

Developed in collaboration with the Wound Care Champions, Wound Care Specialists, Enterostomal Nurses, and South West Regional Wound Care Program (SWRWCP) members from Long Term Care Homes, Hospitals, and South West CCAC contracted Community Nursing Agencies in the South West Local Health Integration Network.



Title
Guideline: Wound Re-Assessment and Consideration of the Use of Adjuvant/Advanced Wound Therapies

Background

- As per the *Wound Bed Preparation Paradigm*, it is imperative that wound care providers regularly re-evaluate the rate of wound closure to determine whether or not the wound is closing at an expected rate
- In general, a 20-40% reduction in wound surface area over a two to four week period is a reliable predictive indicator of chronic wound healing¹
- Specific wound closure rates based on wound etiology are as follows:

Etiology	% Reduction in Surface Area As a Predictor of Wound Healing
Venous Leg Ulcer ²	>28.79% at 4 weeks will close by 24 weeks
Diabetic Foot Ulcer ³⁻⁴	> 50% at 4 weeks will close by 12 weeks
Pressure Injury ^{1, 5-6}	> 39% after 2 weeks will close more quickly
Open Surgical Wound (average size of 10cm ²) ⁷	50% at 13 days will close by 21 days

- To calculate the percent reduction in surface area:

$$\frac{\text{Surface Area (admission)} - \text{Surface Area (current)}}{\text{Surface Area (admission)}} \times 100 = \text{ \% reduction}$$

*Surface area = length x width

- Wound surface area should initially reduce rapidly and then slow, but the wound should continue to progressively close as it moves through the phases of wound healing
- In a ‘healable’ wound, “if the edge is not migrating, and the wound is not getting smaller, a full reassessment of cause and corrective therapies needs to occur⁸”. If despite this reassessment and if “patient and wound factors are optimized and the edge is still not migrating, then a wound may need advanced therapies to kick-start the healing process⁸”
- Adjunctive therapy refers to additional treatment used together with the primary treatment to achieve the outcome of the primary treatment. Acceptable types of adjunctive therapies (i.e. therapies with robust, quality research to support their use in wound healing) include:

Therapy	Definition	Outcomes	Level of Evidence*
Electrical Stimulation	Application of a capacitive coupled electrical current to	Increased blood flow and oxygenation, edema and pain reduction, debridement,	DFU – 1A PI – 1B

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		transfer energy to a wound ⁹	thrombolysis, bactericidal, faster wound closure, improved scar formation ⁹	Surgical – 1B VLU – 2 ALU – 2 Skin tears
	Pulsed Radio Frequency Stimulation	Application of an electromagnetic field at a low repetition rate to a wound to affect cellular changes ¹⁰	Increased cellular proliferation, hematoma absorption, reduction of edema and pain, increased blood flow and autolytic debridement, improved oxygenation, faster wound closure ¹⁰	PI – 2
	Phototherapy	Application of radiant energy for wound healing purposes, i.e. UVC light ¹¹	Enhanced blood vessel permeability, reduction in bacterial levels, increased wound closure rate	PI – 2A
	Ultrasound	Application of ultrasound waves to the wound/peri-wound to induce cellular activity ¹²	Increases the release of growth factors/fibroblasts, accelerates the inflammatory phase and wound contraction, increases vascularity, improves wound tensile strength and elasticity, reduces pain and edema, reduces bruises and hematoma, bactericidal ¹²	VLU – 1 PI - 2
	Negative Pressure Wound Therapy	Application of controlled negative pressure over the wound surface ¹³	Facilitates the drainage of fluid and debris, reducing bacterial counts and edema, and increasing capillary blood flow and granulation tissue formation ¹³ .	DFU – 1B PI – 4 Surgical - 4
	Hyperbaric Oxygen Therapy	Administration of 100% oxygen at an increased atmospheric pressure to a wound	Improves tissue oxygenation, down regulates inflammatory cytokines, up-regulates growth factors, antibacterial and leukocyte effects	VLU – 1 DFU – 3 PI – 4 Surgical - 4
	Topical Wound Oxygen Therapy ¹⁴	Administration of pressurized oxygen topically to the wound bed	Increases VEGF expression and blood vessel density	
	Intermittent Pneumatic Compression	Application of dynamic compression to the limbs to treat vascular and lymphatic conditions	Reduces lymphedema and edema related to venous insufficiency	VLU - 1

Growth factors ¹⁵	Regulatory polypeptides that coordinate the interaction of cellular and biochemical events that control wound healing	Promote chemotaxis and proliferation of cells involved in wound repair, and enhances granulation synthesis	PI – 1B DFU Skin tears
Skin Equivalents ¹⁵	Alternative to traditional skin graft	Promote healing, eliminates donor site, minimizes contractures and scarring, immunologically compatible	PI – 4 DFU

*Levels of evidence are based on those utilized by the Registered Nurses Association of Ontario in their Best Practice Guidelines, and the Canadian Association of Wound Care in their Best Practice Recommendations (see below)

*DFU = diabetic foot ulcer, PI = pressure injury, VLU = venous leg ulcer, ALU = arterial leg ulcer

Level of Evidence	Definition
1A	Evidence obtained from meta-analysis or systematic review of RCTs
1B	Evidence obtained from at least one RCT
2A	Evidence obtained from at least one well-designed controlled study without randomization
2B	Evidence obtained from at least one other type of well-designed quasi-experimental study without randomization
3	Evidence obtained from well-designed non-experimental descriptive study, such as a comparative study, correlation study, and/or case study
4	Evidence obtained from expert committee reports or opinions and/or clinical experience of respected authority

RCT = randomized controlled trial

- Candidacy for adjunctive therapy intervention (see “Determining Candidacy for Adjunctive Therapies” algorithm)¹⁶⁻¹⁷:
 - **Initially** when timely wound closure is predicted to fail despite implementation of best practices, i.e. in large wounds or wounds of a long duration (i.e. a venous leg ulcer that is >5cm² or >6 months duration on admission), wounds that extend into subcutaneous tissue and underlying structures and interfere with functional activities (i.e. a pressure injury on a person with spinal cord injury), or wounds on those with medical comorbidities like arterial occlusive disease, diabetes, venous insufficiency, hematoma or deep tissue injury
 - When the rate of healing with current best practices predicts failure, i.e. an acute wound on a person with a comorbidity such as chronic obstructive pulmonary disease, atherosclerosis, diabetic neuropathy or neuromuscular or musculoskeletal problems
 - After failure to progress towards closure in a timely manner, i.e. 20-40% reduction in wound surface area in a two to four week period or a chronic wound that has not completely closed at three months
 - Under special circumstances such as an unusual diagnosis or

	<p>patient demand, i.e. in the presence of uncontrolled neuropathic pain refer to physiotherapy for electrical stimulation or topical wound oxygen therapy</p> <ul style="list-style-type: none"> • Rules for adjunctive therapy selection¹⁷: <ul style="list-style-type: none"> ○ Consideration of the person’s medical status, status of the wound healing phase, and available/indicated adjunctive therapies ○ Treatment changes during the progression of healing so as to affect the recovery process ○ Each selected treatment is goal specific based on how it affects the predicted outcome • Must also consider the cost benefit of treatment with adjunctive therapies, i.e. labor, supplies, time to wound closure, etc. vs the standard of care¹⁷ • It is important that all adjuvant therapies be administered by a trained, qualified health care professional • You must also consider the presence of undiagnosed wound malignancy as the cause of a long-standing chronic wound that is failing to progress towards closure at a timely rate • A malignant wound may develop: <ul style="list-style-type: none"> ○ As the result of a primary skin tumor, i.e. squamous cell carcinoma or melanoma ○ Through direct invasion of the skin by an underlying tumor ○ From metastatic spread of a distant tumor ○ Malignant changes in a chronic wound (Marjolin’s ulcer) • If malignancy is suspected, consider requesting a wound tissue biopsy BEFORE implementing any adjunctive therapies. Signs of a malignant wound: <ul style="list-style-type: none"> ○ Raised nodules beneath the skin (initially), most often located on the head, face, neck, breast, underarm, groin, or perineal area ○ Nodular ‘fungus’ or ‘cauliflower’ shaped lesion (fungating lesion) or a crater with high edges and a sunken center (ulcerating lesion) ○ New onset or change in wound pain experience ○ New onset or change in wound odor ○ Change in the character, volume or appearance of exudate ○ Spontaneous, sometimes difficult to control wound bleeding ○ Gradual increase in size and depth of a wound, despite application of best practices ○ Periwound pruritus
Indications	This guideline is intended to be used by front line registered health care providers, to guide their assessment/re-assessment and management of those individuals admitted with or presenting with a wound.
Guideline	NOTE: The assessment and management of a person’s wound for consideration of adjuvant therapies is but one part of the holistic

assessment and management of individuals admitted with/presenting with a wound.

Assessment

1. Review the person's medical records for the following information:
 - a. 'Healability' status (see the "Determining Healability Tool")
 - b. Information re the duration, size, percent reduction in wound surface area, location, and characteristics of the wound to be assessed (if completed, this information should be easily gleaned from the persons "Initial Wound Assessment Form" and "PUSH Tool 3.0" documents)
 - c. Information on current co-morbidities that may be preventing or delaying wound closure and associated treatments and responses
 - d. Notations of the wound presence interfering with functional activities
 - e. A pain history and current pain description, treatments and responses (if completed, this information should be easily available on the "Comprehensive Assessment of Chronic Pain in Wounds" tool)
 - f. Current and recent past wound treatments/interventions and responses
 - g. Current wound care orders

Planning

1. Expected outcomes:
 - a. Information from the person's chart , the person and/or their substitute decision maker (SDM)/power of attorney for personal care (POA C), and your assessment allows for the determination of whether or not the wound is progressing towards closure at an expected rate, and whether or not the person and their wound are appropriate for application of adjunctive therapies
 - b. Registered nursing staff, in collaboration with the individual with the wound and/or their SDM/POA C, and other involved health care disciplines, are able to use the assessment information to initiate/modify and implement an appropriate person-centered, interdisciplinary plan of care which contains clear directions to staff and others who are providing the person with direct care
2. Explain the procedure and its purpose to the person and/or their SDM/POA C, and obtain informed implied/verbal consent
3. Assess the need for pre-procedure pain medication – removal of dressings and the dressing procedure itself may be painful. If required, the person **must** be allotted enough time to achieve the drug's peak effect BEFORE initiating the assessment/dressing change

	<p>Implementation</p> <ol style="list-style-type: none"> 1. Provide for privacy and ensure the person is in a comfortable position to facilitate assessment of the wound and for the wound assessment/dressing procedure 2. Discuss with/question the person or their SDM/POA C: <ol style="list-style-type: none"> a. Current intrinsic, extrinsic, and iatrogenic factors present that may be delaying/preventing wound healing, and strategies to correct/eliminate them b. If/how the presence of the wound is interfering with their functional activities and quality of life c. If/how the presence of the wound contributes to their pain experience d. Failures and successes of past wound treatments e. The wound size, duration, and progress towards wound closure (or lack thereof) 3. Wash your hands and attend to the person with your assessment tools and anticipated dressing supplies 4. If the person is in bed, raise the bed (if you are so able to) to an appropriate ergonomic position to allow for the wound assessment and treatment while preventing self-injury 5. Ensure adequate lighting 6. Don clean disposable gloves and additional personal protective equipment (PPE), i.e. gown, goggles, and/or mask as required if risk for splash back or spray exists 7. Remove the existing wound dressing as per the manufacturer’s instructions and observe the dressing for amount and quality of exudates (see “Guideline: The Assessment and Management of Moisture in Acute and Chronic Wounds”) 8. Dispose of the soiled dressings in the proper receptacle and remove and dispose of your soiled gloves 9. Perform hand hygiene and apply new clean disposable gloves and cleanse the wound as ordered or as per the “SWRWCP’s Dressing Selection and Cleansing Enabler – HEALABLE WOUNDS” or the “SWRWCP’s Dressing Selection and Cleansing Enabler – MAINTENANCE/NON-HEALABLE WOUNDS”. See “Procedure: Wound Cleansing” 10. Gently pat the wound bed dry (if required) and dry the surrounding skin with gauze 11. If indicated, and if you have the knowledge, skill, judgment, and authority, conservatively sharp debride any necrotic tissue present and re-cleans the wound [see: “Guideline and Procedure: Conservative Sharp Wound Debridement (CSWD)”] 12. Assess the wound using the “NPUAP PUSH Tool 3.0” (see “Procedure: NPUAP PUSH Tool 3.0”) – this includes a measurement of the wound’s length and width 13. Calculate the reduction in wound surface area over the past month and since the wound was first measured. To calculate the percent
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reduction in surface area:

$$\frac{\text{Surface Area (admission)} - \text{Surface Area (current)}}{\text{Surface Area (admission)}} \times 100 = \text{ ______ } \% \text{ reduction}$$

*Surface area = length x width

14. Determine if the wound has been progressing towards closure at an expected rate (see the 'Background' section for applicable wound closure rates)
15. Observe for clinical signs of increased bacterial burden/infection and manage, as per the "Guideline: The Assessment and Management of Bacterial Burden in Acute and Chronic Wounds"
16. If debridement interventions are further indicated see "Guideline and Procedures: Wound Debridement (excluding conservative sharp debridement)", "Guideline and Procedure: Conservative Sharp Wound Debridement (CSWD)", and/or consider a referral to a general surgeon or other such professional skilled in sharp debridement (and who has the authority to perform such a procedure), i.e. see "Criteria for Interdisciplinary Referrals"
17. Once you have assessed, cleaned, and debrided the wound, based on your holistic assessment and person-centered goals, determine whether the person and their wound is a candidate for the use of adjunctive therapies, using the "Determining Candidacy for Adjunctive Therapies" algorithm
18. If the person is not a candidate, i.e.:
 - a. Their wound is progressing towards closure at an expected rate
 - b. There are co-factors affecting healability that need to be corrected first
 - c. The wound is not impeding functional activities
 - d. The wound is not considered 'healable'Then do not implement adjunctive therapies, and rather:
 - a. Continue on with the current wound treatment protocol if the wound is progressing towards closure as expected
 - b. Address and correct/remove co-factors affecting healability to determine if this speeds the wound closure rate
 - c. Treat the wound as 'maintenance' or 'non-healable' if their healing status no longer qualifies as 'healable' (see the "Determining Healability Tool"
19. If you feel the person is a candidate for consideration of adjunctive therapies, refer to a physiotherapist for further assessment
20. In the interim, based on your holistic assessment and person-centered goals choose an appropriate dressing (see "Guideline: The Assessment and Management of Moisture in Acute and Chronic Wounds" and consider the "SWRWCP's Dressing Selection and

	<p>Cleansing Enabler – HEALABLE WOUNDS”)</p> <ol style="list-style-type: none"> 21. Remove your gloves and other PPE and dispose of them and of any soiled supplies in the appropriate receptacle 22. Dispose of any used sharps in a sharps container 23. Clean reusable equipment/surfaces touched during the procedure with soap and water or detergent wipes and dry thoroughly to prevent cross infection, returning reusable equipment to the appropriate places 24. Wash your hands 25. Assist the person to a comfortable position if required, and assess for any concerns 26. Lower the person’s bed to an appropriate height (if applicable), and ensure the person’s safety, i.e. apply side rails, personal alarms, restraints, etc. as per the person’s care plan/medical orders 27. Discuss your findings with the person and/or their SDM/POA C and implement referrals and further interventions as indicated 28. Share your wound assessment and intervention implementation findings/outcomes with the interdisciplinary members of the person’s wound care team 29. Complete/update and implement an appropriate, person-centered, interdisciplinary plan of care, based on your holistic assessment and interventions, and as per your organization’s policy <p>Evaluation</p> <ol style="list-style-type: none"> 1. Unexpected outcomes: <ol style="list-style-type: none"> a. The person reports poorly managed pain associated with this procedure and/or background wound pain is unchanged with the implementation of adjunctive therapies (if this was a goal of the therapy) b. The person is not a candidate for adjunctive therapy use as their wound is not ‘healable’ and/or because there are co-factors affecting the person’s healability that first need to be corrected c. Despite addressing the cause/cofactors affecting healability, person-centered concerns, providing appropriate wound care, and applying appropriate adjunctive therapies under the direction of a trained physiotherapist or other such trained health care professional, the wound still continues to fail to progress towards timely closure 2. Re-assess the wound using the “NPUAP PUSH Tool 3.0” at a minimum of weekly to ensure your interventions are effective, i.e. the wound surface area is reducing at an expected rate, and to determine if consideration of other/additional interventions and/or interdisciplinary referrals are necessary 3. Continually review utilization and cost outcomes to ensure the person continues to be a candidate for adjunctive therapy intervention, as
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	<p>this will change throughout the course of care. The following situations may trigger a change in candidacy¹⁷:</p> <ol style="list-style-type: none"> a. Failure to significantly reduce wound surface area after two to four weeks of adjunctive therapy treatment b. Wound regression, i.e. the wound gets larger or deeper or has developed undermining or tunneling despite use of adjunctive therapies c. The person becomes medically unstable d. Other management is indicated, i.e. the wound has progressed to a clean, stable state in the proliferative phase e. The wound needs less skilled care, i.e. the wound has progressed to a phase of healing with a positive response that is sustained f. Goals are met
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<p>Related Tools (NOTE: these tools and their instructions can be found on the SWRWCP’s website: swrwoundcareprogram.ca)</p>	<ul style="list-style-type: none"> • Determining Candidacy for Adjunctive Therapies • Determining Healability Tool • Initial Wound Assessment Form • PUSH Tool 3.0 • Comprehensive Assessment of Chronic Pain in Wounds Tool • Guideline: The Assessment and Management of Moisture in Acute and Chronic Wounds • SWRWCP’s Dressing Selection and Cleansing Enabler – HEALABLE WOUNDS • SWRWCP’s Dressing Selection and Cleansing Enabler – MAINTENANCE/NON-HEALABLE WOUNDS • Procedure: Wound Cleansing • Guideline and Procedure: Conservative Sharp Wound Debridement (CSWD) • NPUAP PUSH Tool 3.0 • Procedure: NPUAP PUSH Tool 3.0 • Guideline: The Assessment and Management of Bacterial Burden in Acute and Chronic Wounds • Guideline and Procedures: Wound Debridement (excluding conservative sharp debridement)

	• Criteria for Interdisciplinary Referrals
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