



SHUTTERSTOCK / ARIA SANDI HASIM

# Debridement options for the interprofessional team

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**Abstract:** Debridement is a core component of chronic wound management. Although various debridement methods exist, each carries a unique patient risk level. This article discusses the different normal tissue components that are critical to safe debridement practice, various methods of wound debridement for nurses, and the importance of an interprofessional team and consulting a wound specialist.

**Keywords:** debridement, interprofessional team, nursing, scope of practice, wounds

## Case study

MT was a 67-year-old male with a health history that included rectal cancer, obesity, alcohol use disorder, and type 2 diabetes (T2DM). He was a previous smoker but quit smoking 20 years ago. His family history included a sister who died from sepsis postamputation secondary to T2DM-related complications.

MT was admitted for home nursing services with orders for wound care for

a small skin tear on his fifth toe (see Fifth toe affected only). The cover dressing that was ordered and applied was a standard silicone-bordered foam, which facilitates moist wound healing, thereby promoting autolytic debridement. As the nurses involved in the care of MT had no advanced training in wound care or in-depth knowledge of wound care dressings, the use of this foam was initiated as ordered and continued despite ongoing significant

wound deterioration. At no time was a comprehensive patient or wound assessment completed while MT was admitted to home care, nor was a referral to a wound specialist made. This resulted in recurrent infections, frequent trips to the ED, and ultimately to a below-knee amputation (BKA) (see Amputation stump).

Wound debridement is an integral part of overall wound management. This first appeared as a clinical term in 17th-century France.<sup>1</sup> Today, it is referenced in various wound management frameworks as a critical element of wound bed preparation (WBP).<sup>2</sup> Debridement refers to the removal of nonviable tissue; biofilms (complex and highly resistant colonies of bacteria surrounded by a protective glycocalyx); planktonic bacteria; debris; and other proinflammatory components from the wound bed, edges, or surrounding skin. Nonviable tissue harbors bac-

## Amputation stump



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teria, including biofilms, necessitating debridement as a routine part of wound management.<sup>2,3</sup> Allowing nonviable tissue and other proin-

flammatory components to remain in the wound bed not only increases the potential for wound infection but also increases the potential for delayed wound closure. Debridement may also be needed to expose the base of the wound for better visualization to develop a comprehensive and accurate management plan.

Initiation of any debridement requires expertise, experience, and access to advanced wound care dressings or specialized equipment, such as a scalpel, curette, or scissors.

This article discusses the different normal tissue components critical to safe debridement practice, methods of wound debridement for nurses, and the importance of collaborating with a wound specialist and an interprofessional team.

### WBP framework

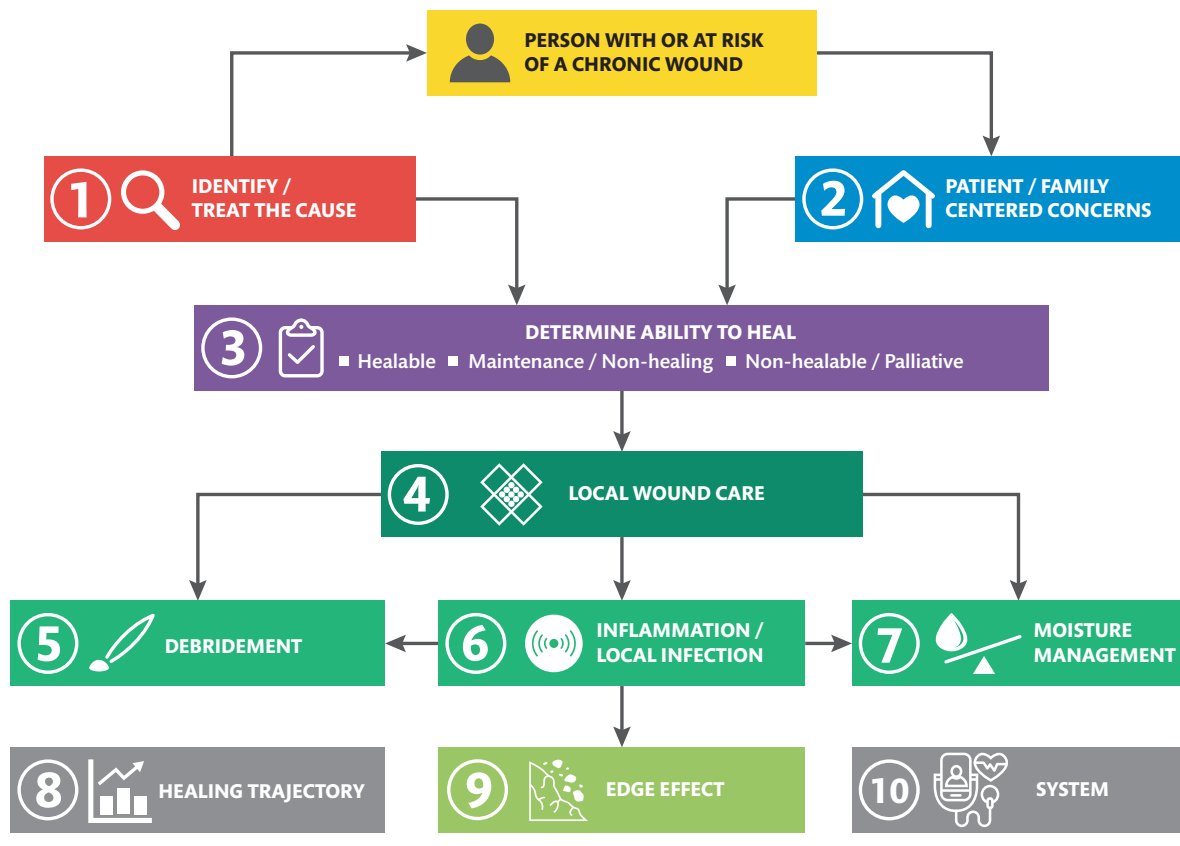
The WBP framework, first published in the early 2000s and updated in 2022, is a compilation of recommendations developed by a panel of international subject-matter experts (see *Wound Bed Preparation 2021*

## Fifth toe affected only



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## Wound Bed Preparation 2021 Paradigm<sup>2</sup>



Note. WBP 2021<sup>2</sup> with updated and numbered paradigm version (2022) reproduced with permission of WoundPedia.

Paradigm).<sup>2</sup> It provides a systematic approach to assessing chronic wounds while ensuring patients remain involved in their care.<sup>2</sup> Establishing common goals with patients empowers them to make informed decisions about chronic wound management. When patients and families are active members of the care team, adherence increases, outcomes improve, and patients are likelier to experience a greater sense of well-being.<sup>4</sup>

The WBP framework begins with conducting a comprehensive wound assessment to ascertain and treat the underlying etiology, manage any additional complicating factors, and identify existing external barriers to healing, including access to necessary resources. Addressing patient or family concerns is important before

moving on to local wound management. Nurses should ask about and actively listen to the patient and family's primary concerns, as healing will not occur until the primary concerns are dealt with.

The potential for wound healing must be determined once all information is obtained from the patient and wound assessment. Wound status falls into one of three categories: healable, nonhealing (maintenance), or nonhealable (see *Wound classifications*).<sup>5</sup> There are several factors to consider when assessing healing potential, including the degree of blood flow and perfusion to the tissues, the ability to correct causative factors (internal or external), and the patient's and family's ability and willingness to follow the wound teams' recom-

mendations.<sup>5,6</sup> In addition to patient factors, health system factors must be considered at all levels, including the availability of local; regional; and state, provincial, or territorial health-care system resources.<sup>7</sup>

As wound status is dynamic, these steps are not only for the initial assessment but should also be revisited with each subsequent assessment thereafter.

Regarding the case study, several factors culminated in a BKA for MT. On admission to in-home nursing services, he did not receive a comprehensive wound or lower extremity assessment to determine the vascular status and degree of perfusion to his lower extremity. MT had clinical signs of compromised circulation, including dependent rubor, nonpalpable

pedal pulses, peripheral edema, and a foot cool to the touch. Neuropathy was present bilaterally. Had an initial comprehensive assessment been conducted, these factors would have been identified and the wound deemed maintenance which would make moist wound healing contraindicated. Despite wound deterioration, the lack of regular wound reassessment resulted in the continued use of silicone-bordered foam dressings and contributed to a BKA.

### Debridement methods

Debridement methods range from supporting the body's natural autolytic process to using exogenous enzymes, larvae, or sharp instruments to remove viable and nonviable tissue selectively. All debridement

methods may be indicated in clinical practice, yet determining the most appropriate method will depend on the patient's goals and preferences;<sup>7</sup> the nurse's competency; the care setting; the available resources, such as nurses and the interprofessional team; and environmental factors.<sup>3</sup>

For example, sharp surgical debridement is the fastest and most selective method of debridement;<sup>7</sup> however, it would not be an appropriate method for the home setting (environmental) due to safety issues and lack of infection prevention and control. Conservative sharp wound debridement (CSWD) is often preferred for the home setting, but this method requires comprehensive training, and the nurses available may not be competent to perform

this method. This would then make it an inappropriate choice. In both examples, an alternative method of debridement would need to be selected.

All methods of debridement carry varying levels of risk for the patient. Advanced education geared toward chronic wound management, including debridement methods, is necessary for any nurse to acquire competence in initiating and performing debridement.<sup>7</sup> This advanced training requires both theoretical and practical education components. Continued competency and ongoing education, including skills labs or practicums, should occur at least annually. Any nurse performing debridement is recommended to have advanced education

## Wound classifications<sup>5</sup>

Status	Definition	Local wound treatment	Example
<b>Healable</b>	Patient has the physiologic capacity to heal and is adherent to the plan of care (adequate vascular supply and treatment of the cause).	<ul style="list-style-type: none"> <li>• Provide moist wound healing</li> <li>• Treat infection/inflammation</li> <li>• Promote granulation</li> <li>• Use acute surgical debridement when appropriate</li> <li>• Use autolytic debridement when appropriate.</li> </ul>	A person with a DFU: <ul style="list-style-type: none"> <li>• where A1C is controlled (under 12, ideally 7-8)</li> <li>• vascular supply and adequate perfusion have been established (referral to a wound specialist is required for this assessment)</li> <li>• infection (superficial, deep, and surrounding) is absent or treated</li> <li>• plantar pressure redistribution has been initiated (patient has appropriate footwear, pressure redistributing devices, and wearing socks)</li> <li>• check calluses for source of increased pressure.</li> </ul>
<b>Maintenance</b>	Patient has the physiologic capacity to heal, but external factors (patient or healthcare system) are present and impede healing.	<ul style="list-style-type: none"> <li>• Decrease moisture</li> <li>• Bacterial reduction</li> <li>• Prevent deterioration</li> <li>• Improve patient quality of life, including managing pain, exudate, and odor control</li> <li>• Conservative surgical debridement for slough, not acute surgical debridement.</li> </ul>	Pressure injury on the ischial tuberosities in a patient physically able to heal but being able to remain active is important to the patient and therefore, pressure is suboptimally redistributed.
<b>Nonhealable</b>	Patient does not have the physiologic capacity to heal: <ul style="list-style-type: none"> <li>• inadequate blood supply that cannot be repaired</li> <li>• cause cannot be corrected.</li> </ul>	<ul style="list-style-type: none"> <li>• Decrease moisture</li> <li>• Bacterial reduction</li> <li>• Prevent wound deterioration</li> <li>• Optimize comfort</li> <li>• Only conservative surgical debridement of slough.</li> </ul>	Fungating tumors due to uncontrolled malignancy, arterial wounds where revascularization is no longer an option.

Abbreviation: DFU = diabetic foot ulcer. Adapted from Sibbald et al. (2011)<sup>5</sup> with permission.

from a recognized, curriculum-based program, a comprehensive preceptorship with a qualified mentor (preferably one with the same scope of practice), access to an interprofessional team (in-person or virtual), and the legal scope of practice to perform debridement, as determined by regulatory bodies and healthcare setting policies.<sup>8-10</sup>

MT's care focused solely on dressing the wound on the toe. There was no request for a referral to a wound specialist despite an order for a dressing that promotes moist wound healing (autolytic debridement). This lack of knowledge of debridement and advanced dressings led to the continued inappropriate use of products and deterioration of the wound and foot, as MT did not have sufficient perfusion to heal.

### Debridement considerations

Nonviable tissue can prevent a healable wound from following a normal healing trajectory.

When using any form of debridement, the nurse should assess the psychological (ability to cope) and physiologic impact of the respective chronic disease processes, investigate tissue perfusion and differentiate between wound infection and inflammation, identify the anatomical location of underlying tissues and structures, distinguish the various tissue types in the wound base, and involve the appropriate healthcare professionals who can initiate and perform the selected debridement method should they not be competent in delivering the most appropriate method.<sup>6</sup>

The nurse need also consider appropriate clinical settings for each debridement method, evaluate patient and system factors, such as their health history, current medications, and access to specialized care. Lastly, informed consent must be obtained from the patient to perform any form of debridement, including discussing all associated risks, ben-

efits, alternative treatments, and expected outcomes.<sup>8,11,12</sup>

Debridement should never be initiated on wounds below the knee before a comprehensive lower extremity assessment is completed to determine vascular status and ensure there is sufficient perfusion to the affected area,<sup>7</sup> especially in patients with known conditions that impact the delivery of oxygenated blood, including, peripheral arterial disease, diabetes, and chronic kidney disease. The lower extremity vascular assessment is necessary to determine the healability of a wound and can include calculation of an ankle-brachial index or assessment of pedal pulse waveforms via a handheld Doppler.<sup>13,14</sup>

Clinical signs of vascular integrity include the absence of dependent rubor and elevation pallor, a warm extremity, and a normal capillary refill time (less than 3 seconds). Signs of vascular compromise may include dependent rubor and elevation pallor, a cool extremity, and a capillary refill time of greater than 3 seconds.

Inappropriate debridement of a wound without identification of the etiology (and complicating factors) can result in complications such as deep tissue infection, limb loss, exsanguination, and in some cases death. While many nurses are educated to conduct a lower extremity assessment, nurses must also have sufficient knowledge and education in interpreting the findings and using the information in conjunction with the overall health assessment. For example, vascular flow may appear sufficient on lower extremity assessment; however, a high A1C may mask the clinical signs of deep and surrounding infection.<sup>15</sup>

The A1C measures the average blood glucose level over 90 days (normal A1C is less than 5.7%, with 5.7% to 6.4% borderline or prediabetes, a value of 6.5% or higher is often linked to clinical diabetes, and

over 8% delayed wound healing begins).<sup>16</sup> Therefore, obtaining recent lab values is a necessary component of an initial wound assessment. Many patients are unaware of their A1C, so if blood work results are not received from the primary care provider, the nurse needs to request and wait for new blood work prior to determining the wound as healable.<sup>8</sup>

In the case of MT, the wound was below the knee. A lower extremity assessment, including vascular status and tissue perfusion, should have been established prior to the initiation of autolytic debridement. All wounds below the knee, regardless of etiology, should be considered nonhealing and a maintenance protocol initiated until further assessments can be completed. The local wound management for a maintenance wound is very different from a healable wound and does not include debridement, as goals of care should include keeping the area dry and preventing deterioration.<sup>2</sup> Patients with complex comorbidities, especially those with diabetes, are at higher risk of infection. Inappropriate initiation of debridement, including autolytic debridement through the use of advanced wound dressings, on a wound before establishing potential for healing can lead to infection resulting in lower extremity loss and other complications.

### Wound bed tissue types

Nurses performing debridement should be able to identify and distinguish healthy tissue from nonviable tissue. There are many tissue types, and there may be further categories within each type. Accurate identification of tissues in the wound bed is necessary to anticipate healing time, infection risk, and safe and appropriate care plans.<sup>14</sup> In some cases, CSWD and sharp surgical debridement carry the highest risk of unintentional injury to underlying structures, including blood vessels,

muscles, tendons, and nerves, and may result in loss of function.<sup>8,11</sup>

### *Epithelial tissue*

This tissue appears pale pink-whitish epithelial tissue at the wound edge or white islands of epithelial tissue at the opening of hair follicles within the granulation tissue in the wound bed.<sup>11,17</sup>

Management of epithelial tissue requires protection and maintenance of adequate moisture. An advancing edge (often a pink-purple color but, if overhydrated, will be white due to maceration) usually indicates a reasonably healthy wound bed. In contrast, rolled wound edges (epibole) or unattached edges indicate the wound bed is not adequate for cell migration. For nonadvancing wound edges, consultation with the wound specialist is warranted.<sup>11</sup>

### *Granulation tissue*

Granulation tissue is required for wounds to heal by secondary intention. When there is too much moisture or bacteria in the wound bed, overgrowth of granulation tissue occurs (hypergranulation tissue). It is important to note that any tissue above the skin level is considered abnormal, will delay reepithelization, and should be referred to a wound specialist.<sup>11</sup>

Healthy pink granulation tissue is firm with the appearance of granules or little buds protruding as new blood vessels develop.<sup>17</sup>

Unhealthy granulation tissue may appear bright red, dark, or dusky in color and bleed easily (friable).<sup>18</sup> Bright red to pale pink hypergranulation tissue, is often shiny, soft, and often extends above the level of the surrounding skin.<sup>19</sup>

### *Adipose tissue*

Adipose tissue, or fat, is found in the subcutaneous layer of skin. The color of adipose tissue will change when damaged or dehydrated due to inadequate moisture, ischemia, or infection.



## **Nurses should identify and understand their professional scope of practice, including their ability to initiate or perform care below the dermis.**

Healthy tissue is yellowish/white (except for newborns: it is brown) and globular adipose tissue. Unhealthy adipose tissue is darker yellow.<sup>11</sup>

### *Fascia*

Fascia is a dense connective tissue adjoining muscle and organs and can be found directly beneath the subcutaneous layer. Unintentional debridement of fascia significantly increases the risk of infection, as microbes spread easily along this damaged tissue.<sup>20</sup> Fascia can be difficult to identify in a wound and can easily be mistaken as fibrinous tissue or slough by a novice nurse or a nurse not appropriately prepared for this procedure.<sup>11</sup>

Healthy fascia is shiny and white, appearing as fibrinous bands or a sheath. Unhealthy fascia over muscle will appear as a thin layer of fibrinous bands over striated and bright red muscle with a firm, rebound feel on palpation.<sup>20</sup>

### *Muscle*

Healthy muscle is striated or smooth with a red-pink or pink

color, whereas unhealthy muscle appears pale.<sup>11</sup>

Asking a patient to contract the muscle in and around the wound can confirm muscle is in fact exposed. Healthy muscle appears similar to granulation tissue and can be inappropriately identified as such.

### *Tendon or ligament*

Ensuring tendons remain moist is crucial. Unhealthy tendon can look similar to thin, loosely adherent, white/yellow or darker slough and be debrided mistakenly.<sup>11</sup>

Tendons can be located very close to the skin's surface in some areas and are commonly damaged during sharp debridement by a nurse not appropriately trained.<sup>21</sup> Like muscle, when asking the patient to move the associated body part, tendons can be seen to contract in the wound bed.

### *Bone*

A healthy bone is white, pale yellow, and hard. An unhealthy bone is rough, gritty, or soft with loose fragments on palpation or probing. Exposed bone can indicate potential osteomyelitis, especially in patients with diabetes and a foot ulcer.<sup>11</sup>

### *Dead tissue (slough/escar)*

Soft slough can be adherent with a yellow color or stringy, often white color. When white in color, slough can be mistaken for tendon.<sup>17</sup> Hard eschar may be black or brown in color, with excessive moisture.

Slough and eschar appear brown-grey-cream.<sup>11</sup>

## **Nursing implications**

Nurses should identify and understand their professional scope of practice, including their ability to initiate or perform care below the dermis. The scope of practice for all nurses differs by licensure, state or provincial/territorial legislation, organizational guidelines and policies or medical directives, and individual

nursing experience. A nurse must be aware and accountable for their own scope of practice, particularly regarding CSWD.<sup>8-10</sup>

Although CSWD may carry a moderate level of risk to a patient, inappropriate dressing selection facilitating autolytic debridement in a nonhealable wound can have similarly devastating effects.

For nurses to achieve independent competency in wound debridement, they must have specialized knowledge, skills, and judgment from a competency-based education program.<sup>8</sup> Curriculum-based and competency-driven nursing educational programs exist for advanced wound care and debridement. To obtain competency in performing debridement, the nurse must successfully complete an educational program that includes both a theoretical and practical (or skills-based) component.<sup>8-10</sup> Autodidactic learning alone for the care of chronic wounds, particularly for debridement, is insufficient in achieving competency.<sup>21,22</sup>

In addition, nurses are responsible for maintaining their competency through continuing education. Nursing certification must include insight and reflection into their practice to determine competency in a skill or the need for further education and mentoring.

Regardless of what dressing is ordered, nurses are responsible for conducting a comprehensive assessment to ensure the product being ordered is appropriate for the patient and the wound. It is imperative nurses have education and training specific to wound care and understand the mechanism of action of wound care dressings to prevent cases such as MT from occurring.

In the case of MT, a silicone-bordered foam was ordered. This dressing facilitates autolytic debridement; however, MT had various signs of inadequate perfusion making autolytic debridement contraindicated. The nurse in this case should have

requested a change in orders or referral to a wound specialist, as they had no additional education or training in chronic wound management.

#### *Interprofessional collaborative care*

Wound care is multifactorial and requires collaboration among a variety of healthcare professionals. Nurses should consider multiple host- and wound-related factors when assessing for appropriate specialist referrals. Across the continuum of care, nurses are typically the primary healthcare professional responsible for patients' wound assessment and the day-to-day management of chronic wounds. Using a specialized framework can not only provide a systematic approach to care but also standardize communication among interprofessional team members and enable early identification of a stalled wound, prompting the need for reassessment and potential care plan changes.

Furthermore, with proper education and training, an enhanced ability to think critically can facilitate timely referral to the wound specialist, who can then conduct a more comprehensive patient and wound assessment that considers metabolic abnormalities; treatment or correction of the cause; patient-centered concerns, including pain management and activities of daily living; standardized wound documentation and reporting; local wound care, including debridement, and management of infection, inflammation, and moisture; interprofessional consultation; adjunctive or advanced therapies for stalled healable wounds; and surface area reduction.<sup>8,23</sup>

Regarding the latter, healing trajectory, in general, should decrease by 20% to 40% monthly at a minimum unless alternate literature exists for specific etiologies.<sup>2</sup> For example, venous leg ulcers managed with compression therapy healing trajectory should achieve a minimum of 30% surface area reduction monthly.<sup>23</sup>

In MT's case, including an interprofessional team from the onset may have resulted in a different outcome, as all contributing underlying factors could have been addressed, such as diabetes management and assessment for lower extremity revascularization.

#### *Debridement with inadequate resources*

Consider the setting or environment and patient circumstances when deciding the most appropriate type of debridement modality. Sharp surgical debridement is often unsuitable in community settings such as home care and long-term care due to poor lighting and the inability to maintain sterile instruments and adjust furniture for ergonomic safety. Controlled settings in outpatient or ambulatory clinics and hospitals are often preferred when sharp, higher-risk methods of debridement are considered. Such settings provide a safer environment for the patient and healthcare team when performing higher-risk forms of debridement. In addition, these settings are more likely to have the necessary equipment to control an adverse event such as bleeding or BP changes.

Patients living in rural settings may not have access to a wound specialist, or the patient may lack the ability to travel due to limited mobility, transportation, or financial status. Autolytic debridement is an appropriate method for consideration in these circumstances, as it simply relies on the principles of moist wound healing and these dressings are often readily available in home and community settings. Although autolytic debridement requires the simple application of moisture-promoting or -retaining dressings, it is still equally important for the nurse to ensure they have the necessary knowledge on the appropriate use of the recommended products for care plan development. Autolytic debridement is considered the slowest form of

debridement, as it requires time to allow the body to use its natural processes. The ongoing oversight by a wound specialist or interprofessional team may still be necessary to ensure a healing trajectory is maintained and the wound remains infection-free. As autolytic debridement takes the greatest amount of time and uses advanced dressings, there may be financial limitations for patients without public or third-party funding.

In some situations, after a thorough environmental assessment and when deemed safe for the patient and healthcare professional, CSWD may be performed in the home by a nurse with appropriate competency. Most CSWD performed in the home does not regularly include debriding into the level of the dermis.

Callus reduction is among the top three reasons for CSWD in the home and community setting, likely due to the high prevalence of diabetic foot ulcers (see *Callus reduction*).<sup>24</sup>

Regular follow-up appointments can be challenging for patients receiving wound care interventions, especially those living in rural or remote areas. Virtual or blended care models can be practical and increase access to regular appointments with wound specialists and other members of the interprofessional team for community-dwelling patients. Existing models have demonstrated more timely access to specialized care thereby reducing wound-related infection, length of admission to nursing services, and cost of product utilization.<sup>25,26</sup> These models should remain a viable source of accessing specialized wound care and be considered for all areas, especially rural and remote communities.

## Conclusion

The WBP framework provides a clear, systematic direction for managing chronic wounds. This framework places the patient at the cen-

## Callus reduction



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ter of care, making them an integral member of the wound care team. A comprehensive patient and wound care assessment is essential for safe and effective quality care. Assessing one's professional scope of practice and individual competency is a nursing requirement of all state and provincial/territorial nursing regulatory bodies when considering initiating or performing debridement in the care and management of chronic wounds.

Involving a wound specialist and interprofessional team further helps to mitigate risk to the patient and ensures appropriate utilization of debridement methods. Placing the patient at the center of care plan development can increase adherence and reduce adverse outcomes for the patient, the nurse, and the healthcare system. ■

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