**BACKGROUND**

Wound care in a rehabilitation environment is a costly and difficult problem. A well-validated retrospective, observational study was performed in a population of rehabilitation and long-term care patients with acute and chronic wounds of varied etiology to determine if differences in wound healing outcomes could be observed when treated with a bioelectric wound care device as compared to standard local wound care methods. The bioelectric device generates a microcurrent in the presence of an electrolyte such as wound exudate or sterile saline. It has been shown to facilitate wound repair and has been associated with faster epithelialization and reduced expression of inflammatory biomarkers such as cytokine interleukin-1 in in vitro studies.

**METHODS**

Data files of 30 patients who received either standard wound treatment (SOC; n=20), or were treated with a bioelectric wound device (n=18) were retrospectively reviewed. Wounds were assessed until deemed clinically to have healed with up to 100% epithelialization. All patients (18 – 99 years) with single wounds were included. Statistical analysis was performed to compare the wounds in two groups for the number of days to heal, the rate of wound volume reduction, or the monotonically decreasing, or the increasing and then decreasing trend as a function of Days. The wounds in the SOC group healed on average at 38.25 days (SD 28.34), while the bioelectric device group healed significantly faster at 22.98 days (SD 12.64), p<0.001. The rate of volume reduction per day was 3.85% for SOC vs. 5.18% volume reduction per day (p=0.032) for the bioelectric group. The SOC group had 35% of its wounds heal monotonically vs. 83.3% in the bioelectric device group (p=0.018).

**RESULTS**

The wounds in the SOC group healed an average of 38.25 days (SD 28.34), while the bioelectric device group healed significantly faster at 22.98 days (SD 12.64), p<0.001. The rate of volume reduction per day was 3.85% for SOC vs. 5.18% volume reduction per day (p=0.032) for the bioelectric group. The SOC group had 35% of its wounds heal monotonically vs. 83.3% in the bioelectric device group (p=0.018). Wounds heal monotonically vs. 83.3% in the bioelectric device group, when compared to SOC, in a rehabilitation center environment, which translates to improved patient care, and potentially, significant cost savings.

**CONCLUSION**

This multicenter retrospective study demonstrated a 45.4% faster and more robust healing of wounds with the use of the bioelectric wound care device, when compared to SOC, in a rehabilitation center environment, which translates to improved patient care, and potentially, significant cost savings.

**REFERENCES**

1. Skelton SN. The role of a bioelectric antimicrobial dressing in the healing of acute and chronic wounds. [Journal]. Clinical Topography on Advancers in Skin and Wound Care, Las Vegas, NV; October 2006 (suppl): .

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**Summary of patient intake data**

<table>
<thead>
<tr>
<th>Group</th>
<th>Bioelectric Dressing</th>
<th>Standard Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of cases</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Males</td>
<td>14</td>
<td>13</td>
</tr>
<tr>
<td>Females</td>
<td>4</td>
<td>7</td>
</tr>
<tr>
<td>Age [Years (SD)]</td>
<td>80.37 ± 10.24</td>
<td>81.5 ± 9.29</td>
</tr>
<tr>
<td>Wound size</td>
<td></td>
<td></td>
</tr>
<tr>
<td>[Volume, cc]</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td>0.01</td>
<td>0.01</td>
</tr>
<tr>
<td>Max</td>
<td>224.1</td>
<td>312.1</td>
</tr>
<tr>
<td>Mean</td>
<td>21.1 ± 35.00</td>
<td>Mean 50.4 ± 74.18</td>
</tr>
</tbody>
</table>

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**Stage II Blister**

**Patient 6 - Bioelectric Device**

- Age: 83 y/o with recent fall and non-operable fx
- Dx: Tib/Fib and ankle fx, dM, Peripheral Neuropathy, Chronic Arteriosclerosis, Pacemaker, HTN, chronic renal disease, COPD, CHF, MI
- Blister completely resolved in 5 days

**Patient 9 - SOC**

- Age: 83 y/o female
- Right medial thigh
- Dx: Right TKR, chronic pain, HTN, Vitamin D def., h/o Uterine CA

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**Surgical Dehiscence**

**Patient 8 - Bioelectric Device**

- Age: 85 y/o female
- Dx: Sinus tract in fistula, colovesical fistula s/p repair; diverticulosis bowel, left upper stent repair; UTI; sepis; perforation of intestine, AF, DM II, HTN, CAD, anxiety, depression, bilateral renal cysts, anemia, nephritis, hyponatremia, s/p polymineral vagus, hypothyroidism, Vitamin D deficiency
- Tx: Procellera® Wound Dressing treatment began 9/12 and NPWT discharged 9/12

**Patient 9 - SOC**

- Age: 85 y/o female
- Dx: Surgical dehiscence with MRSA, HTN, anemia, MI, immune thrombocytopenia, anemia, hypothyroidism, hypoproteinemia, renal arterial stenosis, CVA, AAA, s/p bilateral ileoceleal exclusion s/p s/p stent, temporal bypass
- Tx: NPWT + antimicrobial wound filler Treatment began 9/8/11; discharged NPWT 9/29/11

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**Open Hematoma**

**Patient 1 - Bioelectric Device**

- Age: 65 y/o with recent fall and non-operable fx
- Dx: Tib/Fib and ankle fx, dM, Peripheral Neuropathy, Chronic Arteriosclerosis, Pacemaker, HTN, chronic renal disease, COPD, CHF, MI
- Blister completely resolved in 5 days

**Patient 2 - SOC**

- Age: 65 y/o male
- Hematoma occurred on 6/28/12, opened on 7/8/12
- Dx: Falls, DM, HTN, ESRD with hemodialysis, PVD, right AKA, depression, dementia, poor skin integrity

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**Category III Skin Tear**

**Patient 15 - Bioelectric Device**

- Age: 85 y/o female
- Dx: Alzheimers’ disease, HTN, hypothyroidism, s/p DVT, CAD, edema, depression, CVD, PVD, cerebrovascular insufficiency, hypercalcemia, hypercalcinemia, hyperparathyroidism, DVT

**Patient 3 - SOC**

- Age: 85 y/o female
- Dx: Aortic dissection, HTN, hyperthyroidism, s/p DVT, CAD, edema, depression, CVD, PVD, cerebrovascular insufficiency, hypercalcemia, hypercalcinemia, hyperparathyroidism, DVT

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**RESULTS**

- The wounds in the SOC group healed on average at 38.25 days (SD 28.34), while the bioelectric device group healed significantly faster at 22.98 days (SD 12.64), p<0.001. The rate of volume reduction per day was 3.85% for SOC vs. 5.18% volume reduction per day (p=0.032) for the bioelectric group. The SOC group had 35% of its wounds heal monotonically vs. 83.3% in the bioelectric device group (p=0.018). Wounds heal monotonically vs. 83.3% in the bioelectric device group, when compared to SOC, in a rehabilitation center environment, which translates to improved patient care, and potentially, significant cost savings.

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