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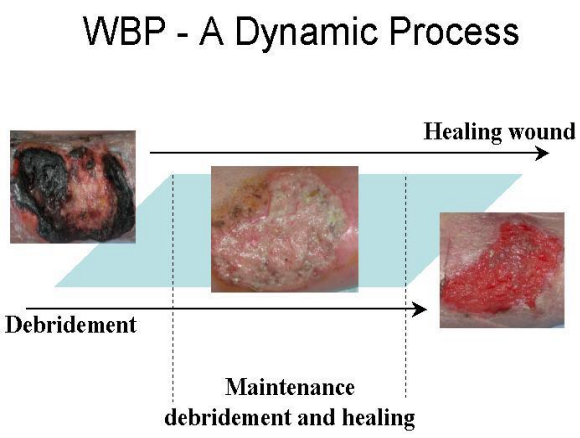
Developed by the BC Provincial Nursing Skin and Wound Committee in collaboration with Wound Clinicians from:

Education Module

Use of Conservative Sharp Wound Debridement to Debride Necrotic Tissue in Wounds



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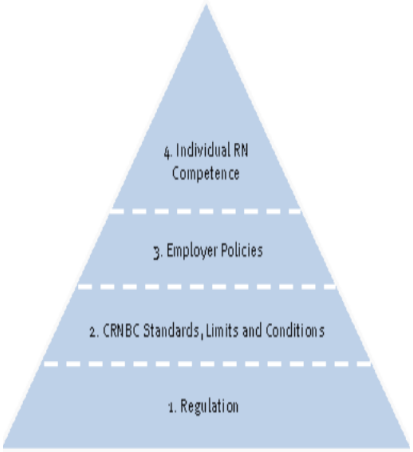
Framework for Mastering Conservative Sharp Wound Debridement

Conservative sharp wound debridement (CSWD) is the removal of nonviable tissue to the level of viable tissue, using a scalpel, scissors or a curette to create a clean wound bed.

CSWD is the most aggressive form of debridement that can be carried out by nurses and is associated with significant risk to the client if performed inappropriately. For these reasons the following requirements are necessary before incorporating CSWD into nursing practice:

- Relevant nursing college (e.g. CRNBC, CRPNBC) must have CSWD included in the scope of practice of its members.
- All limits and conditions set by the relevant nursing college on carrying out CSWD must be met.
- Employer must have clinical practice standards, decision support tools and procedures in place to support the practice of CSWD by nurses.
- Employer must have a process in place for nurses to obtain competency in CSWD which includes both knowledge and skill development.
- Nurses carrying out CSWD must be able to recognize limitations in their competence and seek further assistance when required.
- Only those with robust wound assessment, wound treatment and lower limb assessment skills and knowledge should work toward competency in CSWD.
- Only those able to maintain competency in their clinical practice should obtain competency in CSWD.



Mastering a competency requires nurses to have the appropriate knowledge, technical skill and clinical judgment to carry out the task. These competencies must be integrated safely into the practice environment. Completing this module is only one part of the preparation required to be able to carry out CSWD safely and effectively.

Acquiring Knowledge, Skill and Clinical Judgement

The following is one process that can be used to obtain competency in CSWD. The process used to obtain competency in CSWD in clinical practice must be approved by the employer.

a. Theory (Knowledge Acquisition)

b. Complete this self-study education module.

c. Review the following guidelines and procedures in conjunction with this module:
   - Practice Guideline / Procedure: Conservative Sharp Wound Debridement
   - Practice Guideline: Conservative Sharp Wound Debridement Using Sterile Scissors, Scalpel or Curette (pending)
   - Procedure: Conservative Sharp Wound Debridement Using Sterile Scissors, Scalpel or Curette (pending)
   - Procedure: Conservative Sharp Wound Debridement of Callus in a Diabetic Foot (pending)

d. Review the following clinical practice guidelines and reference materials:
   - Practice Guideline: Wound Bed Preparation
   - Practice Guideline: Assessment and Treatment of Lower Limb Ulcers in Adults
   - Practice Guideline: Assessment and Treatment of Diabetic & Neuropathic Ulcers in Adults
   - Assessment Tool: Lower Limb Assessment Flow Sheet
   - Documentation Guideline: Lower Limb Assessment Flow Sheet (Paper only)
   - Documentation Guideline: Lower Limb Assessment Flow Sheet (Paper and Pixalere)

e. Review employer's clinical practice standards, decision support tools and procedures related to CSWD.

b. Skill (Technical Skill and Clinical Judgement)

f. Under the mentorship and supervision of a nurse competent in CSWD (e.g. Enterostomal Therapy Nurse or Wound Clinician) practice carrying out CSWD using props.

c. Integrating Knowledge into Practice

Under the mentorship and supervision of a nurse competent in CSWD demonstrate carrying out CSWD in the practice setting. The number of demonstrations required will be mutually determined through a collaborative discussion with your mentor. Use the skills checklists found on pages 48-49 of this education module.

INTRODUCTION

Debridement is integral to wound bed preparation as it removes non-viable tissue, foreign material, wound debris and bacteria from the wound. Providing the wound is healable, debridement can stimulate the healing process, helping wounds that are trapped in the inflammatory stage to proceed to the granulation and epithelializing stages of wound healing. Optimizing the debridement process promotes effective and rapid healing of chronic wounds and can significantly reduce the cost of treatment.[14] Wound debridement can be achieved in a number of ways: surgical, conservative sharp, autolytic, enzymatic, biologic (maggots) and mechanical.

This module focuses on one form of debridement: Conservative Sharp Wound Debridement (CSWD). CSWD involves the use of a scalpel, scissors or a curette to remove non-viable necrotic tissue or callus from the wound to the level of but not into viable tissue.[43] As opposed to surgical debridement, CSWD should cause little or no pain or bleeding. Because this procedure carries a high degree of risk, the College of Registered Nurses has set limits on practice requiring nurses to have successfully completed additional education on CSWD and to follow an approved guideline and procedure when carrying out this skill.

This module, in conjunction with the practice guideline "*Conservative Sharp Wound Debridement Using Sterile Scissors, Scalpel or Curette*" and procedures "*Conservative Sharp Wound Debridement Using Sterile Scissors, Scalpel or Curette*" and *Conservative Sharp Wound Debridement of Callus in a Diabetic Foot* comprise the educational materials required for practice.

Purpose

This self-study module has been designed to help you understand the theory required to make clinical judgments regarding CSWD and to develop the skills required to carry out CSWD. This knowledge and skill will result in the ongoing safe and effective removal of non-viable tissue using sharp instruments for the purpose of creating a clean wound bed. Because CSWD is a high risk restricted activity, nurses should have previous experience with most facets of wound care before attempting to develop knowledge and skill in CSWD.

Learning Objectives

After completing this module you will be able to:

- Understand nurse's scope of practice with respect to CSWD and recognize limits in personal competence.
- Distinguish between viable and non-viable tissue.
- Carry out or collaborate with a wound clinician or physician / NP to carry out a client assessment in order to determine if CSWD is indicated and safe.
- Following client assessment identify the client's precautions and contraindications with respect to CSWD.
- Explain the procedure to clients and obtain informed consent.
- Manage pain and discomfort prior to, during and following the procedure.
- Select and utilize the equipment and supplies required to carry out CSWD effectively and safely..
- Differentiate among and recognize various types of underlying tissue such as subcutaneous tissue, tendons, muscle and bone.
- Set up and maintain a sterile field for the equipment and supplies required to carry out CSWD.
- Identify when to seek further specialist intervention or help from other professionals.
- Be aware of and manage the adverse events associated with CSWD such as bleeding, pain, damaged underlying tissues and client anxiety.
- Plan the frequency and extent of debridement.
- Understand the advantages and disadvantages of various types to debridement and use **secondary debridement techniques**[1] as needed.

Learning Activities

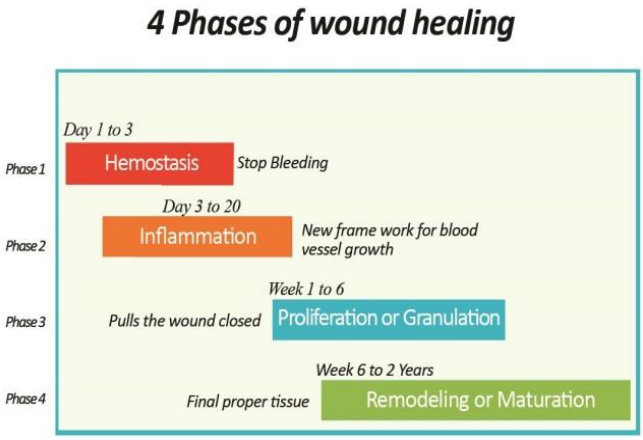
The learning activities included in this module support knowledge and skill acquisition and should help you to integrate your knowledge and skills into the practice environment. The learning activity, quiz and case studies address content from this module plus the guideline on CSWD and the procedures for CSWD and callus debridement .

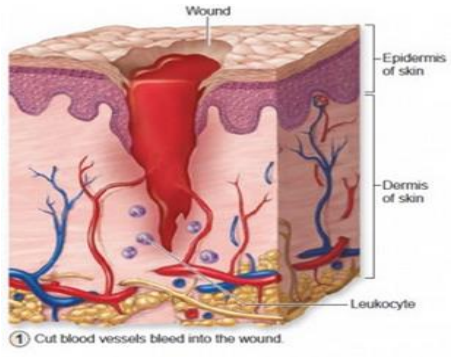
[1] All words in the text that are bolded are included in the Glossary on page ****

SECTION A: THEORY

WOUND HEALING PROCESS [22]

Wound healing is a normal biological process and is achieved through 4 precise and programmed stages: hemostasis, inflammation, granulation and remodeling. For successful wound healing to occur, these stages should follow one another and overlap in a specific chronological order.



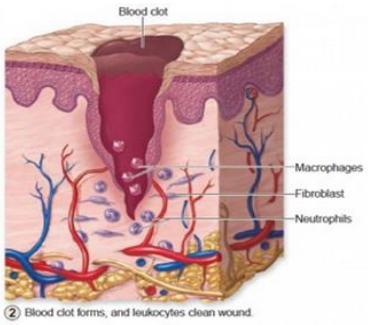


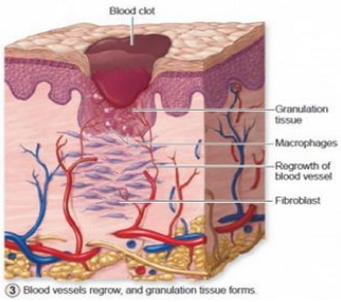
Hemostasis

- Damaged blood vessels constrict to slow blood flow and prevent loss of fluid from the wound.
- Platelets aggregate to form a clot and stop bleeding.
- Leukocytes (white blood cells) migrate into the tissue to initiate the inflammatory process.

Inflammation

- Macrophages engulf and digest foreign particles, bacteria and necrotic debris.
- Neutrophils secrete chemicals to kill bacteria.
- Macrophages release substances to stimulate capillary growth which supports the development of granulation tissue.
- This stage presents as redness, swelling, localized warmth and increased exudate.



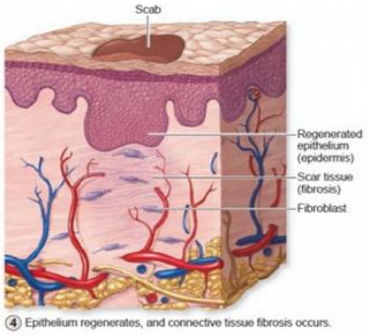


Proliferation (Granulation, Contraction & Epithelialization)

- Granulation tissue is formed from macrophages, fibroblasts and new capillaries.
- Healthy granulation tissue is granular and uneven in texture; it does not bleed easily and is pink / red in colour.
- Epidermal cells migrate from the wound edge across the wound.
- Wound edges contract.

Remodeling

- Epidermal cells grow over granulation tissue to close the wound.
- Fibroblasts secrete collagen to strengthen the tensile strength of wound tissue.
- Wound remodeling occurs to reorganize and strengthen collagen fibers.
- The wound contracts to increase tissue integrity.



However, risk factors can interfere with one or more phases of the healing process creating a wound that is not healing or healing very slowly. These chronic wounds frequently enter a state of prolonged inflammation [22] and, as a result, may have a build-up of non-viable tissue which further delays wound healing.

Wounds in those with diabetes mellitus (DM) are common and DM, if not well controlled, can decrease leukocyte function, impair the development of granulation tissue and cause defects in collagen synthesis affecting the strength of the wound after it has healed.

While many wounds heal over time, others are determined to be non-healable based on the presence or absence of the following factors:

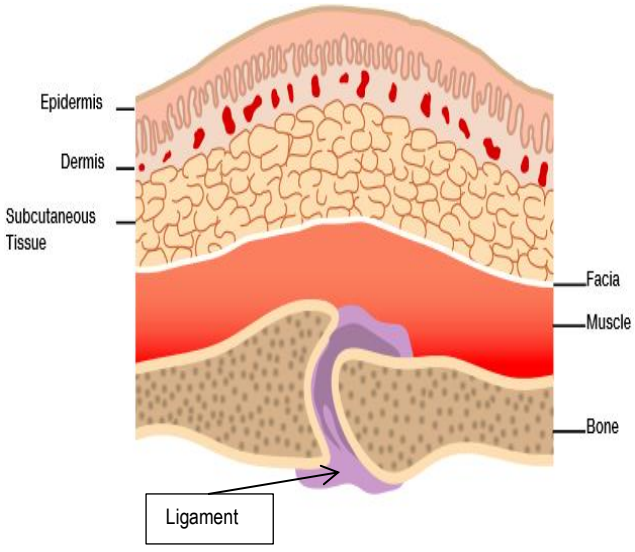
- The underlying causes, such as malignancy, impending death or gangrene, cannot be treated.
- There is an insufficient level of arterial blood flow to the wound to support healing.
- The client's risk factors for healability such as systemic disease, medications or poor nutrition cannot be modified.

Wound healability must be determined prior to implementing moist wound healing and debridement.

Watch the video *How Wounds Heal* available from
ccrs.vch.ca/onlinecourses/wound_management/howwoundsheal_v4/index.html

ANATOMY OF THE SKIN AND UNDERLYING STRUCTURES

The nurse must be confident and knowledgeable about any anatomical structures that are likely to be encountered during debridement, especially during CSWD. The nurse may see many types of viable tissue while examining wounds but will most commonly see subcutaneous tissue, **fascia**, muscle, bone, **tendons, ligaments** and blood vessels.



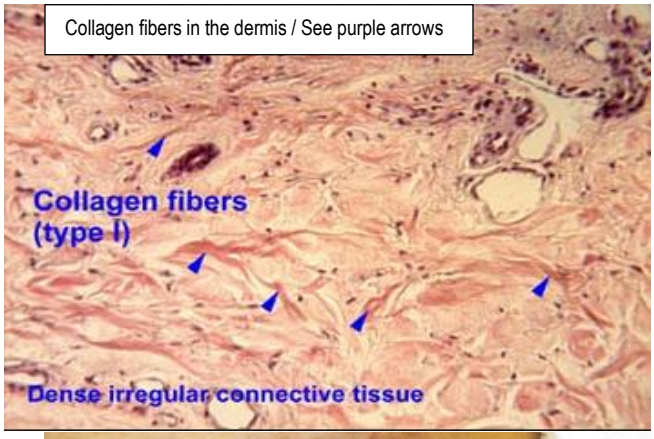
The nurse must understand the anatomy of the area surrounding and beneath the wound. [12]
The epidermis, the outermost layer of skin, provides a waterproof barrier and creates our skin tone. The dermis, beneath the epidermis, contains blood vessels, lymph vessels, tough connective tissue, hair follicles, and sweat glands. The deeper subcutaneous tissue (hypodermis) is made of adipose / fat and connective tissue. The epidermis and dermis combined are approximately 2 mm thick.

When debriding wounds, the nurse should be able to distinguish muscle, bone, fascia, ligaments and tendon in the wound because cutting these tissues can create serious problems for the client.

Debridement must be stopped when the nurse is not able to identify anatomical structures in the wound. [12, 29]

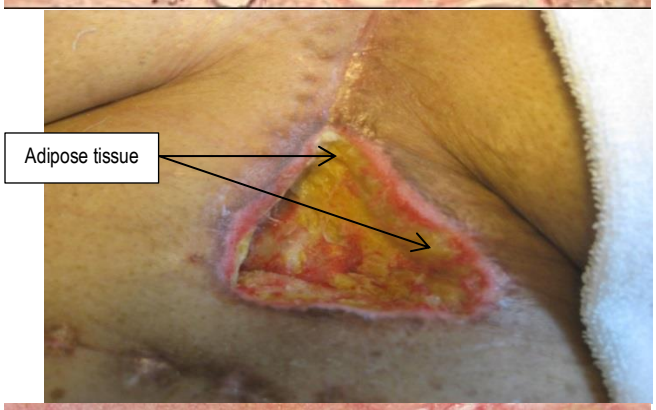
1. Fibrous Collagen

Collagen is a fibrous protein that makes up the majority of the dermal layer and gives this layer its thickness. Collagen fibers have a high tensile strength which prevents tearing of the skin through overstretching. Fibrous collagen is also found in muscles, tendons and ligament as well as cartilage, bones and blood vessels.
Tough bundles of collagen called *collagen fibers* are a major component of the extracellular matrix that supports most tissues and is an external support for cells.



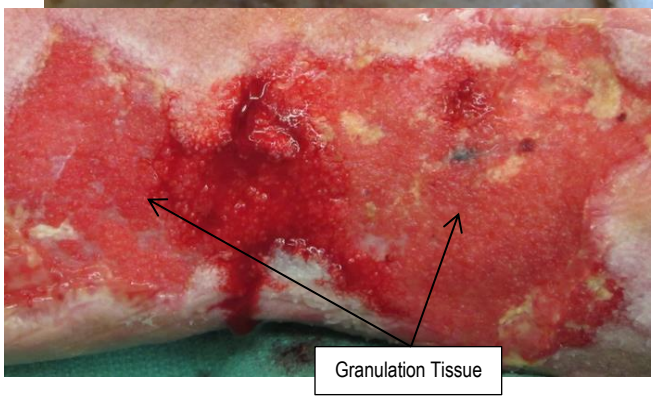
2. Adipose Tissue

In biology, **adipose tissue** or body fat is one of the main forms of connective tissue. It presents as yellow globular tissue present under the dermal layer of the skin.
Its main role is to store energy in the form of lipids, although it also cushions and insulates the body.



3. Granulation Tissue

Granulation tissue is new **connective tissue** comprised of collagen and tiny blood vessels that form on the surface of a wound during the healing process. Granulation tissue typically grows from the base of a wound and is able to fill wounds of almost any size.
Healthy granulation tissue is moist, granular, uneven in texture and is pink / red in colour. The colour and texture of the granulation tissue is often an indicator of how well the wound is healing.



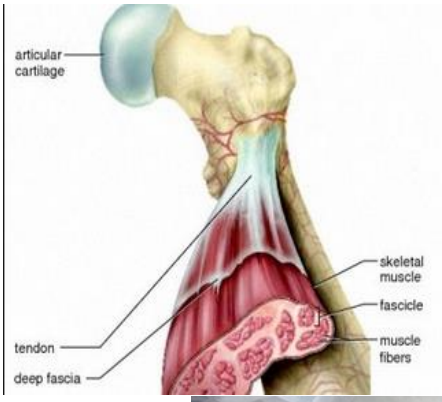
4. Epithelial Tissue

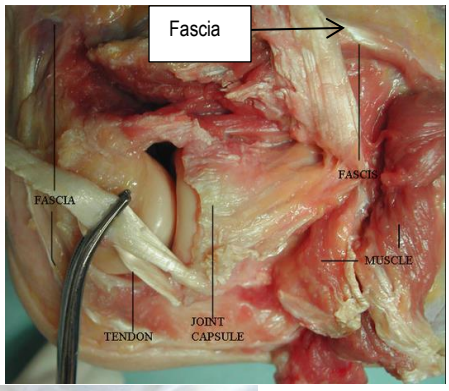
Epithelial tissue is a series of tightly-packed epithelial cells that provide one or more layers of epithelial tissue (depending on the part of the body it covers) that slowly cover granulation tissue as the wound heals. Fresh epithelial cells migrate from the wound margins, hair follicles, sebaceous glands or sweat glands across the granulation tissue until the wound is closed. Epithelial tissue will not move over the wound until the granulation tissue is on a level with surrounding skin.

Although viable tissue and underlying anatomical structures such as bones, fascia, tendons, muscle and ligaments are not debrided it is improtant that nurses carrying out CSWD can recognize them in the wound bed. Inadvertently cutting these underlying structures during CSWD creates a serious situation that requires immediate physician involvement.

1. <u>Fascia</u>

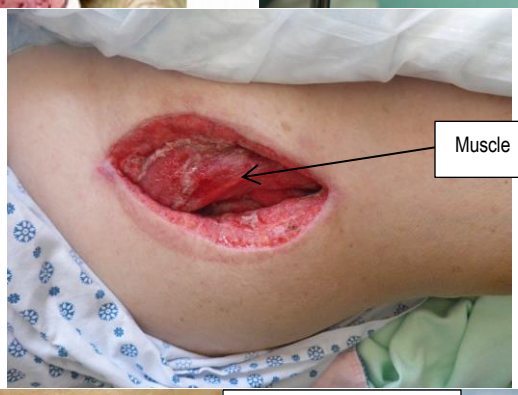
Fascia is the shiny gleaming white cover over muscles. It is described as the "tough covering over muscles".





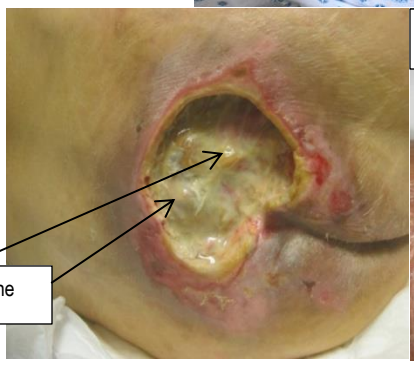
2. <u>Muscle</u>

Muscle is dull red, highly vascularized and tears easily. Protects bones, joints and nerves. Healthy muscle contracts when it is pinched.



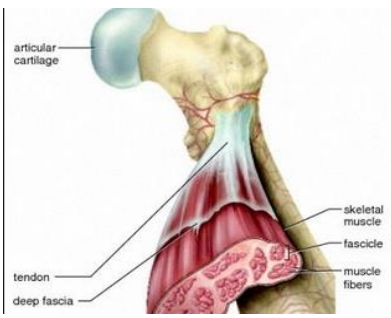
3. <u>Bone</u>

Bone is bright white and hard. Bone dessicates rapidly and turns yellow if exposed.



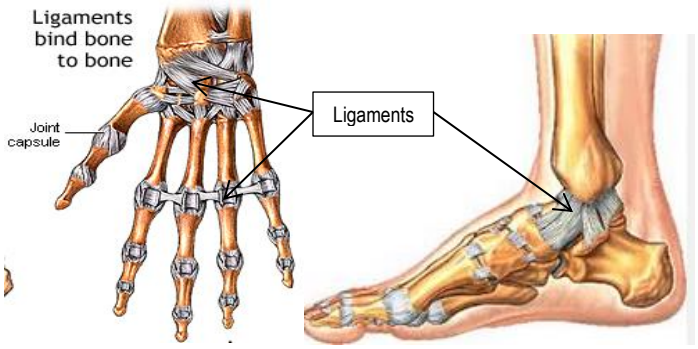
4. <u>Tendon</u>

Tendons are narrow, fibrous striated bundles of collagen. They appear as shiny white cords with a fibrous, elastic presentation. Tendons attach muscle to bone and support movement of the bone.

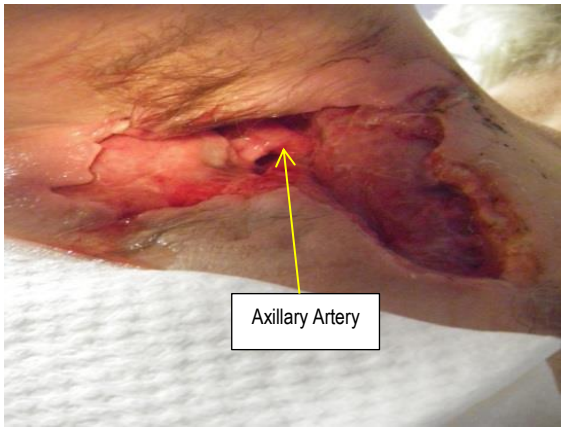


5. Ligaments

A ligament is fibrous connective tissue that attaches bone to bone or cartilage and serves to hold structures together and keep them stable.



6. Vascular Structures
Vascular structures close to the skin surface may be exposed in a wound.



If there are structures in the wound you do not recognize or do recognize as tendon, bone, muscle, ligament or fascia, stop the procedure and consult with a wound clinician or physician / NP.

Learning Activity # 1

Answer the following questions.

1. When wound healing is stalled which stage of the healing process is it usually stalled in? _____
2. Which stage of the healing process presents as redness, swelling and localized warmth? _____
3. If ligaments attach bone to bone what do tendons do? _____
4. Name 3 factors that might render a wound unhealable? _____
5. The dermis contains 5 different types of tissues. What are they? _____

ASSESSMENT

CSWD is always part of a larger plan of care to support client comfort and improve wound healing. Hence the need for a comprehensive assessment including client concerns, client risk factors, a lower limb assessment if the wound is on the leg or foot, a detailed wound assessment, an assessment of pain and an assessment for wound infection. [63]
It is imperative to carry out this comprehensive assessment before determining (1) if the wound is healable, (2) if debridement is appropriate and (3) the risks and benefits for the client prior to, during and following CSWD.

The following table outlines the assessment that must be completed before it is possible to choose one or more debridement methods that meet the needs of the client and the wound.

Table #1: Comprehensive Assessment and Rationale [1, 22]

ASSESSMENT	RATIONALE
Client Assessment [40, 47]	
1. Clients level of understanding about the wound, healability and risk factors. 2. Client and/or caregiver's ability and motivation to understand and participate in the treatment plan. 3. Client and/or caregiver's preferences for treatment of the wound, ability to participate in treatment of risk factors and their goals for wound care. 4. Impact of the wound on client's daily life and body image. 5. Social and financial concerns and availability of support systems to address these concerns. 6. Emotional, cognitive, behavioral or mental health concerns and the availability of support systems to address these concerns. 7. Quality of life issues that could impact treatment. 8. Impact of client's current environment on care.	▪ If the client or family member does not understand the treatment and is not involved in developing the goals of care it is unlikely that the care plan will be effective. ▪ Emotional responses to a wound can include fear about the future, frustration with the lack of progress in healing and a sense of loneliness and frustration at the loss of physical capacity. ▪ Clients may require psychological support to address the stress of living with a wound. ▪ Addressing client's social, financial and emotional issues can help to reduce wound related stress. ▪ Addressing cognitive, behavioral and mental health concerns related to CSWD as well as quality of life issues and the client's environment supports the client to participate in care as well as increasing the likelihood of successful wound healing.
Risk Factors for Wound Healability [22, 26]	
1. Medical conditions such as venous (edema) and/or arterial (ischemia) insufficiency, inflammatory conditions such as vasculitis and rheumatoid arthritis, bleeding disorders, heart failure, anemia, renal disease especially those undergoing dialysis, cancer, being at the end of life, diabetes and spinal cord injury. [41] 2. Undergoing cancer related treatments such as radiation or chemotherapy. 3. Advanced age. 4. Lifestyle factors such as tobacco and excessive ETOH use and the motivation to quit, poor personal hygiene, inactivity or a lack of exercise. 5. Medications that interfere with wound healing, e.g. NSAIDS, anti-neoplastics, systemic corticosteroids, anticoagulants, platelet inhibitors and vasopressors. 6. MRSA or VRE colonization. 7. Impaired nutritional status: ▪ Obesity [22], poor glycemic control, low body weight, cachexia, dehydration, edema, restrictive diet and prolonged NPO. ▪ Inadequate nutritional intake of protein, calories or fluids as evidenced by % of intake at meals or calorie counts. 8. Presence of pressure, shear and friction over the wound or peri wound area.	▪ A detailed assessment of risk factors is necessary to determine if precautions or contraindications to CSWD are present. ▪ Medical conditions that (1) decrease the amount of oxygen and nutrients available to healing wounds, (2) compromise the immune system or (3) increase the risk of bleeding can compromise wound healing and increase the risk for adverse events when using CSWD. ▪ Age related changes can cause a time delay but not a change in the quality of wound healing. [22] ▪ Excess alcohol consumption interferes with the proliferative stage of healing and increases the incidence of infection.[22] ▪ Smoking decreases the availability of O_2 to the wound and interferes with the inflammatory and proliferative phases of wound healing. [1] ▪ Medications that interfere with clot formation or platelet function, the inflammatory response and cell proliferation in the wound negatively affect wound healing.[27] ▪ Protein deficiency impairs capillary formation, fibroblast proliferation, collagen synthesis and wound remodeling. It also decreases leukocyte phagocytosis and increases susceptibility to infection. [59]
Basic and Advanced Lower Limb Assessment	
1. A basic lower limb assessment is required for wounds present below the knee. If results are abnormal, for example, if signs and symptoms of arterial compromise, venous insufficiency or decreased sensation are present, complete an advanced lower limb assessment including an ABI or refer to a wound clinician for same.	▪ Assessing blood flow is necessary to determine if the wound is healable and therefore if moist wound healing and debridement can take place. ▪ Impaired circulation in a healable wound can negatively impact all stages of wound healing and potentially be a contraindication for CSWD.

2. When assessing a diabetic foot, the assessment focuses on neuropathic, vascular and structural changes.	

Review the *Basic and Advanced Lower Limb Assessment* Form available at
https://www.clwk.ca/buddydrive/file/lower-limb-assessment-flow-sheet/

Review the Guideline: *Assessment and Treatment of Lower Limb Ulcers* available at
https://www.clwk.ca/buddydrive/file/guideline-lower-limb-venous-arterial/

Wound and Peri Wound Assessment	
1. History of current and previous wounds. 2. Wound etiology, e.g. malignant or inflammatory wounds. 3. Location of wound(s) and the presence of vascular grafts, prostheses or dialysis fistulas in close proximity to the wound. 4. Size of the wound including length, width, depth, undermining, sinuses and tunnels. Note if wound probes to bone. 5. Describe the wound bed noting percentage of tissue type, presence of a foreign body and/or exposed underlying structures, e.g. tendon, muscle or bone. Necrotic tissue may prevent a full assessment of the wound base. 6. Describe the presence of callus on the foot or in the peri-wound area. 7. Type of tissue requiring debridement, i.e. eschar, slough or callus. 8. The nature and amount of exudate, if present. 9. Note the presence of odour after cleansing. 10. Condition of the peri-wound skin. 11. Describe the wound edge noting the interface between viable and non-viable tissue.	▪ A detailed wound assessment is necessary to determine: – If CSWD is an appropriate debridement method. – If precautions or contraindications to CSWD are present. – If adverse events are likely to occur. – The appropriate instruments needed for CSWD. ▪ Wounds that are larger and of longer duration may heal poorly. ▪ CSWD is contraindicated if the interface between viable and non-viable tissue is not clear.
Pain Assessment Prior to, During and Following CSWD.	
1. Type (neuropathic or nociceptive pain), location, frequency and quality of pain in the wound or as a result of treatment. 2. Pain severity using client self-report, observation of non-verbal cues and / or a pain scale, e.g. Wong Baker FACES Scale, Visual Analog Scale, PAINAD. 3. Onset and duration of pain and precipitating or alleviating factors. 4. Pain in an otherwise insensate foot. 5. The amount and type of pain expected with the procedure. 6. Current pharmacological and non-pharmacological interventions for pain and their effectiveness.	▪ This information is required so that the nurse can plan for appropriate pain management prior to, during and following CSWD. ▪ Pain in an insensate foot due to peripheral neuropathy is an important indication of wound infection.
Wound Infection	
1. Presence of inflammation, bio burden / localized infection, deep infection or systemic infection.	▪ If infection is present, it may require treatment prior to CSWD.

Watch the video *Magnifying Wound Assessment* available from
ccrs.vch.ca/onlinecourses/wound_management/woundassessment_v4/index.html.

Review the *Wound Assessment and Treatment Flow Sheet* available at
https://www.clwk.ca/buddydrive/file/watfs-portrait/ if this is relevant for your practice.

Learning Activity # 2

Mr. LeBlanc is 80 and has a venous ulcer located above his left medial malleolus. The wound is 12 cm x 8 cm, shallow with irregular wound margins and is covered with large amounts of yellow slough. Although he gets his dressing changed weekly his wound has shown little improvement in the last 6 months. He has significant edema in both legs. He lives alone and eats mainly tinned foods once or twice daily. He is currently on prednisone for Polymyalgia Rheumatica.
Identify the factors that might impair healing in Mr. LeBlanc's wound.

Learning Activity # 3

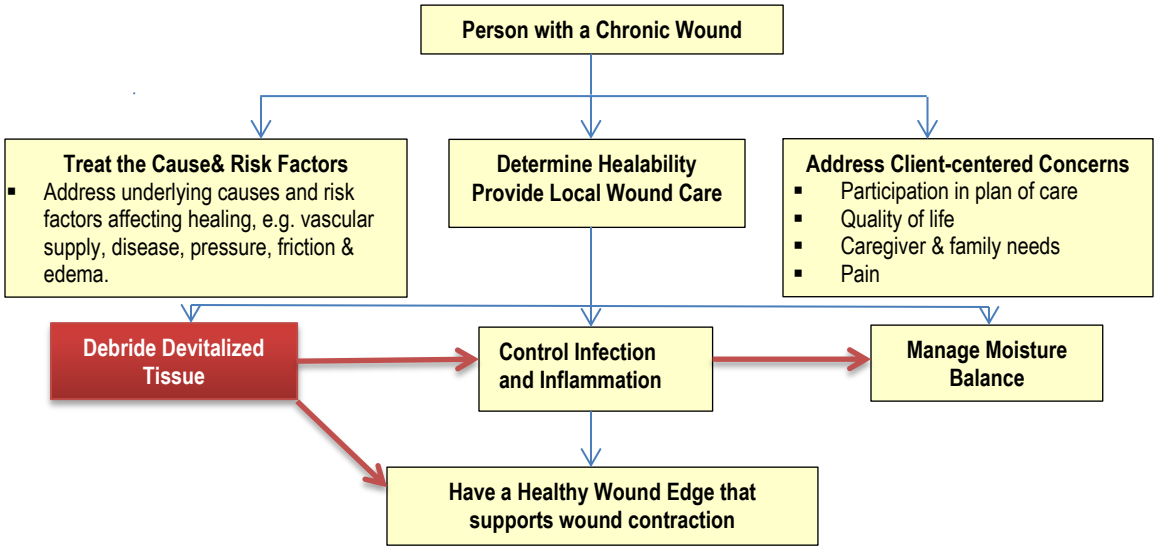
During your initial visit with Mr. LeBlanc he appears depressed and says "I give up…this sore is never going to get any better".
List 3 questions you could ask Mr. LeBlanc to get a better understanding of his concerns.

WOUND BED PREPARATION [29, 50, 57]

Wound bed preparation (WBP) is defined as "the management of a wound in order to accelerate healing or to facilitate the effectiveness of other therapeutic measures".[50] Wound bed preparation (WBP) is an overall framework used to promote healing in chronic wounds.

In addition to treating the underlying causes, risk factors and client concerns, WBP frames the approach to localized wound care by directing nurses to remove non-viable tissue through debridement, to control bacterial burden and infection / inflammation, to maintain moisture balance and to stimulate wound edges to encourage cell migration and wound closure (DIME). However, debridement is a key component when treating healable wounds and is necessary in order to control inflammation / infection, maintain moisture balance and manage wound edges. Left intact, necrotic tissue increases wound exudate, promotes wound infection and interferes with wound closure.

Framework for Wound bed Preparation



Adapted from Sibbald, G., et al. (2011). Special considerations in wound bed preparation 2011: An update. *Advances in Skin and Wound Care.* 24(9): 415 – 436.

Review the Guideline: *Wound Bed Preparation for Healable and Non Healable Wounds* available at https://www.clwk.ca/buddydrive/file/guideline-wound-bed-preparation/

INFECTED WOUNDS

Signs and Symptoms of Wound Infection [49, 60]

Increasing severity of infection		
Bacterial Bio burden / Localized Infection	**Deep Infection**	**Systemic Infection**
Non-healing (minimal change in size after 3 weeks of care)	Onset of wound pain or increasing pain	General malaise (predominantly elderly, immune compromised or pediatric clients)
Increased volume of exudate	Increased volume of exudate	Fever (muted in elderly or immune compromised clients)
Red friable tissue	Peri wound warmth 2 cm or more	Rigor / chills
Necrotic debris in the wound	Peri wound edema & erythema 2 cm or more	Change in behaviour or cognition (especially in elderly clients)
Odour present after wound cleansing	Odour present after wound cleansing	Unexplained high blood sugar (in clients who are diabetic)
	Increased wound size & / or the development of sinus tracts & / or satellite wounds	Rapid heart rate and respirations .
	Wound that probes to bone or exposed bone	Elevated white cell count
		Septic shock potentially leading to multi organ failure
2 or more of the above S & S are sufficient for a clinical diagnosis of potential or actual wound infection.		

Wounds can be debrided using CSWD if bio burden / localized infection are present but CSWD is contraindicated if deep or systemic infection is present unless the infection has been treated with antibiotics. [30] However, when systemic infection with sepsis is present, surgical debridement may be the best option. [6]

All wounds that are debrided using CSWD are cleansed with an antiseptic, such as chlorhexidine or Prontosan [2, 17, 62] prior to CSWD. This reduces the possibility of transient bacteremia. In addition, antimicrobial dressings can be used as filler in smaller cavity wounds following debridement. [51] Antimicrobial fillers for larger wounds could include PHMB, silver dressings, medical honey dressings and antimicrobial foam.

Infection in a Diabetic Foot Ulcer (DFU). [2, 31, 54, 62]

Diabetic foot infections are one of the most frequent and severe complications seen in clients with diabetes mellitus (DM). More than half of those with diabetic foot ulcers develop wound infections. [22] **Microangiopathy** decreases tissue perfusion increasing micro-organisms in the wound that lead to infection.

Link to the Guideline *Wound Infection* section #3, pages 4 and 5 to review the assessment for wound infection. Available at …

As with other infections, the diagnosis of infection in a diabetic wound is based on a clinical assessment. However, the clinical signs of infection can be muted, especially if the diabetes is not well controlled, because of compromised arterial blood flow, blunting of the inflammatory process, and diminished sensation. Wounds that probe to bone occur more frequently with DFU. Suspect osteomyelitis if the wound probes to bone or exposed bone is present. Clients with diabetes who have 1 - 2 signs of infection, especially if there is new or increasing pain or purulent drainage, should have a C & S swab of the wound. Any infection in a DFU may be a precursor to serious illness and amputation and therefore requires immediate medical attention and treatment with antibiotics.

DEBRIDEMENT

Debridement is defined as the removal of necrotic tissue or callus from the peri wound or wound bed. It is indicated for healable wounds. [29] Debridement is one of four key components in the wound bed preparation framework and is a necessary first step to accomplish the other aspects of local wound care. Left intact, moist necrotic tissue, slough and foreign materials in the wound make it extremely difficult to maintain moisture balance, keep the wound free from infection, and ensure the closure of the wound edges. [29, 58] Debridement is often performed in repeated sessions and a number of different types of debridement may be used as a wound progresses through the healing process.

Necrotic tissue and slough can be debrided using autolytic, biological (maggot therapy), enzymatic, mechanical, conservative sharp and surgical debridement.

Debriding necrotic tissue achieves several objectives. It: [17, 23, 29, 41]

1. Removes necrotic tissue and debris from the wound decreasing the bacterial load which reduces the risk of infection.
2. Helps visualize the wound bed. In the presence of necrotic tissue, accurate and thorough assessment of viable tissue is difficult.
3. Helps to uncover abscesses and underlying pockets of fluid.
4. Interrupts the cycle of the chronic wound at the molecular level to "jump start" healing.
5. Facilitates the development of granulation tissue and the migration of epithelial cells to form a new epidermis over the wound. The presence of necrotic tissue provides a physical barrier to the migration of these cells.
6. Reduces wound exudate and odour associated with necrotic tissue.
7. Speeds up healing thereby decreasing psychological stress for the client.

Debriding callus:

1. Removes undermined tissue which decreases the reservoir of potential pathogens.
2. Reduces pressure at the callused sites which supports wound healing.
3. Exposes wounds that are present underneath callus. [31]

Learning Activity # 4

Which statements about debridement are correct?

a. Debriding a wound helps to visualize the wound bed.
b. Repeated debridement interferes with wound closure.
c. Debridement is a critical element in wound bed preparation.
d. Debriding a wound with localized infection may spread the bacteria to surrounding tissues.

Necrotic Tissue

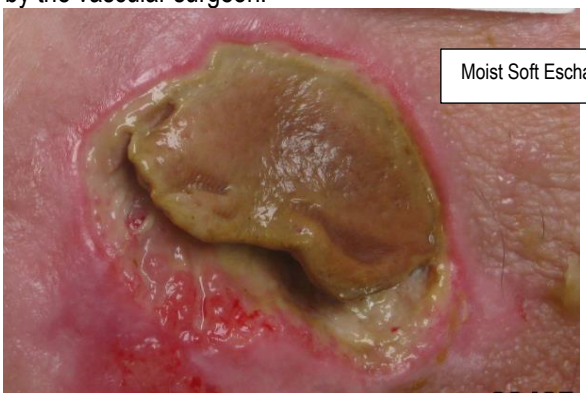
Necrotic tissue presents as either dry or boggy eschar, or wet or dry slough.


Dry stable eschar


Unstable, Dry Boggy Eschar

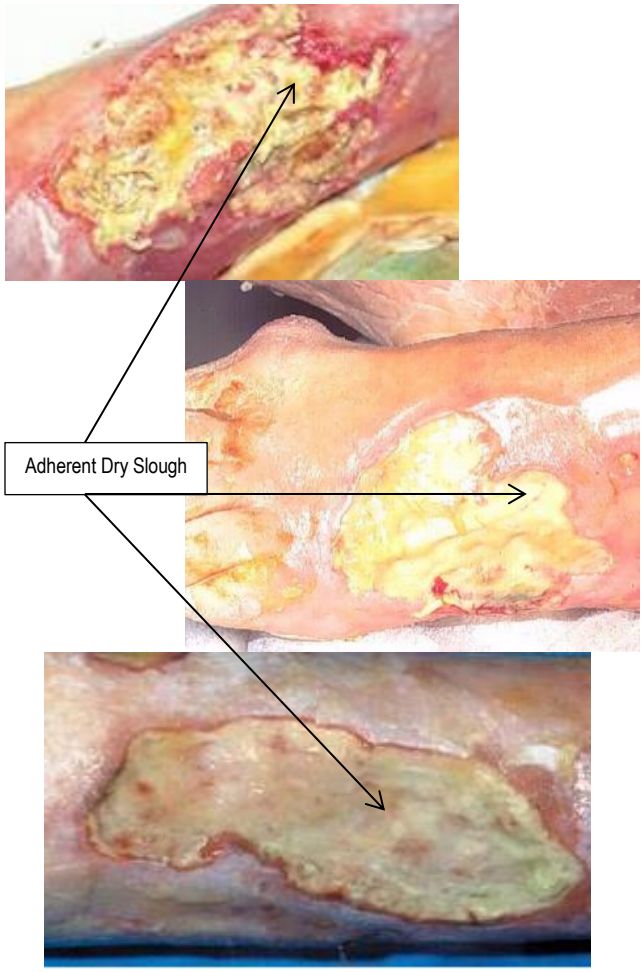

Combination soft eschar and slough

- **Dry stable eschar** is firm, dry necrotic tissue with an absence of drainage, edema, erythema or fluctuance. It can be black or brown and is attached to the wound edges and wound base. It can be present in any type of wound.[8]
- Non healable and healable *arterial* wounds on the lower leg that are covered with dry stable eschar *should not be debrided*. The goal of care is to maintain the dry eschar and protect the wound.
- Stable, non infected, heel ulcers covered with dry eschar should not be debrided unless they show signs of infection such as **fluctuance**, edema, erythema and drainage. [6]
- *Wounds other than arterial and heel wounds* that are covered with eschar can be debrided if contraindications are not present.
- If dry eschar begins to lift or becomes unstable, moist or boggy, consult a wound clinician and / or physician / NP to determine if debridement is indicated. [12]
- **Unstable, boggy eschar** may be black, brown or gray and firmly or loosely attached to the wound edges and wound base.[8] Fluctuance and drainage may be present.
- It may be necessary to trim the edges of lifting eschar with scissors to prevent it from getting caught on clothes or bedding. [12]
- If clients undergo successful re-vascularization surgery, lower limb arterial wounds may be debrided. However, the decision to debride is made by the vascular surgeon.

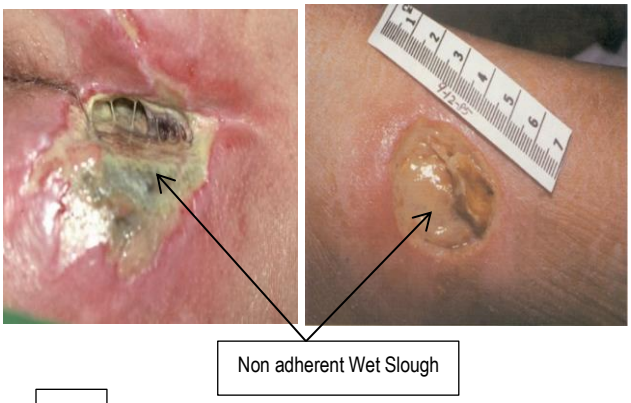

Moist Soft Eschar

- It may be difficult to determine if the dry tissue covering a wound is a scab which is part of the physiological healing process or necrotic eschar which is pathological and has a negative impact on healing. [30] Scabs are not debrided.


Scab



Necrotic slough can be moist or dry and is brown, tan, yellow or green in colour. It may be thin or thick and the consistency may be fibrous, stringy or gelatinous. It may be firmly or loosely attached to the wound edges and base. Fluctuance and drainage may be present.



Necrotic or devitalized tissue compromises wound healing in many ways. [21, 57, 63]

1. Serves as a medium for bacterial growth which may contribute to bioburden / localized infection, deep infection and systemic infection.
2. Reduces the effect of topical antimicrobials.
3. Leads to increased production of exudate and odour.
4. Interferes with the ability of white cells to clear bacteria and debris from the wound.
5. Causes a prolonged inflammatory response, resulting in the presence of necrotic material, which adds to the release of cytokines and retards healing.
6. Impedes the development of healthy granulation tissue and the migration of epithelial cells.

Learning Activity # 5

1. Stable heel ulcers should be debrided if they show signs of:
   a. Poor circulation
   b. Pyoderma gangrenosum
   c. Infection
   d. Maceration
2. Dry eschar is present in which of the following wounds?
   a. Arterial wounds
   b. All wounds
   c. Venous wounds
   d. Pressure ulcers

Learning Activity # 6

1.Necrotic tissue is which of the following?

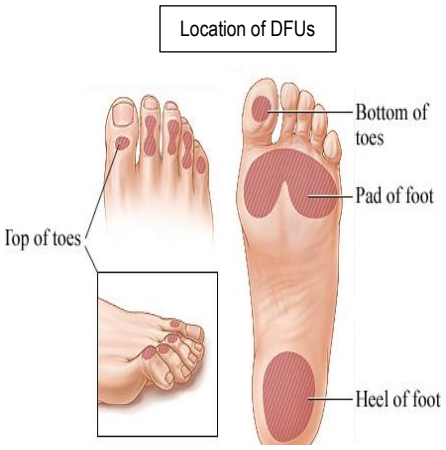
a. Fibrous yellow wound tissue that adheres to the wound bed.
b. Tendon and bone underlying the wound.
c. Devitalised, dead tissue that appears black.
d. Red, granular tissue that fills a wound as it is healing.

2. What is the primary treatment aim for an arterial wound covered with dry eschar?

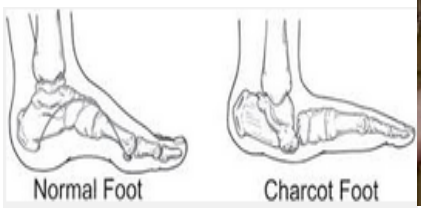
a. To remove devitalised dry eschar tissue.
b. To keep the eschar dry and protect the wound.
c. To maintain a moist, warm wound surface.

Callus Formation in Clients with Diabetes Mellitus (DM)

Calluses appear as thick, rough, yellow skin patches. They are the result of excessive skin buildup which is a protective function of the epidermis in response to uncorrected high pressure over bony prominences on the foot. Callus (hyperkeratosis) is commonly encountered on the soles of feet, under the metatarsal heads and on the plantar aspect of the toes where there are areas of pressure, uneven weight distribution, and friction.[62] Callus formation can be caused by faulty footwear and abnormal foot mechanics such as a deformity of the foot. [20]

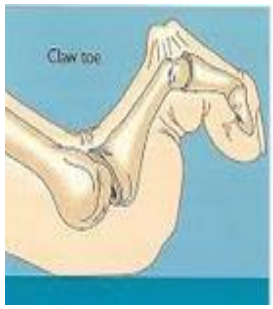


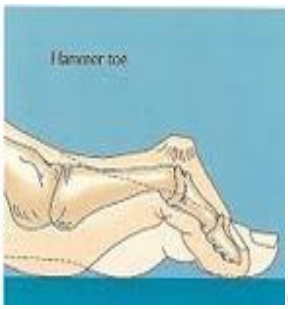
Foot ulcers are one of the major complications of neuropathy for clients with diabetes. The sensory component of neuropathy eliminates protective sensation in the foot and the motor component leads to muscle atrophy, foot deformity and increased plantar pressure. [25]

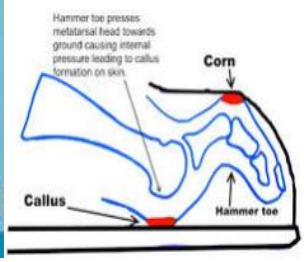


Risk factors for DFU include: [62]

- Foot deformities such as **Charcot foot**, **claw toes**, **hammer toes** and corms.
- Pressure / shear over foot bones.
- Callus formation.
- Dry skin with fissures and cracks.
- Decreased sensation.
- Poor fitting shoes or shoes with little or no support.

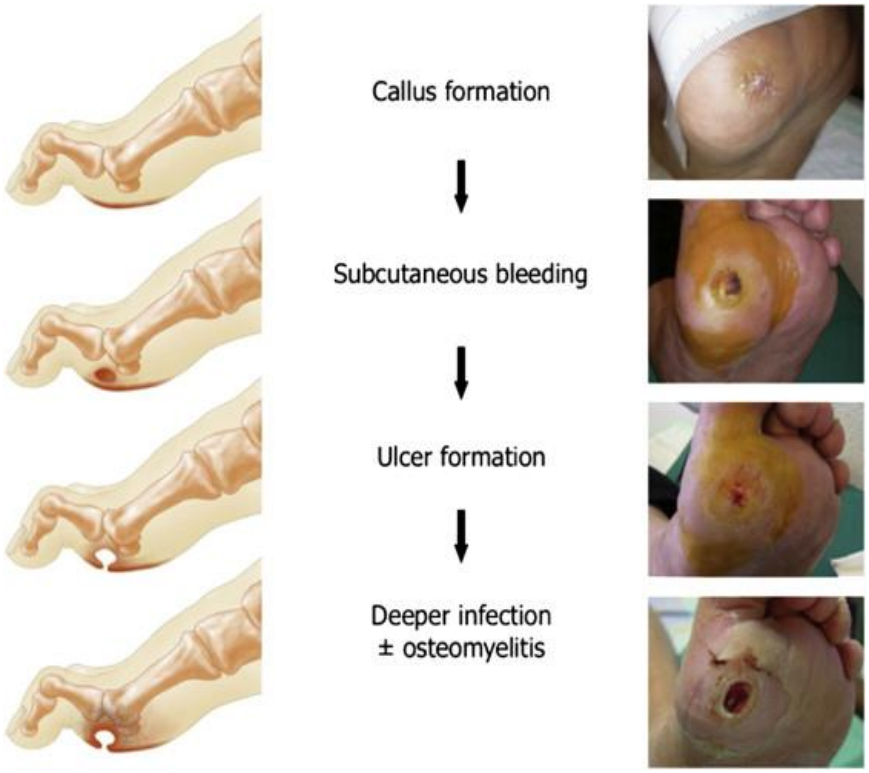






Callus formation creates additional shearing forces between bone and skin and promotes or perpetuates ulceration by creating focal areas of high foot pressure that lead to subcutaneous bleeding called **sub keratotic hematoma.**
If pressure is not resolved, pressure-induced

necrosis or ulcers form on the plantar surface of the foot.
DFU present with callus over the wound, callus around the wound margin or necrotic tissue in the wound bed. [25] Callus may also be present on the foot with no underlying damage.



Alavi, A., et al. (2014)

DFU may probe to bone, especially if there is an infection. If the wound probes to bone osteomyelitis should be suspected.

Once a neuropathic ulcer has occurred, frequent conservative sharp debridement of wounds with adequate circulation is strongly linked to reduced pressure over the foot and increased wound closure. [2, 25] Slater (2006) found that debriding callus on the plantar surface of the toes reduced surface pressure from 2.80 kg/cm^2 to 1.99 kg/cm^2. Sharp debridement combined with custom moulded orthoses further reduced pressure to1.28 kg/cm^2. [1, 52]

For clients with diabetes and peripheral neuropathy, assess the following: (Link to Assessment and Treatment of Diabetic and Neuropathic Ulcers in Adults)

1. Pressure points over the feet and ankles.
2. Appearance of foot deformities such as corns, bunions, hammer toes or claw toes.
3. Decreased joint mobility in the ankle, foot and toes, especially in the large toe.
4. Diminished sensation using monofilament testing over 10 points on the foot (Link to Monofilament Testing DST).
5. Peri wound callus or areas of callus on the foot.
6. Blood glucose levels.
7. Analysis of gait or refer to therapy services for same.
8. Current indoor and outdoor footwear.

Review the Guideline: *Assessment and Treatment of Diabetic and Neuropathic Ulcers* available at https://www.clwk.ca/buddydrive/file/guideline-diabetic-neuropathic-ulcers/

METHODS OF DEBRIDEMENT

When the nurse has determined that debridement of necrotic tissue or callus is appropriate to support wound healing, the nurse must then choose an appropriate debridement method. Necrotic tissue and slough can be debrided by autolytic, biological (maggot therapy), enzymatic, mechanical, CSWD and surgical debridement. Callus is often debrided using CSWD. More than one debridement method may be needed to achieve a clean wound bed. The following table briefly describes each debridement method and highlights their advantages and disadvantages.

Table #2: Advantages and Disadvantages of Wound Debridement Methods [6, 17, 21, 28, 29, 41, 58]

Types of Debridement	Mechanism of action	Advantages	Disadvantages
Autolytic	Supports the body's naturally occurring process in which enzymes & moisture in the wound rehydrate, soften and liquefy eschar and slough. Moisture retentive dressings that promote autolysis include hydrocolloids, hydrogels, film dressings, alginates, cadexomer iodine & hydrofibers. Hypertonic dressings such as Mesalt or Ringers dressing Scoring dry eschar prior to applying moisture retentive dressings may help to speed up the autolytic process.	▪ Can be used in conjunction with other debridement methods, e.g. prior to maggot debridement or CSWD to soften tissues. ▪ Is selective, preserving viable tissue. ▪ Is pain free; may be the best choice for very painful wounds. ▪ Easy to use. ▪ Safe. ▪ Readily available.	▪ Debridement process is slow especially if the wound is large. ▪ Accumulated wound fluid may macerate wound edges. ▪ Requires close monitoring for wound infection. Can be used for infected wounds only if they are already receiving treatment. ▪ Less effective in those with a compromised immune system. ▪ Produces debris that must be removed from the wound. ▪ Is more expensive because of the longer time requirement.
Mechanical	Involves the use of mechanical force to remove non-viable tissue from the wound. Includes different strategies to apply mechanical force including: ▪ Wound irrigation ▪ Pulsatile lavage ▪ Wet-to-dry dressings and whirlpool therapy (not recommended) ▪ Monofilament Fiber pad – Wetted and gently wiped over the wound for 2- 4 minutes.	▪ Wound irrigation, except for wet-to-dry dressings is selective preserving viable tissue, is safe and pain free and easy to access and perform. ▪ Pulsatile lavage is rarely used by nurses. ▪ Monofilament fiber pads are effective on softened necrotic tissue, quick, easy to use and only occasionally cause minor discomfort during the procedure. [7, 33, 34, 37]	▪ Some strategies such as irrigation are slow to debride especially if there is a large amount of necrotic tissue. ▪ Does not work on dry necrotic tissue. ▪ Wet-to-dry dressings are non-selective potentially removing healthy as well as necrotic tissue and are very painful when removed. ▪ Whirlpool therapy may increase the possibility of a wound infection. ▪ Monofilament fiber pads are less effective on dry necrotic tissue.
Maggot Debridement Therapy (MDT)	Larvae of the green bottle fly debride the wound by dissolving dead and infected tissue with their proteolytic, digestive enzymes. They kill bacteria in the wound by secreting antimicrobial molecules, by ingesting and killing microbes within their gut, and by dissolving biofilm. They stimulate the growth of healthy tissue	▪ Is highly selective, removing only necrotic tissue. ▪ Produces quick debridement. ▪ Stimulates healing. ▪ Can be used on infected wounds.	▪ Needs to be ordered from the US so can delay treatment. ▪ Require physician order to access maggots. ▪ Not suitable for wounds that bleed easily, communicate with a body cavity or an organ or are near major blood vessels. ▪ Dressings must be offloaded which may restrict their use on certain parts of the body. ▪ May cause slight pain as the maggots grow. ▪ Does not work on dry necrotic tissue. ▪ Aesthetically unacceptable for some clients. ▪ Require frequent monitoring & increased availability of resource people.

Enzymatic	Proteolytic enzymes are applied topically to the wound & dissolve the collagen bundles that bind nonviable tissue to the wound bed. Collagenase is the only licensed enzyme debrider available in Canada. Collagenase works more effectively in a moist wound. Requires a doctor's order.	▪ Is selective, removing only necrotic tissue. ▪ Can be used on infected wounds. ▪ Produces quick debridement. ▪ Can be used in conjunction with other debridement methods. ▪ Cost effective [41, 61]	▪ Require physician / NP order to access collagenase. ▪ Collagenase requires daily application and dressing changes. ▪ Produces debris that must be removed from the wound. ▪ Enzymatic activity is inhibited by zinc, iodine & silver. ▪ May produce pain or a burning in the wound. ▪ Temporary redness/irritation may occur.
Conservative Sharp Wound Debridement (CSWD)	Using a sharp instrument (scalpel, curette or scissors), involves the removal of non- viable tissue to the level of but not into viable tissue. If done correctly should not cause pain but may cause minor amounts of bleeding.	▪ Produces immediate debridement. ▪ Is one of the most cost effective methods. [41, 61,] ▪ Is selective removing only necrotic tissue. ▪ Very effective on heavily exudating wounds.	▪ Carries a higher degree of clinical risk than other debridement methods. ▪ Requires additional education for nurses prior to carrying out CSWD. ▪ Requires appropriate setting & equipment. ▪ May cause bleeding or pain so may not be best choice for painful wounds or for clients on anticoagulants. ▪ Not indicated for wounds where demarcation between viable and non-viable tissue is not clear. ▪ See Contraindication on page 24 & 25.
Surgical	Done by a surgeon in the operating room or other suitable environment. Is done below the level of non-viable tissue so can cause pain and bleeding.	▪ Produces immediate debridement. ▪ Turns a chronic wound into an acute wound thereby promoting more rapid wound healing.	▪ Non selective viable tissue is removed. ▪ Painful. ▪ Expensive

Learning Activity # 7

1. Identify 5 methods of debridement._____
2. Name 2 debridement methods that are cost effective._____
3. Name 2 debridement methods that provide fast debridement._____
4. Which debridement methods are non-selective? _____
5. Which debridement methods have the potential to cause pain? _____

CHOOSING THE APPROPRIATE DEBRIDEMENT METHOD(S)

In the absence of severe, rapidly spreading infection that requires surgical debridement, the clinician usually has time to consider the most appropriate method of debridement. Decisions to categorize a wound as "healable", "maintenance" or "non-healable" must be made prior to considering debridement and in collaboration with interdisciplinary team members involved in the client's care.

Link to the Wound Bed Preparation guideline, page 6 to review the Goals of Care for healable, maintenance and non healable wounds at https://www.clwk.ca/buddydrive/file/guideline-wound-bed-preparation/

The different methods of debridement have distinct features in terms of pain potential, cost, health care professional time and skill level required, resources used, appropriate environments and wound characteristics. In many situations, there is more than one appropriate method for debriding a wound. [19]

Based on the client's assessment information, the nurse, in collaboration with the wound clinician or physician / NP decides whether debridement is indicated, and if it is, what method of debridement is preferable. Selecting the most appropriate debridement method also takes into account the client's individual wishes and concerns and the clinician's competence.

When choosing the most appropriate method of debridement, consider the following: [8, 12, 16, 21, 58, 63]

1. Client Concerns / Risk Factors:
    a. Client preferences for treatment.
    b. Client's ability to participate in the debriding process.
    c. Relevant lab work.
    d. Medications that can cause bleeding or compromise the immune system.
    e. Pre-existing illnesses that impair arterial and venous circulation, compromise the immune system, cause bleeding or promote inflammation.
    f. Current wound pain and potential for further treatment-related pain.
    g. Client's vascular status.
    h. The presence of pressure, shear and/or friction over the wound and the ability to mitigate these.
    i. The client's nutritional status with respect to wound healing.

2. Wound Characteristics:
    a. Wound etiology, for example, arterial, malignant or inflammatory wounds, e.g. pyoderma gangrenosum where debridement may be contraindicated.
    b. Wound measurements and check for undermining, tunneling or sinus tracts if possible.
    c. Wound(s) probing to bone which may indicate osteomyelitis.
    d. Presence of visible muscle, bone, tendon or vascular structures (pulsatile movement) in the wound.
    e. Appearance of the wound bed, noting percentage of tissue type, especially the nature and amount of eschar and/or slough.
    f. Description of the wound edge noting the interface between viable and non-viable tissue and the presence of peri wound callus.
    g. Anatomical position of the wound especially if this affects the ability to visualize the wound.
    h. Vascular grafts or dialysis fistulas in close proximity to the wound.
    i. Presence of structures in the wound, such as internal sutures, non-soluble mesh, orthopedic hardware and prostheses.
    j. Presence of localized, deep or systemic infection.

3. Clinical concerns
    a. Skill level and knowledge of the nurse.
    b. Timeframe for debridement.
    c. Availability of equipment and resources.
    d. Availability of a safe environment for debridement.
    e. Cost.
    f. Involvement and availability of the interdisciplinary team.

Based on analysis of the previous information, the nurse who is contemplating CSWD should answer the following questions prior to discussing CSWD with the wound clinician or physician / NP: [6, 58]

1. Are there precautions or contraindications for debridement generally and specifically for CSWD? (See below.)
2. Is peripheral circulation adequate to support wound healing.
3. Does the wound contain necrotic eschar or slough?
4. Is the wound easily accessible?
5. Does the wound show signs of bio burden / localized infection, deep infection or systemic infection?
6. Is there a specific time frame required for clearing the wound bed of non-viable tissue and debris?
7. Is cost a factor?
8. Are the client and / or caregiver willing and able to participate in and adhere to the care plan for debridement?
9. Does the client have risk factors that impact the safety for debridement and specifically for CSWD such as systemic disease, poor peripheral circulation, poor nutrition or medications that interfere with healing?
10. Does wound etiology indicate that debridement is contraindicated, e.g. malignant wounds?

11. Is significant wound or treatment-related pain present?
12. Are the necessary resources, equipment and supplies available to carry out CSWD?
13. Is there competent staff to carry out CSWD?
14. Does the available environment(s) for CSWD support safe and effective practice?
15. Is assistance easily accessible in a timely way if needed?

CSWD is an appropriate debridement method if: [6]

1. The goal is to quickly remove necrotic tissue.
2. The goal is to remove callus to reduce pressure on the foot.
3. The wound margin between non-viable and viable tissue is well defined.
4. CSWD is not contraindicated.
5. The client consents to and can tolerate the procedure.
6. A competent practitioner is available.
7. The setting supports safe practice.

CSWD is a rapid and cost effective means of achieving a clean wound bed and is the preferred method when clients meet the selection criteria outlined above. [12]

Learning Activity # 8

Mr. Larsen is 84 and lives in a small apartment with his wife and adult son. He has a long standing arterial wound (ABI 0.7) on his left lateral malleolus. He has CAD, arterial insufficiency and rheumatoid arthritis (RA). He takes an aspirin daily and is on methotrexate for his RA. He is complaining of increasing wound pain. He has had numerous wound infections and thinks he may be getting another one. He spends long periods in bed lying on his left side due to some right sided pain following a bout of shingles.

When considering the most appropriate type of debridement, which facts would you consider important?

CONSERVATIVE SHARP WOUND DEBRIDEMENT (CSWD)

Conservative sharp wound debridement is the removal of non-viable tissue including eschar, slough or callus to the level of viable tissue, using a scalpel, scissors or curette. It involves minimal pain and bleeding and does not require a general anesthetic but may require analgesics and / or topical anesthesia. To prevent the removal of viable tissue, it is important to remove non-viable tissue layer by layer. [12, 23]

This is a fast and effective method of debridement that minimizes the risk of serious complications. CSWD may be performed in repeated sessions and be combined with other forms of debridement if necessary.

Only healable and maintenance wounds are appropriate for CSWD. CSWD can only be used successfully if assessment information is collected and analysed and the decision to use CSWD is based on this analysis. It is also important to remember that the decision to use CSWD is determined by the physician / NP or wound clinician in collaboration with the client's nurse.

CSWD is not a stand-alone procedure. It is part of a comprehensive plan of care that addresses client concerns as well as risk factors such as poor glycemic control, poor nutrition, pressure, shear and friction and frequently involves other members of the inter professional team. This comprehensive plan of care also includes reassessment, client monitoring and evaluation of wound outcomes following CSWD. Although this module addresses RN practice, CSWD is best optimized by an interdisciplinary approach to wound management and this approach is particularly important when caring for high acuity wounds such a diabetic foot ulcers. [36]

Read the practice guideline *Conservative Sharp Wound Debridement Using Sterile Scissors, Scalpel or Curette*

Indications, Contraindications and Precautions for CSWD

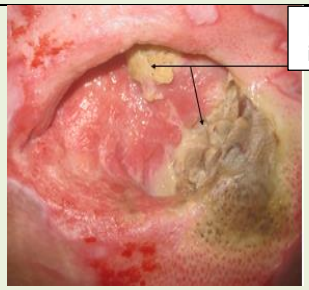
Table # 2: Indication, Precautions and Contraindications for CSWD [17, 58, 63]

CSWD is indicated if:

- The wound is healable.
- There is necrotic slough or eschar in the wound impairing the healing process.
- Callus is present on the foot or at the margins of a neuropathic foot ulcer.
- Bio burden or localized infection is present.
- Wound odour is present and related to necrotic tissue.
- Wound exudate is present and related to necrotic tissue.

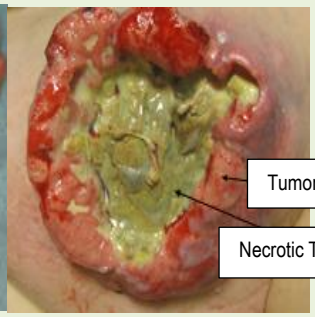
CSWD should be carried out with caution, in collaboration with a physician / NP and/or wound clinician and in a controlled setting if:

- There is a condition present that puts the client at risk for bleeding, e.g. use of anticoagulants or platelet inhibitors.
- There is evidence of moderate to severe arterial compromise.
- A deep or systemic infection is present and is being treated with antibiotics.
- The client has significant wound pain or pain associated with debridement.



CSWD is contraindicated if:

- The client does not consent to CSWD.
- The interface between viable and non-viable tissue cannot be clearly identified.
- There is a below-knee, non-infected, ischemic ulcer, covered with dry, stable eschar and the goal of care wound stability rather than healing, e.g. an arterial ulcer or a diabetic ulcer with dry gangrene.
- Pressure related heel ulcers that are healable and covered with dry stable eschar.
- Wounds are fungating, malignant or inflammatory, e.g. vasculitic wounds, Pyoderma Gangrenosum.
- There is exposed bone, ligament, muscle and/or tendons in the wound OR underlying structures, such as bone, tendons or ligaments in the wound cannot be clearly identified.
- The wound is on the hands, face or foot including the Achilles tendon where tendon, bone or ligaments is near the skin surface. The heel region and bottom of the foot can be debrided.[12, 16, 29]
- Wet or dry gangrene is present.
- It is not possible to fully access or visualize the wound.
- The client has a vascular graft, prostheses or dialysis fistula in close proximity to the wound.
- The nurse is unable to maintain no-touch or sterile technique or appropriately position the client for debridement.
- The environment is not safe or suitable to carry out CSWD.



Scoring or Cross Hatching the Wound Prior to CSWD

If using autolytic or enzymatic debridement to eschar prior to carrying out CSWD or other forms of debridement, scoring or cross-hatching can speed the softening process. The surface of eschar is scored with a sterile scalpel blade, making superficial parallel grooves approximately 0.5 cm apart in a grid pattern on the hard surface. Score with the belly of the scalpel and not the tip. The grooves are not intended to penetrate the slough or eschar and there should be no bleeding or pain as a result of scoring the wound.

Learning Activity # 9

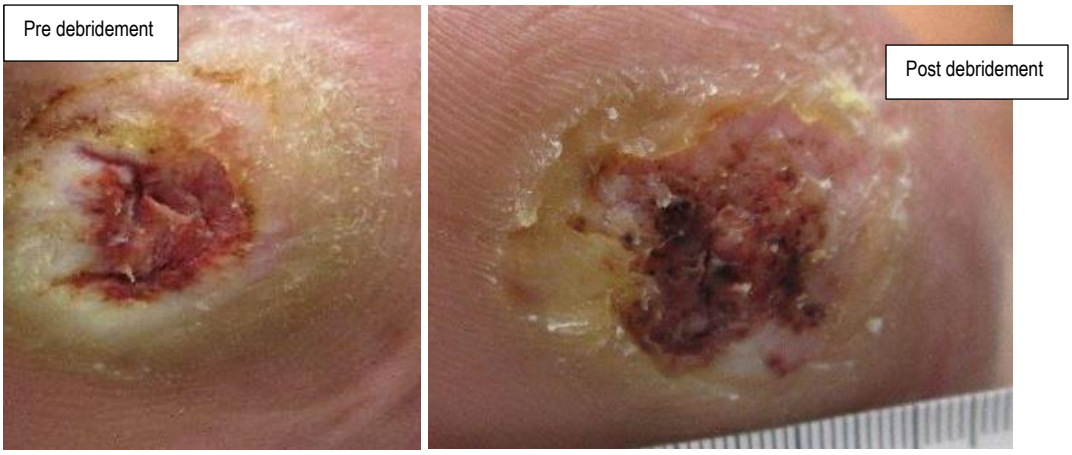
Is CSWD indicated in the following scenarios?

a. Mr. Horsley has arterial insufficiency and a small wound covered with dry stable eschar on the top of his left foot. YES NO
b. Although Mrs. Green's home health nurse and her physician feel that CSWD would be appropriate for her sacral wound, she becomes anxious and cries each time it is discussed with her. YES NO
c. Mr. Clarke has a necrotic wound on his right hip that shows evidence of localized infection and his renal failure is stable on dialysis. YES NO

Callus Debridement for Diabetic and Neuropathic Foot Ulcers (DFU) [12, 62]

Successful treatment of diabetic foot ulcers consists of debridement, infection control and offloading. CSWD is the treatment of choice for most diabetic wounds unless deep or systemic infection is present. [31]

Debridement of DFU includes removing callus build up, removing peri-wound callus and undermining, and removing necrotic tissue in the wound bed. Callus debridement allows for more accurate assessment if there is a wound underneath the callus. Callus is pared down to but not through healthy epidermal tissue. Early plantar callus removal decreases the risk of developing a wound and improves the possibility of wound healing if a wound is present. [25]



Peri wound undermining can create a reservoir for bacterial proliferation and increase the risk for wound infection in those with diabetic wounds. Removing the peri wound undermined skin containing callus helps with wound contraction and healing but also decreases the risk of infection. [25] The process of removing this undermining is called "saucerizing" because the undermining and callus are removed at an angle leaving the appearance of a saucer. [25]

Infection is a frequent and serious problem for those with diabetic wounds. Early recognition of infection in a diabetic foot is critical. Two or more signs / symptoms of infection are sufficient to diagnose infection in a diabetic wound, especially if one is new or increased pain. [31] Surgical debridement and antibiotics are indicated for all deep and systemic wound infections in diabetic foot ulcers (DFU). [54]

Osteomyelitis is common in diabetic foot wounds and difficult to treat. It is important to determine if the wound probes to bone when assessing DFU. [31]

As with all wounds, adequate vascular supply must be present prior to debriding diabetic wounds. If healability is not established, CSWD and moist interactive dressings are not recommended.

Studies have shown that frequent callus paring and removal of necrotic tissue in diabetic ulcers with adequate circulation results in more frequent wound closure [25] and a reduction in plantar pressures by up to 30%. [38, 52]
Callus debridement should be done in conjunction with other interventions such as offloading footwear, shock-absorbing orthotics, rocker soles / footwear adaptations and client education. [2, 62]

Aseptic Technique

Sterile or no touch technique is always used when carrying out CSWD. Using *sterile technique* requires the use of sterile gloves, a sterile field, sterile tray, sterile instruments, sterile solution and sterile dressings. Only sterile gloved hands or sterile instruments are used for direct contact with the wound.

Using *no-touch technique* requires the use of clean gloves and a sterile field, sterile tray, sterile instruments, sterile solution and sterile dressings. Only sterile instruments are used for direct contact with the wound. The procedure should be stopped if there is a breach of sterile technique.

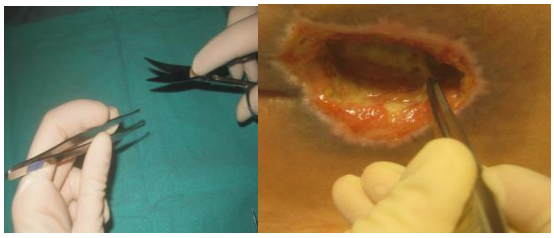
The Equipment Required to Perform CSWD

Appropriate equipment must be available to perform CSWD safely and effectively. Scissors, scalpels and curettes are all used to carry out CSWD therefore it is important to understand how these instruments are used and the most appropriate instrument needed for the type of tissue to be debrided. *Sterile* instruments must be used at all times. Reusable or disposable instruments can be used based on availability.

Tissue Forceps

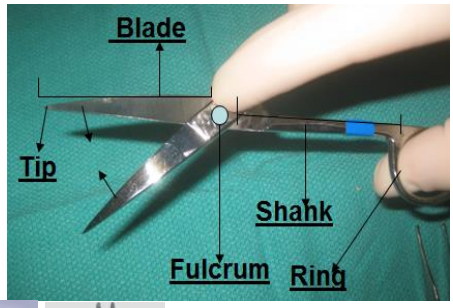
- Tissue forceps are grasping instruments used for holding non-viable tissue during dissection and debridement. Do not use plastic forceps.
- The fine 1x 2 toothed forceps concentrate force on a very small area, providing excellent holding power with minimal tissue damage.
- Examples of forceps include Adson, Semken and Gilles which can all be used for

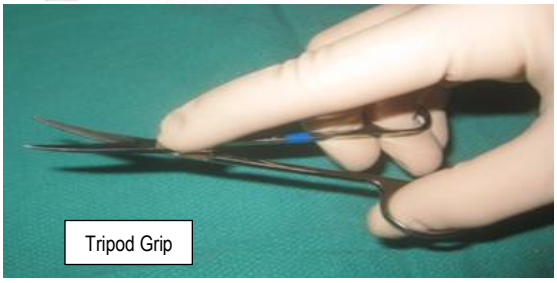
CSWD.



Scissors

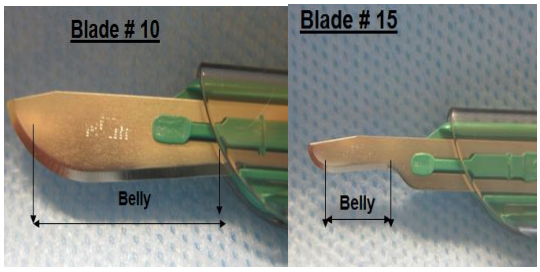
- Scissors allow stabilization of the tissue between the blades, permitting a more precise removal of flaccid tissue than the scalpel. They also provide better control of depth than the scalpel.
- Scissor blades can be curved, straight, short or long with round or pointed tips. Do not use suture removal scissors for debridement.
- Curved blades offer more mobility and visibility than straight blades but straight blades offer greater mechanical advantage when cutting tough tissue such as eschar.
- The cleanest and most precise cutting happens when the tissue is cut near the tip of the scissors instead of close to the fulcrum.
- Scissors with short blades provide greater fulcrum and easier cutting with less force while a longer shank offers more fulcrum power.
- CSWD should always be done with scissor tips angled upward.
- Lift the necrotic tissue with the forceps and use the tip of the scissors to carefully cut away necrotic tissue.
- Angle the scissors parallel to or away from the wound bed. Movement of the scissors should follow the tissue planes.
- Scissors work well with thick necrotic slough and eschar.
- Tripod Grip
    - The tripod grip provides maximum control of the scissors.
    - The thumb and ring fingers are placed through the rings of the scissors and the index finger rests on the fulcrum.
    - The tripod grip provides more torque and shearing force than the thumb-index finger grip.





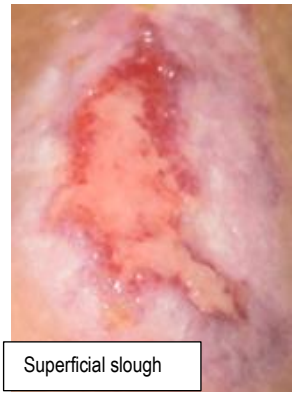
Scalpels

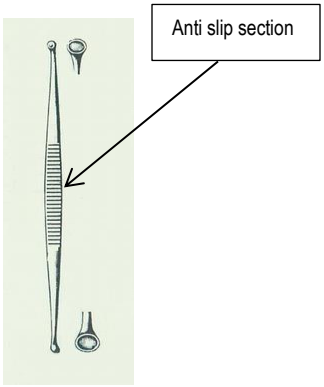
- The scalpels most commonly used for CSWD are #10 and #15.
- A #10 is more effective for removing extensive necrotic tissue while a #15 is better for finer removal of small areas of tissue by nurses.
- The sharpest part of the blade is the belly and this area should be used to cut necrotic tissue.
- The scalpel should be held like a pen, 3-4 cm away from where the blade meets the handle.
- The cutting action of the scalpel is controlled by finger and wrist movement.
- When cutting, the scalpel should be parallel to or angled away from the wound bed. Scalpel movement should follow the tissue planes and thin slices of tissue are cut away at a time.
- Do not use a lot of force on the scalpel as the blade may penetrate through the necrotic tissue, cutting underlying structures and viable tissue.
- Scalpels work well with callus and thick necrotic slough.

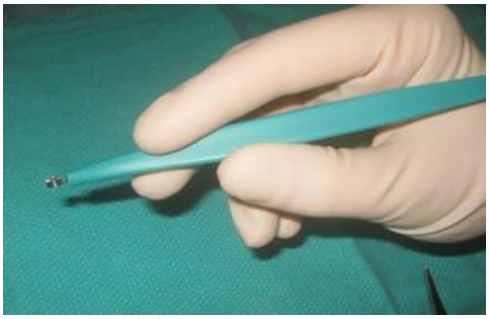


Loop Curettes

- Curettes are often used to scrape superficial necrotic slough; they are often a better option for debridement of superficial loose slough than scalpels or scissors. Curettage may be painful.
- Curettes range in size from 1-7 mm. However, the sizes most commonly used are 4, 5 and 7 mm.
- Curettes are held like a pen at a 10 – 20^0 angle toward the area to be debrided.
- Place the Index finger on the anti-slip section of the curette. Stretch the skin-wound base with the non-dominant hand, and move the curette toward yourself scraping away loose, non-viable tissue using short strokes.



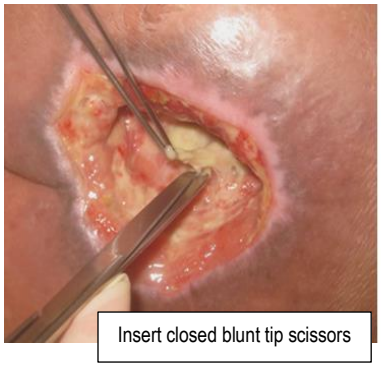




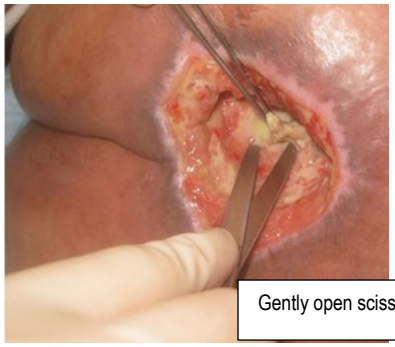
Blunt Dissection Technique:

Blunt dissection technique safely separates viable and non-viable tissue, allowing non-viable tissue to be more easily debrided with scissors.

Insert the closed blunt tips of scissors or arterial forceps under the loose slough to a depth of approximately 1 – 2 cm. and then gently open the scissors or forceps. Note that forceful stretching can tear adjacent healthy tissue. [35]



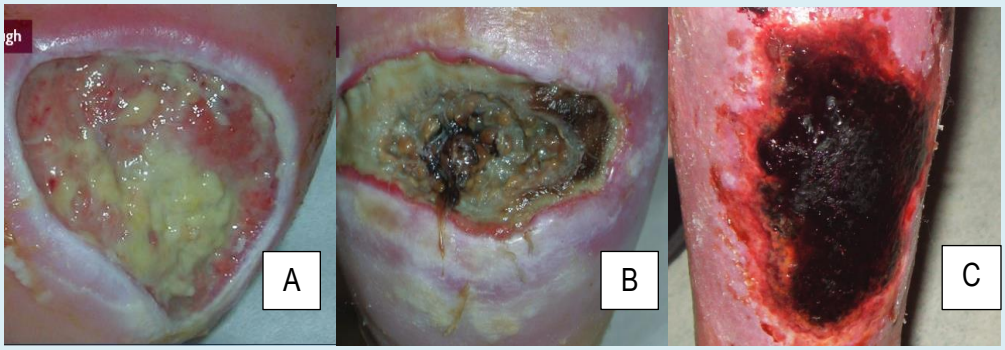
Insert closed blunt tip scissors



Gently open scissors

Learning Activity # 10

Identify the instruments (scalpel, scissors or loop curette) that are best able to debride the following wounds.



Read the following procedure *Conservative Sharp Wound Debridement Using Sterile Scissors, Scalpel or Curette* available at….

Read the following procedure *Conservative Sharp Wound Debridement of Callus in a Diabetic Foot* available at ….

A Safe Environment in Which to Perform CSWD

CSWD is a high risk procedure and therefore requires a controlled environment that supports the nurse to practice safely and effectively. A calm environment allows the clinician to perform the procedure without unnecessary noise and distraction. If the nurse becomes fatigued during the procedure, it should be stopped. An assistant may be necessary to help with positioning the client and managing any unintended outcomes of the procedure. There must also be enough time allocated for the procedure to be carried out adequately and safely.

The literature [12, 16] supports carrying out CSWD in the hospital, clinic, facility or home *only* if the following conditions are in place:

1. The client must be in a position that is comfortable, can be maintain for the duration of the CSWD and that clearly exposes the wound. If there is risk for movement a second person must attend the debridement to support the client to remain still.
2. The nurse must have enough uncluttered space to maneuver without impediment and a chair or stool to sit on to carry out the procedure comfortably if the bed cannot be elevated.
3. The nurse must be able to maintain good body mechanics throughout the procedure.
4. The nurse must be positioned so s/he is able to clearly visualize and access the wound and all required equipment.

5. CSWD must be done on a stable surface such as a firm bed, clinic examining table or hospital bed.
6. Lighting must be adequate to visualize the wound; a portable lamp should be used if the lighting is not adequate.
7. The nurse must have access to assistance in a timely manner, if required, to address complications as they arise.
8. The nurse must be able to maintain a sterile environment during the procedure.

Learning Activity # 11

Is CSWD safe in these environments?

a. Mrs. Woo lives in a small studio apartment that has not been cleaned for some time. She sleeps on her couch. Social services staff have been asked to work with Mrs. Woo's daughter to address the excessive clutter in the apartment.
YES NO

b. O'Hara lives in a house with his wife. The house is large and well kept. Although the only lighting in the bedroom is a bedside lamp Mrs. O'Hara states that she has an excellent reading light in the den. His bed is firm and Mr. O'Hara is able to follow directions well. YES NO

Competence to Perform CSWD [26, 23, 39, 62]

Only those who have successfully completed agency requirements for competency in CSWD are able to perform the procedure.

CSWD provides quick results and is very effective but it carries a higher degree of clinical risk than other debridement methods. Therefore CSWD must only be carried out by nurses who are competent to perform the procedure because clinical competence is central to risk reduction for clients. In addition to the ability to perform CSWD, nurses must be competent to assess a client to determine if CSWD is indicated and to work with a wound clinician or physician / NP to make the decision to debride. The nurse also needs to know when to involve others in the debridement process, how to manage unintended outcomes and when debridement should be stopped. Nurses should only accept the responsibility to perform CSWD if they are confident that they have the appropriate level of knowledge and skill to perform the procedure. [12] Although nurses may be competent to debride some wounds, other wounds, such a large, deep wounds, wounds over bone or tendon, very painful wounds or infected diabetic wounds may be beyond their level of competence. [23]

Agencies and health authorities must have policies that address educational preparation and competency and have mechanisms to monitor who has successfully completed the education. [12, 23, 43]

Obtaining Client Consent for CSWD

Informed consent is the process by which the nurse and other health care professionals disclose appropriate information to a competent client so that the client can make a voluntary choice to accept or refuse treatment.[53] Consent must be obtained for CSWD as it may cause pain and carries a significant risk for the client. The adequacy of consent explanations is judged by the "reasonable client" standard, that is, what a reasonable client in the particular client's position would expect to hear before consenting. [13]

Education empowers the client to make informed treatment decisions about debridement methods and to be a full partner in their care. [12] When clients understand the reason for their treatment they are more likely to participate in and adhere to the treatment plan. [17, 53]

The client should receive the following information prior to being asked to provide consent for CSWD: [12, 17, 53]

1. A description of the procedure and how it is performed.
2. What to expect once it is completed, e.g. the wound will be larger.
3. The benefits and risks of CSWD:
    a. Removes non-viable tissue quickly.

   b. May cause treatment related pain or bleeding. Identify measures to control pain and bleeding during and following the debridement.
   c. Is cost effective and time efficient.
   d. Reduces the risk of infection.
   e. Promotes healing.
   f. May cause damage to tendons, fascia, ligaments, muscles and bone.
4. The rationale for CSWD as the debridement method of choice.
5. Available alternatives to CSWD.
6. The approximate length of the procedure.
7. The client's ability to stop the procedure at any time.

For consent to be valid, the person giving the consent must understand the information provided and be capable of giving consent. However, if the client is not competent to give consent a family member, client representative, substitute decision maker or significant other who is aware of the client's situation and has received appropriate information can agree to the procedure. [13, 53]

Consent can be either written or verbal based on agency policy and must always be documented on the client's record.[35]

Repeated CSWD

Repeated or serial debridement is the removal of non-viable tissue in repeated sessions until the majority of necrotic tissue is removed. [12, 62] CSWD may not be completed in a single session because the wound may be large, non-viable tissue can be extensive or more difficult to debride and necrotic tissue can re-accumulate making repeated debridement a necessary. In addition, the nurse may have insufficient time to complete the debridement or the client may request that a debridement session end and be restarted at a later date. Optimum debridement times range from 15 to 30 minutes to prevent nurse and client fatigue. [16, 43, 62]

Repeated debridement sessions continue until a healthy wound bed is achieved. Repeated debridement has been reported as an independent factor leading to a higher rate of healing in some wounds. [29, 62]

Combination debridement

Combination debridement is the use of complimentary methods of debridement to prepare the wound for CSWD or to continue the debridement process between CSWD sessions. [12] The choice of debridement methods may change at different stages of wound healing as the wound environment changes. [6] For example, CSWD may remove slough to just above the level of viable tissue and autolytic debridement may be used to remove the remaining slough or autolytic debridement may be used to soften surface eschar prior to CSWD.

ADVERSE EVENTS OF CONSERVATIVE SHARP WOUND DEBRIDEMENT

The procedure should be stopped immediately if complications such as pain, damage to underlying tissues or bleeding occur. The client should be reassured and appropriate action taken which may involve seeking expert or medical assistance. All complications and subsequent actions should be documented in the client's health record and other health professionals caring for the client should be informed.

Wound Pain

Prior to starting CSWD the nurse must assess for any evidence of wound pain. For clients with extensive wound pain CSWD may not be the debridement method of choice. Although removing necrotic tissue does not cause pain, CSWD can be painful if viable tissue is pulled or cut during the procedure. It is important to ensure the client is fully informed and in a comfortable position before debridement is initiated as an informed and comfortable client is usually a more relaxed client and less likely to move unexpectedly. [29, 43]

Systemic pain management is indicated if the client has wound pain prior to CSWD, if the wound is large or if there is concern about the structures underneath the necrotic tissue. If the client has wound pain and/or treatment-related pain, organize care to coordinate with analgesic administration allowing sufficient time for the analgesic to take effect. Administer ordered analgesic medication regularly and in the appropriate dose to control pain. If wound pain is not well controlled with oral analgesics, consult with a physician / NP to determine the need for topical analgesics (e.g. morphine) or anesthetics if wound pain is not well controlled. In addition, analgesic dressings such as Biatian IBU can be helpful post debridement.

EMLA is a topical anesthetic with clinical evidence of analgesic efficacy. It is applied prior to CSWD to decrease pain. Numerous studies have shown that EMLA applied to the wound significantly reduces pain during and following sharp debridement. In addition it has low systemic toxicity, has low potential for sensitization and no adverse effects on healing. Research also shows that those receiving EMLA require fewer debridement sessions and the time needed to achieve a clear wound bed is reduced. [10, 32, 45, 55]

Apply 1-2 g. / 10 cm^2 (2 inches) up to a total of 10 grams of EMLA to the wound and occlude the wound for 30 – 60 minutes prior to treatment. Apply EMLA 60 minutes ahead of debriding if debriding necrotic tissue with a thicker penetration barrier (thick eschar). Start debriding immediately following removal of EMLA cream.

If there is a second person participating in the CSWD procedure, reposition the client periodically to increase comfort. If the client experiences pain despite pharmacological and non-pharmacological interventions, the procedure should be stopped and the pain addressed before continuing CSWD or the session terminated and attempted again at another time.

Bleeding

Although CSWD should not produce bleeding, occasionally a small amount of bleeding from the tissue may occur. However, sometimes a blood vessel in the wound bed may be cut. If bleeding occurs, stop the procedure and determine if the bleeding is from tissues or from a blood vessel. If bleeding appears to be from a blood vessel in the wound bed, contact a physician / NP immediately.

For bleeding from the tissues or from a blood vessel:

1. Put a hemostatic dressing such as an alginate dressing or a plant / cellulose sponge on the wound, elevate the limb (if on a limb) and apply pressure to the area.
2. If the dressing or sponge used to apply pressure becomes saturated, do not remove it. Rather place a second pad over the first and continue applying pressure.
3. If bleeding from the tissues fails to stop with pressure, apply a silver nitrate stick to the area to control bleeding.
4. If bleeding is not controlled within 15 minutes or continues to be profuse, contact a wound clinician or physician / NP.
5. If you are not able to stay with the client longer than 15 minutes and the wound is still bleeding, send the client to an emergency department.
6. Once bleeding is controlled, gently cleanse the wound and place a non adherent hemostatic dressing such as an alginate over the bleeding surface.

The process of clot formation and resolution is a normal body response to injury. Medications such as platelet inhibitors and anticoagulants are given to prevent clots that could cause tissue damage or death from problems such as coronary artery disease, atrial fibrillation and joint replacement. [27] If CSWD is an option for debridement, it is important for the nurse to know if the client is taking these medications. If the client is taking platelet inhibitors and anticoagulants they should have a recent Hgb, PTT and INR (if they are taking Warfarin).

Bleeding that cannot be controlled within the stated time must be documented in the client's record. In addition, a PSLS report must be completed. The British Columbia Patient Safety & Learning System (BC PSLS) is a web-based tool used by healthcare providers across BC to report and learn from patient safety concerns such as adverse events, good catches (near misses) and hazards.

Products to Control Bleeding	Mode of Action
▪ Calcium alginate dressings.	▪ Calcium alginate dressings contain calcium and sodium fibers and are made from seaweed. ▪ When placed in a moist wound, the dressing releases calcium ions which can activate thrombin and improve hemostasis. ▪ Is effective for minor bleeding.
▪ Silver Nitrate Sticks	▪ Contains silver nitrate and potassium nitrate and is used to chemically to cauterize a wound, providing hemostasis. Is effective for minor bleeding. ▪ The stick is rolled on the affected mucous membrane or visible blood vessel where chemical cauterization stops the bleeding. ▪ If the bleeding is too copious, the chemical cautery may not be effective, as the flowing blood can wash away the chemical before it can react with the tissue. ▪ The Product Information Sheet for silver nitrate sticks is available at https://www.clwk.ca/buddydrive/file/silver-nitrate-sticks-for-wound-care/
▪ Absorbable Gelatin / Plant Cellulose Sponges	▪ Sponges placed into the wound stop bleeding by forming an artificial clot and producing structural support for the forming clot.

Damage to Underlying Tissues

Damage may occur to muscle, fascia, bone, ligaments and tendons underlying non-viable tissue in the wound. It is recommended to debride necrotic tissue and callus in thin layers or small amounts to avoid this complication.

If a ligament, muscle, fascia or tendon is cut, stop the procedure, cover the wound with a sterile moistened dressing and contact a physician / NP immediately.[15] Nourishment is disrupted to tendon or bone when they are exposed. This can lead to infection or **desiccation**. In addition, stop the procedure immediately if you are unsure of the anatomy seen in the wound and surrounding area or a structure in the wound cannot be identified. Notify the wound clinician or physician / NP if this occurs.

If an underlying structure is exposed or damaged in any way, document this in the client's record, notify the wound clinician and physician/ NP and complete a PSLS.

Learning Activity # 12

Identify 3 ways to control bleeding during or following conservative sharp debridement.

ASSESSMENT AND DOCUMENTATION FOLLOWING CSWD

Following the procedure, assess and document the following:

1. Client consent.
2. Appearance of the wound following debridement including the area debrided, wound measurements, and the amount and type of tissue removed.
3. Presence of infection, purulent drainage or an abscess.
4. Presence of undermining or tunneling.
5. Type of dressing applied to the wound.
6. Presence of untoward events and treatment used:
    a. Pain during or following the procedure
    b. Bleeding if present especially if difficult to control

   c. Damage to underlying tissue.
7. Other types of debridement used on the wound.
8. Photographs before and after debridement.
9. Date for follow-up assessment.
10. Date for follow-up debridement session, based on agency policy.

SUMMARY

Congratulations! You have completed **Section A – Theory** of this self-study module on conservative sharp wound debridement. It has provided information on the healing process, anatomy of the wound and underlying structures, the assessment required prior to debriding a wound, various types of debridement with emphasis on CSWD and the adverse events that can occur with CSWD.

Section B – Practice starting on page 34 contains a quiz and 3 case studies to help you consolidate the knowledge you gained in Section A. After successfully completing Section B you are ready to work with a clinical mentor to practice the skill of conservative sharp wound debridement. See Appendix B for the Skills Checklist.

SECTION B: PRACTICE

Note that the quiz and care studies in this section include content from:

- This Self Study Module
- The guideline: *Conservative Sharp Wound Debridement Using Sterile Scissors, Scalpel or Curette*
- The procedure *Conservative Sharp Wound Debridement Using Sterile Scissors, Scalpel or Curette*
- The procedure *Conservative Sharp Wound Debridement of Callus in a Diabetic Foot*

The answers for the quiz and case study questions are in Appendix C.

QUIZ

1. CSWD is defined as? Choose the **best** response.
    a. Rehydrating necrotic tissue to soften and separate from viable tissue.
    b. Removing dead tissue with a scalpel or scissors above the level of viable tissue.
    c. Facilitating wound healing.
    d. Removing dead tissue and healthy tissue causing bleeding and pain.

2. CSWD: Choose the **correct** responses.
    a. Quickly removes large amounts of necrotic tissue.
    b. Is the debridement method of choice for clients taking anti-coagulant medication?
    c. Does not require premedication for pain.
    d. Should not be used when the client refuses consent.
    e. Is contraindicated for wounds with untreated deep and systemic infection.

3. The presence of necrotic tissue in the wound affects healing in each of the following ways *except:*
    a. Impairs healthy granulation tissue.
    b. Serves as a medium for bacterial growth.
    c. Facilitates the migration of epithelial cells.
    d. Increases exudate and wound odour.

4. Necrotic slough is: (Choose one or more responses)
    a. Devitalised, dead tissue that often appears black.
    b. Wet or dry yellow necrotic tissue that adheres to the wound bed.
    c. Red, granular tissue that fills a wound as it is healing.
    d. Helpful to wound healing.

5. Which debridement methods are not effective on dry, stable eschar?
    a. CSWD
    b. Enzymatic debridement.
    c. Biological / maggot debridement.
    d. Surgical debridement.

6. Diabetic wounds are found on which of the following areas:
    a. The medial malleolus.
    b. Tops of the toes
    c. Over the gaiter area.
    d. Bottom of the heel
    e. Bottom of the toes.
    f. On the dorsal forefoot.

7. Identify five S & S of bioburden / localized infection in wounds._____
_____
_____

8. Match the description below left with the type of tissue on the right. Use each statement on the left only once.

1. Contains blood vessels and connective tissue	1. Dry stable eschar ____
2. Moist soft tissue that is tan, yellow or green	2. Tendon ____
3. Covers muscle	3. Moist unstable eschar ____
4. Contracts when pinched	4. Muscle ____
5. Desiccates rapidly if exposed.	5. Moist slough ____
6. Attaches muscle to bone.	6. Bone ____
7. Firm dry black tissue	7. Dermis ____
8. Soft boggy black tissue	8. Fascia ____

9. Identify 4 reasons to stop conservative sharp wound debridement._____
_____
_____

10. Identify 4 contraindications for CSWD.
_____
_____

11. Identify 3 situations where CSWD, if performed, should be performed with caution.
_____
_____

12. Identify if the following statements are true or false.
    a. If the wound is below the knee, a lower limb assessment should be completed prior to CSWD. _____
    b. CSWD is a non-restricted activity according to the Nurse's (Registered) and Nurse Practitioner Regulation. ___
    c. CSWD is indicated if wound odour and exudate are related to necrotic tissue. _____
    d. CSWD is indicated if the client has an untreated systemic infection. _____
    e. CSWD is indicated if underlying structures such as tendon or bone cannot be clearly identified. _____
    f. A lower limb assessment should be completed prior to CSWD if the wound is on the leg or foot. _____

13. Identify 3 investigations that may be indicated prior to CSWD.
_____
_____

14. Which statements about debridement are correct?
    a. One goal of debridement is to reduce exudate and odour from the wound.
    b. Once debrided, necrotic tissue will not recur.
    c. Ischemic toes with gangrene should be debrided to re-establish a moist healing environment.
    d. Clients with an ABI between 0.9 and 0.7 should not receive CSWD.

15. List 5 clinical concerns that you would need to consider when choosing the most appropriate method of debridement.
_____
_____
_____

CASE STUDIES

Case Study #1

You see Mr. Graham in the Wound Care Clinic. He is 38 years old and works in telemarketing. He lives with his wife and 2 children and is the sole provider for the family. He has paraplegia and although he is able to transfer himself he requires assistance with personal care.
He tells you that he has a pressure ulcer on his sacrum. His wife has been changing the dressing daily and is concerned that the ulcer is getting bigger and beginning to smell even after the dressing has been changed.
He is on Nortriptyline and Baclofen but other than the paraplegia he is healthy. He has an indwelling catheter and has a recurrent UTI which is being treated with antibiotics.
When the dressing is removed you are aware of a strong odor. There is a large amount of purulent drainage and the wound is clearly infected and has not been treated for this. The wound bed is covered with a large amount of moist necrotic slough. It is not possible to assess the base of the wound.

1. Would you use CSWD to debride this wound? Describe your rational for your decision.

   _____
   _____

2. Based on the clinical signs, does Mr. Graham's have a localized or deep infection? How would you follow-up after determining the type of infection?

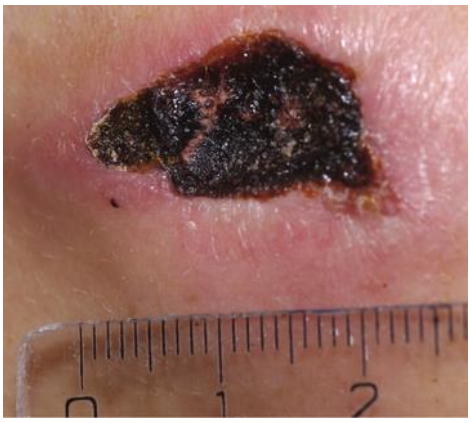
   _____
   _____

3. The infection in his sacral wound has been treated and the erythema, warmth, foul odour and purulent exudate have resolved. The wound clinician has indicated that you can debride the wound using CSWD.

   How long wound you debride before stopping and how would you treat the wound between CSWD sessions?

   _____
   _____
   _____

Case Study #2



A LTC case manager has asked you to see Mr. Anderson. He is 83 years and lives alone in an apartment. The apartment is cluttered and he has 2 cats. He depends on daily home support workers for his meals, bathing and daily hygiene and has someone who cleans his apartment weekly. He is thin and has osteoarthritis and heart failure that has been treated.
Last week he fell and was found on the floor by his home support worker 18 hours after the fall. He was hospitalized for 24 hours and sent home with a pressure ulcer on the upper right quadrant of his back.

When Mr. Anderson arrives in the clinic he has an undressed wound covered with dry black eschar on his back. There is minor erythema and edema around the wound margins and the margins are attached to the peri wound skin. There is no drainage.

1. Does this wound require debridement? Provide a rational for your decision.

   _____

2. You discuss the need for debridement with the wound clinician and she agrees that he should come into the wound clinic and have the wound debrided using CSWD. However before that occurs the dry eschar needs to be softened.

   What method of debridement would be appropriate to soften the eschar?

   _____

3. Mr. Anderson Is back in the clinic 2 weeks later. The eschar has softened and appears as necrotic slough. His wound appears infected and he tells you that this doctor has out him on antibiotics. The wound clinician wants you to use CSWD to clear the necrotic tissue.

   Prior to debriding this wound, what would your assessment entail?

   _____
   _____
   _____

4. Since seeing him last, Mr. Anderson he has been put on the anti-inflammatory medication Celebrex for his osteo arthritis.

   How will this affect his wound healing? _____
   Is this a contraindication for CSWD? _____

5. During the debridement Mr. Anderson becomes anxious and starts shaking.

   What would you do? _____

6. He agrees to another debridement session and when you set the appointment, he tells you that it is extremely difficult to get to the clinic so you set up the appointment at his home.

   When you get to the home what would you assess for to make sure that the environment is safe for CSWD?

   _____

Case Study #3

Mrs. Clarke sees you in the clinic following a recent caesarian section. She gained 60 lbs during her pregnancy and continues to be significantly overweight. She smokes heavily. She lives with her husband, does not work and has her newborn and a 4 year old child at home. She has diabetes and is on insulin but has no other health problems.
She developed a wound infection following her C-section and the wound dehisced. Following the dehiscence, her wound was treated with **Dakin's** solution 1:24 packing daily which seemed to help initially but Mrs. Clarke states that recently the wound has not improved.

1. Currently her wound is draining a minimal amount of sero-purulent drainage with no odour and no peri wound redness. The wound bed is covered with adherent thick yellow-brown slough with small areas of pink tissue on the periphery of the wound.

   Does this wound require debridement? Provide a rational for your decision.

   _____
   _____

2. How would the diagnosis of diabetes affect her ability to heal?

   _____
   _____

3. As you are debriding, you find a foreign body that you think might be a suture near the base of the wound.

   What would you do?

   _____
   _____

Case Study #4

Clara Kennedy Is 66 and extremely overweight. She has had Type 2 diabetes for 10 years and recently started taking insulin to better control her blood sugars. She retired early and lives with her husband who still works. She is able to do her personal care but depends on him for most other things.
She seldom leaves the house and wears sandals with little support most of the time. When asked about the callus on the bottom of her left great toe she states that she has "had it for ages" and "never really worried about it". She is concerned about the diabetic foot ulcer on the pad of her right forefoot even though it is not causing her any pain.

1. Following discussion with the wound clinician the decision is made to debride the callus in both areas using CSWD.

   What is the rational for debriding the calluses?

   _____
   _____

2. Mrs. Kennedy has the beginning of a Charcot foot.

   What is a Charcot foot and why is it problematic?

   _____
   _____

3. When you debride the callus on her great toe how deep do you debride?

   _____

4. Which of the following might you notice on the foot of someone with diabetes?
   a. Dry skin.
   b. Claw or hammer toes.
   c. A wound probing to bone.
   d. Peri-wound callus.
   e. Wound infection.

GLOSSARY

1. **Aseptic technique –** Technique used to limit the transfer of microorganisms from one person to another by minimizing the microbe count and preventing cross contamination; includes sterile, no-touch and clean technique. The technique chosen is based on the clinical condition of the client, the etiology of the wound, invasiveness of the procedure, goal of care and agency policy.
2. **Bacterial bio burden / Localized infection –** Replicating microbial burden in the wound surface compartment with subtle clinical signs if host injury.
3. **Debridement** – The removal of non-viable tissue from the wound. It supports the development of granulation tissue which is necessary for healing to occur. Surgical debridement is not within nurse's scope of practice; however nurses can carry out all other types of debridement. Because CSWD is a restricted activity nurses require additional education and must follow a guideline when carrying out this activity.
4. **Charcot foot** – A condition affecting the bones, joints, and soft tissues of the foot and ankle. Occurs due to diabetic neuropathy. Diabetes, sensory-motor neuropathy, autonomic neuropathy and trauma combine to produce an acute localized inflammatory condition that, over time leads to bone destruction, subluxation, dislocation, and deformity. Pain may occur in the acute stage, but diminishes over time. The main deformity is a mid-foot collapse, described as a "rocker-bottom" foot. The "rocker-bottom" deformity is a late stage symptom and can be avoided by early recognition and management with offloading and surgery if indicated. If it continues unchecked, Charcot foot results in joint deformity, ulceration, infection, loss of function, and in the worst-case scenario, amputation or death.
5. **Claw toes** – Claw toes bend up at the joint where the toes and the foot meet, then bend down at the middle joints and at the joints nearest the tip of the toes. This causes the toes to curl down toward the floor. This often affects the four smaller toes at the same time. Claw toes are the result of nerve damage caused by diabetes that weakens the muscles in the foot. As a result of claw toes, corns may develop over the top of the toe or under the ball of the foot. Treatments include shoes with a wide toe box, soft upper shoe, and stiff sole, metatarsal pads, cushioning socks with a silicone lining to relieve pressure at the proximal interphalangeal (PIP) joint and tip of the toe or a longitudinal pad beneath the toes to prevent point pressure at the tip of the toes.
5. **Desiccation** – the state of extreme dryness or the process of extreme drying.
6. **Eschar, dry stable** – Firm, dry necrotic tissue with an absence of drainage, edema, erythema, fluctuance or separation from the wound edge; may be black or brown in color and is attached to the wound edges and wound base.
7. **Eschar, soft boggy** – Soft boggy necrotic tissue which is black, brown or gray in colour; it may be firmly or loosely attached to the wound edges and wound base; fluctuance and drainage may be present.
8. **Friction** – A mechanical force that occurs with repeated movements over surfaces such as bedding; it results in the loss of the protective layers of skin when and reduces the amount of pressure needed to cause breakdown.
9. **Fluctuance** – Occurs when the wound has a wave-like motion when it is palpated.
10. **Gangrene** – Death or decay of body tissue which may involve bacterial infection. Is usually due to loss of blood supply to the affected area and can be wet or dry.
11. **Granulation tissue** – New connective tissue and tiny blood vessels that form on the wound bed during the healing process. It appears as firm, red, moist, pebbled healthy tissue.
12. **Hammer toes** –. Hammer toes are a contracture (bending) of the middle toe joint or both joints of the second, third, fourth, or fifth (little) toes. Hammer toes often occur with bunions and may cause corns or calluses. They may present with inflammation, redness, or a burning sensation. They are progressive so should receive early attention. Treatments include padding corns and calluses, changing foot wear, and orthotic devices.
13. **Healable wound** – Wounds are healable when the cause can be treated, there is adequate blood flow for healing and risk factors that impede healing can be mitigated. Normal wound healing occurs in a predictable trajectory. However wound healing trajectories can be heterogeneous and non uniform and some wounds present with a prolonged wound healing trajectory.
14. **Hyperkeratosis** - Increased keratinization (cornification) of the epidermis, which appears clinically as thickening of the skin or mucous membrane. Hyperkeratosis is seen in numerous lesions including verruca vulgaris, psoriatic plaques, and actinic keratosis.
15. **Ligament –** A short band of tough, flexible, fibrous connective tissue that connects two bones or cartilages or holds together a joint.

16. **Micro-angiopathy –** A disease of the capillaries (very small blood vessels), in which the capillary walls become so thick and weak that they bleed, leak protein, and slow the flow of blood. For example, diabetes predisposes to the development of micro-angiopathy in many areas, including the feet and eyes.
17. **Non-healable wound** – Wounds that are not able to heal due to insufficient blood supply, an inability to treat the cause of the wound (malignant wounds) or an inability to treat factors impacting wound healing (immune compromised client).
18. **Slough** – Soft, moist necrotic tissue that is brown, tan, yellow or green in colour. It may be thin or thick and the consistency may be fibrous, stringy or mucinous. It may be firmly or loosely attached to the wound edges and base.
19. **Sub Keratotic Hematoma** – A frank hematoma underlying a callus in a neuropathic/diabetic foot. It can predispose to an ulcer if pressure and friction are not addressed.
20. **Tendons –** A flexible, inelastic cord of strong fibrous collagen tissue attaching a muscle to a bone. Are nourished by blood vessels and by diffusion of nutrients from synovial fluid. When exposed they desiccate and become non-viable.

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APPENDIX A: Additional Readings

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APPENDIX B: Skills Checklist [24]

Conservative Sharp Wound Debridement: Skills Checklist for RNs

Name_____ **Date** _____

CSWD Education Attendance: Date _____

Place a √ or an X in the appropriate square.

Competency	Mentored Sessions				Follow-up (if needed)	
	1	2	3	4	1	2
1. Discusses the debridement with the wound clinician or physician / NP and receives a directive or order to continue with debridement.						
2. Is aware of the precautions and contraindications for CSWD.						
3. Provides rationale for use of CSWD based on client assessment.						
4. Accesses adequate lighting, equipment and assistance, if needed and positions the client appropriately.						
5. Explains required information to the client and obtains informed consent.						
6. Positions the client so that they are comfortable and the wound is easily accessible.						
7. Demonstrates understanding of relevant anatomy and underlying tissue.						
8. Identifies viable and non-viable tissue.						
9. Performs a complete wound assessment prior to debriding.						
10. Uses sterile or no touch technique correctly.						
11. Manages pain and discomfort prior to, during and following the procedure.						
12. Demonstrates acceptable skills and techniques when carrying out CSWD: ▪ Gathers appropriate instruments to debride the specific wound. ▪ The instruments are handled appropriately with respect to safety & the most appropriate tool is selected for the tissue type to be removed. ▪ The tissue to be removed is grasped securely with care for the underlying viable tissues. ▪ The non-viable tissue is removed one layer at a time. ▪ Viable tissue is not compromised.						
13. Identifies when to stop the procedure at the appropriate level of tissue.						
14. Applies an appropriate wound dressing once the procedure is completed.						
15. Assembles what is needed to address bleeding during the procedure and identifies the process for addressing bleeding for those not on anticoagulants and for those on anticoagulants.						

16. Recognizes skill limitations and the need to involve others if necessary.						
17. Utilizes secondary debridement techniques if needed.						
18. Documents CSWD according to agency standards.						
19. Outlines a comprehensive plan of care for reassessment, ongoing debridement and wound healing.						

Within the 4 mentoring sessions, wounds with eschar, slough and callus should be debrided. In addition, the learner should use a variety of debriding instruments.

Signature / Status of Mentor for Session #1 _____

Signature / Status of Mentor for Session #2 _____

Signature / Status of Mentor for Session #3 _____

Signature / Status of Mentor for Session #4 _____

Signature / Status of Mentor for Follow-Up #1 _____

Signature / Status of Mentor for Follow-Up #2 _____

Comments

_____

_____

_____

_____

_____

Achievement of Competency

I / We have mentored this nurse for ____ client visits and think that she / he demonstrates sufficient competency to perform CSWD independently.

Signature / status of mentor _____

Signature / status of mentor _____

Signature / status of mentor _____

Signature / status of mentor _____

Signature / status of mentor _____

Signature / status of mentor _____

Signature / status of practitioner _____

APPENDIX C: Learning Activity, Quiz and Case Study Answers

LEARNING ACTIVITIES

Note that all **correct answers** are **bolded.**

1. Answer the following questions.
    a. When wound healing is stalled which phase of the healing process is it usually stalled in?
        Inflammatory phase.

    b. Which phase of the healing process presents as redness, swelling and localized warmth?
        Inflammatory phase.

    c. If ligaments attach bone to bone what do tendons do?
        Attach bone to muscle.

    d. Name 3 factors that might render a wound unhealable?
        - **The underlying causes, such as malignancy, impending death or gangrene, cannot be treated.**
        - **There is an insufficient level of arterial blood flow to the wound to support healing.**
        - **The client's risk factors for healability such as systemic disease, medications or poor nutrition cannot be modified.**

    e. The dermis contains 5 different types of tissues. What are they?
        The dermis contains blood vessels, lymph vessels, tough connective tissue, hair follicles, and sweat glands.

2. Mr. LeBlanc is **80 years** and has a venous ulcer located above his left medical malleolus. The wound is **12 cm x 8 cm**, shallow with irregular wound margins and is covered with **large amounts of thick yellow slough**. Although he gets his dressing changed weekly his wound has shown **little improvement in the last 6 months**. He has **significant edema** in both legs. He lives alone and **eats mainly tinned foods once or twice daily**. He is currently on **prednisone** for Polymyalgia Rheumatica.

    Identify the factors that might impair healing in Mr. LeBlanc's wound.
    See bolded factors above.

3. During your initial visit with Mr. LeBlanc he appears depressed and says "I give up…this sore is never going to get any better".

    List 3 questions you could ask Mr. LeBlanc to get a better understanding of his concerns.
    - **Ask him what he knows about his wound, for example how it developed and what can be done to help it heal.**
    - **Ask him if he is willing to have additional treatment on his wound to improve wound healing. Describe the treatment.**
    - **As you are questioning him, determine if his cognition is intact and ask him if he understands what you are saying.**
    - **Ask him how his wound impacts on his daily life and if he is concerned about it when he goes out.**
    - **Ask him how he manages with his ADLs and IADLs especially his ability to shop and prepare meals.**
    - **Ask him if he is feeling depressed and if he has friends or family who can support him as his wound is treated (Note that prednisone can cause depression).**

    These questions are derived from the assessment section titled "Client Assessment". There are many other questions that could be developed from this section depending on the needs of the client.

4. Which statements about debridement are correct?
    - **a. Debriding a wound helps to visualize the wound bed.**
    - b. Repeated debridement interferes with wound closure.
    - **c. Debridement is a critical element in wound bed preparation.**
    - d. Debriding a wound with localized infection may spread the bacteria to surrounding tissues.

5. Choose the correct answer.
    a. Stable heel ulcers should be debrided if they show signs of:
        i. Poor circulation
        ii. Pyoderma gangrenosum
        iii. Infection
        iv. Maceration

    b. Dry eschar can be present in which wounds?
        i. Arterial wounds
        ii. All wounds
        iii. Venous wounds
        iv. Pressure ulcers

6. Choose the correct answer.
    a. Necrotic tissue is which of the following? Choose the correct answers.
        i. Fibrous yellow wound tissue that adheres to the wound bed.
        ii. Tendon and bone underlying the wound.
        iii. Devitalised, dead tissue that appears black.
        iv. Red, granular tissue that fills a wound as it is healing.

    b. What is the primary treatment aim for an arterial wound covered with dry eschar?
        i. To remove devitalised dry eschar tissue.
        ii. To keep the eschar dry and protect the wound.
        iii. To maintain a moist, warm wound surface.

7. Answer the following questions.

    a. Identify 5 types of debridement.
        Mechanical, Autolytic, Biological (Maggot), Enzymatic, CSWD, Surgical

    b. Name 2 debridement methods that are cost effective.
        CSWD, Enzymatic

    c. Name 2 debridement methods that provide fast debridement.
        Surgical, CSWD, Enzymatic, Biological

    d. Which methods are non-selective?
        Surgical, Mechanical (Wet to Dry)

    e. Which methods have the potential to cause pain?
        CSWD, Surgical, Enzymatic, Biological, Mechanical (Wet to Dry)

8. Mr. Larsen is 84 and lives in a small apartment with his wife and adult son. He has a **long standing arterial wound (ABI 0.7)** on his left lateral malleolus. He **has CAD, arterial insufficiency and rheumatoid arthritis (RA).** He takes an **aspirin daily** and is on **methotrexate for his RA**. He is complaining of **increasing wound pain**. He has had **numerous wound infections** and thinks he may be getting another one. He spends **long periods in bed lying on his left side** due to some right sided pain following a bout of shingles.

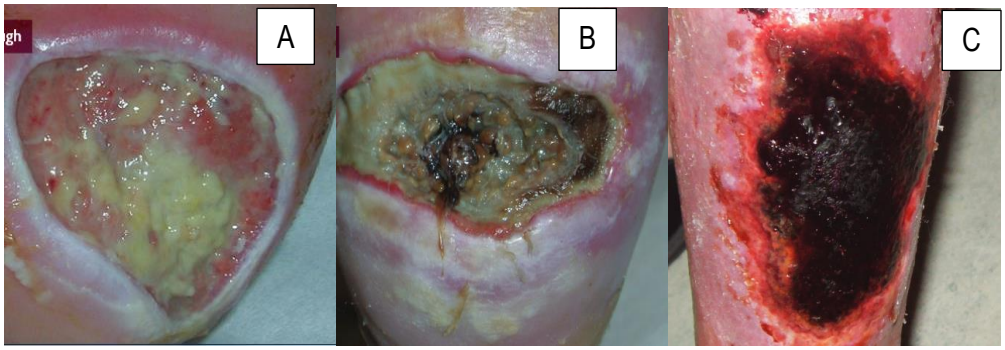
When considering the most appropriate type of debridement, which facts would you consider important?
See bolded facts in scenario.

9. Is CSWD safe in the following scenarios?
    a. Mr. Horsley has arterial insufficiency and a small wound covered with dry stable eschar on the top of his left foot. YES **NO**

    b. Although Mrs. Green's home health nurse and her physician feel that CSWD would be appropriate for her sacral wound, she becomes anxious and cries each time it is discussed with her. YES **NO**

    c. Mr. Clarke has a necrotic wound on his right hip that shows evidence of localized infection and his renal failure is stable on dialysis. **YES** NO

10. Identify if instruments (scalpel, scissors or loop curette) that are best able to debride the following wounds.



A = Curette
B = Scissors or scalpel
C = Scissors to trim edges or scalpel to remove

11. Is CSWD safe in these environments?
    a. Mrs. Woo lives in a small studio apartment that has not been cleaned for some time. She sleeps on her couch. Social services staff have been asked to work with Mrs. Woo's daughter to address the excessive clutter in the apartment. YES **NO**

    b. O'Hara lives in a house with his wife. The house is large and well kept. Although the only lighting in the bedroom is a bedside lamp Mrs. O'Hara states that she has an excellent reading light in the den. His bed is firm and Mr. O'Hara is able to follow directions well. **YES** NO

12. Identify 3 ways to control bleeding during or following conservative sharp debridement.
    Apply pressure to the wound
    Use a silver nitrate stick to stop the bleeding
    Apply hemostatic dressings such as alginate dressings or cellulose sponges to the wound.

QUIZ

Note that all **correct answers** for multiple choice and true / false questions are **bolded.**

1. CSWD is defined as? Choose the **best** response.
    a. Rehydrating necrotic tissue to soften and separate from viable tissue.
    b. Removing dead tissue with a scalpel or scissors to above the level of viable tissue.
    c. Facilitating wound healing.
    d. Removing dead tissue and healthy tissue causing bleeding and pain.

2. CSWD: Choose the **correct** responses.
    a. Quickly removes large amounts of necrotic tissue.
    b. Is the debridement method of choice for clients taking anti-coagulant medication?
    c. Does not require premedication for pain.
    d. Should not be used when the client refuses consent.
    e. Is contraindicated for wounds with untreated deep and systemic infection.

3. The presence of necrotic tissue in the wound affects healing in each of the following ways *except:*
    a. Impairs healthy granulation tissue.
    b. Serves as a medium for bacterial growth.
    c. Stops the migration of epithelial cells.
    d. Reduces exudate and wound odour.

4. Necrotic slough is: Choose the correct answers
    a. Devitalised, dead tissue that often appears black.
    b. Wet or dry yellow necrotic tissue that adheres to the wound bed.
    c. Red, granular tissue that fills a wound as it is healing.
    d. Helpful to wound healing.

5. Which debridement methods are not effective on dry, stable eschar?
    a. CSWD
    b. Enzymatic debridement.
    c. Biological / maggot debridement.
    d. Surgical debridement.

6. Diabetic wounds are found on which of the following areas:
    a. The medial malleolus.
    b. Tops of the toes
    c. Over the gaiter area.
    d. Bottom of the heel
    e. Bottom of the toes.
    f. On the dorsal forefoot.

7. Identify five S & S of bioburden / localized infection in wounds.
    1. Non healing (minimal change in size after 3 weeks of care.
    2. Increased volume of exudate.
    3. Red friable tissue.
    4. Necrotic tissue in the wound
    5. Odour present after wound cleansing.

8. Match the description below left with the type of tissue on the right.

1. Contains blood vessels and connective tissue	A. Dry stable eschar **7.**
2. Moist soft tissue that is tan, yellow or green	B. Tendon **6.**
3. Covers muscle	C. Moist unstable eschar **8.**
4. Contracts when pinched	D. Muscle **4.**
5. Desiccates rapidly if exposed.	E. Moist slough **2.**
6. Attaches muscle to bone.	F. Bone **5.**
7. Firm dry black tissue	G. Dermis **1.**
8. Soft boggy black tissue	H. Fascia **3.**

9. Identify 4 reasons to stop conservative sharp wound debridement.
    1. **Client has pain or increased pain.**
    2. **Wound is bleeding.**
    3. **Cannot identify structures in the wound**
    4. **Client asks you to stop.**
    5. **Underlying tissues such a bone, ligament or tendon are present in the wound bed.**
    6. **Breach of sterile technique.**
    7. **Practitioner fatigue.**

10. Identify 4 contraindications for CSWD.
    1. **The client does not consent to CSWD.**
    2. **The interface between viable and non-viable tissue cannot be clearly identified.**
    3. **There is a below-knee, non-infected, ischemic ulcer, covered with dry, stable eschar and the goal of care is wound stability rather than healing, e.g. an arterial ulcer or a diabetic ulcer with dry gangrene.**
    4. **Pressure related heel ulcers that are healable and covered with dry stable eschar.**
    5. **Wounds are fungating, malignant or inflammatory, e.g. vasculitic wounds, Pyoderma Gangrenosum.**
    6. **There is exposed bone, ligament, muscle and/or tendons in the wound OR underlying structures, such as bone, tendons or ligaments in the wound cannot be clearly identified.**
    7. **The wound is on the hands, face or foot including the Achilles tendon where tendon, bone or ligaments is near the skin surface. The heel region and bottom of the foot can be debrided.**
    8. **Wet or dry gangrene is present.**
    9. **It is not possible to fully access or visualize the wound.**
    10. **The client has a vascular graft, prostheses or dialysis fistula in close proximity to the wound.**
    11. **The nurse is unable to maintain no-touch or sterile technique or appropriately position the client for debridement.**
    12. **The environment is not safe or suitable to carry out CSWD.**

11. Identify 3 situations where CSWD, if performed, should be performed with caution.
    1. **There is a condition present that puts the client at risk for bleeding, e.g. use of anticoagulants or platelet inhibitors.**
    2. **There is evidence of moderate to severe arterial compromise.**
    3. **A deep or systemic infection is present and is being treated with antibiotics.**
    4. **The client has significant wound pain or pain associated with debridement.**

12. Identify if the following statements are true or false.
    a. If the wound is below the knee, a lower limb assessment should be completed prior to CSWD. **TRUE**
    b. CSWD is a non-restricted activity according to the Nurse's (Registered) and Nurse Practitioner Regulation. **FALSE**
    c. CSWD is indicated if wound odour and exudate are related to necrotic tissue. **TRUE**
    d. CSWD is indicated if the client has an untreated systemic infection. **FALSE**
    e. CSWD is indicated if underlying structures such as tendon or bone cannot be clearly identified. **FALSE**

f. A lower limb assessment should be completed prior to CSWD if the wound is on the leg or foot. **TRUE.**

13. Identify 3 investigations that may be indicated prior to CSWD.
    1. **Refer to a wound care clinician for toe pressures, if available or to the physician / NP for further investigation, e.g. vascular studies, if the client has lower extremity ulcers, absent or decreased pulses or an ABI of less than 0.91 or greater than 1.30.**
    2. **Appropriate testing if the client has diabetes or end stage renal disease and recent lab results are not available.**
    3. **Radiology studies to r/o osteomyelitis if the wound probes to bone and this is a new finding.**
    4. **Appropriate testing if nutritional concerns are present and recent lab results are not available.**
    5. **Hemoglobin, platelet count, neutrophil count, INR or PTT if recent results are not available.**

14. Which statements about CSWD are correct?
    a. **One goal of debridement is to reduce exudate and odour from the wound.**
    b. Once debrided, necrotic tissue will not recur.
    c. Ischemic toes with gangrene should be debrided to re-establish a moist healing environment.
    d. Clients with an ABI between 0.9 and 0.7 should not receive CSWD.

15. List 5 clinical concerns that you would need to consider when choosing the most appropriate method of debridement.
    1. **Skill level and knowledge of the nurse.**
    2. **Timeframe for debridement.**
    3. **Availability of equipment and resources.**
    4. **Presence of a safe environment for debridement.**
    5. **Cost.**
    6. **Involvement and availability of the interdisciplinary team.**
    7. **Ergonomic needs of the nurse.**

CASE STUDIES: Note that the **answers** are **bolded.**

Case Study #1

You see Mr. Graham in the Wound Care Clinic. He is 38 years old and works in telemarketing. He lives with his wife and 2 children and is the sole provider for the family. He has paraplegia and although he is able to transfer himself he requires assistance with personal care.
He tells you that he has a pressure ulcer on his sacrum. His wife has been changing the dressing daily and is concerned that the ulcer is getting bigger and beginning to smell even after the dressing is changed.
He is on Nortriptyline and Baclofen but other than the paraplegia he is healthy. He has an indwelling catheter and has a recurrent UTI which is being treated with antibiotics.
When the dressing is removed you are aware of a strong odor. There is a large amount of purulent drainage and the wound is clearly infected and has not been treated. The wound bed is covered with a large amount of moist necrotic slough. It is not possible to assess the base of the wound.

1. Would you use CSWD to debride this wound? Describe your rational for your decision.
   CSWD is contraindicated in wounds with untreated infection. Autolytic or enzymatic debridement wound be appropriate alternative until the infection is treated. Collagenase requires a physician's order. At that time consult with a wound clinician about proceeding with CSWD.

2. Based on the clinical signs, what type of infection does Mr. Graham have? How would you follow-up after determining the type of infection?
   Mr. Graham's wound is showing signs of a deep infection. There are large volumes of exudate, peri wound erythema extending more than 2 cm from the wound, odour is present after cleansing and there is an increase in wound size. This requires follow-up with the physician / NP and a swab for C & S if there is an area of viable tissue exposed in the wound bed.

3. The infection in his sacral wound has been treated and the erythema, warmth, foul odour and purulent exudate have resolved. The wound clinician has indicated that you can debride the wound using CSWD.

   How long wound you debride before stopping and how would you treat the wound between CSWD sessions?
   Each session of CSWD should last between 15 and 30 minutes to avoid client and nurse fatigue. It is a large wound so it is unlikely that the debridement can be completed in one session. Therefore, either autolytic or enzymatic debridement could be used between CSWD sessions.

Case Study #2

A LTC case manager has asked you to see Mr. Anderson. He is 83 years and lives alone in an apartment. The apartment is cluttered and he has 2 cats. He depends on daily home support workers for his meals, bathing and daily hygiene and has someone who cleans his apartment weekly. He is thin and has osteoarthritis and heart failure that has been treated.
Last week he fell and was found on the floor by his home support worker 18 hours after the fall. He was hospitalized for 24 hours and sent home with a pressure ulcer on his upper right quadrant of his back.
When you see Mr. Anderson he has an undressed wound covered with dry black eschar on his back. There is minor erythema and edema around the wound margins and the margins are attached to the peri wound skin. There is no drainage or odour.

1. Does this wound require debridement? Provide a rational for your decision.

   Mr. Anderson's wound requires debridement. Debridement will:
   - **Remove the necrotic tissue and debris from the wound to prevent infection and to help the nurse to visualize the wound bed.**
   - **Interrupts the chronic wound to help "jump start" healing.**
   - **Facilitate the formation of granulation tissue and the migration of epithelial cells across the wound.**
   - **Speed up healing to reduce the psychological stress that the fall and the subsequent wound have caused Mr. Anderson.**

2. You discuss the need for debridement with the wound clinician and she agrees that he should come into the wound clinic and have the wound debrided using CSWD. However before that occurs the dry eschar needs to be softened.

   What method of debridement would be appropriate to soften the eschar and why?

   Autolytic debridement would be the most appropriate debridement method to soften the eschar. Scoring the wound will speed up the softening process.

3. Mr. Anderson Is back in the clinic 2 weeks later. The eschar has softened and appears as necrotic slough. His wound appears infected and he tells you that this doctor has put him on antibiotics. The wound clinician wants you to use CSWD to clear the necrotic tissue.

   Prior to debriding this wound, what would your wound assessment entail?
   - **Location of wound.**
   - **Size of the wound including length, width, depth. Note if wound probes to bone.**
   - **Describe the wound bed noting percentage of tissue type.**
   - **The type of tissue requiring debridement.**
   - **The type of tissue expected to be found beneath the non-viable tissue.**
   - **Describe the nature and amount of exudate, if present.**
   - **Note the presence of odour after cleansing.**
   - **Describe the peri-wound skin.**
   - **Describe the wound edge noting the interface between viable and non-viable tissue.**

4. During the debridement he becomes anxious and starts shaking.

   What would you do?

   The immediate action is to stop the debridement. Once debridement is stopped, reassure Mr. Anderson and ensure that he is comfortable. Once he is comfortable it would be helpful to determine what caused his anxiety and in collaboration with Mr. Anderson, decide if another session of CSWD is acceptable to him. It might be helpful to have a second nurse with you if he agrees to another debridement session.

5. Since seeing him last, Mr. Anderson he has been put on the anti-inflammatory medication Celebrex for his osteo arthritis.

   How will this medication affect his wound healing? Is this a contraindication for CSWD?

   Although the use of Celebrex is not contraindicated for the use of CSWD it is an anti-inflammatory medication and as such interferes with the inflammatory stage of wound healing.

6. He agrees to another CSWD session and when you set the appointment he tells you that it is extremely difficult to get to the clinic so you set up the appointment at his home.

   When you get to the home what would you assess for to make sure that the environment is safe for CSWD?

   - **At your request Mr. Anderson has asked his neighbor to be present to reassure him and hold him steady if he begins to move.**
   - **His bedroom is large and uncluttered but the bed is low to the floor so you sit on a kitchen chair to do the debridement.**
   - **Can you clearly visualize and access the wound and all required equipment?**
   - **Determine if the bed is sufficiently firm to carry out the debridement.**
   - **Lighting must adequate to visualize the wound; a portable lamp should be available if the lighting is not adequate.**
   - **You have arranged with the wound clinician to page her if difficulties arise.**
   - **You must be able to maintain a sterile environment during the procedure.**

Case Study #3

Mrs. Clarke sees you in the clinic following a recent caesarian section. She gained 60 lbs during her pregnancy and continues to be significantly overweight. She smokes heavily. She lives with her husband, does not work and has her newborn and a 4 year old child at home. She has diabetes and is on insulin but has no other health problems.
She developed a wound infection following her C-section and the wound dehisced. Following the dehiscence, her wound was treated with Dakin's 1:24 packing daily which initially seemed to help but Mrs. Clarke states that recently the wound has not improved.

1. Currently her wound is draining a minimal amount of sero-purulent drainage with no odour and no peri wound redness. The wound bed is covered with adherent thick yellow-brown slough with small areas of pink tissue on the periphery of the wound.

   Does this wound require debridement? Provide a rational for your decision.

   Mrs. Clarke's wound requires debridement. Debridement will:
   - **Remove the necrotic tissue and debris from the wound to prevent any recurrence of infection. Because she is diabetes she is more vulnerable to another infection.**
   - **The base of the wound is not visible and debridement will help you to visualize the wound bed.**
   - **Interrupts the chronic wound to help "jump start" healing.**
   - **Facilitate the formation of granulation tissue to help fill the wound and ultimately the migration of epithelial cells across the wound.**
   - **Speed up healing to reduce the psychological stress and physical burden of the wound when she is trying to care for 2 small children.**

2. How would the diagnosis of diabetes affect her ability to heal?
   Diabetes mellitus can decrease leukocyte function, impair the development of granulation tissue and cause defects in collagen synthesis affecting the strength of the wound after it has healed.

3. As you are debriding the wound using CSWD, you find a foreign body that you think might be a suture near the base of the wound. What would you do?
   Stop debridement immediately and consult with the wound clinician or her physician for direction on how to proceed.

Case Study #4

Clara Kennedy Is 66 and extremely overweight. She has had Type 2 diabetes for 10 years and recently started taking insulin to better control her blood sugars. She retired early and lives with her husband who still works. She is able to do her personal care but depends on him for most other things.
She seldom leaves the house and wears thongs on her feet most of the time. When asked about the callus on the bottom of her left great toe she states that she has "had it for ages" and "never really worried about it". She is concerned about the diabetic foot ulcer on the pad of her right forefoot even though it is not causing her any pain.

1. Following discussion with the wound clinician the decision is made to debride the callus in both areas using CSWD. What is the rational for debriding the calluses?
    - **It removes necrotic tissue and debris from the wound decreasing the bacterial load which reduces the risk of localized infection.**
    - **It facilitates the development of granulation tissue and the migration of epithelial cells to form a new epidermis over the wound.**
    - **Reduces wound exudate and odour associated with necrotic tissue.**
    - **It speeds up healing thereby decreasing psychological stress for the client.**
    - **Removes undermined tissue which decreases the reservoir of potential pathogens.**
    - **Reduces pressure at the callused sites which supports wound healing.**
    - **It helps visualize the wound bed exposes wounds that are present underneath callus.**

2. Mrs. Kennedy has the beginning of a Charcot foot. What is a Charcot foot and why is it problematic?
    Charcot foot affects the bones, joints, and soft tissues of the foot and ankle in those who have diabetic neuropathy. Is an acute localized inflammatory condition that, over time leads to bone destruction, subluxation, dislocation, and deformity. Pain may occur in the acute stage, but diminishes over time. The main deformity in the late stages is a mid-foot collapse, described as a "rocker-bottom" foot. It can be avoided by early recognition and management with offloading and surgery if indicated. If it continues unchecked, Charcot foot results in joint deformity, ulceration, infection, loss of function, and in the worst-case scenario, amputation or death.

3. When you debride the callus on her great toe how deep do you debride?
    Callus is pared down to but not through healthy epidermis.

4. Which of the following might you notice on the foot of someone with diabetes?
    a. **Dry skin.**
    b. **Claw or hammer toes.**
    c. **A wound probing to bone.**
    d. **Peri-wound callus.**
    e. **Wound infection.**

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