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

BACKGROUND
Although unamended 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 influence the wound microenvironment, interventions, and local pathology [2].

Although wound pain is multidimensional, it is a common indication of infection and stalled wound healing [3].

Dressings that actively reduce inflammation and edema, control bioburden, and allow the non-adaptive wound matrix to remain 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 wound edges [4].

A novel polyurethane 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 vapor [5,6].

We evaluated the ability of this novel 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 where excising and excision therapy, and debried at dressing changes as necessary.

• Topical gentamicin ointment was applied to the wound prior to the self-adaptive wound dressing as a step of expected wound colonization.

• The self-adaptive wound dressing (total 104 x 154 x 15 cm) was placed over the wound, overlapping 2-3 cm onto intact skin. When more than one dressing was required, dressings were placed side by side and fastened with adhesive tape.

• Dressings were secured with a kerlix wrap or adhesive tape.

• Dressings were changed every 2-3 days, and weekly thereafter for six weeks until the wound was fully epithelialized, whichever occurred first.

RESULTS
• The self-adaptive wound dressing was evaluated in nine patients (5 female) with nine wounds. Average age was 68 years old (range: 34 to 95 years).

• Five wounds were acute and four were chronic. Chronic wound etiology included venous (n=1), venous/arterial (n=1) and nonhealing after trauma to healing tissues (n=3). Average duration of chronic wounds prior to subject dressing initiation was 48.1 days (range: 10 to 92 days).

• Patients reported average localized pain of 4 (range: 0 to 10) prior to first dressing application. Following dressing initiation, all patients reported pain of 0 within an average of 7.8 days.

• Average granulation tissue coverage was 75.7% at dressing initiation. In one wound, 100% granulation tissue coverage was not achieved. Mean time to 100% granulation tissue coverage in the remaining eight wounds was 20.8 days.

• Four of nine wounds healed within 6-week study period, mean time to full epithelialization was 25.8 days. One wound healed with a layered skin substitute in six weeks and was healed one week prior. Two wounds were 100% granulated and decreased in dimension by 75% in six weeks. One chemical burn wound achieved full closure at 10 weeks. The remaining 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 seven remaining cases.

CONCLUSIONS
• Wound-related pain, both during treatment and dressing changes, was diminished with the use of the self-adaptive wound dressing, including chronic pain that had been present for months.

• The self-adaptive dressing utilized in arterial/venous ulceration and burn wounds, as demonstrated in the 100% granulation tissue coverage of eight of nine wounds, including wounds initially covered with 80% to 100% slough.

• The self-adaptive dressing protected healthy, non-macerated post-wound skin and resolved initiated post-wound areas.

• Particularly in highly exudating wounds, the self-adaptive dressing demonstrated superior absorption properties compared to all previously used dressings.

CASE 1
Traumatic, painful extremity wound with slough. Complete closure achieved using only 3 dressings.

Case summary:
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 hypoxemic chronic obstructive pulmonary disease, peripheral arterial disease, neumopathy, diabetes mellitus, hypothyroidism, and anemia.

A Day 0
Trauma wound with slough at presentation was measured 4 x 5 x 0.2 cm. Patient reported wound pain 5/10.

B Day 0
Self adaptive advanced wound dressing was placed over the wound, overlapping 2-3 cm onto intact skin, then wound with gauze wrap.

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

D Day 10
For initiation of self-adaptive dressings, wound was considerably contracted and measured 3.0 x 0.4 x 0.11 cm.

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

F Day 30
Wound is 60% granulated and measures 2.9 x 0.45 x 0.2 cm. Wound-related pain is 0.

G Day 75
Wound fully re-epithelialized with no surgical intervention.

Case result:
Case 1 demonstrated superior absorption properties compared to all previously used dressings. Particularly in highly exudating wounds, the self-adaptive dressing demonstrated superior absorption properties compared to all previously used dressings.

Case 2
Chemical burn caused by propofol extravasation in dorsum of hand.

Case summary:
78-year-old female with a chemical burn following IV catheter insertion of anesthetic during surgery. Patient is in the history of end-stage renal disease, peripheral arterial disease, neuropathy, diabetes mellitus, hypothyroidism, and anemia.

A Presentation
Patient full-thickness chemical burn sustained after injury during significant tissue necrosis with 100% yellow slough cover and severely pronounced edema and erythema.

B Day 0
Following 5 days of treatment with collagenase and moist gauze, edema is still decreased in dimension by 75% at six weeks. One chemical burn wound achieved full closure at 10 weeks. The remaining wound did not progress due to issues of patient non-compliance.

C Day 15
Edema is contained within the dressing and there is no post-wound maceration with slough of self-adaptive wound dressing. Wound is non-inflamed and slough is 0. Requiring no topical pain medication.

D Day 30
Wound is 60% granulated and measured 2.9 x 0.45 x 0.2 cm. Wound-related pain is 0.

E Day 75
Wound fully re-epithelialized with no surgical intervention.

Case result:
Case 2 demonstrated superior absorption properties compared to all previously used dressings. Particularly in highly exudating wounds, the self-adaptive dressing demonstrated superior absorption properties compared to all previously used dressings.

CASE 3
Non-healing extremity wound in anticoagulated patient with multiple concomitant medical comorbidities.

Case summary:
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 a history of hypertonic chronic obstructive pulmonary disease and chronic arterial ischemia requiring anticoagulation medicine.

A Day 0
Non-healing trauma wound, staged for 3 weeks, at presentation measured 2.9 x 0.5 x 0.15 cm. Patient reported wound pain of 5/10.

B Day 15
Edema is contained within the dressing and there is no post-wound maceration with slough of self-adaptive wound dressing. Wound is non-inflamed and slough is 0. Requiring no topical pain medication.

C Day 21
At the fourth dressing change, wound was fully re-epithelialized, full of alladaptive dressings were discontinued.