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Statement of Purpose

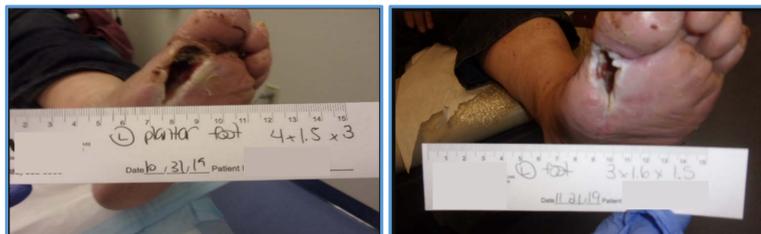
This case series examines the use of a novel negative pressure wound therapy pump, which claims to be quieter, safer, and more user friendly while still providing effective negative pressure wound therapy with up to -200 mmHg pressures. Authors evaluate the effective use of this NPWT pump in a three patient case series.

Literature Review

Wounds can have a negative effect on not only the patient's medical health, but their social and emotional well-being [1]. Wounds also have a large financial burden to the patient and society [2]. So, their treatment for rapid healing has been highlighted in the literature. Negative pressure wound therapy (NPWT) has become one of the most successful treatment modalities for chronic and complex wounds [3]. However, some patients can be noncompliant with these treatment devices for several reasons, including pain with changing of the dressing, inability to sleep because of noise generation, and complication of the device. New NPWT models have tried to combat these reasons for noncompliance while still providing effective therapeutic pressures for a wide range of wound types.

Case Study 1

Patient 1 presented to a clinical wound care center after a right hallux amputation. Wound is noted to be stable with no clinical signs of infection. Patient has a past medical history (PMH) of right great toe osteomyelitis, diabetes, COPD, cardiomyopathy, CAD, Pulmonary Embolus, HTN, dyslipidemia, GERD, hypothyroidism, hemorrhoids, ischemic colitis, BPH, and sepsis. Patient denies smoking and illicit drug use. Admits to social alcohol use. The initial NPWT application (left) and 14 days of NPWT (right) are seen below. After 14 days of NPWT, the patient had a 59.1% reduction in volume from 17.6cm to 7.2cm. The area of the wound also decreased from 7.1cm to 4.8cm.



Case Study 2

Patient 2 presented to a clinical wound care center after a 4th and 5th ray resection with graft application. Patient's PMH is significant for PVD, diabetes, and osteomyelitis. Patient admits to smoking cessation 2 months prior to surgical intervention. Wound is noted to have erythema, edema, and serosanguinous drainage upon initial presentation. No malodor is noted. Wound during initial presentation (left) and after 19 days of NPWT intervention (middle) are seen below. Patient had a 124% reduction in volume and the area of the wound decreased from 31.5cm to 21.2cm. After 19 days of therapy, NPWT was stopped and standard wound care lead to healing without complication (right).

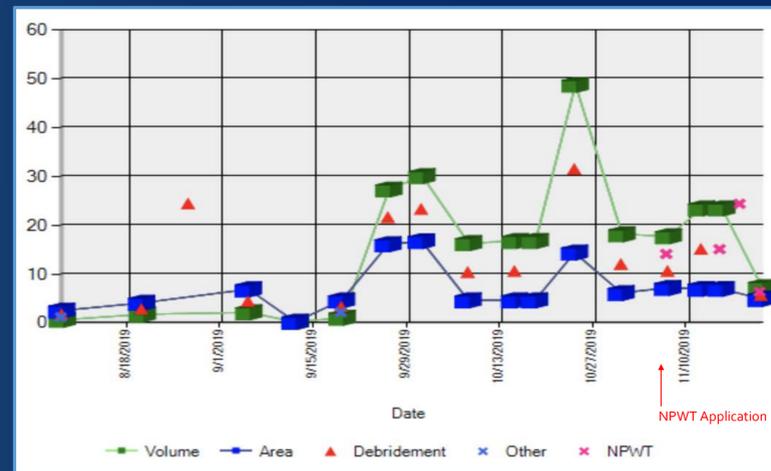


Figure 1: Graph illustrating the volume and area of Patient 1's wound over time. It is noted a significant decrease in both area and volume after NPWT application.

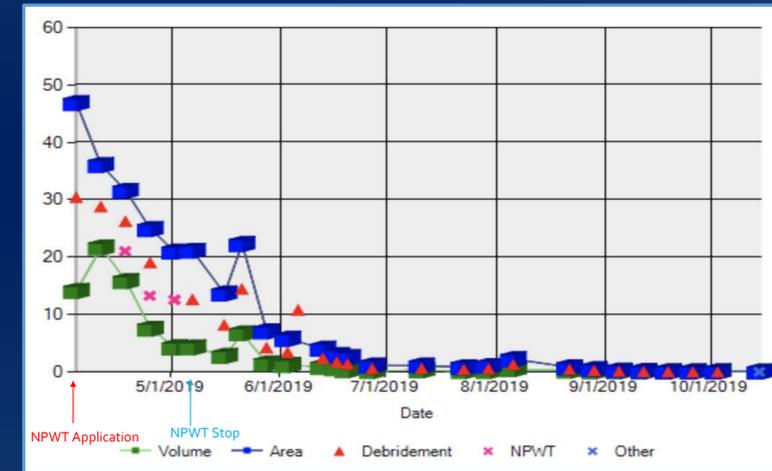


Figure 2: Graph illustrating the volume and area of Patient 2's wound over time. It is noted a significant decrease in both area and volume after NPWT application.

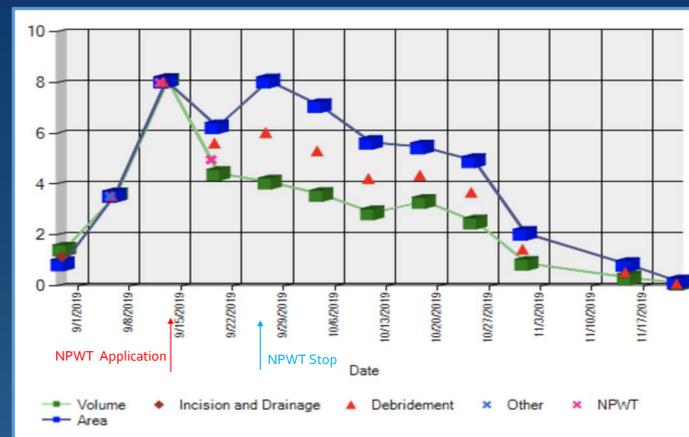


Figure 3: Graph illustrating the volume and area of Patient 3's wound over time. It is noted a significant decrease in both area and volume after NPWT application.

*Invia® Liberty™ NPWT System; Medela AG

Case Study 3

Patient 3 presented to the clinical wound care center with nonhealing plantar 1st metatarsal head ulcer. PMH includes DM-2, HTN, Neuropathy, CKD Stage 3, and HLD. Patient is a former smoker with social alcohol consumption. Initial presentation wound evaluation is significant for erythema, edema, mild odor, and serosanguinous drainage. Patient is noted to have a mass in the area of the ulcer, which was surgically removed. The surgical intervention left a large soft tissue defect under the first metatarsal head (pictured below).



NPWT was applied after surgery (left). After 14 days of NPWT therapy, there was a dramatic reduction in volume from 8cm to 4cm (right). NPWT therapy was stopped and standard wound care lead to healing without complication.



Analysis and Discussion

Three patients with lower extremity ulcerations and diabetes were treated with a novel NPWT device. The wound area and wound volume before and after the application of the novel NPWT device were compared. On average, a 4.23cm² decrease in wound area and an 8.67cm³ decrease in wound volume were found. Patients anecdotally reported the lighter weight, less noise, and ease of use of this device compared to others used in the past.

This case series found that the novel NPWT device substantially decreased the area and volume of the chronic diabetic ulcerations. Authors conclude that the novel device allowed for effective NPWT and increased patient comfort through noise control and lower device weight.

References

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2. Bollero, Daniele, et al. "The role of negative pressure wound therapy in the spectrum of wound healing." *Ostomy Wound Manage* 56.5 Suppl (2010): 1-18.
3. Fracalvieri, Marco, et al. "Patient's pain feedback using negative pressure wound therapy with foam and gauze." *International wound journal* 5 (2011): 492-499.