NON-DRUG PAIN CONTROL AND ACCELERATON OF GRANULATION AND EPITHELIALIZATION

with

Novel Self-Adaptive Dressing Technology

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OBJECTIVE

To evaluate the effectiveness of a new non-drug, self-adaptive wound dressing technology* with respect to slough removal, pain control, granulation tissue formation, re-epithelialization rates, and simplicity in acute and chronic wounds.

BACKGROUND

- Although unresolved pain is known to negatively affect wound healing and impact quality of life, pain remains a common experience among people with wounds [1].
- Wound pain has numerous, often interconnected, causes that may relate to the wound itself, interventions, and/or local pathology [2].
- Although wound pain is multi-dimensional, it is a common indicator of inflammation and stalled wound healing.
- Dressings that actively reduce inflammation and edema, control bioburden, and involve non-traumatic removal may be instrumental in reducing pain and accelerating wound healing [1].
- Selection of appropriate dressings that minimize wound-related pain should be based on comfort, moisture balance, healing potential and maintenance of healthy periwound edges [3].
- A synthetic polymer self-adaptive dressing is recently available and designed to facilitate proper moisture balance in all wound types through the simultaneous absorption of fluid and release of water vapor [4,5].
- We evaluated the ability of the new self-adaptive advanced wound dressing to affect wound-related pain, comfort, moisture balance, granulation tissue and epithelialization rates, and maintenance of healthy periwound edges of acute and chronic wounds.

METHODS

- With patient consent, consecutive acute and chronic wounds, regardless of etiology or amount of exudate, were prospectively evaluated.
- Wounds were sharp debrided prior to initial dressing application, except in patients who were receiving anti-coagulation therapy, and debrided at dressing changes as necessary.
- Topical gentamicin ointment was applied to the wound prior to the self-adaptive wound dressing in cases of suspected wound colonization.
- The self-adaptive wound dressing (sized 10 x 10 or 15 x 15 cm) was placed over the wound, overlapping 2 to 3 cm onto intact skin. When more than one dressing was required, dressings were placed side by side and taped with adhesive tape. Dressings were secured with a kerlix wrap or adhesive tape.
- Dressings were changed once after 2-3 days, and weekly thereafter for 6 weeks or until the wound was fully epithelialized, whichever occurred first.

REFERENCES

1. Principles of best practice: Minimising pain at wound dressing-related procedures. A World Union of Wound Healing Societies' Initiative consensus document. London: MEP Ltd, 2004.
2. Vuolo JC. Wound-related pain: key sources and triggers. Br J Nurs 2009; 18(15): S20-S25.
3. Mudge, Orsted H. Wound infection and pain management made easy. Wounds International 2010; 1(3):1-6.
4. Fischenich V, Wolcott R. Effectiveness of a self-adaptive advanced wound care dressing in multiple wound types. Poster presented at: The Symposium on Advanced Wound Care; April 19-22, 2012; Atlanta, GA.
5. Fischenich V, Wolcott R. Utilizing the self-regulating moisture control of a self-adaptive dressing to manage a single complex wound. Poster presented at: The Symposium on Advanced Wound Care; April 19-22, 2012; Atlanta, GA.

RESULTS

- The self-adaptive wound dressing was evaluated in eight patients (4 female) with 8 wounds. Average age was 66.8 years old (range: 34 to 92 years).
- Four wounds were acute and 4 were chronic. Chronic wound etiology included venous (n=1), venous/arterial (n=1) and nonhealing ulcer secondary to trauma (n=2). Average duration of chronic wounds prior to subject dressing initiation was 448.1 days (range: 30 to 912.5 days).
- Patients reported average localized pain of 3.0 (range, 0 to 9) on a 0 to 10 scale prior to first dressing application. Following dressing initiation, all patients reported pain of 0 within an average of 6.9 days.
- Average granulation tissue coverage was 40.0% at dressing initiation. In one wound, 100% granulation tissue coverage was not achieved. Mean time to 100% granulation tissue coverage in the remaining 7 wounds was 13.6 days.
- Four of the 8 wounds healed; mean time to full epithelialization was 15.8 days. One wound received a living, bi-layered skin substitute at 6 weeks and was healed one week later. Two wounds were 100% granulated and decreased in dimension by 73% at 6 weeks. The remaining one wound did not progress due to issues of patient non-compliance.
- Slight maceration was observed in one wound, which resolved after one week. In a second wound with heavy wound drainage, the ultra-absorbent version of the self-adaptive dressing was used to alleviate wound edge maceration. Wound edge maceration was not noted in the 6 remaining cases.

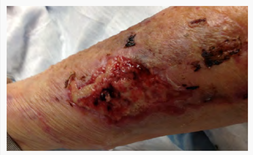
CONCLUSIONS

- All wound pain, both during treatment and dressing changes, was eliminated with the use of the self-adaptive wound dressing, including chronic pain that had been present for months.
- The self-adaptive dressing assisted in autolytic debridement and biofilm removal, as demonstrated in the 100% granulation tissue coverage of 7 of 8 wounds, including wounds initially covered with 80 to 100% slough.
- The self-adaptive dressing protected healthy, non-macerated peri-wound skin and resolved irritated peri-wound areas.
- Particularly in highly exudating wounds, the self-adaptive dressing demonstrated superior absorption properties compared to all previously used dressings.
- Patients were very satisfied with the dressing due to comfort, pain elimination during treatment, and non-traumatic dressing removal.
- Preparation of the wound for bioengineered skin application was anecdotally faster with the use of the self-adaptive dressing, compared to previous dressings.
- Application of the self-adaptive dressing jump-started granulation tissue formation in all previously nonhealing wounds.
- The dressing was compatible with many topical therapies, including antibiotics.
- In the investigator's opinion, the new self-adaptive wound dressing is extremely versatile, and can be used in lieu of a wide array of wound care products to simplify wound care in any healthcare setting.

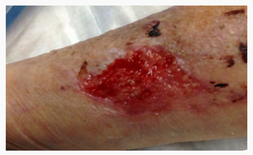
CASE 1

Traumatic, painful extremity wound with slough. Complete closure achieved using only 3 dressings.

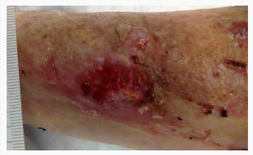
72-year-old female with a trauma wound sustained on her left forearm during a fall two weeks prior. Patient is oxygen dependent with a history of congestive heart failure, coronary artery disease and hypertension.



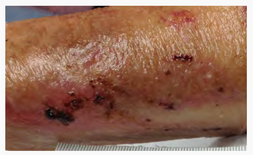
A Day 0
Trauma wound with slough at presentation measured 4.0 x 3.0 x 0.2 cm. Patient-perceived pain was 9/10.



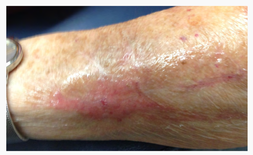
B Day 3
After 3 days with self-adaptive wound dressings, the wound was 100% granulated and drainage was controlled. Pain was reduced to 0/10.



C Day 10
Post initiation of self-adaptive dressings, wound was considerably contracted and measured 3.0 x 0.6 x 0.1 cm.



D Day 17
At the third dressing change, wound was closed and self-adaptive dressings were discontinued.

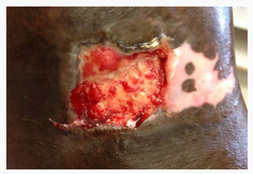


E Day 24
Wound closure at one-week follow-up post discontinuation of self-adaptive dressings.

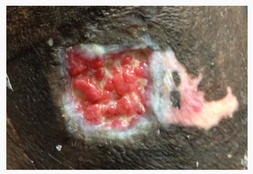
CASE 2

Nonhealing foot ulcer with chronic osteomyelitis secondary to crush injury

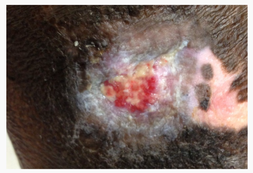
44-year-old male with foot ulcer complicated by chronic osteomyelitis secondary to crush injury sustained four months prior.



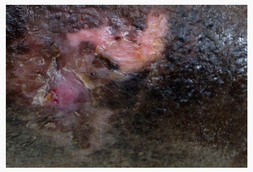
A Day 0
Crush wound with 80% slough after four months of previous treatment measured 2.5 x 2.8 x 0.3 cm with wound edge epibole and slight undermining.



B Day 16
After two weeks of self-adaptive advanced wound dressings, the wound was 90% granulated and measured 2.0 x 2.3 x 0.3 cm with moist, flattened, non-macerated wound edges.



C Day 37
After five weeks of self-adaptive dressings and one week post bi-layered skin substitute, wound is nearly re-epithelialized. No maceration or pain is reported.

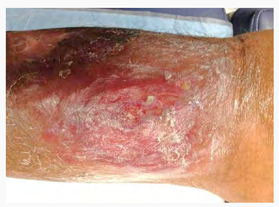


D Day 52
Wound is fully re-epithelialized.

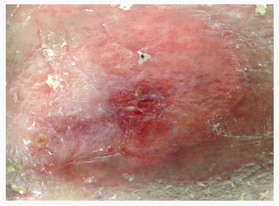
CASE 3

Non-healing extremity wound in anticoagulated patient with multiple concomitant medical comorbidities

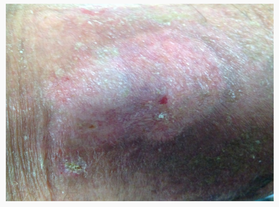
72-year-old female with a wound induced by subcutaneous tissue hematoma sustained on her right lower leg one month prior. Patient is oxygen dependent with history of hypoxemic chronic obstructive pulmonary disease and chronic atrial fibrillation requiring anticoagulation medicine.



A Day 0
Non-healing trauma wound, stalled for 3 weeks, at presentation measured 2.9 x 0.8 x 0.1 cm; patient reported wound pain of 5.



B Day 15
Exudate is contained within the dressing and there is no peri-wound maceration with use of self-adaptive advanced wound dressings. Wound is re-epithelializing and wound pain is 0, requiring no topical pain medication.



C Day 21
At the fourth dressing change, wound was fully re-epithelialized, and self-adaptive dressings were discontinued.