

Skin and Wound Diagnostics and Labs

SKIN AND WOUND – PRACTICE RESOURCE

Applies to:	Direct clinical care staff who provide skin and wound care to individuals.
Purpose:	To describe the most common diagnostics and labs used in skin and wound care.

Diagnostics and lab work is an important part of skin and wound care, and can be used to correctly identify:

- Etiology of a wound
- Factors that may prevent or delay wound healing
- Factors that may lead to wound development

Bloodwork

Note: A prescriber order is required for all lab tests.

Test Name	To identify or diagnose:	Key Points
eGFR and creatinine	<ul style="list-style-type: none"> • Risk factors for delayed healing. • Risk factors for wound development. • Etiology — may limit diagnostic options. 	Impaired kidney function: <ul style="list-style-type: none"> • Limits red blood cell production, resulting in anemia and reduced healing. • Can lead to the development of wounds caused by calciphylaxis. • May increase risk of adverse effects from contrast dye.
Hemoglobin and iron stores	<ul style="list-style-type: none"> • Risk factors for delayed healing. 	<ul style="list-style-type: none"> • Anemia and decreased hemoglobin reduces the amount of available oxygen at the wound bed. This impairs healing times and tissue regeneration.
Complete blood count	<ul style="list-style-type: none"> • Risk factors for delayed healing. 	<ul style="list-style-type: none"> • Significant abnormalities can identify conditions that may affect healing, such as anemia, infection, immune dysfunction and autoimmune diseases; they can also identify risk for bleeding (low platelets).
Blood glucose: <ul style="list-style-type: none"> • Hemoglobin A1C (HbA1c) • Fasting blood glucose 	<ul style="list-style-type: none"> • Risk factors for wound development. • Risk factors for delayed healing. <p>🚩 Clients with diabetes and a trend of elevating fasting blood glucose should be investigated for infection.</p>	Elevated blood glucose levels: <ul style="list-style-type: none"> • Leads to narrowing of blood vessels and decreases the transportation of oxygen and nutrients to (and waste away from) the wound bed. • Decreases white blood cell activity and reduces immune response to infection. • Increases nitric oxide, which increases blood pressure, leading to narrowing of vessels.
Albumin and prealbumin	<ul style="list-style-type: none"> • Risk factors for delayed healing. • Risk factors for wound development. 	<ul style="list-style-type: none"> • Inadequate nutritional protein or protein loss from wound exudate can delay healing. • Albumin levels are a late indicator of malnutrition. • Prealbumin is a more timely and sensitive indicator of protein status. • Low albumin can lead to a fluid shift from the blood vessels, resulting in edema and weeping in the lower limbs. • Values may not be reliable in clients with chronic kidney disease.

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C-reactive protein (CRP)	<ul style="list-style-type: none"> Risk factors for delayed healing. 	<ul style="list-style-type: none"> Non-specific for wounds, but can support a differential diagnosis of ongoing infection and/or chronic inflammation.
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Bedside/Outpatient/Clinic Settings

Test Name	To identify or diagnose:	Key Points/Considerations
Monofilament testing	<ul style="list-style-type: none"> Risk factors for wound development (screening tool). 	<ul style="list-style-type: none"> Identifies the loss of protective sensation (LoPS) related to neuropathy in the lower limbs. Part of the <i>Inlow's 60 Second Diabetic Foot Screen</i> screening tool and other lower limb assessments. Assessment results inform prevention strategies.
Probe to bone test	<ul style="list-style-type: none"> Risk factors for delayed healing (due to osteomyelitis). 	<ul style="list-style-type: none"> A blunt metal probe is used to gently palpate the wound bed; bone is identified by the probe coming into contact with a hard, gritty surface. This positive result is highly predicable of osteomyelitis, especially in a diabetic foot injury.
Biopsy	<ul style="list-style-type: none"> Etiology. Risk factors for delayed healing. 	<ul style="list-style-type: none"> Analysis of bone or tissue to diagnose: malignancy, pathogens, or inflammatory conditions. Biopsies should be considered for wounds that have not responded as expected to treatment within 6 weeks, or show unhealthy tissue that is suspicious for malignancy.
Non-contact infrared thermometer	<ul style="list-style-type: none"> Risk factors for delayed healing. Risk factors for wound development. 	<ul style="list-style-type: none"> Identifies localized elevated temperature that can support diagnosis of infection and/or inflammation. Must be in Fahrenheit. A 3°F or greater difference from the contralateral area of the body indicates inflammation and/or infection. Useful to identify inflammation in a neuropathic foot, which can be a precursor to a wound, allowing for preventative measures to be implemented.
Culture and Susceptibility (C&S) wound swab	<ul style="list-style-type: none"> Risk factors for delayed healing. 	<ul style="list-style-type: none"> Wounds should only be cultured when clinical signs and symptoms of a spreading infection are present. Procedure: Culture & Susceptibility (C&S) Swab in Suspected Wound Infection Guideline: Assessment, Prevention, & Treatment of Wound Infection
Peripheral pulse assessment with hand-held Doppler	<ul style="list-style-type: none"> Etiology — Arterial insufficiency. 	<ul style="list-style-type: none"> Provides audible (and sometimes visual) arterial waveforms (monophasic; biphasic; and triphasic), which identifies the quality of blood flow. Technique and interpretation requires practice and mentorship.
Ankle brachial pressure index (ABPI) & toe brachial pressure index (TBPI)	<ul style="list-style-type: none"> Etiology — Arterial insufficiency. 	<ul style="list-style-type: none"> Identifies degree of arterial insufficiency using the ankle or toe pressure divided by brachial pressure. A component of a vascular lower limb assessment. ABPI cannot be considered accurate in patients with non-compressible vessels (e.g., diabetic patients).

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	<ul style="list-style-type: none"> • Can be done with hand-held Doppler units, or Bedside units/automatic ABPI devices. • Technique and interpretation requires practice and mentorship.
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Medical Imaging

Test Name	To identify or diagnose:	Key Points
CT angiogram with runoff	<ul style="list-style-type: none"> • Etiology. 	<ul style="list-style-type: none"> • Used to determine peripheral arterial perfusion and the presence of collateral circulation and shunting. • Patients with reduced kidney function may not be candidates or may require a hydration protocol if dye is used.
Venous duplex ultrasound	<ul style="list-style-type: none"> • Etiology. 	<ul style="list-style-type: none"> • Used to assess for venous reflux and deep vein thrombosis (DVT).
Resting arterial Doppler	<ul style="list-style-type: none"> • Etiology. 	<ul style="list-style-type: none"> • Assesses arterial supply and stenosis, and provides ABPI/TBPI. • Also known as vascular lab studies.
Fluoroscopy or CT sinogram	<ul style="list-style-type: none"> • Risk factors for delayed healing. • Etiology. 	<ul style="list-style-type: none"> • Investigates sinus tracts and fistulas. • Patients with reduced kidney function may not be candidates or may require a hydration protocol if dye is used.
Computed tomography (CT) scan	<ul style="list-style-type: none"> • Risk factors for delayed healing. • Etiology. 	<ul style="list-style-type: none"> • Used to identify: foreign bodies, depth of tissue injuries, infection/abscesses, areas of necrosis/ischemia, fistulas, and cancer diagnosis/progression. • Provides cross-sectional images of the bones, blood vessels and soft tissues and more detailed information than an X-ray.
Magnetic resonance imaging (MRI)	<ul style="list-style-type: none"> • Risk factors for delayed healing. • Etiology. 	<ul style="list-style-type: none"> • Used to identify foreign bodies, depth of tissue injuries, infection/abscesses, areas of necrosis/ischemia, fistulas, and cancer diagnosis/progression. • Does not use radiation, but may require ionized contrast. • MRIs are considered to be the gold standard in diagnosing osteomyelitis.
Magnetic resonance angiogram (MRA)	<ul style="list-style-type: none"> • Etiology. 	<ul style="list-style-type: none"> • Used to determine peripheral arterial perfusion and the presence of collateral circulation and shunting. • Results will inform interventions and prevention strategies.
Ultrasound	<ul style="list-style-type: none"> • Risk factors for delayed healing. 	<ul style="list-style-type: none"> • Used to see internal body structures and can identify fluid collections, such as abscesses.
X-rays	<ul style="list-style-type: none"> • Risk factors for delayed healing. • Risk factors for wound development. 	<ul style="list-style-type: none"> • Identifies abnormalities in bone and foreign bodies. • Weight bearing x-rays assess the functional position of the bones in the foot and ankle; bony deformities can lead to wound development. • Sequential x-rays can assist in diagnosing osteomyelitis. • First line test for suspicion of Charcot foot arthropathy.

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Nuclear Imaging

Test Name	Indications	Key Points
White blood cell (WBC) scan	<ul style="list-style-type: none">Risk factors for delayed healing.	<ul style="list-style-type: none">Ordered to assess for abscess, osteomyelitis, or unexplained fever, particularly after surgery.
Bone scan	<ul style="list-style-type: none">Risk factors for delayed healing.	<ul style="list-style-type: none">Used to identify osteomyelitis.