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In the News

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Data Grow for Negative Pressure Wound Therapy With Instillation, Dwell Time

By Victoria Stern

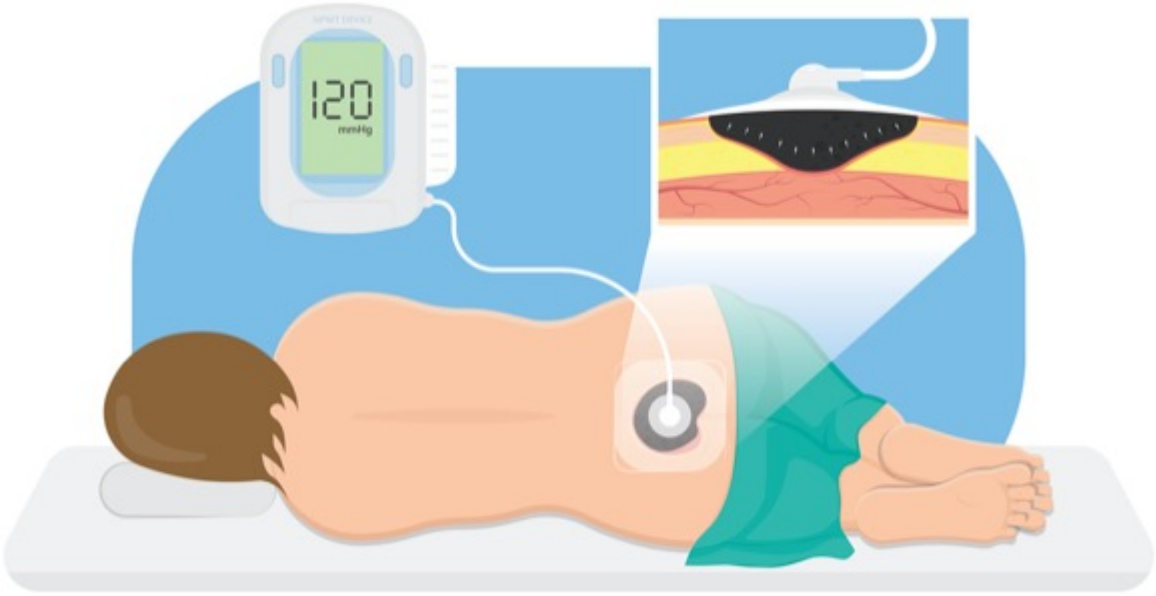
In early 2020, a 54-year-old man arrived at the Arizona Burn Center, in Phoenix, with a third-degree burn stretching from his knee to the mid-thigh. The patient had spilled scalding-hot food down his right leg while cooking dinner.

Marc Matthews, MD, got to work immediately. After surgically debriding the wound to the muscle and fascia, he began a process known as negative pressure wound therapy (NPWT) with instillation and dwell time to continuously clean and promote wound healing (V.A.C. VERAFLO Therapy, KCI).

A standard of care for treating wounds, NPWT acts as a vacuum, suctioning excess fluids and debris from the wound bed (*Plast Reconstr Surg* 2006;118[2]:390-397; *J Trauma* 2011;71[1 suppl]:S147-S150). However, research indicates the technique may not eliminate bacteria effectively enough in complex wounds (*J Wound Care* 2016;25[8]:475-478).

That's where instillation and dwell time come in.

"With NPWT plus instillation and dwell time, you're constantly washing out the wound," Dr. Matthews, a program director of the burn surgery fellowship at the Arizona Burn Center and an associate professor of surgery at Creighton University, in Omaha, Neb., and the University of Arizona, told *General Surgery News*. "Over a few days, this process does your debridement for you and leads to a better, more granulated wound bed for an eventual skin graft."



A growing body of evidence suggests that adding instillation and dwell time to standard NPWT leads to faster healing, fewer operative visits, shorter length of stay and higher rates of closure before discharge in complex wounds (*Wounds* 2020;32:279-282; *Plast Reconstr Surg* 2014;133[3]:709-716).

Despite these findings, the adjunctive therapy has not been widely adopted. A main barrier, according to Dr. Matthews, is that case series dominate the literature. “Those who use the technique feel there’s a decided difference in patient outcomes, but there has been no definitive proof,” he said. In other words, “we didn’t have randomized controlled trials.”

At the 2020 Symposium on Advanced Wound Care (SAWC) annual meeting, Dr. Matthews discussed the latest research, which included the first randomized controlled trial of NPWT, and barriers to implementation.

In June 2020, surgeons published a randomized controlled trial that compared 69 patients receiving NPWT with instillation and dwell time and 63 on NPWT (*Int Wound J* 2020;17:1194-1208). The instillation group exhibited a significant decrease in bacterial counts after the initial surgical debridement and a lower risk for rehospitalization (three vs. nine patients), although there were no significant differences in the number of debridements, time to wound closure or wound complications.

Paul J. Kim, DPM, who led the effort, noted that the lack of significant difference in the number of debridements was “somewhat unexpected,” given previous study findings and his own experience. But he pointed to several drawbacks—including the use of polyhexamethylene antiseptic to irrigate the wounds, which may have slowed granulation tissue formation, and protocol variations across institutions—that may have affected the results.

Two other studies published in 2020 aligned more closely with the case series literature. A meta-analysis of 13 studies, which Dr. Kim presented at the SAWC meeting, showed patients receiving NPWT with instillation had significantly fewer surgical debridements, reduced bacterial burden and shorter duration of therapy (1.5 vs. 3.5 days) than those receiving NPWT alone or conventional dressings. Additionally, a 2020 retrospective analysis found that 42 patients undergoing instillation with saline had significantly fewer operations, shorter length of stay and higher percentage of closed wounds than the 74 patients receiving NPWT (*Cureus* 2020. doi: 10.7759/cureus.9047).

Dr. Matthews called the retrospective analysis "groundbreaking," noting it "should be a game changer for wound care."

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After reviewing the 2020 research, Dr. Matthews detailed his own experience. For his third-degree burn patient, he described covering the wound bed with a reticulated open-cell foam dressing with through holes to aid the removal of exudate and then irrigating the wound with a solution of hypochlorous acid for 20 minutes, followed by negative pressure for 160 minutes. This three-hour cycle was repeated for several days, at which point Dr. Matthews applied a fresh dressing. Ultimately, the patient required five operations interspersed with NPWT with instillation until granulation tissue began to form and an autograft could be placed.

Consensus guidelines, published last year, provide a framework for when to use this technique, which includes full-thickness burns after excision as well as traumatic, infected and diabetic wounds (*Int Wound J* 2020;17[1]:174-186). Still, wound care experts have been slow to adopt NPWT with instillation. According to Dr. Kim, the medical director of the Wound Program at The University of Texas Southwestern Medical Center, in Dallas, the perception that standard NPWT "is good enough" and instillation "adds greater complexity" represents a major hurdle.

Luis G. FernÁndez, MD, a trauma surgeon, believes the mentality of "we've always done it this way" is often a barrier to the development of innovative approaches that may benefit patients. "It's human nature to fear change, and it takes time and effort to learn and adapt to a new paradigm," said Dr. FernÁndez, the medical director of trauma wound care and a professor of surgery at The University of Texas Health Science Center, in Tyler.

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Alex Wong, MD, who was not involved in the research, noted that NPWT alone may be the instinctive first choice for surgeons based on accessibility and familiarity, but he sees the advantages of adding instillation. "The data on NPWT with instillation looks solid and consistent, and intuitively it makes sense to clean the wound more," said Dr. Wong, an

associate professor of surgery in the Division of Plastic and Reconstructive Surgery at the University of Southern California's Keck School of Medicine, in Los Angeles. "After reviewing the evidence and updated consensus guidelines, I may increase my use of NPWT plus instillation."

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