



BY JARROD SHAPIRO, DPM

# Almost Entirely Preventable

We must be more proactive in preventing the complications of diabetes.

*Practice Perfect is a continuing every-issue column in which Dr. Shapiro offers his unique personal perspective on the ins and outs of running a podiatric practice.*

**O**f all the disorders podiatrists treat, it would be a good bet that the most common ones experienced by all of us are the diabetic foot complications. This is very unfortunate because almost all of the complications that occur are entirely preventable.

Take, as an example, Mr. Smith (names and some details modified for privacy), a 35-year-old Type 2 diabetic who ended up with an acquired adult clubfoot after surgical removal of his entire 5th metatarsal. He had a callus under the 5th metatarsal head (from a pes cavus foot type) that became infected, ab-



ful in saving his extremity.

However, two months ago, this same patient returned with a plantar forefoot ulcer on the other side. As one might expect, his blood sugars

- 3) Deformity (pre-existing or acquired)
- 4) Increased pressure
- 5) Tissue trauma
- 6) Ulcer
  - 7) Infection
  - 8) Amputation

There's a world of detail between and within each of these numbered steps, but these eight cover the major stages reasonably well. Now, look at each step individually, and you'll note most of them are preventable. In fact, not only is each one preventable, but stopping the process at one step eliminates all of the downstream complications from occurring. Prevent the diabetes and steps 2-8 don't occur. Control the blood sugar, which prevents the neuropathy, and stop steps 3-8 from happening.

It's also important to realize that preventing each step later in the process is progressively more difficult than the preceding step. Preventing an infected ulcer from becoming an amputation is much more difficult than preventing the ulcer in the first place.

If Mr. Smith had taken better care of himself, he wouldn't have become diabetic. If, after becoming diabetic, Mr. Smith had worked to control his blood sugar, he wouldn't have become neuropathic. If his cavus foot had been properly managed with appropriate shoes and regular podiatric care, he wouldn't have acquired the ulcer. If he had sought care when he acquired the ulcer, it would have been treated, and the infection may not have oc-

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**... almost all of the complications [of diabetes] that occur are entirely preventable.**

scussed, requiring a partial 5th ray amputation that was later converted to an entire 5th ray amputation.

Any podiatrist could predict that loss of the attachment of the peroneus brevis tendon attachment would lead to an equino-adductovarus contracture. The extra strain while walking, combined with his uncontrolled diabetes resulted in Charcot arthropathy of the ankle. A major reconstruction later (consisting of three surgeries) was success-

were very high, with a hemoglobin A1c above 14%. He's now fighting to heal his wound before an infection leads to an amputation.

This patient's situation highlights the highly preventable nature of this problem. The creation of a diabetic foot ulcer is a multi-step process that could have been prevented at each of the steps. Consider these stages, one leading almost sequentially to the next:

- 1) Acquire diabetes
- 2) Acquire neuropathy

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Lawrence A. Lavery, DPM, MPH  
Professor and Director of Research  
Department of Plastic Surgery  
University of Texas Southwestern Medical Center  
Dallas, Texas  
Llarry.lavery@utsouthwestern.edu


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Lawrence Lavery, DPM, MPH

Professor and Director of Clinical Research  
Department of Plastic Surgery  
University of Texas  
Southwestern Medical Center - Dallas, TX

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curred, which wouldn't have led to the amputation, which wouldn't have led to the acquired clubfoot deformity, which might not have led to the Charcot and the need for a reconstructive surgery. Notably, we stopped the leg amputation by reconstructing the deformity.

It's really tragic that there are

ple equations that are highly applicable to clinical practice:

$$\text{Neuropathy} + \text{Deformity} = \text{Ulcer}$$

$$\text{Ulcer} + \text{Infection (or PAD)} = \text{Amputation}$$

For a podiatrist, these equations are like Newton's laws of motion. Maybe we can call them the Diabetes Laws of Complications. The real key equation, though, is the first one

neuropathic foot will decrease the prevalence of ulcer formation. This might look like a trial in which neuropathic diabetic patients who all have some deformity (hammertoes, equinus, cavus, planus, limited joint motion, etc.) but no ulcer history are randomized to a surgical group and a non-surgical control group. They would then be observed for a set period of time (say, five years on average), watching for the prevalence of ulceration, infections, hospitalizations, and amputations.

This landmark study could show an overall decrease in all negative outcomes and perhaps even an increase in life expectancy. This is clearly a hard study to perform, which is why it hasn't been done yet. Until the study is done, we will be relegated to reacting to the disease's complications rather than proactively eliminating deformity as a risk factor. Until we start proactively reconstructing high-risk feet, the medical community will not realize the true potential of podiatry and how we can most effectively help our patients. **PM**

**Dr. Shapiro** is editor of PRESENT Practice Perfect. He joined the faculty of Western University of Health Sciences, College of Podiatric Medicine, Pomona, CA in 2010.

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so many places where we could intervene, and yet the disease continues its rampage almost unabated. Until a cure for diabetes is found, we are going to continue what appears to be an inexorable trail toward ever more severe limb complications in increasingly sick patients.

For all you diabetes researchers out there, do the research project that has yet not been done: testing what happens to foot ulcer rates when we intervene much more aggressively than we do now. There are two sim-

because if the ulcer doesn't occur, then the infection doesn't happen. You can effectively prevent the amputation by preventing the ulcer. It makes logical sense, then, for us to focus our podiatric prevention on the first equation. It's also pretty obvious that podiatrists aren't going to cure neuropathy. That leaves us with one final area to intervene: deformity. And that brings us to a research recommendation.

The research study that hasn't been done yet is to see if surgically eliminating the deformity of a