

Mechanically-Powered Disposable Negative Pressure Wound Therapy Use in Diabetic Foot Wounds

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Background

- Negative pressure wound therapy (NPWT) is routinely used as an adjunctive tool in complicated diabetic foot ulcer (DFU) management.¹
- Size, bulk, noise, and need for an electrical power source are all drawbacks of traditional NPWT devices.²
- Patients with smaller-sized diabetic foot wounds may benefit from ultraportable, mechanically-powered disposable negative pressure wound therapy (dNPWT*) that may allow a quick return to activities of daily living while receiving the effects of NPWT.^{1,2}

Methods

- A retrospective data analysis was performed to determine outcomes of 4 diabetic patients with complicated foot wounds that were adjunctively managed with dNPWT following surgical intervention.
- All wounds were debrided prior to dNPWT, and systemic antibiotics were administered as needed.
- Disposable NPWT was applied with a foam dressing to each wound at -125 mmHg and changed 3 times weekly.

Results

- Age of patients ranged from 46 to 71 years old.
- Duration of dNPWT use was 16-24 days, during which time drainage was controlled and robust granulation tissue formed in all wounds.
- Therapy was stepped down to oxidized regenerated cellulose (ORC)/collagen/silver-ORC dressings** as appropriate.
- Therapy goals, including wound bed preparation and removal of infectious materials, were achieved in all wounds.
- All wounds healed secondarily and there were no complications.

Conclusions

- Use of mechanically powered dNPWT should be considered in smaller-sized DFUs to expedite wound bed preparation for secondary closure following surgical intervention.

References

- Armstrong DG, Marston WA, Reyzelman AM, Kirsner RS. Comparative effectiveness of mechanically and electrically powered negative pressure wound therapy devices: a multicenter randomized controlled trial. Wound Repair Regen. 2012 May-Jun;20(3):332-41.
- Lerman B, Oldenbrook L, Ryu J, et al. The SNaP Wound Care System: a case series using a novel ultraportable negative pressure wound therapy device for the treatment of diabetic lower extremity wounds. J Diabetes Sci Technol. 2010 Jul 1;4(4):825-30.

Case 1. A 46-year-old female with a right plantar DFU underwent a 2nd and 3rd metatarsal head resection. Post-operatively, she developed a hematoma and wound dehiscence requiring I & D of the hematoma and wound debridement. Disposable NPWT was initiated. After 24 days of dNPWT, goals of therapy were met, and the wound care regimen was switched to ORC/collagen/silver-ORC dressings with full secondary closure 8 weeks later. There were no complications.



1A. At presentation, the dehiscenced wound measured 2.2 x 0.5 x 0.3 cm.



1B. After 13 days of dNPWT, wound edges are healthy.



1C. After 24 days of dNPWT, wound bed was granulated to surface, and regimen changed to ORC/collagen/silver-ORC dressings.



1D. At 11 weeks, the wound was healed secondarily.

Case 2. A 71-year-old diabetic male with chronic osteomyelitis of the first metatarsal and sesamoids underwent a first ray amputation. His wound was left open. Two weeks later, dNPWT was initiated. After 16 days of dNPWT, the wound was filled with robust granulation tissue and the wound care regimen was changed to ORC/ collagen/silver-ORC dressings with full closure 4 weeks later. There were no complications. Wound was almost completely closed at 1-week follow-up.



2A. Amputation wound at presentation measured 7.0 x 3.1 x 0.5 cm



2B. dNPWT applied to wound.

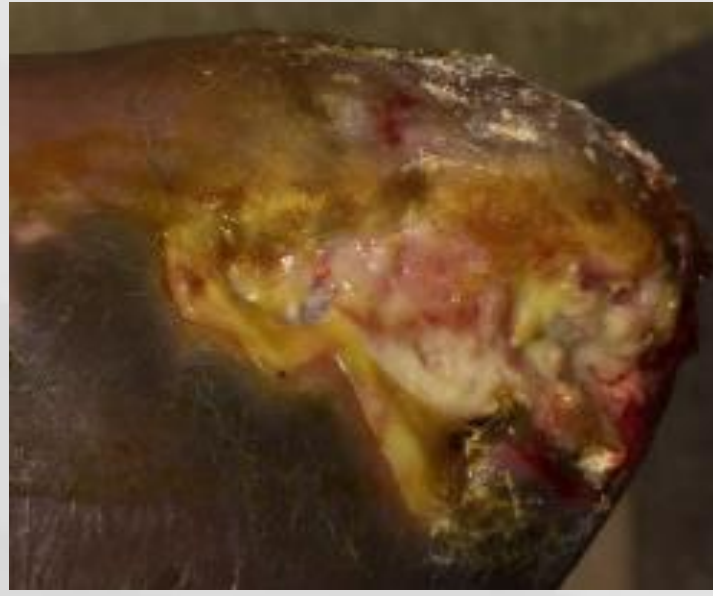


2C. After 16 days of dNPWT, wound measured 5.5 x 1.0 x 0.3 cm; dNPWT discontinued.



2D. Wound healed at 6 ½ weeks.

Case 3. A 60-year-old diabetic male developed a wound dehiscence following trans-metatarsal amputation of his right forefoot and primary closure 3 weeks prior. Appropriate IV antibiotics were administered. Sutures were removed and the wound was sharply debrided and painted with betadine daily for 2 weeks. Wound care was changed to ORC/collagen/silver-ORC dressings for 2 weeks, followed by dNPWT. After 3 weeks of dNPWT, the wound was considerably smaller. Wound care was changed to ORC/collagen/silver-ORC dressings and wound healed secondarily 3 weeks later.



3A. Dehiscenced amputation stump wound (2.8 cm x 4.5 cm x 1.0 cm) at presentation.



3B. Granulation tissue coverage after 9 days of dNPWT, initiated 1 month after dehiscence.



3C. After 21 days of dNPWT, wound measured 1.7 x 3.0 x 0.2 cm and dNPWT was discontinued.



3D. Healed amputation stump 3 weeks post discontinuation of dNPWT.

Case 4. A 42-year-old diabetic female presented with wound dehiscence after 3rd metatarsal head resection and a foreign body reaction to a hemostatic agent used intra-operatively. Patient returned to OR for washout and debridement, and dNPWT was initiated immediately post surgery. Disposable NPWT was discontinued after 17 days. Therapy goals were met with no complications. Wound was almost completely closed at 1-week follow-up.



4A. Dehiscenced wound (4.4 cm x 1.5 cm x 0.5 cm) at presentation.



4B. Granulation tissue coverage after 10 days of dNPWT.



4C. After 17 days of dNPWT, wound measured 3.0 x 0.4 x 0.3 cm and dNPWT was discontinued.