

Management of Traumatic Wounds with a Bioelectric Wound Dressing

Penny E. Campbell, PT, CWS, FACCWS, DAPWCA
Bethany Health & Rehab Center, Nashville, TN

BACKGROUND

Postoperative management of complex traumatic wounds oftentimes require a specialized, systematic approach for treatment. Techniques which help prevent infection, facilitate wound healing, promote patient comfort, and simultaneously maintain optimal function and minimize deformities are key. (1) While various advanced wound care modalities are currently available on the market, such as bioengineered skin substitutes and negative pressure wound therapy, there still remains a need for wound management options when these advanced treatment methods fail to provide improvement in wound condition, despite best efforts. A bioelectric, antimicrobial wound dressing has been observed to provide an optimal environment for wound healing through the presence of electric fields. (2) The dressing, which contains a matrix of microbatteries, produces a sustained voltage in the range of 0.3 to 0.9 Volts on its surface in the presence of a conductive fluid.

CASE HISTORY

Patient is a 41 y/o male who suffered a MVA ~ 6/13/12 resulting in multiple fractures including right ribs 4 - 9, left ribs 6 - 9, left 5th toe, left calcaneus, left mid-shaft tibia, and left open distal fibula. The left 5th toe and calcaneus were non-operative. ORIF surgical repair of tib/fib fractures on day of admission. He underwent STSG and soleus flap on 6/14/12, developed in infection, I & D on 6/25/12, wound debridement on 7/2/12 and Wound VAC placement, 7/9/12 surgical debridement of left foot and ankle wounds, Integra placement and reapplication of Wound VAC. Overall spent 40 days in hospital. Admitted to Rehab center on 7/12/12. Began treatment with bioelectric dressing and NPWT on 7/19/12. Important to note that all wounds connected with the exception on Wound 1.

METHODS

The bioelectric dressing was evaluated in a case series of five traumatic wounds with an initial mean volume of 178cm³. The dressings were applied 1-2 times a week in conjunction with the best standard of care protocols, and wounds were evaluated for signs of healing improvements at weekly increments.

RESULTS

All wounds were healed by primary or tertiary intention in an average of 39 days. Three of the wounds healed before plastic surgery could close with STSG. One wound bed was prepped for accepting the STSG. One STSG failed and ultimately closed with the use of the bioelectric dressing.

CONCLUSION

It appears that the application of a bioelectric dressing optimizes the wound healing environment through the presence of low-level microcurrents, and may play a valuable role in high-risk, limb threatening cases, and promoting functional and cosmetic outcomes and limb salvage in traumatic wounds.

REFERENCES

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2. R. Rivkah Isseroff and Sara E. Dahle. *Advances in Wound Care*. December 2012, 1(6): 238-243. doi:10.1089/wound.2011.0351.

Wound 1: Left Lower Leg

7/19/12: Began Procellera and NPWT with dressing changes 2x/wk, prepping for skin graft; 9/11/12: Re-admitted to Rehab center following hospital admission for skin graft placement. Skin Graft. Began treatment with bioelectric dressing only. Dressing changes 2x/wk. 9/24/12: Wound healed.



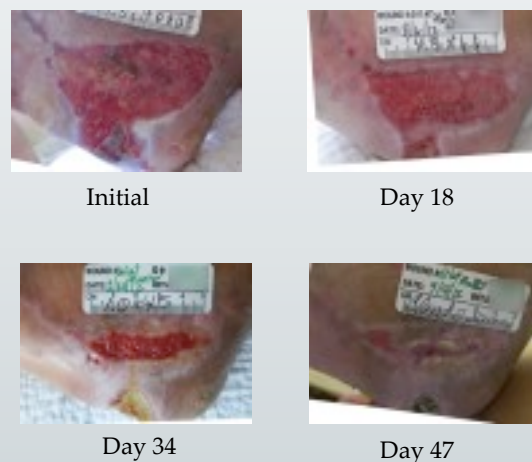
Wound 2: Left Medial Leg

Large wound that spanned medial portion of foot and continued to involve the top portion of the foot. Goal was to prep for skin grafting. Integra was present on top portion of the foot wound on admission. 7/19/12: Began Procellera and NPWT with dressing changes 2x/wk. 9/11/12: Re-admitted with STSG. Bioelectric dressing no longer required.



Wound 3: Left Lateral Foot

7/19/12: Began bioelectric dressing and NPWT with dressing changes 2x/wk. Prepping for skin graft. 9/4/12: Wound closed. No skin grafting required.



Wound 4: Left Thigh Donor Site

9/11/12: Re-admission to rehabilitation facility with new donor site. Pain was at level 10 at dressing change and level 0 ten minutes following application of bioelectric dressing to the site. No narcotics used. No reports of pain after bioelectric dressing was applied until dressing was removed on 9/17/12. 9/17/12: Donor site closed and pigmentation starting to return. Site likely closed before 6 day but dressing was not changed until 9/17/12.



Wound 5: Left plantar upper Site

9/11/12: Small wound that was initially part of the larger totally involved plantar wound. Wound was initially 100% necrotic. The entire plantar surface was treated with Santyl and NPWT. Re-admitted to the Rehab facility and wound started on bioelectric dressing alone. No NPWT indicated at this time. 10/1/12: Wound closed.



Wound 6: Left Plantar Lower Site

9/11/12: The lower plantar site was initially part of the larger totally involved plantar wound. Wound was initially 100% necrotic. The entire plantar surface was treated with Santyl and NPWT. Re-admitted to Rehab center following surgical debridement. Applied bioelectric dressing only. No NPWT required. Prepping for skin graft. 10/22/12: Re-admitted after skin graft. Procellera applied. No NPWT. 11/12/12: Wound closed.

