



The Impact of Home Parenteral Nutrition on Wound Healing Outcomes

A Case Series

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INTRODUCTION:

Chronic wounds affect approximately 8 million individuals each year in the United States. Even with access to advanced wound care therapies, many patients continue to experience delayed healing. One critical factor that may underlie delayed healing is a patient's nutritional status. Nutrition plays a pivotal role in wound repair and its adequacy can be evaluated by conducting a comprehensive nutrition assessment, including reviewing a detailed food diary, and obtaining relevant laboratory values (e.g. serum albumin).

For patients with chronic wounds, this information is vital in identifying nutritional deficiencies that may be impairing healing. Without optimizing nutrition, even the most advanced wound treatments (e.g. negative pressure wound therapy, cellular tissue products, specialized dressings) may fail to achieve desired outcomes. Integrating nutrition-focused care into wound management is key to supporting timely and effective healing.

Wound healing is a metabolically intensive process that depends on adequate availability of both macronutrients and micronutrients to effectively restore skin integrity. Macronutrients including carbohydrates, fats, proteins, and fluids alongside essential vitamins and minerals, act synergistically to support the complex and overlapping phases of tissue repair. The increased caloric requirements associated with protein synthesis, a critical component of granulation tissue formation, highlight the elevated nutritional demands inherent to the reparative stages of wound healing (Seth et al., 2024).

METHODS:

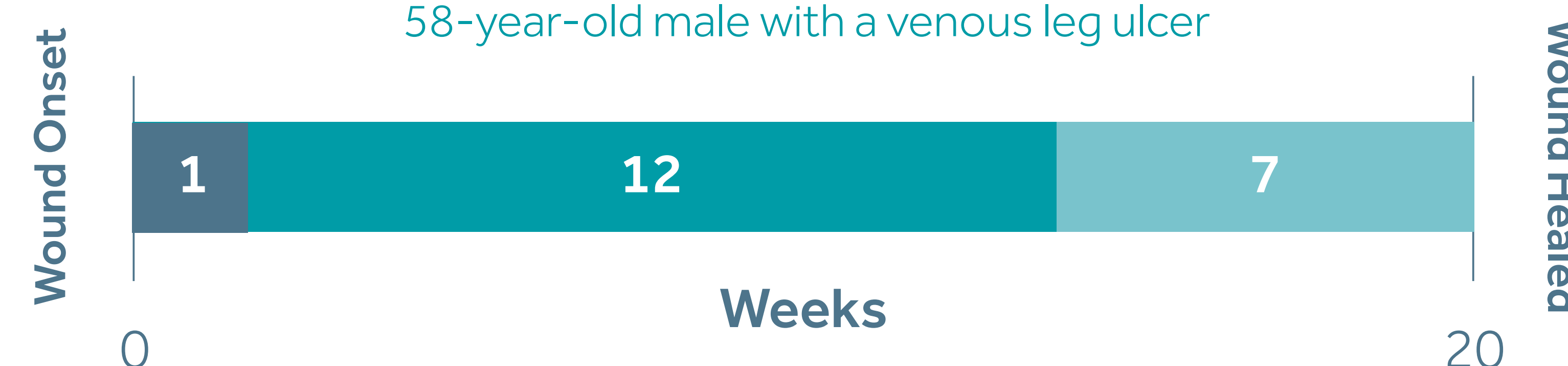
Four patients were included in this case series, each presenting with chronic non-healing wounds persisting for more than 12 weeks. All patients had previously received advanced wound care interventions from their local wound care providers; however, wound healing had plateaued and was classified as non-healing at the time home parenteral nutrition (HPN) was initiated. Patients were subsequently enrolled with home health services, which provided weekly laboratory monitoring, peripherally inserted central catheter (PICC) dressing changes, and ongoing PICC management. Patients received home parenteral nutrition (HPN) administered through a PICC over a 12-hour nocturnal infusion period.

Weekly monitoring was conducted by home health registered nurses, with additional oversight from an interdisciplinary clinical team including pharmacists and registered dietitians. Laboratory values were assessed weekly to optimize individualized parenteral nutrition formulations, with adjustments made based on biochemical trends and patient tolerance. Patients were also followed regularly by wound care specialists to evaluate and support ongoing wound healing.

Home Self-Management Clinic-Based Wound Care HPN Therapy & Clinic-Based Wound Care

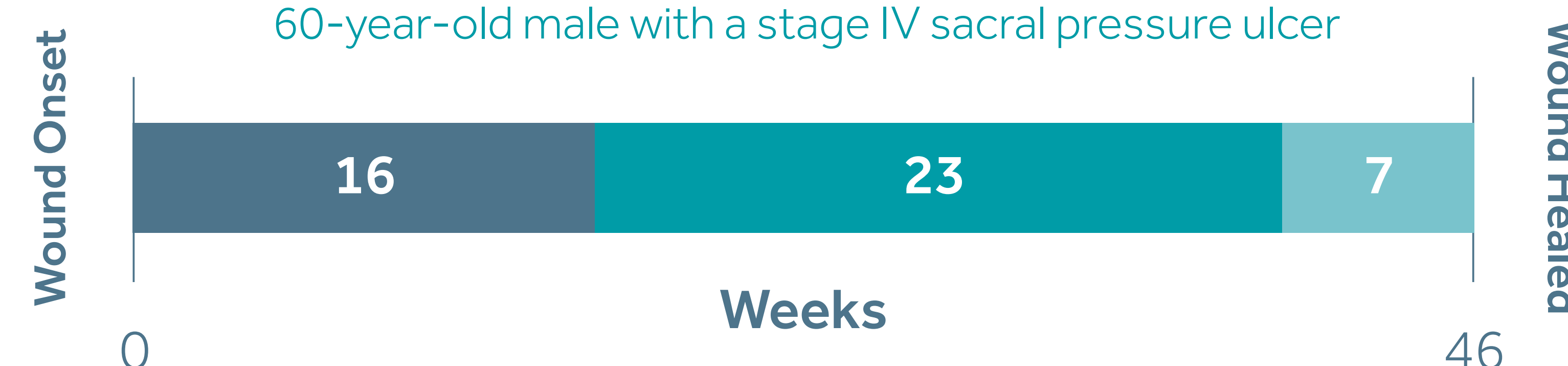
Case #1:

58-year-old male with a venous leg ulcer



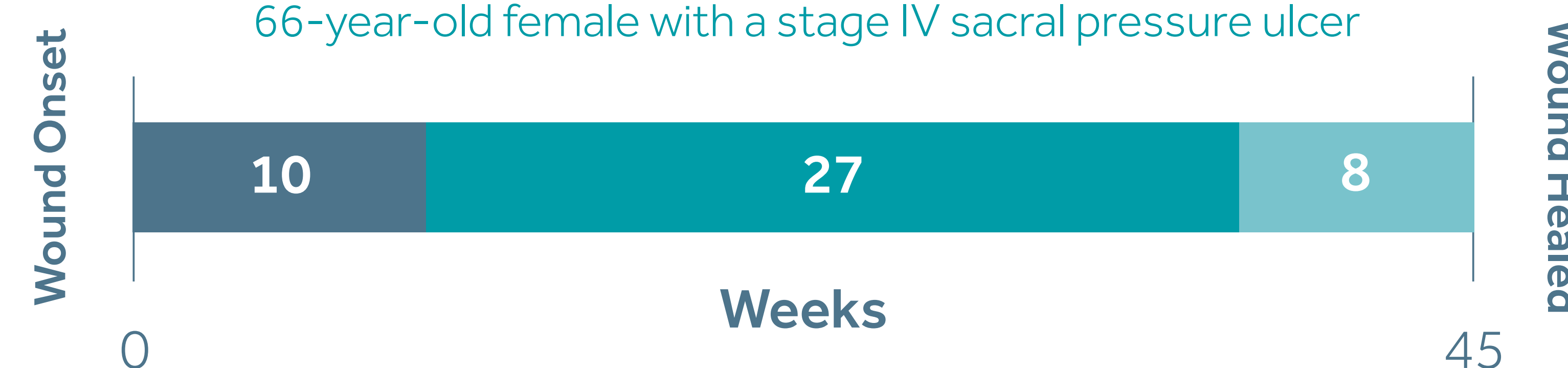
Case #2:

60-year-old male with a stage IV sacral pressure ulcer



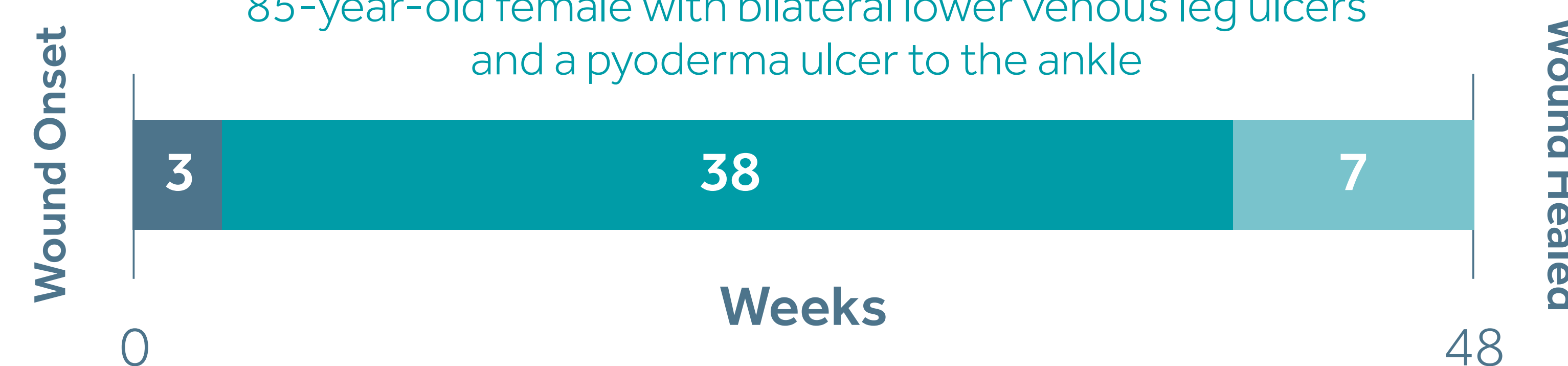
Case #3:

66-year-old female with a stage IV sacral pressure ulcer



Case #4:

85-year-old female with bilateral lower venous leg ulcers and a pyoderma ulcer to the ankle



OUTCOMES:

Prior to initiating HPN, patients in this case series had chronic non-healing wounds that persisted for an average of 32.5 weeks. Following HPN initiation, wound measurements improved and complete wound healing was achieved within 7-8 weeks. After documented wound closure, HPN therapy was continued for an additional 2 weeks to support complete tissue recovery and reduce the risk of recurrence. All four patients were discharged from their respective wound care centers upon completion of their final HPN infusion.

DISCUSSION:

Wound healing is an energy intensive process, with estimated caloric requirements ranging from 30–35 kcal/kg and increasing to as much as 40 kcal/kg in underweight individuals. These energy needs are influenced by multiple factors, including age, comorbid conditions, body weight, activity level, as well as the stage, severity, and number of wounds present. Beyond total caloric intake, macronutrient distribution is critical, as carbohydrates, proteins, and fats each serve distinct and essential roles in supporting effective wound repair. In the presence of chronic wounds, protein requirements may increase substantially by as much as 250% due to excessive protein losses and heightened metabolic demand (Seth et al., 2024).

A comprehensive nutrition assessment of all four patients revealed that each individual was either clinically malnourished or likely had an underlying condition impairing nutrient absorption. As a result, these patients were not receiving sufficient nutrients to support effective wound healing, contributing to their prolonged non-healing status. In this case series, the home parenteral nutrition (HPN) formulations were fully individualized for each patient, guided by weekly laboratory results and detailed nutritional assessments, to ensure delivery of the specific nutrients required to promote optimal wound healing.

REFERENCES:

Seth, I., Lim, B., Cevik, J., Gracias, D., Chua, M., Kenney, P. S., Rozen, W. M., & Cuomo, R. (2024). Impact of nutrition on skin wound healing and aesthetic outcomes: A comprehensive narrative review. JPRAS open, 39, 291–302. <https://doi.org/10.1016/j.jptra.2024.01.006>