



### Full-Thickness Neuropathic Leg/Foot Ulcer

A full-thickness wound extends into deeper tissues which may involve subcutaneous tissue, muscle, bone or other supporting structures.

**Goals of Care:** restore skin integrity and avoid infection.

**Wound and Skin Care Objectives:** protect intact periwound skin, cleanse wound, manage wound exudate, debride wound, hydrate wound, manage wound odor, and fill in dead space.

**NOTE:** Cautious use of moisture-retentive dressings and close monitoring is recommended with ischemic wounds. When peripheral pulses are absent, do not use occlusive dressings. Examples of non-occlusive dressings include hydrogels in amorphous or sheet forms, calcium alginates or impregnated gauze sponges. Examples of non-occlusive cover dressings include composite dressings or gauze.

# NEUROPATHIC ULCERS



## Healed Peripheral Neuropathic Ulcer or Skin at Risk

A healed wound is epithelialized with adequate strength to maintain closure. At risk skin is tissue exposed to potential injury or tissue that is in a weakened condition (e.g. dry, thin).

**Goals of Care:** maintain intact skin and improve tissue tolerance.

**Wound and Skin Care Objectives:** protect and moisturize intact skin.



## Partial-Thickness Neuropathic Leg/Foot Ulcer

A partial-thickness wound involves the epidermis, dermis or both. It is a superficial wound and may present as an abrasion, blister or shallow crater.

**Goals of Care:** restore skin integrity and avoid infection.

**Wound and Skin Care Objectives:** protect intact periwound skin, cleanse wound, manage wound exudate, debride wound, hydrate wound and manage wound odor.

**NOTE: Cautious use of moisture-retentive dressings and close monitoring is recommended with ischemic wounds. If peripheral pulses are absent, do not use occlusive dressings. Examples of non-occlusive dressings include a hydrogel in amorphous or sheet form, calcium alginate or impregnated gauze sponge. Examples of non-occlusive cover dressings include a composite dressing or gauze.**

### BACKGROUND INFORMATION:

Neuropathic ulcers may occur in patients with diabetes, spinal cord injury, Hansen's Disease, or other conditions that result in loss of sensation in the legs and feet. Diabetic foot ulcers are most commonly caused by peripheral neuropathy and peripheral vascular disease. (When the diabetic wound occurs in a patient with peripheral vascular disease alone, refer to educational materials on Arterial Leg/Foot Ulcers available from Hollister Incorporated).

**Neuropathy** is caused by prolonged glucose elevation and involves sensory and motor changes. **Sensory neuropathy** leads to loss of sensation which is a protective function. The patient is unable to feel pain or discomfort so that friction from improperly fitting shoes, foreign objects in the shoes, or injuries from stepping on an object with bare feet does not result in corrective actions. Under these circumstances, patients may develop ulcerations, and they may not be aware of the injury. **Motor neuropathy** may result in deformities of the foot (Charcot deformities), thinning of the fat pad of the plantar area of the foot, and mid foot collapse with loss of the arch of the foot. These changes affect alignment of the foot and pressure distribution during ambulation which may result in pressure ulcers.

**Neuropathic ulcers** typically share the following characteristics:

- may occur on any part of the leg, but are most commonly seen at the ankle and foot, particularly at the plantar surface and metatarsal heads
- varied wound depth
- even, well-defined wound margins
- varied presence and amount of necrotic tissue or exudate

Neuropathic foot ulcers are staged using numerous systems. For simplicity, these ulcers have been classified as partial-thickness which involves the epidermis and dermis, or full-thickness which involves deeper tissue such as subcutaneous tissue, muscle, bone and other supporting structures. In diabetics, if bone is exposed, 85% of the cases have osteomyelitis.

The **periwound and leg/foot skin** may demonstrate the following changes:

- a circumferential callous
- maceration
- palpable pulses (usually present)
- erythema
- cellulitis
- warm skin temperatures

*Multidisciplinary management of these patients with early intervention and close monitoring is key to prevention and proper treatment of complications such as gangrene and osteomyelitis which may result in amputation.*

The algorithm on the reverse side provides a general path of decision-making for assessment, management and treatment of neuropathic ulcers. Below is detailed information which is designed to assist health care providers. This tool should be used along with the consultative services of a wound care specialist, such as an ET nurse, physical therapist, clinical nurse specialist with expertise in wound management or a physician when indicated.

### NURSING ASSESSMENTS:

The following provides a guideline for clinical assessment. Assessments must be done at regular intervals and are used to drive treatment decisions.

- **Assessment of risk or contributing factors:** patients at risk experience decreased sensation of their legs and feet. Painless trauma may occur and be repetitive precipitating ulceration. Groups at high risk are those with diabetes, spinal cord injury, smoking history, advanced age or Hansen's Disease.
- **General assessments:** if the patient is diabetic, assessment of disease control is primary. Further assessment requires differentiation between neuropathic, arterial, and venous ulceration. Patients may have a combination ulcer etiology (i.e. neuropathic and venous insufficiency).
- **Assessment of leg** requires evaluation of the ankle-brachial index. An index of <0.8 is an indicator of arterial involvement of some degree. However, diabetics with peripheral vascular disease may have falsely high results because of calcification of the arteries. These patients should be referred for noninvasive laboratory testing. Edema may be present.
- **Assess for degree and type of pain** (e.g. reduced response to touch). Neuropathic ulcers, without peripheral vascular disease involvement will have palpable pulses. Multidisciplinary evaluation and management is necessary in neuropathic ulcer care.
- **Assessment of nutrition, previous ulcer care (if applicable), level of understanding, compliance in care, and learning style.**
- **Assessment of wound:** infection; edema; exudate; odor; size (length, width and depth); necrotic tissue; granulation; epithelialization; and periwound skin condition.

### GENERAL NURSING INTERVENTIONS:

- **Treat the cause of the problem:** refer for medical and vascular evaluation. If the patient is diabetic, disease control is primary. Surgical consultation may be required for debridement and possible revascularization. When the ulcer is caused by pressure from a shoe, refer patient to orthotics for non-weight bearing devices.
- **Support moist wound healing:** if perfusion is poor, the wound bed may dry out quickly. *Cautious use of moisture-retentive dressings and close monitoring is recommended.* If gangrene is present, it is recommended to keep the wound dry to avoid further bacterial growth. Wounds between the toes may benefit from cotton or sheepskin placed between the toes to absorb fluid and protect intact skin. Following revascularization, moist wound healing techniques may be resumed.
- **Prevent infection.**
- **Ambulate as tolerated.**
- **Control edema, if present.**
- **Aggressively treat infection:** consult with physician to determine the need for antibiotic therapy, debridement, cleansing and dressing approach.
- **Debride:** this is based upon the condition of the patient and wound. *Debridement may be contraindicated in neuropathic wounds with arterial disease.* Consult a wound care specialist in these situations. Methods of debridement include: autolytic, mechanical, sharp and enzymatic.
- **Perform daily skin inspection and care:** inspect for cracks, bruises or injury to the skin. Cleanse and moisturize the skin. Protect feet from injury. Avoid foot soaks. Check temperature of the water with a forearm or hand before bathing. Proper nail care is critical.
- **Provide adequate nutritional intake.**
- **Manage pain:** if pain is present, it may help to position legs and feet in a dependent position.
- **Provide education:** patient, family and caregiver. Education plans should include the following: compliance with medications; control of diabetes (if applicable); smoking cessation; avoidance of exposure to trauma (e.g. friction, pressure, extremes in temperature, constrictive clothing, and going bare foot).
- **Document** assessments and interventions.
- **Reassess** at regular intervals per agency protocol.

# HOLLISTER PRODUCTS

for improved outcomes

## Healed Ulcer or Skin at Risk

Restore Clean `N Moist

Hollister Skin Cleanser

Restore Barrier Creme

Hollister Skin Conditioning Creme

Hollister Moisture Barrier Ointment

Hollister Skin Gel

Restore Extra Thin Hydrocolloid

EpiFlex Heel and Elbow Protectors

## Partial-Thickness Ulcer

### SKIN CARE

Restore Clean `N Moist

Hollister Skin Cleanser

Restore Barrier Creme

Hollister Skin Conditioning Creme

Hollister Moisture Barrier Ointment

Hollister Skin Gel

EpiFlex Heel and Elbow Protectors

### WOUND CARE

Restore Wound Cleanser

Restore Extra Thin Hydrocolloid\*

Restore Cx Hydrocolloid\*

Restore Plus Hydrocolloid\*

Restore Hydrogel (gel, gauze or packing strip)

Restore CalciCare Calcium Alginate

Odor-Absorbent Dressing

Hollister Deodorizer Germicide

\*Occlusive Wound Care Dressings

## Full-Thickness Ulcer

### SKIN CARE

Restore Clean `N Moist

Hollister Skin Cleanser

Restore Barrier Creme

Hollister Skin Conditioning Creme

Hollister Moisture Barrier Ointment

Hollister Skin Gel

EpiFlex Heel and Elbow Protectors

### WOUND CARE

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Restore Hydrogel (gel, gauze or packing strip)

Restore CalciCare Calcium Alginate

Odor-Absorbent Dressing

Hollister Deodorizer Germicide

\*Occlusive Wound Care Dressings

*Developed in collaboration with Bonnie Sue Rolstad, RN, BA, CWOCN  
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Photography courtesy of Ms. Rolstad*

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