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Case Series

Staged Limb Salvage in Complex Lower-Extremity Wounds: A Case Series Demonstrating Real-World Application of Advanced Wound Care Strategies

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Background: Complex lower-extremity wounds are associated with substantial morbidity and risk of amputation, particularly in patients with significant comorbidities and advanced disease. Although staged limb salvage approaches incorporating surgical and advanced wound care strategies are increasingly used in clinical practice, there is currently limited evidence describing their application across diverse wound types.

Methods: This descriptive case series reports four patients with complex lower-extremity wounds managed in a specialized outpatient wound care practice using a structured staged limb salvage approach. Management included surgical debridement, negative pressure wound therapy (NPWT), dermal regeneration template application, and adjunctive therapies as clinically indicated. The cases represent a spectrum of high-risk wound presentations, including exposed tendon, deep soft tissue defects, traumatic wounds, and osteomyelitis.

Results: Initial wound dimensions ranged from 7.4 × 4.0 × 1.0 cm to 12.0 × 6.5 × 2.0 cm. All wounds demonstrated progression from non-viable to viable wound beds following debridement, with subsequent granulation tissue formation and advancement toward closure. Complete wound closure was achieved in all four patients, with time to confirmed closure ranging from 4 to 12 months. Limb salvage was achieved in all cases. One patient experienced partial graft loss, which was resolved with continued wound care. No wound recurrence, subsequent amputation, rehospitalization, or major treatment-related complications were documented during 1–2 months of post-closure follow-up.

Conclusions: These cases illustrate the real-world application of a staged limb salvage approach across a range of complex wound etiologies. The findings support the role of structured, multidisciplinary management strategies incorporating debridement, wound bed preparation, and staged reconstruction in promoting healing and achieving limb salvage in high-risk patients. Further studies are warranted to evaluate outcomes in larger patient populations.

Keywords: debridement; diabetic foot; negative pressure wound therapy; osteomyelitis; skin transplantation; treatment outcome; wounds; wound healing

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Chronic and complex lower-extremity wounds represent a significant clinical challenge and are associated with substantial morbidity, healthcare burden, and risk of amputation. These wounds frequently occur in patients with multiple comorbidities, including diabetes, peripheral vascular disease, and other systemic conditions that impair tissue perfusion and healing capacity. When compounded by other factors such as exposed tendon or bone, infection, or osteomyelitis, the likelihood of delayed wound healing, recurrent breakdown, and amputation increases considerably.[1–3]

In routine clinical practice, management is often further complicated by delayed presentation, prolonged wound duration, and multiple interacting risk factors. Patients frequently present with advanced disease, including extensive tissue loss and underlying infection, requiring coordinated multidisciplinary care. Although advances in wound care technologies and reconstructive techniques have expanded available treatment options, much of the published evidence is derived from controlled or narrowly defined patient populations. As a result, there remains a relative paucity of data describing the application of these approaches in clinical settings, particularly among patients with high-risk or limb-threatening wounds.[2,4]

A staged approach to limb salvage has increasingly been adopted for the management of complex lower-extremity wounds. This approach typically involves initial surgical debridement to remove non-viable tissue and control bioburden, followed by wound bed preparation and adjunctive therapies to promote the formation of granulation tissue. Negative pressure wound therapy (NPWT) and dermal regeneration templates are commonly used to support the development of a vascularized wound bed, particularly in cases with exposed structures.[5–7] Once adequate tissue coverage has been achieved, definitive closure may be pursued through grafting or continued wound contraction and re-epithelialization.

Despite growing clinical use, there is limited literature describing how these staged approaches are implemented across a range of complex wound types and patient populations. In particular, there is a need for detailed clinical descriptions that illustrate treatment progression, decision-making, and outcomes in patients with significant comorbidity burden and diverse wound etiologies.[4,8]

The purpose of this case series is to describe the application of a staged limb salvage approach in patients with complex lower-extremity wounds managed in a specialized outpatient setting. Through detailed case narratives and serial photographic documentation, this report aims to illustrate treatment strategies, clinical progression, and outcomes in patients with challenging wound presentations.

MATERIALS AND METHODS

STUDY DESIGN AND SETTING

This was a descriptive case series of patients with complex lower-extremity wounds managed at Indy Wound Care (Indiana, USA), a specialized outpatient wound care practice. The manuscript was prepared with consideration of the CARE (CAse REport) reporting guidance, adapted for a multi-patient case series format. The report presents selected cases illustrating the application of a staged limb salvage approach in patients with high-risk wounds, including those with exposed tendon, deep soft tissue defects, traumatic wounds, and osteomyelitis. All cases were managed by the same clinical team using a consistent approach incorporating surgical and advanced wound care modalities.

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PARTICIPANTS AND CASE SELECTION

Cases were selected from patients managed during a two-year period who met the predefined eligibility criteria, including the presence of a complex lower-extremity wound requiring staged reconstruction and the availability of serial clinical documentation and photographic records. The cases were not consecutive. Selection was based on clinical complexity, representation of diverse wound etiologies encountered in routine practice, and the availability of complete longitudinal documentation suitable for detailed case presentation.

The four cases were selected because they illustrate the application of a staged limb salvage approach across a spectrum of challenging wound presentations. Selection was based on the educational and illustrative value of the cases, while also reflecting complex wound types routinely encountered in clinical practice. Cases with incomplete documentation, inadequate photographic records, or insufficient longitudinal follow-up were not considered for inclusion. A formal screening log was not maintained; therefore, the total number of potentially eligible cases and reasons for exclusion of all non-included cases could not be determined retrospectively. The selected cases were intended to provide practical examples of staged limb salvage management rather than a representative sample of all patients treated during the study period.

ETHICAL APPROVAL AND INFORMED CONSENT

Formal institutional ethics review was not sought because this retrospective case series was prepared from routine clinical documentation and did not constitute prospective human subjects research under institutional practice. Clinical photographs were obtained as part of routine patient care and include both pre- and post-debridement images where appropriate. Image orientation was standardized where feasible during retrospective figure preparation. Scale markers were present in most, but not all, photographs because images were collected during routine clinical practice rather than under a standardized research photography protocol. Written informed consent for publication of de-identified clinical information and wound photographs was obtained from all patients included in this case series. All images were reviewed prior to publication and de-identified to remove patient-identifying information.

CLINICAL ASSESSMENT PROCEDURES

All patients underwent standard clinical evaluation at presentation, including assessment of wound characteristics, comorbid conditions, and factors known to influence wound healing, including diabetes status, vascular perfusion, infection, smoking history, nutritional status, and relevant comorbid conditions. Wounds were assessed for location, extent of tissue involvement, and the presence of non-viable tissue, slough, or exposed structures such as tendon or bone, as well as clinical indicators of infection or inflammation.

Where clinically indicated, additional investigations were performed to further characterize the wound and guide management. Imaging studies, including magnetic resonance imaging and computed tomography angiography, were performed where clinically indicated to assess for osteomyelitis and vascular status. Histopathologic evaluation, microbiological culture testing, and vascular assessment were obtained when clinically indicated to support diagnosis and guide management. Serial photographic documentation was obtained as part of routine clinical care to monitor wound progression.

INTERVENTIONS AND MANAGEMENT PROTOCOL

All cases were managed using a staged limb salvage approach. Initial management focused on surgical debridement to remove non-viable tissue and establish a viable wound bed, with repeated debridement performed as required based on clinical progression.

Following wound bed preparation, advanced wound care interventions were introduced to support tissue regeneration. NPWT was applied to promote granulation tissue formation and optimize the wound environment. NPWT was delivered using the KCI system at 125mmHg continuous pressure with dressing changes performed three times weekly. White foam interface dressings were used where appropriate to protect exposed structures. Dermal regeneration templates were used to facilitate neodermis formation, particularly in wounds with exposed structures. The dermal regeneration template (DRT) used was the Integra® Bilayer Wound Matrix (Integra LifeSciences, USA) which was secured using sutures and staples. Successful integration was assessed clinically through adherence to the wound bed. Treatment parameters, including NPWT pressure settings, dressing interfaces, change frequency, duration of therapy, dermal template application techniques, and fixation methods are summarized in **Table 2**. Where appropriate, subsequent grafting was performed to achieve definitive closure following satisfactory wound bed maturation. Split-thickness skin grafts were harvested from the thigh. Graft take was assessed clinically according to the percentage of graft incorporation, with a graft take greater than 70% considered acceptable.

TREATMENT PROGRESSION

Progression between treatment stages was guided by clinical assessment. Progression from debridement to NPWT was generally undertaken when residual wound depth required further wound bed preparation. Progression from NPWT to DRT template placement required healthy granulation tissue formation. Progression to grafting required successful template integration, adequate granulation tissue, and elimination of wound depth. Advancement to the closure phase was guided by epithelial migration and ongoing wound contraction. Final decisions regarding progression remained clinician-dependent and were individualized according to patient and wound characteristics.

ADJUNCTIVE MANAGEMENT

Adjunctive management included systemic antibiotic therapy in the presence of infection, as well as offloading or immobilization to reduce mechanical stress on the wound. Antibiotic selection was guided by microbiological culture results and clinical assessment where available, with infectious disease consultation obtained when clinically indicated. Detailed antibiotic agents, routes of administration, and treatment durations were not consistently available in the retrospective clinical record for all cases. Ongoing local wound care, including dressing changes and serial clinical reassessment, was performed throughout the treatment course. Management followed a structured protocol addressing acute clinical priorities, including debridement, infection control, and coordination of multispecialty care, while remaining surgeon-dependent with respect to the extent of debridement, selection of advanced wound care products, and timing of progression between treatment stages. The typical interval between treatment stages ranged from 4 to 8 weeks, depending on wound progression and patient-specific factors.

OUTCOME ASSESSMENT AND ANALYSIS

Outcomes were assessed descriptively based on clinical progression and documented wound healing over time. The primary outcomes of interest were achievement of wound closure and limb salvage, defined as avoidance of amputation. Wound progression was evaluated through serial clinical assessment and photographic documentation. Complete wound closure was defined as full re-epithelialization of the wound surface without drainage and was confirmed through clinical examination and serial photographic documentation at a subsequent follow-up assessment. Secondary outcomes included development of granulation tissue, reduction in wound size, and progression toward re-epithelialization.

Serial quantitative wound measurements and percent area reduction milestones were not consistently available from the retrospective clinical record. Consequently, wound progression was assessed using serial clinical examination and longitudinal photographic documentation, supplemented by documented treatment milestones including time to adequate granulation tissue formation, grafting where applicable, and confirmed wound closure. Complications encountered during treatment, including graft-related issues, delayed healing, recurrence, infection recurrence, rehospitalization, reoperation, and other treatment-related adverse events, were also recorded. Follow-up after confirmed closure was used to assess durability of healing and recurrence. Given the descriptive nature of this case series and the small number of cases, findings are presented using descriptive methods without formal statistical analysis.

RESULTS

COHORT OVERVIEW

In this case series, four patients with complex lower-extremity wounds were included representing a spectrum of high-risk clinical scenarios including exposed tendon, deep soft tissue defects, traumatic wounds, and osteomyelitis. Patients ranged in age from 33 to 76 years and commonly presented with significant comorbidities, including diabetes, chronic kidney disease, and substance use disorder. Wound duration ranged from two weeks to one year prior to presentation. Time to complete wound closure ranged from 4 to 12 months across cases. Baseline patient and wound characteristics are summarized in **Table 1.**

Treatment components and clinical outcomes are summarized in **Tables 2** and **3**. Key treatment milestones, including wound bed preparation, advanced wound care interventions, grafting where applicable, and confirmed wound closure, are summarized in **Table 4**.

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Table 1. **Baseline Patient and Wound Characteristics**

Case	Age (years)	Key comorbidities	Initial wound size (cm)	Relevant healing factors	Wound location	Duration	Severity	Infection/ Osteomyelitis	Perfusion assessment	Revascularization
1	76	D, COPD	7.5 × 4.0 × 1.0	HbA1c 6.6%; controlled diabetes; never-smoker; albumin 4.5g/dL	Posterior heel	~2 weeks	Exposed Achilles tendon	Soft tissue infection; cultures positive for *Staphylococcus aureus*	Arterial duplex ultrasound and CTA; normal findings	No
2	44	D, smoking	7.4 × 4.0 × 1.0	HbA1c 10.8%; poorly controlled diabetes; active smoker; nutrition concern present; albumin 3.4g/dL	Anterior tibia	~1 month	Deep soft tissue defect	Soft tissue infection; cultures positive for *Providencia stuartii*	CTA; normal findings	No
3	74	D, CKD, CHF	11.2 × 9.3 × 0.3	HbA1c 6.5%; controlled diabetes; CKD (non-dialysis); never-smoker; albumin 3.8g/dL	Pretibial	~1 month	Deep traumatic ulcer	Soft tissue infection; cultures positive for *Proteus vulgaris*	Arterial duplex ultrasound; normal findings	No
4	33	IVDU	*Right:* 12.0 × 6.5 × 2.0; *Left:* 7.5 × 4.0 × 0.6	HbA1c 5.1%; prior daily smoker; albumin 4.3 g/dL; opioid abuse/IVDU history	Bilateral tibia	~1 year	Exposed bone	Osteomyelitis confirmed by MRI, biopsy, and cultures positive for *Escherichia coli* and *Pseudomonas aeruginosa*	Palpable femoral, dorsalis pedis, and posterior tibial pulses; normal findings	No

CHF–congestive heart failure; CKD–chronic kidney disease; COPD–chronic obstructive pulmonary disease; CTA–computed tomography angiography; D–diabetes; IVDU–intravenous drug use; OM–osteomyelitis;

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Table 2. **Treatment Components Across Cases**

Case	NPWT settings	Dressing changes	Dermal template	Fixation method	Grafting	Antibiotics	Adjunctive measures
1	125 mmHg continuous (KCI system)	3× weekly	Integra DRT	Sutures and staples	None	Culture-directed therapeutic antibiotics (details unavailable)	CAM boot, collagen
2	125 mmHg continuous (KCI system)	3× weekly	Integra DRT	Sutures and staples	None	Culture-directed therapeutic antibiotics (details unavailable)	Compression, collagen
3	125 mmHg continuous (KCI system)	3× weekly	Integra DRT	Sutures and staples	STSG (thigh)	Culture-directed therapeutic antibiotics (details unavailable)	CAM boot/walker
4	125 mmHg continuous (KCI system)	3× weekly	Integra DRT	Sutures and staples	STSG (thigh)	Therapeutic (6-week IV antibiotic course)	Hydrogel, compression

CAM–controlled ankle movement; DRT–dermal regeneration template; NPWT–negative pressure wound therapy; STSG–split-thickness skin graft.

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Table 3. Clinical Outcomes

Case	Time to granulation suitable for progression	Ambulatory at presentation	Ambulatory at closure	Offloading /immobilization	Return to footwear	Assistive device	Return to baseline activity	Time to graft	Time to confirmed closure	Follow-up after closure	Recurrence	Adverse events /complications	Limb salvage
1	~1-day post-debridement	Yes	Yes	~ 5 months	Yes	CAM boot/walker	Yes	N/A	~6 months	1–2 months	No	No complications reported; serial bedside debridement performed	Yes
2	~1-day post-debridement	Yes	Yes	None	Yes	None	Yes	N/A	~6 months	1–2 months	No	No complications reported; serial bedside debridement performed	Yes
3	~2 days post-debridement	Yes	Yes	Not documented	Yes	Cane/walker	Yes	~2 months	~4 months	~1 month	No	No complications reported; serial bedside debridement performed	Yes
4	~1 week post-debridement	Yes	Yes	Not documented	Yes	None	Yes	~2 months (STSG)	~12 months	1–2 months	No	Partial graft loss, resolved with ongoing wound care, serial bedside debridement performed	Yes

STSG–split-thickness skin graft. Closure was defined as complete re-epithelialization without drainage and was confirmed at a subsequent follow-up visit through clinical examination and serial photographic documentation. No recurrence, infection recurrence, rehospitalization, reoperation, NPWT-related complications, immobilization-related complications, deep vein thrombosis, falls, new ulceration at the same site, or subsequent amputation were documented during follow-up. Partial graft loss occurred in Case 4 and resolved with continued wound care.

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Table 4. Treatment Timeline by Case

Case	Presentation	Initial Debridement	NPWT Initiated	DRT Placement	Grafting	Closure
1	Week 0	Week 0	Week 0	~ Month 1	N/A	Month 6
2	Week 0	Week 0	Week 0	~ Month 1	N/A	Month 6
3	Week 0	Week 0	Week 0	~ Month 1	~ Month 2	Month 4
4	Week 0	Week 0	Week 0	~ Month 1	~ Month 2	Month 12

NPWT was typically continued for ~one month prior to dermal regeneration template placement, contingent on granulation tissue formation and wound bed readiness. Timing reflects typical treatment intervals documented in the clinical record and should be interpreted as approximate.

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CASE NARRATIVES

Case 1. A 76-year-old female with diabetes, chronic obstructive pulmonary disease, and well-controlled glycemic status (HbA1c 6.6%) presented with a stage IV posterior heel ulcer with exposed Achilles tendon (**Figure 1A**). Vascular assessment demonstrated adequate perfusion without the need for revascularization. Tissue cultures grew *Staphylococcus aureus*, and antibiotic therapy was administered. Following initial debridement and vascular assessment, a DRT was applied and supported with NPWT (**Figure 1B–C**). With continued offloading and wound care, the wound demonstrated progressive granulation and contraction, ultimately achieving complete closure without the need for amputation (**Figure 1D**). Complete closure was achieved at ~6 months.

Figure 1. Case 1 – Progressive wound healing following intervention

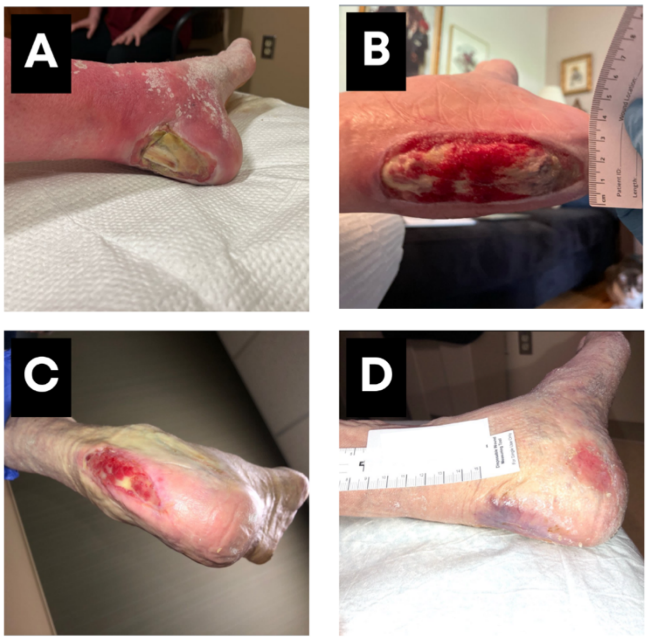

Figure 1. Case 1 demonstrates staged wound healing progression. (A–D) Serial images of the wound over time. Baseline (A) demonstrates a chronic wound with non-viable tissue and surrounding inflammation. Following debridement (B), a cleaner wound bed with improved tissue viability is observed. Early post-application (C) shows granulation tissue formation and initial integration. The final image (D) demonstrates advanced healing with re-epithelialization and wound contraction.

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Case 2. A 44-year-old male with poorly controlled diabetes (HbA1c 10.8%), active smoker, and nutritional concerns presented with a nonhealing anterior tibial wound (Figure 2A). Tissue cultures grew *Providencia stuartii*, and antibiotic therapy was administered. Debridement was performed to establish a viable wound bed, after which, staged reconstruction was undertaken using a DRT and NPWT (**Figure 2B–C**). Over time, progressive granulation tissue formation, wound contraction, and re-epithelialization were observed (**Figure 2D**), culminating in complete closure at ~6 months. No recurrence or subsequent amputation was documented during 1–2 months of follow-up after confirmed wound closure.

Figure 2. Case 2 – Wound bed preparation and healing trajectory

Figure 2. Case 2 demonstrates wound bed optimization and healing progression. (A–D) Serial images illustrating the treatment course. Baseline (A) shows a wound with slough and non-viable tissue. Following debridement (B), improved wound bed quality is evident. Early healing (C) demonstrates granulation tissue formation. The final image (D) shows reduction in wound size with progressing re-epithelialization.

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Case 3. A 74-year-old female with multiple comorbidities, including diabetes, chronic kidney disease not requiring dialysis, and congestive heart failure, developed a traumatic pretibial wound (**Figure 3A**). Glycemic control was well maintained (HbA1c 6.5%), and vascular assessment demonstrated adequate perfusion. Tissue cultures grew *Proteus vulgaris*, and antibiotic therapy was administered. Following surgical debridement, improved tissue viability was observed (**Figure 3B**), permitting graft application with continued NPWT support (**Figure 3C**). With ongoing wound care and serial debridement, the wound progressed with re-epithelialization and contraction, ultimately resulting in complete closure (**Figure 3D**). Complete closure was achieved at ~4 months.

Figure 3. Case 3 – Complex wound with marked tissue regeneration

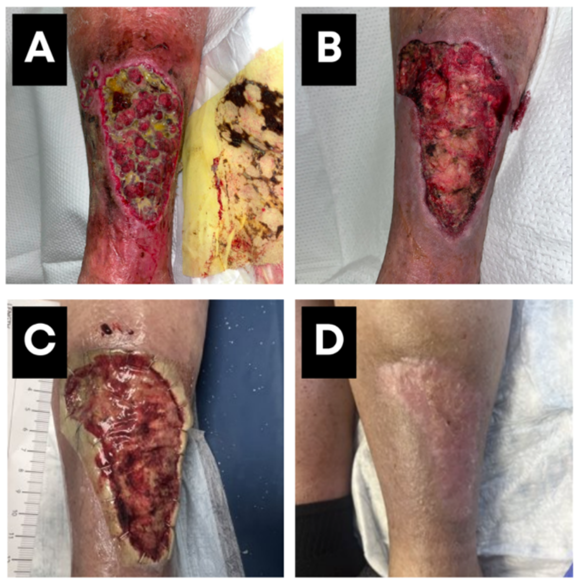

Figure 3. Case 3 demonstrates the healing of a complex wound. (A–D) Serial images demonstrating wound progression. Baseline (A) reveals extensive slough and non-viable tissue. Following debridement (B), improved tissue viability is observed. Early integration (C) shows development of granulation tissue. The final image (D) demonstrates advanced healing with re-epithelialization and contraction.

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Case 4. A 33-year-old female with a history of intravenous drug use, opioid abuse, and former daily smoker presented with bilateral lower-extremity wounds complicated by exposed bone and osteomyelitis (**Figure 4A, E**). The wounds had been present for one year prior to presentation. Glycemic control was normal (HbA1c 5.1%), and serum albumin was 4.3g/dL. Osteomyelitis was confirmed by magnetic resonance imaging, tissue biopsy, and positive cultures demonstrating *Escherichia coli* and *Pseudomonas aeruginosa*. Probe-to-bone testing was positive, and surgical management included bone debridement in addition to serial soft tissue debridement. Noninvasive vascular assessment demonstrated palpable femoral, dorsalis pedis, and posterior tibial pulses with no evidence of clinically significant perfusion impairment, and revascularization was not required. Management involved a multidisciplinary team including infectious disease, vascular surgery, and psychiatry. The patient completed a six-week course of intravenous antibiotic therapy and underwent serial surgical debridement, resulting in improved tissue viability and establishment of a viable wound bed with adequate granulation tissue one week following debridement (**Figure 4B, F**). Subsequent staged reconstruction included DRT application followed by split-thickness skin grafting (STSG) (**Figure 4C, G**).

Despite the severity and chronicity of presentation, and partial graft loss during treatment, both wounds progressed with continued care, demonstrating contraction and re-epithelialization, ultimately achieving complete closure without amputation (**Figure 4D, H**). Complete wound closure was confirmed at 12 months. No recurrence or subsequent amputation was documented during follow-up. Sustained patient adherence, including continued abstinence from substance use, securing employment, and regular attendance at follow-up visits despite residing out of state, contributed to successful limb salvage and durable wound healing.

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Figure 4. Case 4 – Bilateral lower extremity wounds

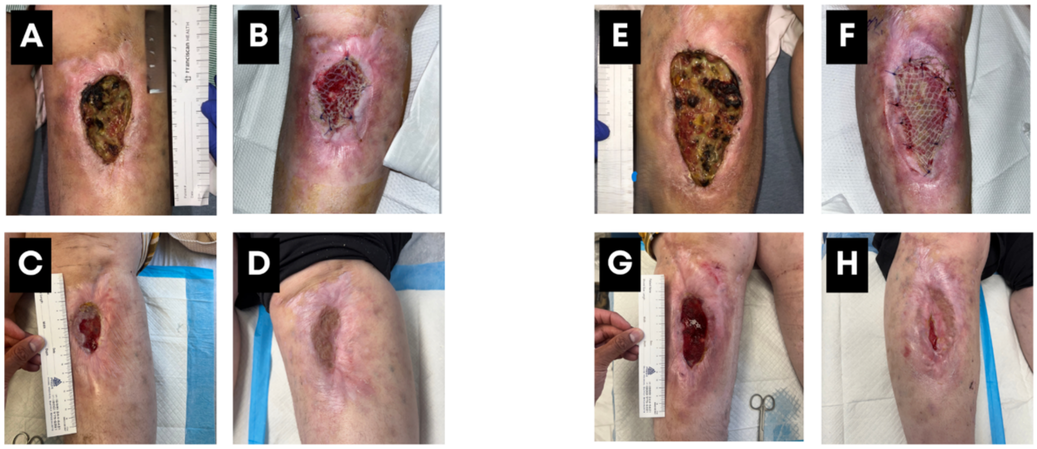

Figure 4. Bilateral lower extremity wounds demonstrating staged progression following debridement and dermal regeneration template (DRT) application and split-thickness skin grafting (STSG). (A–D) Left lower limb and (E–H) right lower limb. Baseline images (A, E) demonstrate extensive necrotic and sloughy tissue with surrounding inflammation. Following debridement (B, F), a cleaner wound bed with improved tissue viability is observed. Subsequent images (C, G) demonstrate staged reconstruction following DRT application and STSG. Final images (D, H) demonstrate substantial wound contraction and re-epithelialization with complete wound closure.

DISCUSSION

This case series describes the application of a staged limb salvage approach in patients with complex lower-extremity wounds managed in an outpatient setting. Despite variation in wound etiology, severity, and patient comorbidities, all cases demonstrated a similar trajectory in which aggressive debridement enabled transition from a non-viable to a viable wound bed, followed by progressive granulation tissue formation and advancement toward closure. Limb salvage was achieved in all patients, including those presenting with exposed tendon, deep soft tissue loss, and osteomyelitis. All patients remained ambulatory throughout treatment, returned to footwear following wound healing, and resumed their baseline activities during follow-up.

These findings are consistent with established principles of wound management, in which removal of non-viable tissue and control of bioburden are essential first steps in promoting healing.[4,9] In complex wounds, particularly those involving exposed structures or infection, debridement alone is often insufficient, and adjunctive therapies are required to support wound bed preparation and tissue regeneration. The staged approach observed in this series reflects a practical integration of these principles, combining surgical and advanced wound care modalities to progressively convert non-healing wounds into conditions suitable for closure.[9,10]

NPWT has been widely reported to promote granulation tissue formation, reduce edema, and enhance local perfusion, thereby facilitating wound bed preparation.[5,11] Similarly, DRTs provide a scaffold for neodermis formation and are particularly useful in wounds with exposed tendon or bone, where conventional healing modalities are limited.[6,12] In this series, the consistent use of these modalities across cases highlights their role within a broader staged strategy, rather than as standalone interventions. The observed progression from debridement to granulation and eventual closure aligns with previously described mechanisms of action and clinical outcomes associated with these therapies.[7,11,12]

Importantly, this series reflects the complexity of wound care in routine clinical practice, where patients frequently present with advanced disease and multiple comorbidities that impair healing.[2,8,13] Many such patients are traditionally considered at high risk for amputation, particularly in the presence of infection or osteomyelitis. The successful limb salvage observed across all cases in this series underscores the potential for structured, staged approaches to achieve favorable outcomes even in high-risk populations.[1,13] The bilateral case further illustrates the reproducibility of this approach within a single patient, suggesting that consistent application of wound care principles can yield comparable healing trajectories across different anatomical sites.

LIMITATIONS

Despite these encouraging findings, several limitations should be acknowledged. This is a small, descriptive case series, and the selected cases may not be representative of all patients with complex lower-extremity wounds. The absence of a comparator group and the multicomponent nature of the intervention strategy limit attribution of outcomes to any individual treatment component. Because all included cases ultimately achieved successful limb salvage and wound closure, selection bias cannot be excluded, and the findings may not reflect the full spectrum of outcomes encountered in routine clinical practice. Consequently, unsuccessful outcomes, amputations, and cases with incomplete documentation may be underrepresented, limiting the representativeness of the findings. As such, the findings should be interpreted as illustrative rather than definitive. Finally, the relatively short duration of post-closure follow-up may not fully capture late wound recurrence, re-ulceration, or delayed complications.

Nonetheless, this series provides clinically relevant insight into the real-world application of staged limb salvage strategies in complex wounds. The detailed case narratives and serial photographic documentation offer practical examples of treatment progression, decision-making, and outcomes in a heterogeneous patient population. These findings support the role of structured, multidisciplinary approaches in the management of complex lower-extremity wounds and highlight the importance of early debridement, wound bed preparation, and appropriate use of adjunctive therapies.

The consistency of wound progression observed, despite variation in wound etiology and patient factors, supports the reproducibility of this approach when applied within a structured clinical framework. Further research is warranted to better define the relative contribution of individual treatment components and to evaluate outcomes in larger, more diverse patient populations. Prospective studies and comparative analyses may help to refine treatment pathways and identify patient subgroups most likely to benefit from staged limb salvage approaches.

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CONCLUSION

A staged limb salvage approach incorporating surgical debridement, wound bed preparation, and adjunctive advanced wound care was successfully applied across a series of complex lower-extremity wounds in an outpatient setting. Despite variation in wound etiology, severity, and patient comorbidities, all cases demonstrated progression from non-viable to viable wound beds over 4–12 months, with subsequent granulation, contraction, and advancement toward closure. Limb salvage was achieved in each case, including patients presenting with exposed structures and osteomyelitis.

These findings support the role of structured, staged management strategies in the treatment of high-risk wounds and highlight the potential for favorable outcomes even in challenging clinical scenarios. Further studies are warranted to better define optimal treatment pathways and evaluate outcomes in larger patient populations.

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Institutional Review Board Statement: This manuscript describes a retrospective case series derived from routine clinical care and does not report experimental interventions or prospectively conducted research. Formal institutional ethics review was not sought because the report was prepared retrospectively using clinical documentation generated during standard medical practice, involved no alteration to patient management, and all patients had provided written informed consent for clinical photography and for the use of de-identified clinical information and wound images for educational, research, and publication purposes. Under these circumstances, no formal institutional review board or ethics committee determination, waiver, or exemption was requested. All procedures were conducted in accordance with the ethical principles of the Declaration of Helsinki.

Informed Consent Statement: Written informed consent for publication of de-identified clinical information and wound photographs was obtained from all patients included in this case series. All images were reviewed prior to publication and de-identified to remove patient-identifying information.

Data Availability Statement: The data supporting the findings of this study are not publicly available because they contain patient-level clinical information and photographic records obtained during routine medical care. De-identified data may be made available from the corresponding author upon reasonable request, subject to review of the proposed use and patient confidentiality considerations.

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