

# Negative Pressure Wound Therapy With Instillation and Dwell Time Use in Non-Healing, Lower Extremity Wounds

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## Background

- The presence of non-healing lower extremity wounds carries a risk for amputation.
- However, advanced wound therapies can offer options for managing these complex wounds, and potentially help avoid limb amputation.
- The addition of negative pressure wound therapy with instillation and dwell time (NPWTi-d\*) using reticulated open cell foam dressings with through holes (ROCF-CC<sup>†</sup>) to wound care plans may help remove barriers to healing by helping to remove thick exudate and infectious materials and promoting development of granulation tissue.

## Purpose

- The use of NPWTi-d with ROCF-CC dressings was assessed in 6 patients with non-healing, lower extremity wounds.

## Methods

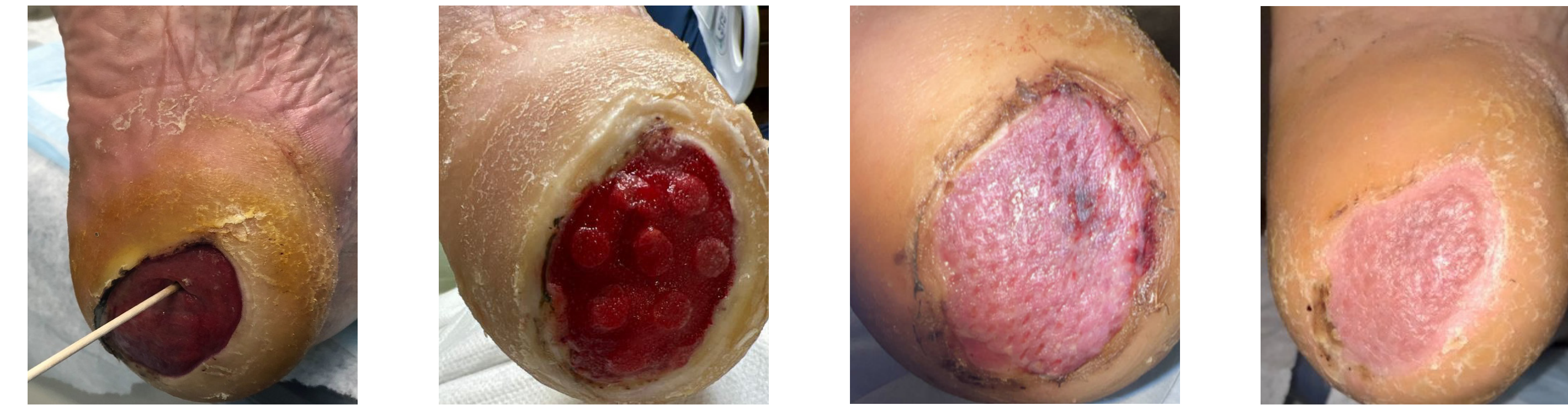
- Patients presented for care after previous treatment plans with other health care providers failed to promote wound healing.
- Wounds were assessed for osteomyelitis and malignancy.
- Antibiotics were initiated for all patients.
- Surgical debridement was performed followed by application of NPWTi-d with ROCF-CC dressings.
- Normal saline was instilled with a 1-minute dwell time, followed by continuous negative pressure at -125 mmHg for 2.5 hours.
- Dressings were changed every 2-3 days.
- Once the wound bed was covered with healthy granulation tissue, NPWTi-d was discontinued.
- Patients then received either split-thickness skin grafts (STSGs) or continued wound care using advanced wound dressings alone or with hyperbaric oxygen therapy (HBOT).

## Results

- Six patients (average age 70.2 years) presented for care.
- Wound types included ulcer (n=2), Wagner Grade 3 diabetic foot ulcer (DFU, n=2), Stage 4 pressure injury (n=1), and open surgical wound (n=1) (Table 1).

## Representative Cases

- Neuropathic ulcer present for >8 years. After 14 days, healthy granulation tissue covered the wound bed and an STSG procedure was performed. The wound was fully closed 51 days after presentation.



**Figure 1A.** Wound at presentation  
**Figure 1B.** Wound after 10 days of NPWTi-d  
**Figure 1C.** Wound 8 days after STSG  
**Figure 1D.** Wound remains closed 38 days after STSG

- Stage 4 pressure injury present for 7 days. After 26 days of NPWTi-d, healthy granulation tissue covered the wound bed. NPWTi-d was discontinued and an STSG procedure was planned. After discharge from the hospital, the patient was temporarily lost to follow up and the window of opportunity to perform an STSG was lost.



**Figure 2A.** Wound 99% closed before loss of wound care  
**Figure 2B.** Severe wound deterioration after 7 days  
**Figure 2C.** Wound after 80 days of sharp debridement, wound dressings, and offloading



**Figure 2D.** Wound after 12 days of NPWTi-d  
**Figure 2E.** Wound after 26 days of NPWTi-d

- Wagner Stage 3 DFU present for >1 year. After 48 days, NPWTi-d was discontinued, and HBOT, antimicrobial wound matrix, and placental allograft applications initiated. The wound was fully healed 140 days after presentation.



**Figure 2A.** Wound at presentation  
**Figure 2B.** Wound after surgical debridement and excision  
**Figure 2C.** Wound after 26 days of NPWTi-d  
**Figure 2D.** Wound fully closed 140 days after presentation

- Open surgical wound after amputation of 2nd, 3rd, and 4th metatarsals. After 35 days, NPWTi-d was discontinued and oxidized regenerated cellulose (ORC)/collagen/silver-ORC dressing<sup>‡</sup> use initiated. The wound was 90% closed 3.5 months after presentation.



**Figure 4A.** Wound post metatarsal amputation  
**Figure 4B.** Application of NPWTi-d



**Figure 4C.** Wound after 35 days of NPWTi-d  
**Figure 4D.** Wound 90% closed 3.5 months after presentation

## Results (Cont'd)

- Wounds had been present for 7 days to 8 years.
- NPWTi-d with ROCF-CC dressing use resulted in removal of debris and infectious material from the wound bed.
- Wound closure was achieved with a STSG in 4 patients.
- One patient received further care with HBOT, native Type 1 collagen matrix with polyhexamethylene biguanide dressings, and placental wound allograft coverings.
- The remaining patient received wound care with advanced wound dressings until wound closure.
- Five wounds were fully closed 51-140 days after presentation (Figures 1-4).
- The remaining patient was lost to follow up prior to wound closure.

Table 1. Patient and wound demographics

Demographic	n=6
Age (years, ± SD)	70.2 ± 8.6
Sex	
Male	3 (50%)
Female	3 (50%)
Wound Type (n, %)	
Ulcer	2 (33.3%)
Wagner Grade 3 DFU	2 (33.3%)
Stage 4 Pressure Injury	1 (16.7%)
Open Surgical wound	1 (16.7%)
Comorbidity	
Hypertension	6 (100%)
Diabetes	4 (66.7%)
Neuropathy	4 (66.7%)
Obesity	4 (66.7%)
Cancer	2 (33.3%)
Cerebral Vascular Accident	2 (33.3%)
Congestive Heart Failure	2 (33.3%)
Chronic Kidney Disease	2 (33.3%)
Hyperlipidemia	2 (33.3%)
Alcoholism	1 (16.7%)
Autoimmune Disease	1 (16.7%)
Chemotherapy	1 (16.7%)
Coronary Heart Disease	1 (16.7%)

DFU= Diabetic Foot Ulcer; SD= Standard Deviation

## Conclusions

- NPWTi-d with ROCF-CC dressing use helped remove debris and infectious materials and promoted granulation tissue development in these 6 patients.
- The comprehensive wound care plan used to manage these complex wounds, which included NPWTi-d with ROCF-CC dressings, HBOT, and advanced wound dressings, helped with limb preservation.

\*3M™ Veraflo™ Therapy; †3M™ V.A.C. Veraflo Cleanse Choice™ Dressing; ‡3M™ Promogran Prisma™ Collagen Matrix with ORC and Silver (3M Health Care, St. Paul, MN)

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