

Initial experience of a novel traditional Negative Pressure Wound Therapy dressing incorporating a distribution layer (tNPWT+DL⁺) in patients with surgical and traumatic wounds.

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Introduction

- Traditional and single-use Negative Pressure Wound Therapy (tNPWT, sNPWT) are effective and widely used interventions used to manage a range of open wound indications, and closed incisions (1). In a randomized control trial comparing tNPWT with sNPWT^{††}, sNPWT^{††} demonstrated superior outcomes including faster wound closure when used with and without a wound filler (2). These benefits are attributed to proprietary technology delivering a unique mode of action, distributing negative pressure across the wound and wider therapeutic zone incorporating the peri-wound area (3). Until now, this mode of action has been unique to wounds treated with sNPWT^{††}. These cases present the initial experience of a novel tNPWT+DL⁺ dressing incorporating this same proprietary technology (Figure 1). The dressing features a negative pressure distribution layer, and a silicone wound contact layer.

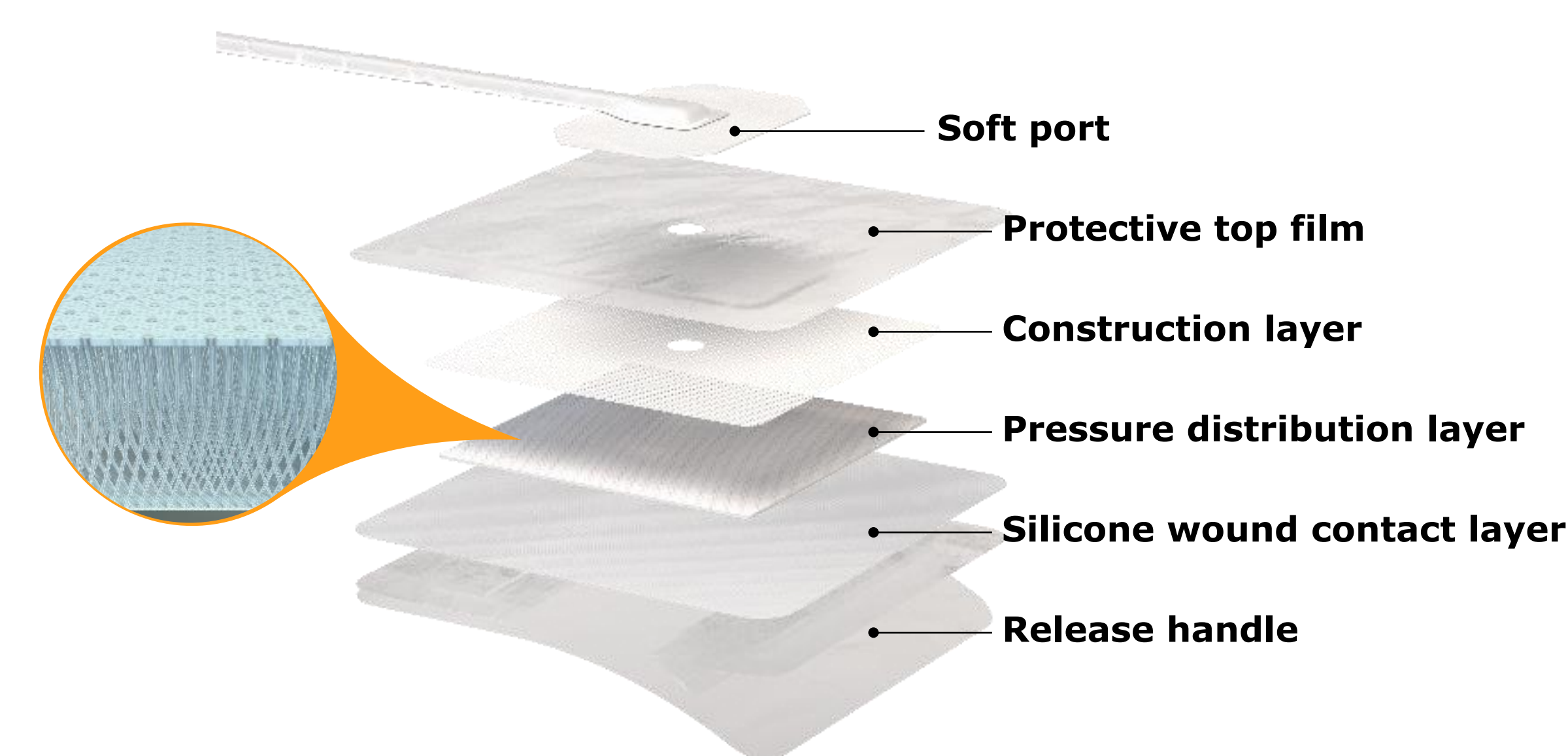


Figure 1. Novel tNPWT+DL⁺ dressing and constituent layers.

Methods

- Three retrospective cases are presented following the treatment of complex and challenging traumatic and surgical wounds. The novel tNPWT+DL⁺ dressing was utilized in each case under the care of the lead authors, in the acute and post-acute setting. Wounds were surgically debrided when required and dressings were changed every 2-3 days unless otherwise stated. Treatment goals were to control edema and to prepare the wounds for definitive closure or secondary intention.

Conclusions

- The novel tNPWT+DL⁺ dressing was successfully utilized to achieve the primary treatment goals of, promoting granulation tissue formation and wound size reduction prior to grafting. In each case, the periwound skin and tissue edema were well controlled, aiding these goals.
- The proprietary pressure distribution layer enabled multiple open and closed wounds to be covered with a single dressing.
- The ability to cut and modify the dressing aided application around the orthopedic pins.
- The silicone contact layer allowed for repositioning at dressing changes and ease of application over irregular contours such as the inframammary folds.

References: (1) Apelqvist J, Willy C, Fagerdahl A-M, Fracalvieri M, Malmjö M, Piaggies A, et al. EWMA Document: Negative Pressure Wound Therapy. Journal of Wound Care. 2017;26(Sup3):S1-S154. (2) Kirsner R, Dove C, Reyzelman A, Vayser D, Jaimes H. A prospective, randomized, controlled clinical trial on the efficacy of a single-use negative pressure wound therapy system, compared to traditional negative pressure wound therapy in the treatment of chronic ulcers of the lower extremities. Wound Repair Regen. 2019;27(5):519-29. (3) Brownhill VR, Huddleston E, Bell A, Hart J, Webster I, Hardman MJ, et al. Pre-Clinical Assessment of Single-Use Negative Pressure Wound Therapy During In Vivo Porcine Wound Healing. Adv Wound Care (New Rochelle). 2021;10(7):345-56.

Case 1

- A 67-year-old male presented with a comminuted open proximal and mid tibial fracture resulting from a road traffic accident. Upon initial presentation, the wound was irrigated, the tibia debrided and antibiotic beads were utilized by the orthopedic surgeon. The patient had no known pre-existing conditions.

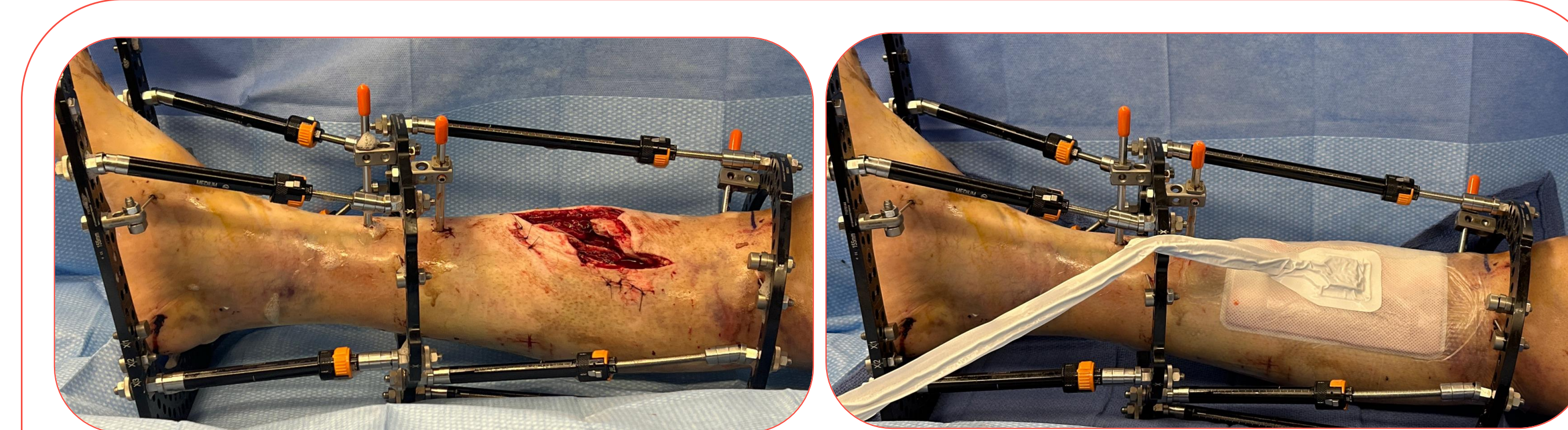


Figure 2. Treatment initiation with the tNPWT+DL⁺ dressing. Surrounding incisional wounds and small lacerations were treated under one dressing. Modifications to the dressing were needed to conform to the external fixator pins.

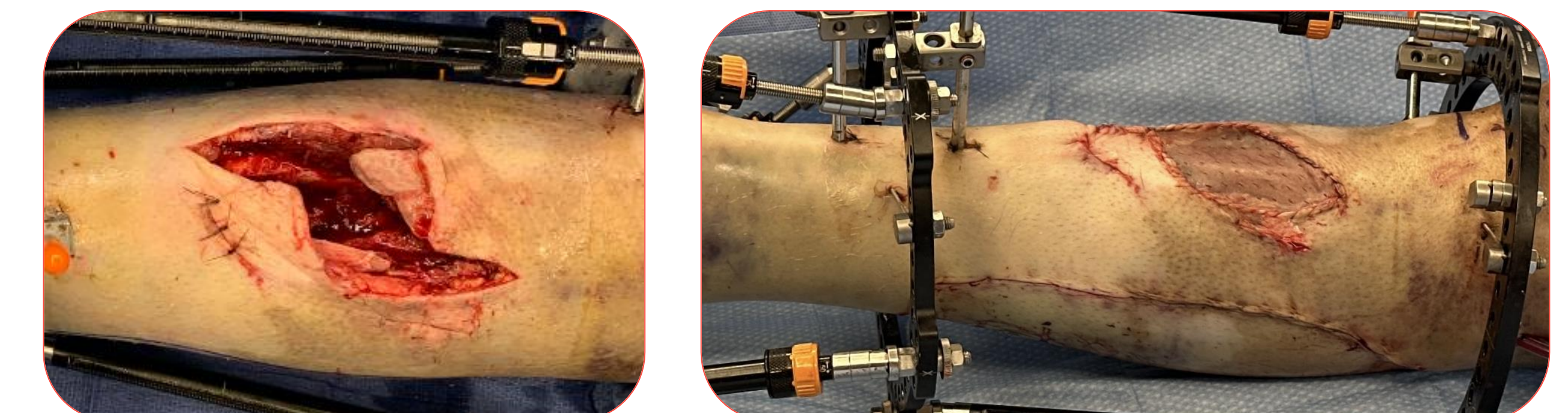


Figure 3. Day 4, wound management was continued following medial gastrocnemius flap and split-thickness skin graft (STSG). One dressing covered the STSG and muscle flap donor site incision.

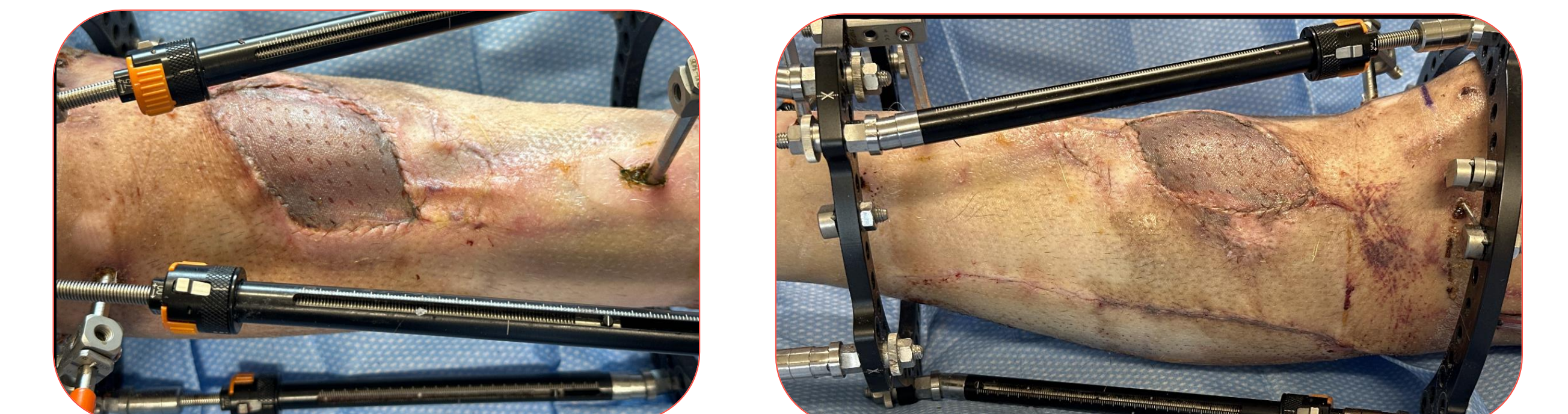


Figure 4. Day-11, muscle flap and STSG are viable. tNPWT was discontinued.

Case 3

- A ~50-year-old male presented with an open wound following a tibial crush injury. 4-6 weeks previously, the injury had been treated with orthopedic fixation, a fasciotomy, and STSG. On presentation to the plastic surgery department, the wound showed partial loss of the skin graft and contained non-viable muscle tissue.



Figure 9. Treatment was initiated with the tNPWT+DL⁺ dressing. Following surgical debridement, the wound measured 12 x 5 cm.



Figure 10. Dressing change on Day 6. Skin islands from the previous graft remained viable.



Figure 11. Dressing change on Day 9. Wound area had reduced by 27%. Initial edema had subsided. Treatment continued with sNPWT^{††}.



Figure 12. Dressing change, Day 39 following debridement.

Case 2

- A 40-year-old female presented in the post-acute clinic with bilateral surgical site dehiscence two weeks following breast reduction for symptomatic macromastia. Both wounds showed signs of tissue necrosis. The patient was obese and had a history of smoking.

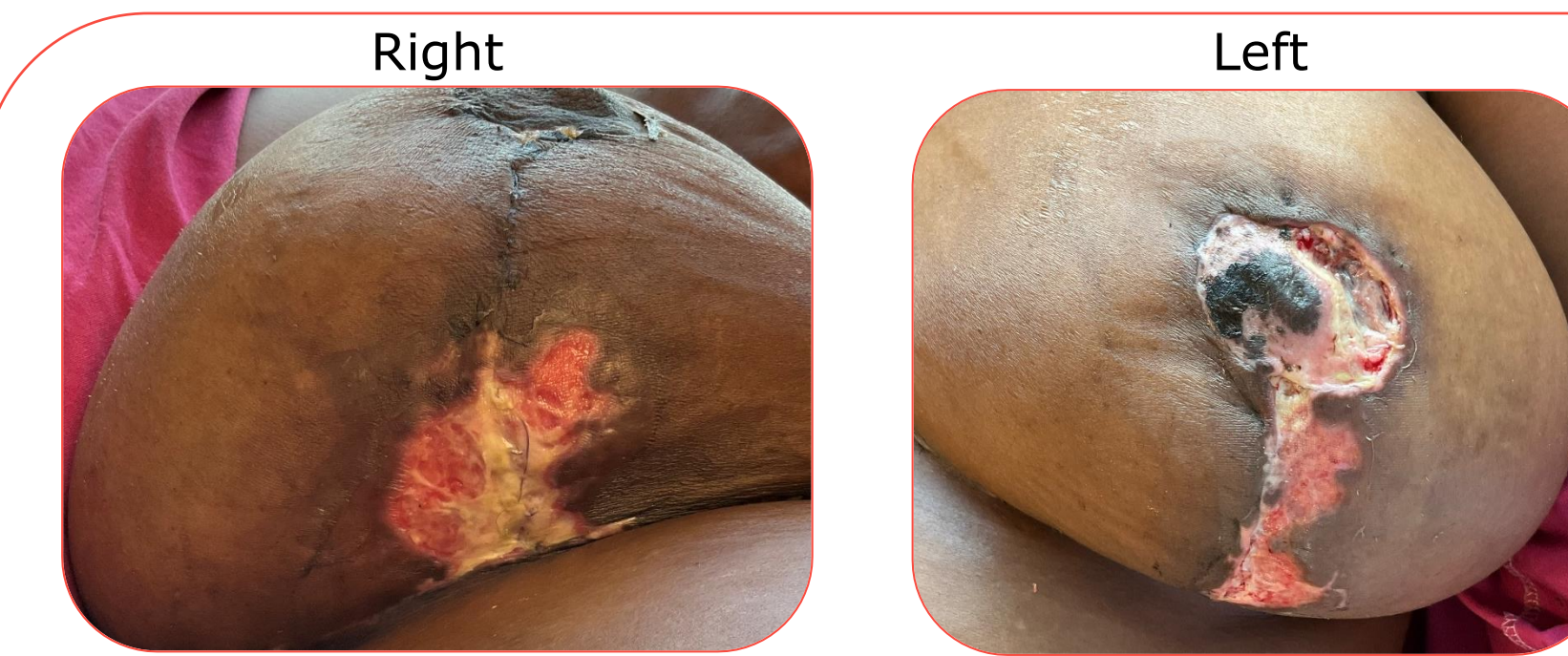


Figure 5. The right breast wound centered around the "T" junction of closure. The left breast wound encompassed the meridian and left peri-areolar closure sites. Post-debridement, treatment was initiated with the tNPWT^{††} dressing. Both wounds were connected to a single NPWT pump^{†††}.



Figure 6. Day 4, edema had reduced, wounds were clean and granulating. Treatment continued with the tNPWT+DL⁺ dressing.

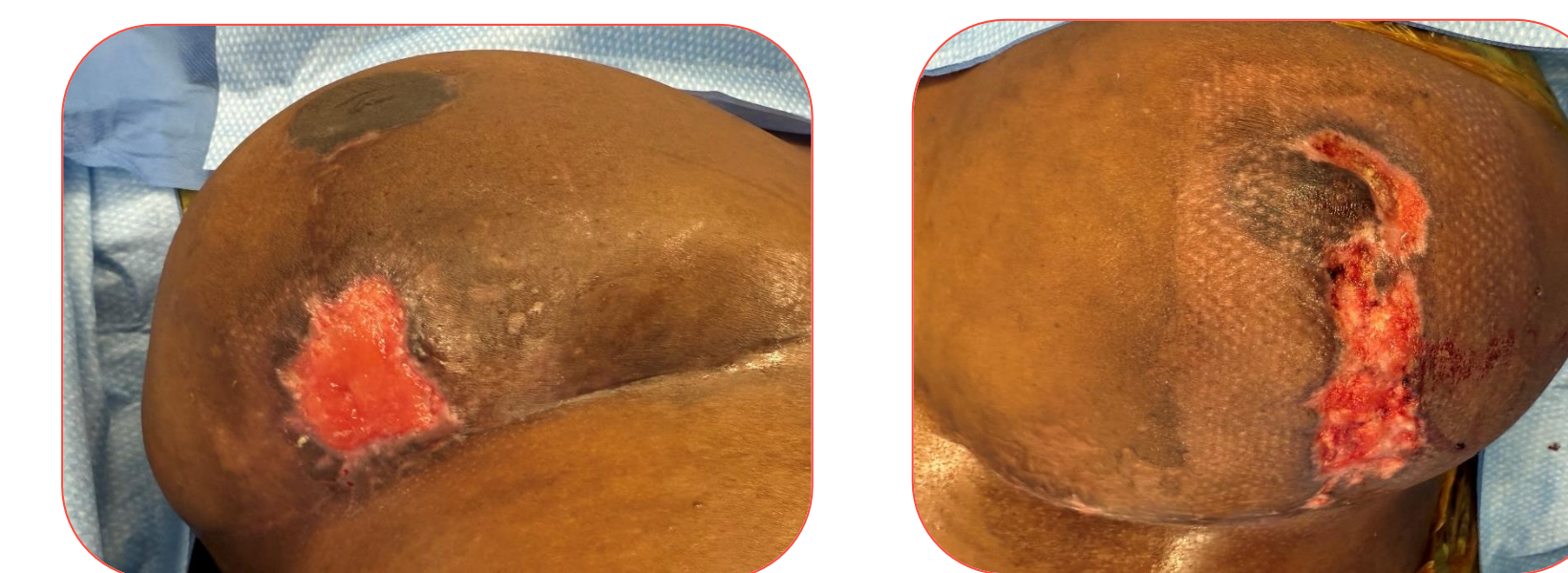


Figure 7. Day 32, wounds continued to granulate. Islands of epithelialization were apparent on the left breast. Wounds were closed with STSG and bolstered with the tNPWT+DL⁺ dressing.



Figure 8. Day 39, both STSGs had adhered and were viable. Treatment was transitioned to sNPWT^{††}.