

## **In-Vivo Reflectance Confocal Microscopy of Meissner's Corpuscles as an objective measure of Diabetic Distal Symmetric Polyneuropathy**

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### **ABSTRACT**

**Objective:** To evaluate in-vivo reflectance confocal microscopy (RCM) of Meissner's corpuscles (MC) as a measure of diabetic distal symmetric polyneuropathy (DSP).

**Methods:** Forty-three adults with diabetes and 21 control subjects underwent RCM of MC density at the fingertip of digit V, thenar eminence (TE), and arch of the foot, ankle skin biopsy for epidermal nerve fiber density (ENFD), electrophysiological studies, monofilament touch threshold testing, and timed vibration at the toe. Subjects with diabetes were subdivided into groups with and without clinical DSP using the American Academy of Neurology (AAN) case definition for DSP and neuropathy outcomes were compared across groups.

**Results:** Both diabetic groups (with and without AAN criteria for DSP) had objective evidence of peripheral sensory involvement using conventional sensory measures, although those who met the AAN criteria had greater abnormalities. MC densities were lower in the entire diabetic group at the TE and finger (digit V) relative to controls. Additionally, MC densities at all imaging sites were associated with corresponding conventional sensory measures. Furthermore, MC densities were reduced in subjects without AAN DSP criteria at the finger compared to controls, while the corresponding ulnar sensory nerve conduction studies and MF touch-pressure threshold testing did not differ.

**Conclusions:** In-vivo RCM of MC density at the finger (digit V) is a non-invasive, painless, and objective marker for early peripheral sensory involvement in diabetes at a time when corresponding conventional upper limb sensory measures do not differentiate subjects with diabetes from controls. Further studies are needed to determine whether RCM of MCs can identify quantitative changes in DSP associated with disease progression or treatment.