



## Evaluation and Management of a Patient for Amputation

<b>Description of the Activity</b>	<p>Vascular surgeons are frequently involved in the management of patients requiring lower extremity amputation in both acute and chronic settings. These patients may be established patients or present as referrals for pain or nonhealing or infected wounds, including those in extremis due to infection/sepsis or trauma. Vascular surgeons should have a comprehensive understanding of the spectrum of indications for amputation, the necessary workup to determine healing capacity, and the principles of surgical management, including selection criteria for intervention and the level and timing of amputation. Surgeons should understand perioperative management, including recognition and treatment of complications of amputation, follow-up for healing, and referral for prostheses.</p>
<b>Functions</b>	<ul style="list-style-type: none"><li>❖ Nonoperative/Preoperative<ul style="list-style-type: none"><li>➤ Synthesize information from a patient's records, history, physical exam, and diagnostic evaluations to determine if amputation is indicated.</li><li>➤ Evaluate wound-healing potential and identify a patient requiring revascularization before amputation.</li><li>➤ Select the level of amputation that provides the highest probability of healing, with consideration given to postamputation ambulation.</li><li>➤ Consider and coordinate multidisciplinary care.</li><li>➤ Communicate the operative plan and options to a patient/caregiver(s) and consultants.</li><li>➤ Obtain informed consent. Describe the indication, risks, benefits, alternatives, and complications of the proposed procedure, including a discussion of nonhealing amputation sites and an evidence-based determination of the likelihood of prosthetic fitting and ambulation.</li></ul></li><li>❖ Intraoperative<ul style="list-style-type: none"><li>➤ Perform lower extremity amputation procedures.<ul style="list-style-type: none"><li>▪ Above-knee amputation (AKA)</li><li>▪ Below-knee amputation (BKA)</li><li>▪ Digit amputation</li><li>▪ Ray amputation</li><li>▪ Staged amputation, including guillotine</li><li>▪ Transmetatarsal amputation (TMA)</li></ul></li><li>➤ Recognize and manage unexpected intraoperative findings, such as:<ul style="list-style-type: none"><li>▪ Evidence of infection</li><li>▪ Nonviable or ischemic tissue</li><li>▪ Residual prosthetic graft material</li><li>▪ Venous hypertension with bleeding</li></ul></li><li>➤ Work with anesthesia staff, nursing staff, and other perioperative health care professionals to create and maintain an intraoperative environment that promotes patient-centered care.</li></ul></li><li>❖ Postoperative</li></ul>



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	<ul style="list-style-type: none"><li>➤ Initiate and oversee postoperative care and disposition, including pain and wound management, referral for rehabilitation, and prosthesis fitting.</li><li>➤ Communicate with the patient/caregiver(s) and members of the health care team (primary care provider, nursing staff, other health care providers) to ensure understanding of the preprocedure and postprocedure instructions and the patient's ability to carry out the resultant plan within the context of their life (eg, transportation, living situation, insurance, access to a pharmacy).</li><li>➤ Recognize and manage the most common complications after amputation, such as:<ul style="list-style-type: none"><li>▪ Bleeding, hematoma</li><li>▪ Chronic pain</li><li>▪ Deep venous thrombosis or pulmonary emboli</li><li>▪ Infection</li><li>▪ Nonhealing or ischemic residual extremity</li><li>▪ Poorly fitting prosthesis</li><li>▪ Traumatic injury to a residual extremity</li></ul></li></ul>
<b>Scope</b>	<ul style="list-style-type: none"><li>❖ In scope<ul style="list-style-type: none"><li>➤ AKA</li><li>➤ BKA</li><li>➤ Digital/ray amputation</li><li>➤ Guillotine</li><li>➤ TMA</li></ul></li><li>❖ Out of scope<ul style="list-style-type: none"><li>➤ Cancer-related (eg, sarcoma)</li><li>➤ Hip disarticulation</li><li>➤ Upper extremity/hand</li></ul></li><li>❖ Included Diagnoses<ul style="list-style-type: none"><li>➤ Diabetic foot infection</li><li>➤ End-stage peripheral vascular disease</li><li>➤ Mangled extremity/trauma</li><li>➤ Wet/dry gangrene</li></ul></li><li>❖ Special Population<ul style="list-style-type: none"><li>➤ Patients with:</li></ul></li></ul>

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- Nonhealing prior amputation
- Orthopedic hardware
- Prior prosthetic graft
- Sepsis secondary to lower extremity infection



## Evaluation & Management of a Patient Needing Amputation

Level	Preoperative/ Nonoperative	Intraoperative	Postoperative
<p><b>1</b></p> <p><b>Limited Participation</b></p> <p>Demonstrates understanding of information and has very basic skills</p> <p><b>Framework:</b> What a learner directly out of medical school should know</p> <p>The attending can show and tell.</p>	<ul style="list-style-type: none"> <li>Identifies a patient who will need amputation for an unsalvageable limb</li> <li>Demonstrates understanding that gas/wet gangrene is a surgical emergency requiring urgent amputation</li> <li>Identifies socioeconomic determinants of health and disparities in this patient population</li> <li>Discusses consent with a patient or surrogate, clearly describing the side and level of the amputation</li> <li>Communicates with a patient/caregiver(s) in a compassionate and patient-focused manner about the need for amputation</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrates understanding of sharps safety, safe use of devices, and surgical field sterility</li> <li>Performs basic surgical tasks efficiently, including suturing and knot-tying</li> <li>Demonstrates basic surgical skills, including making an incision and closure</li> <li>Identifies the correct level for the amputation and the basic steps of the operation</li> </ul>	<ul style="list-style-type: none"> <li>Identifies a basic postop problem (anemia, fever) and initiates management with supervision</li> <li>Identifies critical data points for hand-offs (eg, antibiotics, knee immobilizer, weight-bearing status)</li> <li>Identifies key health system components of postamputation care (skilled nursing, rehab, PT, prosthetics) and different payor types</li> <li>Communicates with a patient/caregiver(s) in a timely way regarding complications, changes in course, expected discharge time, and location</li> </ul>
<p><b>2</b></p> <p><b>Direct Supervision</b></p> <p>Demonstrates understanding of the steps of the operation but requires direction through principles and</p>	<ul style="list-style-type: none"> <li>Synthesizes clinical data (wound, perfusion) to recommend the level of amputation (TMA, BKA, AKA)</li> <li>Identifies a patient as part of a population/community at risk for inequities in care for peripheral arterial disease</li> <li>Discusses consent with a patient/caregiver(s), clearly</li> </ul>	<ul style="list-style-type: none"> <li>Demonstrates respect for tissues (gentle handling of flap edges and neurovascular bundle) and developing skill in instrument handling</li> <li>Assists in dissection for the amputation; separates the vessels and performs suture ligation</li> <li>Sets up the flap for closure with assistance</li> </ul>	<ul style="list-style-type: none"> <li>Manages a common postop problem (anemia, hematoma, MI), ordering and interpreting additional testing when needed</li> <li>Coordinates the care of a postamputation patient in a routine situation with the interprofessional team (nursing, rehab, PT, prosthetics)</li> <li>Describes components of the health care system used by postamputation</li> </ul>

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<p>does not know the nuances of a basic case</p> <p><b>Framework:</b> The learner can use the tools but may not know exactly what, where, or how to do it.</p> <p>The attending gives active help throughout the case to maintain forward progression.</p>	<p>describing potential procedural and systemic complications</p> <ul style="list-style-type: none"> <li>Communicates and shows empathy to a patient/caregiver(s), considering patient-specific factors (age, functional status, social situation); actively listens to the patient/caregiver(s) to understand expectations</li> </ul>	<ul style="list-style-type: none"> <li>Identifies most steps of the procedure and the equipment required (tourniquet, saw); requires prompting to advance the procedure</li> </ul>	<p>patients (rehab, PT, prosthetics), including how they are interrelated and impact patient care</p> <ul style="list-style-type: none"> <li>Anticipates the need for further difficult conversation between health care providers and a patient/caregiver(s), identifying conflicts that may arise; adjusts to complex communication barriers</li> </ul>
<p><b>3</b></p> <p><b>Indirect Supervision</b></p> <p>Can do a basic operation but will not recognize abnormalities and does not understand the nuances of an advanced case</p> <p><b>Framework:</b></p>	<ul style="list-style-type: none"> <li>Describes specific alternate approaches for amputation, including alternative flaps</li> <li>Uses local resources to provide a patient in need of amputation access to needed care</li> <li>Discusses consent with a patient/caregiver(s), including any possible changes due to intraop decision-making and the anticipated postop course</li> <li>Communicates with a patient/caregiver(s) with anticipation of the challenges a postamputation patient faces</li> </ul>	<ul style="list-style-type: none"> <li>Performs the procedural steps independently; identifies and controls neurovascular structures; delicately handles tissues to facilitate wound closure</li> <li>Identifies all critical steps of the procedure and the equipment required; advances the procedure with minimal prompting</li> </ul>	<ul style="list-style-type: none"> <li>Recognizes and manages a complex postop problem (eg, infection), including identifying the need to return to the OR</li> <li>Coordinates the care of a postamputation patient in a complex situation with multiple services; uses consultants (prosthetist, therapist) to mitigate discharge barriers</li> <li>Uses resources and consults with multidisciplinary providers to expedite discharge (social work, home health, insurance) and minimize the risk of readmission</li> </ul>

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<p>The learner can perform the operation in straightforward circumstances.</p> <p>The attending gives passive help. This help may be given while scrubbed for more complex cases or during a check-in for more routine cases.</p>			<ul style="list-style-type: none"> <li>Communicates well with a challenging patient and acknowledges uncertainty in their clinical course</li> </ul>
<p><b>4</b></p> <p><b><u>Practice Ready</u></b></p> <p>Can manage more complex patient presentations and operations and take care of most cases</p> <p><b><u>Framework:</u></b> The learner can treat all straightforward amputation cases and has a strong understanding of</p>	<ul style="list-style-type: none"> <li>Adapts the operative plan for a changing clinical situation (eg, progressive infection, sepsis)</li> <li>Identifies a patient in a population at risk for poor amputation outcomes and adapts the treatment plan to address disparities</li> <li>Identifies the need for a surrogate decision-maker for a patient who is unable to provide informed consent</li> <li>Engages other health care providers and caregivers (eg, palliative care) to navigate the care of a patient</li> </ul>	<ul style="list-style-type: none"> <li>Proficiently handles instruments and equipment, uses assistants, guides the conduct of the operation, and makes independent intraop decisions, anticipating when assistance is needed</li> <li>Identifies all critical steps of the procedure and the equipment required and advances the procedure without prompting in a complex case</li> </ul>	<ul style="list-style-type: none"> <li>Leads the team and provides supervision in managing postop complications (wound/systemic)</li> <li>Ensures safe transition of care at discharge for a postamputation patient in a complex situation (undomiciled patient), including coordination with other disciplines and specialties</li> <li>Advocates for the outpatient care needs of a patient, with consideration of limitations of their payment model</li> <li>Leads a difficult conversation with a patient regarding complication/futility of care; resolves conflicts that arise between the health care team and the patient/caregiver(s); facilitates a difficult</li> </ul>

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<p>surgical options and techniques for less common scenarios.</p> <p>The attending is available at the request of the learner but is not routinely needed for common presentations, though input may be needed for more complex presentations.</p>			<p>discussion about the long-term prognosis and return to ADLs</p>