

# Wound Care



The Official Publication of the Canadian Association of Wound Care  
La revue officielle de l'Association canadienne du soin des plaies

Soins  
des  
plaies



## Conference Highlights from the 18th Annual CAWC Conference

The Development of Wound Care  
as a Clinical Specialty  
Développement du soin des plaies  
comme spécialité clinique

Self-management of Chronic Wounds  
Autogestion des plaies chroniques

Dispelling the Myths About  
Wound Pain Management

Wound Care in Haiti: After the Earthquake

Canadian Association  
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# MARK YOUR CALENDAR!

The 19th Annual Canadian Association of Wound Care Conference

## From Innovation to Action: The Future of Wound Care is Now

November 7–10, 2013

Sheraton Wall Centre, Vancouver, British Columbia



For further information, please visit [www.cawc.net](http://www.cawc.net).

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The Canadian Association of Wound Care is a non-profit organization of healthcare professionals, industry participants, patients and caregivers dedicated to the advancement of wound 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 five key areas: public policy, clinical practice, education, research and connecting with the international wound care community. The CAWC works to significantly improve patient care, clinical outcomes and the professional satisfaction of wound care clinicians.

L'Association canadienne du soin des plaies est un organisme sans but lucratif regroupant des professionnels de la santé, des gens de l'industrie, des patients et des membres du personnel soignant fortement intéressés à l'avancement des connaissances pour le soin des plaies au Canada.

Fondée en 1995, l'ACSP organise, chaque année, au Canada, un congrès qui lui tient lieu de réunion officielle, le Congrès annuel de l'ACSP. L'association consacre ses efforts dans cinq domaines particuliers : les politiques gouvernementales, la pratique clinique, la formation, la recherche et la création de liens avec la communauté internationale directement impliquée dans le soin des plaies. L'Association canadienne du soin des plaies vise une amélioration significative du soin donné au patient, des résultats cliniques et de la satisfaction professionnelle des spécialistes en soin des plaies.

## A Conversation with Greg Archibald, Newly Elected President of the Canadian Association of Wound Care



Greg Archibald: "We are eagerly developing purposeful relationships with our Quebec wound care counterparts."

### What is your mission and vision for the CAWC over the course of your term as President?

One of the main things I'd like to do during my tenure is explore ways that physicians – particularly family physicians – can actively participate in team-based care with respect to wound management. In the past, I believe there was a bit of a disconnect regarding team-based approaches for the management of our patients, especially those with chronic wounds. This issue has been explored by the CAWC over the past few years; we have reached out to physicians through our annual conference and through a series of communications, to encourage their collaboration with other professionals as team members in providing wound care.

As well, the CAWC has spent the last 2 years looking at enhancing the current programming, such as the annual conference and the Foundations of Wound Care learning series, which is now available online. We are also looking forward to developing other relevant programs through our improved and enhanced relationships

with such organizations as the Canadian Diabetes Association (CDA) and the Ontario Ministry of Health and Long-Term Care, and exploring the potential for developing advisory working groups. We are also eagerly developing purposeful relationships with our Quebec wound care counterparts.

The next area of focus relates to continuing the excellent work that has already been accomplished through the CAWC's *PEP* (Peer Education Program) Talk initiative, which is a large part of our commitment to creating enhanced linkages with our patients.

Another key relationship is with our own membership: In order to be more relevant and effective to our members, we will pay more attention to enhancing value-added membership opportunities within the CAWC.

### How will the reorganization of leadership roles benefit the CAWC with respect to short- and long-term goals?

We've created a number of efficiencies with respect to reorganizing the CAWC offices. It came to our attention that restructuring was required to build a team that would help the Board of Directors broaden the organizational vision. To that end, and drawing upon the excellent leadership of Peggy Ahearn as Executive Director, a proposal was accepted by the Board in December 2012 to redistribute the operational responsibilities among a core group, which will be led by Peggy. The main thrust of the new management team places her in a more strategic role, one that champions the development of broader and deeper relationships with our corporate and wound care partners and also supports new programming based upon the strengths of current contractors in 3 distinct portfolios:

1. Douglas Queen, Director of Strategic Development, will be exploring ways the CAWC can refresh or reposition itself in the near future regarding national and international relationships and opportunities within the academic and industry milieus.
2. David Stein, Director of Operations, will be controlling the day-to-day operational

and financial accountabilities of the organization, and developing – with staff support – efficient logistics regarding education and product development.

3. Mariam Botros, Director of Educational Program Development, will focus on the delivery of high-quality, relevant educational programming, as well as liaising with academic institutions and affiliated organizations such as the CDA.

All of these efforts are part of a longer-term plan to move the CAWC into a stronger leadership position nationally and internationally.

### What further impact can the CAWC have on clinical practice in wound care in the future?

Our intention is to continue to create leadership around practice standards development that is dynamic, to fulfill the strategic direction of the CAWC and lead the writing of such important documents as our best practice recommendations, which will influence the educational agenda.

Another impact will be to explore substantial relationships with international organizations. This would include such initiatives as the Wound Care Program at Hôpital Bernard Mevs in Port-au-Prince, Haiti, which was launched after the devastating earthquake in January 2010. We hope to be involved in such initiatives in a very meaningful way; as well, the educational and practical tools developed by the CAWC plan to be shared on an international stage.

### What are your personal goals with respect to wound care across Canada in the future?

Broadly speaking, I plan to spend a portion of my educational leave time within the next 2 years exploring educational modelling for wound care training as it pertains to engaged constructs in Canada; as well, to consider research with respect to the impact of change to team-based approaches regarding the care of people with chronic wounds in our health systems, particularly those in long-term and home care. ☺

## Professor Keith Harding Honoured for Services to Healthcare

By Douglas Queen, Director of Strategic Development, CAWC

**It is with the utmost pleasure and pride that the Canadian Association of Wound Care recognizes both a long-time friend and an inspirational leader in the area of wound care, Keith Harding CBE MB ChB MRCGP FRCP FRCS.**

To most of us involved in wound care, Dr. Harding needs no introduction; his achievements are legendary. However you know him, you're certainly aware of Dr. Harding's passion and commitment to wound care and its evolution into a true clinical specialty. Indeed, he has devoted the majority of his professional career to this goal and coined the phrase 'woundologist,' of which he is a prime example.

In recognition of his effort and passion, Her Majesty the Queen named Dr. Harding a Commander of the Order of the British Empire (CBE) in the 2013 New Year Honours List, for his services to medicine and healthcare. This honour, announced December 29, 2012, recognizes his outstanding career, forwarding the clinical specialty of wound care, benefiting those who suffer from both acute and chronic wounds not only in Wales but in other regions of the U.K. and on the international scene, including Canada. Dr. Harding will be invited to Buckingham Palace to receive his CBE from a member of the royal family at an investiture ceremony.

Following is an abbreviated recap of the career of a professional wound carer: Dr. Harding has had a long-standing interest in wound healing. He has undergone training in both general surgery and general

practice. He was appointed as the first Director of the Wound Healing Research Unit, Wales College of Medicine, Biology, Life and Health Sciences, Cardiff University, in 1991. From 2002–2005 he was also Head of the University Department of Surgery and currently is the Director of the TIME Institute, School of Medicine, Cardiff University; Head of the Wound Healing Research Unit, Cardiff University; and Clinical Director of Wound Healing in the Cardiff and Vale NHS Trust. His clinical practice focuses exclusively on treating patients with wound-healing problems with a wide range of etiologies. He has authored more than 300 publications in the field of wound healing and has written a number of chapters and books in this area.

He is the Editor-in-Chief of the *International Wound Journal*, published by Wiley-Blackwell. He was the First President of the

European Pressure Ulcer Advisory Panel and First Recorder of the

European Wound Management

Association, and is a Past

President of the European

Tissue Repair Society. He

was Chair of the International

Working Group on Wound

Healing in Diabetic Foot Disease

in 2003, Chair of the Expert Working

Group that produced the World Union

of Wound Healing Societies (WUWHS)

Consensus Document on minimizing pain

at wound dressing-related procedures in

2004. He was Chair of WUWHS expert

working groups on exudate in 2007 and on

compression, vac therapy and wound diag-

nostics in 2008. He was also Chair of the

international consensus document on wound

infection in 2008. He chaired an International

This high honour is recognition of true dedication and lifetime achievement in a field close to the hearts of our readership.



In recognition of his effort and passion, the Queen named Dr. Harding a Commander of the Order of the British Empire.

Working Group on Pressure Ulcer Prevention, Prevalence and Evidence in Context, which was published in 2009.

He has obtained funding of more than £30 million from a range of academic, commercial and clinical sources since the Wound Healing Research Unit was created in 1991.

Much has been achieved over the past 3 decades; however, being awarded this high honour is recognition of true dedication and lifetime achievement in a field close to the hearts of our readership.

On behalf of the Canadian Association of Wound Care, I would like to congratulate Keith on this significant recognition and for his continued contribution to wounds on a global basis. I know he will say he is accepting on behalf of his team, as nothing is truly achieved without a true professional multidisciplinary approach. 🙌

### Tweet Tweet!

You can now find the Canadian Association of Wound Care on Twitter and Facebook. Follow us on Twitter at <http://twitter.com/woundcarecanada> to receive timely updates regarding the Association's wound care education programs and the latest news in wound care. You can also find the Canadian Association of Wound Care on Facebook.



## Canadian Association for Enterostomal Therapy

The Canadian Association for Enterostomal Therapy (CAET) has been working on initiatives focused in education, research and informatics, and advocacy. The CAET owns and operates the CAET Academy, which provides the Enterostomal Therapy Nursing Education Program online education program to educate and prepare new enterostomal therapists. There are also online courses entitled "Knowledge to Practice," which are focused in wound and ostomy care for healthcare professionals from various fields (e.g. registered nurses, registered practical nurses and personal support workers). The programs are available in both English and French. For further information, please visit [www.caetacademy.ca](http://www.caetacademy.ca).

The CAET is working on a "Find an ET Program," which will be launched mid-2013. This will allow people to locate an ET nurse

in their area by using a search engine supporting access to ET specialized nursing care.

Finally, the CAET is working collaboratively with the Canadian Association of Wound Care, the Ontario Wound and Skin Care Interest Group, and MEDEC, as part of the steering committee of Wound Care Alliance Canada, a group dedicated to establishing a wound care innovation centre of excellence program in Canada.

The CAET invites you to attend its 32nd annual national conference, "Leading Change," which will be held at the Toronto Downtown Eaton Centre Marriott Hotel, May 9–12, 2013. There is a strong lineup of experts speaking on topics in wound, ostomy and continence care. For further information, please visit [www.caet.ca](http://www.caet.ca). ☺

## CAWC Announces a New Approach to Wound Care Education in 2013!

### Foundations of Wound Care

Due to popular demand, the Foundations of Wound Care modules are available online. If you are new to wound care or need a refresher, this program is perfect for you! Available online only at the Ontario Hospital Association website ([www.oha.com](http://www.oha.com)), the Foundations of Wound Care program is comprised of four modules:

- Introduction to Wound Care ■ Prevention and Management of Pressure Ulcers
- Prevention and Management of Diabetic Foot Ulcers
- Prevention and Management of Leg Ulcers

Each module is a stand-alone program; take one or all four, depending on your needs. A certificate of learning is provided upon successful completion of each module.

### CAWC Learning Series

The CAWC Learning Series is a three-day live program led by an interdisciplinary faculty of wound care experts. The program combines theory with practical hands-on workshops.

**Days 1 and 2: Skills Workshop – Putting Knowledge into Practice.** Wound care theory is presented through lectures, interactive discussions and hands-on sessions. Topics include local wound care, dressings 101, debridement, lower

limb assessment and compression, foot wear and foot care, among others. All types of wounds are discussed in detail, and theory is put into practice.

**Day 3: Knowledge Translation and Implementation.** This segment of the program provides a recap of Days 1 and 2, and provides participants with clear direction to put what they've learned into practice when they return to their workplace.

## Ontario Woundcare Interest Group

The Ontario Woundcare Interest Group (OntWIG) is pleased to host its 4th symposium, entitled "From Strategy to Action: Maintaining Momentum," which will be held on Friday, April 19, 2013, at the White Oaks Conference Resort and Spa, Niagara-on-the-Lake, Ontario. This one-day event is for healthcare executives, managers and clinicians from all sectors who share an interest in addressing fragmented and uneven access and delivery of quality wound management services across Ontario. The 2013 symposium is designed to identify barriers and opportunities to implementing OntWIG's recommended provincial framework. Participants will glean insights from national and local experts, including Rosemary Hannam (from Rotman's Collaborative for Health Sector Strategy), Corrine McIsaac MEd BScN RN, and Karen Lorimer RN.

The day has been organized to stimulate conversations utilizing roundtable formats to support and encourage dialogue and brainstorming on improving policies, access and delivery of quality wound prevention and management services throughout Ontario. To register for the symposium, please email [ontwig@gmail.com](mailto:ontwig@gmail.com). ☺

The CAWC Learning Series is offered on the following dates in 2013:

|                      |                    |
|----------------------|--------------------|
| <b>April 5–7</b>     | <b>Toronto, ON</b> |
| <b>May 24–26</b>     | <b>London, ON</b>  |
| <b>June 21–23</b>    | <b>Calgary, AB</b> |
| <b>October 18–20</b> | <b>Halifax, NS</b> |
| <b>December 6–8</b>  | <b>Toronto, ON</b> |

For further information regarding the CAWC Learning Series, please visit [www.cawc.net](http://www.cawc.net). ☺

# 2012 Conference a Tremendous Success!

## Conférence de 2012 : un franc succès!

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The 18th annual Canadian Association of Wound Care conference was held November 8–11, 2012, at the London Convention Centre, London, Ontario, with more than 700 clinicians, healthcare policymakers and industry representatives in attendance. This year's theme, "A Canadian Healthcare Crisis: Chronic Wounds," addressed the wound care topics that are top of mind for many healthcare professionals.

The sessions were well attended by a variety of healthcare professionals, and offered a diverse program to attract wound care clinicians of all backgrounds. Some of the program highlights that you can read about in this issue include:

- wound care as a clinical specialty (page 10);
- strategies to support patient self-management of chronic wounds (page 14);
- dispelling the myths about wound pain management (page 25);
- best practice recommendations for pressure ulcer prevention in spinal cord injury (page 27); and
- assessment and management of ischemic arterial pain (page 31).

The Canadian Association of Wound Care continues to partner with the Canadian wound care industry, and presented exciting and well-attended pre-conference satellite symposia, plus power breakfasts, learning lunches and product theatres. As well, the spacious exhibit hall allowed for easy movement, and provided ample space for participants to meet and network between sessions. This year's exhibit hall offered the largest wound care trade gathering in Canada (more than 30 exhibitors), and presented unparalleled educational opportunities and the chance to see the latest products and services.



Plus de 700 cliniciens, décideurs du domaine de la santé et représentants de l'industrie ont assisté à la 18<sup>e</sup> conférence annuelle de l'Association canadienne du soin des plaies, tenue du 8 au 11 novembre 2012 au Centre des congrès de London, en Ontario. Les questions relatives au soin des plaies abordées au cours de la conférence, dont le thème était « Crise des soins de santé au Canada : les plaies chroniques », comptent parmi les plus pressantes pour beaucoup de professionnels de la santé.

De nombreux professionnels de la santé de domaines divers ont assisté aux séances qui, afin de piquer l'intérêt de cliniciens de tous les domaines, ont porté sur des sujets variés. Dans le présent numéro, vous trouverez des articles sur les faits saillants suivants de la conférence :

- le soin des plaies en tant que spécialité clinique (page 10);
- les stratégies qui soutiennent la gestion des plaies chroniques par les patients eux-mêmes (page 14);
- la dissipation des mythes entourant la gestion de la douleur liée à une plaie (page 25);
- les recommandations en matière de pratiques exemplaires pour la prévention des plaies de pression chez les patients qui ont subi un traumatisme médullaire (page 27); et
- l'évaluation et la gestion de la douleur d'origine ischémique artérielle (page 31).

L'ACSP a continué de s'associer à l'industrie canadienne du soin des plaies pour présenter, avant la conférence, un symposium satellite d'un jour stimulant et qui a attiré un grand nombre de participants, tenir des petits-déjeuners-débats et des dîners-causeries et organiser des séances sur les produits. Par ailleurs,

The social events offered even more opportunities for attendees to network with peers and colleagues. The exhibit hall grand opening was a tremendous success, and the Saturday evening Annual President's Party offered attendees a chance to kick up their heels and dance the night away.

*Attendees enjoyed the diversity  
of the program as well as  
the opportunity to network with  
colleagues and acquaintances.*

Overall, the conference was an enormous success. Attendees enjoyed the diversity of the program as well as the opportunity to network with colleagues and acquaintances. Thank you to all participants and to all those healthcare professionals who work so very hard to help people with acute and chronic wounds.

We look forward to seeing you at the 19th annual Canadian Association of Wound Care conference, to be held November 7–10, 2013, at the Sheraton Wall Centre in Vancouver, British Columbia. Please visit [www.cawc.net/conference](http://www.cawc.net/conference) for further information. ☺

comme la salle des exposants était vaste, il était facile d'y circuler et les participants pouvaient s'y réunir et réseauter entre les séances. L'exposition de cette année était la plus importante du domaine du soin des plaies au Canada (plus de 30 exposants). Elle offrait aux participants des possibilités d'apprentissage sans précédent et leur donnait la chance de se familiariser avec les plus récents produits et services.

Les activités sociales tenues dans le cadre de la conférence étaient d'autres occasions pour les participants de réseauter avec leurs pairs et collègues. L'inauguration de la salle des exposants a été un grand succès et les participants ont pu danser toute la soirée à la fête annuelle du président tenue le samedi.

*Les participants ont apprécié  
la diversité du programme, ainsi  
que l'occasion de réseauter avec  
des collègues et connaissances.*

La conférence a dans l'ensemble été couronnée de succès. Les participants ont apprécié la diversité du programme, ainsi que l'occasion de réseauter avec des collègues et connaissances. Nous remercions tous les participants et tous les professionnels de la santé qui mettent tout en œuvre pour venir en aide aux patients qui souffrent de plaies aiguës et chroniques.

Nous serons heureux de vous revoir à la 19<sup>e</sup> conférence annuelle de l'Association canadienne du soin des plaies, qui se tiendra du 7 au 10 novembre 2013 à l'hôtel Sheraton Wall Centre de Vancouver, en Colombie-Britannique. Pour de plus amples renseignements, visitez le site [www.cawc.net/conference](http://www.cawc.net/conference). ☺

## ONLINE ONLY: Supplement to *Wound Care Canada*

**Oral and Poster Abstracts**  
**18th Annual Canadian Association of Wound Care Conference**  
**London, Ontario, Canada**  
**November 8–11, 2012**

This year, the published oral and poster abstracts from the 18th annual Canadian Association of Wound Care conference are available online. Please visit [www.woundcarecanada.ca](http://www.woundcarecanada.ca) to view and download the abstract supplement.

# Wit, Fit and Balance... Strategies for Success



PRESENTER:  
MEG SOPER RN

**T**he opening plenary session provided attendees with an enlightening and entertaining look at living life to the fullest, and achieving optimal work/life balance. Meg Soper applauded the audience for their efforts in their day-to-day jobs, and noted: "From coast to coast, you improve your patients' quality of life – you make a difference!"

As healthcare professionals, we have an opportunity to create a positive environment, both at work and at home, she continued: "When you work and support each other as a team, you can do the best job possible and still have energy left at the end of the day."

How can we do it all, and keep it all together? "After 20 years," noted Soper, "I know that what you need to survive life is a sense of humour."

There is much that we have to balance between work and family. However, positive energy and a sense of perspective will help us to get through. Soper defined positive energy as a combination of 2 elements: positive spirit from the heart, and positive attitude from the head. As the pace of our lives continues to pick up speed, we not only need to adapt to change, we must embrace it. "Your mind and body are connected – change one

and the other will follow," she added.

So often when we're getting through our to-do lists at home or at work, we don't think about our wishes and dreams. It is crucial that we do so – and then take an extra step. Soper noted, "You have a 50% greater chance of doing something by telling someone else; you have an 80% greater chance of

*As the pace of our lives continues to pick up speed, we not only need to adapt to change, we must embrace it.*

doing something when you write it down." She added, "If you think it, that's where it stays, so if you want to make a shift, tell someone or write it down. No matter what it is – whether personal or professional – you make it happen!"

Soper concluded the session by offering the following pearls of wisdom:

- Be good at what you do.
- Communicate effectively.
- Live with balance.
- Always strive for humour and perspective. ☺

**Meg Soper** is a professional speaker and comedienne based in Oakville, Ontario.

# The Development of Wound Care as a Clinical Specialty:

## A call to action

## Développement du soin des plaies comme spécialité clinique : Un appel à l'action

PRESENTER /  
PRÉSENTATEUR :

KEITH HARDING  
MB CHB FRCGP  
FRCP FRCS

### Objectives



Keith Harding began the session by noting that a call to action is required of wound carers around the globe to recognize wound care as a clinical specialty.

He introduced the term "woundology," noting that it may not necessarily be appropriate or accurate, but it implies focus and expertise in the clinical area of wound care. He added, "We must do more than just 'care' for wounds. Care to me suggests passivity – but it's a challenge that I encourage everyone involved in this area to consider."

### Background

Wound care and wound healing have been performed for many years, but what is new in this area? Harding asked. "Without a doubt, much progress has been made in the field of wound healing over the past 35 years," he answered. "However, questions remain regarding why such a long-standing and challenging clinical problem has received attention only in recent years."

Harding presented some sobering statistics regarding the incidence and prevalence of wounds around the world.

Diabetes has recently become the leading cause of chronic cutaneous wounds in China. A cross-sectional survey of 2,513 patients who underwent treatment of chronic cutaneous wounds from 17 hospitals between 2007 and 2008 noted a prevalence of 1.7%. Only 22.4% were treated with modern dressings or other novel technologies, and more patients received antibiotics. Treatment was paid for by patients (42.3%), social medical insurance (25%), commercial medical insurance (4.8%) and free medical care (27.9%).

### Objectifs



Monsieur Harding a d'abord fait remarquer que les professionnels du soin des plaies du monde entier devaient passer à l'action pour que le soin des plaies soit reconnu comme spécialité clinique. Il a parlé de la « science des plaies », expression qui évoque l'orientation des activités sur le soin des plaies et l'expertise clinique dans ce domaine. Monsieur Harding est d'avis qu'il faut aller au-delà du simple « soin » des plaies – qui selon lui évoque la passivité – et a invité tous les intervenants du domaine à relever le défi que cela représente.

### Contexte

Il y a des années qu'on s'intéresse au soin et à la guérison des plaies, mais, comme l'a demandé monsieur Harding, qu'y a-t-il de nouveau dans le domaine? « De grands progrès ont indubitablement été accomplis dans le domaine de la guérison des plaies au cours des 35 dernières années, mais on se demande pourquoi un problème clinique aussi ancien et complexe ne suscite de l'intérêt que depuis quelques années. »

Monsieur Harding a présenté de sombres statistiques sur l'incidence et la prévalence mondiales des plaies.

Le diabète est devenu depuis peu la principale cause de plaies cutanées chroniques en Chine. Une enquête transversale menée auprès de 2513 patients de 17 hôpitaux chez qui on avait traité des plaies cutanées chroniques de 2007 à 2008 a révélé que la prévalence était de 1,7 %. Seulement 22,4 % des patients avaient été traités au moyen de pansements modernes ou d'autres nouvelles technologies et davantage de patients avaient reçu un antibiotique. Le traitement

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The large population and considerable financial burden mean that serious attention should be paid to the early detection, prevention and diagnosis of wounds.<sup>1</sup>

In India, a cross-sectional study was conducted between 2001 and 2003 to screen the population of 2 communities (1 urban, 1 rural) for wounds. The prevalence of wounds in the population studied (n=6,917) was 15.03 per 1,000. The prevalence of acute and chronic wounds was 10.55 and 4.48 per 1,000 of the population, respectively. The most common site for both acute and chronic wounds was the lower extremity. Unlike results from Western studies, the most common etiology for a chronic lower extremity wound was an untreated acute traumatic wound.<sup>2</sup>

To quantify the epidemiology of wounds within Western Australia's public health system, all neonates, pediatric and adult inpatients within Western Australian public hospitals were examined for any wounds in May 2007 and 2008. A total of 5,800 patients were examined: the prevalence of wounds was 49%, with acute wounds (31%), pressure ulcers (9%) and skin tears (8%) constituting the majority of wounds. Compliance with evidence-based wound management guidelines was low and few organizations had governance structures in place for the prediction, prevention and management of wounds.<sup>3</sup>

In England, a study was conducted to estimate the cost of wound care in a local population of approximately 590,000 using results from a wound care audit. The results showed that caring for patients with wounds required the equivalent of 88.5 full-time nurses and up to 87 hospital beds. The most important determinant of cost was wound complications, which either required hospitalization or delayed hospital discharge.<sup>4</sup>

The global increase in the incidence of diabetes, noted Harding, means that the global burden of diabetic foot ulcers will become severe. The number of people with diabetes worldwide is projected to increase from 171 million in 2000 to 366 million in 2030.<sup>5</sup> Two important demographic data relating to the increase in diabetes are the increase in proportion of people >65 years of age; and the urban population in developing countries, which is projected to double between 2000 and 2030.

**With respect to specific populations at risk for diabetes and complications, Harding noted the following:**

- The region of sub-Saharan Africa contains 33 of the 50 poorest countries in the world and will experience the greatest risk in diabetes prevalence in the next 20 years.
- Although the region of Australasia has a low popula-

*« De grands progrès ont indubitablement été accomplis dans le domaine de la guérison des plaies au cours des 35 dernières années. »*

avait été payé par les patients dans 42,3 % des cas, par une assurance médicale sociale dans 25 % des cas et par une assurance médicale commerciale dans 4,8 % des cas; il avait été gratuit dans 27,9 % des cas. Comme la population est très nombreuse et le fardeau financier, important, il faut accorder une grande attention à la détection précoce, à la prévention et au diagnostic des plaies<sup>1</sup>.

En Inde, on a mené une étude transversale de 2001 à 2003 pour dépister les plaies dans deux populations (une en milieu urbain et l'autre en milieu rural). La prévalence des plaies dans les populations étudiées (n = 6917) a été de 15,03 pour 1000. La prévalence des plaies aiguës a été de 10,55 pour 1000 et celle des plaies chroniques, de 4,48 pour 1000. Dans la plupart des cas, le siège des plaies aiguës et chroniques était un membre inférieur. Contrairement à ce qu'on a observé au cours d'études menées en Occident, la cause la plus courante des plaies chroniques des membres inférieurs était une plaie traumatique aiguë non traitée<sup>2</sup>.

Pour quantifier l'épidémiologie des plaies dans le système de santé publique de l'état de l'Australie-Occidentale, on a recherché les plaies chez tous les patients hospitalisés (nouveau-nés, enfants et adultes) des hôpitaux publics de l'état en mai 2007 et 2008. Un total de 5800 patients ont été examinés. La prévalence des plaies a été de 49 % et la majorité des plaies étaient des plaies aiguës (31 %), des plaies de pression (9 %) et des déchirures cutanées (8 %). La fidélité aux lignes directrices fondées sur des données probantes sur la prise en charge des plaies était faible et peu d'hôpitaux avaient une structure de gouvernance permettant la prédiction, la prévention et la prise en charge des plaies<sup>3</sup>.

Une étude a été menée en Angleterre pour estimer, à partir des résultats d'un audit sur le soin des plaies, le coût du soin des plaies chez environ 590 000 personnes. Les résultats ont révélé que le soin des patients souffrant de plaies exigeait l'intervention de l'équivalent de 88,5 infirmières à plein temps et jusqu'à 87 lits d'hôpitaux. Le plus important déterminant des coûts était les complications des plaies, qui exigeaient soit l'hospitalisation, soit le prolongement du séjour à l'hôpital<sup>4</sup>.

Monsieur Harding a signalé qu'en raison de l'augmentation mondiale de l'incidence du diabète, le fardeau des ulcères du pied diabétique va devenir

*“Without a doubt, much progress has been made in the field of wound healing over the past 35 years.”*

tion density, diabetes is common among native and island people.

- On many islands in the Caribbean, diabetes prevalence is approaching 20%, and amputations in patients with diabetes are among the highest in the world.

In England, the cost of wound care to the National Health Service has been estimated to be £2.3–£3.1 billion per year. Indeed, the treatment of diabetic foot complications accounts for 15% to 25% of total healthcare resources for diabetes. The rates of recurrence of diabetic foot ulcers are >50% over 3 years.<sup>6,7</sup>

With respect to pressure ulcers, Harding noted that data are limited regarding the incidence of hospital-acquired pressure ulcers in European hospitals. However, point prevalence studies have suggested that 1 in 5 acute hospital inpatients has a pressure ulcer at any time.<sup>8</sup>

#### **Developing a specialty: The pathophysiology of wounds**

The broadest definition of a wound, noted Harding, is “a disruption in the normal continuity of a body structure.”

Acute wounds include surgical incisions and traumatic injuries such as lacerations, abrasions, avulsions, penetrations or bites, and burn injuries. Acute wounds normally proceed through an orderly and timely reparative process that results in sustained restoration of anatomic and functional integrity.<sup>9</sup> However, noted Harding, “no data indicate a ‘normal’ rate of wound healing – it’s a starting point, rather than an end point.”

A chronic wound, continued Harding, is a wound that has failed to proceed through an orderly and timely series of events to produce a durable structural, functional and cosmetic closure.<sup>10</sup> Wounds may become chronic due to patient, clinician and healthcare system factors.

When considering wound care, the phases of healing must be addressed; noted Harding. “If we focus only on dressings, rather than the global management of wounds, then we are doing our patients a disservice.” He added, “What we must do – if we are to become a recognized clinical specialty – is identify when a patient is on a particular clinical trajectory (improving, static, fluctuating, deteriorating) and ensure that they get on the right track.”

Harding further raised the question of why a physician would be interested in wounds, and consider wound care as a clinical specialty? He answered that wound care touches many other clinical specialties,

très lourd. On estime que le nombre de personnes atteintes de diabète à l’échelle mondiale, qui était de 171 millions en 2000, atteindra 366 millions en 2030<sup>5</sup>. Deux importantes données démographiques ayant un lien avec l’augmentation de l’incidence du diabète sont l’augmentation de la proportion des personnes de 65 ans et plus et la croissance de la population urbaine dans les pays en développement, laquelle aura doublé en 2030 par rapport à 2000.

#### **Pour ce qui est de populations particulières qui sont exposées au diabète et à ses complications, monsieur Harding a fait les observations ci-dessous.**

- C’est en Afrique subsaharienne, où on retrouve 33 des 50 pays les plus pauvres du monde, que la prévalence du diabète risque le plus d’augmenter au cours des 20 prochaines années.
- Dans la région de l’Australasie, la densité de la population est faible, mais le diabète est courant dans les populations autochtones et insulaires.
- Dans plusieurs îles des Caraïbes, la prévalence du diabète est de près de 20 % et la proportion des patients diabétiques qui subissent une amputation est parmi les plus élevées au monde.

En Angleterre, on estime que le soin des plaies coûte entre 2,3 et 3,1 milliards de livres par année au National Health Service. Le traitement des complications du pied diabétique accapare de 15 à 25 % du total des ressources affectées au diabète. Les taux de récurrence des ulcères du pied diabétique dépassent 50 % à trois ans<sup>6,7</sup>.

En ce qui concerne les plaies de pression, monsieur Harding a souligné que les données sur l’incidence des plaies de pression nosocomiales dans les hôpitaux européens sont limitées. Toutefois, selon des études de prévalence ponctuelle, un patient sur cinq séjournant dans un hôpital de soins actifs présente une plaie de pression à un moment quelconque<sup>8</sup>.

#### **Développement d’une spécialité : la physiopathologie des plaies**

Selon monsieur Harding, la plus large définition d’une plaie est la suivante : « toute interruption dans la continuité normale d’un tissu du corps. »

Les plaies aiguës comprennent les incisions chirurgicales et les blessures traumatiques, telles que lacérations, écorchures, abrasions, avulsions, pénétrations ou morsures et brûlures. La guérison des plaies aiguës est un processus de réparation méthodique et opportun qui aboutit à la restauration soutenue de l’intégrité fonctionnelle et anatomique<sup>9</sup>. Toutefois, comme l’a fait remarquer monsieur Harding, il n’y a pas de données sur le délai de guérison

including pediatrics, internal medicine, anesthesiology, surgery and pathology. The challenges of funding, however, render wound care a clinical specialty that is difficult to organize, due in part to such considerations as short-term partnerships with industry, as well as budget and academic grant considerations. However, he noted that multidisciplinary teams are key to the success of wound management as a clinical specialty.

#### The challenges of working in a multidisciplinary team include:

- team/individual conflict;
- role ambiguity;
- role overload;
- poor communication;
- leadership differences; and
- lack of shared documentation.

#### Conclusion

Harding concluded: "Perhaps the most important and clinically relevant global development in the past 35 years of wound healing is the development of clinics and services that have demonstrated immense benefits for patients." ☺

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« normal » des plaies, la guérison étant un point de départ plutôt qu'un résultat final.

Toujours selon monsieur Harding, on qualifie une plaie de chronique quand elle ne passe pas par la série d'étapes méthodiques et opportunes qui produit une fermeture structurale, fonctionnelle et cosmétique durable<sup>10</sup>. Une plaie peut devenir chronique en raison de facteurs liés au patient, au clinicien ou au système de soins de santé.

Le soin des plaies doit tenir compte des étapes de la guérison. De l'avis de monsieur Harding, mettre l'accent uniquement sur les pansements plutôt que sur la prise en charge globale des plaies, c'est rendre un mauvais service aux patients. Il a ajouté que pour que le soin des plaies devienne une spécialité clinique reconnue, il nous faut déterminer la trajectoire clinique du patient (amélioration, pas de changement, fluctuation ou détérioration de l'état) et nous assurer que le patient est sur la bonne voie.

Pourquoi un médecin s'intéresserait-il aux plaies et choisirait-il le soin des plaies comme spécialité clinique? Monsieur Harding a répondu à cette question en soulignant que le traitement des plaies fait intervenir de nombreuses autres spécialités cliniques, dont la pédiatrie, la médecine interne, l'anesthésiologie, la chirurgie et la pathologie. Toutefois, les défis posés par le financement font que le soin des plaies est une spécialité clinique difficile à organiser, en partie en raison de facteurs comme les partenariats à court terme avec l'industrie et de considérations liées aux budgets et aux subventions universitaires. Monsieur Harding a cependant souligné que les équipes multidisciplinaires étaient la clé du succès de la prise en charge des plaies comme spécialité clinique.

#### Le travail au sein d'une équipe multidisciplinaire comporte des défis, dont les suivants :

- conflit au sein de l'équipe/entre les individus;
- rôles ambigus;
- surcharge de travail;
- mauvaise communication;
- différences en matière de leadership; et
- lacune au chapitre du partage de la documentation.

#### Conclusion

Monsieur Harding a conclu en ces termes : « La création de cliniques et de services qui ont eu des bienfaits immenses pour les patients est peut-être le progrès mondial le plus important et le plus cliniquement pertinent des 35 dernières années dans le domaine de la guérison des plaies. » ☺

Références (voir page 13)

# Self-management of Chronic Wounds:

Strategies for healthcare professionals to support patients

## Autogestion des plaies chroniques :

stratégies de soutien des patients pour les professionnels de la santé

PRESENTER /  
PRÉSENTATEUR :

PATRICK MCGOWAN  
PHD

### Introduction

**D**uring this session, attendees learned the following principles of self-management support (SMS) with respect to chronic wounds: rationale and justification for self-management; the "5 A's" conceptual framework for delivering self-management support; how to apply self-management support strategies in clinical settings; and handy tools to assist when using self-management support strategies.

### Self-management support – The 5 "A's"

Figure 1 depicts a chronic care model that is used to plan and evaluate care and management for patients with chronic health conditions, and one of its main components is SMS. The interaction between health-care professionals and patients, noted McGowan, is crucial: "If we're prepared and proactive, then we'll have better functional outcomes."

McGowan defined self-management as the following:

The tasks that individuals must undertake to live well with one or more chronic conditions. These tasks include having the confidence to deal with medical management, role management and emotional management of their conditions.

He further clarified that only patients engage in self-management; healthcare professionals are involved through self-management support, which is defined as the following:

### Introduction

**A**u cours de la séance, les participants ont appris les principes suivants du soutien de l'autogestion des plaies chroniques : fondement et justification de l'autogestion; cadre conceptuel des cinq piliers du soutien de l'autogestion; application des stratégies de soutien de l'autogestion en milieu clinique; et outils pratiques pour la mise en application des stratégies de soutien de l'autogestion.

### Les cinq piliers du soutien de l'autogestion

La figure 1 présente un modèle de soins chroniques utilisé pour planifier et évaluer les soins et la gestion chez les patients qui souffrent d'un problème de santé chronique, dont un des principaux éléments est le soutien de l'autogestion. Selon monsieur McGowan, l'interaction entre les professionnels de la santé et les patients est de toute première importance : « Quand on est préparé et proactif, on obtient de meilleurs résultats fonctionnels. »

Monsieur McGowan définit l'autogestion comme suit :

Mesures qu'une personne prend pour mieux vivre avec un ou plusieurs troubles chroniques, entre autres pour avoir la confiance voulue pour assumer la gestion médicale, la gestion des rôles et la gestion affective de ses troubles de santé.

Il a précisé que les patients sont entièrement responsables de l'autogestion. Le rôle des professionnels de

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The systematic provision of education and supportive interventions by healthcare staff to increase patients' skills and confidence in managing their health problems, including regular assessment of progress and problems, goal setting, and problem-solving support.

McGowan offered a few considerations regarding self-management:<sup>1,2</sup>

- Clinicians are present for only a fraction of the patient's life; indeed, over the course of a year, a clinician spends between 3 and 5 hours with a chronic disease patient.
- Motivation is not enough; people also require self-confidence, as well as certain skills that can be modelled and taught.
- Nearly all outcomes are mediated through the patient's behaviour, i.e. much of what happens depends on what that person does when they leave the clinician's office and are coping in the real world.

Essential elements of self-management include the following:

- Both parties – patient and healthcare professional – should be considered to be experts.
- Information exchange should be two-way.
- Both parties should state preferences; however, there must be consensus to decide treatment.
- The relationship must be collaborative.

FIGURE 1

### Framework for prevention and management of chronic disease



FIGURE 1

### Cadre de prévention et de gestion des maladies chroniques



la santé se limite au soutien de l'autogestion, laquelle est définie comme suit :

Prestation systématique par des travailleurs de la santé d'interventions qui visent à éduquer et à soutenir les patients afin qu'ils aient les compétences et la confiance voulues pour gérer leurs problèmes de santé, interventions qui comprennent l'évaluation régulière des progrès et des problèmes, l'établissement d'objectifs et le soutien de la résolution des problèmes.

Monsieur McGowan a fait les quelques observations suivantes sur l'autogestion<sup>1,2</sup> :

- Le clinicien passe très peu de temps avec le patient : en effet, pendant une année, le clinicien ne passe que 3 à 5 heures avec un patient qui souffre d'une maladie chronique.
- À elle seule, la motivation ne suffit pas; les gens doivent aussi avoir confiance en eux et posséder certaines compétences qu'on peut modéliser et enseigner.
- Presque tous les résultats dépendent du comportement du patient, c'est-à-dire que le devenir du patient dépend de ce qu'il fait une fois qu'il quitte le cabinet du médecin et de la façon dont il se débrouille au quotidien.

Les aspects essentiels de l'autogestion sont les suivants :

- Les deux intervenants – soit le patient et le professionnel de la santé – doivent être considérés comme des experts.

One approach to self-management education is the “5 A’s,” which consist of the following: assess, advise, agree, assist and arrange.

The recent Registered Nurses’ Association of Ontario (RNAO) clinical best practice guidelines entitled *Strategies to Support Self-Management in Chronic Conditions: Collaboration with Clients* recommends the use of the “5 A’s” model.<sup>3</sup> McGowan noted that this model incorporates the best evidence, is used in many clinical settings and has been shown to be an accepted framework for self-management in people with chronic health conditions.

### Assess

An important component of establishing rapport is to assess and address distress, such as feelings of anger and frustration related to coping with and caring for a chronic illness.

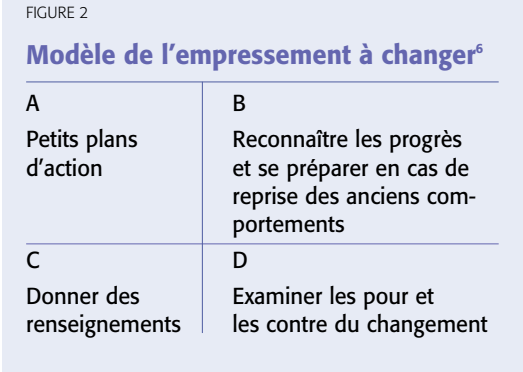
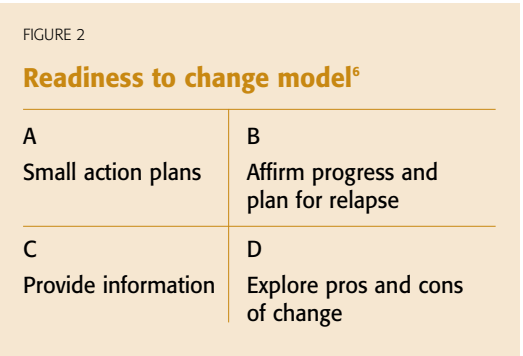
Healthcare professionals should ask about and assess behavioural health risks and factors affecting patients’ choice of behaviour change goals and methods. The following open-ended questions and statements are useful in conducting an assessment:

- What are the biggest problems you’re having?
- Tell me about a typical day.
- What else is happening in your life?

According to the RNAO guidelines, establishing rapport with patients ensures that they have adequate opportunities to express their priority concerns.<sup>3</sup> As well, setting a visit agenda with the patient ensures that both the health professional’s and patient’s concerns are addressed in the visit.

Traditional approaches to patient education assume that patients are ready to change.<sup>4</sup> However, noted McGowan, in reality, only a minority of patients are ready to change their behaviour at any one time.<sup>5</sup>

Thus, it is crucial that healthcare professionals determine how ready their patient is to make a change, and a number of strategies are available to achieve this. One such strategy is the “readiness to change” model (Figure 2).<sup>6</sup> Readiness to change refers



- L’échange d’information doit être bidirectionnel.
- Les deux intervenants doivent préciser leurs préférences, mais la décision concernant le traitement doit faire l’objet d’un consensus.
- La relation doit être axée sur la collaboration.

Une des démarches en matière d’éducation sur l’auto-gestion s’appuie sur les cinq piliers suivants : évaluation, counseling, entente, assistance et planification.

Les lignes directrices sur les pratiques exemplaires énoncées récemment par l’Association des infirmières et infirmiers autorisés de l’Ontario (RNAO), intitulées *Strategies to Support Self-Management in Chronic Conditions: Collaboration with Clients*, préconisent l’utilisation du modèle des cinq piliers<sup>3</sup>. Monsieur McGowan a fait remarquer que ce modèle s’appuie sur les meilleures données probantes, qu’il est utilisé dans de nombreux milieux cliniques et qu’on a montré que c’était un cadre reconnu pour l’auto-gestion chez les personnes atteintes de troubles de santé chroniques.

### Évaluation

Un des aspects importants de l’établissement d’un bon rapport avec le patient est l’évaluation et le soulagement de l’anxiété, dont les sentiments de colère et de frustration engendrés par l’adaptation à une maladie chronique et les soins qu’elle exige.

Les professionnels de la santé doivent déterminer et évaluer les risques pour la santé et facteurs liés au comportement qui influent sur les choix du patient en ce qui a trait aux objectifs et aux méthodes de modification du comportement. Les questions ouvertes ci-dessous sont utiles pour l’évaluation.

- Quels sont vos plus gros problèmes?
- Décrivez-moi une journée typique.
- Qu’est-ce qui se passe dans votre vie?

Selon les lignes directrices de la RNAO, en établissant un bon rapport avec le patient, on s’assure que celui-ci a toutes les occasions voulues pour exprimer ses principales préoccupations<sup>3</sup>. Par ailleurs, en détermi-

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*One approach to self-management education  
is the “5 A’s:” Assess, advise, agree, assist and arrange.*

to how prepared individuals are to make changes to their behaviour. Interventions guided by this theory focus on individuals’ motivation to change; these approaches must be adapted according to differences in participants’ motivation to change a behaviour. Assessing the patient’s readiness to make a behaviour change helps the health professional to use an appropriate behaviour change strategy with the patient.

#### **Advise**

The second step of the “5 A’s” – advise – involves offering clear, specific and personalized behaviour change advice, including information about personal health harms and benefits. Personally relevant, specific recommendations for behaviour change should be provided.

Two strategies are useful during this step of self-management education: “ask-tell-ask” and “closing the loop.” The “ask-tell-ask” strategy is a technique to ensure patients receive the information they have requested. In this technique, reflective listening and positive affirmations are used to help clients identify their own health goals, and the discrepancies in the behaviour that influence the achievement of these goals.

“Closing the loop” is a technique to assess a patient’s understanding of what has been explained to them, and involves the healthcare provider asking their patient to repeat back information provided to ensure that they understand what had been said.

#### **Agree**

The third step – agree – involves interaction between the healthcare professional and patient to collaboratively select appropriate treatment goals and methods based on the patient’s interest in changing their behaviour, and their willingness to do so.

This involves: a) setting a goal; b) developing an action plan; and c) following up. Indeed, teaching patients how to make an action plan helps patients start and maintain a behaviour, while follow-up on the action plan facilitates the success of the plan itself.

In this phase of self-management education, patient self-efficacy will be a prominent feature: McGowan noted that it affects every phase of health behaviour change, including:

- whether one even considers changing a health behaviour;
- how much one benefits from the changed behaviour;

nant avec le patient le programme de la consultation, on s’assure que les préoccupations du professionnel de la santé et celles du patient seront prises en compte au cours de la consultation.

Les démarches traditionnelles d’éducation des patients supposent que les patients sont disposés à changer<sup>4</sup>. Toutefois, selon monsieur McGowan, la réalité est tout autre, un très petit nombre de patients étant prêts à modifier leur comportement<sup>5</sup>.

Il est donc très important que le professionnel de la santé détermine dans quelle mesure son patient est disposé à changer. Pour y parvenir, il peut utiliser diverses stratégies, entre autres celle fondée sur le modèle de « l’empressement à changer » (figure 2)<sup>6</sup>, lequel permet de déterminer dans quelle mesure le patient est prêt à modifier son comportement. Les interventions qui s’appuient sur ce modèle mettent l’accent sur la motivation du patient à changer son comportement et doivent être adaptées en fonction des différences de degré de motivation entre les participants. L’évaluation de l’empressement du patient à modifier son comportement aide le professionnel de la santé à utiliser une bonne stratégie de modification du comportement chez ce patient.

#### **Counseling**

Le deuxième des cinq piliers du soutien de l’autogestion consiste à donner au patient des conseils clairs, précis et personnalisés sur la modification du comportement, dont des renseignements sur les méfaits et les avantages pour la santé. Il faut faire au patient des recommandations spécifiques, pertinentes et adaptées à sa situation sur la modification de son comportement.

Deux stratégies sont utiles au cours de cette étape de l’éducation sur l’autogestion : « demander-dire-demander » et « boucler la boucle ». La stratégie « demander-dire-demander » permet de s’assurer que le patient a obtenu les renseignements demandés. Elle consiste à utiliser la reformulation et les affirmations positives pour aider le patient à fixer ses propres objectifs en matière de santé et à cerner les lacunes comportementales qui nuisent à l’atteinte de ces objectifs.

La technique « boucler la boucle » permet d’évaluer la mesure dans laquelle le patient a compris ce qui lui a été expliqué. Pour ce faire, le professionnel de la santé demande au patient de lui répéter les renseignements qu’il lui a donnés.

#### **Entente**

Le troisième pilier du soutien de l’autogestion exige une collaboration entre le professionnel de la santé et le patient pour le choix d’objectifs et de méthodes de

- how well one maintains the change achieved; and
- how vulnerable one is to relapse.

### Assist

The fourth A – assist – refers to caregiver activities that address barriers to change, increase patients' motivation and self-help skills, and help the person secure the needed supports for successful behaviour change. This includes such activities as:

- reviewing goals and action plans;
- teaching self-monitoring and problem-solving skills; and
- linking patients to community resources (e.g. the community chronic disease self-management program).

The steps involved are as follows:

1. Have the patient identify a problem.
2. List ideas that could solve the problem.
3. Select one idea to try.
4. Assess the results.
5. Substitute another idea if needed.
6. Utilize other resources.
7. If multiple ideas are not successful in changing the behaviour, accept that the problem may not be solvable now.

### Arrange

The fifth A – arrange – involves scheduling follow-up contacts (in person or by telephone) to provide ongoing assistance and support, and to adjust the treatment plan as needed; this includes referral to more intensive or specialized treatment if needed.

With respect to follow-up, McGowan noted that regular and sustained follow-up is crucial for the success of goal-setting and action-planning. It should also include problem-solving regarding any barriers to goal achievement.

A crucial component of follow-up is planned chronic care visits, in which the only agenda topic is the patient's chronic condition. Planned visits are essential to help people to adopt healthy behaviours; as well, noted McGowan, they are an antidote to the "tyranny of the urgent," i.e. acute issues crowding out chronic care management. Follow-up visits can be planned with doctors, nurses, pharmacists, educators or nutritionists, as needed and appropriate, and can be conducted in a group context or individually with one patient.

Guidelines for group visits include the following: Obtain patient consent; engage the group to find solutions or answer questions; use simple charts; brainstorm solutions with the whole group; and limit the time you spend talking, so that participants can express themselves appropriately. ☺

## *Une des démarches en matière d'éducation sur l'autogestion s'appuie sur les cinq piliers suivants : évaluation, counseling, entente, assistance et planification.*

traitement convenables et fondés sur l'intérêt et l'empressement du patient à l'égard de la modification de son comportement.

Le pilier « entente » consiste à : a) fixer un objectif; b) élaborer un plan d'action; et c) faire un suivi. En apprenant au patient à élaborer un plan d'action, on l'aide à adopter et à maintenir un comportement; le suivi du plan d'action contribue au succès du plan.

L'auto-efficacité du patient est un élément essentiel de cette phase de l'éducation sur l'autogestion. Monsieur McGowan a observé que l'auto-efficacité influe sur toutes les phases de la modification du comportement lié à la santé :

- le désir de la personne de modifier un comportement lié à la santé;
- l'importance des avantages de la modification du comportement;
- la mesure dans laquelle le patient maintient le nouveau comportement; et
- le risque de reprise de l'ancien comportement.

### Assistance

Le quatrième pilier du soutien de l'autogestion porte sur les activités du fournisseur de soins qui visent à surmonter les obstacles au changement et à accroître la motivation du patient, à améliorer son autonomie et à l'aider à obtenir le soutien dont il a besoin pour réussir à modifier son comportement. Ces activités comprennent les suivantes :

- passer en revue les objectifs et plans d'action;
- enseigner au patient à pratiquer l'auto-surveillance et à résoudre les problèmes; et
- renseigner le patient sur les ressources offertes à l'échelle communautaire (p. ex. le programme communautaire d'autogestion des maladies chroniques).

Les étapes à suivre sont comme suit.

1. Demander au patient de cerner un problème.
2. Dresser la liste des solutions possibles.
3. Choisir une solution et en faire l'essai.
4. Évaluer les résultats.
5. Remplacer la solution par une autre au besoin.
6. Utiliser d'autres ressources.
7. Si l'essai de plusieurs solutions ne permet pas de modifier le comportement, accepter qu'il puisse être impossible de résoudre le problème pour l'instant.

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## Workshop on the Prevention and Management of Diabetic Foot Complications

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Visit [www.cawc.net](http://www.cawc.net) for more information and online registration.

Canadian Association of Wound Care  
Association canadienne du soin des plaies

## Planification

Le cinquième pilier du soutien de l'autogestion consiste à déterminer les dates auxquelles le professionnel de la santé rencontrera le patient ou lui téléphonera pour lui donner l'aide et le soutien voulus et pour modifier le plan de traitement au besoin, entre autres orienter le patient vers un traitement plus intensif ou plus spécialisé si nécessaire.

Monsieur McGowan a fait remarquer qu'un suivi régulier et soutenu est essentiel au succès de la détermination des objectifs et de l'établissement d'un plan d'action. Le suivi permet aussi de régler tout problème qui nuit à l'atteinte des objectifs.

La planification de consultations axées uniquement sur les soins de la maladie chronique est un des aspects fondamentaux du suivi. Ces consultations sont essentielles pour aider le patient à adopter des comportements sains et, comme l'a fait remarquer monsieur McGowan, elles sont l'antidote à la « tyrannie de l'urgence », soit les problèmes urgents qui nuisent à la gestion des soins chroniques. On peut planifier des consultations de suivi avec un médecin, une infirmière, un pharmacien, un éducateur ou un nutritionniste, selon les besoins du patient, et ces consultations peuvent être individuelles ou non.

Voici comment procéder pour les consultations de groupe : obtenir le consentement des patients; mettre les participants à contribution pour trouver des solutions ou répondre aux questions; utiliser des tableaux simples; trouver des solutions avec l'ensemble du groupe; et ne pas trop parler pour permettre aux participants de s'exprimer. 🗣️

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# Peer-led Educational Model for Preventing Diabetic Foot Ulcers

## A Discussion of *PEP Talk: Diabetes, Healthy Feet and You*

# Un modèle d'éducation par les pairs pour la prévention des ulcères du pied diabétique

## Une discussion du *PEP : Le diabète : des pieds en santé et vous*

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KEN MCLELLAN

### Introduction



Attendees at this session learned about the following:

- gaps in foot care education;
- the role of peer-led educational models in preventing diabetic foot ulcers; and
- the concept of empowerment.

The presenters noted the following sobering statistics:

- 15% of people with diabetes will suffer a foot wound in their lifetime.<sup>1</sup>
- 85% of amputations are preceded by foot ulcers.<sup>2</sup>
- 50% of people who have had an amputation will have a second amputation within 2–5 years of the first ulcer incidence.<sup>2</sup>

Common causes of amputations are outlined in Table 1.<sup>3</sup> The presenters noted one striking comment from a patient who had undergone amputation of both lower limbs: "If only I'd known about proper foot care, I'd probably still have both legs."

TABLE 1

### Causes of amputation<sup>3</sup>

| Direct causes of amputation          | %    |
|--------------------------------------|------|
| Trauma                               | 6.1  |
| Ischemia/peripheral vascular disease | 21.2 |
| Foot wound                           | 69.7 |
| Cancer                               | 3.0  |

### Introduction



a séance a porté sur les sujets suivants :

- les lacunes de l'éducation sur le soin des pieds;
- le rôle des modèles d'éducation par les pairs dans la prévention des ulcères du pied diabétique; et
- le concept de l'autonomisation.

Les présentateurs ont cité les sombres statistiques suivantes :

- 15 % des personnes diabétiques présentent un ulcère du pied à un moment quelconque<sup>1</sup>;
- 85 % des amputations sont précédées d'ulcères du pied<sup>2</sup>;
- 50 % des amputés subissent une seconde amputation de deux à cinq ans après la survenue du premier ulcère<sup>2</sup>.

Le tableau 1 présente les causes courantes d'amputation<sup>3</sup>. Les présentateurs ont cité un commentaire frappant d'un patient qui avait subi une amputation des deux jambes : « Si j'avais su prendre soin de mes pieds, j'aurais probablement encore mes jambes. »

### Le diabète : des pieds en santé et vous

*Le diabète : des pieds en santé et vous* est une initiative conjointe de l'Agence de la santé publique du Canada et de l'Association canadienne du soin des plaies (ACSP) dont l'objet est le développement d'outils d'autogestion et d'ateliers offerts par les pairs sur la prévention des ulcères du pied diabétique.

*The overarching principle of the  
PEP Talk program is patient empowerment.*

### Diabetes, Healthy Feet and You

*Diabetes, Healthy Feet and You* is a joint collaboration between the Public Health Agency of Canada and the Canadian Association of Wound Care to develop self-management tools and peer-led workshops for the prevention of diabetic foot ulcers.

#### Phase 1 of the initiative included the following:

- An interactive website – <http://cawc.net/index.php/public/feet> – where patients can complete a diabetes self-management questionnaire, develop a personal foot care plan and learn what questions to ask their physician.
- A brochure for clinicians, to help them determine if their patients are at risk for diabetes-related foot complications.
- A patient self-screening brochure and posters, which were designed to assist people with diabetes in recognizing factors that lead to skin breakdown, and to support early interventions to prevent diabetic foot ulcers.
- Information sheets for patients on the topics of vascular insufficiency, neuropathy and foot deformity.
- A patient education video entitled *Diabetes, Healthy Feet and You: Caring for Your Feet*.
- A series of 3 information guides that complement the video by providing patients with quick reference tips on proper foot care, questions to ask their health-care professional and an explanation on what occurs during a foot exam.

*“Empowerment is not something one does to patients. Rather, empowerment begins with healthcare providers acknowledging that patients are in control of their daily diabetes care.” – Anderson & Funnell, 2010*

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All of the CAWC *Diabetes, Healthy Feet and You* materials were developed with the support of an expert advisory group and a patient focus group. The expert advisory group for Phase 1 was composed of interdisciplinary healthcare professionals from healthcare organizations across Canada.

Phase 2 of the initiative is entitled *PEP (Peer Education Program) Talk: Diabetes, Healthy Feet and You*. It is an educational peer-led workshop program in self-management. Volunteer peer leaders are people who are living with diabetes and neuropathy, who

La première phase de cette initiative prévoyait le développement des éléments suivants :

- un site Web interactif – <http://cawc.net/index.php/public/feet> – que le patient peut visiter pour remplir un questionnaire sur l'autogestion du diabète, élaborer un plan personnalisé de soin des pieds et apprendre quelles questions poser à son médecin;

TABEAU 1

### Causes d'amputation<sup>3</sup>

| Causes d'amputation directes             | %    |
|------------------------------------------|------|
| Traumatisme                              | 6,1  |
| Ischémie/maladie vasculaire périphérique | 21,2 |
| Plaies du pied                           | 69,7 |
| Cancer                                   | 3,0  |

- une brochure pour aider les cliniciens à déterminer si un patient est exposé aux complications du pied liées au diabète;
- une brochure et des affiches pour aider les patients diabétiques à reconnaître les facteurs qui entraînent la dégradation de la peau et pour encourager les interventions précoces visant la prévention des ulcères du pied diabétique;
- des feuillets de renseignements destinés aux patients sur l'insuffisance vasculaire, la neuropathie et les difformités des pieds;
- une vidéo éducative à l'intention des patients, intitulée *Le diabète : des pieds en santé et vous : soignez vos pieds*;
- une série de trois guides d'information qui accompagnent la vidéo et qui donnent au patient des trucs sur le soin des pieds, des questions à poser au professionnel de la santé et une explication de l'examen des pieds.

L'ACSP a préparé tout le matériel du programme *Le diabète : des pieds en santé et vous* avec l'aide d'un groupe d'experts-conseils et d'un groupe de discussion composé de patients. Le groupe d'experts conseils ayant contribué à la première phase du programme était composé de professionnels de la santé de diverses disciplines associés à des organismes de soins de santé de toutes les régions du Canada.

La deuxième phase de l'initiative, intitulée *PEP*

*« L'autonomisation n'est pas quelque chose que subit un patient. Pour autonomiser le patient, le fournisseur de soins doit commencer par reconnaître que les soins quotidiens du diabète dépendent du patient lui-même. » – Anderson et Funnell, 2010*

encourage others to successfully adopt self-management behaviours that help prevent diabetic foot ulcers.

One main benefit of a peer-led program is that peer leaders are able to help others with respect to the experience of living with diabetes; navigating the healthcare system; dealing with emotions and family relationships; and sharing and offering support.

### Patient empowerment

The overarching principle of the *PEP Talk* program is patient empowerment. Indeed, it has been demonstrated that interventions aimed at empowerment are able to improve the health status, psychological condition and quality of life of chronically ill patients.<sup>4</sup>

**To this end, the main program objectives of *PEP Talk* are:**

- Support the use of self-management for diabetic foot ulcer prevention through the dissemination of the existing patient tools at the peer-led workshops.
- Influence positive behaviour change in participants.
- Increase the knowledge of risk factors for foot ulcers.
- Offer patients ongoing support and resources needed to prevent and treat these ulcers.

In 2012, *PEP Talk* workshops for the prevention of diabetic foot ulcers were launched at 12 sites within 10 Canadian communities. Many more are planned for 2013. Participants' evaluations of the workshops noted the following: friendly environment; good sharing experience; informative; and peer leaders' knowledge was helpful. Most importantly, participants committed to checking their feet daily, checking their blood glucose levels, following their diet, getting more exercise and wearing their shoes in the house.

**Program components include the following:**

- Recruitment of an expert advisory group composed of healthcare professionals and peer educators (i.e. people living with diabetes).
- Support of the group through mentoring, outreach and a portal website ([www.diabetespeptalk.ca](http://www.diabetespeptalk.ca)).
- Evaluation of the program strategy, with revision as required.
- Dissemination of the strategy through final reports.

**The roles and responsibilities of the expert advisory group were as follows:**

- Identify potential participants from 10 communities in each province to train the core group of diabetic foot ulcer prevention peer educators.
- Advise on the content of the proposed training curriculum.
- Develop terms of reference and clear roles and

## Un pair animateur du PEP donne ses impressions

*Monsieur Ken McLellan, pair animateur du PEP de London, en Ontario, a assisté à la conférence sur le programme et décrit son expérience du programme.*



Ken McLellan (pair animateur en Ontario) et sa femme Brenda à la récente conférence de L'ACSP.

J'ai entendu parler du PEP pour la première fois en 2011, pendant un séjour au service des amputés de l'Hôpital Parkwood de London. J'ai décidé de participer au programme à titre de bénévole parce que je voulais faire ma part pour aider d'autres personnes à éviter l'amputation. C'était aussi pour moi une façon de montrer ma gratitude pour tous les soins et toute l'aide que j'avais reçus à l'Hôpital Parkwood.

À mon avis, l'éducation sur la façon de bien prendre soin de ses pieds est un des aspects les plus importants du PEP pour les personnes diabétiques. Je souhaite que nous puissions éduquer autant de personnes que possible et faire valoir l'importance du bon soin des pieds; ainsi, les personnes qui assistent aux ateliers pourront, je l'espère, éviter l'amputation.

J'espère que le programme pourra un jour être offert dans d'autres régions de l'Ontario et partout au Canada, y compris dans les régions où les Autochtones dominent, car les taux de diabète y sont très élevés.

*(Programme d'éducation par les pairs) : Le diabète : des pieds en santé et vous* est un programme d'ateliers sur l'autogestion donnés par les pairs. Les pairs animateurs bénévoles sont des personnes atteintes de diabète et de neuropathie qui encouragent les gens à adopter des comportements d'autogestion pour prévenir les ulcères du pied diabétique.

Un des principaux avantages du PEP est que les pairs animateurs peuvent aider les gens à composer avec le diabète au quotidien, notamment en les orientant dans le système de soins de santé, en leur apprenant à gérer leurs émotions et leurs relations familiales, en échangeant avec eux et en leur offrant leur soutien.

### Autonomisation des patients

Le principe fondamental du PEP est l'autonomisation des patients, car on a démontré que les interventions axées sur l'autonomisation peuvent améliorer la santé physique, l'état psychologique et la qualité de vie des patients qui souffrent d'une maladie chronique<sup>4</sup>.

**Les principaux objectifs du PEP sont comme suit :**

- encourager l'autogestion pour la prévention des ulcères du pied diabétique en diffusant des outils destinés aux patients au cours des ateliers offerts par les pairs;
- inciter les patients à adopter de meilleurs comportements;
- renseigner les patients sur les facteurs de risque

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responsibilities for peer educators and healthcare professionals.

- Review and advise on all materials and content of program, including infrastructure of support, web portal design, data collection, evaluation research plan and final report.

### Conclusion

Peer leaders are the future of promoting optimal foot care and potentially reducing amputations across Canada. Healthcare professionals should visit [www.diabetespeptalk.ca](http://www.diabetespeptalk.ca) for details regarding how their patients can participate in a workshop in their area, or to get involved themselves! ☺

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### A PEP Talk peer leader shares his thoughts

Ken McLellan, a PEP Talk program peer leader from London, Ontario, attended the PEP Talk conference session and described his experiences with the program.

I first learned about the PEP Talk program when I was a patient at the Parkwood Amputee Ward at Parkwood Hospital in London in 2011. I decided to get involved with the program because I thought that if my involvement might help someone else avoid an amputation, then I would be more than willing to volunteer. I also felt that I would like to repay all the care and assistance I had received while at Parkwood.

I believe one of the most important things the PEP Talk program offers to other people living with diabetes is education regarding proper foot care. My hope is that we can educate as many people as possible, and bring some focus to the importance of healthy foot care; in this way, hopefully, attendees will avoid amputation.

In the future, I hope the program will be expanded to other regions of Ontario – and across Canada – including aboriginal areas, where diabetes rates are so high.

We were pleasantly surprised when we had 16 participants attend a recent PEP Talk workshop. The greatest difficulty we had was finding a venue that would offer complimentary meeting space!



Ken McLellan (Ontario peer leader), with his wife, Brenda, at the recent CAWC conference.

d'ulcère du pied;

- offrir de façon continue aux patients le soutien et les ressources dont ils ont besoin pour la prévention et le traitement des ulcères.

En 2012, les ateliers du PEP sur la prévention des ulcères du pied diabétique ont été offerts à douze endroits dans dix communautés canadiennes. On prévoit offrir de nombreux autres ateliers en 2013. Dans leurs évaluations, les participants ont dit que les ateliers étaient conviviaux, propices au partage de l'expérience et éducatifs, et que les connaissances des pairs animateurs étaient utiles. Fait plus important, les participants se sont engagés à examiner leurs pieds chaque jour, à vérifier leur glycémie, à suivre leur régime alimentaire, à faire davantage d'exercice et à porter des chaussures dans la maison.

### Les composantes du programme sont les suivantes :

- recrutement de professionnels de la santé pour former un groupe d'experts-conseils et d'éducateurs de pairs (soit des personnes atteintes de diabète);
- soutien du groupe par l'entremise du mentorat, de l'intervention directe et d'un portail Web (<http://diabetespeptalk.ca/fr>);
- évaluation de la stratégie du programme et révision de celle-ci au besoin;
- dissémination de la stratégie.

### Les rôles et responsabilités du groupe d'experts-conseils étaient comme suit :

- trouver dans dix communautés de chaque province des personnes pour former le groupe central de pairs qui offrira l'éducation sur la prévention des ulcères du pied diabétique;
- donner des conseils sur le contenu du programme de formation envisagé;
- déterminer le mandat et définir clairement les rôles et responsabilités des éducateurs de pairs et professionnels de la santé;
- passer en revue l'ensemble du matériel et du contenu du programme.

### Conclusion

Les pairs animateurs représentent l'avenir de la promotion des soins optimaux des pieds, voire de la réduction du nombre d'amputations au Canada. Pour obtenir des renseignements sur la participation de leurs patients à un atelier dans leur région, ou savoir comment ils peuvent contribuer au programme, les professionnels de la santé peuvent visiter le site [www.diabetespeptalk.ca/fr](http://www.diabetespeptalk.ca/fr). ☺

Références (voir page 24)

# Dispelling the Myths About Wound Pain Management:

## Strategies to assist healthcare professionals in assessing and managing patients' pain levels

PRESENTERS:

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MD FRCPC

ROSEMARY KOHR  
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### Introduction



During this session, attendees learned the following regarding wound pain management:

- Pain in chronic wounds is an important factor to measure and address.
- It is important for clinicians to understand the components of a thorough pain assessment in chronic wound management.
- Clinicians should identify treatment modalities for chronic wound pain that treat the cause of the pain, as well as the pain.
- The individual is at the centre of the pain management model of care.

### Perception of pain

Pain remains a function of an individual's personal and unique experience, and is multi-dimensional, relational and temporal. Determinants of the expression of pain include the following:

- Pain is a subjective experience, not just a sensation.
- Different people will respond differently to the same painful event.
- Religion and culture greatly mediate the expression, experience and meaning of pain.

With respect to patients' perspectives of pain, the following factors are pertinent: When considering pain, patients remember past experiences (e.g. degree of pain at a particular point compared with past pain). Schulz and Kohr asked, with respect to pain management: "Who has the control? Patient, nurse or other healthcare professional?" They noted that, more often than not, the caregiver determines the pain management, in many cases according to their own temporal and relational experiences.

Regarding the presence of pain, Schulz and Kohr observed, "It doesn't have to hurt!" This colloquialism means assessing the patient's pain, taking all

*A major consideration with respect to minimizing pain is minimizing patient anxiety.*

available steps to minimize trauma and pain, and responding appropriately to the patient's report of pain (e.g. vocally, verbally and through body language).

The following principles apply regarding assessment of pain:

- Obtain a detailed pain history.
- Remember that chronic wounds may cause heightened sensitivity.
- Remember that wound pain may worsen with time. Identify factors that may worsen pain and determine causes of pain from any underlying medical condition.

As well, when assessing pain it is important to use validated assessment strategies. Factors such as age, language and cultural considerations should be taken into account. When dealing with individual patients, clinicians should use the same pain scale throughout the course of treatment. Most importantly, accept the patient's reported level of pain, even if it might seem out of proportion.

It is important to assess pain between dressing changes as well as during them. As the condition of the wound changes, so will the needs of the patient. For any dressing change or other intervention, assess the patient's comfort after the procedure has been completed; as well, assess background pain and differentiate it from intervention-related pain.

### Minimizing trauma

The following clinical pearls were offered with respect to minimizing the trauma of pain.

**Valerie Schulz** is an associate professor in the Department of Anesthesia and Perioperative Medicine at the Schulich School of Medicine and Dentistry at Western University in London, Ontario.

**Rosemary Kohr** is with Saint Elizabeth in London, Ontario.

*Advocate for the right of patients to have access  
to pain medication and treatments that  
minimize pain and trauma.*

**Avoid trauma to the wound bed**

Dressing removal can damage healing tissue, and traumatic dressing removal will not only cause unnecessary suffering to the patient but will also delay wound healing. Avoid dressings such as gauze, which adhere to the wound bed and require soaking prior to removal; rather, replace them with an atraumatic cover dressing.

**Avoid trauma to skin surrounding a wound**

The following should be avoided: dressings with allergenic potential; adhesive dressings that may cause skin stripping upon removal; and dressings that do not adequately control exudate. Choose a dressing that may be left in place for as long as possible, as frequent dressing changes increase the risk of further skin breakdown as well as increased pain.

Dressing selection should be based on an individual wound's needs, and the following principles apply:

- Soft silicones, hydrofibre, hydrogels or alginates maintain a moist wound environment, are atraumatic at dressing changes and support a favourable healing environment.
- With respect to appropriate absorptive capacity, exudate level is likely to change during treatment; thus, avoidance of a "one for all" approach is prudent to minimize the risk of maceration, as well as to seal wound edges and protect peri-wound skin.
- Dressing selection should be reviewed at each dressing change, as dressing requirements may change as the wound heals.

**Minimizing pain**

A major consideration with respect to minimizing pain is minimizing patient anxiety. To this end, the following considerations should be noted with respect to dressing changes:

- choose a quiet, relaxing environment;
- involve the patient throughout the procedure;
- explain the procedure thoroughly; and
- establish how the patient would like to be involved.

Avoidance of pain triggers is crucial, so the following considerations should be borne in mind:

- Patients may be extremely sensitive to even the slightest stimulus.
- The wound should be handled very gently.
- Identify what the patient thinks affects their pain.

- Choose the right dressing for the wound.
- Avoid any unnecessary stimulus or manipulation.

The use of pain-reducing factors is also crucial. To this end, ensure the patient is made as comfortable as possible, and use approaches the patient has previously found helpful. As well, consider the following:

- Use distractions such as relaxing music.
- Use relaxation techniques, such as slow rhythmic breathing.
- Vary the procedure in response to pain.
- Allow the patient to pace the procedure.
- Encourage the patient to tell you immediately about any pain they are experiencing during the procedure.
- Use frequent verbal pain checks and pain assessment tools.
- Give the patient 'time out' breaks if discomfort becomes unacceptable.
- Consider preventive analgesia, especially for debridement.

**Conclusion**

In conclusion, Schulz and Kohr noted the following general points:

- Advocate for the right of patients to have access to pain medication and treatments that minimize pain and trauma.
- Recognize the intrinsic value of each individual in all dimensions (i.e. physical, psychological, social, spiritual and family).
- Always take the time to assess patients' pain, and be sure to engage them and their family members/caregivers in treatment decisions and processes. ☺

**Suggested reading**

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## Best Practice Recommendations for

# Pressure Ulcer Management in People With Spinal Cord Injury – Launch

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## Introduction



his session provided participants with a description of the process undertaken to develop a best practice guideline for the prevention, assessment and treatment of pressure ulcers (PU) in people with spinal cord injury. This population has a high prevalence of Stage III and Stage IV PUs – there is a 35% prevalence of PUs, 80% to 90% of people with spinal cord injury will have a PU during their lifetime, and 15% will have recurrent PUs. Acute care patients (i.e. those with immediate spinal cord injury) typically have sacrum and heel ulcers, while those in the community typically have sitting-acquired PUs and ischial tuberosities. PUs are most prevalent 20 years post-spinal cord injury.

While a number of Canadian and international PU guidelines have been written<sup>1-3</sup>, there is a need to develop a guideline specific to the spinal cord injury population, particularly for sitting-acquired PUs.

The overarching objective of this group was to create a resource that could help clinicians working with spinal cord injury patients to appreciate wound care, and to help those working in wound care appreciate the specific challenges of spinal cord injury. Accordingly, the following statement of purpose was formulated:

*To provide a common framework for spinal cord experts and wound care specialists that will enhance pressure ulcer prevention and management strategies for people with spinal cord injuries across the continuum of care.*

## Methodology

The process began with the identification and invitation of a multidisciplinary and geographically diverse panel. The panel included healthcare professionals and lay representatives from various practice settings and locations (Table 1).

Literature searches were conducted in June 2010 and May 2012. English-language articles published from 2000 onward were identified from PubMed, Embase, Scopus, CINAHL and MEDLINE. The search was restricted to human studies (case studies, experimental, retrospective, cohort studies, randomized controlled trials and systematic reviews) in which at least 50% of subjects had spinal cord injury. The literature search identified 520 citations, from which 331 articles were retrieved.

The best practice recommendation panel (12 members) and working groups (9 members) reviewed the literature, proposed new research from a database search and proposed new recommendations. The group met in Toronto in October 2010 for 2 days to achieve consensus.

Draft guidelines were then prepared and the panelists refined the writing, clarified recommenda-

TABLE 1

### Best practice guideline panel

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Peter Athanasopolulosa CPA  
Jennifer Birt OT  
Karen Campbell PhD RN  
Lincoln D'Souza RN  
Martin Ferguson-Pell PhD  
Christine Fraser RD  
Pamela Houghton PhD PT  
David Keast MD  
James Mahoney MD  
MaryAnn Regan RN  
Scott Worley MD BScPT FRCPC

TABLE 2

**RNAO levels of evidence<sup>1,2</sup>**

| Level of evidence | Criteria                                                                                                                                       |
|-------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Ia                | Evidence obtained from meta-analysis or systematic review of randomized controlled trials.                                                     |
| Ib                | Evidence obtained from at least 1 randomized controlled trial.                                                                                 |
| IIa               | Evidence obtained from at least 1 well-designed controlled study without randomization.                                                        |
| IIb               | Evidence obtained from at least 1 other type of well-designed quasi-experimental study without randomization.                                  |
| III               | Evidence obtained from well-designed, non-experimental descriptive studies, such as comparative studies, correlation studies and case studies. |
| IV                | Evidence obtained from expert committee reports or opinions and/or clinical experiences or respected authorities.                              |

tions, and assigned a level of evidence to each recommendation using criteria set by the Registered Nurses' Association of Ontario (RNAO) (Table 2). The draft document was over 90,000 words, covered 10 sections (Table 3), and included 8 appendices (tools and resources), 112 recommendations and more than 330 references. In Spring 2012, 129 stakeholders (physicians, nurses, dietitians, occupational therapists and consumers) were invited to review the document; of the 43 who responded, 97% strongly agreed or agreed with the recommendations. In addition, they provided suggestions on how to clarify and condense the document, and increase feasibility of the recommendations.

**Recommendations**

The distribution of recommendations by level of evidence is summarized in Table 4.

TABLE 3

**Best practice guideline chapters**

1. Pressure Ulcer Prevention and Interprofessional Team
2. Human Factors, Education and Self-management
3. Body Weight, Nutrition, Hematological and Biochemical Markers
4. Principles of Pressure Management
5. Beds, Mattresses and Recumbent Positioning
6. Wheelchairs and Seating
7. Mobility, Activity and Conditioning
8. Assessment After a Pressure Ulcer
9. Pressure Ulcer Treatment: Non-surgical, Surgical
10. Tele-Rehabilitation

**Examples of Level Ia and Ib recommendations**

Four recommendations were supported by the highest level of evidence:

Recommendation 2.2: Prevention during pre-hospital and acute care

- As soon after spinal cord injury as emergency medical and spinal stabilization status allows, review individual risk factors and implement appropriate PU prevention strategies that:
  - avoid prolonged immobilization whenever possible (Level IIb);
  - limit the time a person is on a spinal board (Level Ia); and
  - employ interoperative pressure reduction strategies (Level Ib).

Recommendation 3.8: Daily protein intake

- Provide 1.0 to 2.0 g/kg protein daily for people at risk of developing PU. (Level Ia)
- Provide a daily protein intake at the higher end of the range for people with severe PU. (Level Ia)

Recommendation 9.7: Electrical stimulation to speed closure of PU

- Use electrical stimulation combined with standard wound care interventions to promote closure of Stage III or IV PU. (Level Ia)

Recommendation 8.1: Assessing the individual with PU

- Prompt comprehensive evaluation if PU develops. (Level Ib)

**Pressure management recommendations**

The following recommendations dealing with recumbency, sitting and mobility were presented by Laura Titus. She stressed the importance of a full physical assessment in order to formulate a collaborative plan to identify issues and goals for support surfaces, strategies for integrating pressure management in a person's daily life, and following up with plans for reassessment. In addition, she highlighted the fact that evidence suggests that the more active a patient is, the lower the risk of PU.

Recommendation 4.2: 24-hour approach to PU risk management

- Perform a comprehensive assessment of posture and positioning to evaluate PU risk. Consider all surfaces in both recumbent and sitting positions that a person uses to participate in daily activities over the entire 24-hour period. (Level IV)

#### Recommendation 5.8: Repositioning schedule

- If the person's medical condition allows, turn and reposition individuals who require assistance at least every 2 hours initially. Adjust the repositioning schedule based on the individual's skin response, determined by frequent skin checks, until an appropriate repositioning schedule is established. (Level IV)

#### Recommendation 5.10: Bed rest for PU treatment

- Avoid prolonged use of full-time bed rest to treat PU in individuals with spinal cord injury. Use bed rest, if necessary, to offload pressure completely for a specific and limited time, such as after surgical repair of PU. (Level IV)

#### Recommendation 6.2: Principles of sitting posture and positioning for pressure management

- Address pelvic asymmetry, postural instability, kyphosis and spasticity using postural management and support surfaces.
- Evaluate the effects of posture, deformity and movement on interface pressure distribution, and the influence of subdermal tissue loads on sitting support surfaces.
- Consider the effects of clothing, shoes and additional layers on the surface's microclimate, friction, shear and pressure-redistributing properties. (Level IV)

#### Recommendation 6.18: Schedule for periodic reassessment

- Establish a mechanism for regular reassessment of performance of sitting support surfaces specific to PU prevention and treatment. Schedule reassessment at least every 2 years, or sooner if any of the following occurs:
  - health status changes, including weight or medical changes;
  - changes in functional status;
  - equipment wear or disrepair;
  - PU development; and
  - changes in living situation. (Level IV)

#### Recommendation 7.2: PU risks associated with mobility and activity

- Evaluate PU risks associated with movement during the mobility assessment, including the following:
  - Adequacy of postural support in all positions to reduce the risk of shear due to sliding
  - Protection of vulnerable bony prominences from trauma at rest and during movement
  - Amount of lift off different surfaces achieved by the individual during movement to minimize friction

TABLE 4

### Distribution of recommendations by level of evidence

| Level of evidence | Number of recommendations supported by this level of evidence |
|-------------------|---------------------------------------------------------------|
| Ia                | 3                                                             |
| Ib                | 7                                                             |
| IIa/b             | 13                                                            |
| III               | 30                                                            |
| IV                | 80                                                            |

- Safety of environmental configuration to minimize the risk of trauma and falls, including maintaining all transfer surface heights as equal as possible
- Level of attention the individual gives to movement quality
- Identification of factors that interfere with movement quality or safety (Level IV)

#### Recommendation 7.7: Wheelchair skills

- Integrate controlled simulations into a formalized wheelchair skills training program. (Level Ib)

#### Recommendation 7.8: Individualizing weight-shift strategies

- Individualize pressure-redistributing strategies using a variety of weight-shifting approaches including automatic pressure redistribution with functional movement, active lifting or shifting, and dynamic weight shifts (tilt and recline) with and without power-assist.
- Base the duration, frequency and amount of active or power-assisted weight-shifting on the individual skin response and the effectiveness of the strategy across the full day. (Level III)

### Pressure treatment recommendations

The treatment of PU in spinal cord-injured persons does not differ significantly from non-spinal cord-injured persons. Many of these best practice recommendations would be known to the audience from other sources. The best practice recommendations panel confirmed these recommendations, with some nuances.

#### Recommendation 9.3: Beds and mattresses

- Consider replacing the recumbent support surface with one that provides better pressure redistribution, offloading capabilities, shear reduction and microclimate control for individuals who:

- Cannot be positioned off the ulcer
- Have PU on at least two turning surfaces
- Fail to heal, or demonstrate ulcer deterioration, despite appropriate comprehensive care
- Have a high risk of developing additional ulcers
- Bottom out on the existing support surface. (Level IV)

#### Recommendation 9.5: Dressings

- Select a dressing(s) that provides the optimal moisture level to the wound base of superficial PU.
- Ensure the dressing meets the needs of the individual and is modified as individual goals and/or wound status change.
- Avoid using daily dressing changes if at all possible by using absorbent dressings that manage exudate and odour and remain in place for as long as possible. (Level Ib)

#### Recommendation 9.8: Other adjunctive therapies for non-surgical treatment of PU

- Consider adding the following adjunctive therapies to a standard wound care program to speed healing of Stage II, III or IV PU.
  - Electromagnetic energy (Level Ib)
  - Ultraviolet C light (Level Ib)
  - Non-contact non-thermal acoustic therapy (Level III)
  - Topical oxygen (Level III)
  - Maggot therapy (Level III)
  - Topical recombinant growth factors (Level III)
  - Recombinant erythropoietin (Level III)
  - Anabolic steroids (Level III)
  - Activated factor XIII (Level III)
  - Tension therapy (Level IV)
  - Hyperbaric oxygen (Level IV)

#### Recommendations related to risk and human factors

##### Recommendation 1.1: Spinal cord injury interprofessional team

- Develop an interprofessional spinal cord injury team that includes, at a minimum:
  - patient

- physiatrist (or physician with spinal cord injury training)
- occupational therapist, physiotherapist
- wound care clinician
- nurse
- psychologist, social worker
- dietitian

- Include additional members as local resources allow. Ensure that all team members have knowledge of spinal cord injury, and PU prevention and care. (Level III)

##### Recommendation 1.2: Rapid admission to specialized care

- Admit people with spinal cord injury as soon as possible to a specialized spinal cord injury unit staffed by an experienced interprofessional team. (Level III)

##### Recommendation 1.4: Risk assessment tools

- Use the Waterlow, Braden or Spinal Cord Injury Pressure Ulcer Scale (SCIPUS) tool to assess PU risk in people with spinal cord injury. (Level IIa)

#### Publication and dissemination

The guideline document is currently available at the Ontario Neurotrauma Foundation website ([www.onf.org](http://www.onf.org)). Implementation has started via the Knowledge Mobilization Network (a project of the Rick Hansen Institute's Best Practice Implementation program, [www.rickhanseninstitute.org](http://www.rickhanseninstitute.org)), with a focus on those recommendations that are supported by the higher levels of evidence. There are also plans to promote research around gaps identified in the guideline and to develop a practice enabler for the CAWC. ☺

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# Assessing and Managing Arterial Ischemic Pain

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## Introduction



During this session, participants were given an overview of ischemic arterial pain, current research for nonpharmacologic treatment of ischemic and wound-related pain, as well as a method of assessing total pain in patients living in the community.

## Pain – An overview

Pain is defined as an unpleasant sensory and emotional experience associated with actual and potential tissue damage. Acute pain is functional and purposeful. It is the body's signal to protect and guard damaged tissues. However, because there are multiple pain pathways (central, spinal and peripheral) and pain modulators, the pain signalling can get out of control and become chronic.

Pain can be subcategorized as nociceptive, which results from excitation of nociceptors (free nerve endings) via damage (mechanical or ischemic) that is perceived as somatic or visceral pain. Pain is perceived by nociceptors in the periphery. The free nerve endings located between the epidermis and the dermis transmit signals via the spinal cord, which are then transmitted to the higher brain centres and the cortex. Nociceptive pain, often related to tissue damage and inflammation, is typically described as aching or throbbing.

Another subcategory, neuropathic pain, is due to nerve damage, and is often associated with altered sensation and autonomic changes. Common examples of neuropathic pain include diabetic neuropathy (26%), herpes zoster and phantom limb pain. This type of pain is often described as shooting, stabbing, burning or electric shock.

Other categories of pain include: allodynia, which is due to a stimulus that does not normally provoke pain; and hyperalgesia, an abnormally heightened sensitivity to pain, which can occur when pain pathways become sensitized.

## Ischemic arterial pain

Ischemic arterial pain is nociceptive pain associated with reduced blood flow tissue oxygenation. As it often accompanies severe underlying cardiovascular

*Chronic pain management is necessary, as ischemic nerve injury may take time to resolve.*

pathology, it commonly occurs in individuals with venous or renal disease, or in those undergoing vascular surgery. Peripheral arterial disease causing an ischemic wound can be reflective of disease in the main organs in the body – the brain, heart and kidneys. The pain can be severe and unrelenting, and is often worse at night and/or when a limb is elevated. It occurs at rest and during exercise (claudication).

## Critical limb ischemia

Critical limb ischemia is characterized by pain at rest, non-healing ulcers of the foot and gangrene. The diagnosis is made on the basis of a history and physical examination, which includes the presence or absence of pulses (Doppler signals), and evaluation of the following: vital organ function (kidney, heart, brain and eyes) in order to understand if arterial disease is widespread; overall change in quality of life; and causes of pain, including wound pain.

Medical management involves addressing risks to reduce the risk of myocardial infarction (e.g. hyperlipidemia, smoking, hypertension, obesity, diabetes and hypercoagulation of microcirculation). Patients with diabetes are 20% to 30% more likely to develop peripheral arterial disease and critical limb ischemia. Their risk increases with duration of diabetes, as their microcirculation is progressively impaired. Optimal diabetes treatment is essential.

Treatment of hyperlipidemia has been shown to reduce cardiovascular events by 25% over a 5-year period, and to increase pain-free walking and decrease claudication by 65% at 12 months.

Smoking increases the risk of peripheral arterial disease by 2.5% to 9.8%. Smoking cessation reduces the risk of critical limb ischemia, amputation, myocardial infarction and stroke, and may improve walking and wound healing.

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### Charlotte Koso

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### Valerie Schulz

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TABLE 1

### Nonpharmacologic pain therapies

|                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Behavioural/cognitive | <ul style="list-style-type: none"> <li>• Relaxation</li> <li>• Distraction (e.g. music)</li> <li>• Visual imagery</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Patient education     | <ul style="list-style-type: none"> <li>• Positioning</li> <li>• Exercise (e.g. for claudication)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Biophysical agents    | <ul style="list-style-type: none"> <li>• Electrotherapy               <ul style="list-style-type: none"> <li>– <i>Conductive</i>: transcutaneous electrical nerve stimulation; high-voltage pulsed current; neuromuscular electrical stimulation; high-frequency electrical muscle stimulation; frequency rhythmic electrical modulation system</li> <li>– <i>Inductive</i>: pulsed electromagnetic field; pulsed radiofrequency; pulsed short-wave diathermy</li> </ul> </li> <li>• Monochromatic light therapy</li> <li>• Hyperbaric oxygen</li> </ul> |

Hypertension increases atherosclerosis and peripheral arterial disease. Decreasing blood pressure levels reduces the risk of limb amputation, and of death from myocardial infarction, stroke and microvascular thrombosis.

For symptomatic patients with low ankle brachial index (ABI), medical management may include ASA therapy, weight loss and exercise as tolerated. Pain is the most common symptom, with pain at rest and pain with dressing changes.

Chronic pain management is necessary, as ischemic nerve injury may take time to resolve. In addition, ischemic wounds are at risk of infection and subsequent infection-related pain. Infection can lead to microvascular thrombosis and further worsen the peri-wound ischemia. These wounds need to be cleansed topically, necrotic tissue must be removed, and antibiotics should be used if necessary. If possible, the limb should be revascularized.

It is essential to identify if a patient is at risk of dying. This is easier to determine in patients with malignant vs. non-malignant conditions. People who are dying often have severe arterial ischemic pain. The goals of care must be determined through shared decision-making and consideration of the patient's disease state (i.e. is it reversible and treatable?), the patient's and family's understanding of the illness, their own values and wishes, and the overarching goals of life extension and comfort. Options include offering palliation in the care plan, deciding the aim of wound care in the context of threatened arterial supply, and discussing code status with the physician.

#### Capturing the total pain experience

Assessing pain in a systematic manner is practised in oncology, palliative care, acute situations such as post-operative care and injury, and acute wounds. However,

TABLE 2

### Pharmacologic pain therapies

- Nonsteroidal anti-inflammatory drugs
- Opioids
  - Systemic: oral, intravenous, inhaled
  - Local: injection, topical (cream, powder), dressings, patches
- Nerve block: sodium, N-methyl-D-aspartate
- Anticonvulsants
- Antidepressants

an environmental assessment identified that many clients in the community had unmanaged wound pain and chronic wound pain such as ischemic arterial pain.

#### Innovative nonpharmacologic treatments

The presenters reviewed the current literature on nonpharmacologic treatments for ischemic arterial pain. These treatment modalities are listed in Table 1, while pharmacological treatments are shown in Table 2. Many modalities involve electrotherapy, which can promote analgesia by increasing tissue perfusion, angiogenesis, nitric oxide release and release of vascular endothelial growth factor.

#### Conclusions

The session concluded with reminders about the importance of setting goals for care (which may not always be to heal the condition), the need for comprehensive investigations of the types and causes of wound pain, and the evidence supporting nonpharmacologic approaches to wound care. 🙌

*For suggested reading, please see page 34*

# Wound Care in Haiti:

## After the earthquake

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### Introduction



Attendees at this session learned about the development of the Wound Care Program at Hôpital Bernard Mevs in Port-au-Prince, Haiti. The program was launched after the devastating earthquake of January 12, 2010.

Dr. Macdonald began by noting some sobering statistics regarding the earthquake, which lasted for only 1 minute but resulted in untold damage:

- In a population of 10.5 million, 3 million people were directly affected.
- The estimated number of resultant deaths was 300,000; more than 7,000 people were buried in mass graves.
- 1.5 million people were rendered homeless; indeed, today, approximately 450,000 people continue to live in tent cities.
- The estimated number of injured was 300,000; more than 4,000 amputations were performed in the months following the earthquake.
- More than 200 healthcare personnel were killed or injured.

On January 14, 2010 – just days after the earthquake – Dr. Macdonald and his medical colleagues travelled to Port-au-Prince. “At the beginning, there were only 7 doctors, and no nurses,” he recalled. “There was no running water or toilets, and no antibiotics were available; we kept morphine tablets in our pockets that we fed to patients to relieve their pain.”

Dr. Macdonald estimated that about 80% of the people affected by the earthquake had wounds. The following wound morbidities were encountered:

- crush injuries, i.e. laceration, avulsion;
- compound fractures;
- compartment syndrome;
- rhabdomyolysis;
- post-operative amputations;
- split thickness skin grafts;
- external fixation;
- vacuum-assisted closure (VAC) application and maintenance; and
- burns.

Because antibiotics were unavailable, many amputations had to be done. “So many wounds had become infected that we had no other options,” said Dr. Macdonald. “The first amputation was performed just days after the earthquake, on a card table, and under local anesthesia.”

A tent hospital was built, using money available from donated funds. One tent was dedicated specifically to wound care; however, there was still no running water.

The traumatic wound protocol for acute wounds was as follows:

- irrigation and debridement (saline, betadine and Dakins solution);
- topical antibiotics (silver sulfadiazine, betadine-soaked gauze);
- Vaseline-impregnated gauze (Xeroform); and
- gauze cover dressing + Kerlex + Coban.

For chronic wounds, the traumatic wound protocol was as follows:

- dressing change every 2 to 3 days;
- debridement;
- saline irrigation;
- topical silver;
- Vaseline Gauze (Xeroform);

### John Macdonald

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### Adler Francius

is with Project Medishare at Hôpital Bernard Mevs Wound Clinic in Port-au-Prince, Haiti.

### David Keast

is centre director of the Aging, Rehabilitation and Geriatric Care Research Centre at St Joseph’s Parkwood Hospital in London, Ontario.

### Canadian Association of Wound Care initiatives in Haiti

In an effort to provide support for wound care initiatives in Haiti, the Canadian Association of Wound Care donated a number of CAWC Institute of Wound Prevention and Management educational materials – including slides, workbooks and web-based resources – to Hôpital Bernard Mevs/Project Medishare Wound Clinic.

“We are pleased to be able to provide these invaluable materials to such a worthy endeavour,” says Peggy Ahearn, Executive Director of the CAWC. “We look forward to an ongoing partnership with Dr. Francius and hope we can contribute to the success of his work.”

- Kerlex and Coban wrap; and
- VAC application.

Noted Dr. Macdonald, "We had to make the protocols very simple, because the medical volunteers knew nothing about wound care."

By February 2012, 1.2 million people were still living in tents; however, more volunteer doctors and nurses continued to arrive, and the chaos began to come to order.

With respect to human resources, the following teams were formed:

- Bedside care and triage: 2 mobile teams of 2 to 3 people each.
- Pediatric surgical: Team of 2 to 3 people for all dressing changes, with conscious sedation.
- Adult surgical: Team of 3 to 4 people for major debridement and VAC, with conscious sedation.
- Outpatient care: 2- to 4-member team for dispensary and wound care.

The sheer volume of wound care required was staggering. Dr. Macdonald discussed "wound care by the numbers," and noted the following:

- 80% of patients affected by the earthquake had wounds.
- 140 amputations were performed in the first 30 days after the earthquake.
- 160 wound dressing were changed per day.
- 75 outpatients with wounds were seen per day.

The 20-bed clinic that was first set up after the earthquake is now a 60-bed hospital. To ensure that effective

wound management was being carried out, the World Health Organization guidelines entitled *Wound and Lymphoedema Management* were used.<sup>1</sup>

### Hôpital Bernard Mevs/ Project Medishare Wound Clinic

Dr. Francius discussed the Hôpital Bernard Mevs/Project Medishare Wound Clinic in Haiti. He noted that the clinic currently sees an average of 45 patients per day. Approximately 40% of wounds treated are surgical wounds, while another 40% are traumatic wounds.

Initially, the clinic's primary focus was on dressing changes. Now, with the assistance of physicians from other wound care centres – including Dr. Macdonald's team in Miami – the clinic is undertaking the following initiatives:

- applying critical thinking to the prevention, management and healing of wounds;
- discussing and questioning the best treatment and dressing options for each and every patient; and
- documenting wound statistics.

Dr. Francius concluded his presentation by noting that his dream for the Hôpital Bernard Mevs/Project Medishare Wound Clinic is to become a centre of excellence to treat, teach and train, where patients are happy, healthy and healed!

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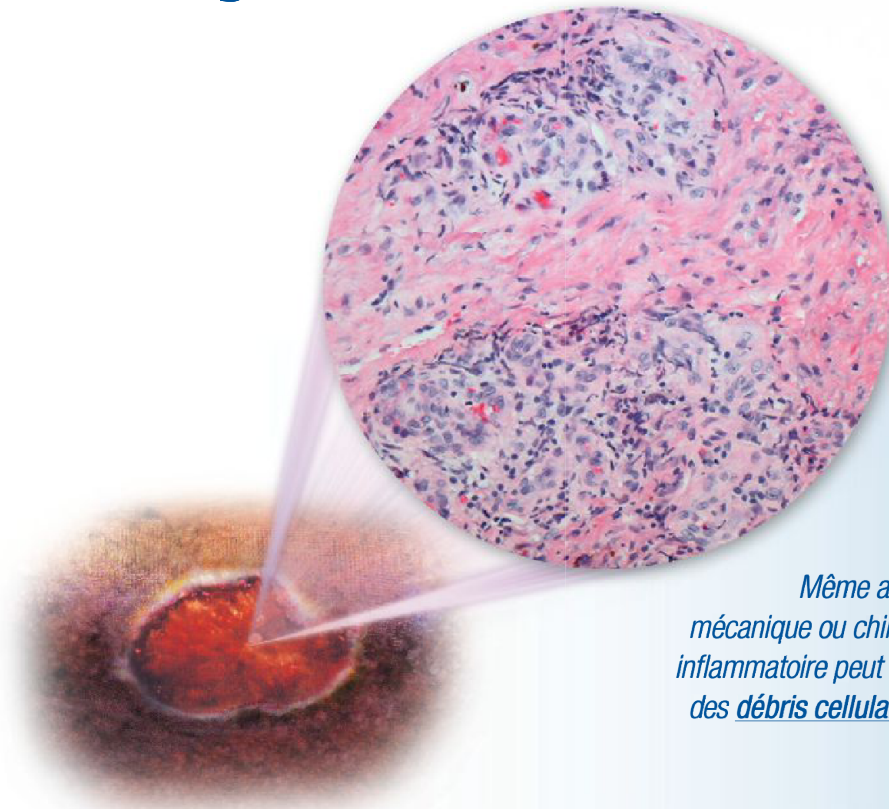
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When wounds are trapped in the inflammatory phase, debridement is not complete...

Lorsque les plaies sont piégées dans la phase inflammatoire, le débridement n'est pas complet...

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- L'onguent SANTYL® avec collagénase cible le collagène de manière sélective sans endommager les tissus sains
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Occasional slight transient erythema has been noted in surrounding tissue when applied outside the wound. One case of systemic hypersensitivity has been reported after 1 year of treatment with collagenase and cortisone.

Use of Collagenase SANTYL® Ointment should be terminated when debridement is complete and granulation tissue is well established.

Please see complete Prescribing Information on adjacent page.

On a noté un érythème occasionnel et léger sur les tissus environnants lorsque l'application de l'onguent dépasse le pourtour de la plaie. Un cas d'hypersensibilité systémique a été rapporté après un an de traitement à la collagénase et à la cortisone.

L'utilisation de l'onguent SANTYL® avec collagénase devrait être cessée lorsque le débridement est complété et que la granulation est bien entamée.

Veillez consulter l'information posologique complète sur la page adjacente.

**Collagenase**  
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Ointment 250 units/g

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**Collagénase**  
**Santyl**<sup>®</sup>  
Onguent 250 unités/g

**L'agent de microdébridement actif continu**

# Collagenase<sup>®</sup> Santyl<sup>®</sup>

Ointment 250 units/g

*Supports natural healing*

**DESCRIPTION:** Santyl<sup>®</sup> (collagenase) ointment is a sterile topical enzymatic debriding agent that contains 250 units of collagenase per gram of white petrolatum USP. The enzyme collagenase is derived from the fermentation of *Clostridium histolyticum*. It possesses the unique ability to selectively digest denatured and undenatured collagen that binds necrotic debris to the wound surface.

**CLINICAL PHARMACOLOGY:** Santyl<sup>®</sup> (collagenase) possesses the ability to digest insoluble collagen, undenatured and denatured, by peptide bond cleavage, under physiological conditions of pH and temperature. This ability makes it particularly effective in the removal of detritus from dermal lesions, contributing towards the more rapid formation of granulation tissue and subsequent epithelization of dermal ulcers and severely burned areas. Collagen in healthy tissue or in newly formed granulation tissue is not digested.

**INDICATIONS:** Santyl<sup>®</sup> (collagenase) is a sterile ointment indicated for the debridement of dermal ulcers or severely burned areas.

**CONTRAINDICATIONS:** Application is contraindicated in patients who have shown local or systemic hypersensitivity to collagenase.

**WARNINGS:** Debrided patients should be closely monitored for systemic bacterial infections because of the theoretical possibility that debriding enzymes may increase the risk of bacteremia.

**PRECAUTIONS:** The enzyme's optimal pH range is 6 to 8. Significantly lower pH conditions have a definitive adverse effect on the enzyme's activity, and appropriate precautions should be carefully taken. The enzymatic activity is also adversely affected by detergents, hexachlorophene and heavy metal ions such as mercury and silver that are used in some antiseptics and by cobalt, magnesium and manganese. When it is suspected such materials have been used, the site should be carefully cleansed by repeated washings with normal saline before Santyl<sup>®</sup> (collagenase) ointment is applied. Soaks containing metal ions or acidic solutions such as Burow's solution should be avoided because of the metal ion and low pH. Cleansing materials such as hydrogen peroxide or Dakin's solution followed by sterile normal saline do not interfere with the activity of the enzyme. The ointment should be confined to the area of the lesion in order to avoid the possible risk of irritation or maceration of normal skin; however, the enzyme does not damage newly forming granulation tissue. A slight erythema has been noted occasionally in the surrounding tissue particularly when the enzyme ointment was not confined to the lesion. This can be readily controlled by protecting the healthy skin with a material such as zinc oxide paste. Since the enzyme is a protein, sensitization may develop with prolonged use.

**ADVERSE REACTIONS:** Although no allergic sensitivity or toxic reactions have been noted in the recorded clinical investigations to date, one case of systemic manifestations of hypersensitivity has been reported in a patient treated for more than one year with a combination of collagenase and cortisone. Irritation, maceration or erythema has been noted where prolonged contact of normal skin with Santyl<sup>®</sup> (collagenase) ointment has been allowed, either by application of the ointment to areas of normal skin or by excessive application of ointment to the wound crater with subsequent spread to normal skin when dressings are applied. The reported incidence for this type of reaction was 1.8%.

**SYMPTOMS AND TREATMENT OF OVERDOSE:** **Symptoms:** To date, the irritation, maceration or erythema reported on prolonged contact of normal skin with Santyl<sup>®</sup> (collagenase) ointment constitute the only symptoms of overdose reported. **Treatment:** Santyl<sup>®</sup> (collagenase) ointment can be rendered inert by the application of Burow's solution USP (pH 3.6 - 4.4) to the treatment site. If this should be necessary, reapplication should be made only with caution.

**DOSAGE AND ADMINISTRATION:** For external use only. Santyl<sup>®</sup> (collagenase) ointment should be applied once daily, or more frequently if the dressing becomes soiled (as from incontinence) in the following manner: **(1)** Prior to application the lesions should be gently cleansed with a gauze pad saturated with sterile normal saline, to remove any film and digested material. If a stronger cleansing solution is required, hydrogen peroxide or Dakin's solution may be used, followed by sterile normal saline. **(2)** Whenever infection is present, as evidenced by positive cultures, pus, inflammation or odor, it is desirable to use an appropriate antibacterial agent. Should the infection not respond, therapy with Santyl<sup>®</sup> (collagenase) ointment should be discontinued until remission of the infection. **(3)** Santyl<sup>®</sup> (collagenase) ointment should be applied (using a tongue depressor or spatula) directly to deep wounds, or when dealing with shallow wounds, to a non-adherent dressing or film dressing which is then applied to the wound. The wound is covered with an appropriate dressing such as a sterile gauze pad and properly secured. **(4)** Use of an occlusive or semi-occlusive dressing may promote softening of eschar, if present. Alternatively, crosshatching thick eschar with a #11 blade is helpful in speeding up debridement then cleanse with sterile saline. It is also desirable to remove as much loosened detritus as can be done readily with forceps and scissors. **(5)** All excess ointment should be removed each time the dressing is changed. **(6)** Use of Santyl<sup>®</sup> (collagenase) ointment should be terminated when debridement of necrotic tissue is complete and granulation is well under way.

**HOW SUPPLIED:** Available in 30 gram tubes of ointment. Sterile until opened. Contains no preservative. Do not store above 25°C.

Product monograph available upon request.

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# Collagénase<sup>®</sup> Santyl<sup>®</sup>

Onguent 250 unités/g

*Favorise la guérison naturelle*

**DESCRIPTION:** Santyl<sup>®</sup> (collagénase) onguent est un agent de débridement topique stérile enzymatique qui renferme 250 unités de collagénase par gramme de pétrolatum blanc U.S.P. L'enzyme collagénase est dérivée de la fermentation de *Clostridium histolyticum* possédant le pouvoir unique de digérer de manière sélective le collagène aussi bien naturel que dénaturé qui lie les fibres nécrosées à la surface de la plaie.

**PHARMACOLOGIE CLINIQUE:** Santyl<sup>®</sup> (collagénase) a la capacité de digérer le collagène insoluble, non dénaturé et dénaturé, par clivage de la liaison peptidique à un pH et à une température physiologiques. Cette caractéristique le rend particulièrement efficace dans l'élimination des déchets des lésions dermiques favorisant ainsi la formation du tissu de granulation et l'épithélialisation ultérieure des zones dermiques ulcérées et gravement brûlées. Le collagène des tissus sains ou du nouveau tissu de granulation n'est pas digéré.

**INDICATIONS:** Santyl<sup>®</sup> (collagénase) est un onguent stérile indiqué pour le débridement des zones dermiques ulcérées ou gravement brûlées.

**CONTRE-INDICATIONS:** L'application est contre-indiquée chez les patients ayant présenté une hypersensibilité locale ou systémique à la collagénase.

**MISE EN GARDE:** Les patients atteints de conditions débilantes doivent être surveillés étroitement pour éviter la généralisation des infections bactériennes. Les enzymes de débridement augmenteraient le risque de bactériémie.

**PRÉCAUTIONS:** Le pH optimal de l'enzyme est de 6 à 8. Un pH nettement inférieur à un effet nettement adverse sur l'action de l'enzyme et des précautions appropriées doivent alors être prises. L'action de l'enzyme est également contrariée par les détergents, l'hexachlorophène et les ions de métaux lourds, comme le mercure et l'argent, présents dans certains antiseptiques, et par le cobalt, le magnésium et le manganèse. Quand on soupçonne l'utilisation de ces produits, la zone affectée doit être soigneusement nettoyée par des lavages répétés avec une solution saline avant l'application de l'onguent Santyl<sup>®</sup> (collagénase). Les bains contenant des ions de métaux ou des solutions acides comme la solution de Burow doivent être évités en raison de l'ion métal et du faible pH. Les solutions nettoyantes comme l'eau oxygénée ou la solution de Dakin suivie d'une solution stérile saline n'entravent pas l'action de l'enzyme. L'application de l'onguent doit se limiter à la zone affectée pour éviter le risque possible d'irritation ou de macération de la peau saine. Cependant, l'enzyme n'altère pas le nouveau tissu de granulation. Un érythème bénin dans le tissu avoisinant pourrait se produire. Cela peut facilement être évité en protégeant la peau saine avec un produit comme de la pâte d'oxyde de zinc. Compte tenu de la nature protéique de l'enzyme présent dans le médicament, son emploi prolongé pourrait amener une sensibilisation.

**EFFETS SECONDAIRES:** Bien qu'aucune sensibilité allergique ni réaction toxique n'aient été notées à ce jour dans les compte rendus d'études, on a signalé un cas de manifestations systémiques d'hypersensibilité chez un patient traité pendant plus d'un an avec une association de collagénase et de cortisone. On a noté de l'irritation, de la macération ou de l'érythème dans le cas de contact prolongé de la peau normale avec l'onguent Santyl<sup>®</sup> (collagénase), soit par application de l'onguent sur les régions normales de la peau, soit par application excessive de l'onguent dans le cratère de la plaie, permettant à celui-ci de s'étendre à la peau normale lors de l'application des pansements. L'incidence signalée de ce type de réaction était de 1,8%.

**SYMPTÔMES ET TRAITEMENT DU SURDOSAGE:** **Symptômes:** Jusqu'ici, l'irritation, la macération ou l'érythème signalés en cas de contact prolongé de la peau saine avec l'onguent Santyl<sup>®</sup> (collagénase) représentent les seuls symptômes signalés de surdosage. **Traitement:** On peut rendre l'onguent Santyl<sup>®</sup> (collagénase) inerte en appliquant la solution de Burow U.S.P. (pH 3.6-4.4) sur la plaie. La réapplication du produit, si elle est considérée nécessaire, ne se fera qu'avec prudence.

**POSOLOGIE ET ADMINISTRATION:** Pour usage externe seulement. L'onguent Santyl<sup>®</sup> (collagénase) doit être appliqué une fois par jour ou plus fréquemment si le pansement se souille (à cause d'incontinence par exemple) de la façon suivante: **(1)** Avant application, les lésions doivent être nettoyées doucement avec une gaze saturée d'une solution stérile saline normale pour enlever toute pellicule et toute matière digérée. Si l'on a besoin d'une solution nettoyante plus puissante, on peut utiliser de l'eau oxygénée ou de la solution de Dakin suivie de solution stérile saline normale. **(2)** En cas d'infection, révélée par la présence de cultures positives, de pus, d'une inflammation ou d'une odeur, il serait souhaitable d'employer un agent antibactérien approprié. Il faut interrompre le traitement au Santyl<sup>®</sup> (collagénase) jusqu'à rémission de l'infection, si l'infection ne se résorbe pas. **(3)** Appliquer Santyl<sup>®</sup> (collagénase) directement sur les blessures profondes à l'aide d'un abaisse-langue ou d'une spatule. Pour les plaies superficielles, appliquer l'onguent sur une compresse non adhérente ou un pansement transparent à être déposée sur la plaie; puis recouvrir d'un pansement approprié tel une compresse de gaze stérile adéquatement retenue. **(4)** L'utilisation d'un pansement occlusif ou semi-occlusif peut favoriser le ramollissement de l'escarre, le cas échéant. Ou, si l'on hachure une escarre épaisse à l'aide d'une lame numéro 11, on peut accélérer le débridement. Nettoyer alors avec une solution saline stérile. Il est également souhaitable d'enlever autant de débris lâches que possible à l'aide de pinces et de ciseaux. **(5)** Enlever tout excès d'onguent à chaque renouvellement du pansement. **(6)** Arrêter les applications de l'onguent Santyl<sup>®</sup> (collagénase) dès que le tissu nécrosé est suffisamment débridé et que le bourgeonnement est bien entamé.

**PRÉSENTATION:** Disponible en tubes de 30 grammes d'onguent. Stérile dans l'emballage non ouvert. Aucun agent de conservation. Ne pas entreposer au-dessus de 25°C.

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# Patient Conditions that Impact the Efficacy and Cost of Wound Debridement

## L'efficacité des méthodes de débridement des plaies selon la condition des patients

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**Introduction**

Wound healing is an important physiological process and it is critical that healing progress in an effective and timely fashion. This process includes several phases, such as coagulation, inflammation, granulation/re-epithelialization, and remodelling. Normally, these phases follow one another and overlap in a specific chronological order to promote wound healing. Time is of great importance in wound care, as it enables one to distinguish between an acute wound that is healing in a timely fashion from a chronic wound that is stuck in the inflammatory phase and healing very slowly. It has long been recognized in the field of wound care that an infection in a wound will delay its healing<sup>1</sup>. The intensity and speed of the immune system's inflammatory response following an injury to the skin barrier is, therefore, a key element to wound healing in adults. A number of interventions in wound care attempt to supplement or support the cellular elements responsible for the healing process<sup>2</sup>.

Wound care includes assessing the healing potential and the need for debridement, as well as facilitating biocontamination prevention and control, maintaining a suitable, moist environment, and stimulating wound closure by re-epithelialization<sup>3,4</sup>. The presence of devitalized tissues is considered the main cause of delays in wound healing<sup>5</sup>. Since they serve as an

**Introduction**

Un processus de cicatrisation rapide et efficace d'une plaie offre plus de chances de survie à un organisme blessé. Ce processus comprend plusieurs phases comme la coagulation, l'inflammation, la granulation/ré-épithélialisation et le remodelage. Normalement, ces phases se succèdent et se chevauchent avec un ordre précis dans le temps afin de permettre la guérison de la plaie. Le temps est d'une grande importance dans le soin des plaies; il permet de distinguer une plaie aiguë qui cicatrise dans les délais prévus d'une plaie chronique bloquée en phase inflammatoire qui cicatrise très lentement. Il est reconnu depuis longtemps dans le domaine du soin des plaies qu'une infection de la plaie entraîne un retard de cicatrisation<sup>1</sup>. L'intensité et la rapidité de la réaction inflammatoire du système immunitaire à la suite d'une atteinte de la barrière cutanée est donc un élément essentiel à la cicatrisation d'une plaie chez l'adulte. Plusieurs des interventions dans le cadre du soin des plaies tentent de suppléer ou de soutenir les éléments cellulaires responsables du processus de cicatrisation<sup>2</sup>.

Le soin des plaies comprend l'évaluation du potentiel de cicatrisation, le débridement, la prévention et le contrôle de la biocontamination, le maintien d'un milieu humide adéquat et la stimulation de la fermeture de la plaie par ré-épithélialisation<sup>3,4</sup>. La présence de tissus dévitalisés est considérée comme la princi-

TABLE 1

### List of health conditions limiting the activity of leukocytes responsible for debridement

| Condition       | Number | Migration | Metabolism |
|-----------------|--------|-----------|------------|
| Advanced Age    | ✓      | ✓         | ✓          |
| Arterial Insuf. |        | ✓         | ✓          |
| Cancer          | ✓      |           |            |
| Chemotherapy    | ✓      |           | ✓          |
| Cold            |        | ✓         | ✓          |
| Corticosteroids | ✓      | ✓         | ✓          |
| Diabetes        |        | ✓         | ✓          |
| Hepatic Insuf.  |        |           | ✓          |
| HIV             | ✓      |           |            |
| Immun. Insuf.   | ✓      | ✓         | ✓          |
| Kidney Insuf.   |        |           | ✓          |
| Malnutrition    |        |           | ✓          |
| Obesity         |        | ✓         |            |
| Pain            |        | ✓         | ✓          |
| Paralysis       |        | ✓         |            |
| Smoking         |        | ✓         | ✓          |
| Stress          |        | ✓         | ✓          |
| Transfusion     |        |           | ✓          |
| Venous Insuf.   |        | ✓         |            |

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energy substrate for microorganisms, devitalized tissues increase the risk of infection<sup>1</sup>. In addition, these tissues establish a physical barrier to the influx of fibroblasts and keratinocytes from the periphery of the wound<sup>2</sup>. The enzymes released by necrotic cells can break down the growth factors that help stimulate healing. Also, the metabolites from the membranes of injured cells, such as arachidonic acid, can have toxic effects on healthy cells at the periphery<sup>1</sup>. These devitalized tissues can be dry or moist and vary in quantity and colour (black, brown, yellow, whitish or green), depending on the presence or not of microorganisms<sup>6</sup>.

Devitalized tissue in wounds is composed of tissue-specific dead cells, blood cell elements (leukocytes, erythrocytes, platelets), fibronectin, fibrin, collagen and other extracellular matrix proteins. In addition, microorganisms are often present in their mucopolysaccharide layer (biofilm) as well as other foreign materials (dressing residues, sutures, etc.)<sup>7,8</sup>. These tissues have been incorrectly associated with the term "fibrin". In reality, fibrin is a structural protein synthesized and released during the clotting process. A blood clot in a wound contains platelets, blood cells, and structural proteins such as vitronectin, fibronectin and fibrin<sup>9</sup>. These factors clog the blood vessels and form a provisional extracellular matrix that promotes

pale cause of delays of the cicatrization of the plaies<sup>5</sup>. En servant de substrat énergétique aux microorganismes, les tissus dévitalisés augmentent le risque d'infection<sup>1</sup>. Ces tissus induisent également une barrière physique à la migration des fibroblastes et des kératinocytes provenant de la périphérie de la plaie<sup>2</sup>. Les enzymes relâchées par les cellules nécrotiques peuvent dégrader les facteurs de croissance qui contribuent à stimuler la cicatrization. Les métabolites des membranes cellulaires des cellules lésées comme l'acide arachidonique peuvent également avoir des effets toxiques sur les cellules saines des tissus en périphérie de la plaie<sup>1</sup>. Ces tissus dévitalisés peuvent être secs (synonyme d'escarre ou nécrose sèche) ou humides (synonyme de nécrose humide), de quantité et de couleur variables (noir, brun, jaune, blanchâtre et vert) selon la présence ou non de microorganismes<sup>6</sup>.

Les tissus dévitalisés des plaies sont composés de cellules mortes spécifiques aux tissus atteints, d'éléments cellulaires sanguins (leucocytes, érythrocytes, plaquettes), de fibronectine, de fibrine, de collagène et autres protéines de la matrice extracellulaire, de microorganismes dans leur couche de mucopolysaccharides (biofilm) et de corps étrangers (résidus de pansement, fil de suture, etc.)<sup>7,8</sup>. Ces tissus ont longtemps été associés à tort au terme de « fibrine ». En réalité, la fibrine est une protéine de structure synthétisée et libérée lors du processus de coagulation. Le caillot sanguin dans une plaie contient des plaquettes, des cellules sanguines, et des protéines de structure dont la vitronectine, la fibronectine et la fibrine<sup>9</sup>. Ces éléments colmatent la brèche des vaisseaux sanguins et forment une matrice extracellulaire provisoire qui favorise la migration des cellules et la formation des nouveaux vaisseaux sanguins du tissu de granulation<sup>10</sup>. On ne retrouve qu'une très petite quantité de fibrine dans les tissus dévitalisés. Dans le cas des ulcères veineux, la distension des capillaires entraînerait une extravasation des protéines en circulation telles que le fibrinogène et la fibrine qui se polymérisent pour former un manchon périvasculaire<sup>11</sup>. Possiblement à l'origine de l'appellation du terme de « fibrine », ces dépôts de « fibrine » sont en fait composés de fibrine, de fibronectine, de laminine, de tenascine et de collagène<sup>12</sup>.

Le débridement des tissus dévitalisés est considéré depuis longtemps comme une étape essentielle du processus de cicatrization<sup>1</sup>. Il permet d'éliminer les tissus dévitalisés, les microorganismes et les corps étrangers afin de synthétiser de nouveaux tissus et favoriser la fermeture de la plaie<sup>13</sup>. Plusieurs cellules et médiateurs chimiques contribuent naturellement au débridement des plaies. Depuis près d'un demi-siècle, il a été démontré qu'il est possible de stimuler la

cell migration and the formation of new blood vessels in the granulation tissue<sup>10</sup>. Only a very small amount of fibrin is found in devitalized tissue. In the case of venous ulcers, distention of capillaries is thought to result in circulating protein extravasation and fibrinogen and fibrin then polymerize to form a perivascular cuffing<sup>11</sup>. Possibly, this is the origin of the term “fibrin” but these deposits of “fibrin” are actually composed of fibrin, fibronectin, laminin, tenascin and collagen<sup>12</sup>.

The debridement of devitalized tissues has long been considered an essential step in the healing process<sup>1</sup>. It eliminates the devitalized tissues, microorganisms and foreign material in order to foster new tissue generation and promote wound closure<sup>13</sup>. Many different cells and chemical mediators contribute naturally to wound debridement. For half of a century, it has been shown that it is possible to stimulate the speed of migration of leukocytes (white blood cells such as neutrophils and monocytes/macrophages) responsible for the debridement of devitalized tissue and in turn stimulate healing and promote faster closure of wounds<sup>14,15</sup>. The importance of rapid debridement and rapid wound closure are underappreciated even today. Several studies have shown a direct link between the presence of devitalized tissues and infection in the increase of wound chronicity, duration of follow-up visits and costs<sup>16</sup>.

### Debridement: A natural process

Debridement is carried out mainly during the inflammatory process by neutrophils and monocytes/macrophages. These cells attach themselves to the walls of the vessels by means of receptors after sensing a signal through chemotaxis. They migrate to the wound site by diapedesis and start a phagocytic cleaning process. The waste and microorganisms are digested by enzymes and free radicals. The speed and effectiveness of neutrophils and macrophages are directly influenced by their number and their ability to capture proinflammatory mediators. Success is also related to their ability to adhere to vessel walls, to migrate by diapedesis and then to quickly phagocytize, digest and eliminate debris<sup>7,17</sup>. These inflammatory cells also release enzymes (metalloproteinases or MMPs) at the wound site in order to cut the collagen fibers holding the devitalized tissues into smaller fragments so that they can then be converted to gelatin<sup>9</sup>.

In the past 10 years, several studies have found an association between the presence of biofilms and chronic inflammation and delayed wound healing<sup>18</sup>. A wound bed biofilm looks like a viscous coating. Generally transparent, biofilm can be difficult to detect with the naked eye. In some cases, it is coloured

vitesse de migration des leucocytes (globules blancs tels que neutrophiles et monocytes/macrophages) responsables du débridement des tissus dévitalisés et ainsi stimuler la cicatrisation et la fermeture des plaies<sup>14,15</sup>. La rapidité du débridement et de la fermeture de la plaie sont des éléments sous-estimés même de nos jours. Plusieurs études ont établi un lien direct entre la présence de tissus dévitalisés et l'infection dans l'augmentation de la chronicisation des plaies, de la durée du suivi et des coûts<sup>16</sup>.

### Le débridement, un processus naturel

Le débridement est principalement effectué en phase inflammatoire par les polynucléaires neutrophiles et les monocytes/macrophages. Dans le circuit vasculaire à proximité de la plaie, ces derniers adhèrent aux parois des vaisseaux à l'aide de récepteurs après avoir capté un signal par chimiotactisme. Ils migrent par diapédèse au site de la plaie et entament un processus de nettoyage par phagocytose. La digestion des déchets et des microorganismes se fait à l'aide d'enzymes et de radicaux libres. La rapidité et l'efficacité des neutrophiles et des macrophages sont directement influencées par leur nombre, leur capacité à capter les médiateurs pro-inflammatoires, à adhérer à la paroi des vaisseaux, à migrer par diapédèse et à rapidement phagocyter, digérer et éliminer les débris<sup>7,17</sup>. Ces cellules inflammatoires libèrent également des enzymes (métalloprotéinases ou MMPs) au site de la plaie afin de couper les fibres de collagène qui retiennent les tissus dévitalisés en fragments plus petits qui se dénaturent en gélatine<sup>9</sup>.

Au cours des dix dernières années, plusieurs études ont permis d'associer la présence de biofilms à l'inflammation chronique et au retard de cicatrisation des plaies<sup>18</sup>. Le biofilm a l'apparence d'un enduit visqueux dans le lit de la plaie. Généralement transparent, ce biofilm peut être difficile à détecter à l'œil. Il arrive parfois qu'il soit coloré par des composés provenant des microorganismes (ex. : la pyocyanine du *Pseudomonas*). Les microorganismes comme les bactéries se multiplient et adhèrent aux surfaces inertes (cathéters, prothèse) ou vivantes comme les muqueuses (vessie, lit de la plaie)<sup>19</sup>. Après leur adhésion, les microorganismes comme le *Staphylococcus* et le *Pseudomonas* ne prennent que quelques heures pour produire une matrice de polysaccharides (biofilm) qui les protège des antiseptiques et des antibiotiques<sup>20</sup>. Cet environnement leur permet de se transmettre des gènes de résistance aux antibiotiques. Il est nécessaire de tenter d'éliminer le biofilm lorsqu'il est suspecté dans une plaie. Le biofilm mature qui adhère au lit de la plaie est cependant difficile à déloger et peu de produits antimicrobiens sont efficaces face à cette matrice. Le débridement mécanique a prou-

by microorganisms' products (Ex.: pyocyanine of pseudomonas). Microorganisms, such as bacteria, multiply and adhere to inert surfaces (catheters and prostheses) and living surfaces, such as mucous membranes (for example the bladder or a wound bed)<sup>19</sup>. Just a few hours after they attach, microorganisms such as Staphylococcus and Pseudomonas produce a polysaccharide matrix (biofilm) that protects them from antiseptics and antibiotics<sup>20</sup>. This environment enables them to transmit antibiotic resistance genes from one bacterium to another. If a biofilm is suspected in a wound, an attempt should therefore be made to eliminate it. However, it is difficult to dislodge a mature biofilm that is adhering to a wound bed, and few antimicrobial products are effective against this type of matrix structure. Mechanical debridement has been shown to be effective in facilitating the breakup and detachment of the matrix. The remaining parts of the biofilm are then more susceptible to natural antimicrobials and free radicals from neutrophils and macrophages as well as certain products based on iodine<sup>21</sup>, silver<sup>3</sup>, antibiotics and polyhexamethylene biguanide (PHMB) with betaine<sup>19</sup>.

#### Debridement methods

In the context of wound debridement, there are several methods available: sharp (surgical sharp and conservative sharp), autolytic, enzymatic, chemical, biological and mechanical. These different methods can be used alone, in conjunction with or alternately

vé son efficacité en facilitant la rupture et le détachement de la matrice. La partie restante du biofilm est alors plus sensible aux antimicrobiens naturels et aux radicaux libres provenant des neutrophiles et des macrophages ainsi qu'à certains produits à base d'iode<sup>21</sup>, d'argent<sup>3</sup>, d'antibiotiques ou de polyhexaméthylène biguanide (PHMB) avec bétaine<sup>19</sup>.

#### Méthodes de débridement

Dans le cadre du débridement des plaies, il existe plusieurs méthodes : chirurgicale (conservateur ou non), autolytique, enzymatique, chimique, biologique et mécanique. Ces différentes méthodes peuvent être utilisées seule, conjointement ou en alternance afin d'éliminer rapidement et le plus sélectivement possible les tissus dévitalisés, les corps étrangers et les microorganismes ainsi que leurs biofilms. Il importe de sélectionner la ou les méthodes de débridement les plus appropriées selon la condition des patients (voir tableau 1) afin de stimuler la guérison des plaies, de réduire les risques d'infection, de chronicisation, et de détérioration de la qualité de vie des patients en plus de réduire les coûts associés aux heures de soins et aux produits. Le processus de cicatrisation dépend directement de l'apport suffisant d'oxygène à la plaie en provenance uniquement du circuit artériel<sup>22</sup>. En présence de tissu dévitalisé sec occlusif, toute méthode de débridement est contre-indiquée à moins d'avis médical contraire, aussi inoffensive puisse telle paraître ex. : hydrogel et pansements rétenteurs d'humidité (débridement autolytique), si l'indice de perfusion artérielle systolique est inférieur à 0.8 et si la condition du patient (ex. : hypovolémie, dénutrition) n'offre pas de potentiel de cicatrisation<sup>23</sup>. En plus de l'évaluation du degré de perfusion sanguine de la région atteinte, il importe d'utiliser une approche interprofessionnelle dans l'évaluation de la condition du patient : son statut nutritionnel, métabolique (catabolisme, diabète, insuffisance rénale ou hépatique) et infectieux<sup>23</sup>.

#### Débridement chirurgical

Le débridement chirurgical nécessite des instruments comme une pince, un ciseau, un scalpel, un jet d'eau tangentiel sous une pression entre 12,800 et 15,000 psi (hydrocission)<sup>24</sup> ou un laser<sup>25</sup>. Reconnue pour sa rapidité et son efficacité, cette intervention médicale permet de retirer des quantités considérables de tissus dévitalisés et sains de façon non sélective. Ce type de débridement est préconisé lorsqu'il y a une grande quantité de tissu à débrider ou lorsqu'on soupçonne une infection des tissus profonds<sup>26</sup>. Cette procédure chirurgicale nécessite un professionnel spécialisé qualifié (médecin) disposant d'un support médical

TABLE 2

Efficiency (cost/effectiveness) and the perception of pain according to debridement methods<sup>2, 27, 71, 73</sup>

| Debridement method                    | Speed <sup>71</sup> (weeks)                                | Selectivity (S) | Costs <sup>71</sup> (\$CAD) | Pain <sup>73</sup><br>1 the less<br>5 the more |
|---------------------------------------|------------------------------------------------------------|-----------------|-----------------------------|------------------------------------------------|
| Surgical Sharp                        | 3                                                          |                 | 1 039,09                    | 5                                              |
| Surgical Conservative                 | 6                                                          |                 | 1 119,60                    |                                                |
| Autolytic                             | 10                                                         | S               | 1 504,73                    | 1                                              |
| Enzymatic                             | 4                                                          | S               | 1 264,69                    | 2                                              |
| Biologics                             | 3                                                          | S               | 2 150,89                    | 3                                              |
| Mechanical (syringe -15 lb)           | 6                                                          |                 | 1 840,74                    | 4                                              |
| Mechanical (wet-to-dry or wet-to-wet) | Not recommended                                            |                 | No data available           |                                                |
| Mechanical (hydrotherapy)             | Risk of infection and cross-contamination between patients |                 | No data available           |                                                |

to quickly and as selectively as possible eliminate the devitalized tissues, foreign matter and microorganisms and their biofilms. It is important to choose the debridement method or methods most suited to the patient's condition (see Table 1) in order to stimulate wound healing and reduce the risk of infection, chronicity and deterioration in quality of life. In addition, it is important to be mindful of costs in terms of care time and products used. The wound healing process depends directly on an adequate supply of oxygen to the wound from the arterial circuit<sup>22</sup>. In the presence of dry occlusive devitalized tissue, every debridement method is contraindicated unless there is a medical opinion to the contrary. Even an innocuous method such as hydrogel and moisture-retaining dressings (autolytic debridement) should not be used if the systolic arterial perfusion index is less than 0.8 and if, because of the patient's condition (e.g. hypovolemia or malnutrition), healing is not possible<sup>23</sup>. In addition to evaluating the level of blood perfusion in the affected area, it is important to use an interprofessional approach to evaluate the patient's condition, specifically, his/her nutritional, metabolic (catabolism, diabetes or renal or hepatic failure) and infection status<sup>23</sup>.

### Surgical debridement

Surgical sharp debridement utilizes instruments, such as forceps, scissors, a scalpel, a tangential water jet at a pressure between 12,800 and 15,000 psi (HydroCision)<sup>24</sup> or a laser<sup>25</sup>. Recognized for its speed and effectiveness, surgical sharp debridement is a medical procedure used to aggressively but nonselectively remove large amounts of tissue; both devitalized and often healthy tissue. This type of debridement is recommended when there is a large amount of tissue to be removed or when a deep tissue infection is suspected<sup>26</sup> but it is a surgical procedure that requires a skilled medical professional with proper medical support. These two aspects limit largely the use of this type of debridement. Of all the methods of debridement, surgical debridement is the most painful (Table 2)<sup>27</sup>.

"Conservative" sharp debridement performed by a trained professional, such as a qualified nurse, is used to remove only devitalized tissues and foreign matter on the surface of the wound. This method of debridement requires knowledge of anatomical structures and some skill which also limits its use by various stakeholders responsible for regular wound care follow-ups. This method cannot be used in some patients because of excessive risk of bleeding and/or pain. These nonselective surgical debridement methods can be combined with other, more selective methods, such as autolytic or enzymatic debridement.

TABEAU 1

### Liste des conditions de santé limitant l'activité des leucocytes responsables du débridement

| Condition           | Nombre | Migration | Métabolisme |
|---------------------|--------|-----------|-------------|
| Âge avancé          | ✓      | ✓         | ✓           |
| Cancer              | ✓      |           |             |
| Chimiothérapie      | ✓      |           | ✓           |
| Corticostéroïde     | ✓      | ✓         | ✓           |
| Dénutrition         |        |           | ✓           |
| Diabète             |        | ✓         | ✓           |
| Douleur             |        | ✓         | ✓           |
| Froid               |        | ✓         | ✓           |
| VIH                 | ✓      |           |             |
| Insuff. artérielle  |        | ✓         | ✓           |
| Insuff. hépatique   |        |           | ✓           |
| Insuff. immunitaire | ✓      | ✓         | ✓           |
| Insuff. rénale      |        |           | ✓           |
| Insuff. veineuse    |        | ✓         |             |
| Obésité             |        | ✓         |             |
| Paralysie           |        | ✓         |             |
| Stress              |        | ✓         | ✓           |
| Tabagisme           |        | ✓         | ✓           |
| Transfusion         |        |           | ✓           |

adéquat pour des interventions chirurgicales. Ces deux aspects limitent grandement l'utilisation de ce type de débridement. De toutes les méthodes de débridement, elle est la plus douloureuse (tableau 2)<sup>27</sup>.

Le débridement chirurgical dit « conservateur » effectué par un professionnel qualifié comme une infirmière permet uniquement le retrait des tissus dévitalisés et des corps étrangers. Cette méthode de débridement demande une connaissance des structures anatomiques et une certaine dextérité qui limite également son utilisation de la part de plusieurs intervenants responsables du suivi régulier des plaies. Cette méthode ne peut pas être utilisée chez certains patients en raison des risques trop élevés de saignements ou de douleurs. Ce débridement non sélectif peut être combiné à d'autres méthodes plus sélectives comme le débridement autolytique ou enzymatique.

### Débridement autolytique

Sélective mais également la plus lente des méthodes (tableau 2), le débridement autolytique dépend de la quantité et de l'activité métabolique des propres (autolytique) leucocytes (neutrophiles et macrophages) de l'individu. Ces cellules du système immunitaire non-spécifique synthétisent et utilisent

### Autolytic debridement

Autolytic debridement is more selective but is also the slowest of the methods available (Table 2). Autolytic debridement depends on the amount and specific metabolic activity (autolytic) of the patient's own leukocytes (neutrophils and macrophages). These cells involved in the non-specific immune response synthesize and promote the use of MMPs such as collagenases (MMP-1 and 8) to facilitate the removal of devitalized tissue, pathogenic microorganisms and their biofilms. An adequate moist environment facilitates natural migration of leukocytes. The use of products such as hydrogels and moisture retaining dressings (absorbent, semi-occlusive and occlusive) favour this method of debridement. Despite a suitable, moist environment, this method may sometimes be ineffective and too slow. According to the recommendations, when there are no obvious signs of debridement within 24 to 72 hours, a different method should be used<sup>28</sup>. Under certain individual conditions of immune deficiency associated with neutropenia, cancer, corticosteroid use, advanced age, diabetes and others, this technique is less effective (Table 1). In diabetes, where leukocytes do not detect the inflammation signal that enables them to attach themselves to the vessel walls so that they can migrate to the wound site, the autolytic method is not very effective. In the presence of arterial insufficiency with dry occlusive devitalized tissue the use of hydrogel is not recommended since it can only soften the devitalized tissues without allowing the cells responsible for eliminating tissue and pathogenic microorganisms to migrate. One should therefore avoid promoting a moist environment in the presence of arterial insufficiency because of the lack of oxygen and the reduced supply of nutrients and leukocytes<sup>23</sup>.

Some health professionals are mistaken about the action of hydrogels and think that these substances contain factors that have enzymatic action, but this is not the case. Hydrogel only provides a moist environment that facilitates the migration of the cells (leukocytes, fibroblasts, keratinocytes) involved in the wound healing process. Applying too much hydrogel can cause artificial wound chronicity because the cells responsible for wound healing, such as fibroblasts and keratinocytes, are inhibited by the presence of the artificial exudate from the hydrogel mixed with inflammatory substances present in the wound<sup>3</sup>.

A more recent autolytic method consists of using a polyacrylate dressing activated with a Ringer's physiological solution. This dressing seems to have a greater affinity for proteins than for salts and the polyacrylates appear to absorb debris, devitalized tissue and microorganisms without adhering to the wound<sup>29</sup>.

des MMPs comme les collagénases MMP-1 et 8 pour faciliter l'élimination des tissus dévitalisés, des microorganismes pathogènes et leurs biofilms. Un environnement humide adéquat facilite la migration naturelle des leucocytes. L'utilisation de produits comme l'hydrogel et les pansements rétenteurs d'humidité (absorbants, semi-occlusifs et occlusifs) favorisent cette méthode de débridement. Malgré un environnement humide adéquat, il arrive que cette méthode soit peu efficace et trop lente. Dans les recommandations, lorsqu'il n'y pas de signes évidents de débridement dans les 24 à 72 heures, il est conseillé d'utiliser une autre méthode<sup>28</sup>. Dans certaines conditions individuelles de dysfonction immunitaire associée à la neutropénie, au cancer, à la prise de corticostéroïdes, à l'âge avancé, au diabète et autres, cette approche est moins performante (Tableau 1). Dans une condition de diabète, les leucocytes ne captent pas le signal inflammatoire qui permet à ces derniers de s'accrocher aux parois des vaisseaux afin de migrer au site de la plaie. Dans une condition avec insuffisance artérielle avec tissu dévitalisé sec occlusif, il est également déconseillé d'utiliser l'hydrogel car ce produit ne fait que ramollir les tissus sans qu'il puisse y avoir une migration des cellules responsables de l'élimination des tissus et des microorganismes pathogènes. Il faut donc éviter de favoriser un milieu humide en présence d'une insuffisance artérielle par manque d'oxygène, de nutriments et de leucocytes au site de la plaie<sup>23</sup>.

Certains intervenants se méprennent sur l'action de l'hydrogel et y associent une action enzymatique alors qu'il n'en est rien. L'hydrogel ne fait que fournir un environnement humide qui facilite la migration des cellules (leucocytes, fibroblastes, kératinocytes) impliquées dans le processus de cicatrisation des plaies. L'application d'une trop grande quantité d'hydrogel peut également être à l'origine d'une chronicisation artificielle de la plaie. Les cellules responsables de la cicatrisation de la plaie comme les fibroblastes et les kératinocytes sont inhibés par la présence d'un exsudat artificiel provenant de l'hydrogel qui se mélange aux substances inflammatoires présentes dans la plaie<sup>3</sup>.

Une méthode autolytique plus récente consiste à utiliser un pansement de polyacrylates activés avec une solution physiologique complète (solution Ringer). Ayant une affinité plus grande pour les protéines que pour les sels, les polyacrylates absorbent les débris, les tissus dévitalisés et les microorganismes sans adhérer à la plaie<sup>29</sup>.

### Débridement chimique/autolytique

En raison des phénomènes de résistance aux antibiotiques, certains produits antimicrobiens comme l'iode, l'argent, le chlore et même le miel

## Chemical/Autolytic debridement

Due to the phenomena of resistance to antibiotics, some antimicrobial products such as iodine, silver, chlorine and even honey have seen increased use in recent years. The antimicrobial effect of these products allows leukocytes responsible for autolytic debridement to regain control of the bacterial flora and complete debridement of devitalized tissue.

Iodine and silver have been used as broad-spectrum antimicrobial agents for many years. The molecular iodine ( $I_2$ ) and silver allow the elimination of microorganisms by various methods such as the denaturation of proteins and the alteration of the structure of the membranes. Iodine and silver are also effective against biofilms<sup>20, 30, 31</sup>.

Chlorine solution (Dakin) is recommended for short time treatment, in the early inflammatory phase, of wounds with large amounts of devitalized tissue or those that are heavily infected<sup>32</sup>. As with iodine, it has antiseptic and cleaning effects, without the inconvenience of resistance encountered with antibiotics, but it has no debridement action.

Manuka honey could reduce the high pH levels of chronic wounds which may then allow for leukocytes to work more effectively<sup>33</sup>. Honey is also associated with an osmotic effect which can assist autolytic debridement<sup>34</sup>. Although some studies attempt to clarify the role of honey in the healing process of wounds, randomized, controlled clinical studies are still needed<sup>35</sup>.

## Enzymatic debridement

The devitalized tissues in a wound are held by the collagen fibres of the extracellular matrix that was an important component of the healthy tissue before the injury. Enzymatic debridement uses laboratory-synthesized enzymes, such as collagenase, that are applied minimally once a day directly onto the tissues to be debrided. This method imitates the natural action of cellular (endogenous) collagenase produced by neutrophils and macrophages that are responsible for the removal of dry or moist devitalized tissues and microorganisms in the wound. Regardless of the immune status of the patient (i.e. the level of natural production and effectiveness of their enzymes by leukocytes) this approach allows the clinician to quickly administer an effective tool for the selective debridement of wounds.

Collagenase selectively cleaves denatured (damaged) collagen fibres and other components of the extracellular matrix, such as elastin, fibronectin and laminin, but not fibrin<sup>2</sup>. Collagenase is a water-soluble endopeptidase that selectively cuts damaged collagen, whose cleavage sites between amino acids are no

TABEAU 2

### L'efficacité (coûts/efficacité) et la perception de la douleur selon les méthodes de débridement<sup>4, 27, 71, 73</sup>

| Débridement                           | Rapidité <sup>71</sup><br>(semaine)                               | Sélectivité<br>(S) | Coûts <sup>71</sup><br>(\$CAD) | Douleur <sup>73</sup><br>1 la moins forte<br>5 la plus forte |
|---------------------------------------|-------------------------------------------------------------------|--------------------|--------------------------------|--------------------------------------------------------------|
| Chirurgical Sop - hydrocision         | 3                                                                 |                    | 1 039,09                       | 5                                                            |
| Chirurgical conserv.                  | 6                                                                 |                    | 1 119,60                       |                                                              |
| Autolytique                           | 10                                                                | S                  | 1 504,73                       | 1                                                            |
| Enzymatique                           | 4                                                                 | S                  | 1 264,69                       | 2                                                            |
| Biologique                            | 3                                                                 | S                  | 2 150,89                       | 3                                                            |
| Mécanique (seringue pression 8-15 lb) | 6                                                                 |                    | 1 840,74                       | 4                                                            |
| Mécanique (wet-to-dry or wet-to-wet)  | Pratique non recommandée                                          |                    | Données non disponibles        |                                                              |
| Mécanique (hydrothérapie)             | Risque d'infection et de contamination croisée entre les patients |                    | Données non disponibles        |                                                              |

sont de plus en plus utilisés depuis quelques années. L'effet antimicrobien de ces produits comme ceux des antibiotiques permet aux leucocytes responsables du débridement autolytique de reprendre le contrôle sur la flore microbienne et de finaliser le débridement des tissus dévitalisés.

L'iode et l'argent sont utilisés comme antimicrobiens à large spectre depuis de nombreuses années. L'iode moléculaire ( $I_2$ ) et l'argent permettent d'éliminer les microorganismes par différents procédés tels que la dénaturation des protéines et l'altération de la structure des membranes. L'iode et l'argent sont également efficaces contre les biofilms<sup>20, 30, 31</sup>.

Le chlore (solution Dakin) est recommandé, en phase inflammatoire précoce, pour le traitement ponctuel de plaies contenant beaucoup de tissus dévitalisés ou étant fortement infectées<sup>32</sup>. Tout comme l'iode, il exerce un effet antiseptique, nettoyant mais sans action de débridement et sans l'inconvénient de la résistance rencontrée avec les antibiotiques.

Le miel Manuka diminuerait le pH élevé des plaies chroniques ce qui améliorerait l'activité enzymatique des leucocytes<sup>33</sup>. Le miel serait également associé à un effet osmotique qui favorise le débridement autolytique<sup>34</sup>. Bien que certaines études tentent de préciser le rôle du miel dans le processus de guérison des plaies, les études cliniques contrôlées et randomisées demeurent insuffisantes<sup>35</sup>.

longer protected. Normally, these cleavage sites on collagen fibres are protected from collagenase by mucopolysaccharides. The safety of using collagenase on collagen fibres in healthy tissue (around the wound) and newly synthesized scar tissue has been well documented<sup>36-38</sup>. Collagenase yields fragments that denature into gelatin that is susceptible to other less specific proteinases including some other MMPs<sup>39</sup>. It is important to note that both autolytic (using endogenous collagenase) and enzymatic debridement (using exogenous collagenase) methods produce debris that can serve as a bacterial culture medium if it is not eliminated. For this reason, it is important to facilitate the removal of debris by regular cleaning of the wound at dressing changes. Some health professionals also combine the use of a topical compatible antimicrobial to keep bacterial growth under control<sup>2</sup>.

Collagenase is also thought to have certain stimulating effects on the healing process, such as angiogenesis, the stimulation of the proliferation and migration of keratinocytes (re-epithelialization) and the inhibition of the production of inflammatory substances, such as cytokines and MMPs<sup>40</sup>. The enzymatic activity of collagenase can be inhibited by certain ions (zinc, iodine, silver) contained in antiseptics and antimicrobials<sup>41</sup>.

This easy-to-use debridement method can be utilized after a procedure such as surgical debridement or as a first-line treatment when surgical debridement is not an option or in circumstances where the patient's immune function is not strong enough for effective autolytic debridement<sup>42</sup>. A recent study by Milne demonstrated a significant difference in efficacy in favor of enzymatic debridement compared to autolytic debridement with hydrogel in the elderly<sup>43</sup>.

### Biological debridement

Biological debridement therapy consists of using the larvae (maggots) of some species of flies (*Lucilia Sericata* or *Phaenicia Sericata*) that feed exclusively on dead tissue and spare healthy tissue<sup>44</sup>. This method of debridement is specific. Maggot therapy can be facilitated by applying the larvae directly on the wound or using bags called "BioBags". In a 2009 study, the free-range maggots took 14 days to debride wounds but maggots in "Biobags" took 28 days<sup>44</sup>. The larvae eliminate dead tissue by excretion of proteolytic enzymes and by ingestion. Their excretions and secretions also contain antibacterial substances (e.g. allantoin, phenylacetic acid) and can increase the pH which inhibits bacterial growth. Larvae debride mechanically by the use of their mandibles and their movements when they are applied directly on the wound. The analysis of the mode of action of maggot

### Débridement enzymatique

Les tissus dévitalisés d'une plaie sont retenus par des fibres de collagène de la matrice extracellulaire qui composait le tissu sain avant son atteinte. Le débridement enzymatique est une méthode de débridement qui fait appel à l'utilisation d'enzymes comme la collagénase produites en laboratoire et directement appliquées, minimalement une fois par jour, sur les tissus à débrider. Cette méthode imite l'action naturelle de la collagénase des leucocytes (neutrophiles – macrophages) responsables du retrait des tissus dévitalisés secs ou humides et des microorganismes. Indépendamment du statut immunitaire du patient, c'est-à-dire du niveau de production naturel de cette enzyme par les leucocytes, cette approche permet de fournir rapidement sur place un outil essentiel au débridement sélectif des plaies.

La collagénase clive de façon sélective les fibres de collagène dénaturées c'est-à-dire endommagées ainsi que d'autres éléments de la matrice extracellulaire comme l'élastine, la fibronectine et la laminine mais pas la fibrine<sup>2</sup>. La collagénase est une enzyme de nature endopeptidique hydrosoluble qui coupe de façon sélective le collagène endommagé dont les sites de clivage entre acides aminés ne sont plus protégés. Normalement, ces sites de clivage sur les fibres de collagène sont effectivement protégés de la collagénase par des mucopolysaccharides. Depuis plusieurs années, la sécurité de l'utilisation de la collagénase sur les fibres de collagène du tissu sain (au pourtour de la plaie) et du tissu cicatriciel nouvellement synthétisé a été prouvée<sup>36-38</sup>. La collagénase produit des fragments qui se dénaturent ainsi en gélatine sensible aux autres protéinases moins spécifiques parmi lesquelles on retrouve certaines autres MMPs<sup>39</sup>. Comme dans le contexte d'un débridement autolytique, ces débris peuvent servir de milieu de culture aux bactéries s'ils ne sont pas éliminés. Pour cette raison, il importe de favoriser l'élimination des débris par un nettoyage régulier de la plaie au moment des changements de pansements. Certains intervenants combinent également la collagénase à un antimicrobien topique compatible afin de limiter la croissance bactérienne<sup>2</sup>.

La collagénase aurait également des effets stimulants sur le processus de cicatrisation comme l'angiogenèse, la stimulation de la prolifération et la migration des kératinocytes (ré-épithélialisation) ainsi que l'inhibition de la production des substances inflammatoires comme les cytokines et les MMPs<sup>40</sup>. L'activité enzymatique de la collagénase peut être inhibée par certains ions (zinc, iode, argent) contenus dans des antiseptiques et antimicrobiens<sup>41</sup>.

Facile d'utilisation, ce mode de débridement peut

debridement links this biological treatment to both enzymatic and mechanical debridements<sup>44</sup>. The dressing should be moistened to obtain optimum results and the patient should be comfortable with this type of debridement<sup>45</sup>.

In spite of studies that demonstrate that maggot debridement therapy is more effective than autolytic or surgical debridement, it is still not very popular in Canada. The main reasons are the weakness of studies related to this therapy<sup>46</sup>, the reluctance of patients and health care workers to use it and the difficulty of supply. Indeed, these organisms have a short life which does not always make them practical for clinical use.

### Mechanical debridement

In the past, moistened cotton compresses were applied and left to dry (wet-to-dry) and were then removed to lift away the devitalized tissues and microorganisms. This debridement method was used extensively in the past. This method is non-selective (i.e. it removes devitalized as well as newly synthesized, healthy tissues) and it can induce pain and bleeding (Table 2). For these reasons, this method of debridement is not considered a recommended best practice in wound care. In monitoring surgical wound debridement this method is still often prescribed (69%) after the procedure but is not clinically indicated in 78% of cases<sup>47</sup>. Its variant, which consists of applying moistened compresses and removing them before they are completely dry (wet-to-wet) is too demanding in terms of care time and is seldom used in the appropriate circumstances<sup>48</sup>.

In contrast, mechanical debridement with high-pressure irrigation (a 30-cc syringe and an 18-gauge needle to achieve a pressure of between 8 and 15 lb) requires little experience, and it is widely used. Hydrotherapy, which utilizes a whirlpool to mechanically facilitate the removal of tissue, is used as well. However, studies have shown an increased risk of wound maceration, contamination and infection with this method in individuals whose immune system has been weakened by age, disease or drugs<sup>42</sup>. Furthermore, the antibacterial products used to clean the tanks and equipment can damage new scar tissue<sup>49</sup>. For all these reasons, many wound care centres have abandoned this practice<sup>2</sup>. Wound irrigation with tap water rather than saline solution does not increase the risk of infection and may even reduce the risk<sup>50</sup>. It should, however, be used with caution in the case of immunosuppressed patients. The use of tap water is not recommended when the controlled distribution of the water is not available.

Debridement with ultrasound is another method and can be performed with or without direct contact with the

être utilisé après une méthode comme le débridement chirurgical ou de façon primaire lorsque le débridement chirurgical n'est pas possible ou encore, dans des conditions où la fonction immunitaire du patient est insuffisante pour un débridement autolytique efficace<sup>42</sup>. Une étude récente de Milne a d'ailleurs permis de démontrer une différence significative sur l'efficacité du débridement enzymatique par rapport au débridement autolytique avec hydrogel chez la personne âgée<sup>43</sup>.

### Débridement biologique

L'asticothérapie ou larvothérapie (maggot debridement therapy) consiste à employer les larves de certaines espèces de mouches (*Lucilia Sericata* ou *Phaenicia Sericata*) qui se nourrissent exclusivement de tissus dévitalisés et épargnent les tissus sains<sup>44</sup>. Cette méthode de débridement est donc spécifique. L'asticothérapie peut être effectuée en déposant les larves directement dans la plaie ou en utilisant des sachets appelés «biobags» contenant les larves. Dans une étude publiée en 2009, le temps de débridement des larves libres a été de 14 jours comparativement à 28 jours pour les larves en «biobags»<sup>44</sup>. Les larves favorisent l'élimination des tissus dévitalisés par l'excrétion d'enzymes protéolytiques et l'action d'ingestion. Leurs déjections contiendraient des substances ayant un effet antibactérien (ex. : allantoïne, acide phenylacétique) et auraient également pour effet d'augmenter le pH ce qui contribue à limiter la croissance bactérienne. Les larves débrident mécaniquement par l'utilisation de leurs mandibules et leurs déplacements lorsqu'elles sont déposées directement dans la plaie. L'analyse des effets des larves permet d'associer ce traitement biologique aux débridements enzymatique et mécanique<sup>44</sup>. Le pansement doit être humidifié pour un résultat optimal et le patient doit être confortable avec ce type de débridement<sup>45</sup>.

Malgré les études ayant démontrées les avantages de la larvothérapie par rapport au débridement autolytique et au débridement chirurgical, elle demeure peu utilisée au Canada. Les principales raisons sont la faiblesse des études réalisées à ce jour<sup>46</sup>, la réticence des patients et du personnel traitant à utiliser cette thérapie et la difficulté d'approvisionnement. En effet, les contraintes d'élevage et la courte durée de vie des larves rend leur utilisation difficile dans la réalité clinique.

### Débridement mécanique

Autrefois, on appliquait des compresses de coton humidifiées qu'on laissait sécher (wet-to-dry) avant de les retirer afin d'arracher les tissus dévitalisés et

wound. Direct ultrasound therapy involves the use of a specialized probe held in direct contact with the wound. This method can promote debridement and has cavitation, mechanical and hydrodynamic effects which cause tissue disruption, fragmentation and emulsion in the wound bed. The other method involves the use of non-contact, low frequency ultrasound delivered through a saline mist to the wound bed. The ultrasound activity causes the saline bubbles to burst in the wound bed thereby lifting the necrotic tissue and microorganisms<sup>45, 51</sup>.

Plasma-mediated bipolar radiofrequency ablation (PBRA) uses microwaves to destroy bacteria in a wound. In an *In vivo* pig model this method has been shown to be associated with a reduction in the number of methicillin-resistant *Staphylococcus aureus* (MRSA)<sup>52</sup>. This control of the bacterial flora may then allow for leukocyte activity (autolytic debridement).

Negative Pressure Therapy (NPWT) mechanically stimulates granulation in wounds and is used after debridement. This therapy can also help debridement by removing exudate, edema fluid and a small amount of devitalized tissue<sup>53</sup>. It could also have an effect of reducing biofilm<sup>54</sup>.

### The factors that influence debridement

Choosing a debridement treatment plan can sometimes be difficult because of the variability in healing potential depending on the patient's age and comorbidity factors. Certain diseases directly affect the leukocyte debridement process. Several factors will influence the choice of debridement method or methods to be used. The four main considerations are 1) the number of leukocytes, 2) their migratory ability, 3) their metabolism, and 4) the decision or preference of the patient and the health professionals on the most appropriate method of debridement. Table 1 lists the main conditions that may affect the number, migration and metabolism of leukocytes.

### Number of leukocytes

The neutrophil and macrophage count directly influences effective wound debridement. Therefore, any condition that affects this number, such as age, cancer or increased requirements during an infection, will directly affect wound debridement.

The age of the individual (babies or elderly people) directly influences the functionality of cells in the immune system. The defense system in premature or newborn babies is immature, which predisposes them to infection. Several studies have shown a link between aging and an increase in wound healing time and complications<sup>55</sup>. Aging causes an increase in senescent cells and as a result, there is reduction in the number of active leukocytes and their inflammatory response<sup>56</sup>.

les microorganismes. Ce mode de débridement a beaucoup été utilisé dans le passé. Cette méthode est non sélective (c.-à-d. retrait agressif des tissus dévitalisés mais également des tissus nouvellement synthétisés) et elle induit des douleurs lors de la procédure de même que des saignements (Tableau 2). Pour toutes ces raisons, cette méthode de débridement n'est pas considérée comme une pratique exemplaire recommandée dans le soin des plaies. Dans le suivi des plaies chirurgicales, ce mode de débridement est cependant encore beaucoup prescrit (69%) mais cliniquement non indiqué dans 78% des cas<sup>47</sup>. La variante qui consiste à appliquer des compresses humidifiées et à les retirer avant qu'elles ne soient complètement sèches (wet-to-wet) est trop contraignante en termes de temps de soins et s'avère peu utilisée dans les bonnes conditions<sup>48</sup>.

À l'inverse, le débridement mécanique avec irrigation à haute pression (seringue de 30 cc et aiguille 18 visant à obtenir une pression entre 8 et 15 lb) demande peu d'expérience et son utilisation est largement répandue. Dans le même ordre d'idée, l'hydrothérapie qui utilise un tourbillon d'eau pour favoriser le retrait mécanique des tissus est très répandue. Certaines études démontrent cependant des risques accrus de macération, de contamination et d'infection des plaies pour les individus dont le système immunitaire est affaibli par l'âge, la maladie ou les médicaments<sup>42</sup>. Les produits antibactériens utilisés pour nettoyer la cuve peuvent également altérer les nouveaux tissus cicatriciels<sup>49</sup>. Plusieurs centres de soins de plaies ont abandonné cette pratique pour toutes ces raisons<sup>2</sup>. L'irrigation des plaies à l'aide d'eau du robinet plutôt que d'une solution saline n'augmente pas le risque d'infection et pourrait même réduire ce risque<sup>50</sup>. Il faut toutefois agir avec prudence en présence de patients immunosupprimés. L'utilisation de l'eau du robinet n'est pas recommandée lorsque la distribution contrôlée (aqueduc) de cette eau n'est pas disponible.

Le débridement par ultrasons se fait avec ou sans contact avec la plaie. Lorsque la sonde est dirigée directement sur la plaie, les ultrasons ont des effets de cavitation ainsi que des effets mécaniques et hydrodynamiques qui provoquent une fragmentation des tissus dévitalisés et une émulsion dans la plaie. Dans le second cas, des ultrasons de basse fréquence permettent la vaporisation d'une solution saline sous forme de brume dans le lit de la plaie. L'éclatement des bulles de cette solution dans le lit de la plaie provoque le décollement du tissu nécrotique et des microorganismes<sup>45, 51</sup>.

L'ablation par radiofréquence bipolaire (PBRA) consiste à utiliser des micro-ondes pour détruire les bactéries présentes dans une plaie. Dans un modèle *in vivo* de porc, cette méthode a été associée à

There is also a decrease in the number of phagocytic macrophages as people age<sup>55</sup>. Chemotherapy that limits cell division also influences the number of leukocytes and reduces the inflammatory response of the immune system<sup>57</sup>. AIDS patients are also subject to delayed healing due to their insufficient number of leukocytes capable of fighting microorganisms<sup>58</sup>.

In the case of deep tissue infections, rapid surgical debridement is required (in addition to systemic antibiotics) and is preferable to slower debridement methods, such as autolytic debridement. In those critical situations, the patient's leukocyte count may not be high enough for effective, rapid debridement and the elimination of the infected tissue and this is worse in case of immunodeficiency related to aging and cancer<sup>2</sup>.

### Migration of leukocytes

Several studies have found abnormal leukocyte migration to the wound bed in the presence of hyperglycemia (diabetes). This phenomenon is due to a dysfunction in the chemotactic adhesion of neutrophils and monocytes to the endothelial cells that line blood vessels<sup>12</sup>. The migratory dysfunction of defense system cells leads to a decrease in debridement and infection control and finally to a slowing of the healing process.

With age, there is a decrease in the release of nitric oxide from endothelial cells, which decreases capillary permeability at the site of the wound and therefore, there is a decrease in neutrophil diapedesis which can impact debridement<sup>55</sup>.

All vascular conditions in which there is a reduction in the lumen may directly influence the migration ability of leukocytes that perform the debridement of the wound site. These conditions include atherosclerosis (arterial insufficiency with hypertension or diabetes), edema (venous, lymphatic), vasoconstriction in response to sympathetic system stimuli (smoking, stress, cold, medicine, pain) and hypovolemia experienced during heart failure<sup>1, 12</sup>. Substance P is a neuropeptide that normally contributes to vasodilation and leukocyte migration. The decrease in the production of substance P observed with a neuropathic condition could also explain the difficulties of healing diabetic patients<sup>59</sup>. The adipose tissue in obese patients is poorly vascularized, which contributes to reducing leukocyte access to wound sites, and therefore slows down debridement and the healing of this tissue<sup>12</sup>.

Patients with paralysis due to damage of the spinal cord have a deficient nutritional status and a reduced immune response due to reduced receptors responsible for adhesion of leukocytes and this also impacts the process of debridement<sup>60</sup>.

une réduction du nombre de *Staphylococcus aureus* résistant à la méticilline (SARM)<sup>52</sup>. Ce contrôle de la flore microbienne favorise l'activité des leucocytes (débridement autolytique).

La thérapie par pression négative (TPPN) stimule mécaniquement la granulation des plaies et est utilisée après le débridement. Cette thérapie peut aussi aider au débridement en retirant l'exsudat, le liquide œdémateux et une petite quantité de tissu dévitalisé<sup>53</sup>. Elle pourrait également avoir un effet de réduction du biofilm<sup>54</sup>.

### Facteurs influençant le débridement :

Le choix du plan thérapeutique peut parfois être difficile en raison de la variabilité des potentiels de cicatrisation selon l'âge des patients et leurs facteurs de comorbidité. Certaines pathologies affectent directement le processus de débridement des leucocytes. Plusieurs considérations influencent le choix de la ou des méthodes de débridement qui seront utilisées. Les quatre grandes raisons sont : 1) le nombre, 2) la migration ainsi que 3) le métabolisme des leucocytes et finalement 4) la prise de décision ou préférence du patient et des professionnels de la santé assurant le suivi. Le tableau 1 énumère les principales conditions pouvant affecter le nombre, la migration et le métabolisme.

### Nombre de leucocytes

Le nombre de neutrophiles et de macrophages a une influence directe sur la capacité à effectuer un débridement. Toutes conditions affectant ce nombre comme l'âge, le cancer ou encore l'augmentation des besoins en situation d'infection affectent directement la capacité de débridement des plaies des patients.

L'âge des individus (bébé ou personne âgée) influence directement la capacité des cellules du système immunitaire. Le système de défense des prématurés ou des bébés naissants est immature, ce qui les prédispose davantage aux infections. Plusieurs études ont démontré un lien entre le vieillissement et l'augmentation du temps de la cicatrisation des plaies et des complications<sup>55</sup>. Le vieillissement induit une augmentation des cellules sénescentes et ainsi une réduction du nombre de leucocytes actifs et leur réponse inflammatoire<sup>56</sup>. Il y a également une diminution du nombre de macrophages phagocytaires avec l'âge<sup>55</sup>. La chimiothérapie qui limite la division cellulaire influence également le nombre de leucocytes et diminue la réponse inflammatoire de défense immunitaire<sup>57</sup>. Les sidatiques sont également sujets à un retard de cicatrisation en raison de leur nombre insuffisant de leucocytes capables de combattre les microorganismes présents<sup>58</sup>.

En situation d'infection des tissus profonds, un

### Metabolism of leukocytes

During the inflammatory phase, oxygen requirements are high. Leukocyte migration and metabolic activities associated with phagocytosis and enzymatic lysis demand oxygen voltages above 30 mmHg<sup>61</sup>. Hemodilution and anemia do not affect the healing process<sup>62</sup> while blood transfusions appear to have an inhibitory effect on T cell functions<sup>63</sup>.

All factors associated with vascular limitation like drugs, stress, pain, diabetes, nicotine (smoking) and cold decrease oxygen blood flow to the wound site and consequently, the metabolic activity of the cells<sup>2, 64</sup>. Smoking also decreases the oxidative antimicrobial mechanism of neutrophils<sup>65</sup>. The metabolic activity of the cells is also affected by temperature. The use of cold solutions, non-occlusive dressings that promote evaporation and a local reduction of the temperature of the wound may affect metabolism and directly impact debridement. Patients suffering from malnutrition or wasting state have reduced opsonization (phagocytosis)<sup>66</sup>.

Age directly influences the metabolic activity of cells of the immune system. As we age, the metabolic activity of all cells in the body decreases, which limits the capacity for cell division but also any phagocytic activity and synthesis of enzymes or free radicals.

Leukocytes are no longer able to respond quickly to remove devitalized tissue from the wound before microorganisms colonize the wound, produce an infection and delay healing. Cellular senescence associated with aging results in a decrease in response to, and secretion of growth factors and finally in delayed healing of wounds and chronicity<sup>66</sup>.

Patients with immune dysfunction (e.g. due to corticosteroid use) do not necessarily have the classic signs of infection (warmth, redness, swelling and pain)<sup>67</sup>. Taking glucocorticoids suppresses the synthesis of inflammatory mediators (histamines, leukotrienes, prostaglandins), inhibits the migration of neutrophils and macrophages, reduces the metabolic activity of production of lysosomal enzymes and reduces cell proliferation<sup>68</sup>. Conditions of kidney and liver failure are also associated with delayed healing<sup>2</sup>.

### The decision of the patient and health professional

Health conditions can differ from patient to patient, which means that the choice of debridement method needs to be individualized. Palliative care patients with a wound containing devitalized tissue do not necessarily need aggressive debridement and in this case care should be more oriented toward comfort<sup>69</sup>.

As mentioned above, several factors, such as the patient's health condition, the objective of therapy, the

débridement chirurgical rapide est requis (en plus des antibiotiques systémiques) et préférable aux méthodes de débridement plus lentes comme le débridement autolytique. Dans ces situations critiques, le taux de leucocytes est insuffisant pour rapidement débrider et éliminer les tissus infectés ce qui est encore davantage le cas dans les situations d'immunodéficience associé à l'âge ou au cancer<sup>2</sup>.

### Migration des leucocytes

Plusieurs études ont démontré une migration anormale des leucocytes au site du lit de la plaie en situation d'hyperglycémie (diabète). Ce phénomène provient d'un dysfonctionnement de l'adhésion chimiotactique des neutrophiles et monocytes aux cellules endothéliales qui tapissent les vaisseaux sanguins<sup>12</sup>. La dysfonction migratoire des cellules du système de défense conduit à une diminution du débridement et du contrôle de l'infection et finalement à un ralentissement de la cicatrisation

Avec l'âge, il y a une diminution de la libération d'oxyde nitrique par les cellules endothéliales, ce qui diminue la perméabilité des capillaires au site de la plaie et par conséquent, la diapédèse des neutrophiles<sup>55</sup>.

Toutes les conditions vasculaires de réduction de la lumière influencent directement la capacité de migration des leucocytes qui effectuent le débridement au site de la plaie. Ces conditions incluent l'athérosclérose (insuffisance artérielle associée à l'hypertension ou au diabète), l'œdème (insuffisance veineuse, lymphatique), la vasoconstriction en réaction du système sympathique (tabac, stress, froid, médicaments, douleur) et l'hypovolémie en situation d'insuffisance cardiaque<sup>1</sup>.<sup>12</sup>. La substance P est un neuropeptide qui contribue normalement au phénomène de vasodilatation et de migration des leucocytes. La diminution de la production de cette substance P, observée avec une condition neuropathique, pourrait également expliquer les difficultés de cicatrisation des patients diabétiques<sup>59</sup>. Les tissus adipeux des patients obèses sont faiblement vascularisés ce qui contribue à réduire l'accès des leucocytes au site des plaies et par conséquent freine le débridement et la cicatrisation de ces tissus<sup>12</sup>.

Les patients atteints de paralysie suite à une atteinte de la moelle épinière ont un statut nutritif déficient ainsi qu'une réponse immunitaire diminuée par une réduction des récepteurs responsables de l'adhésion des leucocytes chargés du débridement<sup>60</sup>.

### Métabolisme des leucocytes

Les besoins en oxygène sont élevés en phase inflammatoire. La migration des leucocytes et les activités métaboliques associées à la phagocytose et à la

wound's etiology, the amount of devitalized tissue and the patient's infection status will influence this choice<sup>5, 16</sup>. Poor wound assessment, the lack of knowledge around some methods of debridement and the fear of harm to patients lead clinicians to opt for less efficient methods such as the autolytic method<sup>5</sup>. Financial resources of patients may also influence the choice of therapy. Financial difficulties may indeed lead some patients to choose suboptimal treatments despite recommendations from stakeholders and this may result in an increase in the duration of therapy and more costly clinical monitoring. Patient preferences can be directed by their personal finances but also anxiety and lack of knowledge around the various debridement methods. Accessibility and the skills of the health professional may also influence the final decision on the method of debridement and treatment of the wound.

### Costs

According to several economic studies, surgical debridement (surgical sharp or conservative sharp) is the least expensive method of removing necrotic tissue from the wound bed. The costs take into account all the resources used and the savings associated with the debridement methods are mainly dependent upon the difference in time required to obtain a clean wound bed (Table 2)<sup>2, 27, 70, 71</sup>. However, the surgical debridement method is not suitable for all patients depending on their health status and remote geographical status. Other economic studies have demonstrated that enzymatic debridement is less expensive compared to biological (larva), autolytic or mechanical debridement. In Canada, biological debridement with larvae is little used. Mechanical debridement based on the rapid removal of cotton compresses is also used less frequently due to non-selectivity and pain<sup>42</sup>. The achievement of a clean wound bed occurs more rapidly with surgical or enzymatic debridement compared with mechanical debridement<sup>70</sup>. In addition, based on follow-up on an out-patient basis, enzymatic debridement allowed patients to achieve a clean wound faster compared to those where autolytic debridement was used. It is important to remember that speed of debridement is associated with reduced rates of infection and infection has been shown to increase the length of follow-up<sup>42</sup>. The prolongation of the healing process and follow-up period leads to significant costs in terms of human and material resources<sup>42, 72</sup>.

### Conclusions

The presence of devitalized tissues in wounds has several negative consequences that can lead to an increase in morbidity and even mortality in affected

lyse enzymatique demande des tensions d'oxygène au-dessus de 30 mmHg<sup>61</sup>. L'hémodilution et l'anémie n'affecte pas le processus de cicatrisation<sup>62</sup>. Les transfusions sanguines semblent cependant avoir un effet d'inhibition des fonctions des lymphocytes T<sup>63</sup>.

Tous facteurs de restriction vasculaire associés aux médicaments, au stress, à la douleur, au diabète, à la cigarette et au froid diminuent l'apport d'oxygène sanguin au site de la plaie et conséquemment, l'activité métabolique des cellules<sup>2, 64</sup>. Le tabagisme diminue également le mécanisme oxydatif antimicrobien des neutrophiles<sup>65</sup>. L'activité métabolique est aussi affectée par la température. L'utilisation de solutions froides, de pansements non occlusifs qui favorisent l'évaporation et une réduction locale de la température affectent directement la capacité de débrider en réduisant le métabolisme. Les patients souffrant de dénutrition ou en état de cachexie ont une diminution de leur capacité d'opsonisation (phagocytose)<sup>66</sup>.

L'âge des individus influence directement l'activité métabolique des cellules de leur système immunitaire. En vieillissant, l'activité métabolique de toutes les cellules du corps diminue ce qui limite la capacité de division cellulaire mais également toute activité de phagocytose et de synthèse d'enzymes ou de radicaux libres. Les leucocytes ne sont plus en mesure de réagir et d'éliminer rapidement les tissus dévitalisés de la plaie avant que les micro-organismes ne la colonisent et ne produisent une infection et un retard de guérison. La sénescence cellulaire associée au vieillissement se traduit par une diminution des réponses aux, et des sécrétions de facteurs de croissance et finalement par un retard de cicatrisation ainsi qu'une chronicisation des plaies<sup>66</sup>.

Les patients ayant une dysfonction immunitaire (ex : la prise de corticostéroïdes) ne présentent pas nécessairement les signes classiques d'infection (chaleur, rougeur, œdème, turgescence et douleur)<sup>67</sup>. La prise de glucocorticoïdes supprime la synthèse des médiateurs de l'inflammation (histamines, leucotriènes, prostaglandines) et freine la migration des neutrophiles et des macrophages, l'activité métabolique de production d'enzymes lysosomales et la prolifération des lymphocytes<sup>68</sup>. Les conditions d'insuffisance rénale et hépatique sont également associées à un retard de cicatrisation<sup>2</sup>.

### Décision du patient et des professionnels

Les conditions de santé peuvent différer d'un patient à l'autre ce qui requiert un choix individualisé de la méthode de débridement. Toute personne en fin de vie ayant une plaie avec des tissus dévitalisés n'a pas nécessairement besoin d'un débridement agressif. Les soins sont alors davantage orientés vers des soins de confort<sup>69</sup>.

Comme mentionné au préalable, plusieurs facteurs

patients. When there is a deficiency in and/or a dysfunction of the cells responsible for wound debridement, it is imperative that health providers compensate for this by using the fastest, most selective, least painful and most professionally accessible debridement methods according to patient preferences. In summary, several factors, such as the patient's health condition, the objective of therapy, the wound's etiology, the amount of devitalized tissue and the patient's infection status will influence this choice. The financial situation of patients treated in primary care settings, who have to pay in certain cases will also influence this choice. Patient preferences and the accessibility and competence of the healthcare professional need to be carefully considered. In opting for quick and efficient removal of necrotic tissue through the use of an appropriate debridement method, one can reduce the risk of infection, wound chronicity and delayed healing which are costly in terms of hospitalization, care time, products used and can negatively impact the patient's quality of life. 🗣️

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comme la condition de santé, le but recherché, l'étiologie de la plaie, la quantité de tissus dévitalisés et le statut infectieux influencent le choix d'une méthode de débridement<sup>5, 16</sup>. Une mauvaise évaluation de la plaie, une méconnaissance de certaines méthodes de débridement ainsi que la crainte de porter atteinte aux patients conduisent certains intervenants à opter pour des méthodes moins efficaces comme la méthode autolytique<sup>5</sup>. Les ressources financières des patients influencent également le choix thérapeutique. Les difficultés financières peuvent en effet amener certains patients à opter pour des traitements sous optimaux malgré les recommandations des intervenants ce qui conduit à une augmentation coûteuse de la durée du suivi clinique. Les préférences des patients peuvent être dirigées par leur capacité financière mais également par l'anxiété et la méconnaissance des méthodes. L'accessibilité et les compétences des professionnels influencent la décision finale quant à la méthode de débridement et les autres traitements de plaies.

#### Coûts

Selon certaines études économiques, le débridement chirurgical (conservateur ou non) est la méthode la moins coûteuse pour nettoyer le lit d'une plaie. Les coûts tiennent compte de l'ensemble des ressources utilisées et les économies sont principalement calculées sur la différence de temps nécessaire à l'obtention d'une plaie propre (Tableau 2)<sup>2, 27, 70, 71</sup>. Le débridement chirurgical ne convient cependant pas à tous les patients en raison de leur condition. D'autres études économiques démontrent que le débridement enzymatique serait moins coûteux comparé aux débridements biologique (larve) ou mécanique<sup>71</sup>. Au Canada, le débridement biologique avec les larves est peu utilisé. Le débridement mécanique basé sur le retrait rapide de compresses de coton est également de moins en moins utilisé<sup>42</sup>. L'obtention d'une plaie propre se produit plus rapidement avec le débridement chirurgical ou enzymatique comparé au débridement mécanique<sup>70</sup>. En plus de rendre possible un suivi en externe, les résultats du débridement enzymatique permettent aux patients d'obtenir une plaie propre plus rapidement comparé à ceux traités avec l'approche du débridement autolytique. Il importe de retenir que la rapidité est associée à une réduction des taux d'infection qui peuvent augmenter la durée des suivis<sup>42</sup>. La prolongation des suivis entraîne des coûts importants en termes de ressources humaines et matérielles<sup>42, 72</sup>.

#### Conclusion

La présence de tissus dévitalisés dans les plaies a plusieurs effets négatifs qui conduisent à une hausse

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des taux de morbidité et de mortalité. Lorsqu'il y a un déficit et/ou une dysfonction des cellules responsables du débridement des plaies, il devient impératif de suppléer à ces lacunes en utilisant les méthodes de débridement les plus rapides, sélectives, indolores, accessibles professionnellement et selon les préférences des patients. En résumé, plusieurs facteurs comme les conditions de santé du patient, le but recherché, l'étiologie de la plaie, la quantité de tissus dévitalisés et le statut infectieux du patient vont influencer ce choix. La situation financière du patient traité en première ligne, qui doit payer dans certains cas, influence aussi ce choix. Les préférences des patients ainsi que l'accessibilité et la compétence des professionnels de la santé doivent être considérées attentivement. En favorisant une action rapide et efficace du débridement, il est possible de réduire le risque d'infection, de chronicisation des plaies et de retards de cicatrisation coûteux en termes d'hospitalisations, d'heures de soins, de produits et de qualité de vie des patients. ☺

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# Implementation of a Comprehensive Therapy Concept in the Treatment of Venous Leg Ulcers in Daily Practice

A summary of a satellite symposium held at the 18th annual conference of the Canadian Association of Wound Care – November 8, 2012

## Introduction

Approximately 90% of lower leg ulcers are of vascular origin. Venous leg ulcers (VLUs) are extremely painful, and have a negative impact on quality of life. Moreover, they present a significant burden on health-care resources. The Canadian Medical Advisory Secretariat reports the prevalence of leg ulcers to be 0.12% to 0.32% of the general population. Other reports indicate a prevalence of 1% to 2% of adults.<sup>1</sup>

A recent systematic review demonstrated that compression therapy is the most effective therapeutic intervention for VLUs.<sup>2</sup>

- Compression therapy improves ulcer-healing rates.
- Multi-layer systems are more effective than single-layer systems.
- High-compression bandaging is more effective than low-compression bandaging.

The authors concluded: “Compression therapy consists of specialized bandaging applied by appropriately trained health professionals followed by long-term use of compression stockings. This increases ulcer healing better than non-compression therapies.”<sup>2</sup>

Unfortunately, VLUs are often improperly treated. Gottrup and colleagues noted that in patients with chronic wound problems, only 51% had a significant diagnostic examination; furthermore, 40% of patients with VLUs are not treated with compression, the accepted standard therapy.<sup>3</sup>

In an effort to gain an understanding of the implementation of a complex therapy regimen for the treatment of VLUs in clinical practice, patients in Germany (n=29), Italy (n=28) and Austria (n=6) were treated with moist wound dressings and compression therapy in the setting of routine medical care.<sup>4</sup>

The methodological approach to the study consisted of the following:<sup>4</sup>

- **Graduated compression** (liner and overstocking; Jobst® Ulcer Care Compression System, 40 mmHg), to counteract venous hypertension and to reduce and control edema.
- **Moist wound care** (Cutimed® Siltec® B), to absorb excess wound fluid, promote moist wound healing, and to provide protection at the wound and periwound sites.
- **Antimicrobial therapy** (Cutimed® Sorbact®), in the presence of unclean, colonized or infected wounds.

At the completion of the 12-week study, 84% of patients' wounds were reduced significantly in size, and 57% of wounds had healed completely. Of particular note is that some of the larger wounds (~5 cm in size) were treated successfully.<sup>4</sup>

“The majority of patients had not experienced any wound healing progress for extended periods of time prior to the study, due in large part to complex health situations (underlying diseases, obesity, infection) or use of inadequate therapies,” noted Dr. Brambilla.

“Thus, the rapid healing results noted in our study were rated very positively by both patients and physicians.” Moreover, patients' well-being was substantially improved, which resulted in a high level of compliance during the study period.

The use of Cutimed® Sorbact® rendered possible the treatment of infected wounds without antibiotics; this is an important consideration, noted Dr. Brambilla, as 43% of the wounds included in the study showed signs of infection.

Study investigators also noted that the therapeutic intervention was straightforward to apply, and was well-tolerated by patients. Benefits included:<sup>4</sup>

- Stability of wound dressings under compression.
- Speedy wound healing led to improvement of patients' well-being, which in turn resulted in a high rate of compliance; indeed, the majority of patients indicated that they would use similar products should a venous ulcer develop again.

Figure 1

Male with VLU at enrollment (A) and study end (B)



Figure 1 depicts one of the study enrollees. This 59-year-old male presented with a VLU, which was complicated by the additional risk factors of adiposity and diabetes (Figure 1a). He had shown disturbed wound healing over the last 3 months, and signs of infection were present. Upon completion of the study, the patient's ulcer was almost completely healed (Figure 1b).

The 3 major study conclusions, noted Dr. Brambilla, were:

- 1) complete ulcer healing in more than half of study participants;
  - 2) significant improvement in wound status for the majority of patients; and
  - 3) increased quality of life for all enrollees.
- He added, “It is clear that treatment pathways of this nature can be implemented successfully in daily practice.”

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## Understanding

# Antimicrobial Dressings and Their Role in Wound Care

A summary of a satellite symposium held at the 18th annual conference of the Canadian Association of Wound Care – November 8, 2012

## Introduction

Dr. Keast began the session by noting the importance of distinguishing between inflammation and infection. Key determinants are noted in Table 1.<sup>1</sup> He added that the most common cause of chronic inflammation in a wound is bacteria. Three key considerations regarding wound infection are: the number of bacteria present, the virulence of the bacteria and host resistance (which requires assessment of comorbid conditions that may affect the ability of the patient to manage bacterial loads).

He further noted that the diagnosis of infection is a clinical judgment; hence, assessment of bioburden through documentation of clinical signs and symptoms is crucial in helping to determine the proper wound care intervention. Surface swabs, appropriately obtained, may assist in guiding treatment; the Levine method is the best approach to obtain a swab. Furthermore, the management of infection requires a global approach, which includes maximizing host resistance, debridement and the selection of appropriate dressings.

Table 1

### Inflammation vs. infection<sup>1</sup>

| Inflammation                                                                       | Factor                  | Infection                                                  |
|------------------------------------------------------------------------------------|-------------------------|------------------------------------------------------------|
| Coexisting systemic disease                                                        | <i>Comorbidity</i>      | Decreased host resistance                                  |
| Constant, onset with lesions                                                       | <i>Pain</i>             | Increasing                                                 |
| Multiple sites, symmetric                                                          | <i>Location</i>         | Single location, asymmetric                                |
| Palpable purpura, livedo pattern, rolled border, focal necrosis, satellite lesions | <i>Morphology</i>       | Classic or subtle signs of infection, soft tissue crepitus |
| Local                                                                              | <i>Erythema</i>         | Advancing                                                  |
| Normal or warm                                                                     | <i>Skin temperature</i> | Warm or hot                                                |

## Silver dressings

Silver dressings play 2 main roles in the treatment of wounds:

1) they reduce bioburden and 2) they act as an antimicrobial barrier.

Silver dressings are appropriate for use on wounds that present with localized, spreading or systemic infection, e.g. acute traumatic wounds, including burns and surgical wounds, and for chronic wounds.

## Biatain Alginate Ag (formerly SeaSorb Ag)

Biatain Alginate Ag (SeaSorb Ag) is a highly absorbent, sterile, non-woven, antimicrobial pad composed of calcium alginate, carboxymethylcellulose and an ionic silver complex (Alphasan). The silver complex releases silver ions when exposed to positive ions such as sodium from the wound exudate. The dressing has a 7-day wear time, and possesses hemostatic capabilities due to the sodium–calcium ion exchange.

Biatain Alginate Ag (SeaSorb Ag) works in the following manner: As exudate is absorbed, the carboxymethylcellulose swells and the alginate saturates – this in turn forms a high tensile strength gel that can be removed in 1 piece. The Na<sup>+</sup> that discharges from the wound exudate allows the release of Alphasan silver complex. Hemostasis occurs due to the sodium–calcium ion exchange process; calcium replaces the sodium, which stops the bleeding.

## Biatain Ag foam

Münter and colleagues studied the effect of a sustained silver-releasing dressing on ulcers with delayed healing.<sup>2</sup> This was the first large-scale (>600 patients), international, randomized controlled trial using an outcomes approach to investigate the clinical performance of a wound dressing. Compared with traditional clinical trials, this approach mimics real-life situations, as it allows the inclusion of data from patients seen in everyday clinical practice situations rather than data from carefully selected patients only.

During the 4-week study, investigators compared an antibacterial sustained silver-releasing hydro-activated foam dressing (Biatain Ag) with local best practice in the treatment of diabetic foot ulcers, venous/arterial/mixed ulcers, pressure ulcers and several other types of wounds with delayed healing.

The results of the study demonstrated that:

- The wound area decreased significantly faster in patients treated with Biatain Ag than with local best practice (50.0% vs. 34.3%, respectively;  $P=0.002$ ).
- Progress toward complete healing was achieved to a larger extent ( $P=0.0001$ ) compared with local best practice.
- Faster reduction of odor occurred with Biatain Ag ( $P<0.001$ ).
- The exudate level decreased faster with Biatain Ag ( $P=0.006$ ).
- There were fewer leakages and significantly fewer occurrences of maceration with Biatain Ag than local best practice ( $P=0.04$ ).
- Biatain Ag had significantly longer wear time than local best practice (3.1 days vs. 2.1 days, respectively;  $P<0.0001$ ).
- Biatain Ag was easier to use than local best practice ( $P<0.0001$ ).

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## Wound Infection

# An Old Problem with New Solutions: PHMB in Practice

A summary of a power breakfast held at the 18th annual conference of the Canadian Association of Wound Care – November 10, 2012

Surgical site infections are the cause of 20% of all healthcare-associated infections, and at least 5% of patients undergoing a surgical procedure develop a surgical site infection. However, patients with chronic wounds are also at high risk for wound infection; since the wound is open for so long, the opportunity for infection is greater.<sup>1</sup>

The “TIME” matrix (assessment of tissue, infection or inflammation, moisture imbalance, epidermal margin) is critical with respect to clinical observations, wound bed preparation clinical actions and overall clinical outcomes.<sup>1</sup>

Singh and colleagues noted that in many chronic infections, bacteria live in biofilms.<sup>2</sup> The transition from a free-living, independent existence to a biofilm lifestyle can be devastating, as biofilms are notoriously resistant to the host defence mechanisms and antibiotics.<sup>2</sup> Electron micrographs reveal biofilms on 60% of chronic wounds and <10% of acute wounds.<sup>3</sup>

Lazarus and colleagues reported that some presently utilized antibacterial regimens may actually promote the presence of ecological profiles that inhibit wound healing, since they target inappropriate bacteria populations or fail to deliver adequate concentrations of drug to the wound bacteria. They further noted that other interventions have been developed to target key processes in this complex biological system and include regimens that deal with populations of organisms and the destruction of biofilms.<sup>4</sup>

Wound characteristics that may increase the risk of infection are noted in Table 1.

As clinicians’ understanding of the intricate balance between wound healing and the bio-community of organisms living within the wound expands, new challenges arise regarding the provision of effective

strategies to manage wound bioburden without inducing pathogen resistance and negatively influencing the healing process. The increase in antibiotic-resistant organisms has led to renewed interest in the use of antiseptics such as biguanides for managing wound pain and infection; polyhexamethylene biguanide (PHMB) is one particular example.<sup>5</sup>

In 2001, Reitsma and colleagues evaluated the effectiveness of gauze treated with PHMB to prevent external contamination from reaching the skin of normal volunteers. The results clearly demonstrated that 0.2% PHMB prevented the migration of 106 organisms through the gauze and kept underlying skin free from bacteria.<sup>6</sup>

PHMB binds to the bacterial phospholipid outer membrane; it then disrupts the membrane, causing cytoplasm to leak out. This in turn causes the cell’s protective layer to disintegrate; the cell then collapses and dies.

In a tertiary wound healing centre, 12 patients with chronic wounds (10 with venous leg ulcers, 2 with vasculitic ulcers) with a history of recurrent systemic and local infection were given PHMB-embedded antimicrobial foam dressings. The patients were followed weekly until the wound healed or the patient no longer required an antimicrobial foam dressing. At each visit, the patients’ wounds were assessed, a pain assessment was conducted, and pain experienced during dressing change was measured. As well, reduction in wound area was determined using a tracing grid, and the condition of the wound bed and peri-ulcer skin were also recorded.

The results showed that: in 7 patients, wounds decreased in size; wounds healed for 3 patients, while wounds remained static for 2 patients. Wound pain increased in 1 patient and maceration was experienced by 3 patients. “That is a much higher success rate than many other antimicrobial agents,” noted Dr. Harding. “Although this was not a randomized controlled trial, the healing rates give clinicians hope.”

A randomized controlled trial was conducted to compare the effectiveness of Kendall AMD antimicrobial foam dressing with Allevyn Ag hydrocellular antimicrobial dressing in the reduction in size, change in bioburden and wound biochemistry of hard-to-heal chronic venous leg ulcers.

All 32 of the patients studied had venous ulcers for >6 months, which had failed to respond to standard therapy. The mean age of study subjects was 67.7 years; the AMD group mean wound area was 7.8 cm<sup>2</sup>; the comparator group mean wound area was 10 cm<sup>2</sup>.

Although the results of this study have not yet been published, Dr. Harding noted the following results:

- The dressing was well-tolerated in >87.5% of patients.
- 15 patients scored >70% satisfaction with the AMD dressing.
- The dressing was easy to apply and remove.

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Table 1

## Wound characteristics that may increase the risk of infection

| Acute wounds                                                                                                                                                                                     | Chronic wounds                                                                                                                                                                                                                 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>■ Contaminated surgery</li> <li>■ Long operative procedure</li> <li>■ Trauma with delayed treatment</li> <li>■ Necrotic tissue or foreign body</li> </ul> | <ul style="list-style-type: none"> <li>■ Necrotic tissue or foreign body</li> <li>■ Prolonged duration</li> <li>■ Large in size and/or deep</li> <li>■ Anatomically situated near a site of potential contamination</li> </ul> |

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# Efficacy and Cost of Wound Debridement

A summary of a Lunch-and-Learn session held at the 18th annual conference of the Canadian Association of Wound Care – November 11, 2012

## Wound debridement – overview

Dr. Despatis began by noting that the stages of molecular and cellular events in skin wound healing are: clotting; vascular response; inflammation; scar formation; epithelial healing; contraction; and scar remodeling.<sup>1</sup> Wounds that remain in the inflammatory phase are often not able to clear necrotic tissue and debris, and require debridement.

Debridement methods include: autolytic; enzymatic; biological; mechanical; and surgical. Regardless of which method is chosen, healing potential and outcome goals must be determined before commencing debridement.<sup>2</sup>

Autolytic debridement uses the patient's own enzymes to break down necrotic tissue in the wound. As illustrated in Table 1,<sup>3</sup> many patients do not have the ability to facilitate debridement, because the leukocytes needed may not be able to migrate to the wound bed, they may be few in number, they may not be functional and/or they may not be able to produce the enzymes needed to break down necrotic tissue.

Enzymatic debridement uses enzymes to facilitate the removal of dead tissue from a wound. The topical application of enzymes to break down devitalized tissue uses proteolytic enzymes (e.g. collagenase). As the collagenase enzyme liquefies the collagen fibers within necrotic tissue, the cellular and fibrotic debris loosen their connections from each other and the wound bed, so they more easily wash away during routine cleansing at each dressing change.

Biological debridement involves the use of fly larvae from the species *Lucilia sericata*, which feed on dead tissue. This method is little used in Canada – in large part due to patient reluctance – however, it remains a viable therapy.

Mechanical debridement involves hydrosurgery, whereby pressurized water is delivered using a hand piece to control the pressure. This is a very rapid method of debridement; however, clinicians must be aware that blood loss is involved.

Surgical debridement involves the removal of necrotic or septic tissue by a skilled practitioner. This method is quite painful for patients, an issue that must be addressed before the procedure commences.

## Treating the diabetic foot: How can we shape our outcomes?

Dr. Mayer noted that debridement is essential in the treatment of hard-to-heal wounds, especially diabetic foot ulcers.

Diabetes presents a significant risk for lower-limb complications. These include neuropathy, ulceration, peripheral arterial disease, infection and amputation. Moulik and colleagues noted that diabetic foot disease is associated with a 5-year mortality rate of 50 to 80%.<sup>4</sup> This mortality rate is higher than almost all cancers, except lung and pancreatic cancer. Diabetic foot ulcers are the most common complication of diabetes, and Dr. Mayer noted the following statistics:<sup>5</sup>

- The infected diabetic foot is the most common reason for admission to hospital for a person with diabetes.
- 1 in 5 ulcers leads to lower extremity amputation.
- After a major amputation, 50% of people will have the contralateral limb amputated within 2 years.
- 20 to 40% of total diabetes healthcare costs are related to the diabetic foot.

When diabetic foot ulcers develop, the mainstays of treatment are offloading and debridement. Many patients with diabetes are unable to clear necrotic tissue that builds up during the inflammatory phase due to poor circulation and a dampened immune response. Without the availability and proper function of cells that produce the enzymes, these patients require clinical intervention. Where appropriate, surgical debridement is the fastest way to remove large amounts of necrotic tissue. This procedure can be followed

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Table 1

Health conditions that affect the activity of leukocytes responsible for debridement<sup>3</sup>

| Condition              | Number | Migration | Metabolism |
|------------------------|--------|-----------|------------|
| Advanced age           | √      | √         | √          |
| Diabetes               |        | √         | √          |
| Arterial insufficiency |        | √         |            |
| Venous insufficiency   |        | √         |            |
| Kidney insufficiency   |        |           | √          |
| Hepatic insufficiency  |        |           | √          |
| Corticosteroids        | √      | √         | √          |
| Chemotherapy           | √      |           | √          |
| Cancer                 | √      |           |            |
| Obesity                |        | √         |            |
| HIV                    | √      |           |            |
| Malnutrition           |        |           | √          |
| Smoking                |        | √         | √          |
| Paralysis              |        | √         |            |
| Transfusion            |        |           | √          |

with an enzymatic agent such as collagenase to provide continuous debridement. In patients who are unable to undergo surgical debridement (lack of a skilled clinician, bleeding issues, pain), an enzymatic agent provides the necessary enzymes to rapidly clear the wound bed of necrotic tissue.

Frequent debridement is crucial. Clinicians should act immediately to optimize wound milieu, determine viable vs. non-viable tissue and choose the appropriate method of debridement that best supports wound healing.<sup>6</sup> With respect to the cost of various debridement methods, Canadian data are shown in Table 2. Dr. Mayer noted that innovative debridement techniques such as the use of collagenase produce excellent results at significant cost savings, compared with autolysis.<sup>7</sup>

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Table 2

Cost of debridement

| Method             | Time to clean wound bed (weeks) | Cost (\$, CAD) |
|--------------------|---------------------------------|----------------|
| Surgical sharp     | 3                               | 1,039.09       |
| Biological         | 3                               | 2,150.89       |
| Enzymatic          | 4                               | 1,264.69       |
| Conservative sharp | 6                               | 1,119.60       |
| Mechanical         | 6                               | 1,840.74       |
| Autolytic          | 10                              | 1,504.73       |

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# The Essential Role of Nutrition in Pressure Ulcer Management

A summary of a satellite symposium held at the 18th annual conference of the Canadian Association of Wound Care – November 8, 2012

## Introduction

Pressure ulcers (PUs) have a significant impact on quality of life. Pain and depression are common, and are associated with increased mortality in the elderly in long-term care.<sup>1,2</sup> The financial burden of PUs is substantial. Canadian data show that complex care for 3 months, per ulcer, costs \$24,050; for community care, the cost is \$27,500 per ulcer.<sup>3</sup> The prevalence of PUs in Canada is shown in Figure 1.<sup>4</sup>

## Barriers to healing

Once a PU develops, modifiable risk factors become barriers to healing. Thus, it is imperative that clinicians ask the following questions:

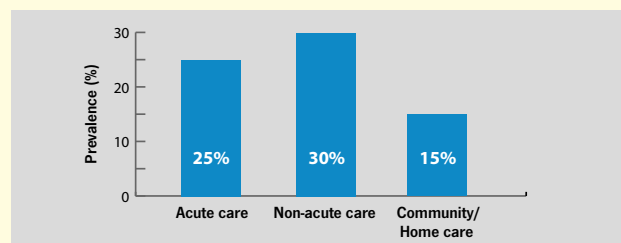
- Are the patient's nutritional and hydration status being addressed?
- Will the specialized dressings and other treatments be effective if the patient is not optimally nourished and hydrated?

## Assessments

Current guidelines regarding PUs and nutritional considerations note that, "All individuals must have a comprehensive nutritional assessment upon admission to a healthcare facility, with each condition change, and/or when progress toward PU closure is not observed."<sup>5</sup> This requires an interprofessional approach, and the following steps should be taken:

- Initiate a referral to a registered dietitian.
- Obtain a current body weight.
- Initiate an order for pertinent blood work.
- Initiate intake records.
- Initiate queries regarding appetite, food allergies and intolerances, dentition, swallowing, preferences, cultural dietary requirements and the need for physical assistance to eat or drink.
- Establish an appropriate bowel care program.

Figure 1  
Prevalence of pressure ulcers in Canada



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Healthcare practitioners must consider not only adequacy of nutritional intake but also common routes of nutritional loss, including gastrointestinal and urinary tract loss and wound exudate and fistulae loss. A comprehensive assessment to help identify all underlying, resolvable barriers to wound healing includes investigation of blood work indices. Tests should investigate for anemia, hyperglycemia, dehydration, hypothyroidism and indicators of risk for malnutrition related to the severity of illness or injury.

## Nutrients in wound healing

Key nutrients in wound healing include: energy from non-protein sources; protein; water; and vitamins and minerals. Nutrients are involved in all four phases of wound healing, and play a role in the cellular, structural and immune functions. Some guidelines recommend that patients with nutritional risk and PU risk factors should be offered a minimum of 30–35 kcal/kg body weight/day with 1.25–1.5 g/kg/day protein.<sup>6</sup> Whey protein supplements may prove helpful in this regard, and should be incorporated into a PU management plan. Precautions and contraindications to protein supplementation include impaired renal and hepatic function. Optimal hydration is crucial in patients with PUs, as dehydration can lead to skin breakdown, loss of appetite, physical and cognitive impairments, infection, bowel impairment, renal failure and death. The general recommendation regarding hydration is a minimum of 1 mL/kcal consumed; this should be increased based on fluid losses, and signs and symptoms of dehydration. Precautions and contraindications regarding hydration include: impaired renal function; congestive heart failure; and syndrome of inappropriate antidiuretic hormone secretion. Precautions and contraindications regarding hydration must be considered.

Supplementation should be based upon assessed adequacy of intake from all sources, consideration of losses, knowledge of the metabolism of nutrients with physiological stress, and when deficiencies are confirmed or suspected. Zinc, vitamin C and vitamin A play crucial roles at all levels of PU healing. Clinical judgment – based on comprehensive assessment – is needed in the absence of tests that definitively identify deficiencies. To meet the nutritional needs of an individual with a PU, a nutrition care plan may include one or more of the following: meals plus snacks; liquid and/or powder supplements; med pass program; vitamin and mineral supplementation; enteral nutrition support; and total parenteral nutrition (if gastrointestinal dysfunction or disease precludes adequate oral intake or tube feeding).

## Conclusions

PUs have a significant healthcare and financial impact and can be prevented. Clinicians should be aware of their patients' extrinsic and intrinsic risk factors for PUs, and work to modify them. Once a PU ulcer develops risk factors such as malnutrition become barriers to healing; these barriers must be addressed. Adequate energy, protein, fluid and micronutrient intake are essential.

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# CAWC Wound Care Education – 2013



## Foundations of Wound Care (online only)

This program is comprised of four modules:

1. Introduction to Wound Care
2. Prevention and Management of Diabetic Foot Ulcers
3. Prevention and Management of Pressure Ulcers
4. Prevention and Management of Venous Leg Ulcers

Each module is a stand-alone program; take one or all four, depending on your interest and needs. A certificate of learning is provided upon successful completion of each module.

Available online only at the Ontario Hospital Association website ([www.oha.com](http://www.oha.com)).

## CAWC Learning Series

The CAWC Learning Series is a 3-day live program.

### **Days 1 and 2: Skills Workshop – Putting Knowledge into Practice**

Wound care theory is presented through lectures and hands-on sessions. Topics include local wound care, dressings, debridement, lower limb assessment and compression and foot care.

### **Day 3: Knowledge Translation and Implementation**

This segment of the program provides participants with clear direction to put what they've learned into practice.

### **2013 Schedule**

The 2013 CAWC Learning Series is offered on the following dates:

|               |             |
|---------------|-------------|
| April 5–7     | Toronto, ON |
| May 24–26     | London, ON  |
| June 21–23    | Calgary, AB |
| October 18–20 | Halifax, NS |
| December 6–8  | Toronto, ON |

For further information regarding the CAWC Learning Series, please visit [www.cawc.net](http://www.cawc.net).

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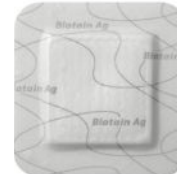
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