Combination of a Portable Negative Pressure Wound Therapy System and Total Contact Casting for the Treatment of Chronic Diabetic Foot Ulcers

Bart Gillespie, DPT; Julia Pierson, SPT; Charles Spencer, DPT
Lower Extremity Diabetic Wound Care Clinic, VA Medical Center, Salt Lake City, UT

BACKGROUND

Total contact casting (TCC) has been reported as the gold standard for treatment of diabetic foot ulcers. Negative pressure wound therapy (NPWT) has been clinically and scientifically established as an effective wound care modality for treatment of diabetic foot ulcers. However, the combined use of TCC and NPWT has not previously been described. In this retrospective case series we report the healing of three patients with chronic diabetic foot ulcers treated with an ultraportable NPWT system while in a TCC.

METHODS

Three patients with complicated plantar diabetic foot ulcers (one heel ulcer, one metatarsal head ulcer, and one post hallux amputation wound) were treated with a mechanically powered NPWT system and off-loaded using a TCC. The TCC was custom-fabricated in the traditional fashion. Both devices were replaced once per week rather than twice per week as recommended by the manufacturer of the NPWT system. At each dressing change the wounds were assessed and debrided as needed.

SNAP® WOUND CARE SYSTEM

The SNAP® (Smart Negative Pressure) Wound Care System (Spiracur Inc., Sunnyvale, CA) is an ultraportable NPWT device. This system does not require an electrically powered pump. Instead, it utilizes specialized springs to generate continuous negative pressure at the wound bed. Because it is a disposable single-use system and does not require a rental model for procurement, the SNAP® Wound Care System is available “off-the-shelf” for immediate use.

RESULTS

All three patients reached complete wound healing. The heel ulceration closed in 14 days, the post-hallux amputation wound closed in 21 days, and the metatarsal head ulcer achieved wound closure in 35 days. Although the NPWT manufacturer recommends twice per week dressing changes, we have experienced no complications with once per week dressing changes while using the ultraportable NPWT device with TCC.

Case #1

An 80 year-old male presented to podiatry after developing a left heel pressure wound during a rehabilitation stay following a left femur ORIF. Patient was treated for 14.5 weeks with sharp wound debridement, topical treatments, gauze and profore dressings, and a prevalon/Hollister boot for off-loading. Patient then was transferred to wound care clinic with the wound measuring 2.0 cm x 0.5 cm x 1.5 cm deep with a base of mixed fibrotic and granular tissue without purulence. Wound was debrided and dressed with a 125 mmHg SNAP® Wound Care System and a total contact cast (TCC) for off-loading. At following visits the patient was placed in a CAM boot with plastazote cutout for off-loading because the wound had responded quickly and the patient needed more secure mobility to ensure safety at home. After three weeks, SNAP® was discharged due to wound closure.

Case #2

A 62 year-old male with a history of type II diabetes and subsequent diabetic foot ulcers and a left hallux amputation. Six weeks after the amputation, the surgical site had developed into an open wound with a fibrogranular base and macerated borders. The wound had moderate edema and measured 3.0 cm x 1.0 cm and 1.0 cm deep. Previous treatments included sharp debridement, gentian violet, iodosorb, adaptic, gauze kling dressings, Profore compression wraps and then SNAP® under Profore compression wraps. Patient was transferred to the wound care clinic and treated with the SNAP® and TCC for two weeks before wound was closed with fragile skin. Patient then had TCC without the SNAP® for one week and CAM boot for another two weeks to protect fragile skin.

Case #3

A 58 year-old male with history of DM Type II, Hepatitis C, HTN, and chronic diabetic lower extremity ulcerations. Patient had a history of missing scheduled clinic visits and non-compliance with blood glucose monitoring and control. Past treatments included cleansing wounds with chlorohexadine, dressing with iodosorb, steri-strips as needed, non-adherent dressing, kling, Profore and off-loading with bilateral CAM boots. SNAP® Wound Care System was placed on the right foot and bilateral TCCs. After 3 weeks with a SNAP® and TCC, the right foot wound healed. TCC was placed for an additional week to ensure maturation. After 4 weeks, the right foot was placed in a custom shoe. Patient showed good wound healing and function in custom shoes 10.5 weeks after starting treatment.

CONCLUSIONS

In our clinic the combination of NPWT and TCC has been an efficient and effective way of healing complicated plantar diabetic foot ulcers. While there is limited research on the combination of these treatments, our clinical experience suggests that this combination may lead to faster healing times for diabetic foot ulcers compared to either treatment individually. Further research in this area is warranted.

FURTHER INFORMATION

Bart Gillespie, DPT: bart.gillespie@va.gov