



Canadian Association For Enterostomal Therapy

Evidence-Based Recommendations

For

Conservative Sharp Wound Debridement





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Evidence-Based Recommendations for Conservative Sharp Wound Debridement (2011)

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A Message from the CAET President

Karen Bruton

2010-2012 President, Canadian Association for Enterostomal Therapy



The Canadian Association for Enterostomal Therapy (CAET) is pleased to present this collaborative document designed to promote and advance specialized nursing knowledge and practice: the CAET Evidence-Based Recommendations for Conservative Sharp Wound Debridement (CSWD). This document reflects current evidence-based research, case studies, and expert opinion.

The CAET extends its heartfelt thanks to the development team for the many volunteer hours that were put into this project. Elise Rodd-Nielsen did a wonderful job of combining web-based technology with tremendous leadership skills to lead this team through the twenty month development period. Additional thanks to Mary Hill (Past President) and Cathy Harley (Executive Director) for their vision and commitment to the advancement of research and evidenced-based practice.

The evidence as presented in this document supports the use of conservative sharp wound debridement when presented with specific clinical criteria. These criteria are intended to guide the Registered Nurse in making the best appropriate clinical decisions when performing this skilled intervention. In addition, it is important to note that the scope of practice pertaining to conservative sharp wound debridement varies from one province/territory to another. It is the intention of the CAET that these recommendations will support a better understanding of conservative sharp wound debridement and promote further research and policy development in this area.

The CAET believes that the dissemination of these recommendations will enhance professional practice and provide positive outcomes for client care. We encourage you to share this document with colleagues and interdisciplinary health care professionals. We invite you to send us your opinions and comments on these recommendations for CSWD to: office@caet.ca.

A handwritten signature in black ink, appearing to read 'K Bruton'.

Karen Bruton RN, CETN(C)

This document was reviewed and approved by the CAET board of directors on May 12, 2011.

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Background

1. Scope and Purpose

The Canadian Association for Enterostomal Therapy (CAET) Conservative Sharp Wound Debridement (CSWD) Evidence-Based Recommendations are a result of the decision and commitment to advance clinical nursing practice to improve the provision of care to clients through the development of an open source guide. The recommendations were developed by a volunteer group of Enterostomal Therapy Nurses who work in clinical practice, policy development, consultation, and education in wound care. The document was developed over the course of 2 years spanning 2009-2011 and is a distillation of existing literature, guidelines, and opinions. The development and dissemination of the recommendations was sponsored by the CAET.

The recommendations have been written by and for Enterostomal Therapy Nurses/JWOCN/Registered Nurses and allied health professionals who practice CSWD. The recommendations encompass the provision of CSWD to the adult population primarily with chronic wounds in acute care, clinic, and community/home care settings and apply to clinical practice, education, and policy development. All recommendations are derived from research published between 1991 and 2010, case studies, and expert opinions. The CAET proposes that a team of Enterostomal Therapy Nurses with subject matter expertise review and update these recommendations every four years.

These recommendations should be considered in the context of the organization or care setting as well as available resources and supports. Resources and supports take the form of access to emergency care, physicians and allied health professionals, education, administrative support, funding, supplies, equipment, and policy. These recommendations should also be used with consideration of the evolving evidence that will further define practices in CSWD.

For the purpose of this document, the term *client* refers to individuals, residents, family members, etc and the term *patient* refers to those clients being cared for in institutions.

Please refer to the appendices for the databases and terms used in the literature search and a glossary of terms.

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The entire development panel declares no conflict of interest in the production of this document.

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6. Background Context

In this document the definition of Conservative Sharp Wound Debridement (CSWD) is the removal of loose, devascularized tissue, callous or hyperkeratotic tissue with the aid of a scalpel, scissors, or curette above the level of viable tissue. The removal of hyperkeratotic tissue surrounding lower extremity wounds (“picking” of scales, as in venous hypertension), and peri-wound callous “paring” associated with diabetic ulcers is often perceived by practitioners as having a lower level of risk. However, removing this type of devitalized tissue requires the use of sharp instruments¹ and is associated with the same risks of tissue damage, increased pain, further tissue trauma, and infection.²

A difficulty encountered by the development panel was the lack of clear explanations or standardized definitions of debridement using sharp instruments in the research literature. Often the term 'sharp debridement' was used but it was unclear whether this was in fact *conservative* sharp or *surgical* sharp debridement. Surgical sharp debridement and CSWD are not synonymous terms. Contrary to CSWD, surgical debridement involves extensive and aggressive removal of tissue, often removing viable as well as non-viable tissue.^{1,3} It serves to convert a wound from a chronic to an acute physiological state, and is believed to stimulate a host response to prevent infection.⁴ It is best performed under sterile conditions by a physician, podiatrist, or surgeon supported by anesthesia in an operating room setting and results in perpendicular, rather than beveled wound edges.^{5,6} Surgical debridement is contraindicated on non-healable wounds.⁷ Surgical debridement and CSWD form part of a continuum of care resulting in a wound bed prepared for tissue re-growth when the wound is assessed as 'healable'.

Many debridement options exist to optimize the wound bed in preparation for healing, from the slower and conservative method of autolytic debridement to the more rapid surgical debridement. CSWD is a rapid and cost effective means of achieving a clean wound bed and is a preferred method when selection criteria are met. Although high level evidence is lacking, some positive outcomes with the use of sharp wound debridement have been demonstrated, particularly in diabetic foot ulcers^{8,9} and venous leg ulcers.¹⁰ As there is sufficient published research to support CSWD in these particular wound types, they merit separate recommendations, but this in no way excludes the use of CSWD in other wound etiologies.

While wound debridement is identified within the scope of nursing practice in Canada, experts agree that CSWD is a level of specialized wound management requiring specific knowledge and educational preparation (i.e. advanced preparation beyond the basic entry to nursing practice), and a supervised regulatory process for assessing the skills of the clinician.^{11,12} CSWD is best optimized by an interdisciplinary approach to wound management and this approach is critical in the care of high acuity wounds such as diabetic foot ulcers. The safe practice of CSWD must be ensured regardless of the client care setting: acute/primary care, clinic, community/home care, or long term care.

The nursing practice of CSWD is not well documented in Canada. Many provincial nursing licensing bodies do not specifically address this clinical practice in guidelines, policy, or position statements. The individual nurse and/or institution/organization are therefore left to interpret and apply the dictates of general scope of practice to the specific practice of CSWD. One implication of this dearth of specific directives from a regulatory body is likely that CSWD is practiced on clients by nurses with varying

levels of license, knowledge, judgment and skill. In the United Kingdom in 2002, Fairbairn and Colleagues highlighted the results of an informal survey of 199 community nurses practicing sharp wound debridement which revealed that although most practiced CSWD, 17% of that group had not received any training.¹³ A second survey referenced in the article was conducted at a Wound Bed Symposium which revealed that 22% of delegates who practiced CSWD were self-taught.¹³ These alarming figures served to drive educational and policy reforms in the U.K.

CAET supports best practice in CSWD by:

- Providing a competency based educational program that includes theory in wound bed preparation, debridement, and a mandatory clinical preceptorship (Enterostomal Therapy Nurse Education Program [ETNEP]);
- Providing continuing skills development workshops on CSWD at CAET annual conferences;
- Promoting that individual nurses ensure their clinical practice is consistent with the scope of practice set within their regulatory body and employment organization;
- Encouraging Enterostomal Therapy Nurses to be informed and current in clinical practice and specific skill sets such as CSWD; and
- Promoting the recommendations within this document to advance safe clinical practice, research, and policy development related to CSWD.

7. Interpretation of Evidence

The Levels of Evidence used by the Registered Nurses Association of Ontario (RNAO) as adapted from SIGN 50: A Guideline Developer's Handbook (2008) were employed in the review of the literature and the determination of level of evidence for the CSWD evidenced-based recommendations.

Table 1 RNAO overview of levels of evidence:

Interpretation of Evidence: RNAO Levels of Evidence	
Ia	Evidence obtained from meta-analysis or systematic review of randomized controlled trials
Ib	Evidence obtained from at least one randomized controlled trial
IIa	Evidence obtained from at least one well designed controlled study without randomization
IIb	Evidence obtained from at least one 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 reports of expert committees or opinions and / or clinical experience of respected authorities

Abbreviation: RNAO, Registered Nurses Association of Ontario.

The table outlines the levels of evidence that were used for the analysis of the literature reviewed. The levels of evidence used by the RNAO were adapted by Sign 50: A Guideline Developer's Handbook (2008).

Organizational and Policy Recommendation

Recommendation 1

Institutional policies must be in place to enable qualified nurses to perform CSWD.

Level of Evidence IV

Discussion:

In concurrence with many authors, it is the opinion of the development panel that prior to engaging in the practice of CSWD, the registered nurse should ensure that there is explicit employer approval for the practice of CSWD.^{3, 7, 12, 43, 69, 70, 72} Although nursing is a self regulated profession in Canada, institutional policies may act to restrict or enable a nurse to work to his/her full scope of practice. It is in the best interests of the employer to provide clear policies on CSWD in order to ensure that clients have safe access to this treatment shown by research to improve healing rates and quality of life.

The Canadian Nurses Association (CNA) recognizes that the overall scope of practice of registered nurses encompasses the activities that nurses are authorized and educated to perform.¹⁸ It also recognizes that the actual scope of practice of a nurse is influenced by the requirements of the employer to meet the needs of the client. Registered nurses adhere to professional standards which describe in broad terms the professional expectations for nurses.¹⁹ They apply to all nurses in every practice setting. According to professional standards, the nurse must judge him/herself as having the appropriate knowledge, skill, judgment, and attitude to perform a role or task. A guiding principle is that nurses are responsible for their own decisions, their own actions and for maintaining competence throughout their careers.¹⁹ However, the nurse should be cognizant of the fact that in the case of untoward incident, the nurse's competence will be compared with that of someone who frequently practices sharp debridement.^{16, 20}

Provincially legislated definitions of nursing practice are normally supported and complemented by standards, guidelines, and policy positions issued by professional nursing bodies¹⁸ and informed by such documents as Provincial Hospital/LTC acts. The ability to practice CSWD can vary between care settings depending on Provincial legislations. For example, in some acute care settings, CSWD may require a medical delegation or transfer of function in accordance with Provincial hospital legislation.

More than half of the Canadian provincial registered nursing colleges do not have a specific policy or position statement with regards to CSWD.¹⁵ The potential risk associated with this element of wound management and the absence of directives from a professional regulatory body make it mandatory that local role specifications and authority for practice become the responsibility of the employer or agency.^{15, 21-23} In some Canadian provinces, it is an expectation of the Provincial Nursing College that the nursing practice of CSWD is specifically addressed and/or sanctioned through employer policy and procedure.¹⁵

The practice of CSWD is of interest to employers because it can result in a rapid preparation of the wound bed for healing, and may have a positive economic impact on care.¹⁵ It is important to support

this with an institutional framework for safe practice.²⁴ Nurse clinicians must have this framework in place by their employers, as well as the specialized knowledge and mentored practice before undertaking CSWD with qualified clients. Potential inequalities between patient care populations are generated when patients are denied access to CSWD.²⁵

The onus is on the employer to provide a comprehensive policy and procedure for CSWD in order to promote accountability, client safety, and the reduction of avoidable error.^{13, 14, 16, 22, 23, 26, 27} In some countries, organizational accreditation requires a written procedure before CSWD can be practiced.¹³ The assessment of clinician competency is critical in order to safeguard patients from risk and to protect the nurses and employers from liability.¹³ The employer remains vicariously responsible for the nurses practice;²⁸ therefore, a record of the educational qualifications and quality assurance checks of the nurse performing CSWD should be included in the employee's file.

Comprehensive organizational nursing policy and procedures should be written in consultation with a certified wound specialist nurse, such as an Enterostomal Therapy Nurse. The proposed policies should be submitted to an interdisciplinary committee that oversees interdisciplinary practice issues.²³ Policies should address the following points:

Related to Nurse training, supervision, and competency assurance:

- Specify the type/method of CSWD that the nurse may perform, and under what circumstances¹⁴
- Specify the experience, training, and/or education requirements for CSWD^{3, 14, 22, 23, 26}
- Establish a method for initial and continuing evaluation of the competence (validation) of the RN performing CSWD^{3, 14, 22, 23}
- Establish a method to evaluate the nurse's ability to fully assess the client and their situation, make a differential diagnosis for the development of a plan of care, evaluation of the plan of care, and reassessment around the procedure of CSWD^{15, 29, 30}
- Provide a method for maintaining a written record of those persons authorized to perform CSWD¹⁴

Related to an interdisciplinary approach:

- Specify the circumstances in which the RN is to immediately communicate with a client's physician concerning the client's condition^{14, 21, 23}
- Include CSWD as part of an interdisciplinary team approach to wound management^{17, 26}

Related to documentation:

- Specify client record keeping requirements^{14, 23, 26}
- Specify the type of consent required^{20, 24, 31, 32}
- Provide a method for the periodic review of the policy and procedures¹⁴
- Specify documentation, reporting, and investigation procedures for adverse events²⁶

Related to the performance of the procedure:

- Describe the procurement of appropriate equipment²⁶
- Consult the end-user for procurement decisions³³
- State the limitations on settings in which CSWD may be performed^{14, 23}
- State the anatomical locations or wound etiology types that may be debrided¹³
- Describe infection control measures^{24, 34}
- Describe absolute and relative contraindications to the procedure^{24, 32, 35}
- Describe safety measures to be taken when performing CSWD^{1, 13, 24, 26, 36}
- Describe occupational health and safety/ergonomic measures to be taken^{1, 24, 26, 36}
- Describe the cleaning and re-processing of the equipment (classified as critical equipment)³⁷

Clinical Recommendations

Recommendation 2

Complete a comprehensive wound assessment prior to initiating CSWD

Level of Evidence IV

Discussion:

The literature reviewed by the development panel emphasizes the requirement for a comprehensive wound assessment prior to making the decision to initiate CSWD. A comprehensive wound assessment is defined here as encompassing three elements: (1) a holistic client assessment, (2) a determination of the etiology of the wound/reasons for chronicity, and (3) a focused wound assessment using a validated tool such as the Bates-Jensen Wound Assessment Tool (BWAT) or the Pressure Ulcer Assessment tool. This section will discuss the elements of a comprehensive wound assessment that are of particular concern in the decision to initiate CSWD. We invite the reader to review other literature sources for extensive discussions of other elements of a comprehensive wound assessment.

A holistic client assessment focuses on the experiences of the client. These experiences include the client perceptions of wound pain, quality of life factors, adherence to treatment, and emotional support systems.⁷ The client's own goals are important to determine and document. All of these client factors may impact the client's ability to participate in CSWD and as such, require assessment and documentation in the determination of suitability for CSWD.

Following this, a thorough client history designed to elucidate the possible cause and co-morbidities associated with the wound³⁸ is recommended. Of particular importance in the decision to perform CSWD is the absence/presence of malignancies, diabetes, and vascular-compromising diseases. Critical to decision making for CSWD is the assessment of the presence/absence of clotting disorders and the use of anticoagulant therapy. Immune-altering health disorders also impact the choice of debridement method for the practitioner. The clinical assessment should record physical findings and test results (e.g. ankle-brachial pressure index Ankle Brachial Pressure Index (ABPI) that indicates adequate peripheral circulation. Conservative sharp wound debridement can only be used safely when there is adequate circulation.^{6, 7, 39} The local wound should be examined for suitability of CSWD using a validated wound assessment tool. For decisions to use CSWD it is important to pay particular attention to the ability to visualize the wound, for uncontrolled edema and signs and symptoms of infection. It is also necessary prior to initiating CSWD that any anatomical structures be noted, as well as internal sutures, non-soluble mesh, and grafts/ prostheses. Acute wounds are examined for debris, as it can serve as both a nidus of infection and toxic contaminants.^{5, 40} This type of thorough client wound assessment leads to a valid determination of goals or alternate end-points such as odour or exudate control, and has to be completed prior to employing CSWD.⁴¹

Consistent intervals between focused wound assessments aid in determining if a wound is progressing towards the goal of care and whether repeated debridement is required. The consistent use of the same wound assessment tool provides the best measurement of wound status. Weekly assessments with measurements of wound length, width, and depth allow wound volume to be

calculated, and are initiated with the first wound assessment prior to starting treatment. Wound measurements that consist solely of a determination and calculation of length multiplied by width result in a wound surface area measurement. A 20-40% reduction in wound surface area over a period of two-four weeks is felt to be a predictor of wound healing for wounds of venous and pressure-related etiologies.⁷ Wounds need to be measured before and after CSWD as this intervention will often result in an enlargement of the wound size as devitalized tissue is rapidly removed. This treatment-related enlargement in wound size needs to be documented and taken into consideration when decisions are made about on-going treatments. Photo documentation can be of great assistance in providing a visual record of wound status both before and after wound debridement sessions.

For assessments related directly to debridement session outcomes, Saap and Falanga (2002) developed a scoring system to evaluate whether the debridement technique was adequate, and whether enough devitalized tissue was removed. The Debridement Performance Index tool was trialed for validation and prediction on 143 patients who had participated in a clinical trial comparing 'standard therapy' to a bioengineered skin construct. The scoring index also determined whether or not an ulcer required debridement at initial assessment. Generalized implementation of this tool could increase the use of CSWD in the wound bed preparation of chronic wounds by determining the need for debridement from the initial point of assessment. The Debridement Performance Index tool could also be used to advance research related to CSWD.⁴²

Recommendation 3

Select CSWD for wound bed preparation, when appropriate

Level of Evidence: III

Discussion:

There is emerging evidence that CSWD can result in cost savings by hastening the preparation of a clean wound bed ready for healing. In a retrospective study done in Ontario, Canada, there were clear cost savings when CSWD was used by Enterostomal Therapy Nurses (ETNs) as part of a best-practice scenario to obtain a clean wound bed on foot ulcers.⁴³ This study elucidated a savings of approximately \$1,516 Canadian per case when sharp debridement was employed, as compared with forced irrigation. Other than this clinical benefits and cost savings analysis, there is a general lack of clinical research trials that compare one method of debridement over another.³⁹ Conservative sharp wound debridement may result in time and cost savings in preparing a clean wound bed and should be given preference over other methods available to nurses when CSWD has been determined to be a clinically appropriate procedure. There is emerging evidence that supports the use of surgical debridement techniques in stalled, chronic wounds without necrotic tissue. Although outside the scope of nursing practice, these will be discussed in light of the nurse's role as client advocate in these situations.

The suitability of the wound and client for selected methods of debridement will depend upon the results of a comprehensive wound assessment. A summary of the factors impacting the decision to employ CSWD is found in Table 3. Nurses need to consider the indications and contraindications for each of the debridement options, as well as, considerations such as environment, resources, skill level of the nurse, client consent/preference, and the availability of institutional policy.^{7,24} Some authors also posit that the debridement method selected should be based on the speed of removing

non viable tissue, tissue selectivity, presence of wound pain, exudate, infection, anatomical position of wound, and cost.^{39, 44, 45}

Wound Etiology and Co-Morbidity/Co-factors:

Non-healable wounds are defined as having inadequate circulation, an untreatable cause, or co-existing medical conditions or medications that prohibit the healing process.^{1, 46, 47} It is essential to preclude inadequate circulation as in the case of arterial disease.^{1, 39} CSWD performed by nurses is contraindicated when severe arterial compromise is present.^{1, 35, 35, 47} Malignant cutaneous wounds are another example of a non-healable wound for which CSWD is rarely an option for nurses^{1, 48, 49} due to the wounds' propensity for profuse bleeding.⁴⁸

Clients with impaired clotting mechanisms should not be treated with CSWD⁵⁰, whereas clients undergoing anticoagulation therapy should be carefully considered, monitored, and treated by a interdisciplinary team in a safe care environment. Conservative sharp wound debridement is implemented with extreme caution or not at all in such conditions as pyoderma gangrenosum due to a process called pathergy.³⁴ Pathergy is inflammation and ulceration occurring as a result of minor trauma. Sharp wound debridement can result in a dramatic enlargement and worsening of a pyoderma gangrenosum ulcer, due to this process, in approximately 14-40% of patients.^{39, 51} Conversely, Kelly (2001) purports that when the condition has been correctly diagnosed and proper care is taken, debridement may play a part in the treatment of these painful and often large ulcers.⁵¹ It is the opinion of the development panel that nurses undertaking CSWD of wounds with an etiology of pyoderma gangrenosum and other complex wound types (vasculitic wounds) should only do so in the context of an interdisciplinary team and in a setting where the client can be closely monitored.

According to literature, acute wounds are more numerous than chronic wounds.⁵² The same principles for preparing the wound bed through the removal of non-viable tissue apply to these types of wounds. In 2008,⁵² published guidelines that address healing impediments in acute wounds. The removal of necrotic tissue and excess bacterial load through debridement (with a preference for sharp surgical debridement), was recommended.

After careful consideration of 50 years of often conflicting empirical evidence on the subject of burn blisters, Flanagan (2001) concludes that it is advisable to leave burn blisters intact, rather than debride or de-roof them. This allows for the gradual re-absorption of burn fluid while maximizing healing, decreasing bacterial colonization, and increasing client comfort.⁵³

Wound location:

A consensus of practitioners feel that wounds located on the heel and covered with a dry stable eschar should not be considered for debridement of any type.⁵⁴ However, in a healable wound, as the eschar lifts away from the underlying intact skin, it is the experience of the development panel that it is often necessary to 'trim' the lifting edges using a sharp blade or scissors to prevent the possible trauma of the edges being caught on clothing and pulled away. If the black eschar develops edema, erythema, fluctuance, or drainage, then the eschar should be debrided.⁵⁴ In some anatomical locations, underlying structures are very close to the skin surface such as on the face, hands, and feet. Specialist advice is recommended before undertaking CSWD in these anatomical areas.³ Sharp debridement of wounds proximal to a prosthesis or device such as an arterio-venous dialysis shunt should not be undertaken by a nurse¹ due to the risk of severe damage/disruption.

Other selection criteria:

In considering debridement choices, selective debridement methods are generally preferred because they remove only necrotic tissue; non-selective methods do not differentiate between non-viable and viable tissue. When viable tissue is inadvertently removed, bleeding and infection are associated risks. Conservative sharp wound debridement is both selective and shown to be more rapid than other methods in obtaining a clean wound bed.⁴³ When the wound shows signs of advancing cellulitis or sepsis, rapid debridement is imperative and should be carried out by an experienced practitioner⁵⁴ and in a interdisciplinary care environment where the client is monitored continually. In this type of situation, surgical debridement is preferred.³⁹ Considerations for choosing CSWD are summarized in appendix F.

Additionally, the selection of the most appropriate method of debridement must take into account the client's individual preferences and concerns, as well as the nurse's expertise. Client concerns include pain potential, allergies, medications, personal preferences, and individual perception of the condition.⁴⁷ Since the quality of life for individuals with a wound is paramount, the nurse and client must build a mutually acceptable treatment plan to ensure maximum adherence and best outcome.⁷ Nurse concerns include the nurse's skill level and confidence, time, cost, available resources including the environment in which the procedure is to be done, and the potential for bleeding or infection.^{35, 44} These clinician-related topics are addressed more thoroughly in the recommendations that address education and institutional policy.

Debridement Methods:

The methods potentially available and within the scope of nursing practice include CSWD, autolytic, and mechanical debridement (includes forced irrigation and pulsatile lavage). Additionally, nurses in collaboration with a interdisciplinary team, may advocate for surgical debridement, hydrosurgical debridement, and/or request to employ enzymatic and biological debridement methods (prescription required in Canada). Table 3 presents an overview of debridement methods. Sometimes, two or more types of debridement are selected to be used concurrently. Bentley (2005) recommends that sharp wound debridement be completed with serial sessions. In between each session of CSWD, another form of debridement such as autolytic debridement can be used.³¹ This topic is addressed in a separate recommendation.

Benefits of advocating for surgical debridement:

Histological findings indicate that debridement of chronic wounds should extend beyond wound margins and below a wound base that may appear as granulation tissue. Such a procedure is obviously beyond the definition of CSWD but does emphasize the need for a interdisciplinary approach to complex chronic wounds and specifically, diabetic foot ulcers. Recent literature suggests that debridement should be considered as part of the treatment plan even when infection and necrosis are not evident. This is based on histological findings that senescent cells at the wound edge, metalloproteases in the wound bed, and biofilms covering the wound will delay or prevent wound healing, and are part of the histological definition of a chronic wound.⁵⁵ A histological analysis of tissue removed during surgical debridement procedures differentiates between physiologically impaired cells, and those that can help a wound heal. It is suggested that surgeons operating on chronic wounds should go beyond the visual 'normal' to examine the pathology of the wound and

remove all refractory cells in the wound margins as well as the wound bed.⁵⁶ More research is required to define what these margins should be.

If repeat wound assessments indicate that a wound is not healing at a satisfactory rate, the presence of biofilm may be suspected.⁵ Laboratory studies have indicated that biofilms will act on a chronic wound surface as a barrier to healing. A biofilm can be defined as "bacteria encountered in nature and medical disease are commonly located on a (wound) surface, but function together in multi-species communities held together by an extracellular slime, known as extracellular polymeric substances (EPS)".⁵⁷ Biofilms are a wound management challenge for the following reasons:

- they are resistant to antibiotics
- they are highly resistant to biocides (hydrogen peroxide, acids)
- they invade the host immune system (white blood cells, antibodies, complement)
- They are poorly penetrated by many antibiotics used.

When suspected to be present, the physical removal and suppression of biofilm reformation is a necessary part of the wound bed management.⁵⁸ Falanga V. (2008) states that the removal of biofilms as well as necrotic tissue may promote healing in wounds recalcitrant to healing. Others suggest that the debridement of biofilm not only removes bacteria but also exposes host defences that are more intact and better suited to combat bacteria.⁵⁷ Expert clinicians and laboratory studies have demonstrated that the removal of biofilm through debridement is the most effective modality to achieve tissue regeneration, or wound healing.⁵⁷⁻⁵⁹ In a majority of cases, there is no loose, devitalized, or necrotic tissue associated with biofilms; therefore, the removal of this film is outside the definition of CSWD. However, in an interdisciplinary team, the nurse has a role of liaison and advocacy towards the client and can play a part in care decisions for stalled wounds.

It is recognized by the development panel that more research is required to compare the different methods of debridement in relation to various wound presentations and other factors related to wound healing. The panel supports the careful selection of debridement method based on the elements addressed in this section and the choice of CSWD when appropriate. If the practitioner is not qualified to undertake CSWD for a client or if there are indications for surgical debridement, then the nurse should refer the client to a qualified professional who can provide the service.

Table 2: Impact of Assessment Findings on Decision to employ CSWD

Assessment	Determines	Specialist Consultation Required
Wound etiology ^{1, 1, 29, 31, 39, 41, 44, 60}	<ul style="list-style-type: none"> ✓ Suitability for CSWD ✓ Healability ✓ Goal of care ✓ Concurrent treatment measures ✓ debridement method ✓ Setting for CSWD ✓ Involvement of interdisciplinary team 	<p>Malignancies</p> <p>Pyoderma Gangrenosum</p> <p>Vasculitis</p>
Co-morbidities/factors ^{1, 26, 26, 48, 61}	<ul style="list-style-type: none"> ✓ Suitability for CSWD ✓ Goal of care ✓ Debridement method ✓ Client teaching ✓ Practice Precautions ✓ Clinical setting ✓ Involvement of interdisciplinary team (medical specialists, etc) ✓ Concurrent treatment measures 	<p>Clotting disorder</p> <p>Anticoagulants</p> <p>Metastases</p>
<ul style="list-style-type: none"> ➤ Cancer ➤ Medications ➤ Diabetes ➤ Autoimmune diseases ➤ Cardiac/Respiratory diseases ➤ Renal dialysis ➤ Immune status 	<ul style="list-style-type: none"> ✓ Suitability for CSWD ✓ goal of care ✓ optimal pain management ✓ client teaching ✓ client adherence ✓ Involvement of interdisciplinary team (vascular specialists) 	<p>Dry gangrene</p> <p>Vascular compromise</p> <p>Malignancies</p>
Healability ^{1, 6, 7, 16, 26, 29, 31, 35, 38, 39, 41, 41, 47, 60-62}	<ul style="list-style-type: none"> ✓ Determine reason for pain ✓ Assess carefully for increasing bioburden ✓ Negotiate length of procedure 	<p>Uncontrolled pain with CSWD</p> <p>Inability to maintain position/moving</p>
Pain ^{1, 7, 29, 47, 60, 61}	<ul style="list-style-type: none"> ➤ Neuropathic ➤ Procedural ➤ Incidental 	

Infection^{1, 6, 7, 35, 38, 41, 82, 83}

- ✓ goal of care during procedure
- ✓ client suitability of CSWD
- ✓ optimal pain management Inability to tolerate procedure
- ✓ client teaching
- ✓ client adherence
- ✓ involvement of interdisciplinary team (pain management specialists)
- ✓ Determine level of tissue invasion Dry gangrene
- ✓ Suitability for CSWD
- ✓ goal of care
- ✓ optimal pain management
- ✓ client teaching
- ✓ client adherence
- ✓ Involvement of interdisciplinary team (Infectious disease specialists, etc)

Anatomical Location of Wound^{1, 13, 16, 26, 35, 38, 39, 60, 61}

- ✓ Suitability for CSWD Proximity to arteries, grafts, prosthesis, tendons (Achilles), dialysis fistula
- ✓ goal of care
- ✓ optimal pain management
- ✓ client teaching
- ✓ client adherence
- ✓ Involvement of interdisciplinary team (OT/PT, etc) Located on hands, face
- Practitioner unable to fully visualize wound
- Client unable to maintain position for procedure

Table 3: Advantages/disadvantages of debridement types and methods

	Speed	Tissue selectivity	Patient Pain
Surgical/Sharp <ul style="list-style-type: none"> ➤ Scalpel ➤ Curette ➤ Hydrosurgery 	*****	***	*****
Autolytic <ul style="list-style-type: none"> ➤ Occlusive dressings 	*	**	*
Biologic <ul style="list-style-type: none"> ➤ Larval therapy 	***	***	***
Enzymatic <ul style="list-style-type: none"> ➤ Collagenase ➤ Papain 	***	****	**
Mechanical <ul style="list-style-type: none"> ➤ Forced irrigation ➤ Wet-to-dry ➤ Pulsed lavage ➤ Hydrotherapy 	***	*	****
Key ***** = Greatest Effect * = Least Effect			

Adapted from: Falanga et al.³⁹ & Sibbald et al.⁴⁴

Recommendation 4

Appropriate pain control methods should be used when performing CSWD

Level of Evidence Ia

Discussion:

Evidence exists to support the use of the topical analgesic EMLA® (Eutectic Mixture of Local Anaesthetics) for wound pain associated with dressing changes or debridement in lower leg wounds.⁶³ Pain is a symptom associated with real or potential damage resulting from the inflammatory reaction of the tissues.⁶³ It is recognized that devitalized tissue has no living nerve endings and its excision should not engender pain. However, the act of pulling or stretching these tissues when securing them for removal can cause pain from innervated, viable tissues beneath the slough/eschar and the surrounding wound. Many clients do not experience pain with debridement, particularly those who suffer from neuropathy. Pain management is a client centred concern, and assessing, addressing, and managing pain should be an integral part of the treatment plan as a primary care objective,⁶⁴ in particular when performing CSWD. Adequate pain management may include pre-intervention analgesia as well as the use of a topical anaesthetic which can decrease the incidence of procedural pain experienced by some clients.

In a review of clinical trials, EMLA® (Eutectic Mixture of Local Anaesthetics) was the only topical anaesthetic for which clinical evidence existed to support its efficacy in the treatment of procedural pain associated with sharp debridement of leg ulcers.⁶⁵ Vanscheidt (2001) found four double-blind placebo-controlled EMLA® studies and one open randomized trial. Included in this review was Lok's et al. (1999) study which used CSWD,⁶⁶ but all the other trials discussed surgical sharp wound debridement. In the Lok et al. (1999) double blind, placebo controlled study, it was found that there was a significant drop in the number of required debridement sessions if clients received an application of EMLA® following established application procedures (see Appendix F) prior to the treatment of venous leg ulcers. The debridement means employed was defined as mechanical, but involved the use of a sharp instrument to remove areas of necroses above the level of viable tissue. In other sources of parallel literature on surgical debridement, Evans and Gray looked at a meta-analysis conducted by the Cochrane Wounds Group of the Cochrane Database (2003) which found six trials that met their inclusion criteria, comparing EMLA® cream to a placebo group where no anaesthesia was used in the treatment of lower leg ulcers. The data supported the use of an analgesic cream (EMLA® 5%) to reduce the intensity of pain associated with CSWD. The concomitant use of a systemic analgesic was also recommended.⁶³

Other topical pain management strategies such as gel-based opioids and lidocaine preparations have not undergone study to the same degree as the EMLA® treatment.⁶³ More research is required to support the use of alternative topical pain control measures and the use of accepted pain management techniques in all types of chronic wounds.

The use of a validated tool to assess pain is essential in the standardization of treatment in chronic wounds.⁶⁴ It is strongly recommended that patients/clients be assessed for pain before, during, and after a treatment such as CSWD. Factors which influence a client's pain experience are related to the

type of pain (nociceptive, neuropathic, or mixed), the anatomical location of pain and its source (procedural, critical colonization, infection, arterial insufficiency, contractures, peripheral neuropathy, etc). Factors such as cognitive difficulties, psychosocial problems, and nutritional deficits can also influence the intensity of the pain.⁶⁴

Non-pharmaceutical measures to control pain should also be employed by the nurse. Setting time limits for the CSWD sessions allows the removal of non-viable tissue in the shortest possible time, thus promoting comfort and quality of life for the client.⁶⁷ Time limits and the extent of debridement should be negotiated with the client prior to initiating each debridement session.²⁴ In order to limit client and nurse fatigue, each session of serial or maintenance debridement should be optimally set at 15-30 minutes. Shorter debridement sessions are supported by authors who suggest that not all of the devitalized tissue be removed in a single procedure.^{38, 68}

Recommendation 5

Specific safety measures and equipment are required to perform CSWD.

Level of Evidence IV

Discussion:

Safely performing a high risk procedure such as CSWD necessitates that the procedure take place in a controlled and appropriate environment.^{26, 35} There are risks of inadvertent injury to both the nurse and client when safeguards are not ensured. Experts in the literature feel that CSWD can safely be done in the home or a clinic setting as well as the hospital.¹³ The development panel members concur with the consensus in the literature that indicates CSWD can be safely performed when certain safety measures are in place. These safety measures are as follows:

- the client should be positioned comfortably from both the client's and the nurse's perspective^{13, 24, 36}
- the procedure is performed on a stable work surface e.g. podiatry couch²⁶
- the lighting is adequate to visualize the wound^{1, 24, 26}
- the environment is clean^{1, 24}
- the nurse has the competence to deal with complications as they arise³⁸
- the nurse has the ability to enlist assistance as required^{1, 3, 35}
- the nurse has good knowledge of the anatomy for the region in which the wound is located as there are clear areas of risk when arteries, veins, and nerves are near the surface³⁵
- the nurse has adequate knowledge of infection control^{37, 69}
- there is additional personnel available to handle potential complications³

The knowledge of one's professional limits is critical to ensuring client safety. The procedure should be stopped if the nurse is unsure of the anatomy of the wound and surrounding area, or a structure cannot be identified. The debridement session should also be terminated when bleeding is excessive, or the source of bleeding is unclear.⁶⁰

As O'Brien (2003) and Kirshen and colleagues (2006) point out, the presence of non-viable matter in a wound can mask the wound bed so a full assessment of deeper tissues and structures is often not possible. Any signs of infection may therefore be hidden. Exposure of the wound bed by CSWD aids visualization and can help to reduce or prevent infection. Conservative sharp wound debridement, when properly performed in the right environment, can remove the bacteria-laden slough and necrotic tissue. However, if a wound is showing clinical or systemic signs of infection, the risk of spreading infection and the possible requirement of antibiotics should be considered.³⁵ Timmons (2003) warns that there is a risk of a transient bacteremic effect which may introduce sepsis into the bloodstream.²⁹

Poston (1996) observed that nurses appear reluctant to open or use packs of instruments. However, it is cheaper and more efficient to open a minor operation, suture, or an intravenous cut down pack than to open several individual packs which may contain inferior instruments (e.g. disposable forceps,³). Razor & Martin (1991) suggest the following instruments: gloves, Adson forceps with teeth, no.3 scalpel handle with no. 10 and 15 blades, 2 mosquito clamps, silver nitrate sticks, absorbable gelatin film (surgical or an absorbable fibrinogen-based dressing), gauze sponges, curved iris scissors, normal saline solution, sterile towels.²³ Others suggest that a calcium alginate dressing

should be on hand for the control of inadvertent minor bleeding. All equipment, including gloves, instruments, solutions, and dressing supplies used during and after CSWD should be sterile.⁷⁰

Instruments used in the performance of CSWD are categorized as critical medical equipment as they present a high risk of infection if the equipment is contaminated with any micro-organisms, including bacterial spores.³⁷ Re-processing of these instruments should include cleaning to remove any visible matter, followed by a minimum of high level disinfection, with sterilization preferred.³⁷ It is the opinion of the development panel that disposable instruments should be used in the home care setting when there is an absence of available sterilization methods. In the home, clinic, or bedside setting, sterile instruments are recommended for CSWD, but the care environment is maintained as 'semi-sterile or clean'.^{37, 69}

Stronger evidence is required to support the benefits of appropriate equipment. However, the panel supports the principle that the use of appropriate equipment improves comfort, safety, and effectiveness of CSWD.

Recommendation 6

Appropriate procedures must be used when performing CSWD.

Level of Evidence III-IV

Discussion:

a) Serial debridement:

Level of evidence III

Serial sharp debridement of necrotic tissue is described as the removal of non-viable tissue in thin layers during sequential sessions.^{13, 23, 68, 71} Sessions are usually repeated daily or at every clinical visit until the majority of necrotic tissue has been removed.²³ The examination of key studies related to sharp debridement suggests the benefits of using serial procedures.

In a retrospective review of two large clinical trials, Cardinal (2009) found that serial sharp debridement defined as the regular removal of "any necrotic, loose fibrin slough, or unhealthy tissue from the wound and wound margins" may induce more immediate wound healing week-to-week. It was also concluded that the "more is better" approach to sharp debridement may be correlated with improved wound healing rates and more frequent wound closure.⁸ In addition, the authors determined that frequent debridement of the wound aids in the management and prevention of wound infection through the removal of necrotic tissue and foreign debris. This finding is supported in an earlier study that noted an improved response rate of patients/clients observed to have had more frequent aggressive sharp wound debridement.⁶⁸ Equally promising is emerging data and expert opinion that suggests that the use of serial debridement to continually remove mature biofilm followed by specific wound management strategies can increase the susceptibility of biofilm communities to selected antibiotics.^{57, 59} Other authors state that regular debridement is deemed the cornerstone of care that offsets the effects of an incomplete inflammatory response associated with diabetic foot ulcers.⁷²

In chronic wounds, consecutive maintenance debridement sessions are frequently necessary.³⁹ It is important to note that the number of serial debridement sessions required may be reduced through the use of EMLA® cream at each session, a concept supported by Lok et al. (1999).⁶⁶ Use of EMLA® cream allows for a decrease in pain associated with CSWD allowing for an increase in the amount of necrotic tissue removed at each session, potentially reducing number of serial debridements required.

b) Maintenance and combination debridement: Level of Evidence IV

The pathology of chronic wounds allows necrotic tissue to accumulate; therefore, debridement of chronic wounds typically involves regular maintenance debridement rather than a single therapeutic intervention.⁷³ In maintenance debridement, necrotic tissue is removed as needed at each client visit in an effort to keep the wound in a state of “readiness to heal” and has been associated with improved healing rates.⁶⁸ According to Falanga et al. (2008) maintenance debridement is a proactive way to “jump- start” the wound and keep it in a healing mode, even when traditional debridement may not appear necessary because of a seemingly “healthy” wound bed.³⁹ Continued maintenance debridement is able to keep wound biofilm in a weakened and susceptible state, keeping the wound balance in favour of the host (healing) for approximately 43% of the days between visits.⁵⁸ Falanga et al. (2008) suggest that the effectiveness of maintenance debridement should be monitored regularly and adjusted as needed to ensure that the wound continues to progress toward healing. Scoring tools available to determine wound healing progress may also be beneficial in revealing the results of an effective maintenance debridement strategy. Such tools include the Debridement Performance Index and Wound Bed Score discussed by Falanga et al. (2008), and the BWAT addressed in recommendation two. Falanga et al. (2008) suggest that maintenance debridement should be continued as long as further increments in healing occur.

Combination debridement entails the use of complementary methods of debridement to prepare the wound for CSWD and continue the debridement process between CSWD sessions. Fairbairn et al. (2002)¹³ cite Edwards (2000)⁵⁰ and Vowden and Vowden (1999),³ suggest that complete debridement of the wound bed may involve a series of sessions of sharp debridement *in conjunction with* autolytic debridement. Enzymatic preparations can help free adherent necrotic tissue from a granulating wound bed prior to CSWD.³⁵ Surface eschar of a wound can be softened and prepared for CSWD by appropriate autolytic or enzymatic therapy.^{35, 65} This is often achieved by rehydration over 24-48 hours allowing the eschar to soften and lift at the edges. This allows the nurse to hold the necrotic tissue with a forcep and resect it using scalpel or scissors.⁶⁷ In some cases, hydrocolloids may be used between CSWD sessions to speed up the cleansing process;⁷⁴ however, caution should be used in the case of diabetic foot ulcers. By combining CSWD with other modalities such as autolysis, the process of debridement can be accelerated by removing remnants of debris not amenable to excision.⁷¹

Stronger evidence is required to support the benefits of maintenance and combination debridement. The panel supports the principle that maintenance and combination debridement optimizes the wound's ability to remain in a state of 'readiness to heal' by eliminating necrotic tissue.

Etiology-Specific Recommendations

Recommendation 7

Treat diabetic foot ulcers with CSWD as part of a multi-modal approach to optimal care.

Level of Evidence III

Discussion:

Research supports the use of CSWD as part of the overall treatment of diabetic foot ulcers. As well as one prospective study that investigated callus removal, there are retrospective reviews that analyzed how CSWD impacted healing rates, and one retrospective chart review that looked at the cost benefits when CSWD was performed by a wound care specialist.

Cardinal et al. (2009) conducted a retrospective review of wound outcomes on 310 diabetic foot ulcers followed over a twelve week period. This review was possible because Cardinal et al. were able to obtain wound assessments completed for a controlled, prospective, and randomized trial of topical wound care treatments. Wound assessments were structured and monitored as part of the randomized controlled study and provided a sound basis for retrospective analysis of the effect of sharp debridement on the rate of wound healing. The wounds included in the study underwent 'sharp debridement' at baseline, and subsequently as required in the follow-up visits. The definition of sharp debridement in this study was the removal of "any necrotic, loose fibrin slough, or unhealthy tissue from the wound and wound margins."⁸ The following conclusions were drawn from this study:

- more immediate wound healing occurred with devitalized/necrotic tissue removal (under appropriate circumstances)
- a positive correlation between frequency of debridement and improved wound healing outcomes was identified
- debridement was identified as aiding in the prevention of wound infection

A well designed study of 14 patients looked at digital callus formation in neuropathic and non-neuropathic feet. Slater et al. (2006) studied the pressure points of the lesser toes (digits 2-4) via a computerized pressure mat. Measurements were taken before and after treatment, and the treatment consisted of debridement to reduce callus as well as fitting for a custom molded digital silicone orthosis. It is postulated by the research authors that effective treatment of callus formation with appropriate off-loading will reduce the incidence of pedal ulceration in diabetic patients, thus reducing the risk of both infection and amputation. Either of the treatments taken singly resulted in an approximate 30% reduction in toe pressure. Combined debridement and orthosis provided a 54% reduction.⁷⁵

In a retrospective chart review of foot-ulcer treatment in the community, a cost benefit analysis was done of CSWD performed by a wound care specialist and compared to forced wound irrigation performed by a home care nurse. A nurse specialist doing CSWD to achieve a clean wound bed averaged two visits per ulcer; whereas, the home care nurse doing irrigation required an average of 29 visits per ulcer to achieve the same objective.⁴³ This difference offers a significant savings in nursing time. The study could not look at healing outcomes, but from a payer perspective with effective usage of nursing personnel, it illustrated that CSWD should be the method of choice in the

wound bed preparation of foot ulcers in the community. More study is required to assess the potential savings of CSWD in the acute care setting.

Cardinal's (2009) study was preceded by an earlier retrospective study by Steed et al.(1996), which showed similar findings. Like Cardinal, Steed used documentation from a randomized controlled study (118 patients with diabetic foot ulcers) that compared treatment outcomes between patients given human platelet derived growth factor and a placebo group to conduct a retrospective analysis correlating sessions of 'aggressive sharp debridement' with wound healing. The percentage of study participants in the placebo and treatment groups was similar, though frequency of debridement sessions differed between study centres. There was a lower rate of healing in those centres that performed debridement less frequently. The study participants underwent sharp wound debridement, defined as removal "of callus and necrotic tissue down to bleeding tissue",⁶⁸ so it can be inferred that frequency of CSWD sessions will have a positive correlation to wound healing. As was the case with Cardinal's research, Steed's retrospective analysis was centre-based, allowing for other practices aside from debridement to play a role in improved healing. More study is required to show a direct correlation between frequency of CSWD procedures and rate of wound healing.

It is the consensus of the development panel based on the findings in the current literature that treatment of diabetic foot ulcers must include effective management of blood glucose, diet, activity level, and client involvement with their own care, including healthy lifestyle choices. In order to prevent further wound injury, proper off-loading and infection control must also be part of the total treatment plan. More study is required to determine the relative importance of each factor with regard to wound healing outcomes and client satisfaction.

Recommendation 8

CSWD can form part of a multi-modal approach to care for chronic venous leg ulcers.

Level of Evidence: III

Discussion:

It is widely accepted that the healing of chronic wounds such as venous leg ulcers is complex and multifactorial, with many variables affecting the long term outcome of these wounds.^{7,8} Compression is the 'gold standard' of treatment for venous leg ulcers,⁷⁶ and the use of CSWD should be considered as part of a multi-modal approach to best practice treatment. There is evidence in the literature that supports the use of CSWD in this specific wound etiology. The cost to health care from this type of chronic wound is significant, and makes up 2% of the total of the national health care budgets for both the U.K. and France.⁷⁷ There is no accurate figure for the treatment cost for chronic venous leg ulcers (CVLUs) in Canada, but it can be presumed to be significant.

In a retrospective analysis of two trials, Cardinal et al. 2009 studied the correlation between wound healing outcomes and serial (or consecutive) debridement on CVLUs as well as diabetic foot ulcers (DFUs) (see Recommendation 6). The research studies analyzed were controlled, prospective, and randomized trials of topical wound treatments on CVLUs and DFUs that took place over a 12 week period. The results on CVLUs showed a significantly higher median wound surface area reduction following serial sharp debridement, defined in the study as the removal of 'necrotic or hyperkeratinized tissue'.⁸ These results suggest that frequent debridement of CVLUs may increase wound healing rates and rates of closure, although there was not enough evidence to support a significant effect or correlation between serial debridement to improve wound healing.

Williams et al. (2005) conducted a non randomized, prospective cohort study on the effects of sharp debridement using a curette on recalcitrant non-healing venous leg ulcers. The study group contained 28 CVLUs with slough, nonviable tissue, and no granulation in the wound beds. Excluded were any clients with complex co-morbidities which might impact the effect of debridement such as peripheral vascular disease, diabetes mellitus, etc. The control group had 27 CVLUs with minimal granulation tissue, and no slough or non viable tissue in the wound beds. A single episode of debridement was performed using a curette on all the clients in the study group except for one. The results showed that wounds in the study group averaged higher ulcer surface area reduction at weeks 4 and 20 than those wounds undergoing treatment with no debridement in the control group.¹⁰

In a retrospective community-based study done in Ontario, the charts of clients with lower leg ulcers and those with another wound etiology were reviewed to differentiate costs and healing rates between evidence-based practice care and standard care. Part of the 'best practice' approach was the removal of devitalized tissue by means of sharp debridement, and weekly visits by a wound care specialist. Those clients with ulcers in the 'best practice' cohort had 42% of ulcers healed in a 4 week period compared to 26% healed in the standard care group for the same time period. There was a savings of 66% with best practice as compared to standard community care. Expected treatment cost per client with a venous leg ulcer was \$1,492 with best practice care including sharp debridement when needed, but became \$4062 with standard care, (no sharp debridement).⁷⁷

It is recognized that some chronic wounds, though treated with all standard means of wound care, stall or fail to progress toward healing. These 'recalcitrant wounds' are often seen in patients with connective tissue disorders, systemic conditions (i.e. sickle cell disease), inoperable arterial compromise, osteomyelitis, immobility, end-stage renal or heart disease, dementia, cancer, and advancing age.⁷⁸ The input of a interdisciplinary team of professionals is optimal for the care of these complex cases.

Education Recommendations

Recommendation 9

Client education is required to obtain informed consent prior to performing CSWD.

Level of Evidence IV

Discussion:

Client education is the key to an informed decision and hence is the initial step of care that leads to the performance of CSWD by a properly trained nurse. One of the guiding principles of nursing care is that clients are the central focus of all nursing services, and, as partners in care they ultimately make their own care decisions.¹⁹ According to the *Canadian Health Care Consent Act*, with the exception of emergencies, health care practitioners have no authority to make treatment decisions on behalf of clients.⁷⁹ Entrenched in common law and nursing standards is the principle of informed consent.⁷⁹ It is the opinion of this development panel that education empowers the client to make informed treatment decisions about debridement methods and to be a full partner in their own care.

In order for a client or substitute decision maker to consent to repetitive and often painful procedures such as CSWD, a complete understanding of the benefits of undergoing this form of treatment, as well as knowledge of the potential risks, is imperative.^{24, 35} Understanding the reasons for the treatment will help solicit the client's participation and adherence to the treatment plan.^{7, 47} Client education includes an explanation of the forms of debridement available (sharp, autolytic, mechanical, biological, and enzymatic). Advantages and disadvantages of each treatment modality must be outlined in terms the client can easily understand. The client and nurse can then discuss which form of debridement is the best for the client's situation, and why it is the optimal choice.^{24, 47} The client should also be informed about pain management, both pharmaceutical (systemic and or topical analgesics), and diversionary/relaxation techniques, agreeing to a set length for the procedure, and having the ability to temporarily halt the procedure (time out) if required.⁴⁷ Preparatory knowledge helps the client minimize anxiety and discomfort, therefore making pain reduction strategies more effective. Finally, the client will need to be informed of the signs and symptoms of possible complications which can occur post-sharp debridement that necessitate follow up with a health professional. This is imperative in the case of CSWD done on diabetic foot ulcers.⁴¹ Support and direction for obtaining client consent for CSWD should come from the nurse's employing agency in the form of policy and procedure.^{26, 31, 36} The topic of consent policy is discussed further in recommendation 1 of this document.

Table 4: Summary of informed consent elements related to CSWD³²

Information	<ul style="list-style-type: none"> ➤ What is CSWD? ➤ How it is performed? ➤ What to expect once it is done? ➤ What would occur without CSWD? ➤ The benefits and risks as listed below.
Benefits	<ul style="list-style-type: none"> ➤ Removal of necrotic tissue quickly and more cost effective ➤ Reduction in the risk of infection ➤ Promotion of healing
Risks	<ul style="list-style-type: none"> ➤ Pain due to the close proximity of viable tissue – provides protection against excessive removal of healthy tissue ➤ Bleeding due to underlying vessels being damaged ➤ Infection

Recommendation 10

Nurse education and training in CSWD should be obtained through a competency-based educational program.

Level of evidence: IV

Discussion:

Nurses who practice CSWD are engaging in a clinical procedure which has an associated high risk.^{13, 28, 71} It is deemed *unacceptable* to be self taught¹³ and several authors have highlighted the implications of practicing CSWD without adequate education, training, and competency assessment.^{13, 16, 21, 80} The need for competency based education and training in CSWD has been identified as a critical factor in the provision of evidence-based, safe practice.^{12, 13, 15, 17, 21, 28} In consideration of the expert opinions voiced in these literature sources, it is recommended that nurses should practice CSWD after a combination of education, training, and mentorship has been obtained through a recognized, competency-based educational program.

Fairbairn and colleagues (2002) recommend a minimum level of qualifications for nurses who carry out CSWD. Their recommendations consider minimum qualifications of baseline wound knowledge, supervision, and mentorship. These recommendations are summarized in Table 5. Ultimately the nurse who exercises CSWD is responsible for maintaining a level of knowledge and skill competency which is within the scope of practice for their profession. Although many courses on CSWD may provide, upon completion of the educational program, a 'certificate of attendance' or 'certificate of completion', the expertise necessary to exercise CSWD is acquired over time and with enough frequency to maintain skill competency. Of equal importance for the nurse who is striving to attain competency in this procedure is a preceptorship with a clinician who is an established and skilled practitioner of sharp wound debridement.

Table 5: Recommended qualifications for nurses performing CSWD ^{13, 26}

1.	Be a registered nurse
2.	Have an accredited education course in wound management
3.	Attend a minimum of a one-day sharp wound debridement study day that includes extensive anatomy of tissues and underlying structures
4.	Be assessed by a specialist in wound care qualified in conservative debridement
5.	Have conducted a series of supervised procedures

Many local, national, and international wound care societies and associations strive for the establishment of comprehensive guidelines and universal standards in wound education and management.¹⁵ As knowledge of wound biochemistry and optimal healing management expands, so too does the expectation for in-depth nursing expertise in this field of care. Several experts have recommended course content in CSWD towards the standardization of education delivered in the acquisition of skills in CSWD. In Canada, the Canadian Association for Enterostomal Therapy CAET Academy Nurse Education Program (ETNEP) includes competency-based theoretical course content covering debridement including conservative sharp wound debridement (CSWD). Annual CAET conferences may provide CSWD workshops and readers should review yearly conference offerings. Completion of the CAET-ETNEP program can lead to certification through the Canadian Nurses Association and is a nationally recognized nursing specialty in wounds, ostomy, and continence. The Canadian Association of Wound Care (CAWC), Institute for Wound Care offers a skills course in CSWD for all health professionals. Various locally-produced courses delivered by or associated with health care institutions such as hospitals and health authorities also exist.

The following list is recommended course content in CSWD:

- Principles of wound healing^{13, 26}
- Anatomy (including tissue anatomy and underlying structures) and physiology¹³
- Potential complications^{13, 21, 35}
- How to manage complications^{21, 35}
- Contraindications to sharp wound debridement^{13, 26, 50}
- Why and when to sharp debride^{13, 50}
- Assess pain and provide adequate pain control²⁶
- Debridement technique,¹³ including other debridement methods^{26, 67}
- Working with other health professionals^{13, 26}
- Consideration of local policy guidelines²⁶
- Legal aspects of client consent¹³
- Code of professional conduct^{13, 26} and review of scope of practice
- A holistic plan of care, which includes provision for ongoing assessment, treatment and clear treatment objectives^{26, 67}
- Have adequate lighting, equipment and comfort for the client²⁶
- Appropriate documentation of the wound pre and post procedure, including photography²⁶

Conservative sharp wound debridement is considered by some to be an extended role²¹ or skill and, as with any area of practice, individual nurses are responsible for ensuring they are competent and

working within their scope of practice before undertaking this task.⁷⁹ Competency means having the ability or authority to do what is required and accepting accountability for that work.⁸¹ With this comes the need to gain and maintain clinical competence in the new field of practice. Provincial nursing colleges emphasize the need for continuous professional training and lifelong learning.

Research Gaps

Research Gaps

The development panel has reviewed an extensive volume of literature and have found a paucity of high level research in many areas of CSWD. There are opportunities and a need for much more research to be done. The following is a list of some of the gaps identified by the development panel:

- Standardization of debridement definitions and descriptions in research studies
- The current state of CSWD practice and education in Canada
- Practice outcomes related to educational programs on CSWD
- Infection rates post debridement related to care setting (home vs. clinic vs hospital)
- Effectiveness of re-usable equipment verses disposable equipment for CSWD
- Measuring CSWD outcomes on healing/closure using the Debridement Performance Index Tool across a broad range of wound etiologies
- Quality of Life studies on clients who have CSWD performed versus other forms of wound debridement (including effects of client education)
- Larger studies on cost/benefits of CSWD in various care settings

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Appendices

Appendix A

Glossary of Terms

Certification: is an exam-based, voluntary credential reserved for registered nurses who meet specific nursing practice, continuous learning and testing requirements. Successfully completing a competency based examination that validates competence, knowledge and skill as a health care professional within a specific area of practice, as evaluated by a body of peers.

Chiropody: The practice of Chiropody is the assessment of the foot and the treatment and prevention of diseases or disorders of the foot by therapeutic, surgical, orthotic and palliative means. Chiropody is practiced by qualified; regulated practitioners who have undergone government established and recognized programs and examinations. Only those who are registered by the Ontario College of Chiropodist are licensed to practice as Chiropodists or Podiatrists.

Competence: is the ongoing ability of a nurse to integrate and apply the knowledge, skills, judgment and personal attributes required to practice safely and ethically in a designated role and setting.

EMLA® (Eutectic Mixture of Local Anaesthetics)

"EMLA® is an emulsion (oil/water) of a eutectic mixture of lidocaine base and prilocaïne base in a portion of 1:1. This dermal analgesic is produced by the migration of the lidocaine and prilocaïne through the epidermal and dermal layers of the skin followed by the accumulation of these agents near the nociceptive nerve endings of the skin." AstraZeneca Canada Inc, monographic EMLA®, 2004.

Enterostomal Therapy Nurse (ETN): In Canada, a Registered Nurse who holds a recognized post graduate certificate in the advanced knowledge and skills associated with the management of wounds, ostomy and continence. It can lead to a master degree. ET nurses may be eligible for certification in this nursing specialty through the Canadian Nurses Association. Upon successful examination an ET has the credential "Certified Enterostomal Therapy Nurse, Canadian CETN(C)"

Fungating wound: a tumor that is showing both ulceration and proliferation

Hydrosurgical debridement: a form of surgical debridement that combines the effects of lavage with sharp instruments

Malignant cutaneous wound: A break in the epidermal integrity by infiltration of malignant cells (Cooper, 1993).

Podiatry: A field of medicine that focuses on preventing, diagnosing, and treating conditions associated with the foot and ankle by medical, surgical or other means.

Tissue viability nurse: a nurse specializing in the maintenance of skin integrity including the management of patients with acute and chronic wounds and the prevention and management of pressure. Term used in the United Kingdom.

Appendix B

Development Process

A call for interest was initiated by CAET by CAET in 2008. A group was formed of 7 English and French speaking Enterostomal Therapy Nurses from across Canada. This volunteer group worked using web-based telecommunications to develop the document. Literature searches were run through the volunteer services of research librarians in Ontario, Quebec and in Alberta and articles were disseminated in hard copy through the post and electronically via email. An abbreviated literature search was re-run in late 2010. International stakeholder review was done using an on-line survey to gain consensus and receive feedback on the recommendations. A draft copy of the recommendations was provided to reviewers in PDF format. Stakeholder feedback was incorporated by the panel members through a consensus process consisting of an online survey followed by facilitated discussions. A final proof-read of the draft document was done by two nurses. The final version of the document was approved by the CAET Board of Directors prior to print and dissemination in 2011.

Appendix C

Search Strategy

Databases:

Ovid EBM Reviews, Cochrane Database of Systematic Reviews (4th quarter of 2009), HealthSTAR, PsycINFO, Medline Plus, Unbound Medline, and CINAHL.

Search words

Search Terms:

1. Conservative debridement sharps injury
2. Sharp wound debridement
3. Sharps debridement
4. Sharps debridement of wounds
5. curette debridement

1-5 AND:

Clinical Skills

Diabetic foot ulcers

Leg ulcers

Pressure ulcers

Restrictions: English and French, Humans, Adult (19 +)

Appendix D

Useful links:

Canadian Association for Enterostomal Therapy: <http://www.caet.ca>

Canadian Association of Wound Care: <http://www.cawc.net>

Canadian Nurses Association: <http://www.cna-nurses.ca>

Canadian Podiatric Medical Association: <http://www.podiatrycanada.org>

Registered Nurses Association of Ontario: <http://www.rnao.org>

Tissue Viability Association/ Wound Care Alliance U.K: <http://www.wcauk.org>

World Council of Enterostomal Therapists (Global): <http://www.wcetn.org>

Wound Ostomy Continence Nurses Society (U.S.A.): <http://www.wocn.org>

Appendix E

Guide for the method of use of EMLA® Cream

Evans and Gray, 2005 recommend that the cream be applied directly to the wound bed and covered with a transparent film for at least 20 minutes prior to debridement for maximum effect. It is recommended safe practice to limit the application to a surface area of less than 100 cm². If pain relief is not achieved with a 20 minute pre-treatment, then it may be necessary to apply for 45-60 minutes prior to the debridement intervention. It is recommended that for safe use, an application of 1.5 to 2.5 g/10 cm² of cream in a thin layer should be applied on a maximum surface of 100 cm². AstraZeneca Canada Inc, monograph EMLA®, 2004. "The most common local reaction was a transient burning sensation observed in 15%, whereas slight local redness and paleness was observed in 2-3%".⁶³ . The concomitant use of a systemic analgesic is also recommended.

Appendix F Decision Factors in Choosing CSWD

