

Use of Negative Pressure Wound Therapy With Instillation to Cleanse Lower Extremity Wounds

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

OrthoNeuro, Columbus, OH; Heritage College of Osteopathic Medicine, Ohio University, Dublin, OH

Introduction

- Use of negative pressure wound therapy (NPWT) with instillation and dwell time (NPWTi-d*) to deliver, dwell, and remove topical wound solutions from the wound bed can assist clinicians in preparing a clean surface for successful closure.¹⁻³

Purpose

- We present our experience using NPWTi-d to manage lower extremity wounds in 5 patients.

Methods

- Prior to NPWTi-d, patients underwent surgical debridement and received antibiotics as necessary.
- NPWTi-d was applied in the operating room. Normal saline or 0.125% sodium hypochlorite solution was instilled with a 5 to 10-minute dwell time, followed by 3-3.5 hours of -125 mmHg.
- No fluid was ever instilled into an open cavity or joint space.
- Therapy continued for 6-7 days with dressing changes every 2-3 days.

Results

- Patient demographics and wound etiologies are shown in **Table 1**.
- All wounds (**Cases 1-5**) 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.
- All wounds were closed within 2-5 weeks (**Table 1**).
- Four patients transitioned to standard NPWT[§] for 2-3 weeks. One patient was managed with alginate dressing with silver[†] until closure 3 weeks later.

Figures

Case 1. A 24-year-old male with chemical burn of the right foot.



A. Presentation of potassium hydroxide burn after initial incision and drainage.



B. Wound after 7 days of NPWTi-d and 3 weeks of NPWT, followed by epidermal micrografting.

Case 2. A 57-year-old female with a vascular ulcer of the right ankle.



A. Presentation of vascular ulcer covered with yellow non-viable tissue.



B. Wound appearance after 6 days of NPWTi-d with 0.125% sodium hypochlorite.

Case 3. A 51-year-old male with a deep tissue injury of the right calf.



A. Initial presentation of deep tissue laceration of profoundly lymphedemic leg.



B. Partial closure granulating wound after 6 days of NPWTi-d.

Case 4. A 61-year-old female with incised abscess below left knee.



A. Wound with non-viable tissue after management with non-adherent alginate dressings.



B. Granulating wound after 6 days of NPWTi-d.

Case 5. A 83-year-old male with a gelatinous hematoma after contusion to lower leg, probable compartment syndrome.



A. Initial presentation of gelatinous hematoma with soft tissue necrosis.



B. Surgical debridement and application of NPWTi-d.



C. Wound with macrocolumns after 3 days of NPWTi-d.



D. Fully closed wound at the 5-month follow-up.

Results (Cont'd)

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

Case	Age	Sex	Wound Type	Bridge to Closure
1	24	M	Chemical burn	NPWT, epidermal micrografts
2	57	F	Vascular ulcer	Alginate silver dressings
3	51	M	Deep tissue injury	NPWT
4	61	F	Incised abscess	NPWT
5	83	M	Contusion with hematoma	NPWT, epidermal micrografts

NPWT = negative pressure wound therapy

Conclusions

- In these patients, use of NPWTi-d assisted in cleansing the wound surface and supported a healthy, granulating wound.
- The improved wound status enabled a quick transition to outpatient care and a positive healing outcome in all 5 cases.

Acknowledgements

- For case 4, orthopedic surgery was performed by Mark Gittins, DO, and Sarah Laub, PA, OrthoNeuro, Columbus, Ohio.

References: 1. Kim PJ, Silverman R, Attinger CE, Griffin L. Comparison of Negative Pressure Wound Therapy With and Without Instillation of Saline in the Management of Infected Wounds. *Cureus*. 2020;12(7):e9047. 2. Willmore J, Wroslavsky P. Preoperative contaminated wound management using short-term negative pressure wound therapy with instillation. *Journal of Wound Care*. 2021;30(12):994-1000. 3. Kim PJ, Attinger CE, Constantine T, et al. Negative pressure wound therapy with instillation: International consensus guidelines update. *International Wound Journal*. 2020;17(1):174-186.