**Neuropathic Ulcers**

**Assessments Completed**

**Interventions Implemented**
(See reverse side for additional information)

**Is the wound progressing toward the desired outcome?**

**YES**

- **Healed or at Risk**
  - Cracked or dry skin? Previous ulcer site? Skin at risk?

- **Partially-Thickness**
  - Exudate? Dry wound? Necrotic? Odor? Periwound skin at risk or impaired?

- **Full-Thickness**
  - Exudate? Dry wound? Necrotic? Odor? Depth or undermining? Periwound skin at risk or impaired?

**NO**

- Reassess
- Monitor

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**Neuropathic Ulcers**

**Protect intact skin:** skin protectant, transparent film, thin foam, offloading footwear

**Moisturize intact skin:** skin moisturizer

**Protect intact skin:** skin protectant, skin cleanser, offloading footwear

**Cleanse wound:** wound cleanser or saline

**Control bioburden:** Consider use of antimicrobial dressings for wounds showing signs of increased bacterial burden

**Manage wound exudate:**
- Minimal - thin foam
- Moderate - foam, calcium alginate
- Heavy - calcium alginate, foam, combinations of dressings

**Debride wound:**
- Dry - transparent film, hydrogel, hydrating impregnated gauze
- Moist/wet - hydrocolloid, foam, calcium alginate

**Hydrate wound:** hydrogel, hydrating impregnated gauze

**Manage wound odor:** wound cleanser, odor absorbent dressing, more frequent dressing changes, antimicrobial dressing (e.g. silver)

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**Healed 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.
NEUROPATHIC ULCERS

BACKGROUND INFORMATION:

Neuropathic ulcers may occur in patients with diabetes, spinal cord injury, or other conditions that result in loss of sensation in the feet. Diabetic foot ulcers are most commonly caused by a combination of peripheral neuropathy and peripheral vascular disease. (When the diabetic ulcer occurs in a patient with peripheral vascular disease alone, refer to educational materials on Arterial / Foot Disease and associated changes. In diabetes, neuropathy is caused by prolonged glucose elevation and involves sensory motor changes. Sensory neuropathy tends to lose sensation in an extremity functionally. The patient is unable to feel pain at the site of injury and is susceptible to skin breakdown from friction and pressure.) Neuropathic ulcers arise in response to shear, friction, and pressure. The patient may be unaware of injury to the foot, and foot collapse will occur 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. Autonomic Neuropathy results in decreased sweating, resulting in dry skin at risk for skin breakdown.

Non-occlusive dressings typically share the following characteristics:

- Most commonly based on the deeper surface of the foot
- Vented wound depth
- Well-defined wound margins
- Absence of tension or pressure on wounds
- Moister dressing environment

Examples of non-occlusive cover dressings include hydrogels in an amorphous or sheet form, calcium alginates or impregnated recombinant collagen dressing.

Non-occlusive dressings are recommended with ischemic wounds. When peripheral pulses are absent, caution is required with moisture-retentive dressings and close monitoring is necessary.

In diabetes, neuropathy is caused by prolonged glucose elevation and involves sensory motor changes. Sensory neuropathy leads to loss of sensation in an extremity functionally. The patient is unable to feel pain at the site of injury and is susceptible to skin breakdown from friction and pressure. The patient may be unaware of injury to the foot, and foot collapse will occur 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. Autonomic Neuropathy results in decreased sweating, resulting in dry skin at risk for skin breakdown.

Automatic Neuropathy results in decreased sweating, resulting in dry skin at risk for skin breakdown.

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

- Assessment of risk or contributing factors: patients at risk experience decreased sensation of their feet. Pressure changes may occur and be poorly, if at all, reported in susceptible individuals. (Check for pressure changes by palpation.eniable areas with handles, e.g., gauze patches, adhesives, or american cheese.
- General assessment: if the patient is at risk of developing neuropathic ulcers, assessment should include: sensation, vascular status, wound appearance, and evidence of infection.
- Assessment of foot ulcer: requires evaluation of the arterial perfusion, which may be performed by a non-invasive test named the ankle-brachial index (ABI). Scores of 0.9 or less are considered abnormal. If the ABI is normal, a Doppler ultrasound may be ordered. If the Doppler ultrasound is abnormal, a more invasive procedure, such as an angiogram, may be necessary to determine the cause of the problem.
- Assessment of pain: pain is usually present in neuropathic ulcers and is managed using non-opioid analgesics and local anesthetic agents.
- Assessment of infection: Management of diabetic patients with neuropathic ulcers should include a skin examination to identify any signs of infection. For example, the presence of a red, warm, swollen, painful area may indicate an infection. Treatment should include appropriate antibiotics and wound care.
- Assessment of nutrition: Management of diabetic patients with neuropathic ulcers should include a nutritional assessment to identify any signs of malnutrition. For example, the presence of weight loss, fatigue, or anorexia may indicate a nutritional deficiency. Treatment should include appropriate nutrition counseling and supplementation.
- Assessment of wound healing: Management of diabetic patients with neuropathic ulcers should include an evaluation of wound healing. For example, the presence of wound healing may indicate the need for additional treatment, such as wound debridement or negative pressure wound therapy.
- Assessment of vascular function: Management of diabetic patients with neuropathic ulcers should include an evaluation of vascular function. For example, the presence of a decreased ABI may indicate a vascular problem. Treatment should include appropriate interventions, such as angioplasty or bypass surgery.
- Assessment of lifestyle factors: Management of diabetic patients with neuropathic ulcers should include an evaluation of lifestyle factors. For example, the presence of smoking, obesity, or inactivity may indicate the need for lifestyle changes. Treatment should include appropriate interventions, such as smoking cessation, weight loss, or exercise programs.
- Assessment of risk factors: Management of diabetic patients with neuropathic ulcers should include an evaluation of risk factors. For example, the presence of diabetes, obesity, or a history of foot injuries may indicate the need for additional treatment, such as off-loading or revascularization.
- Assessment of foot care: Management of diabetic patients with neuropathic ulcers should include an evaluation of foot care. For example, the presence of improper footwear, barefoot walking, or neglecting foot care may indicate the need for additional treatment, such as footwear adjustments or foot care education.
- Assessment of foot function: Management of diabetic patients with neuropathic ulcers should include an evaluation of foot function. For example, the presence of decreased range of motion or swelling may indicate the need for additional treatment, such as stretching exercises or foot care education.