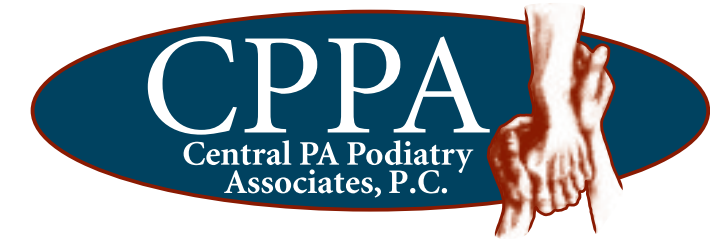


Treatment of Recalcitrant Wounds of Diverse Etiology with a Wireless Microcurrent Generating Device

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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 size, location and etiology. Wounds assessed included a compromised STSG, a wound that had failed to respond following use of synthetic skin substitutes, a post-amputation site, and a wound post-NPWT 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 pilonidal cyst/sacral 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. Ease 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 adjunctive approach. It also appears to be a cost effective approach, with improved clinical response for relatively in line cost compared to other modalities.

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Case 1: Arterial & venous ulcerations non-healing for 16 years

70 YO WF with history of lower leg ulcerations and arterial/venous complications of left lower extremity greater than 16 years with no closure. Complicated by RA and immunocompromise.

Past Tx: Two prior STSG with failure, multiple HBO treatments, several cadaver derived and fibroblast derived dermal substitutes, NPWT, moist wound healing, multilayer compression, drainage control with alginates, foams, 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 atherectomies.

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

Past Medical History: RA, HTN, thyroid disease, hypercholesterolemia, osteoporosis, depression, TIAs, arterial/venous PVD

Meds: Alendronate 70mg qD, Carvedilol 6.25 mg qD, Celebrex 200 mg QD, Clopidogrel 75 mg QD, Crestor 5 mg QD, Cymbalta 30 mg QD, Lorazepam 1 mg QD, Methotrexate 2.5 mg QD, Tramadol 50 mg, Arginate 8 oz BID, Vit D 50000U QD



Case 2: Open surgical wound s/p amputation

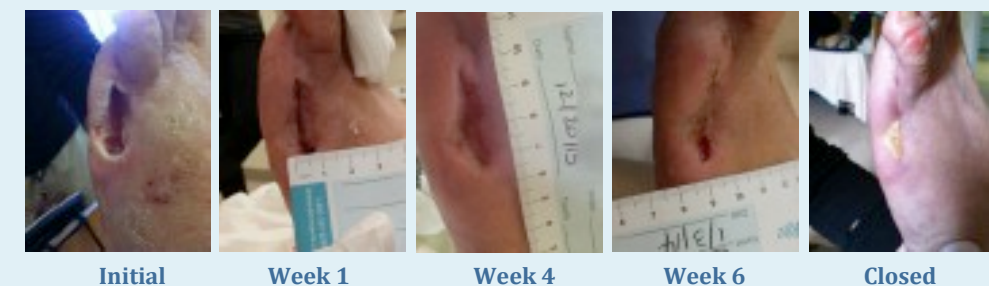
93 YO WM with history of gangrene and s/p amputation partial fifth ray left foot, with partially open granular surgical wound.

Past Tx: Prior to surgery maintained moist wound healing utilizing hydrogels, silver alginates, collagen particle fillers, alcohol to necrotic gangrenous toe, endovascular distal atherectomy, NPWT post-op on open surgical wound.

Approach: After failure to respond for 7 months, started MCD protocol-hydrogel to base of wound, moistened MCD, and applied alginate, transparent film, protective dry sterile dressing, change every 2 days or greater if removed by patient due to dementia.

Past Medical History: HTN, atrial fibrillation, BPH, dual chamber pacemaker, hearing loss B/L, right eye prosthesis, dementia, hypothyroidism, PVD

Meds: Proscar 5mg qD, Lasix 40 mg qD, Synthroid 0.05 mg QD, Lisinipril 20 meq QD, KCl 20 mEq QD, Vit D 2000U QD, Coumadin 6 mg QD, Lortab 5/500 BID, Zinc Sulfate QD, Arginate 8 oz BID, Atarax 25 mg QD, Ferrous Sulfate 325 mg QD, Prosource 1 oz TID



Case 3: Exposed tendon

62 YO WM with history of post surgical complication of the right posterior heel following repair of ruptured achilles tendon. Tendon exposure and osteomyelitis. Surgical removal of anchors and saucerization of posterior calcaneus.

Past Tx: Moist wound healing, off loading in bivalve boot, NPWT, silver based hydrogels, silver alginates, collagen, ECM products, cadaver derived, fibroblast derived dermal substitutes, HBO treatment (discontinued early due to illness), multi layer wraps with short stretch bandage, drainage control with foams and polymer pads. Endovascular laser venous ablation.

Approach: After failure to respond for 34 months, started MCD protocol- hydrogel to base of wound, moistened MCD, applied alginate, transparent film or fluffed gauze depending on outer skin reaction, protective dry sterile dressing, multi layer wrap, change every 2 days.

Past Medical History: RA and sarcoidosis, PAD, venous insufficiency with varicosities

Meds: Arava 10mg QD, Metanx 1 BID, Mobic 15 mg QD, Prednisone 5 mg QD, Septra DS 160/800 mg, Talwin NX 50/0.5 mg PRN, Arginate 8 oz BID



Case 4: Recalcitrant bilateral ulcerations

53 YO WM, quadriplegic, wheel chair ambulation, non pedal ambulation with history of lower leg/ankle ulcerations from complications of lower extremity dependent edema on the right and left lower legs.

Past Tx: Moist wound healing concepts and multi-layer wraps with short stretch bandage, NPWT, silver based hydrogels, silver alginates, collagen, ECM products, cadaver derived and fibroblast derived dermal substitutes. Drainage control with foams and polymer pads. Endovascular laser venous ablation.

Approach: After failure to respond for 25 months, started MCD protocol- hydrogel to base of wound, moistened MCD, alginate, foam to control excess drainage, multi layer wrap, change every 2 days.

Past Medical History: Type II Diabetes, asthma, sleep apnea, PAD mild, venous insufficiency, paraplegia result of MVA.

Meds: Advair 500/50 mcg, Furosemide 40mg, Lisinipril 10 mg, Metformin 500 mg, Prednisone 5 mg QD, ProAir HFA, Warfarin 3.5 mg, Arginate 8 oz BID

