

# Clinical evidence for gauze-based NPWT

Smith & Nephew has a long history of leadership in wound care, now including advanced Negative Pressure Wound Therapy (NPWT). One of the unique aspects of our NPWT system is the option of using gauze as a wound filler. While foam has traditionally been used, data recently published in several peer-reviewed journals indicates that gauze is equally effective for NPWT.

## Gauze as an effective wound filler for NPWT

The inception of NPWT using polyurethane foam was based on the theory that foam would enable microdeformation: the tissue would be compressed and stretched into the pores of the foam, thereby stimulating cell growth and promoting healing. However, recent research indicates that the efficacy of NPWT may not be confined to the use of specific wound filler materials.

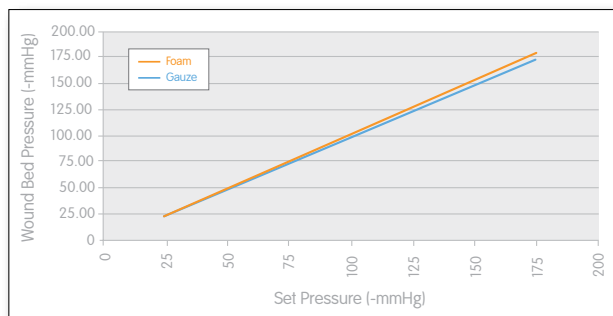
A study of computer models using data from micro-CT analysis predicted that both gauze and foam are capable of inducing substantial microdeformation in wound surface tissue.<sup>1</sup>

In addition, recent clinical evidence indicates that multiple mechanisms of action – not microdeformation alone – may be working simultaneously, producing a synergistic effect on wound healing.

### Multiple mechanisms of action

Other mechanisms that contribute to wound healing during NPWT include physical contraction of the wound (macrodeformation) and increased blood flow to the wound site (perfusion).

In a study of pressure transduction and tissue contraction, both foam and gauze dressings were equally effective at delivering negative pressure to the wound bed.<sup>2</sup>



Another study of wound edge microvascular blood flow demonstrated that both gauze and foam induce the same pattern of hypo- and hyper-perfusion in wound edge tissue, and have very similar effects on wound contracture.<sup>3</sup>

Based on this clinical evidence, it can be concluded that gauze is equivalent to foam as an effective wound filler for NPWT.



## Healing rate and the patient experience

To gauge the efficacy of gauze versus foam, the healing rates of each must be measured and compared. Additionally, the patient experience must also be examined as this can have a significant impact on the healing process.

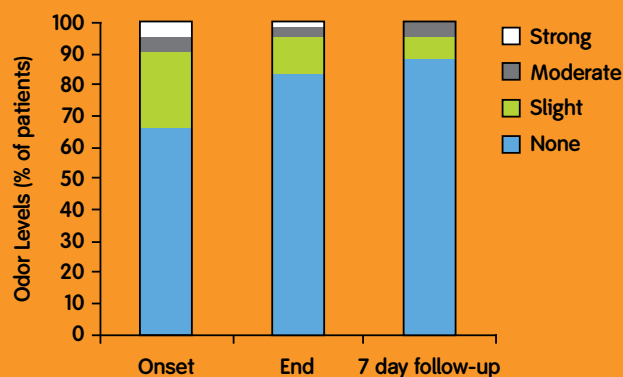
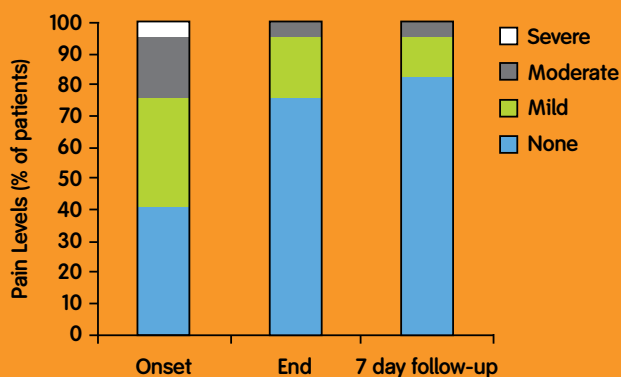
### Healing efficacy

Several recent studies indicate that gauze and foam are equivalent in facilitating wound healing. In a prospective randomized controlled trial, gauze-based NPWT was found to be equivalent to foam-based NPWT.<sup>4</sup>

In a prospective clinical evaluation of 131 patients, wound dimensions were significantly reduced during gauze-based NPWT. A weekly percentage reduction in wound area, depth and volume of 8.3 percent, 15.8 percent and 20.5 percent respectively was observed.<sup>5</sup> In this study, gauze also demonstrated positive advantages related to management of exudate and improvement in granulation tissue.

Further, a retrospective clinical evaluation of gauze-based NPWT found wound volume reductions of 15 percent per week, which was comparable to data from foam-based NPWT.<sup>6</sup>

# Wound pain and odor are significantly reduced during gauze-based NPWT?



152 patient case series of gauze based NPWT published in peer reviewed journal.<sup>10</sup>

## Ease of use

The flexibility and conformability of gauze makes it easier to use in irregularly shaped or contoured wounds. In a study of military trauma cases, it was found that gauze was easier to apply to complex wound shapes and anatomically challenging areas than foam dressing.<sup>7</sup> Gauze has also been used successfully in advanced pediatric reconstructive plastic surgery.<sup>8</sup>

## Patient comfort

Because of the non-adherent properties of gauze, patient comfort is enhanced. Two studies found that gauze-based NPWT was associated with less pain than foam-based NPWT.<sup>9,10</sup> The second study also found that wound odor was significantly reduced with gauze-based NPWT.

## Uncompromising care

If the effectiveness of gauze- and foam-based NPWT is comparable, then your choice of wound filler can be determined by the therapeutic objectives. This gives you the flexibility to exercise your full clinical judgment based on the needs of the patient, the type of wound and the care setting.

<sup>1</sup> Wilkes R, Zhao Y, Kieswetter K, Haridas B. (2009) Effects of dressing type on 3D tissue microdeformations during negative pressure wound therapy: a computational study. *J Biomech Eng. Mar;131(3):031012.*

<sup>2</sup> Malmström M, Ingemansson R, Martin R, Huddleston E., *Negative-pressure wound therapy using gauze or open-cell polyurethane foam: similar early effects on pressure transduction and tissue contraction in an experimental porcine wound model.* *Wound Repair Regen.* 2009 Mar-Apr;17(2):200-5. PMID: 19320888 (peer review). Copyright WRR.

<sup>3</sup> Malmström M, Ingemansson R, Martin R, Huddleston E. Wound edge microvascular blood flow: effects of negative pressure wound therapy using gauze or polyurethane foam. *Ann Plast Surg.* 2009 Dec;63(6):676-81.

<sup>4</sup> Dorafshar AH, Franczyk M, Lohman R, Gottlieb LJ. 2009. Prospective Randomized Study Comparing Gauze Suction Negative Pressure Wound Therapy with Standard Vacuum Assisted Closure Device. Abstract presented at AMERICAN ASSOCIATION OF PLASTIC SURGEONS, 88th Annual Meeting and Symposium March 21-25, 2009.

<sup>5</sup> Dunn, R, et al. A prospective multi-centre clinical evaluation of Negative Pressure Wound Therapy: Results from 131 patients. Poster presented at Clinical Symposium on Advances in Skin & Wound Care 2009.

<sup>6</sup> Campbell PE, Smith GS, Smith JM. Retrospective clinical evaluation of gauze-based negative pressure wound therapy. *Int. Wound J.* 2008 Jun;5(2):280-6.

<sup>7</sup> Jeffery LC. Advanced wound therapies in the management of severe military lower limb trauma: a new perspective. *Eplasty.* 2009 Jul 21;9:e28.

<sup>8</sup> Chariker ME, Gerstle TL, Morrison CS. An algorithmic approach to the use of gauze-based negative-pressure wound therapy as a bridge to closure in pediatric extremity trauma. *Plast Reconstr Surg.* 2009 May;123(5):1510-20.

<sup>9</sup> Dorafshar AH, Franczyk M, Lohman R, Gottlieb LJ. 2009. Prospective Randomized Study Comparing Gauze Suction Negative Pressure Wound Therapy with Standard Vacuum Assisted Closure Device. Abstract presented at American Association of Plastic Surgeons, 88th Annual Meeting and Symposium March 21-25, 2009.

<sup>10</sup> T. Hurd, P. Chadwick, J. Cote, J. Cockwill, T. Mole, J. Smith. Impact of gauze based NPWT on the patient and nursing experience in the treatment of challenging wounds. 2010. *Int Wound J.* In Press.

The author(s) of these articles may or may not be employed by Smith & Nephew, and it should not be implied that the authors have endorsed Smith & Nephew's products in any way or that the techniques described in the article are endorsed or recommended by Smith & Nephew.

With over 150 years of experience in advanced wound care, Smith & Nephew is an industry leader providing innovative solutions to meet the needs of chronic, acute and traumatic wounds across all care settings.

Wound Management  
Smith & Nephew, Inc.  
970 Lake Carillon Drive  
Suite 110  
St. Petersburg, FL 33716  
USA

Customer Care Center  
1 800-876-1261  
T 727-392-1261  
F 727-392-6914  
www.smith-nephew.com  
www.myrenasys.com

Negative Pressure Clinical  
and Patient Hotline:  
1 800-866-NPWT (6798)  
for 24/7 Clinical Support

Acute/Long Term  
Care Ordering via UHS:  
1 866-923-3853

Home Care  
Ordering via Apria:  
1 800-780-1228