



## Contemporary Management of Critical Limb Ischemia

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### Keywords

- Critical limb ischemia • Rest pain • Peripheral arterial disease • Endovascular
- Angioplasty • Bypass graft

### Key points

- Critical limb ischemia suggests extensive systemic atherosclerosis.
- Critical limb ischemia mandates aggressive medical management.
- Arterial revascularization may be indicated with endovascular or surgical techniques, depending on the specific arteries involved.
- Primary amputation is the best option for a select group of patients.

### DEFINITION

Critical limb ischemia (CLI), sometimes referred to as severe limb ischemia or chronic CLI, is best defined by the Trans-Atlantic Inter-Society Consensus Document for the Management of Peripheral Arterial Disease [TASC II]. This definition states patients with CLI have (1) chronic ischemic rest pain (at night or at all times) or (2) tissue loss (ischemic skin lesions such as ulcers or gangrene) whose disease can be attributed to peripheral vascular disease [1]. There are 2 primary classification systems for identifying the severity of peripheral arterial disease (PAD): Fontaine classification stages and Rutherford classification categories (Table 1). A patient with CLI is classified into either stage III or IV for the Fontaine classification. Using the Rutherford system, a patient with CLI is in category 4, 5, or 6. It should be emphasized the TASC II definition includes chronic as a key element in the diagnosis. The

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**Table 1**

Fontaine and Rutherford classifications for peripheral arterial disease, with critical limb ischemia italicized

Fontaine		Rutherford		
Stage	Clinical Features	Grade	Category	Clinical
I	Asymptomatic	0	0	Asymptomatic
IIa	Mild claudication	I	1	Mild claudication
IIb	Moderate to severe claudication	I	2	Moderate claudication
			3	Severe claudication
III	<i>Ischemic rest pain</i>	II	4	<i>Ischemic rest pain</i>
IV	<i>Ulceration or gangrene</i>	III	5	<i>Minor tissue loss</i>
		III	6	<i>Major tissue loss</i>

Data from Fontaine R, Kim M, Kieny R. Surgical treatment of peripheral circulation disorders. *Helv Chir Acta* 1954;21:499–533. [in German]; and Rutherford RB, Baker JD, Ernst C, et al. Recommended standards for reports dealing with lower extremity ischemia: revised version. *J Vasc Surg* 1997;26:517–38.

symptoms should be present for more than 2 weeks [1]. This helps distinguish from acute limb ischemia, which is a surgical emergency. Acute limb ischemia also has a Rutherford classification scheme and it should not be confused with the classification for CLI.

## DIAGNOSIS

At the center of a CLI diagnosis are history and physical examination. Patients have a classic history of claudication that has progressed to pain at all times or pain at night. Often, patients endorse getting up at night to either walk or dangle their feet over the bed to relieve symptoms. Pain most often be described in the distal aspect of the foot. The physical examination often reveals loss of hair over the distal extremity, ruborous and nonswollen extremities with delayed capillary refill, and, in severe cases, a wound. The ankle-brachial index (ABI) and toe systolic pressure (to give a toe-brachial index) are still the first recommended tests for patients with suspected ischemic changes in their lower extremities. There is no consensus on absolute pressure measurements for the diagnosis of CLI. TASC II does have general guidelines to help. True ischemic rest pain is believed present when an absolute ankle pressure drops below 50 mm Hg or a toe pressure is less than 30 mm Hg. If these are not present, alternative diagnoses should be sought. With an ulcer or wound is present, CLI is the diagnosis when the absolute ankle pressure drops below 70 mm Hg or the toe pressure is less than 50 mm Hg [1]. Cross-sectional imaging with CT angiography or conventional angiography provides specific information about areas of stenosis and occlusions. Duplex ultrasound and magnetic resonance angiography can also be used. Transcutaneous partial pressure of oxygen measurements can be helpful for predicting wound healing (the critical level for healing is between 30 mm Hg and 40 mm Hg, depending on the vascular laboratory). Other studies (capillaroscopy and laser Doppler imaging) are used primarily in research settings [1].

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