

Multidisciplinary Perspectives in Peri-Amputation Limb Management

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Christine Murphy is a Registered Nurse and Nurse Specialized in Wound, Ostomy & Continence (NSWOC) with Canadian Nurses' Association certification. She studied tissue viability with professional practice at the undergraduate level and completed a Master of Clinical Science of Wound Healing degree at Western University. She currently works at an Ottawa Hospital, with a specialty in complex surgical and vascular surgery wounds. Additionally, She is an educator and mentor for health professionals interested in complex wound management.

Gustavo Azoubel completed his medical education in 2001 at the University of Pernambuco in Brazil and then trained as a general surgeon in Brazil. In 2006, he enrolled in the critical care medicine fellowship at Sunnybrook Health Sciences Centre/University of Toronto, graduating in 2007, when he was accepted to the general surgery program at the University of Toronto. He completed residency training in general and vascular surgery at the University of Toronto and holds Royal College of Physicians and Surgeons Certification in both disciplines. He is actively engaged in teaching undergraduate and postgraduate trainees and is a member of the residency committee of the vascular surgery residency program at the University of Toronto.

A Team Approach

Wound care is complicated and nuanced (Figure 1). Many patients with wounds, especially if caught early, can be managed in a primary care office when clinicians have enough knowledge of the condition. If wounds become non-healing, patients should be referred to wound clinics that have the resources, knowledge and experience necessary to identify and treat risk factors, comorbidities and other underlying etiologies. If wound healing still does not progress, referral to a tertiary wound clinic, often found in academic hospitals, should be made. These tertiary wound clinics often combine care from numerous specialists, including vascular surgeons, plastic surgeons, podiatric/orthopedic surgeons, infectious disease specialists, rheumatologists, hyperbaric medicine specialists, physical therapists, nurse practitioners, wound nurses and more.

While treating and making referrals to other facilities, health-care providers need to consider the integrity of continuity of care when patients are transferred among emergency rooms, wound clinics, community care and home care. If not managed proactively, these patients can be lost to follow-up.

Healing potential varies based on wound bacteria, blood perfusion and tissue mechanics, but is also affected by the host (patient). Host factors, such as socioeconomic status, nutritional status and access to health care, can be more difficult to identify and address, and can often contribute to a wound that does not heal in a timely manner.

Figure 1. The ARRT of Wound Care

Acknowledge	A single specialty is incapable of managing a chronic wound
Recognize	Lack of wound progression
Refer	Involve other specialists in the care of the wound
Transfer	Timely transfer of care to a secondary or tertiary centre

Vascular Surgery

Vascular surgeons have many roles in managing patients with ischemic wounds, including diagnostic evaluation, staging and imaging of patients with suspected chronic limb-threatening ischemia; wound and tissue loss classification; vascular anatomy imaging; non-invasive surgeries; digital subtraction angiography (DSA) (especially in tibial disease); and evidence-based revascularization.

According to Centers for Disease Control and Prevention (2011), comprehensive foot care programs reduce amputation rates by 45–85%. Rather than focusing on salvaging a limb, clinicians must prioritize limb function preservation. This must take into account wound factors, but also the patient's expectations and realistic functional capacity. When preservation cannot be achieved, amputation is an option that must not be considered a failure.

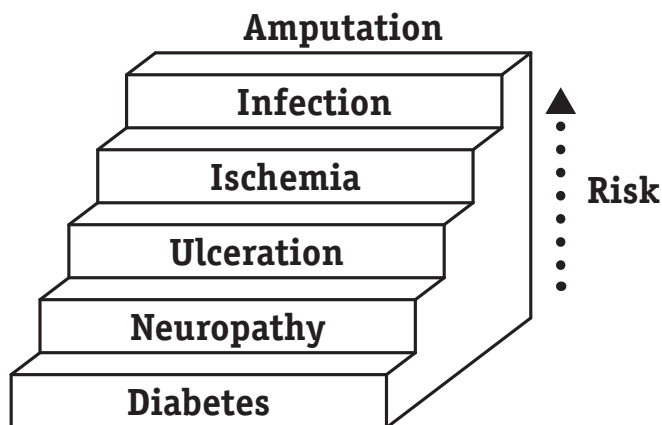
Chronic Limb-threatening Ischemia (CLTI) and Amputation

The presence of ischemia often delays wound healing and increases amputation risk. A multidisciplinary approach is fundamental in managing patients with CLTI and preventing major tissue loss. No single specialist possesses the skills to manage these patients alone. Diagnostic evaluation, staging and imaging of patients with suspected CLTI, leading to evidence-based revascularization, are integral parts of successful treatment.

Protocol-driven Care

It is important to use tools and systems that have proven effective in the management of these complicated patients and wounds and the prevention of amputation (Figure 2). The WIFI (wound, ischemia, foot infection) system stratifies amputation risk according to wound extent, degree of ischemia, and presence and severity of foot infection. Once a WIFI classification is made, the Global Limb Anatomic Staging System (GLASS) can be used to stage infrainguinal disease pattern in chronic limb-threatening ischemia and define the optimal strategy for revascularization. Clinicians can use these patient risk-estimation tools to determine candidacy for limb preservation, periprocedural risk and life expectancy, keeping in mind the need to reassess if wound healing stalls, or the wound deteriorates or recurs.

Figure 2. Stairway to Amputation



Adapted from Rogers LC, Armstrong DG. Podiatry care. In: Cronenwett JL, Johnston KW, editors. Rutherford's Vascular Surgery. 7th ed. Philadelphia: Saunders Elsevier; 2010. p. 1747–1760.

Advanced Therapies

Vascular disease can cause specific impairments, including in collagen linking (scaffold rebuilding),

growth factor and cell availability, biofilm clearance, bacterial environment, nutrient and oxygen availability, waste clearance, neuropathy and edema. When treating these complex wounds, time is tissue; early, proactive, aggressive wound planning is essential for optimal care. Advanced therapies are a critical component of a clinician's toolkit for success for managing wounds, especially in patients with vascular challenges.

Negative pressure wound therapy (NPWT) can be used for vascular incision support. This technology is a real-time pressure feedback system that adjusts pump output to compensate for wound distance, wound position, exudate characteristics and patient movement. 3M™ V.A.C.® Therapy applies negative pressure to uniformly draw the wound closed (wound contraction), and may help reduce localized edema, promote perfusion, promote granulation tissue, reduce wound size and provide an external barrier to contamination.

Limb loss is associated with high mortality and morbidity. Every effort to preserve the limb should be pursued, but delaying amputation when one is obviously needed has negative implications.

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