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**A Quick Reference  
Guide for Lower-  
Extremity Wounds:  
Venous, Arterial, and  
Neuropathic**

WOCN® Society's Wound Committee



## **A Quick Reference Guide for Lower-Extremity Wounds: Venous, Arterial, and Neuropathic**

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### **Purpose:**

This quick reference guide provides a brief overview of key characteristics and common assessment findings, measures to improve venous return, tissue perfusion and prevent trauma; and key strategies for topical/adjunctive therapy for the three most common types of lower-extremity wounds (i.e., venous, arterial and neuropathic). Please refer to the Wound, Ostomy and Continence Nurses Society™ (WOCN®) Clinical Practice Guideline Series for more detailed, evidence-based information about management of wounds in patients with lower-extremity venous, arterial and neuropathic disease (Wound, Ostomy and Continence Nurses Society [WOCN], 2008, 2011, 2012). The guidelines are available from the WOCN Society's Bookstore ([www.wocn.org/bookstore](http://www.wocn.org/bookstore)).

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Lower-Extremity Venous Disease (LEVD) Wounds (WOCN, 2011)	Lower-Extremity Arterial Disease (LEAD Wounds (WOCN, 2008)	Lower-Extremity Neuropathic Disease (LEND) Wounds (WOCN, 2012)
<b>Assessment: History/Risk Factors</b>		
<ul style="list-style-type: none"> <li>• Advanced age.</li> <li>• Obesity.</li> <li>• Pregnancy.</li> <li>• Thrombophilia.</li> <li>• Systemic inflammation.</li> <li>• Anticardiolipin antibody.</li> <li>• Venous thromboembolism (VTE)/phlebitis.</li> <li>• Varicose veins.</li> <li>• Pulmonary embolus.</li> <li>• Sedentary lifestyle or occupation; reduced mobility.</li> <li>• Simultaneous insufficiency of two out of three venous systems.</li> <li>• Trauma/surgeries/leg fractures.</li> <li>• Impaired calf muscle pump.</li> <li>• Restricted range of motion of the ankle.</li> <li>• Family history of venous disease.</li> <li>• Injection drug user.</li> <li>• Previous wound.</li> </ul>	<ul style="list-style-type: none"> <li>• Advanced age.</li> <li>• Smoking.</li> <li>• Diabetes.</li> <li>• Hyperlipidemia.</li> <li>• Hypertension.</li> <li>• Hyperhomocysteinemia.</li> <li>• Chronic renal insufficiency.</li> <li>• Family history of cardiovascular disease.</li> <li>• Ethnicity.</li> </ul>	<ul style="list-style-type: none"> <li>• Advanced age.</li> <li>• Alcoholism.</li> <li>• Chemotherapy.</li> <li>• Diabetes/impaired glucose tolerance.</li> <li>• Hansen’s disease (leprosy).</li> <li>• Heredity.</li> <li>• Smoking.</li> <li>• HIV/AIDS and related drug therapies.</li> <li>• Hypertension, obesity, Raynaud’s disease, scleroderma, hyperthyroidism, hypothyroidism, chronic obstructive pulmonary disease.</li> <li>• Spinal cord injury; neuromuscular diseases; abdominal, pelvic and orthopedic procedures.</li> <li>• Charcot-Marie-Tooth disease.</li> <li>• Paraneoplastic disorders.</li> <li>• Acromegaly/height.</li> <li>• Exposure to heavy metals (e.g., lead, mercury, arsenic).</li> <li>• Malabsorption syndrome due to bariatric surgery; celiac disease.</li> <li>• Vitamin deficiency (B<sub>12</sub>, folate, niacin, thiamine); pernicious anemia.</li> </ul>
<b>Assessment: Comorbid Conditions</b>		
<ul style="list-style-type: none"> <li>• Congestive heart failure.</li> <li>• Lymphedema.</li> <li>• Orthopedic procedures</li> </ul>	<ul style="list-style-type: none"> <li>• Cardiovascular disease.</li> <li>• Vascular procedures or surgeries.</li> <li>• Sickle cell anemia.</li> <li>• Obesity.</li> </ul>	<ul style="list-style-type: none"> <li>• Lower-extremity arterial disease.</li> <li>• Kidney disease.</li> </ul>

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<b>Assessment: Wound Location</b>		
<p>The most typical location is superior to the medial malleolus in the gaiter/sock area (Carmel, 2012), but wounds can be anywhere on the lower leg including back of the leg/posterior calf.</p>	<p>Areas exposed to pressure, repetitive trauma, or rubbing of footwear are the most common locations:</p> <ul style="list-style-type: none"> <li>• Lateral malleolus.</li> <li>• Mid-tibial area (shin).</li> <li>• Phalangeal heads, toe tips or web spaces.</li> </ul>	<ul style="list-style-type: none"> <li>• Plantar foot surface is the most typical location.</li> <li>• Other common locations include: <ul style="list-style-type: none"> <li>○ Altered pressure points/sites of painless trauma/repetitive stress, over bony prominences.</li> <li>○ Metatarsal head (e.g., first metatarsal head and inter-phalangeal joint of great toe is common).</li> <li>○ Dorsal and distal aspects of toes, inter-digital areas, inter-phalangeal joints.</li> <li>○ Heels.</li> </ul> </li> </ul>
<b>Assessment: Wound</b>		
<ul style="list-style-type: none"> <li>• Base: Ruddy red; granulation tissue present; yellow adherent or loose slough may be present.</li> <li>• Size: Variable; can be large.</li> <li>• Depth: Usually shallow.</li> <li>• Margins: Irregular; undermining or tunneling are uncommon.</li> <li>• Exudate: Moderate to heavy.</li> <li>• Infection: Not common.</li> </ul>	<ul style="list-style-type: none"> <li>• Base: Pale; granulation rarely present; necrosis common; eschar may be present.</li> <li>• Size: Variable; often small.</li> <li>• Depth: May be deep.</li> <li>• Margins: Edges rolled, smooth, undermined; punched-out appearance.</li> <li>• Exudate: Minimal.</li> <li>• Infection: Frequent (signs may be subtle).</li> <li>• Pain: Common.</li> <li>• Non-healing; often precipitated by minor trauma.</li> </ul>	<ul style="list-style-type: none"> <li>• Base: Pale, pink; necrosis/eschar may be present.</li> <li>• Size: Variable.</li> <li>• Depth: Variable from shallow to exposed bone/tendon.</li> <li>• Margins: Edges well defined, smooth; undermining may be present.</li> <li>• Shape: Usually round or oblong.</li> <li>• Exudate: Usually small to moderate; foul odor and purulence indicate infection.</li> </ul>
<b>Assessment: Surrounding Skin</b>		
<ul style="list-style-type: none"> <li>• Edema: Pitting or non-pitting; worsens with prolonged standing or sitting with legs dependent.</li> <li>• Scarring from previous wounds.</li> <li>• Ankle flare, varicose veins.</li> <li>• Hemosiderosis (i.e., brown staining).</li> <li>• Lipodermatosclerosis.</li> <li>• Atrophie blanche.</li> <li>• Maceration.</li> <li>• Temperature: Normally warm to touch.</li> <li>• Localized elevation of skin temperature at the ankle (spike over 4° F) is predictive of a wound.</li> </ul>	<ul style="list-style-type: none"> <li>• Pallor on elevation.</li> <li>• Dependent rubor.</li> <li>• Purpura.</li> <li>• Shiny, taut, thin, dry.</li> <li>• Hair loss over lower extremity.</li> <li>• Atrophy of skin, subcutaneous tissue and muscle.</li> <li>• Edema: Atypical of arterial disease.</li> <li>• Temperature: Skin feels cold to touch.</li> </ul>	<ul style="list-style-type: none"> <li>• Normal skin color.</li> <li>• Anhidrosis, xerosis, fissures; or maceration.</li> <li>• Callus formation over bony prominences (might cover a wound), and periwound.</li> <li>• Musculo-skeletal/foot deformities.</li> <li>• Edema: Localized area with erythema may indicate high pressure/inflammation.</li> <li>• Temperature: Skin warm to touch; localized elevation of skin temperature greater than 2° C indicates increased pressure, inflammation, or Charcot fracture.</li> <li>• Tinea pedis.</li> <li>• Diabetic skin markers: Dermopathy, necrobiosis lipoidica, acanthosis nigricans, bullosis diabeticorum.</li> </ul>

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<b>Assessment: Nails</b>		
N/A	<ul style="list-style-type: none"> <li>• Dystrophic.</li> </ul>	<ul style="list-style-type: none"> <li>• Dystrophic; hypertrophy.</li> <li>• Onychomycosis, paronychia.</li> </ul>
<b>Assessment: Complications</b>		
<ul style="list-style-type: none"> <li>• Venous dermatitis (e.g., erythema, itching, vesicles, weeping, scaling, crusting, afebrile).</li> <li>• Infection/Cellulitis (e.g., pain, erythema, swelling, induration, bulla, fever, leukocytosis).</li> <li>• Variceal bleeding.</li> <li>• Tinea pedis.</li> <li>• Venous thromboembolism.</li> </ul>	<ul style="list-style-type: none"> <li>• Infection/Cellulitis (e.g., pain, edema, periwound fluctuance; or only faint halo of erythema around wound).</li> <li>• Osteomyelitis (e.g., probe to bone).</li> <li>• Gangrene (wet or dry).</li> </ul>	<ul style="list-style-type: none"> <li>• Infection/Cellulitis.</li> <li>• Arterial ischemia.</li> <li>• Osteomyelitis.</li> <li>• Charcot fracture (e.g., swelling, pain, erythema, localized temperature elevation of 3–7° C).</li> <li>• Gangrene.</li> </ul>
<b>Assessment Perfusion/Sensation of the Lower Extremity: Pain</b>		
<ul style="list-style-type: none"> <li>• Leg pain may be variable: Dull aching, itchy, sore, tender; severe sharp or throbbing.</li> <li>• The pain may be accompanied by complaints of heaviness.</li> <li>• The leg pain worsens with dependency.</li> <li>• Elevation relieves pain.</li> </ul>	<ul style="list-style-type: none"> <li>• Intermittent claudication (i.e., cramping, aching, fatigue, weakness or pain in the calf, thigh or buttock, which occurs after exercise; and is only relieved by 10 minutes rest) is a classical sign.</li> <li>• Resting, positional, or nocturnal pain may be present.</li> <li>• Elevation exacerbates pain.</li> <li>• Dependency relieves pain.</li> <li>• Paresthesia may occur.</li> <li>• A sudden onset of the 6 P's (i.e., pain, pulselessness, pallor, paresthesia, paralysis, and polar [coldness]) indicates an acute embolism; and warrants an immediate referral to a vascular surgeon.</li> </ul>	<ul style="list-style-type: none"> <li>• Decreased or altered sensitivity to touch occurs.</li> <li>• Pain may be superficial, deep, aching, stabbing, dull, sharp, burning, or cool.</li> <li>• Altered sensation not described as pain (e.g., numbness, warmth, prickling, tingling, shooting, pins and needles; “stocking-glove pattern”) may be present.</li> <li>• Pain may be worse at night.</li> <li>• Allodynia (i.e., intolerance to normally painless stimuli such as bed sheets touching feet/legs) may occur.</li> </ul>

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<b>Assessment Perfusion/Sensation: Peripheral Pulses</b>		
<ul style="list-style-type: none"> <li>• Pulses are present and palpable.</li> </ul>	<ul style="list-style-type: none"> <li>• Pulses are absent or diminished (i.e., pedal, posterior tibial).</li> <li>• Femoral or popliteal bruits may be heard.</li> </ul>	<ul style="list-style-type: none"> <li>• Pulses are absent or diminished (i.e., pedal, posterior tibial).</li> <li>• Femoral or popliteal bruits may be heard.</li> </ul>
<b>Assessment Perfusion/Sensation: Non-Invasive Vascular Tests</b>		
<ul style="list-style-type: none"> <li>• Capillary refill: Normal (less than 3 seconds).</li> <li>• Venous refill time: Shortened (less than 20 seconds).</li> <li>• Ankle brachial index (ABI): Within normal limits (1.0–1.3).</li> </ul>	<ul style="list-style-type: none"> <li>• Capillary refill: Abnormal (more than 3 seconds).</li> <li>• Venous refill time: Prolonged (greater than 20 seconds).</li> <li>• Ankle brachial index (ABI): <ul style="list-style-type: none"> <li>○ LEAD: Equal to/or less than 0.9.</li> <li>○ Borderline: Equal to/or less than 0.6–0.8.</li> <li>○ Severe ischemia: Equal to/or less than 0.5.</li> <li>○ Critical ischemia: Equal to/or less than 0.4.</li> </ul> </li> <li>• Transcutaneous oxygen (TcPO<sub>2</sub>): Less than 40 mmHg is hypoxic.</li> <li>• Toe brachial index (TBI): Less than 0.64 indicates LEAD.</li> <li>• Toe systolic pressure (TP): Less than 30 mmHg (less than 50 mmHg if diabetes) indicates critical limb ischemia (CLI).</li> </ul>	<ul style="list-style-type: none"> <li>• Capillary/venous refill: Normal.</li> <li>• ABI: LEAD often co-exists with neuropathic disease and should be ruled out.</li> <li>• The ABI can be elevated greater than 1.3(indicative of calcified ankle arteries), and in such case, a toe pressure/TBI is indicated. <ul style="list-style-type: none"> <li>○ TBI: Less than 0.64 indicates LEAD.</li> <li>○ TP: Less than 30 mmHg (less than 50 mmHg if diabetes) indicates CLI.</li> </ul> </li> <li>• Transcutaneous oxygen (TcPO<sub>2</sub>): Less than 40 mmHg is hypoxic.</li> </ul>
<b>Assessment Perfusion/Sensation: Screen for Loss of Protective Sensation</b>		
<ul style="list-style-type: none"> <li>• Assess for peripheral, sensory neuropathy using a 10-g Semmes-Weinstein monofilament.</li> </ul>	<ul style="list-style-type: none"> <li>• Assess light pressure sensation using a 10-g Semmes-Weinstein monofilament.</li> <li>• Assess vibratory sensation using a 128 Hz tuning fork.</li> <li>• Check deep tendon reflexes at the ankle/knee with a reflex hammer.</li> <li>• Inability to feel the monofilament, diminished vibratory perception, and diminished reflexes indicate a loss of protective sensation and an increased risk of wounds.</li> </ul>	<ul style="list-style-type: none"> <li>• Assess light pressure sensation using a 10-g Semmes-Weinstein monofilament.</li> <li>• Assess vibratory sensation using a 128 Hz tuning fork.</li> <li>• Check deep tendon reflexes at the ankle/knee with a reflex hammer.</li> <li>• Inability to feel the monofilament, diminished vibratory perception, and diminished reflexes indicate a loss of protective sensation and an increased risk of wounds.</li> </ul>

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<p><b>Measures to Improve Venous Return</b></p> <p>Provided vascular studies have ruled out LEAD:</p> <ul style="list-style-type: none"> <li>• Use compression therapy: 30–42 mmHg compression at the ankle, if ABI greater than 0.8: <ul style="list-style-type: none"> <li>○ Multi-layer compression systems are more effective than single layer systems.</li> <li>○ Intermittent pneumatic compression may be considered for patients who are immobile or need higher levels of compression than can be provided by wraps or stockings.</li> </ul> </li> <li>• Elevate legs above the level of the heart for 30 minutes, 4 times per day.</li> <li>• Consider medications (e.g., pentoxifylline) to improve blood flow.</li> <li>• Increase exercise: Walking, calf muscle exercise, toe lifts, ankle flexion exercises.</li> <li>• Avoid constricting garments, crossing legs, prolonged standing, and high heeled shoes.</li> <li>• Stop smoking.</li> <li>• Control weight (Carmel, 2012).</li> <li>• Surgically obliterate damaged veins: subfascial endoscopic perforator surgery (SEPS).</li> </ul>	<p><b>Measures to Improve Tissue Perfusion</b></p> <ul style="list-style-type: none"> <li>• Revascularize if possible.</li> <li>• Change lifestyle: Stop smoking; avoid caffeine, restrictive garments, and cold temperatures.</li> <li>• Maintain proper hydration/nutrition.</li> <li>• Maintain legs in a neutral or dependent position.</li> <li>• Increase physical activity: Walking; supervised exercise 30–45 minutes, 3 times per week.</li> <li>• Use medications to control hypertension, hyperlipidemia, and diabetes; antiplatelets to improve blood cell movement through narrowed vessels.</li> </ul>	<ul style="list-style-type: none"> <li>• Revascularize if ischemic.</li> <li>• Stop smoking.</li> <li>• Maintain tight glucose/glycemic control; control hypertension.</li> <li>• Engage in exercise that is adapted to prevent injury.</li> <li>• Consider medications, as indicated.</li> </ul>
<b>Measures to Prevent Trauma</b>		
<ul style="list-style-type: none"> <li>• Use reduced compression (23–30 mmHg) if ABI is less than 0.8.</li> <li>• Do not apply compression if ABI is less than 0.5, and refer for vascular testing/surgical evaluation.</li> </ul>	<ul style="list-style-type: none"> <li>• Use proper foot wear.</li> <li>• Use pressure redistribution for heels, toes, and bony prominences, especially if in bed.</li> <li>• Obtain professional nail/callus care.</li> <li>• Avoid chemical, thermal, mechanical injury (e.g., no bare feet even in the house; no hot soaks or heating pads; no medicated corn pads; wear socks/stockings with shoes).</li> <li>• Self-inspect the lower extremities on a daily basis.</li> </ul>	<ul style="list-style-type: none"> <li>• Reduce shear stress and offload wounds (e.g., bedrest, contact casting, walking splints, orthopedic shoes).</li> <li>• Use proper footwear.</li> <li>• Use assistive devices for support, balance and additional offloading.</li> <li>• Use pressure redistribution for heels, toes, and bony prominences, especially if in bed.</li> <li>• Obtain routine professional nail/callus care.</li> <li>• Avoid chemical, thermal, mechanical injury (e.g., no bare feet even in the house; no hot soaks or heating pads; no medicated corn pads; wear socks/stockings with shoes).</li> </ul>



		• Self-inspect the lower extremities on a daily basis.
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<b>Topical Therapy: Goals</b>		
<ul style="list-style-type: none"> <li>• Control edema.</li> <li>• Absorb exudate.</li> <li>• Prevent trauma/injury.</li> <li>• Identify/treat infection.</li> <li>• Promote wound healing/maintain moist wound surface.</li> <li>• Protect periwound skin.</li> <li>• Minimize pain.</li> </ul>	<ul style="list-style-type: none"> <li>• Prevent trauma/injury.</li> <li>• Identify/treat infection.</li> <li>• Promote wound healing.</li> <li>• Minimize pain.</li> <li>• Preserve limb.</li> </ul>	<ul style="list-style-type: none"> <li>• Prevent trauma/injury.</li> <li>• Identify/treat infection.</li> <li>• Promote wound healing.</li> <li>• Minimize pain.</li> <li>• Preserve limb.</li> </ul>
<b>Topical Therapy: Considerations/Options</b>		
<ul style="list-style-type: none"> <li>• Use absorptive dressings to control exudate.</li> <li>• Treat infection: Use culture-guided antibiotic/antimicrobial therapy. <ul style="list-style-type: none"> <li>○ Consider topical antimicrobial/antibiotics for superficial infection.</li> <li>○ Deep tissue infection/cellulitis warrants systemic treatment.</li> </ul> </li> <li>• Remove devitalized tissue.</li> <li>• Avoid known skin irritants and allergens in patients with venous dermatitis/eczema.</li> <li>• Use emollients such as petrolatum to manage dry, scaly skin.</li> <li>• Identify and treat dermatitis/eczema (e.g., topical steroids 1–2 weeks); refer to a dermatologist if unresponsive (Carmel, 2012).</li> <li>• Consider topical analgesics for painful wound care/debridement.</li> </ul>	<ul style="list-style-type: none"> <li>• Avoid occlusive dressings: Use dressings that permit easy, frequent visualization of the wound.</li> <li>• Aggressively treat infection.</li> <li>• Dry, non-infected wounds with stable, fixed eschar/necrosis: <ul style="list-style-type: none"> <li>○ Keep dry, no debridement.</li> <li>○ Assess perfusion status.</li> </ul> </li> <li>• Infected, necrotic wounds: <ul style="list-style-type: none"> <li>○ Refer for revascularization/surgical removal of necrotic tissue and antibiotic therapy.</li> <li>○ Do not rely on topical antibiotics to treat infected, ischemic wounds.</li> <li>○ Institute culture-guided systemic antibiotics promptly for patients with critical limb ischemia and evidence of limb infection, or cellulitis, and/or infected wounds.</li> </ul> </li> <li>• Open/draining wounds with necrotic tissue: <ul style="list-style-type: none"> <li>○ Consider a closely monitored trial of autolytic or enzymatic debridement.</li> </ul> </li> <li>• Open/draining wounds with exposed bones or tendons: <ul style="list-style-type: none"> <li>○ Consider a carefully monitored trial of moist, non-occlusive, absorbent, dressings.</li> </ul> </li> <li>• Open/draining, non-necrotic wounds: <ul style="list-style-type: none"> <li>○ Consider moist wound healing with non-occlusive, absorbent dressings.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Use dressings that maintain a moist surface, absorb exudate and allow easy visualization.</li> <li>• Use occlusive dressings cautiously.</li> <li>• Aggressively treat infection, including fungal infection.</li> <li>• Do not rely on topical antimicrobials alone to treat cellulitis, but they could be used in conjunction with systemic antimicrobials; use of antimicrobials should be culture-guided.</li> <li>• Debride avascular/necrotic tissue in non-ischemic wounds.</li> </ul>



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<b>Adjunctive Therapy</b>		
<ul style="list-style-type: none"> <li>• Skin substitutes.</li> <li>• Electrical stimulation.</li> <li>• Ultrasound.</li> </ul>	<ul style="list-style-type: none"> <li>• Hyperbaric oxygen therapy.</li> <li>• Arterial flow augmentation (i.e., intermittent pneumatic compression).</li> <li>• Electrotherapy.</li> <li>• Low frequency ultrasound.</li> <li>• Spinal cord stimulation.</li> </ul>	<ul style="list-style-type: none"> <li>• Hyperbaric oxygen therapy.</li> <li>• Skin substitutes.</li> <li>• Topical negative pressure.</li> <li>• Growth factor therapy.</li> <li>• Surgery to correct structural deformities.</li> <li>• Surgical debridement/implantation of antibiotic beads, spacers, or gels.</li> <li>• Pain management consultation, as needed.</li> </ul>

## References

- Carmel, J. E. (2012). Venous ulcers. In R.A. Bryant & D.P. Nix (Eds.), *Acute & chronic wounds: Current management concepts* (4th ed., pp. 194–213). St. Louis, MO. Elsevier-Mosby.
- Wound, Ostomy and Continence Nurses Society. (2008). *Guideline for management of wounds in patients with lower-extremity arterial disease*. Mt. Laurel, NJ: Author.
- Wound, Ostomy and Continence Nurses Society. (2011). *Guideline for management of wounds in patients with lower-extremity venous disease*. Mt. Laurel, NJ: Author.
- Wound, Ostomy and Continence Nurses Society. (2012). *Guideline for management of wounds in patients with lower-extremity neuropathic disease*. Mt. Laurel, NJ: Author.