

# New Doors to Be Opened with Epidermal Nerve Fiber Density Testing

*Podiatrists now have a new diagnostic test for neuropathy.*

By Ben Weaver, DPM

*Practice Management Pearls is a regular feature that focuses on practice management issues presented by successful DPM's who are members of the American Academy of Podiatric Practice Management.*

**M**ore and more patients are complaining that their legs are aching and burning, or that their legs seem "restless" at night. As a consequence, primary care doctors are seeing more potentially neuropathic patients and are at a loss as to what to do. There is now a new option for diagnostic testing: epidermal nerve fiber density analysis. This particular type of testing is nothing new; in fact, epidermal nerve fiber density (ENFD) testing has been around for 15 years, but it was only recently brought into the podiatric arena.

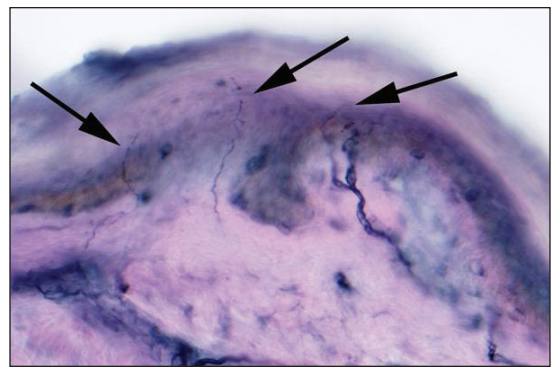
Patients are generally willing to try new forms of diagnostic or ancillary testing, particularly if these studies can help identify and/or manage problems in their feet and

legs. Epidermal nerve fiber density testing uses a simple 3 mm. punch biopsy of skin. This punch is similar to any other punch with two exceptions: 1) special care is necessary to avoid crushing the surface epithelium, and 2) it cannot be placed in formalin fixative. During the analysis, the tiny A-delta and C fibers within the epidermis are quantified and a density

per unit area is calculated. These tissue samples must be placed in special fixative that is available from the testing lab.

The full utility of epidermal nerve fiber density analysis in the management of our diabetic patient populations

is only now becoming appreciated. For much of the last decade, this test has been used mostly in the context of research. It has now become a highly specific and adequately sensitive method to qualify and quantify small fiber peripheral



**Figure 1:** The presence of a normal complement of intra-epidermal nerve fibers (see arrows) militates strongly against established small fiber peripheral neuropathy.

neuropathy. In fact, this test itself has played a crucial role in the research that has allowed this pattern of peripheral neuropathy to be characterized.

## **Confirmatory Diagnostic Tool**

There are multiple angles from which ENFD analysis will allow us to approach the management of our diabetic patients: as a confirmatory diagnostic tool, as a prospective or predictive tool, and as a tool to gauge the effectiveness of management. The most obvious use of this examination is to definitively diagnose suspected small fiber peripheral neuropathy (Figure 1). For years, we as podiatric clinicians have lumped any patient with burning, tingling or numbness into

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## Nerve Fiber Density...

a single wastebasket diagnosis, i.e., "peripheral neuropathy." By not defining the precise pattern of neuropathy, we made it impossible to assess the effectiveness of emerging therapies on specific patient populations. This can be likened to treating every bacterial infection with penicillin and then believing the antibiotic is useless because in some instances it doesn't work. By precisely characterizing the form of neuropathy affecting our patients, we can look at and judge specific therapeutic modalities in the appropriate light.

Perhaps the most promise, and certainly the most compelling potential, related to this test involves its role as a diagnostic tool in patients who are either at risk or early in the development of small fiber peripheral neuropathy. Because ENFD analysis may reveal degenerative changes that precede an actual drop of nerve density, and in some cases a decrease in epidermal nerve fiber density may precede the symptoms of neuropathy (Figure 2), this test may, in time, become a standard means of determining which patients should be placed on preventive medication prior to their development of overt symptomatology. This approach has the potential to curb the number of patients that eventually become symptomatic.

Finally, ENFD analysis is widely used to monitor the effectiveness of various therapeutic modalities in our diabetic and non-diabetic patients. In recent years we have seen some of the most prolific public speakers in podiatry lecture on this topic, among them Doctors Allen Jacobs, Mackie Walker, and Lawrence Didomenico. Epidermal nerve fiber density analysis allows us to document an objective base-

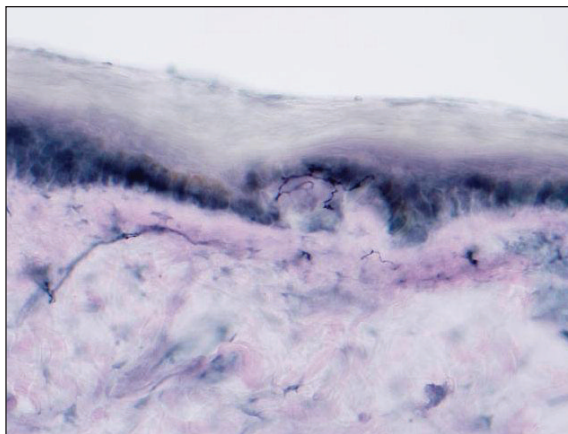


Figure 2: The utter absence of intra-epidermal nerve fibers is indicative of advanced small fiber peripheral neuropathy.

line prior to the initiation of therapy. We can then repeat the exam at future intervals—every 6-12 months—to assess disease progression, or alternatively, disease regression. It is this manner of use that is allowing for the development and refinement of specific therapeutic options for small fiber peripheral neuropathy. It is also here that the

podiatry profession can play a major, if not pivotal, role in ongoing clinical and pharmaceutical research.

### Marketing Possibilities

This new ancillary study can be marketed to a myriad of medical specialists, starting with endocrinologists and pain management specialists. How many of your diabetic

or potential diabetic patients do endocrinologists see on a daily basis? This new ancillary test can provide pain management doctors with a definitive diagnosis instead of a quasi-guess. Providing these two specialists with recent podiatric literature about how you can provide a definitive diagnosis for their patients through ENFD biopsies can be a key to new referrals.

Another group of doctors to

market to are the primary care physicians for their patients with restless leg syndrome. (Recent studies have shown that restless leg syndrome is also a small nerve fiber neuropathy.) Although there are a limited number of treatments for small nerve fiber neuropathy, psychologically a definitive diagnosis can be a Godsend for patients, confirmation that they are not crazy. This alone can be a huge

practice builder.

ENFD can provide a means for fine-tuning our diagnosing, monitoring, and treating cases of neuropathy, as well as provide our fellow referring medical specialists with added diagnostic information. The doors are flying open as we speak.

*The American Academy of Podiatric Practice Management (AAPPMP) has a forty-year history of providing its member podiatrists with practice management education and resources they need to practice efficiently and profitably, through personal mentoring and sharing of knowledge. To Contact AAPPMP call 978-686-6185, e-mail aappmexedir@aol.com or visit www.aappm.com, or circle #150 on the reader service card. ■*

Dr. Weaver is one of the first podiatrists to have become a physician certified in wound care by the Council for Medical Education & Testing. He has completed his certification for wound care, and is a Fellow of the American College of Foot and Ankle Orthopedics and Medicine, as well as the American Professional Wound Care Association and the College of Certified Wound Specialists. He is a member of the Executive Board of Trustees and a Fellow of the American Academy of Podiatric Practice Management and is currently serving as to that organization.



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