

## Technical Tips for Difficult Topical Negative Pressure Dressings

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### Short Communication

Negative Pressure Wound Therapy (NPWT) has transformed wound healing. Its use in both the acute and chronic settings broadens its suitability for varying wounds; ranging from significant open lower limb trauma to pressure ulcers and provides an optimal environment to promote healing. Its mechanism of action is not fully understood but thought to lead macro/micro-deformation, removal of excess fluid, alteration of the wound environment, neurogenesis and angiogenesis [1]. NPWT involves the placement of either foam-based or gauze-based systems, which are then covered with a clear film and a suction-pad. It can be used on closed incisions, known as incisional NPWT, or can cover open wounds as a temporising measure until definitive soft tissue closure or reconstruction has been completed.

We propose the use of a combination of both gauze and foam systems, particularly for deep cavities or wounds where foam alone is difficult to conform to the wound base. Their individual advantages are utilized to synergistically optimise the wound healing environment. The gauze based system is helpful in wounds which have deep extensions or on an irregular surface. There is also evidence that gauze based systems can provide a thinner layer of granulation tissue which is more pliable compared to sponge systems in porcine skin [2]. This can be helpful in areas where mobility is required, e.g. limb extremities.

Firstly, the gauze roll is used to fill the defect or conform to the wound bed, which would otherwise be more difficult to contour with the foam alone (Figure 1). A piece of sponge is cut into a square which is approximately 1cm bigger than the suction pad and is placed over the gauze (Figure 2). The suction-pad is placed directly overlying the foam and holds better than gauze alone, due to its more rigid, firm structure. We feel that this technique provides the advantages of both gauze and sponge in irregular wounds, while still utilising the sponge that comes with the NPWT of choice.

We recommend the use of two Ioban™ (3M™) antimicrobial incise drapes with the gauze/foam in between the min a sandwich fashion (Figure 3). These incise drapes are impregnated with iodine to provide antimicrobial protection. A 1 cm hole is cut into the Ioban, and high-pressure wall-suction is applied quickly, allowing the Ioban to fold into its natural creases, and therefore less likely to lead to leakage (Figure 3). This is useful in high exudate wounds as the negative pressure can be applied before the fluid loss prevents adhesion of the Ioban/clear film, and less likely to lead to air leakage. The suction-pad attached to the NPWT machine is then applied with the desired negative pressure setting (Figure 4).

Kerlix™ AMD antimicrobial gauze rolls can be used with or as a substitute for the gauze layer,

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Figure 1:



Figure 2:



Figure 3:



Figure 4:

which is impregnated with an antiseptic Polyhexamethylene Biguanide (PHMB) that provides broad-spectrum antimicrobial effectiveness including Methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococci (VRE), which can last up to 3 days [3]. This dressing is left in situ for a maximum of 7 days before being changed to minimise wound exposure. Gauze roll is easier to remove and gentler on normal skin, leading to less skin maceration compared

to foam. Foam integrates into the granulation tissue if placed directly on the wound bed rendering its removal more traumatic, prone to bleeding and painful, particularly in conscious patients on the ward or in the outpatient setting, so these patients will normally necessitate a non-adherent interface such as Mepitel silicone dressing directly on the wound bed. The use of gauze based NPWT versus foam-based has been shown to have lower patient-reported pain on dressing change, the requirement of fewer dressing changes and less time spent during dressing changes as there is no need to sculpt the foam [4].

This technique is useful for short term use of up to 7 days, and in our experience, we found that it helped prevent blockage of the machine, as the suction-pad still utilises the rigid structure of the foam to provide adequate suction. The cost can be managed more effectively, as only small foam is required for the size of the suction pad. In our experience, we found that the combination has led to fewer blockages of the NPWT device when compared to using either gauze or foam alone, which perhaps is due to the small pore size in the foam acting as a filter against larger wound debris. This may give clinicians and patients more confidence in allowing early mobilisation and facilitate timely discharges, as machines are less likely to alarm patients at home.

The disadvantages include a sustained potential for NPWT blockage, albeit reduced in our experience. There is also the problem of incurring the extra costs of using the two systems compared to one alone. However, for large or deep wounds, the gauze roll alternative is cheaper than sponge filler, and therefore can be cost-effective if less sponge filler is utilised [5]. We believe the numerous benefits of combining the two systems is a useful approach to provide the optimal wound healing environment for deep wounds or wounds which are difficult to dress with foam alone.

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