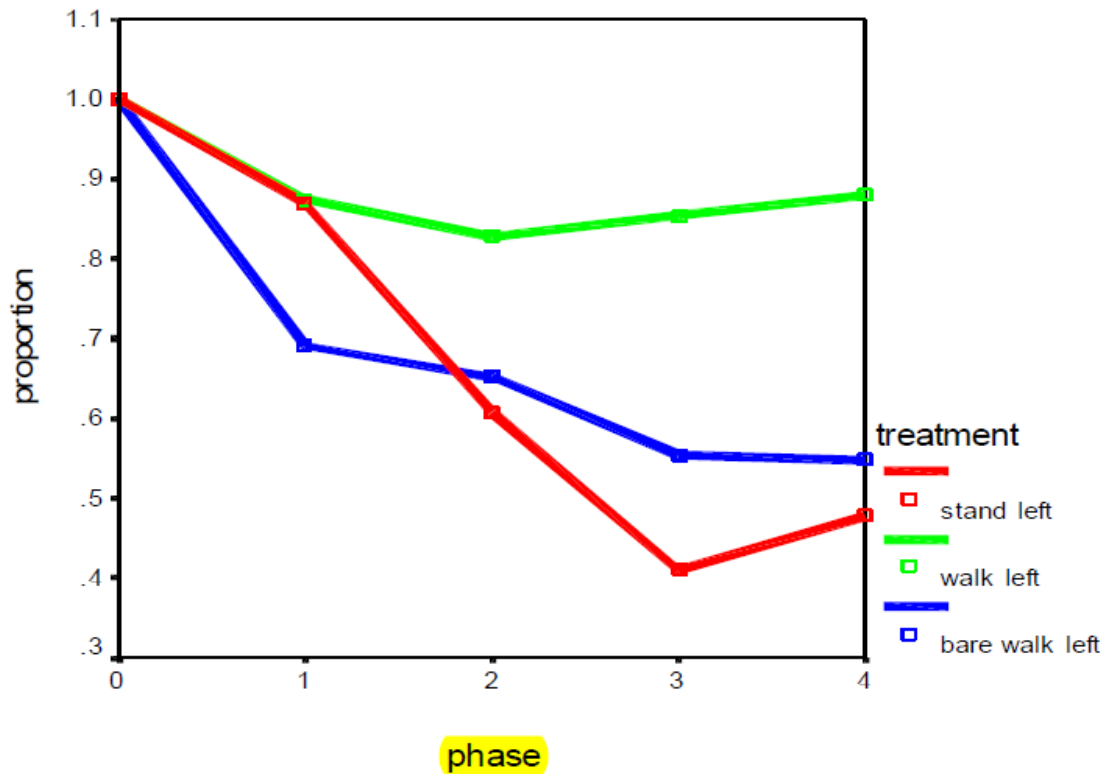
Week 7- Continue to wear Barefoot Science with level five in a totally flexible shoe

In pre-clinical trials using the Barefoot Science insole, it was shown that using the products increased the structural integrity of the foot and, in addition, there was a lessening of pressure hot spots beneath the foot. For those with diabetes, the reduction of these pressure points is key in that it reduces the likelihood of lesions and friction related damage to the skin, which often goes unnoticed and develops into much more serious problems.



Accumulative pressure during gait with standard shoe insole.

Accumulative pressure during gait with Barefoot Science Foot Strengthening Insole.



8 week progressive analysis of foot surface area associated with Barefoot Science insole use.

Here's what one diabetic had to say:

"I have been a Type 1 diabetic for over 29 years and as such have experienced some of the complications of this difficult disease. These have included diabetic neuropathy in my feet causing them to feel numb, to have some atrophy of the muscles and to generally be cold due to poor circulation. In addition to these complications, I have also suffered from flat feet, pronation of the left ankle and ongoing foot, ankle, knee and hip pain for most of my life. To counter this, for the past 7 years, I have been wearing in-shoe custom orthotics.

As a 37 year old mother of two boys and with a busy career, I have often wondered and worried about my foot health. The custom orthotics seemed to be a kind of answer when it came to straightening my ankle and reducing some of the pain caused by this misalignment, but the side effects of positioning my feet in the hard orthotics actually increased the numbness, lack of circulation and muscle atrophy that the neuropathy was already causing. (Not to mention the need to purchase expensive, wide-fitting and not necessarily attractive shoes that could accommodate the orthotic.)

The experience of wearing the Barefoot insoles has been not only eye-opening, but foot changing. Within the first hour of having the inserts in my shoes - at level one of course - I began having more feeling in my feet than I've had for a very long time. My feet felt good - in fact they were beginning to feel warm.

It really was amazing. The other things that have surprised me now that I've worn them longer, are the fact that they are extremely comfortable - providing cushioning to my feet which can be tender, they have not - as I was afraid they might - caused my ankle to turn or be painful. In fact, my ankles, legs, knees and hips feel great - not unsupported.

Lastly, I have gained some mobility back. I could not, for example, curl the toes on my left foot without causing a massive cramp in my foot or calf - and sometimes I couldn't really move them at all. I can curl my toes any time I want to now.

It's amazing what you will learn to live with because you've been told that it's the best solution - or only solution. It's amazing that I could accept the side effects of my custom orthotics as okay. As a diabetic you are constantly told not to wear things that are too tight, that cut off circulation or that don't allow freedom of movement. So why is it acceptable to put our feet into hard, moulded orthotics that do all of the things we're not supposed to?

I am excited and curious to see how much improvement the Barefoot Science inserts can provide me. At the halfway point of working up to number 5, I'm very impressed. My feet are integral to carrying me through life and I don't want to lose them to amputation. Particularly if you are a diabetic - and even if you're not - I urge you to see the amazing difference the Barefoot Science inserts will make to your mobility." - Sarah Wilkins, July 2012



Barefoot Science Products & Services Inc. | 1 Port Street East, Suite 201, Mississauga, ON, L5G 4N1 Canada  
Tel: 1 (905) 271-3668 | Toll Free: 1 (877) 651-3668 | Fax: 1 (866) 420-3719  
info@barefoot-science.ca | barefoot-science.ca

**Stimulates, Strengthens and Restores Optimal Foot Health.**