SUMMER 2016
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Wound Care CANADA

THE OFFICIAL PUBLICATION OF THE CANADIAN ASSOCIATION OF WOUND CARE

A New Way of Looking at Pressure Injuries:
The NPUAP Revisions Explained

Case-based Learning in Today's Educational Environment

PAD: What Every Clinician Needs to Know

Biofilms in Chronic Wounds

Canadian Association of Wound Care
Association canadienne du soin des plaies

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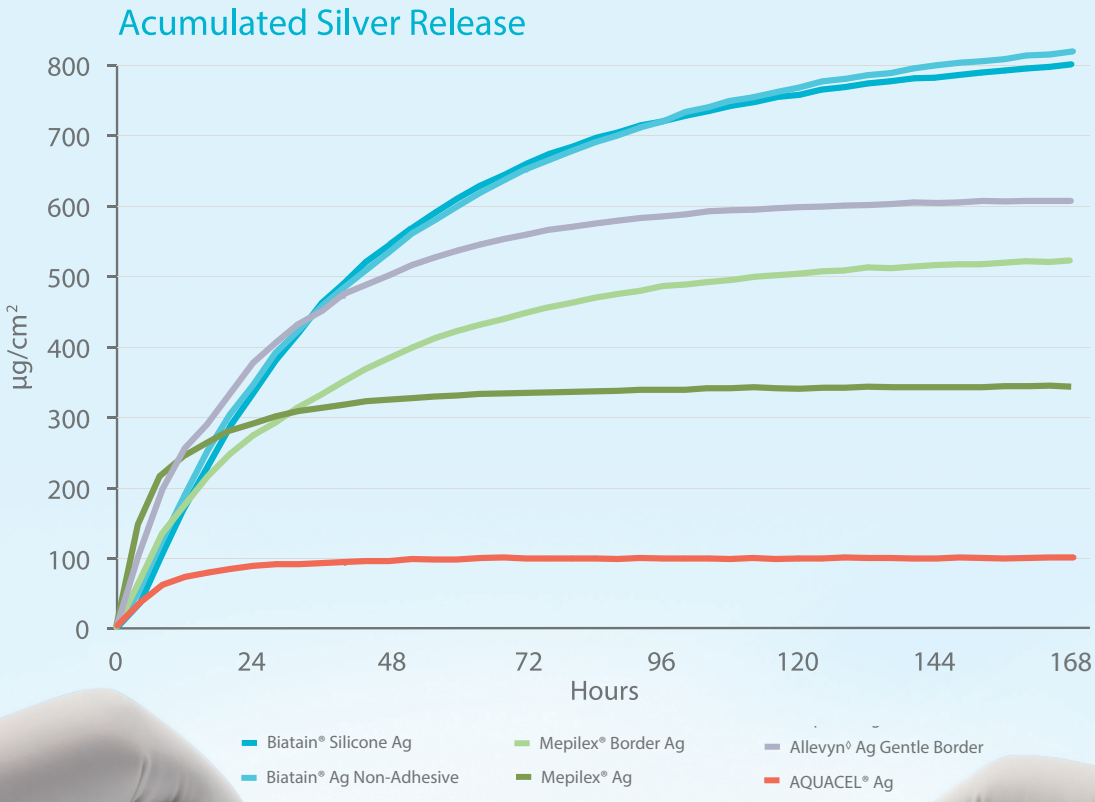
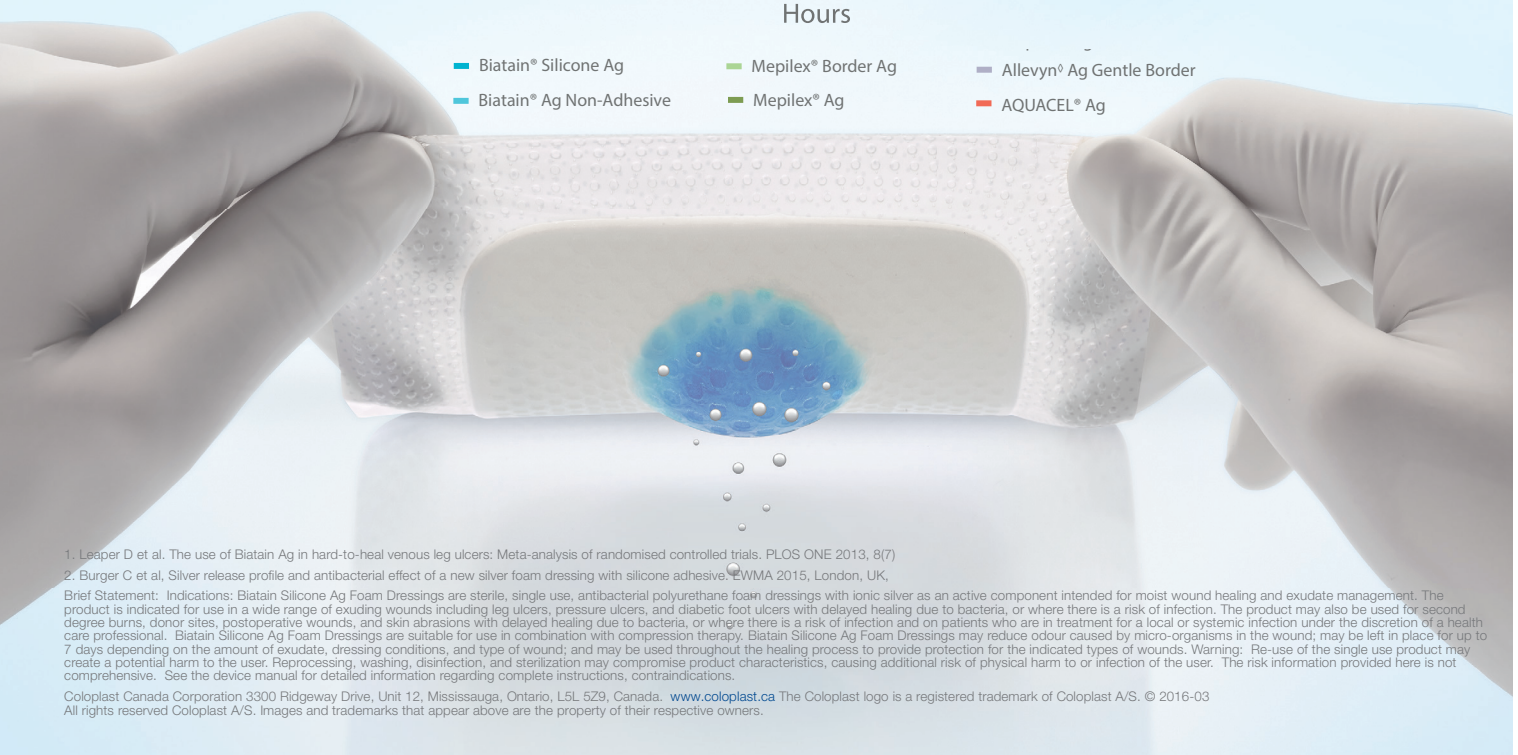
Biatain® Silicone Ag has demonstrated the highest accumulated sustained silver release among competitors starting from 37 hours after application and up to 168 hours (7 days).[1,2]





1. Leaper D et al. The use of Biatain Ag in hard-to-heal venous leg ulcers: Meta-analysis of randomised controlled trials. PLOS ONE 2013, 8(7)

2. Burger C et al, Silver release profile and antibacterial effect of a new silver foam dressing with silicone adhesive. EWMA 2015, London, UK,

Brief Statement: Indications: Biatain Silicone Ag Foam Dressings are sterile, single use, antibacterial polyurethane foam dressings with ionic silver as an active component intended for moist wound healing and exudate management. The product is indicated for use in a wide range of exuding wounds including leg ulcers, pressure ulcers, and diabetic foot ulcers with delayed healing due to bacteria, or where there is a risk of infection. The product may also be used for second degree burns, donor sites, postoperative wounds, and skin abrasions with delayed healing due to bacteria, or where there is a risk of infection and on patients who are in treatment for a local or systemic infection under the discretion of a health care professional. Biatain Silicone Ag Foam Dressings are suitable for use in combination with compression therapy. Biatain Silicone Ag Foam Dressings may reduce odour caused by micro-organisms in the wound; may be left in place for up to 7 days depending on the amount of exudate, dressing conditions, and type of wound; and may be used throughout the healing process to provide protection for the indicated types of wounds. Warning: Re-use of the single use product may create a potential harm to the user. Reprocessing, washing, disinfection, and sterilization may compromise product characteristics, causing additional risk of physical harm to or infection of the user. The risk information provided here is not comprehensive. See the device manual for detailed information regarding complete instructions, contraindications.

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The Canadian Association of Wound Care (www.cawc.net) is a non-profit organization of health-care professionals, industry participants, patients and caregivers dedicated to the advancement of wound prevention and care in Canada.

The CAWC was formed in 1995, and its official meeting is the CAWC annual conference held in Canada each year. The association's efforts are focused on four key areas: education, research, advocacy and awareness, partnerships.

Don't Miss Out

Each time a new issue becomes available, subscribers will be notified by an email that contains a live link to the online magazine. If you are not already a subscriber, send an email to info@cawc.net to get on the list. **It's free!**

Niagara Falls 2016

Join us for four full days of skin and wound education and networking!

This year's Canadian Association of Wound Care conference is in beautiful Niagara Falls, Ontario! Come join us for our 22nd Annual Conference, at the Niagara Fallsview Casino Resort, November 3 – 6, 2016.

Why should you attend?

- Take part in evidence-based wound education regardless of level of expertise or area of practice
- Learn, share and enjoy a stimulating and challenging environment
- Enhance your practice through new products and techniques
- Network with colleagues to share successes and challenges
- Return to your practice with new perspectives on improving patient outcomes

Want a really intensive experience?

Attend CAWC Boot Camp

For those who are new to wound care, we recommend an intensive and varied learning experience—all under one roof during the week of conference.

Part 1, November 1 to 2: Attend our two-day case-based basic course called "Changing Practice through Applied Knowledge."

Part 2, November 3 to 6: Spend the next four days at conference for more learning and networking.

Discounts are available to participants attending both events. Please visit the website at http://cawc.net/en/index.php/conference/registration/ for registration details.

Go to http://cawc.net/en/index.php/conference/ for more information and to register.

CAWC·ACSP

News from Our Industry Partners

Integra LifeSciences Live Webcast

Integra LifeSciences is dedicated to limiting uncertainty for clinicians so they can concentrate on providing the best patient care. Integra offers innovative solutions, including leading plastic and regenerative technologies, specialty surgical solutions, orthopedics and tissue technologies.

Integra would like to invite CAWC members to join our live webcast on September 13, 2016, at 5:30 p.m., with prominent U.S. vascular surgeon and investigator in the FOUNDER Study, Dr. John C. Lantis, on treating chronic wounds with Integra Dermal Regeneration Template (IDRT).

The FOUNDER Study (FOot Ulcer New DErmal Replacement Study), one of the largest to support the treatment of diabetic foot ulcers, demonstrated that, compared to conventional therapy, IDRT increases the incidence of wound closure by 59%, increases the average rate of wound size closure by 50% and reduces the median time to wound closure by five weeks. IDRT also healed patients with fewer applications, with 92% of those who healed requiring two applications or fewer.

About 3M

3M is fundamentally a science-based company. We produce thousands of imaginative products, and we're a leader in scores of markets—from health care and highway safety to office products and abrasives and adhesives. Our success begins with our ability to apply our technologies—often in combination—to an endless array of real-world customer needs. Of course, all of this is made possible by the people of 3M and their singular commitment to make life easier and better for people around the world.

New Educational Program from Coloplast

Coloplast Canada Corp. is proud to announce the launch of our all-new global wound and skin care educational program, the *Coloplast® Wound Institute* – ***CWI.***

Coloplast Wound Institute (CWI) is designed for health-care professionals working with wounds. The program aims to increase the knowledge of modern wound healing principles and improve the standard of care for patients with wounds around the world. It is a part of our ongoing dedication to supporting wound care education.

CWI contains 14* interactive courses covering various wound and skin care topics. Each course is developed in collaboration with world-renowned wound care experts, peer reviewed and endorsed by the European Wound Management Association (EWMA). To learn more about how you can make every day count towards improving patient outcomes with wound and skin care education, please visit https://www.coloplast.ca/cwi.

We Are Coloplast, We Believe in Skin

**Currently, 8 out of 14 courses have been launched in Canada.*

CAWC News

Advocacy Update

Our advocacy efforts to improve the lives of patients with wounds or at risk for wounds have been picking up momentum and we're starting to see results. In April, we held an enormously successful reception with members of the Ontario legislature where we outlined our recommendations for preventing amputations in persons with diabetic foot ulcers. Since this event, we have been in regular contact with the Ministry of Health and Long-Term Care to discuss next steps for getting policy changed. The ministry has publicly acknowledged "the key role of the Canadian Association of Wound Care in improving care for patients with wounds" and has ensured that we have representation on Health Quality Ontario, which is an advisory group to the ministry.

In addition to the attention of the ministry, the reception has led to pick-up in several news outlets with stories about the issue. CAWC Executive Director Mariam Botros has been interviewed by several media outlets and has put forward the CAWC's commitment to keeping this issue in the forefront of government and public awareness.

We are continuing our advocacy initiative regarding the prevention of diabetic foot complications in other provinces and territories across Canada. To that end, our team wrote a short piece aimed at patients on preventing diabetic foot complications that was published in a recent issue of *Maclean's*.

Stay tuned for more information on our progress.

New website coming soon!

Work on the revised CAWC website is coming along nicely and we are confident it will be up and running this fall. This completely redesigned site will allow quicker and easier navigation and more functions to support your information needs.

Stay tuned for more information and for our official launch date!

Overview of our Spring Educational Programs

This spring has been a busy time for the CAWC. We have delivered six educational workshops since January, including four focusing on general wound management and two on the prevention of diabetic foot complications.

The four general wound-focused workshops, called "Changing Practice through Applied Knowledge," hosted in Cobourg, ON; Moose Factory, ON; White Point, NS; and Stratford, ON,

Spread the Word!

Be part of our grassroots communications by connecting with us on our social media channels. Like, share and retweet our messages so your friends and colleagues become aware of the work we all do together.

CAWC:
Facebook: www.facebook.com/woundcarecanada
Twitter: @WoundCareCanada

Diabetic Foot Canada:
Facebook: www.facebook.com/DiabeticFootCanada
Twitter: @DiabeticFootCa

CAWC Conference

2016: Familiar yet New

This year's CAWC national conference, **Wounds Across the Continuum of Care: Access, Innovations and Integration**, is being held in Niagara Falls, ON, November 3 to 6, 2016.

For the first time we have a day where the sessions have been organized into learning blocks that cover patients' main points of access to the health system. These include: home and community care, primary care, long-term care and acute care. In addition to these blocks, we have included many sessions in our "You Asked for It" section, which features presentations on topics based on attendee feedback from prior conferences and other educational events.

The conference will also feature a pediatric wounds stream, overviews of the CAWC's Best Practice Recommendation updates, plenary sessions on a wide variety of topics and blocks on diabetes, pressure injuries and technology and innovation. In addition we have a special block called "How do you solve a problem like wound care," which addresses questions every clinician faces regardless of area of practice or special interest. Oral poster presentations will run for two full days and feature the latest research.

Our popular workshops are moving from the final afternoon of the conference to the evening of the first day, Thursday, November 3. Check out the agenda for details.

CAWC Boot Camp: One Week of Intensive Learning

For those who are new to wound care, we recommend an intensive and varied learning experience—all under one roof during the week of conference. Kick off the week by attending our two-day case-based basic course called "Changing Practice through Applied Knowledge." Stay for the next four days and soak in the knowledge, networking and inspiration that conference brings. At the end of the week you'll be exhausted, excited and ready to tackle the world of skin and wound management.

Discounts are available to participants attending both events. Please visit the website at http://cawc.net/en/index.php/conference/registration/ for registration details.

2017: Twice the Learning

Next year's national conference will take place November 16–19, 2017, in Mississauga, ON, and a brand new regional conference is planned for May 11–13, 2017, in Kamloops, BC. Both agendas will be packed with learning and networking opportunities. Mark your calendars now!

Niagara Falls 2016

delivered the most up-to-date information to approximately 300 health-care professionals.

The two workshops focused on the diabetic foot, called "Advances for the Management of Diabetic Foot Complications," took place in Mississauga, ON, and London, ON. Approximately 200 advanced health-care professionals took part.

Although our focus now shifts to preparing for conference, we look forward to delivering additional workshops in the fall, including the two-day workshop November 1 and 2 in Niagara Falls, ON.

If your facility or agency is interested in hosting one of these events, please contact education@cawc.net.

Coming Soon!

Best Practice Recommendations for the Prevention and Management of Wounds

By Katie Bassett, BMus, and Heather L Orsted, RN, BN, ET, MSc

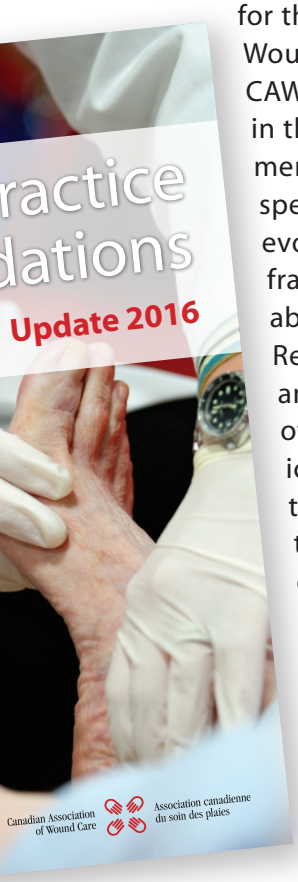
The prevention and management of wounds are challenging endeavours. There are well-defined factors that put patients at risk for developing wounds and for experiencing impaired or prolonged healing of existing wounds. These internal and external stressors include personal health, the environment and the context in which patients live, such as the availability of local and regional resources. Each of these factors, alone or in combination, can have an impact on skin integrity and wound healing.

Ultimately, it is up to the body to heal itself. This means that the purpose of the health-care team is to optimize the body's ability to prevent or heal a wound. Assessments and interventions that identify and acknowledge each patient's specific needs, culture and values allow those patients to be respected as experts in their own lives, assist the team in developing goals of care that meet patient needs and support self-management. It is necessary for health-care professionals to acknowledge and empower the patient as an active part of the health-care team and share goals that can be achieved through evidence-based care.[1]

As part of the current initiative to update the Canadian Association of Wound Care's (CAWC's) best practice recommendation articles (see "Best Practice Recommendations Update: 2016" in the previous issue of *Wound Care Canada*), the Best Practice Recommendations

(BPR) for Preparing the Wound Bed is also being updated to include a new process—a series of five consecutive steps—that supports patient-centred care. The updated article, entitled "Best Practice Recommendations for the Prevention and Management of Wounds," delivers the new process, called the Wound Management Cycle, as an updated and expanded version of the Wound Bed Prep (WBP) model. The Wound Management Cycle guides the clinician through a logical and systematic approach to the prevention and management of wounds, from the initial assessment to a sustainable plan targeting self-management. The Wound Management Cycle will be represented in a number of ways:

- in a visual format showing the five consecutive steps
- as a quick-reference guide (QRG) that outlines the five steps and associated recommendations
- through detailed discussion of the recommendations that incorporate the supporting evidence



The Best Practice Recommendation (BPR) for the Prevention and Management of Wounds will be made available by the CAWC to provide a framework for care in the complex area of wound management and skin health. BPR articles on specific wound-related etiologies have evolved from this new and revised framework and will also be made available later this year. The Best Practice Recommendations for the Prevention and Management of Wounds article and other BPRs are not intended to be clinical practice guidelines but a distillation of existing evidence that has been translated into a succinct practice article and bedside enabler (QRG) for easy mobilization into practice.

Reference

1. RNAO, 2015. Person- and Family-Centred Care: Supplement. Nursing Best Practice Guideline. Accessed February 01 2016. http://rnao.ca/bpg/guidelines/person-and-family-centred-care.

BPRs at the 2016 Conference

Make sure to register for the CAWC's annual conference in Niagara Falls, ON, November 3–6, 2016, for a first look at the complete set of 2016 revisions to the Best Practice Recommendation papers!

A special plenary session on Friday morning, entitled Setting the Stage: Revisiting the Pathway to Best Practice, will outline the evolution of the Wound Bed Prep model into the new Wound Management Cycle, which is at the foundation of each of the topic BPR papers.

On Saturday November 5, 2016, there will be sessions specifically focused on these updates. These sessions will feature talks led by authors of each paper to provide a synopsis of the content and to outline major changes from past versions.

The following BPR papers will be featured:

- Best Practice Recommendations for the Prevention, Diagnosis and Treatment of Diabetic Foot Ulcers
- Best Practice Recommendations for the Prevention and Management of Skin Tears
- Best Practice Recommendations for the Prevention and Management of Surgical Wound Complications
- Best Practice Recommendations for the Prevention and Management of Pressure Injuries

A New Way of Looking at Pressure Injuries

By Heather L. Orsted, RN, BA, BScN, MSc, ET;
Chester Ho, MD; and Janet L. Kuhnke, RN, BA, BScN, MSc, ET

In early April 2016, the National Pressure Ulcer Advisory Panel (NPUAP) announced several changes and updates related to pressure ulcers.[1]

Terminology

One of the most significant updates is a change in terminology from *pressure ulcer* to *pressure injury* to more accurately reflect the nature of pressure-related trauma. In the past, the term *pressure ulcer* was used to describe both stage 1 pressure ulcers and deep tissue injury, even though the skin is intact in both instances and no "ulcer" is present. Under the updated system, *pressure injury* is used to describe the results of all types of pressure-related trauma, regardless of whether the skin is intact or ulcerated.

The term *suspected* is no longer used to describe deep tissue pressure injuries.

Staging

The panel made updates to the stages of pressure injury. Stages are now identified using Arabic numbers 1, 2, 3, and 4 instead of Roman numerals.

Two types of pressure-related injury were given their own labels: medical device-related pressure injury and mucosal membrane pressure injury.

Medical Device-related Pressure Injury:
These injuries result from the

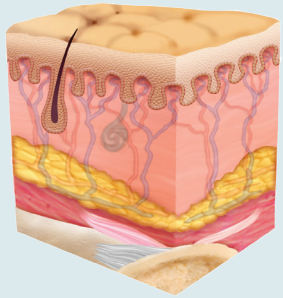
Pressure Injury Defined

Pressure injury is defined as "localized damage to the skin and/or underlying soft tissue usually over a bony prominence or related to a medical or other device. The injury can present as intact skin or an open ulcer and may be painful. The injury occurs as a result of intense and/or prolonged pressure or pressure in combination with shear. The tolerance of soft tissue for pressure and shear may also be affected by microclimate, nutrition, perfusion, co-morbidities and condition of the soft tissue."[1]

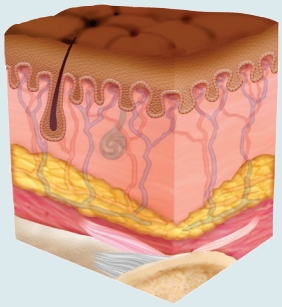
NPUAP Stages of Pressure Injury[1] – April 2016

Healthy Skin

Caucasian



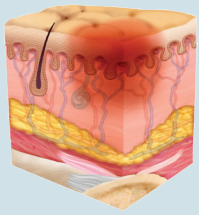
Non-Caucasian



Stage 1 Pressure Injury:
Non-blanchable erythema of intact skin

Intact skin with a localized area of non-blanchable erythema, which may appear differently in darkly pigmented skin. Presence of blanchable erythema or changes in sensation, temperature or firmness may precede visual changes. Colour changes do not include purple or maroon discolouration; these may indicate deep tissue pressure injury.

Caucasian



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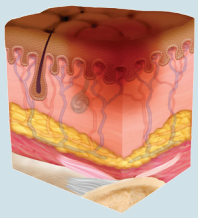
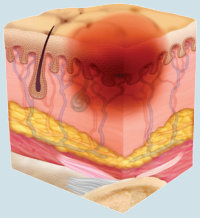
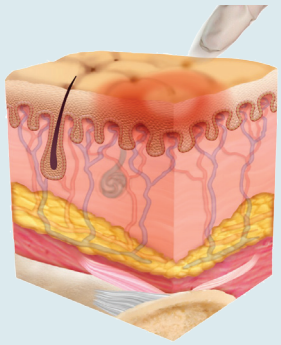


Edema

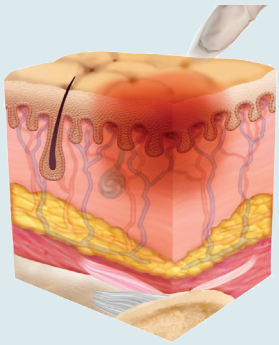


Blanchable and non-blanchable skin

Blanchable

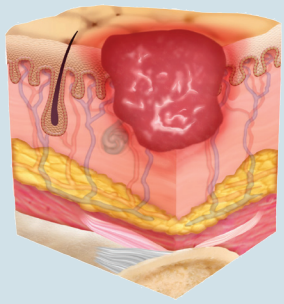


Non-blanchable



Stage 2 Pressure Injury:
Partial-thickness skin loss with exposed dermis

Partial-thickness loss of skin with exposed dermis. The wound bed is viable, pink or red, moist, and may also present as an intact or ruptured serum-filled blister. Adipose (fat) is not visible and deeper tissues are not visible. Granulation tissue, slough and eschar are not present. These injuries commonly result from adverse microclimate and shear in the skin over the pelvis and shear in the heel.



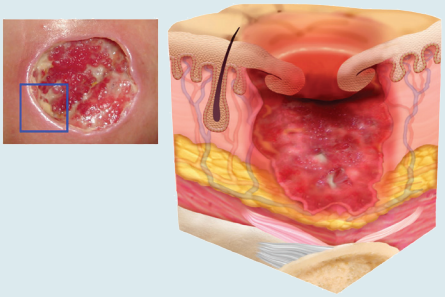
This stage should not be used to describe:

- moisture-associated skin damage (MASD) including incontinence associated dermatitis (IAD)
- intertriginous dermatitis (ITD)
- medical adhesive related skin injury (MARSI)
- traumatic wounds (skin tears, burns, abrasions)

NPUAP Stages of Pressure Injury[1] – April 2016

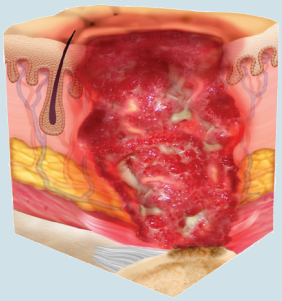
Stage 3 Pressure Injury:
Full-thickness skin loss

Full-thickness loss of skin, in which adipose (fat) is visible in the ulcer and granulation tissue and epibole (rolled wound edges) are often present. Slough and/or eschar may be visible. The depth of tissue damage varies by anatomical location; areas of significant adiposity can develop deep wounds. Undermining and tunneling may occur. Fascia, muscle, tendon, ligament, cartilage and/or bone are not exposed. If slough or eschar obscures the extent of tissue loss this is an Unstageable Pressure Injury.



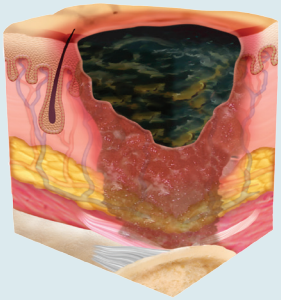
Stage 4 Pressure Injury:
Full-thickness skin and tissue loss

Full-thickness skin and tissue loss with exposed or directly palpable fascia, muscle, tendon, ligament, cartilage or bone in the ulcer. Slough and/or eschar may be visible. Epibole (rolled edges), undermining and/or tunneling often occur. Depth varies by anatomical location. If slough or eschar obscures the extent of tissue loss this is an Unstageable Pressure Injury.



Unstageable Pressure Injury:
Obscured full-thickness skin and tissue loss – dark eschar

Full-thickness skin and tissue loss in which the extent of tissue damage within the ulcer cannot be confirmed because it is obscured by slough or eschar. If slough or eschar is removed, a Stage 3 or Stage 4 pressure injury will be revealed. Stable eschar (i.e., dry, adherent, intact without erythema or fluctuance) on an ischemic limb or the heel(s) should not be removed.



Pressure Injury Staging Photos

Photos are available for educational purposes online. Visit the following website to download the images: www.npuap.org/resources/educational-and-clinical-resources/pressure-injury-staging-illustrations/.

For additional information go to www.npuap.org.

Mucosal Membrane Pressure Injury:
These are pressure injuries found on the mucous membranes with a history of use of a medical device and are not staged. These injuries may conform to the shape or pattern of the device used by the clinician to provide care. They should be staged using the NUPAP staging system.

Why is this important?

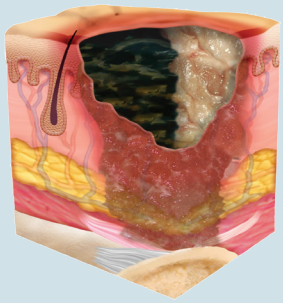
- **Accuracy** – clinicians can more accurately describe the skin injury related to pressure.
- **Patient safety** – clinicians can more accurately report pressure related incidents.

NPUAP Stages of Pressure Injury[1] – April 2016

Deep Tissue Pressure Injury:
Persistent non-blanchable deep red, maroon or purple discolouration

Intact or non-intact skin with localized area of persistent non-blanchable deep red, maroon, purple discolouration or epidermal separation revealing a dark wound bed or blood-filled blister. Pain and temperature change often precede skin colour changes. Discolouration may appear differently in darkly pigmented skin. This injury results from intense and/or prolonged pressure and shear forces at the bone-muscle interface. The wound may evolve rapidly to reveal the actual extent of tissue injury, or may resolve without tissue loss. If necrotic tissue, subcutaneous tissue, granulation tissue, fascia, muscle or other underlying structures are visible, this indicates a full-thickness pressure injury (Unstageable, Stage 3 or Stage 4).

Do not use DTPI to describe vascular, traumatic, neuropathic, or dermatologic conditions.



- **Medical device pressure injuries** – clinicians can report pressure injuries due to medical devices as they are now recognized in the updated staging system.

What are the clinical implications?

- **Policy change** – clinicians should use the new definitions when reporting and documenting skin injury related to pressure.
- **Education revisions** – educators should access the NPUAP definitions and photos online to ensure a consistent approach to assessment, reporting and documentation of pressure injuries.

Chester Ho *has a clinical and research interest in pressure injuries in persons with spinal cord injury. He is an Associate Professor and the Section Chief of Physical Medicine & Rehabilitation at the University of Calgary.*

Janet L. Kuhnke *is an Enterstomal Therapist and nursing faculty at the St. Lawrence College BScN Collaborative Program in Cornwall, Ontario.*

Heather L. Orsted, *Director of Education and Professional Development at the CAWC, is an experienced adult health-care educator, program developer and author with a special interest in knowledge mobilization and wound prevention and management.*

Reference

1. National Pressure Ulcer Advisory Panel. National Pressure Ulcer Advisory Panel (NPUAP) announces a change in terminology from pressure ulcer to pressure injury and updates the stages of pressure injury. 2016. Retrieved from www.npuap.org/national-pressure-ulcer-advisory-panel-npuap-announces-a-change-in-terminology-from-pressure-ulcer-to-pressure-injury-and-updates-the-stages-of-pressure-injury/.

The Challenge of Biofilms in Chronic Wounds:

Where do we go from here?

By Karen M. Cross, MD, PhD, FRCSC

The etiology of chronic wounds is of course complex, and now that we have more advanced diagnostic techniques available it is time to begin addressing the role that biofilms play in wound healing.

Biofilms are communities of bacteria that are present in as many as 60% of all chronic wounds. Though not all bacteria are pathogenic,[1,2] some do have a major impact on wound environments and healing potentials. Biofilm-based bacteria grow slower than free-living cells (making them intrinsically less susceptible to antibiotics) and produce a protective extracellular polymeric substance (EPS) that shields them from environmental insults and the immune system. The production of EPS is particularly challenging in wounds because it creates a barrier to phagocytosis. As a result, the natural mechanisms for bacterial eradication by the immune system are rendered ineffective. Chronic stimulation of the immune system without effectively eradicating the biofilm/bacteria causes collateral damage to the surrounding tissue, aggravates the wound and slows the healing process.

"Biofilms should be thought of as a complex and highly adaptable consortium (akin to a multi-cellular organism) . . ."

Strength in Numbers

We now know that biofilms are the preferred mode of growth for bacteria both in the environment (river rocks, industrial pipelines) and on body surfaces (teeth, skin, catheters, bone, etc.). Biofilms are almost always multi-species, with diverse composition (Gram-negative and Gram-positive genera), and can even include pathogenic yeasts like *Candida albicans*. Many of these species grow better in a symbiotic biofilm than in isolation under standard laboratory conditions because organisms within a biofilm communicate via diffusible signaling molecules to co-ordinate their behaviour ("quorum sensing"). As a result, biofilms should be

thought of as a complex and highly adaptable consortium (akin to a multi-cellular organism), rather than as individual bacterial species.

Because multi-cellularity is a significant factor in virulence, it is important that future therapeutics take a more in-depth approach to diagnosing biofilm species composition using advanced molecular diagnostics rather than historical culture-based methods. Wolcott et al.[3] found that 62.5% of chronic wounds assessed with molecular techniques and treated with targeted antimicrobial therapy healed faster and more completely, versus 48.5% that were assessed with cultures and non-directed therapy. Dowd et al.[4] also showed that 90% of patients receiving personalized topical therapies were more likely to heal their wounds.

The Role of Debridement

Effective debridement, accompanied by the use of antimicrobial dressings to prevent the reformation of biofilm in the wound, is key to wound healing in the presence of a biofilm. Debridement may be by traditional (sharp) methods or through the use of one of several newly developed ultrasound-based debridement tools. Although expensive and sometimes messy, low-frequency ultrasound debridement is the most studied of these modalities and has been tested *in vitro* on single-species biofilms. These studies have shown that ultrasound is effective at breaking up the biofilm but does not affect bacterial viability.[5] However, in an *in vivo* situation, biofilm dispersal is advantageous as it allows for efficient phagocytosis and may make bacteria more susceptible to antibiotic treatment.

What now?

While major advances have been made in the field of basic biofilm biology in the past 10 years, clinical challenges remain. As a first step, we must make efforts to understand what debridement methods are most useful for the initial removal of biofilm (sharp, ultrasound, enzymatic) by comparing them in controlled studies. Once the wound is debrided, we must then endeavour to prevent a pathogenic biofilm from re-forming in the wound. The future of clinical biofilm research lies in understanding that the multi-cellular biofilm lifestyle cannot be treated by traditional antibiotic methods, and that marrying innovative basic science with controlled clinical studies are the way forward. For additional reading about biofilms in wounds, please see the references cited throughout the text and "Ten top tips: Understanding and managing wound biofilm."[6]

***Karen Cross** is a surgeon-scientist with expertise in complex surgical wounds and wound healing. She has both a clinical practice and a research lab focused on translation technologies at St. Michael's Hospital, in Toronto, ON.*

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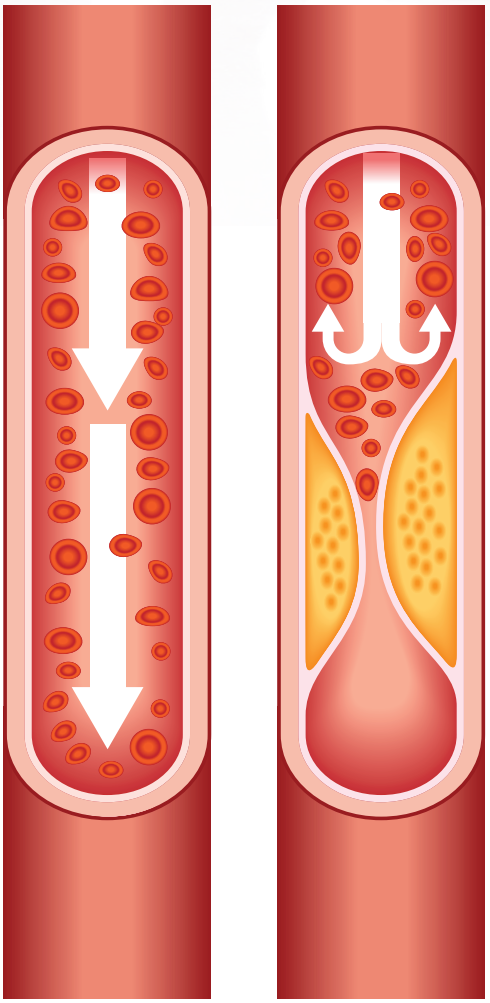
"Effective debridement, accompanied by the use of antimicrobial dressings to prevent the reformation of biofilm in the wound, is key to wound healing in the presence of a biofilm."

Peripheral Arterial Disease:
A Hidden Danger

By Robyn Evans, BSc, MD, CCFP, IIWCC and Giuseppe Papia, MD, Msc, FRCS(C)

Peripheral arterial (or artery) disease (PAD) is a condition that affects hundreds of thousands of Canadians. PAD can have significant negative implications for the individuals with the condition and their families, on health systems and on society as a whole. Unfortunately, PAD is under-recognized by health-care providers (HCPs) and as a result is often left untreated or treated only when it is at an advanced stage. Early intervention, which is more common in many other developed countries, has produced positive outcomes and cost-effective care.

In Canada, the health of affected individuals could be improved if HCPs—including those working in the area of wound prevention and care—were more aware of PAD and its impact. This article provides a quick overview of the condition along with recommendations for improving awareness, diagnosis and treatment.



A healthy artery (left) compared with an artery blocked by plaque (right) as seen in people with peripheral arterial disease (PAD)

Peripheral arterial disease (PAD) is most often caused by atherosclerosis, where plaque builds up on artery walls, causing the blood flow to limb extremities to slow or stop. This reduced blood flow can lead to ischemia and/or gangrene and eventually to amputation of the limb in some patients. The reduced blood flow may also result in the development of wounds or interfere with wound healing because perfusion to the area has been compromised.

PAD Risk Factors

Risk factors for PAD are the same as those for coronary artery disease and include:

- smoking
- age
- hypertension
- obesity
- diabetes mellitus
- chronic renal failure
- high cholesterol
- being male
- family history

PAD Signs and Symptoms

In the slight majority of cases, patients with PAD will exhibit symptoms including:

- a reproducible discomfort in a specific muscle group of the buttock or leg that is induced by exercise and relieved by rest (claudication)
- leg/foot pain that disturbs sleep and is improved when the leg is put in a dependent position (night pain)
- constant leg/foot pain regardless of position or activity (rest pain)
- slow- or non-healing sores or wounds on toes, feet or legs
- colour changes in foot skin (e.g., paleness, blueness)
- lower temperature in one leg compared with the other
- poor nail and hair growth on toes and legs
- difficult-to-palpate pulses in the leg or foot

Although many patients may exhibit some of these symptoms, 40% of those affected are asymptomatic.[1] The absence of symptoms, combined with a general lack of awareness on the

Facts about PAD

- Approximately 800,000 Canadians are affected by PAD.[2]
- PAD is a leading cause of limb amputation.
- Canadian health-care professionals and public remain largely unaware of the disease, its causes and treatment.

The Cost of NOT Treating PAD

$5,955 The annual cost of PAD treatment,[3] with the majority of cost associated with hospitalization.[4]

$70,000 The approximate cost of an amputation, which can result in a lowered quality of life or death.[5]

part of HCPs of the condition, contributes to late diagnosis, poorer outcomes, patient morbidity and results in higher treatment costs.

PAD Detection

To reinforce the mystery that is PAD, the disease is detected in only 50% of cases even when the HCP has an awareness about the condition.[6] This poor detection rate can be attributable to a lack of necessary equipment, time constraints on the practitioner, insufficient training and skills and lack of awareness of the patient to advocate for assessment.[7]

Public Awareness of PAD

Awareness of PAD on the part of the general public is also very low, as would be expected. A survey by Lovell et al. indicated only 36% of those surveyed were familiar with PAD,[2] which is lower than half the rate of any other cardiovascular disease.

Solutions to the Problem of PAD

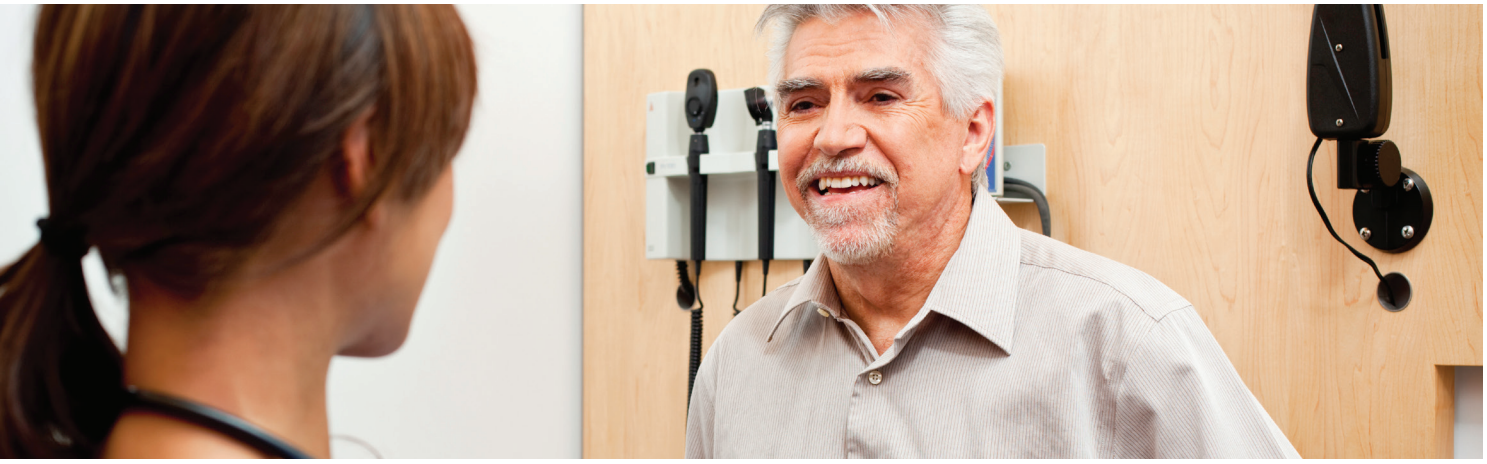
Reducing the impact of PAD on Canadians can be accomplished on two fronts: by improving public and HCP awareness and by improving PAD care.

An awareness campaign by the Canadian Association of Wound Care (see *sidebar p. 20) is in place to improve public consciousness of the condition. As more healthcare professionals learn about PAD and educate their patients the word will spread. The CAWC materials are a good place to start.

Care will be improved through:

1. Improved screening

Improved screening includes taking a comprehensive vascular history, blood pressure measurements and ankle-brachial pressure index (ABI) readings in persons deemed at risk, regardless of evident symptoms, particularly those who smoke, those who have diabetes and those with existing wounds.[8] Note that ABIs in persons with diabetes are not always useful due to vessel calcification. These patients should be referred to a vascular lab for more in-depth evaluation to look at waveforms, toe pressures and in some cases transcutaneous oxygen.[1] Normal ABI is over 0.9. An ABI less than 0.9 is associated with a five-year mortality rate of 25%.



2. Engagement and education of clinicians
Education of clinicians goes beyond simple awareness. It is important that HCPs participate in professional education activities focused on when and how to screen for PAD. As well, the CAWC is developing education on PAD for primary care providers. Please visit cawc.net for more information as details become available.

In addition to their own education, clinicians need to promote policies that support the assessment of high-risk individuals and create a directory of resources available to help treat patients.

3. Implementation of team-based care
As effective recognition and treatment of PAD often require a combination of treatments, a team-based approach will result in better outcomes for patients and more cost-effective care for health systems. A PAD treatment team might include: cardiology, vascular and endovascular surgery, vascular imaging and intervention, endocrinology/diabetes specialists, family physicians, podiatric medicine, nursing, nutrition, physical therapy, wound care specialists and orthopedics. Integrated communication and timely interactions within this group are crucial in preventing amputation.

4. Improved access to endovascular treatment
Advancements have been made in peripheral vascular surgery to revascularize at-risk areas of the lower extremity. Patients may require open bypass procedures, although endovascular surgery is often possible to physically open plaque blockages and restore blood flow to areas that bypass surgery cannot reach. Unfortunately, many Canadians lack timely access to endovascular specialists, resulting in complications that can lead to amputation. In addition to revascularization, attention to the management of infection, neuropathy, foot deformity and cardiovascular risk, where necessary, are key to high limb salvage rates and fewer amputations. Data show that access (or lack of access) to this type of care is a factor that affects variation in amputation rates across regions.[9]

PAD: A three-pronged approach to care

1 **Lifestyle change**
- encourage smoking cessation
- promote exercise
- support weight loss

2 **Medication**
- lower cholesterol
- control platelets (blood clotting)
- lower blood glucose

3 **Revascularization procedures**
- directly restore blood flow

Diabetes and PAD

- Diabetes is a major risk factor for PAD.[10]
- About half of patients with a diabetic foot wound also have PAD.
- Those with diabetes are 20 times more likely to undergo limb amputation.[8]
- The 5-year survival rate post amputation is lower than that of several types of cancer.
- Amputations can often be prevented by appropriate screening, effective nail and foot care, footwear, timely recognition and treatment of PAD.

Though PAD continues to grow as a Canadian health concern, there is nevertheless cause for hope. Awareness at all political and administrative levels is the first step toward achieving co-ordinated, integrated care. If all HCPs with an awareness of PAD take action to spread the word, deliver best practice and actively support policy changes, Canadians will see positive changes and limbs will be saved.

To improve awareness of PAD for both the public and for HCPs, the Canadian Association of Wound Care launched a campaign called "Just Leg Pain? Think Again!" in October 2014. The campaign received media exposure and has been sustained through free online educational materials. The materials are available in English and French, with separate resources for HCPs and the general public. Please go to http://cawc.net/en/index.php/public/peripheral-arterial-disease/ to read more about the campaign and to download the materials.

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Giuseppe Papia *is an Assistant Professor in the Division of Vascular Surgery and Critical Care Medicine, Sunnybrook Health Sciences Centre.*

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Learn More

To learn more about PAD, attend the one-day PAD workshop presented by the Canadian Association of Wound Care. Visit cawc.net for dates and locations.

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For over 20 years clinicians have trusted Integra Dermal Regeneration Template (IDRT) to treat wounds. IDRT has been evaluated in multiple major clinical trials and Integra's Ultra Pure Collagen™ base material has been used successfully in over 12 million procedures worldwide. We asked internationally renowned U.S. vascular surgeon John C. Lantis, MD, FACS, about his experience utilizing IDRT to save limbs and treat wounds.

Q1: Why do you choose IDRT to treat wounds?

The majority of biological skin substrates and wound treatment options revolve around re-epithelialization strategies to achieve wound closure. However, most partial- and full-thickness wounds involve injury to the dermis, which confers much of the functional and mechanical properties to the skin. Therefore, I choose to use a dermal regenerative substrate like IDRT because I believe it allows me to achieve more functional skin regeneration. Most, if not all, re-epithelialization strategies require multiple product applications, which translate to increased costs. I prefer to minimize application frequency as a more cost-effective solution for my patients and my practice.

Epithelialization is critical to achieve final wound closure, and secondary re-epithelialization procedures are necessary for many of the large wounds that I have treated with IDRT. In wounds smaller than 12 cm^2 (such as those in the recently published clinical study of IDRT treatment for diabetic foot ulcers[1]) these secondary epithelialization procedures can be avoided, as spontaneous epithelialization occurs over the regenerated dermis.

Q2: Can you describe a typical patient in your practice who would benefit from early intervention with IDRT?

Two groups common to my practice come to mind:

1. Patients with large, chronic, full-thickness wounds; patients that have had open wounds for more than 4 weeks and wounds > 40 cm^2. There is well accepted epidemiologic work that has shown that if a wound is not closed by 50% within the first four weeks, it has a less than 10% chance of closing within the first three months receiving only standard of care moist wound therapy. In my practice this group undergoes wide debridement and immediate, or almost immediate, treatment with a dermal regenerative substrate, like IDRT, to re-establish a normal dermis and promote wound closure.
2. Patients with chronic, diabetic foot ulcers, < 12 cm^2 and open for more than 4 weeks. The recently published IDRT study[1] is the largest published study to date on the use of biologic skin substitutes for the treatment of diabetic foot ulcers. The study reports that IDRT treatment significantly increases speed and incidence of healing in chronic diabetic foot wounds in patients with controlled blood sugars and the ability to offload appropriately.

Q3: Can you comment on the health economics of using IDRT?

85% of lower extremity amputations are preceded by open ulcerations, so theoretically reducing the number of open ulcerations and the duration in which these open ulcerations are present will reduce the number of amputations.

From a health economics standpoint, for lower extremity wound repair and for diabetic foot ulcers, a "one-and-done" approach for utilization of advanced regenerative products like IDRT makes both humanistic and financial sense. Many commercially available products require multiple applications over time, and this is costly to our system as each application requires reimbursement and incurs cost. There are patient factors as well. A patient and their family likely will prefer to have fewer product applications, since applications translate to clinic visits and procedures.

1. Driver, et al. Wound Rep Reg. 2015;23(6):891-900. http://onlinelibrary.wiley.com/doi/10.1111/wrr.12357/abstract.

*Note: The **FO**ot **U**lcer **N**ew **DE**rmal **R**eplacement **(FOUNDER)** Study was a multi-centre, randomized, controlled, parallel group clinical trial conducted under an Investigational Device Exemption. The trial randomized 307 patients across 32 sites.*

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Education in the Health-Care Setting:

The Importance of Case-Based Learning

By Janet L. Kuhnke, RN, BScN, MSc, ET; David Keast, BSc, MSc, Dip Ed, MD, CCFP, FCFP; Robyn Evans, MD, CCFP, IIWCC; Cody Leduc, Library Technician; and Sue Rosenthal, BA, MA

Wound education is a complex and nuanced discipline. In today's educational environment, educators are challenged to support learners in systematically developing the necessary critical thinking and decision-making skills to support the delivery of patient-centred, evidence-informed care. A second challenge is bridging the "theory to practice" gap by bringing evidence alive in the clinical setting. There are many educational strategies available to address these challenges. One such experiential learning approach that we have found effective is case-based learning.

Though the terms *problem-* and *case-based education* are often used interchangeably, there are subtle differences[1] (see Figure 1). Case-based learning is highlighted as an effective approach that educators can use to convey new knowledge and bridge the gap between theory and clinical practice.

Case-Based Learning: A Learner-Centred Approach

Case-based learning is a learner-focused, flexible teaching strategy.[2] It brings meaning to real-world scenarios through learning activities that require the use of personal and co-operative experimentation (group work), problem solving, sharing and questioning in a safe learning environment. In this approach, educators play an active role as facilitator versus

didactic lecturer.[3,4,5] They must be flexible, creative and sensitive to learners' needs—from the intellectual, cognitive and psychological perspectives.[3]

Case-based learning, or the case method, has a long history of use in education and was first used in the early 1900s at Harvard Medical School and at the University of Edinburgh. In the 1960s, McMaster University-Medical College implemented a full-time curriculum using the principles of case-based and problem-based learning. Since this time, the role of case-based learning in professional education has continued to evolve in other science and professional education programs (e.g., nursing and allied health sciences).[6–9]

Case-based learning is centred on the application of knowledge to practical, real-life case scenarios with the goal of engaging learners in specific case-scenario discussions. Learners play an active role in the examination of real or hypothetical clinical cases with the specific goal of transferring knowledge to the real world (theory to practice).

The strength of contextualizing cases to clinical practice is twofold. First, it helps enrich learning "by providing association that facilitates memory storage, retention and retrieval," making learning more memorable; second, it motivates and fosters new learning that is relevant, practical and meaningful to the learner.[1] A limitation of case-based learning is that the learner may not get as comprehensive an overview of the material as would be achieved in a lecture (didactic style).[1]

Successful case-based learning is interactive, interdisciplinary and engaging. In small groups, learners discuss the case and problem-solve collaboratively.

Applying case-based learning can be achieved by developing quality cases, having a supportive instructional design and having facilitators and teachers competent in both course content and adult learning processes. High-quality cases:

1. raise meaningful issues reflective of professional practice (set in the last five years)
2. are based in clinical practice (reality)
3. provide information to matching real situations
4. require mental activities and processes
5. arouse the learners' curiosity and support the experience of a need-to-know
6. call for a higher-order thinking by using prior knowledge
7. probe the learners' understanding of the issues[15,17]

Learners begin the group discussion with what they already know about the case topic and bring forward knowledge from pre-readings and prior clinical practice to enrich the discussion. This progression gives learners an opportunity to challenge what they already know and demonstrate how to consider and use new knowledge in clinical practice.

Facilitators' Role

The educator or case facilitator has an active role in case-based education, which may occur as a one-on-one role with a learner or in small groups. This active role is necessary for the success of case-based education. Through active facilitation, learners in small groups are supported in discussing the case and deciding how to transfer prior or new knowledge to the clinical setting. The learning shifts from the teacher as expert to the learner as expert. Knowledgeable and competent facilitators are essential for offering effective group support and instruction to the groups through questioning, challenging and engaging learners.[10–14]

Principles for Developing Cases

For educators, one of the challenges in case-based learning is the time and effort it takes to develop relevant, interactive cases.[1] High-quality cases reflect the real-world environment and should reflect the knowledge and skills that the learners will use in the clinical setting. Educators developing cases should:

1. contextualize the cases to the learners' environment so they are relevant
2. develop cases that capture

Figure 1: Comparing Case-based and Problem-based Educational Approaches

Case-based Education	Problem-based Education
Definition	
Learner-focused, flexible teaching strategy,[2] where learners construct new learning and meaning through problem-solving, co-operative group work and experiential sharing.	Involves studying the complex client problem before the theory is reviewed, bringing learners together to critically think, problem-solve and engage in self-directed study.[1]
Learner's Role	
• prior reading required • problem or clinical cases are presented in a structured format • learners (small group) seek outside information and sources • brainstorming to actively explore case • case discussion with integration of prior and new knowledge • group discussion and conclusion • focuses on clinical skills	• prior reading not provided • clinical cases presented • specific tests, investigations, laboratory values • self-directed learning • group discussion and conclusion • conclusion may not be correct and may need further investigation • focus on problem-solving and self-directed learning
Facilitator's Role	
• facilitator has advance preparation • facilitator's role is active in leading learner toward objectives • gives feedback • provides probing questions to further discussion • moderates discussion, correcting errant statements and helping to explain difficult concepts	• facilitator has advance preparation • facilitator's role is passive • does not guide discussion even when learners explore possibilities

the central learning points that then become the central hub of the learning activities and discussion
3. develop cases that challenge the learner cognitively and conceptually

Several researchers have developed basic principles to support the development of cases (see sidebar on p. 23).[15–17]

Summary

The importance of relevant, timely and practical wound care education cannot be overstated. We have found that case-based learning is a valuable approach to convey new knowledge in a relevant and real-world context. If you are an educator, we recommend that you consider case-based learning because when it is offered in a collaborative interdisciplinary venue, learners are able to identify the practical applications of their new understandings to clinical practice.

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Wound Sleuth

By Rob Miller, MD, FRCPC (derm)
and Cathy Burrows, RN, BScN, MScCH

History

This 61-year-old male presented to the emergency department with a red, swollen, necrotic area on the lateral aspect of the left foot. He was referred to the vascular leg ulcer clinic for assessment and management of the wound. Doppler ultrasound was performed and the ankle-brachial pressure index (ABI) was normal at 1.1, venous ultrasound was negative for DVT. The patient was treated for atrial fibrillation two weeks prior and was on warfarin 5 mg daily.

Q What is the cause of this wound?

A This patient has developed warfarin-induced skin necrosis (WISN). WISN is rare and occurs in less than 1% of patients treated with anticoagulants.[1]

Q How would you confirm the diagnosis?

A International normalized ratio (INR) value was 5 (normal 1.5 – 2). Bloodwork results for protein C and S deficiency were negative. Antithrombin III deficiency, anticardiolipn antibodies, factor V Leiden mutation and lupus anticoagulant were also negative. Liver enzymes were within normal range.

The first symptoms of WISN are pain and redness in the affected area. As symptoms progress, lesions develop a sharp border and become petechial, then hard and purpuric. They may then resolve or progress to form large, irregular, bloody bullae with eventual necrosis and slow-healing eschar formation.

Diagnosis was based on clinical history and physical assessment.

Q What would the treatment be?

A The warfarin was stopped and the patient was started on a low-molecular weight-heparin. Local wound management consisted of debridement of the necrotic tissue, and dressing selection was based on maintaining moisture balance and prevention of infection.

Rob Miller *is a dermatologist and* ***Cathy Burrows*** *is an independent wound care consultant, both in Halifax.*

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† As demonstrated in vitro
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ConvaTec

Jane McSwiggan MSc, OT Reg

In an interview conducted by Janet L. Kuhnke, Winnipeg-based Jane McSwiggan outlines her job as Education and Research Coordinator – Wound Care in Manitoba and discusses the rewards and challenges her role brings.

Q What is your current role in wound care?

A I am the Education and Research Coordinator – Wound Care for the Winnipeg Regional Health Authority in Manitoba. In addition to promoting excellence in wound care, I am responsible for supporting initiatives to promote evidence-based practice to improve the quality of wound and skin care, including prevention and management of wounds.

My role is primarily focused on identifying learning needs in wound prevention and wound care for health-care professionals and support staff, and working collaboratively with clinicians to develop learning strategies such as wound care courses, clinician mentorship and collaboration.

Q How has your role in wound care and research evolved over the years?

A The position of Education and Research Coordinator – Wound Care was established in the autumn of 2014, so I feel very privileged to be given the responsibility of establishing the role within this assignment. Since I was appointed in November 2014, I have seen my role evolve from being one focused out of necessity on developing wound care education programs to empowering clinicians to access their clinical reasoning and critical thinking skills in the prevention and treatment of wounds.

Q What is your view on interdisciplinary wound-care teams?

A The consumers of the health services—our patients, clients and residents—expect the highest standards from the professionals and support staff assigned to their care. An interdisciplinary approach to overall care is imperative because of the complexity of the skills and knowledge required by health-care providers, especially with a population that has a large number of older people and that has more complex needs associated with chronic disease. Therefore, I feel that given the multifaceted nature of wound care, interdisciplinary wound care teams that function effectively to provide excellence in care along a continuum from prevention and treatment of the cause of a wound to successful healing, maintenance or palliation of a wound are imperative.

Q Could you describe what you see as critical success factors to developing an interdisciplinary wound care team?

A The literature does help in this regard, and from what I have read, the team needs to be very clear about the scope of services it provides and ensure it has adequate staffing to meet

its mandate. A successful wound team should have professional interdependence, meaning that each team member has mutual respect and values the contributions of the other members. Treatment goals for wounds need to be very clearly articulated, and the person being treated needs to be fully involved, informed and integrated into the process even if they have difficulty in adhering to the team recommendations for care of their wound.

Q What are some of the biggest challenges you have seen in the practice of wound care? Do you see them as barriers or solutions?

A Ironically, perhaps it is the need to develop strong wound care teams with emphasis on evidence-based practice. The delivery of wound care, whether in the prevention or treatment of wounds, seems to be fragmented and struggles with being comprehensive in its delivery. I do not see this as a barrier because my position was created exclusively to encourage and achieve excellence in wound prevention and wound care. My daily telephone calls and emails with clinicians both within and outside Winnipeg give testament to the fact that there is significant interest in making wound care a priority for their teams. They are eager to embrace evidence-based and collaborative practice.

Q What is the biggest challenge in wound care in your present role?

A I am passionate about the complexities of the skin. Skin has the distinction of being the largest organ in the body and is a palette from which we can evaluate state of health and detect local and systemic disease. Skin gives us the ability to regulate temperature, sense danger, feel pain, pressure and touch because of the complex network of blood vessels, sebaceous and sweat glands, nerve endings and sensors.

However, I think that skin is taken for granted, and its status as an organ needs to be raised. Skin care needs to rank high in everyone's mind. Skin ischemia and cell death, while not nice to speak of, is the wording that should be used to help clinicians focus on the detrimental effects of friction, shear and pressure to skin and contribute to the imperative of attention to these forces.

Q What role have you played in wound care in Winnipeg, Manitoba?

A It surprises many that my job is dedicated to wound care. I co-ordinate all of the wound care courses that the Winnipeg Regional Health Authority (WRHA) offers. I am not a content expert so I rely on a strong team of clinicians, including dietitians, nurses, occupational therapists, physicians and physiotherapists to develop content and teach wound care courses. The WRHA courses include an online Level 1 wound care course, which was developed collaboratively with clinicians and stakeholders in the Winnipeg region and has been used as an education tool in the regional health authorities outside Winnipeg.

"I think that skin is taken for granted, and its status as an organ needs to be raised."

I am involved in the development of clinical practice guidelines and manage the education of staff with wound care product conversion by collaboration with our industry partners.

My favourite role is to be a resource to the health-care community in trying to solve problems, connect people with each other and delight in making someone's day a bit easier.

Q Any last or favourite comments?

A I think it is amazing that skin gives us the ability to make an assessment of a person's mental status, mood and disposition as soon as we see them. Perhaps this is the occupational therapist in me coming out. Their skin is providing these clues about their emotions and state of mind without even having a conversation. Every day we must remember that the skin differs from other organs in that it continually renews itself; therefore our fabric does not wear out, our seams don't burst and we don't sprout leaks in the bathtub.

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