

This optimal usage guide is provided for information purposes only and should not replace the judgment of a health care professional. The guide was developed in collaboration with a committee of experts, and INESSS supports the recommendations contained within. This guide is intended for health care professionals who evaluate and treat patients with complex wounds. For more information, visit the INESSS website at [inesss.qc.ca](http://inesss.qc.ca)

## BACKGROUND

- ▶ A complex wound is a wound whose healing is not progressing normally or which requires advanced care.
- ▶ Using a comprehensive approach to identify the intrinsic and extrinsic parameters that impede the wound's healing process is essential in determining the appropriate treatment.
- ▶ Negative pressure wound therapy (NPWT) can be an option for treating complex wounds.

## DECISION MAKING RELATED TO NPWT CASES

- ▶ Ensure that basic care is being applied, **depending on the type of complex wound**.
- ▶ Request a **consultation with a dedicated cross-professional team**. In the absence of such a team, collaborate with a health professional **with expertise in wound care** who is recognized and authorized by their health care institution.
- ▶ **Carefully select the patients who could benefit from NPWT** based on their own and their wounds' characteristics, indications and intended clinical objectives.
- ▶ In collaboration with various health care professionals, discuss **other effective treatment options** that could achieve the intended clinical objectives.
- ▶ Check for **contraindications and risk factors** (relative contraindications).
- ▶ **In partnership with the health care team, the patient and the caregiver, discuss** the pros and cons of resorting to NPWT in order to obtain free and informed consent.

### FACTORS THAT MAY AFFECT THE COMPLEXITY AND HEALING RATE OF A WOUND

WOUND-RELATED	PATIENT-RELATED		
<p><b>Age, recurrence, Area, depth and location</b> <b>State of the wound bed</b></p> <ul style="list-style-type: none"> <li>▪ Presence of debris or necrotic tissue</li> <li>▪ Dehydration, dryness</li> <li>▪ Infection, biofilm</li> <li>▪ Abundant exudate</li> <li>▪ Calcification</li> <li>▪ Ischemia</li> <li>▪ Insufficient arterial or venous flow</li> <li>▪ Hypergranulation</li> <li>▪ Foreign body, metallic or biosynthetic material, or exposure of underlying structures (vessels, intestine, bone, etc.)</li> </ul>	<p><b>General State</b></p> <ul style="list-style-type: none"> <li>▪ Malnutrition: <i>Detected using validated and recognized tools or criteria and/or assessed by a dietitian or a nutritionist.</i></li> <li>▪ High blood sugar</li> <li>▪ Dehydration</li> <li>▪ Arterial insufficiency</li> <li>▪ Reduced mobility</li> <li>▪ Unhealthy lifestyle</li> <li>▪ Sensory deficit</li> <li>▪ Obesity: <i>Assessed according to reference standards based on age, disease and safety risks.</i></li> </ul>	<p><b>Medical history</b></p> <ul style="list-style-type: none"> <li>▪ Venous disease</li> <li>▪ Artery damage</li> <li>▪ Deep vein thrombosis</li> <li>▪ Non-stabilized concomitant disorders (comorbidity) (e.g., diabetes, active neoplasia)</li> <li>▪ Immunodeficiency</li> <li>▪ Chronic inflammatory disease</li> <li>▪ Cardiovascular disease</li> </ul>	<p><b>Medication</b></p> <p>Corticosteroids, nonsteroidal anti-inflammatory drugs (NSAIDs), immunosuppressive agents, antineoplastic agents, diuretics, beta blockers, anticoagulants, CNS depressants, etc.</p> <p><b>Psychosocial aspects</b></p> <ul style="list-style-type: none"> <li>▪ Age, sex</li> <li>▪ Socioeconomic status</li> <li>▪ Social isolation</li> <li>▪ Psychological/psychiatric disorders</li> </ul>

## INDICATIONS

**NPWT can be used with carefully selected patients who have a wound:**

- ▶ Whose healing is not progressing on schedule despite proper management of the [limiting factors affecting healing](#).
- ▶ Whose size or depth needs to be reduced to allow surgical closure or coverage, or to help healing by second intention.

**For information on the justifications for the below indications, see the [recommendation summary document](#).**

### ACUTE WOUNDS

For healing by second intention, surgical closure or reconstructive surgery	For surgical closure or reconstructive surgery
Traumatic wound, which cannot be sutured, associated with significant tissue loss, and/or deep wound without infection or after treatment, if applicable	Open wound to the abdomen or chest
Surgical excision associated with significant tissue loss and/or deep wound without infection or after treatment, if applicable	Surgical wound in an area where there is a high risk of dehiscence (that is to say, any wound requiring a complex approach)
Extended surgical wound dehiscence and/or adverse situation (surgical closure impossible)	Before or after a split-thickness skin graft (STSG) (e.g., in burn cases)
	After the application of flaps

### CHRONIC WOUNDS

#### For healing by second intention, surgical closure or reconstructive surgery

Nonischemic diabetic foot ulcer associated with significant tissue loss, after treatment of a bone or soft tissue infection, as appropriate, and after debridement and offloading of the ulcer

Arterial or mixed ulcer after assessment of revascularization potential<sup>1</sup>

Stage III or IV pressure ulcer<sup>2</sup> after removal of pressure at the wound site and treatment of a bone or soft tissue infection, as appropriate

<sup>1</sup> NPWT is not usually recommended in the venous ulcer context, as this goes against the method for healing this type of wound, which requires compression therapy to promote venous return, decreased exudate and re-epithelialization.

<sup>2</sup> In the context of an evaluation for surgical coverage (STSG or flap graft) or second intention healing.

## CONTRAINDICATIONS

### ABSOLUTE

- Significant presence of necrotic tissue (eschar or moist necrotic tissue)
- Uncontrolled anticoagulant therapy
- Active bleeding
- Active untreated deep infection (e.g., osteomyelitis)
- Patient in shock (e.g., septic, hypovolemic, cardiogenic)
- Wound on a non-excised tumor site
- Unprotected organs and vital structures (e.g., arteries, veins, nerves)
- Unstabilized open fracture
- Non-enteric and unexplored fistula
- Allergy to any equipment required for the procedure
- Any undiagnosed unusual wound (e.g., pyoderma gangrenosum, neoplasia, metastasis, vasculitis, etc.)

### RELATIVE (PATIENT-RELATED RISK FACTORS)

- Patient with a high risk of bleeding
- Arterial insufficiency of non-re-vascularized lower limbs
- Social, medical (e.g., cognitive impairment) or psychological factor preventing adhesion to or safety of treatment

## MOST FREQUENT ADVERSE EFFECTS AND COMPLICATIONS

### NEGATIVE PRESSURE WOUND THERAPY (NPWT)

INTERVENTION PARAMETERS OR MISUSE	QUALITY OF LIFE	COMPLICATIONS RELATED TO UNCONTROLLED RISK FACTORS
<ul style="list-style-type: none"> <li>▪ Localized bleeding (e.g., tubing or dressing with dried blood), hematoma</li> <li>▪ Blister</li> <li>▪ Seroma</li> <li>▪ Development of a skin allergy</li> <li>▪ Fistula</li> <li>▪ Maceration of the surrounding skin</li> <li>▪ Dermatitis (infectious or inflammatory)</li> <li>▪ Severe infection related or unrelated to the presence of forgotten sponge or dressing pieces</li> <li>▪ Pressure wound due to the device<sup>1</sup></li> <li>▪ Rolled wound edges<sup>1</sup></li> <li>▪ Ischemia in the extremities (e.g., finger, toe)<sup>1</sup></li> </ul>	<ul style="list-style-type: none"> <li>▪ Pain when dressing is removed or during device operation</li> <li>▪ Noise (especially bothersome at night)</li> <li>▪ Permanent dependency to the device</li> <li>▪ Mobility limitation</li> <li>▪ Difficulties related to the use of the device</li> <li>▪ Stress or anxiety</li> <li>▪ Smells</li> <li>▪ Damage to social life or self-esteem</li> </ul>	<ul style="list-style-type: none"> <li>▪ Secondary infection</li> <li>▪ Heavy bleeding</li> <li>▪ Sepsis</li> <li>▪ Hypovolemic shock</li> <li>▪ Risk of cardiac arrest in the event of excessive electrolyte loss</li> <li>▪ Mortality</li> </ul>

1. Based on the clinical experience of INESSS expert committee members.

## DETERMINATION OF CLINICAL OBJECTIVES

**Collaborate with a dedicated cross-professional team or a health care professional specializing in wound care who is recognized and authorized by their health care institution.**

The dedicated cross-professional team should, at a minimum, be composed of a physician with expertise in complex wound care and a nurse trained in wound care. The team can also include a nutritionist, a physiotherapist and an occupational therapist.

**Clear treatment objectives based on the wound's evolution and complexity and the characteristics of the patient need to be identified and specified prior to starting NPWT.**

Clinical objectives suggesting the use of NPWT are as follows:

- ▶ Accelerate the formation of quality granulation tissue
- ▶ Reduce closure time
- ▶ Drain exudates and reduce perilesional edema
- ▶ Reduce size for surgical closure (e.g., sutures, staples) or coverage (STSG)
- ▶ Avoid skin edge retraction in case of surgical wound dehiscence
- ▶ Make a temporary dressing before further surgery

### CAUTION

- ▶ NPWT is not a substitute for debridement.
- ▶ NPWT should not be used until complete closure of the wound.

## DETERMINATION OF TECHNIQUES

### CHOOSING THE DEVICE

There is no convincing scientific evidence of differences in effectiveness between the various technologies available on the Québec market. Factors to consider in selecting the device include:

- ▶ Equipment availability at the health care institution and during patient transfer
- ▶ Costs
- ▶ Ease of use
- ▶ Care environment
- ▶ Adverse effects
- ▶ Differences between technologies when it comes to the type of dressing, pressure and mode
- ▶ Certain patient-related parameters (e.g., pain sensitivity)

### PRESSURE

Generally between -80 and -125 mm Hg.

It can be necessary to increase or decrease the pressure depending on the type of dressing used or the indication. In such a case, refer to the product monograph or to a health care professional with expertise in complex wound care.

### MODE

- ▶ Intermittent pressure—generally used for wounds located in less-sensitive areas (e.g., diabetic foot)
- ▶ Continuous pressure—recommended in the following cases:
  - Patients with increased risk of bleeding
  - High-exudate wounds
  - Recent STSG or flap grafts
  - Wounds with acute enteric fistulas
  - Unstable body structures
  - Wounds in the perianal area
  - Patients with higher pain sensitivity

### TYPE OF DRESSING

There is no convincing scientific evidence showing differences in effectiveness between the two types of interfaces (foam- and gauze-based dressings). The choice depends on the nature of the wound, the technology available at the health care institution and during patient transfer, the experience of the health care professionals with expertise in wound care, and the patient's sensitivity to pain.

## INITIATING NPWT

### PRESCRIPTION AND TREATMENT PLAN

Make sure the prescription and the treatment plan are clear and comprehensive. They should at least provide the following information:

- ▶ The treatment's general objectives and clinical criteria
- ▶ The estimated duration of the treatment to achieve the specified clinical objectives
- ▶ The date the treatment plan will be reviewed
- ▶ The recommended device (main and during patient transfer)
- ▶ The NPWT system's technical parameters (pressure, intensity, mode, type of dressing)
- ▶ The parameters to assess during follow-ups, and the frequency of dressing changes

### CAUTION

- ▶ Patients and caregivers must be informed of the technical aspects of the intervention, especially when the NPWT must continue at home.
- ▶ The lack of a firm commitment on the patient's part to observe the instructions on the use of NPWT can be cause for not initiating the therapy.

# DRESSING CHANGES AND PARAMETERS TO ASSESS

## PRECAUTIONS FOR USE PRIOR TO INSTALLATION OF THE DEVICE AND DURING DRESSING CHANGES

- ▶ Implement standard infection control precautions for all patients according to the health care institution's established protocol.
- ▶ **Ensure the wound bed is free of necrotic tissue.**
- ▶ Correctly position the tubing to prevent a pressure ulcer from forming.
- ▶ To minimize the risks associated with dressing changes:
  - Write down, on the dressing, the number of dressing pieces placed in the wound.
  - Do not cut the sponges, the foam-based dressings or the gauze over the wound.
  - Clean the wound bed properly and perform a thorough examination.
  - Ensure dressing is level with the skin (in other words, put in enough sponges or compresses without compacting them) once the NPWT starts.
  - Never leave a dressing in place for an extended period without active use of the pump. Refer to product monographs to adapt length based on the dressing and device being used.
- ▶ Avoid, as much as possible, interrupting the NPWT mid-treatment to maximize the effect.
- ▶ To ensure continuity of care, the NPWT device, or at least the dressing used with the device selected for home care should be installed at the care unit before the patient leaves the hospital.
  - If the patient was not undergoing NPWT at the hospital, the therapy can begin at home.

## PARAMETERS TO ASSESS

PATIENT	WOUND	SURROUNDING SKIN
<ul style="list-style-type: none"> <li>▪ Complications</li> <li>▪ Adverse effects, including pain and discomfort</li> <li>▪ General condition</li> <li>▪ Treatment adherence</li> </ul>	<ul style="list-style-type: none"> <li>▪ Progression of granulation by:                             <ul style="list-style-type: none"> <li>• Wound size (length, width, depth)</li> <li>• Quality, appearance and percentage of granulation tissue</li> <li>• The presence or absence of necrotic tissue</li> </ul> </li> <li>▪ Exudate drainage (quantity and appearance)</li> <li>▪ Infection or biofilm</li> <li>▪ State of the wound edges</li> <li>▪ Smell after cleaning</li> </ul>	<ul style="list-style-type: none"> <li>▪ Edema</li> <li>▪ Redness<sup>1</sup></li> <li>▪ Signs of infection</li> <li>▪ Allergy to dressings</li> <li>▪ Maceration</li> </ul>

<sup>1</sup> Inflammatory redness < 1 cm; redness signalling infection > 1 cm

If pain is felt:

- ▶ Reduce pressure if possible.
- ▶ Use continuous mode.
- ▶ Use gauze if indicated.
- ▶ Stop the machine for a few minutes before changing the dressing.
- ▶ Consider administering an analgesic one hour before changing the dressing and at regular intervals, based on the prescribed analgesic.

## CAUTION

- ▶ All health care professionals **APPLYING** NPWT must have the skills required to use the technology, recognize signs of complications and take any necessary actions.
- ▶ All health care professionals **ASSESSING** a wound undergoing NPWT must have the appropriate and up-to-date skills to assess the wound's evolution, including granulation tissue growth, recognize signs of complications and take any necessary actions.
- ▶ Ensure the patient and/or their caregiver and the nursing staff are properly informed so that they are able to recognize certain signs which may indicate a risk to the patient.

## NPWT FOLLOW-UP, MAXIMUM LENGTH AND RENEWAL

### NEGATIVE PRESSURE WOUND THERAPY (NPWT)

	Dressing changes	Assessment	Review of the appropriateness of continuing NPWT	Maximum length of the initial prescription	Renewal of the initial prescription
<b>When</b>	Every 48 to 72 hours, depending on the condition of the wound and the quantity of exudate <sup>1</sup>	Once a week	Every two weeks after the start of NPWT	30 days	Once
<b>Who</b>	Authorized health care professional <sup>2</sup>	Authorized health care professional <sup>2</sup>	Initial prescriber <sup>3</sup> , in collaboration with a dedicated cross-professional team or a recognized and authorized health care professional specializing in wound care <sup>2</sup>	Does not apply	Initial prescriber <sup>3</sup> , but requires prior review by a dedicated cross-professional team or a recognized and authorized health care professional specializing in wound care <sup>2</sup>

1 The frequency of dressing changes may vary, particularly if NPWT is used before or after covering (flap or skin graft) or with disposable devices, or if the wound is infected.

2 According to the rules of the health care institution.

3 Under the rules of the Collège des médecins du Québec, health care professionals authorized to prescribe NPWT include physicians and nurses.

### CAUTION

To respect therapeutic priorities, reconsider the use of NPWT if anticoagulant therapy must be initiated.

## REASONS FOR STOPPING TREATMENT

- ▶ As soon as the wound is covered with quality granulation tissue, and before it reaches the edges of the wound.
- ▶ As soon as the specified clinical objectives have been achieved.
- ▶ In the presence of necrotic tissue, hypergranulation or stagnation, or if the wound fails to show positive developments after two weeks of NPWT.
- ▶ In the absence of benefits for the pre-established care objectives and clinical criteria.
- ▶ In a situation where applying NPWT would be inappropriate (e.g., difficulty maintaining negative pressure due to the location of the wound).
- ▶ In the absence of health care teams or professionals authorized to change dressings.
- ▶ In the presence of complications that threaten the patient's life.
- ▶ In the presence of moderately severe adverse effects, including:
  - Excessive bleeding
  - Severe infection in or around the wound
  - Severe pain
  - Development of an allergy after application
- ▶ treatment is not adhered to by the patient and/or their caregiver.

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