Wound bed preparation is the management of a wound in order to accelerate endogenous healing or to facilitate the effectiveness of other therapeutic measures.\(^1\) The goal of wound treatment is to optimize wound bed preparation to allow the wound to proceed to endogenous healing or to set the stage for successful wound closure with autologous tissue.\(^2\) This approach is accomplished by removing deterrents to normal healing without adding any agents that may be harmful to the wound tissues.

Recently, a new paradigm was suggested to optimize wound bed preparation for wounds healing spontaneously by secondary intention. For wounds that are not proceeding rapidly to closure, a micro-autografting kit (Xpansion Micro-autografting Kit, SteadMed Medical LLC, Fort Worth, TX) can be used to allow a method of grafting the patient’s own epidermis and dermis to the wound as an outpatient procedure without using an operating theater and with a minimal donor site.\(^2,3\) The kit allows a very small (postage stamp-size) graft to be removed under local anesthesia and minced into small 0.8 mm x 0.8 mm fragments. These micrografts then are placed on the optimally prepared wound and can be spread up to 100-fold under local anesthesia in the wound clinic setting.\(^2\) Micrografts have been reported by Boggio et al\(^4\) to induce faster re-epithelialization of chronic leg ulcers that had failed to heal despite good conservative local therapy. The authors also stated they could repair very large ulcers with small fragments of skin requiring small donor sites. In their study, they reported a 90% success rate with the micrografting technique.

To demonstrate the utility of the micro-autografting technique using Xpansion, three recent cases are presented. The first case involves an 83-year-old Caucasian woman with a nonhealing, post-radiation therapy ulcer on the left pretibial area (see Figure 1). She had a history of squamous cell carcinoma and local radiation therapy. The area healed initially with clinical clearance of tumor, but a chronic ulcerated area developed; an x-ray demonstrated tibial periostitis. There appeared to be adequate arterial perfusion to the limb. A second biopsy was negative for cancer recurrence. Hyperbaric oxygen (HBO) therapy was initiated with aggressive wound care, including debridement and compression therapy. An attempted split-thickness skin graft failed. Following a course of negative pressure wound therapy (NPWT) to assist in wound bed preparation, Xpansion Micro-autografting was attempted. At 4 weeks post-grafting, the fragments could be seen coalescing in the wound (see Figure 2). When seen after an additional month, the wound was completely healed (see Figure 3).

The second case involves an 83-year-old man with diabetes and a history of peripheral vascular disease and a prior left lower extremity percutaneous revascularization for treatment of nonhealing forefoot ulcers. Local wound care failed, and he refused HBO therapy at that time. He ultimately required a transmetatarsal amputation that also failed to heal. He agreed to a course of HBO therapy and aggressive wound care for prevention of limb loss.

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While in HBO therapy, he required a second angioplasty of the left lower extremity as well as stump debridement. With the use of NPWT and collagen-based tissue products, a clean, granulating wound base developed (see Figure 4). Final closure of the remaining stump wound was achieved using the Xpansion Micro-autografting technique. Figure 5 shows the healed wound 4½ weeks following grafting.

The final case involves a 73-year-old woman with long-standing lymphedema of the lower extremities and recurrent episodes of leg ulceration. She was able to heal a left leg ulcer after 5 months of local wound care and compression therapy, but it re-ulcerated 2 months later. In an effort to promote more rapid and durable closure, autologous skin grafting was planned. Following optimal wound bed preparation, the wound was grafted as an outpatient under local anesthesia using the Xpansion Micro-autografting method (see Figure 6). A multilayer compression dressing was placed over the grafted limb. The outer wound dressing was replaced at postoperative day 7 and compression re-applied. It was noted that the donor site had healed by this time. At postoperative day 13, the entire operative dressing was taken down and approximately 90% of the wound was epithelialized. A nonadherent dressing was placed under compression, and the patient was totally healed 3 weeks from the time of micro-autografting (see Figure 7).

As demonstrated by these cases, this new micro-autografting technique allows wound closure with both autologous epidermis and dermis to be performed in the outpatient clinic under local anesthesia. The key to success is adequate wound bed preparation before grafting. Removing the deterrents to wound healing is necessary for this technique as it is with any skin grafting procedure. The micro-graft fragments can be expanded 100-fold. Between 14 and 28 days, the clinician can see the grafts are adherent and coalescing over the wound surface. The minimal donor site has not been a problem for our patients and is usually totally healed by the time the grafted wound has stabilized.

References