

THE ROLE OF HIGH-VOLTAGE, PULSED ELECTRICAL STIMULATION IN LIMB SALVAGE FOR DIABETIC PATIENTS

Jeremy J. Burdge, MD¹; Jodi F. Hartman, MS²; and Michelle L. Wright, BS²

¹Plastic and Reconstructive Surgery, Surgery of the Hand, Columbus, Ohio USA Grant Medical Center Wound Care, Columbus, Ohio USA

²Orthopaedic Research & Reporting, Ltd., Gahanna, Ohio USA

Accepted for Podium Presentations at the 21st Annual Symposium on Advanced Wound Care & The Wound Healing Society San Diego, CA April 2008

Increasing evidence supports the use of high-voltage, pulsed electrical (HVPE) stimulation for the treatment of chronic, full thickness diabetic wounds of the lower extremity.

This retrospective study evaluated the efficacy of HVPE stimulation as an adjunctive therapy in the treatment of the first consecutive 45 diabetic wounds (30 patients) which failed to improve despite multidisciplinary wound treatment, including vascular evaluation and surgical intervention as indicated, aggressive off-loading, bacterial infection control, and wound debridement.

Mean wound age was 25.0 weeks (4.0-60.0). Mean wound surface area was 7.8 cm² (0.6-62.0). Wound locations included the foot (51.2%), heel (27.9%), ankle (11.6%), and lower extremity (9.3%). University of Texas Diabetic Wound Classifications were 4 (9.3%) IA, 2 (4.7%) IB, 14 (32.6%) IC, 1 (2.3%) IIA, 6 (14.0%) IIC, 4 (9.3%) IID, 2 (4.7%) IIIB, 3 (7.0%) mC, and 7 (16.3%) IIID. Co-morbidities included neuropathy (86.2%), peripheral vascular disease (79.3%), cardiac disease (39.3%), infection (34.5%), osteomyelitis (17.2%), and morbid obesity (10.7%).

Mean number of electrical stimulation treatments was 22.3 (6.0-40.0). Thirty-five (77.8%) wounds healed at a mean time of 14.2 weeks (3.4-59.0). At a mean follow-up of 39.8 weeks (11.1-84.3), 31 (68.9%) wounds remained healed. For the 4 (8.9%) recurrences, additional electrical stimulation subsequently healed 2 wounds, below knee amputation was required in another, while treatment is pending for the remaining wound. Ten (22.2%) wounds failed to heal, resulting in a transmetatarsal amputation for one patient (1 wound) and below knee amputation for five patients (6 wounds).

These results suggest that HVPE stimulation is a useful adjunct to a multi-disciplinary limb salvage approach for the management of complex lower extremity diabetic wounds for which conservative treatment has failed. Amputation, which is a major source of morbidity and occasionally mortality among diabetics, was avoided in the majority of patients.