

Clinical Evaluation of an All-in-One Negative Pressure Wound Therapy Dressing for Lower Extremity Wound Management

Ralph J. Napolitano, Jr., DPM, CWSP, FACFAS

Director, Wound Care and Healing, OrthoNeuro, Columbus, OH; Adjunct Clinical Assistant Professor, Heritage College of Osteopathic Medicine, Ohio University, Athens, OH

Introduction

- Negative pressure wound therapy (NPWT) is an effective tool for managing difficult-to-heal lower extremity wounds.¹
- A multilayer, all-in-one NPWT dressing*, which incorporates a non-adherent interface, open-cell foam, and an acrylic-silicone drape, was designed to reduce tissue ingrowth, support extended wear, and facilitate ease of use.

Purpose

- This study evaluates the use of this all-in-one NPWT dressing in 12 patients with lower extremity wounds.

Methods

- Patients provided informed consent prior to collection of de-identified data.
- Surgical debridement was performed as needed. Wounds were managed using NPWT with the all-in-one dressings at -125 mmHg, and dressing changes occurred every 5-7 days.
- Antibiotics were given when necessary.

Results

- The patients included 9 males and 3 females, aged 28-94 years. The most common comorbidities are shown in **Table 1**.
- Wound etiologies are shown in **Table 2**.
- Median therapy duration was 14 days (range: 7-30 days).
- Wounds exhibited granulation tissue formation, reduced surface area, and decreased periwound edema.
- Representative cases are shown in **Figures 1-3**.

Representative Cases



Figure 1. A 57-year-old female with longstanding diabetes developed a limb-threatening infection involving the right foot in the setting of a chronic ulceration and Charcot foot deformity, requiring 5th ray resection. After surgery, primary closure was not possible due to significant tissue loss and infection. NPWT was initiated using conventional dressings. After 3 weeks (A), therapy was transitioned to NPWT with the all-in-one dressings (B). Dressings were changed every 5 days. Notable improvement was visible by the second dressing change (C). After 3 weeks of therapy (D), the wound was closed and NPWT was discontinued. Upon follow-up 6 weeks later, the wound remained closed (E).

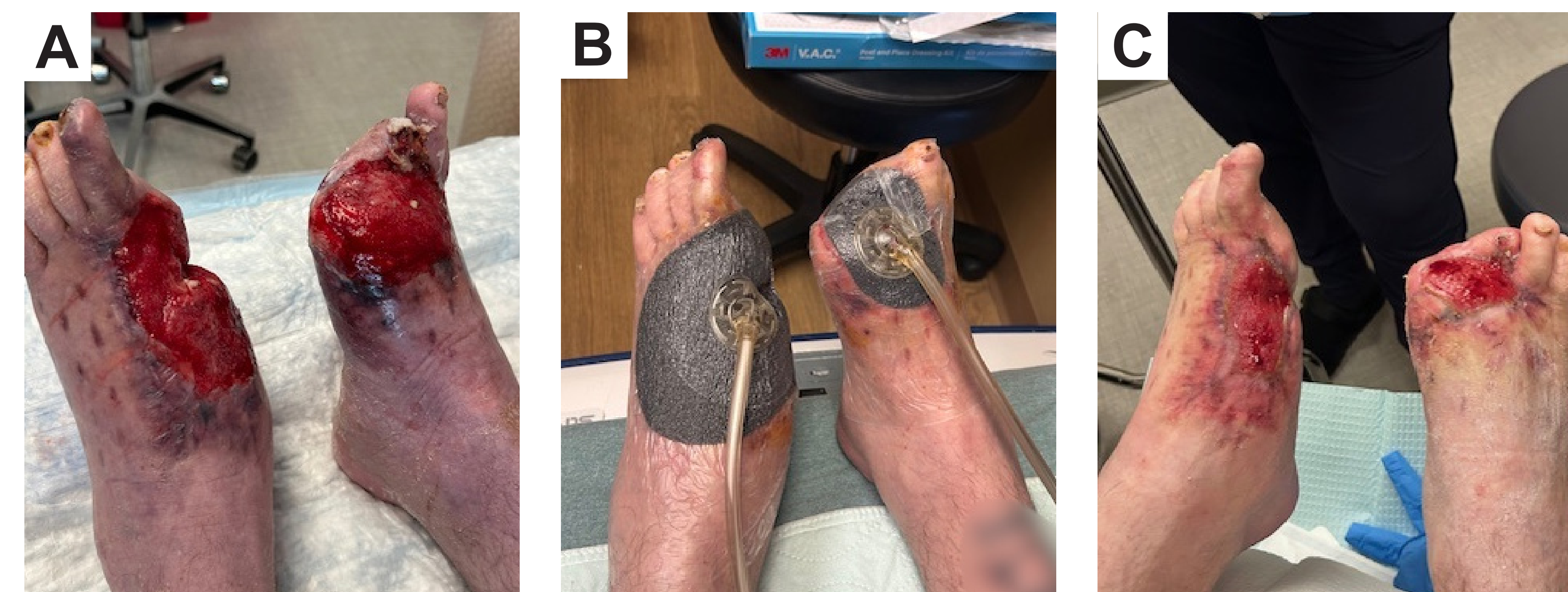


Figure 2. A 38-year-old male presented with a bilateral crush injury, including a severe, comminuted toe and metatarsal fractures, vascular compromise, and extensive traumatic soft tissue necrosis. Trauma service initially stabilized the injuries with percutaneous fixation and performing a fasciotomy of both feet to prevent compartment syndrome. The patient underwent bilateral partial forefoot amputations, coupled with NPWT with instillation and dwell[®] of normal saline for 10 days. Therapy transitioned to NPWT with conventional dressings. After 3 weeks (A), NPWT with medium all-in-one dressings was initiated (B). NPWT continued until the goals of therapy had been met, for 2 weeks on the right foot and 3 weeks on the left foot (C).

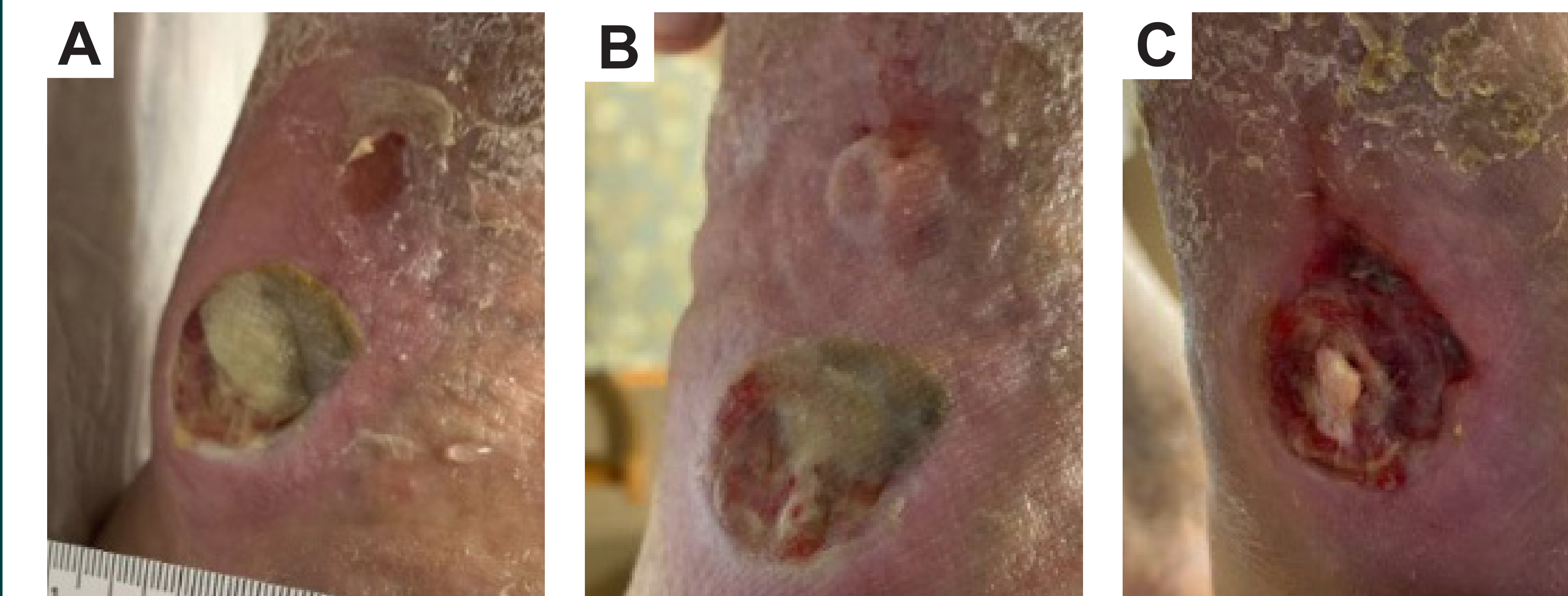


Figure 3. A 94-year-old male with limited mobility and a history of severe aortic stenosis, bradycardia, venous insufficiency and stasis, chronic kidney disease, and venous thromboembolism presented with a deteriorating venous stasis ulcer on the right ankle. An initial debridement was performed (A). NPWT with all-in-one dressings was initiated, with the first dressing change on Day 3 (B). On Day 17 (C), NPWT was discontinued and silver impregnated hydrofiber dressing with multilayer compression were applied for 14 days.

Results (cont'd)

Table 1. Patient comorbidities

	N=12
Hypertension	5 (41.7%)
Hyperlipidemia	5 (41.7%)
Type 2 diabetes mellitus	6 (50.0%)
Chronic kidney disease	4 (33.3%)
Obesity	4 (33.3%)

Table 2. Wound etiologies

	N=12
Secondary closure	4 (33.3%)
Diabetic foot ulcer	3 (25.0%)
Venous stasis ulcer	2 (27.3%)
Neuropathic ulcer	1 (8.3%)
Acute injury	2 (16.7%)

- Two patients exhibited hyperhydration at the wound edge, which saw complete resolution after increasing negative pressure.
- Minor, transient deformation beneath the vacuum port was occasionally observed but resolved spontaneously with no clinical consequence.
- No patients required surgical re-intervention.

Discussion

- This all-in-one NPWT dressing supports efficient management of wound exudate and promotes healing while easing application.
- In our experience, the dressing allowed for quick placement with little need for adjustment, enhanced comfort, and helped provide accessible wound care.

References

- Capobianco CM, Zgonis T. An overview of negative pressure wound therapy for the lower extremity. *Clin Podiatr Med Surg.* 2009;26(4):619-631.