

Adjunctive Role of Negative Pressure Wound Therapy With All-in-One Dressings in Managing Complex Wounds

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Background

- Beneficial application of negative pressure wound therapy (NPWT) using reticulated open-cell foam (ROCF)-interface dressings has been extensively documented across a wide variety of wound types.¹
- Limitations of the ROCF-interface dressing include potential pain during therapy and dressing removal, required dressing change every 48-72 hours, and a time-consuming multi-step application process of measuring and cutting foam and adhesive components.^{2,3}
- We report our experience with an all-in-one dressing⁴ composed of encapsulated ROCF, a perforated nonadherent layer, and hybrid acrylic-silicone drape designed to reduce tissue ingrowth and extend wear time.

Methods

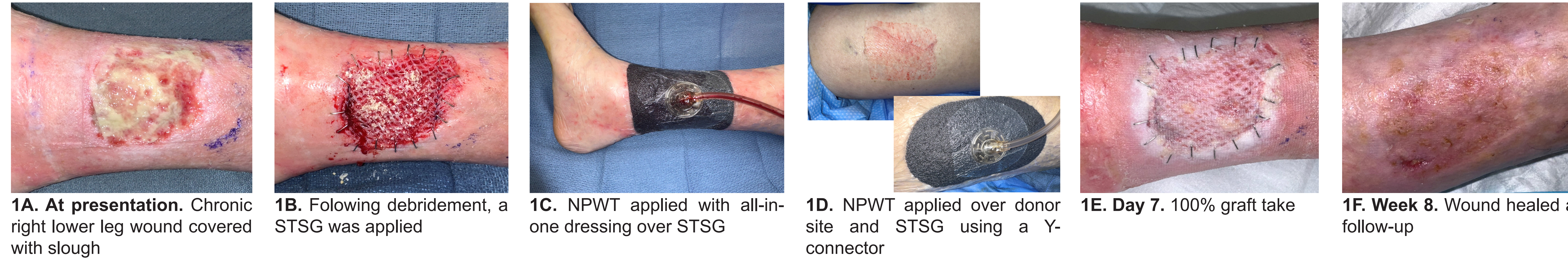
- Wounds were selected for management with NPWT and all-in-one dressings based on wound size and characteristics.
- Antibiotics were administered if appropriate.
- Following adequate debridement, an all-in-one wound dressing with drape* was applied over the wound, with the foam and drape portion extending ≥5 cm beyond the wound edge.
- Dressings were connected via tubing to an NPWT unit[†], and negative pressure was applied at -125 mmHg.
- All-in-one dressings were changed at least once per 7 days.

Results

- Nineteen patients received treatment for 26 wounds.
- Patient demographics and wound types are listed in **Table 1**.
- Average duration of NPWT using all-in-one dressings ranged from 0.5 to 48.0 weeks with a median time of 4.0 weeks.
- Minimal to no pain was noted during therapy as well as dressing application and removal.
- Both patients and clinicians expressed satisfaction with NPWT using all-in-one dressings, citing benefits such as fewer and simpler dressing changes, alleviated pain during therapy and dressing removal, and smoother transitions for patients.
- Representative cases are presented (**Figures 1-3**).

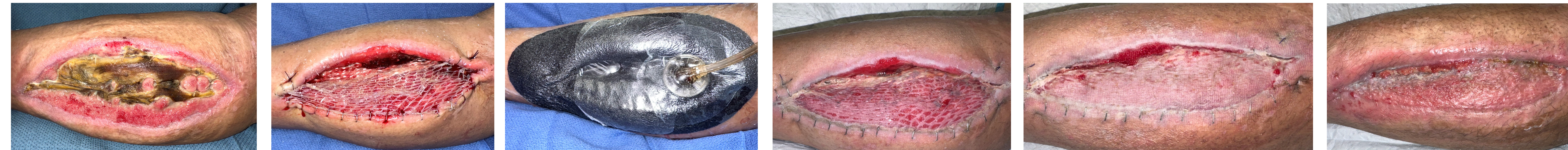
Cases

Figure 1. Chronic lower extremity wound. A 65-year-old immunocompromised female developed a chronic wound on her right lower leg, secondary to earlier sustained trauma. Patient had history of Type 2 diabetes mellitus, hypertension and chronic renal insufficiency, and was receiving chemotherapy. She demonstrated an inability to heal despite multiple treatments with skin substitute products. Patient underwent debridement and STSG placement to expedite healing. NPWT was initiated with all-in-one dressing immediately postoperatively over STSG and donor site.



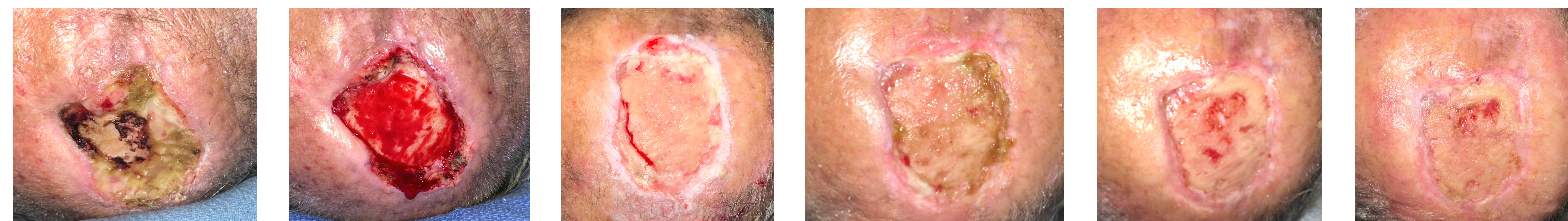
1A. At presentation. Chronic right lower leg wound covered with slough
1B. Following debridement, a STSG was applied
1C. NPWT applied with all-in-one dressing over STSG
1D. NPWT applied over donor site and STSG using a Y-connector
1E. Day 7. 100% graft take
1F. Week 8. Wound healed at follow-up

Figure 2. Fasciotomy wound with muscle necrosis. A 69-year-old male was admitted with a worsening left lower extremity wound with muscle necrosis, secondary to emergent revascularization for popliteal aneurysm complicated by compartment syndrome and a fasciotomy. Patient had history of chronic hypertension, sleep apnea and previous deep vein thrombosis. Initial treatment included serial operative debridements, reconstruction with flap coverage over bone, and application of a synthetic matrix to serve as scaffolding. After a period of NPWT with instillation of a topical wound solution (NPWTi-d), an STSG was applied and NPWT was initiated with an all-in-one dressing over the graft.



2A. At presentation. Fasciotomy wound with muscle necrosis
2B. STSG applied after serial debridements, flap coverage and NPWTi-d treatment
2C. NPWT applied with all-in-one dressing to assist graft take and wound bed preparation
2D. Week 1. 100% graft take achieved
2E. Week 3. One week after discontinuation of NPWT, wound is healing with flattened wound edges
2F. Week 4. Marked wound size decrease at follow-up

Figure 3. Scalp wound. A 79-year-old male was admitted with an acutely infected scalp wound post squamous cell carcinoma treatment with radiotherapy two months prior. Patient had a medical history of immunosuppression, diabetes mellitus, and hypertension. IV antibiotics were administered and bedside debridements performed. Patient was admitted to the operating room for debridement and reconstruction with partial osteotomy of bone and a synthetic allograft to serve as scaffolding. NPWT was initiated immediately with all-in-one dressing to assist with wound bed preparation.



3A. Infected scalp wound at presentation
3B. After debridement, NPWT initiated with all-in-one dressings
3C. Week 4. Wound healing progression after 4 weeks of NPWT
3D. Week 6. Wound size reduced with epithelialization at margins
3E. Week 12. Wound with increased epithelialization and vascularity
3F. Week 20. Treatment is ongoing; wound is healing secondarily

Table 1. Patient Demographics and Wound Types

Characteristic	
Patients	19
Wounds	26
Sex	
Male, n (%)	11 (57.9)
Female, n (%)	8 (42.1)
Age (years)	
Mean	61.7 (SD 13.4)
Range	34-86
Wound type, n (%)	
Pressure injury	6 (23.1)
Venous leg ulcer	4 (15.4)
Trauma	2 (7.7)
Surgical	4 (15.4)
Lower extremity (uncertain)	4 (15.4)
Other chronic	2 (7.7)
Split-thickness skin graft	4 (15.4)

Conclusions

- Increased granulation tissue formation and enhanced wound bed health were observed during use of NPWT with all-in-one dressings in this patient series.
- Clinical benefits of NPWT with all-in-one dressings were most apparent during the latter stages of wound healing.
- This dressing was especially well-suited for patients who may have difficulties tolerating NPWT with traditional ROCF-interface dressings due to requirements of more frequent, potentially lengthy dressing changes, as well as pain.

References

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