Treatment of Recalcitrant Wounds of Diverse Etiology with a Wireless Microcurrent Generating Device

Donald E. Mrdjenovich, DPM, CWS, FACWCS, Central PA Podiatry Associates, PC, Altoona, PA

BACKGROUND
Wound healing is a complex and dynamic process that requires a specialized approach to treatment. After addressing the key factors involved in the wound healing process, there is still a need to optimize the wound healing microenvironment to facilitate healing on a cellular and clinical scale. The use of low-level microcurrents has long been used for expediting wound healing and has been observed to contribute to more rapid healing in both acute and chronic wounds (1). In previous studies, the positive influence of a wireless, antimicrobial microcurrent generating device® (MCD) was observed in the treatment of cutaneous wounds of diverse etiologies (2-3).

METHODS
A case series was conducted to describe the results of the MCD in the treatment of four delayed, complicated non-healing wounds of various skin, location and etiology. Wounds assessed included a complicated STSG, a wound that had failed to respond following use of synthetic skin substitutes, a post-amputation site, and a wound post-MWFT treatment. All wounds had been present greater than 4 weeks duration. Measurements of wound length, width, depth and appearance were recorded once a week.

RESULTS
All complicated and recalcitrant ulcerations were investigated and treated with MCD. All cases had an initial response with evidence of presence of immature epithelial migration noted within the first week of use of MCD. Cases 1 and 2 went to complete closure of ulcerations. Case 3 was discontinued after 8 weeks due to complications with outer and proximal skin structures and other factors related to sarcoidosis. Case 4 was lost to follow up after an extended hospitalization for a complicated postural cyto/secretural ulceration.

CONCLUSION
Following the application of MCD, early onset of granulation and epithelialization was observed in all four non-healing wounds, particularly in the initial 4-6 week treatment period. Early in dressing change was noted with the use of the MCD, as well as improved patient QOL. Based on observations from this case series, the MCD was observed to be a useful modality in the treatment of various recalcitrant wounds, both as a primary as well as an adjunctive treatment. It also appears to be a cost-effective approach, with improved clinical response for mobility in line with cost compared to other modalities.

REFERENCES

Case 1: Arterial & venous ulcerations non-healing for 16 years
50 YO WF with history of lower leg arteriograms and arterial/venous complications of left lower extremity greater than 16 years with no closure. Complicated by RA and diabetes mellitus.

METHODS
Two prior STSG with failure, multiple HBO treatments, several cadaver derived and fibrilized derived dermal substitutes, MWFT, moist wound healing dressings, collagen matrix, biolayer, keratinocytes, polymer pads, granular stimulation with every category of wound product. Several incidents of decline and unsatisfactory response. History of lower extremity bypass and distal endovascular interventions.

RESULTS
After failure to respond, initiated MCD protocol - hydrogel to base of wound, moistened MCD, and applied alginate, polymer dressing to control exudate drainage and 2 layer wrap (silver and short stretch wrap) to control edema. Change outer layers every 2 days or per strike through. Repeat MCD every 7 days.

Case 2: Open surgical wound s/p amputation
63 YO MH with history of gangrene and s/p amputation partial fifth ray left foot, with partially open granular surgical wound.

METHODS
Prior to surgery to managed moist wound healing utilizing hydrogels, silver alginates, collagen particle films, alcohol to expedite granular live, endovascular debridement, MWFT push-up on open surgical wound.

RESULTS
After failure to respond for 7 months, started MCD protocol - hydrogel to base of wound, moistened MCD, and applied alginates, polymer dressing to control exudate drainage and 2 layer wrap (silver and short stretch wrap) to control edema. Change outer layers every 2 days or per strike through. Repeat MCD every 7 days.

Case 3: Exposed tendon

METHODS
Prior to surgery to managed moist wound healing utilizing hydrogels, silver alginates, collagen particle films, alcohol to expedite granular live, endovascular debridement, MWFT push-up on open surgical wound.

RESULTS
After failure to respond for 24 months, started MCD protocol - hydrogel to base of wound, moistened MCD, applied alginates, transparent film or fluffed gauze depending on outer skin reaction, protective dry sterile dressing, multi layer wrap, change every 2 days.

Case 4: Recalcitrant bilateral ulcerations
53 YO WM, quadraplegic, wheelchair ambulant, non-podial ambulation with history of lower limb ischemic situations from complications of lower extremity dependent edema on the right and left lower legs.

METHODS
Prior to surgery to managed moist wound healing utilizing hydrogels, silver alginates, collagen particle films, alcohol to expedite granular live, endovascular debridement, MWFT push-up on open surgical wound.

RESULTS
After failure to respond for 21 months, started MCD protocol - hydrogel to base of wound, moistened MCD, applied alginates, transparent film or fluffed gauze depending on outer skin reaction, protective dry sterile dressing, multi layer wrap, change every 2 days.

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