

Negative Pressure Wound Therapy with Instillation and Dwelling Reduces Reliance on Surgical Debridements in Lower Extremity Wounds

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Introduction

- Negative pressure wound therapy with instillation and dwell time (NPWTi-d)* combines the beneficial effects of negative pressure with the automated flow of topical solutions, solubilization of debris covering the wound bed, and removal of excess fluid.
- When used with reticulated open cell foam dressings with through-holes (ROCF-CC[†]), NPWTi-d hydromechanically disrupts necrotic tissues, reducing the necessary number of surgical debridements to support healing.

Purpose

- We present our experience using NPWTi-d to manage lower extremity wounds in six patients.

Methods

- Deidentified data was collected after obtaining informed patient consent and stored in accordance with federal regulations.
- Patients underwent surgical debridement or amputation intervention if indicated for lower extremity pathologies, followed by placement of ROCF-CC dressings.
- NPWTi-d was initiated with normal saline and a dwell time of 20 minutes, followed by 3.5 hours of negative pressure.
- NPWTi-d dressings were changed every 2-3 days.
- After NPWTi-d was discontinued, patients were transitioned to traditional NPWT[§] and, if clinically appropriate, advanced dressing regimens.

Results

- Patient demographics and wound etiologies are shown in **Table 1**.
- All wounds (**Figures 1-2**) were covered with non-viable tissue or fibrinogen, requiring cleansing.
- NPWTi-d was applied for 6-7 days. After NPWTi-d, the wounds showed growth of healthy granulation tissue and reduced wound size, allowing for discharge to outpatient care.

Figures

Figure 1. A 58-year-old female with peripheral artery disease and coronary artery disease presented with dry gangrene of the left great toe. She underwent left foot 1st ray resection with extensive forefoot debridement, but complete closure was not immediately possible due to soft tissue loss.



Fig 1A. Initial presentation of gangrenous left great toe.



Fig 1B. After debridement, placement of NPWTi-d dressing with through-holes.



Fig 1C. Placement of the hybrid drape and application of NPWTi-d.



Fig 1D. Wound appearance after 6 days of NPWTi-d with normal saline.

Figure 2. A 58-year-old female with a history of smoking presented with bilateral lower leg contusion injuries with deep tissue involvement. She underwent debridement of both legs, with NPWTi-d applied only to the left leg wound.



Fig 2A. Initial presentation of contusion injury on left leg.



Fig 2B. After debridement, placement of NPWTi-d dressing with through-holes.



Fig 2C. Wound showing healthy granulation after 3 days of NPWTi-d with normal saline.



Fig 2D. Appearance after transition to 2.5 weeks of conventional NPWT.

Results (Cont'd)

- After application of NPWTi-d with ROCF-CC dressings, the wounds appeared cleansed with reduced or softened debris.
- All patients in this case series demonstrated positive wound healing outcomes with no significant complications.

Table 1. Patient demographics, wound type, and bridge to closure after NPWTi-d.

Case	Age	Sex	Wound Type	Bridge to Closure
1	60	F	Wet gangrene	Debridement, NPWT
2	58	F	Dry gangrene	NPWT
3	58	F	Traumatic injury	NPWT, advanced wound dressings
4	46	M	Amputation	NPWT
5	42	M	Traumatic injury	NPWT
6	83	M	Traumatic injury	NPWT, epidermal micrografts

NPWT = negative pressure wound therapy

Conclusions

- In these patients, NPWTi-d with ROCF-CC improved the wound bed by dislodging nonviable tissues.
- Thus, fewer debridements were needed to transition the patients to wound closure.