# VA/DOD Clinical Practice Guidelines

# Lower Limb Amputation Rehabilitation


## Provider Summary

Version 3.0 | 2025

# VA/DOD CLINICAL PRACTICE GUIDELINE FOR REHABILITATION OF INDIVIDUALS WITH LOWER LIMB AMPUTATION

**Department of Veterans Affairs**

**Department of Defense**

## Provider Summary

### QUALIFYING STATEMENTS

The Department of Veterans Affairs (VA) and the Department of Defense (DOD) guidelines are based on the best information available at the time of publication. The guidelines are designed to provide information and assist decision making. They are not intended to define a standard of care and should not be construed as one. Neither should they be interpreted as prescribing an exclusive course of management.

This clinical practice guideline (CPG) is based on a systematic review of both clinical and epidemiological evidence. Developed by a panel of multidisciplinary experts, it provides a clear explanation of the logical relationships between various care options and health outcomes while rating both the quality of the evidence and the strength of the recommendation.

Variations in practice will inevitably and appropriately occur when providers consider the needs of individual patients, available resources, and limitations unique to an institution or type of practice. Therefore, every health care professional using these guidelines is responsible for evaluating the appropriateness of applying them in the setting of any particular clinical situation with a patient-centered approach.

These guidelines are not intended to represent VA or DOD policies. Further, inclusion of recommendations for specific testing, therapeutic interventions, or both within these guidelines does not guarantee coverage of civilian sector care.

**Version 3.0 – 2025**

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# Introduction

The Department of Veterans Affairs (VA) and Department of Defense (DOD) Evidence-Based Practice Work Group (EBPWG) was established and first chartered in 2004, with a mission to advise the "…Health Executive Council on the use of clinical and epidemiological evidence to improve the health of the population across the Veterans Health Administration and Military Health System," by facilitating the development of clinical practice guidelines (CPGs) for the VA and DOD populations.(1) Development and update of VA/DOD CPGs is funded by VA Evidence Based Practice, Office of Quality and Patient Safety. The system-wide goal of evidence-based CPGs is to improve patient health and wellbeing.

In 2017, the VA and DOD published a CPG for the Rehabilitation of Lower Limb Amputation (2017 LLA CPG), which was based on evidence reviewed through July 2016. Since the release of that CPG, the evidence base on LLA has expanded. Consequently, a recommendation to update the 2017 LLA CPG was initiated in 2023. This updated CPG's use of Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach reflects a more rigorous application of the methodology than previous iterations.(2) Therefore, the strength of some recommendations might have been modified because of the confidence in the quality of the supporting evidence (see Evidence Quality and Recommendation Strength).

This CPG provides an evidence-based framework for evaluating and managing care for adult patients, 18 years or older, who have experienced LLA, toward improving clinical outcomes. Successful implementation of this CPG will

- Assess the patient's condition and in collaboration with the patient, determine the most appropriate rehabilitation plan;
- Optimize each individual's functional independence, health outcomes, and quality of life;
- Minimize preventable complications and morbidity; and
- Emphasize the use of patient-centered care.

The full VA/DOD LLA CPG, as well as additional toolkit materials including a pocket card and provider summary, can be found at: https://www.healthquality.va.gov/index.asp.

# Recommendations

The evidence-based clinical practice recommendations listed in Table 1 were developed using a systematic approach considering four domains as per the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach (see Summary of Guideline Development Methodology in the full text version of the LLA Rehabilitation CPG). These domains include confidence in the quality of the evidence, balance of desirable and undesirable outcomes (i.e., benefits and harms), patient values and preferences, and other implications (e.g., resource use, equity, acceptability).

**Table 1. Evidence-based Clinical Practice Recommendations with Strength and Category**

| # | Recommendation | Strength[a] | Category[b] |
|---|---|---|---|
| 1. | There is insufficient evidence to recommend one surgical amputation procedure over another. | Neither for nor against | Not reviewed, Not changed |
| 2. | For patients with transfemoral amputation who meet eligibility criteria, we suggest osseointegration as an option to improve prosthesis use. | Weak for | Reviewed, New-added |
| 3. | There is insufficient evidence to recommend for or against targeted muscle reinnervation or other peripheral nerve surgical management for phantom limb pain. | Neither for nor against | Reviewed, New-added |
| 4. | We suggest intraoperative placement of a perineural catheter for the post-operative delivery of local anesthetic to reduce pain following amputation surgery. | Weak for | Reviewed, New-added |
| 5. | Post-transtibial amputation, we suggest application of a rigid or semi-rigid residual limb dressing to promote healing and early prosthesis use as soon as feasible. | Weak for | Not reviewed, Amended |
| 6. | We suggest providing post-operative amputation care in an inpatient rehabilitation facility (IRF) over other settings (e.g., skilled nursing facility (SNF) or home care). | Weak for | Reviewed, Amended |
| 7. | We suggest assessment and treatment to improve behavioral health and psychosocial functioning. | Weak for | Reviewed, New-replaced |
| 8. | We suggest peer support by a trained peer as a component of rehabilitation to improve psychosocial function. | Weak for | Reviewed, Amended |
| 9. | We suggest cognitive assessment to inform rehabilitation goals and prosthetic candidacy. | Weak for | Not reviewed, Amended |
| 10. | We suggest the care team provides patient education throughout amputation rehabilitation. | Weak for | Reviewed, Amended |
| 11. | We suggest mirror therapy, alone or in combination with other therapies, to improve pain, function and quality of life for individuals with phantom limb pain. | Weak for | Reviewed, New-added |
| 12. | We suggest an individualized and skilled rehabilitation program with exercise and gait training to improve functional status, walking ability, and quality of life. | Weak for | Reviewed, New-replaced |
| 13. | We suggest using patient-identified sex to inform individualized rehabilitation plans. | Weak for | Reviewed, New-replaced |
| 14. | We suggest screening for factors associated with rehabilitation outcomes following acquired limb loss, (e.g., smoking, comorbid injuries or illnesses, psychosocial characteristics and physical function). | Weak for | Not reviewed, Amended |
| 15. | For community ambulators, there is insufficient evidence to recommend any specific transfemoral socket design. | Neither for nor against | Reviewed, New-added |
| 16. | For community ambulators, there is | Neither for nor against | Reviewed, |

| # | Recommendation | Strength[a] | Category[b] |
|---|---|---|---|
| | insufficient evidence to recommend for or against ischial containment or sub-ischial socket designs. | | New-added |
| 17. | For prosthetic ambulators, we suggest prescribing microprocessor knee units over non-microprocessor knee units for reducing falls, optimizing functional mobility and improving patient satisfaction. | Weak for | Reviewed, New-replaced |
| 18. | For prosthetic ambulators, there is insufficient evidence to prescribe any specific energy storing and return (ESAR) or microprocessor foot and ankle component over another. | Neither for nor against | Reviewed, New-added |
| 19. | For prosthetic ambulators, we suggest energy storing and return (ESAR) or microprocessor-controlled foot and ankle components over solid ankle cushioned heel (SACH) feet to improve ambulation and patient satisfaction. | Weak for | Reviewed, New-added |
| 20. | We suggest using patient-reported and performance-based measures with acceptable psychometric properties to assess function. | Weak for | Not reviewed, Amended |
| 21. | There is insufficient evidence to recommend for or against neurostimulation (e.g., peripheral nerve stimulation, or spinal cord stimulation) or neuroablation (e.g., cryoneurolysis, radio frequency ablation) interventions for the management of phantom limb pain or residual limb pain. | Neither for nor against | Reviewed, New-added |
| 22. | We suggest perineural catheter delivered anesthetic for the treatment of chronic severe phantom limb pain with functional impairment. | Weak for | Reviewed, New-added |
| 23. | There is insufficient evidence to recommend for or against any systemic pharmacologic intervention for the management of phantom limb pain. | Neither for nor against | Reviewed, New-added |
| 24. | For prosthesis users with hyperhidrosis, there is insufficient evidence to recommend for or against Botulinum toxin treatment to reduce sweat production, improve prosthetic function, reduce pain, and improve quality of life. | Neither for nor against | Reviewed, New-added |
| 25. | There was insufficient evidence to recommend for or against strategies to prevent re-amputation of the ipsilateral limb or amputation of the contralateral limb. | Neither for nor against | Reviewed, New-added |
| 26. | There is insufficient evidence to recommend for or against any specific intervention to improve intimacy and sexual health. | Neither for nor against | Reviewed, New-added |

[a] For additional information, see Determining Recommendation Strength and Direction in the full text version of the LLA CPG.

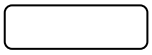
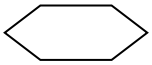
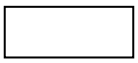
[b] For additional information, see Recommendation Categorization in the full text version of the LLA CPG.

## Algorithm

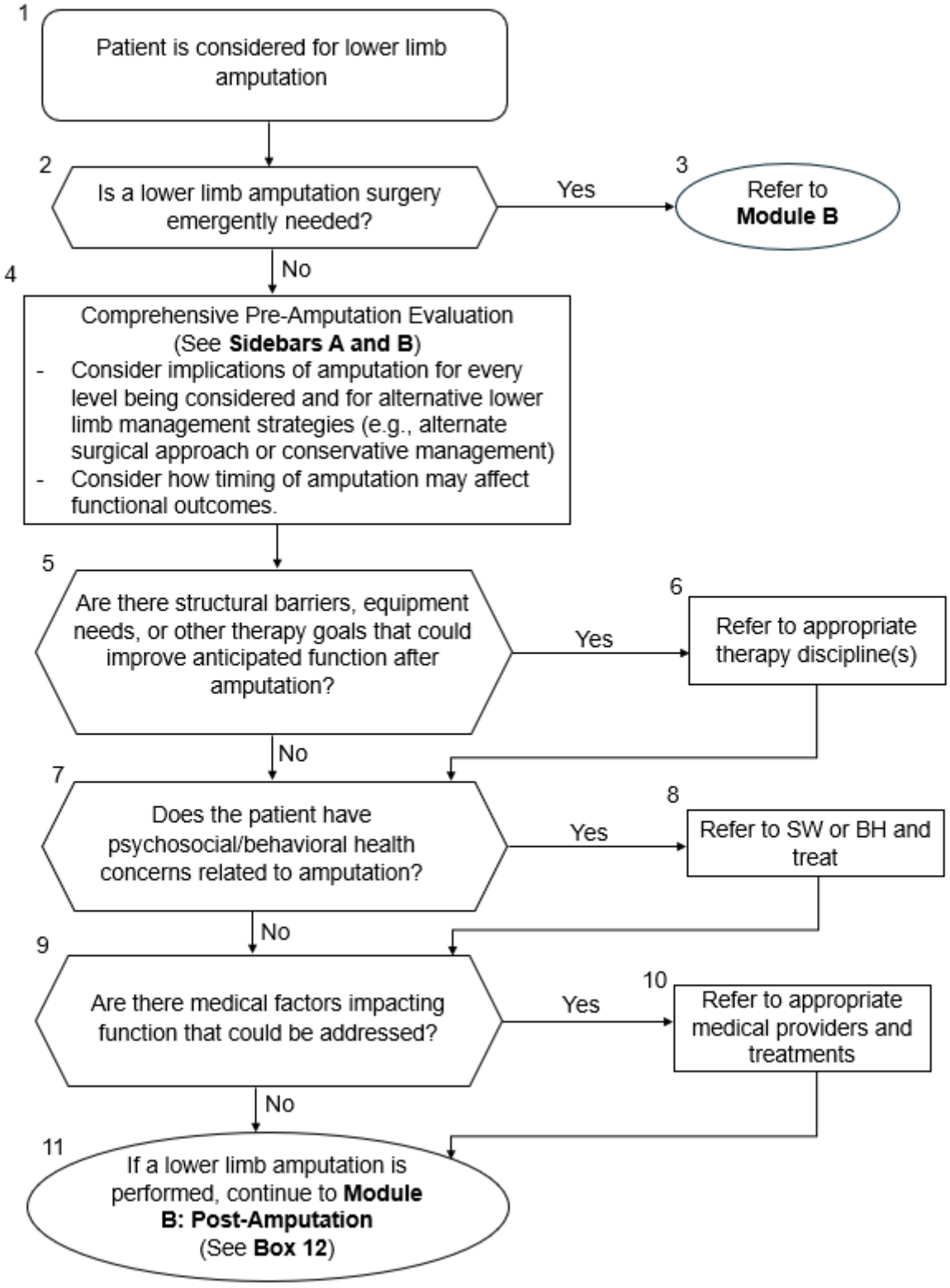
This CPG's algorithm is designed to facilitate understanding of the clinical pathway and decision-making process used in rehabilitation of patients with LLA. This algorithm simplified the flow of the management of patients with LLA and helps foster efficient decision making by providers. It includes

- An ordered sequence of steps of care,
- Recommended observations and examinations,
- Decisions to be considered, and
- Actions to be taken.

The algorithm is a step-by-step decision tree. Standardized symbols display each step, and arrows connect the numbered boxes indicating the order in which the steps should be followed. (3) Sidebars A–D provide more detailed information to assist in defining and interpreting elements in the boxes.

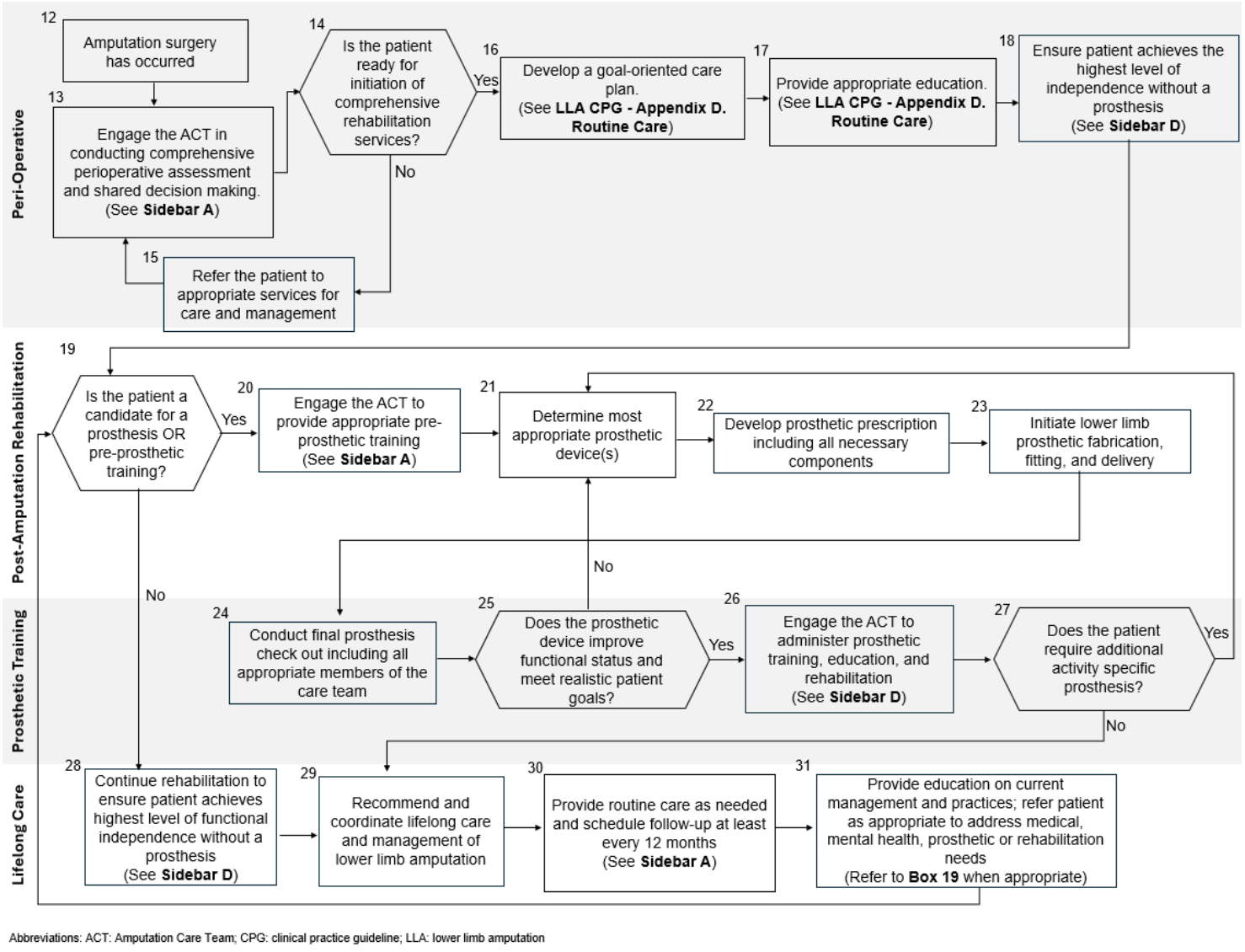
| Shape | Description |
|---|---|
|  | Rounded rectangles represent a clinical state or condition. |
|  | Hexagons represent a decision point in the guideline, formulated as a question that can be answered "Yes" or "No". |
|  | Rectangles represent an action in the process of care. |
|  | Ovals represent a link to another section within the algorithm |

## Module A: Pre-Amputation



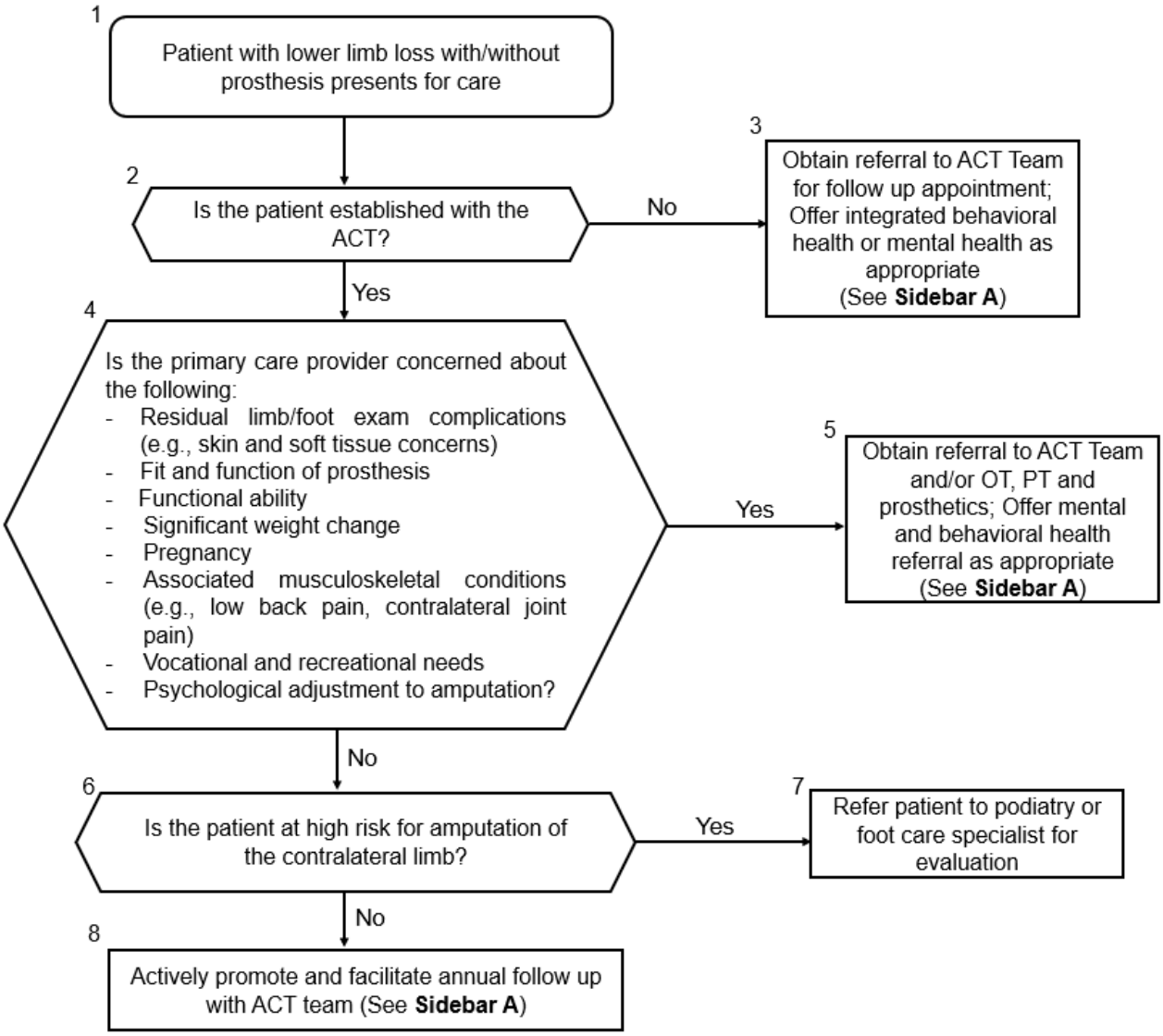

Abbreviations: BH: behavioral health; SW: social work

## Module B: Post-Amputation




Abbreviations: ACT: Amputation Care Team; CPG: clinical practice guideline; LLA: lower limb amputation

## Module C: Primary Care




Abbreviations: ACT: Transdisciplinary Amputation Care Team; OT: occupational therapy; PT: physical therapy;

**Sidebar A: Amputation Care Team (ACT)**

The ACT is a physician-led, patient-centered, transdisciplinary approach to provide a comprehensive treatment plan, limb preservation, and ensure lifelong management. The specialists involved may include:

- Rehabilitation physicians
- Pain management specialists
- Surgeons (e.g., vascular, orthopedic)
- Mental and behavioral health providers
- Case managers
- Nurses
- Occupational therapists
- Physical therapists
- Certified prosthetists
- Social workers
- Trained peer visitors
- Recreational Therapists and Adaptive Sports Providers
- Others (e.g., podiatrist, cardiologist)

Abbreviations: ACT: Amputation Care Team

## Sidebar B: Comprehensive Pre-Amputation Evaluation

**For amputation or other management approaches being considered, assess the following:**

- Preliminary prosthesis candidacy
- Functional implications of amputation if not using a prosthesis (applies to all patients at times)
- Equipment or home modification needs to prepare for post-amputation
- Specific rehabilitation goals such as optimizing mobility with the contralateral limb
- Psychosocial and behavioral health
- Medical factors affecting function
- Alternative surgical approaches or conservative management

See **Appendix D** in the full LLA CPG for further recommendations.

**Sidebar C: Pain Management**

- Perioperative Pain Management:
  - Intraoperative placement of a perineural catheter for the post operative delivery of local anesthetic can reduce pain following amputation surgery. (Recommendation 4)
  - Insufficient evidence to recommend for or against targeted muscle reinnervation (peripheral nerve management) for phantom limb pain. (Recommendation 3)
- **Residual Limb Pain Management:**
  - Insufficient evidence for or against neurostimulation (e.g., peripheral nerve stimulation, or spinal cord stimulation) or neuroablation (e.g., cryoneurolysis, radio frequency ablation) interventions for the management of residual limb pain (Recommendation 21)
- **Chronic Phantom Limb Pain:**
  - Perineural catheter delivered anesthetic for the treatment of chronic severe phantom limb pain with functional impairment (Recommendation 22)
  - Consult for mirror therapy, alone or in combination with other therapies, to improve pain, function and quality of life for individuals with phantom limb pain. (Recommendation 11)
  - Insufficient evidence to recommend for or against any systemic pharmacologic intervention for the management of phantom limb pain. (Recommendation 23)
  - Insufficient evidence for or against neurostimulation (e.g., peripheral nerve stimulation, or spinal cord stimulation) or neuroablation (e.g., cryoneurolysis, radio frequency ablation) interventions for the management of phantom limb pain (Recommendation 21)

Abbreviations: ACT: Amputation Care Team

| **Sidebar D: Functional Activity List** | |
|---|---|
| *Below is a comprehensive list of activities to include throughout the rehabilitation process of individuals with lower limb amputation.*<br>*These activities are dependent on patient preference, level of functioning, and overall clinical judgment to ensure safety.*<br>*The goal of this list is to promote the highest level of independence for individuals with and without prosthesis/prostheses.*<br>*Ensure incorporation of appropriate medical equipment as needed to complete tasks safely (prostheses, wheelchair, crutches, walker, etc.)* | |
| Activities of Daily Living | Bathing and Showering (including transfers) |
| | Toileting and hygiene (including transfers) |
| | Grooming (standing or sitting at sink with or without a prosthesis) |
| | Dressing (managing pants with/without prosthesis, changing shoes on prosthesis) |
| | Donning/doffing shrinkers/liners/prosthesis |
| | Cleaning, charging, basic maintenance of prosthesis |
| | Wound care |
| Functional Mobility | Fall recovery |
| | Transfers to/from kneeling/sitting on floor |
| | Managing a curb |
| | Stairs |
| | Managing uneven terrain (rocks, sand, grass) |
| | Inclines and declines (hills) |
| | Ambulating while carrying objects |
| | Wheelchair management |
| | Managing small spaces (walking backwards, side steps, etc.) |
| | Quick changes of direction/pivots |
| Household Tasks | Cooking |
| | Cleaning dishes (unloading dishwasher, managing high/low cabinets) |
| | Housework (vacuuming, mopping, dusting, cleaning toilets/tubs) |
| | Laundry |
| | Gardening |
| | Yardwork (mowing the lawn, weed whacking) |
| | Making the bed/changing sheets |
| | Taking out the trash/bringing bins to the street |
| | Painting a room |
| | Managing a ladder |
| | Moving furniture/boxes (with or without dolly) |
| | Hanging a painting |
| | Retrieving objects under the bed |
| | Cutting firewood |
| Caregiving | Child rearing (carrying child, pushing child on swing, carrying car seat, playing on floor) |
| | Caring for pets and animals (managing dog leash, washing animal, carrying food bag) |

| Sidebar D: Functional Activity List | |
|---|---|
| | Caring for family members (pushing wheelchair, assisting with transfers) |
| Community Tasks | Driving |
| | Managing public transportation (bus, train, etc.) |
| | Wheelchair management in/out of car or public transportation |
| | Grocery shopping (pushing cart, carrying bags, loading/unloading car) |
| | Carrying tray in the cafeteria |
| | Changing a tire |
| | Religious activities (managing church pews, kneeling, etc.) |
| | Managing opening and closing doors |
| Return to Work | *These tasks will be specific to an individual's job duties. Many jobs can provide a job description that includes the physical requirements.* |
| Return to Sport/Leisure | Gym Exercises (squats, push-ups, managing gym equipment) |
| | Backpacking |
| | Camping (setting up a tent, starting a fire) |
| | Hiking |
| | Golfing |
| | Throwing/catching ball |
| | Transfers in/out of a boat |
| | Hunting/fishing |
| | *These tasks will be specific to an individual's interests.* |
| Return to Travel | Managing security at the airport |
| | Carrying luggage to and through the airport |
| | Placing luggage overhead |
| | Managing escalators and moving sidewalks |
| | Transfers in/out of airplane bathrooms |

## Identifying Patient Rehabilitation Goals

The successful rehabilitation of patients with LLA is influenced by systemic considerations such as availability of the full multi-disciplinary team, structured programs and systems of care such as the VA's Amputation System of Care. Patient level factors include but are not limited to level of amputation, physical conditioning, social support such as a caregiver, comorbidities, cognitive functioning, and psychological factors.(4) Amputations caused by vascular disease generally occur in aging populations with numerous other comorbidities such as cardiovascular disease, hypertension, renal disease, and arthritis.(5) These factors must be considered in order to help patients reach their goals when developing individualized rehabilitation plans for individuals with LLA.

While the pathophysiology of traumatic amputations may be different than non-traumatic amputations, rehabilitation strategies and prosthetic component prescriptions for both should be focused on patient goals. The overall goals of rehabilitation after amputation are to optimize the patient's health status, functional independence, and quality of life.(6,7) Ongoing assessments and therapeutic interventions to address medical, psychosocial, physical, and functional limitations are necessary to achieve these desired outcomes.(8)

## Highlighted Features of this Guideline

The current document is an update to the 2017 VA/DOD LLA CPG. The major strength of this CPG is the coordination and collaboration of the multidisciplinary team ensuring a broad representation of providers engaged in the management of LLA. The following significant updates make it important that providers review this version of the CPG:

- Updated algorithm and sidebars;
- Updated Routine Care for LLA section;
- Added 12 new recommendations, reviewed and replaced 4 recommendations, reviewed and amended 3 recommendations, carried over 1 recommendation not changed, and carried over 4 recommendations amended from the 2017 VA/DOD LLA CPG.

The methodology used in developing this CPG has been updated since the prior versions and reflects a more rigorous application of the GRADE methodology than previous versions. The result is a refined CPG that includes methodologically rigorous, evidence-based recommendations for the rehabilitation of individuals with LLA.

This CPG also provides expanded recommendations on research needed to strengthen future guidelines.

## Scope of the CPG

This CPG is based on published clinical evidence and related information available through March 15, 2024. It is intended to provide general guidance on best evidence-based practices (see Appendix A in the full text version of the LLA CPG for additional information on the evidence review methodology). Although the CPG is intended to improve the quality of care and clinical outcomes (see Introduction), it is not intended to define a standard of care (i.e., mandated or strictly required care).

This CPG is intended for use by VA, DOD, and community providers and others on the healthcare team assessing and managing adult patients with LLA.

This CPG is designed to assist providers in managing or co-managing patients in rehabilitation for LLA. Moreover, the patient population of interest for this CPG is adults who are eligible for care within the VA and DOD healthcare delivery systems. It includes Veterans as well as Active, Guard and Reserve service members and their adult beneficiaries. This CPG does not provide recommendations for rehabilitation of children or adolescents with LLA.

# Methods

The Work Group used the GRADE approach to craft each recommendation and determine its strength. Per the GRADE approach, recommendations must be evidence based and cannot be made based on expert opinion alone. The GRADE approach uses the following four domains to inform the strength of each recommendation (see Determining Recommendation Strength and Direction). (9)

1. Confidence in the quality of the evidence
2. Balance of desirable and undesirable outcomes
3. Patient values and preferences
4. Other considerations, as appropriate (e.g., resource use, equity, acceptability, feasibility, subgroup considerations)

Using these four domains, the Work Group determined the relative strength of each recommendation (*Strong* or *Weak*). The strength of a recommendation is defined as the extent to which one can be confident that the desirable effects of an intervention outweigh its undesirable effects and is based on the framework above, which incorporates the four domains.(10) A *Strong* recommendation generally indicates *High* or *Moderate* confidence in the quality of the available evidence, a clear difference in magnitude between the benefits and harms of an intervention, similar patient values and preferences, and understood influence of other implications (e.g., resource use, feasibility).

In some instances, insufficient evidence exists on which to base a recommendation for or against a particular therapy, preventive measure, or other intervention. For example, the systematic evidence review might have found little or no relevant evidence, inconclusive evidence, or conflicting evidence for the intervention. The manner in which this finding is expressed in the CPG might vary. In such instances, the Work Group might include among its set of recommendations a statement of insufficient evidence for an intervention that might be in common practice although it is unsupported by clinical evidence and particularly if other risks of continuing its use might exist (e.g., high opportunity cost, misallocation of resources). In other cases, the Work Group might decide to exclude this type of statement about an intervention. For example, the Work Group might remain silent where an absence of evidence occurs for a rarely used intervention. In other cases, an intervention might have a favorable balance of benefits and harms but might be a standard of care for which no recent evidence has been generated.

Using these elements, the Work Group determines the strength and direction of each recommendation and formulates the recommendation with the general corresponding text (see Table 2).

**Table 2. Strength and Direction of Recommendations and General Corresponding Text**

| Recommendation Strength and Direction | General Corresponding Text |
|---|---|
| Strong for | We recommend … |
| Weak for | We suggest … |
| Neither for nor against | There is insufficient evidence to recommend for or against … |
| Weak against | We suggest against … |
| Strong against | We recommend against … |

## Guideline Development Team

**Table 3. Guideline Work Group and Guideline Development Team**

| Organization | Names* |
|---|---|
| ***Department of Veterans Affairs*** | **M. Jason Highsmith, PhD, PT, DPT, CP, FAAOP (Champion)** |
| | **Jeffrey T. Heckman, DO (Champion)** |
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| | Leif Nelson, PT, DPT, ATP, CSCS |
| | Aaron Turner, PhD |
| | Patty Young, MSPT, CP |
| | Michael Carroll, PhD, CPO, FAAOP |
| | Rebecca Sepckman, MD, PhD |
| | Teresa Schuck, LCSW |
| | Yvonne Gallegos, DNP |
| ***Department of Defense*** | **Andrea Crunkhorn, PT, DPT (Champion)** |
| | **Tawnee Sparling, MD (Champion)** |
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| | Jessica M. Richards, PhD |
| | Meghan Logeais, OTD, OTR |
| | Robert J. McGill, MD |
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| Organization | Names* |
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| | Jennifer Ballard-Hernandez, DNP, RN, FNP-BC |
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| | Kelley Ern |
| ***Clinical Quality Improvement Program Defense Health Agency*** | Isabella Alvarez, MA, BSN, RN |
| | Lynn Young, BSN, RN, CIC |
| | Gwen Holland, MSN, RN |
| ***Sigma Health Consulting, LLC*** | Frances Murphy, MD, MPH |
| | James Smirniotopoulos, MD |
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| | Samantha Speed-Gangitano, MPH |
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| | Anita Ramanathan, BA |

*Additional contributor contact information is available in Appendix E in the full text version of the LLA CPG.

## Patient-Centered Care

Intended to consider patient needs and preferences, guideline recommendations represent a whole/holistic health approach to care that is patient-centered, culturally appropriate, and available to people with limited literacy skills and physical, sensory, or learning disabilities. VA/DOD CPGs encourage providers to use a patient-centered, whole/holistic health approach (i.e., individualized treatment based on patient needs, characteristics, and preferences). This approach aims to treat the particular condition while also optimizing the individual's overall health and wellbeing.

Regardless of the care setting, all patients should have access to individualized evidence-based care. Patient-centered care can decrease patient anxiety, increase trust in providers, and improve treatment adherence.(11,12) A whole/holistic health approach (https://www.va.gov/wholehealth/) empowers and equips individuals to meet their personal health and wellbeing goals. Good communication is essential and should be supported by evidence-based information tailored to each patient's needs. An empathetic and non-judgmental approach facilitates discussions sensitive to sex, culture, ethnicity, and other differences.

## Shared Decision Making

This CPG encourages providers to practice shared decision making, a process in which providers, patients, and patient care partners (e.g., family, friends, caregivers) consider clinical evidence of benefits and risks as well as patient values and preferences to make decisions regarding the patient's treatment.(13) Shared decision making is emphasized in *Crossing the Quality Chasm,* an Institute of Medicine (IOM), now NAM, report in 2001(14) and is inherent within the whole/holistic health approach. Providers must be adept at presenting information to their patients regarding individual treatments, expected risks, expected outcomes, and levels or settings of care or both, especially where patient heterogeneity in weighing risks and benefits might exist. The VHA and DHA have embraced shared decision making. Providers are encouraged to use shared decision making to individualize treatment goals and plans based on patient capabilities, needs, and preferences.

## The Multidisciplinary Team

A multi-disciplinary team (MDT) provides a coordinated approach to comprehensive care. Members of the team from various areas of specialty provide input based on areas of expertise to ensure all aspects of care are considered. The ideal team should, at the very least, consist of a physician (preferably a physical medicine and rehabilitation physician), a physical therapist, an occupational therapist and a prosthetist. Additional, equally valuable clinicians to include are nurses, social workers, recreational therapists, rehabilitation psychologists, and surgeons.

| | **Pre-Amputation: From Initial Discussion of Amputation to Admission for Amputation** | **Peri-Operative: From Hospitalization Admission to Discharge to Rehabilitation Setting** | **Post-Amputation Rehabilitation: From Acute Hospitalization through Initial Rehab Goals** | **Prosthetic Training: Associated with Prosthesis Related Functional Goals** | **Lifelong Care: From time of Discharge from Therapy Services through to End of Life** |
|---|---|---|---|---|---|
| **Focus Areas** | MDT team/PM&R consult<br><br>Functional implications of amputation<br><br>Home evaluation<br><br>Psychosocial well-being | Pain management<br><br>Residual limb protection and compression<br><br>Contralateral foot/limb management | Promote highest level of independence with *and* without prosthesis for all patients.<br><br>Mobility, ADL, community access goals without a prosthesis (all patients)<br><br>Pre-prosthesis training (if indicated) | Prosthesis management (donning, doffing, sock ply management, etc.)<br><br>Gait and other mobility training<br><br>ADL training<br><br>Floor recovery techniques | Routine amputation specialty team clinic<br>• Prosthesis fit and function<br>• DME needs<br>• Functional goals<br>• Contralateral limb/foot<br>• Psychosocial well-being |
| | | | | | |
| **1. Pain Management** | Assess for and manage existing pain<br><br>Develop a peri-operative pain management plan | Assess and treat residual limb pain (RLP), phantom limb pain (PLP), and phantom limb sensation (PLS)<br><br>Provide treatment plan for RLP, PLP, PLS, including:<br>patient education,<br>narcotic use,<br>regional anesthesia,<br>psychosocial interventions,<br>non-pharmacologic interventions (i.e., exercises, soft tissue mobilization, tapping, residual limb compression, etc.)<br>Graded Motor Imagery | Assess and treat residual limb pain (RLP), phantom limb pain (PLP), and phantom limb sensation (PLS)<br><br>Provide treatment plan for RLP, PLP, PLS, including:<br>patient education,<br>wean use,<br>psychosocial interventions,<br>non-pharmacologic interventions (i.e., exercises, soft tissue mobilization, tapping, residual limb compression, etc.)<br>Graded Motor Imagery | Assess and treat residual limb pain (RLP), phantom limb pain (PLP), and phantom limb sensation (PLS)<br><br>Provide treatment plan for RLP, PLP, PLS, including:<br>patient education,<br>wean narcotic use,<br>psychosocial interventions,<br>non-pharmacologic interventions (i.e., exercises, massage, etc.)<br>Prosthetic sock ply management,<br>Graded Motor Imagery (GMI) | Reassess and adjust treatment for residual limb pain (RLP), phantom limb pain (PLP), and phantom limb sensation (PLS)<br><br>Assess and treat contributing musculoskeletal problems |

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| | | | (GMI) | | |
| **2. Medical Management** | | | | | |
| **2.1. Comorbid and Concurrent conditions** | Assess medical risk factors for poor wound healing or re-amputation (e.g., end-stage renal disease on hemodialysis, etc.)<br><br>Assess medical risk factors for poor functional prognosis (e.g., end-stage renal disease on hemodialysis, tobacco use, diabetes, etc.)<br><br>Evaluate and consider other medical problems affecting function (e.g., polytrauma)<br><br>Initiate medical interventions, specialty consultations, and education as needed<br><br>Assess sensation of all extremities | Complete initial assessment of medical comorbidities and consultation as appropriate, especially if not addressed preoperatively<br><br>Initiate medical interventions and education as needed<br><br>Concurrent injuries or conditions | Continue medical interventions and education as needed<br><br>Evaluate and consider other medical problems affecting function (e.g., polytrauma) | Assess changes in medical comorbidities, and perform interventions and education as needed<br><br>Assess and optimize medical comorbidities affecting residual limb volume and health | Address musculoskeletal problems and other comorbidities that impact function<br><br>Reconcile pharmacologic medication list focusing on side effects that may negatively impact function with or without a prosthesis<br><br>Reinforce preventative care and whole health<br><br>Refer to specialty care as needed to address comorbidities |
| **2.2. Contralateral Lower Limb Management** | Contralateral foot/limb assessment | Contralateral foot/limb risk assessment and regular skin checks | Continued foot/limb evaluation and risk assessment | Continued foot/limb evaluation and risk assessment | Regular foot/limb risk assessment and management; referral to |

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| | Referral to specialists for routine preventive care or evaluation/management of new concerns<br><br>Prescribe appropriate footwear and orthoses<br><br>Manage comorbidities affecting foot/limb health and footwear/orthosis fit<br><br>Patient education about foot/limb protection and care | Contralateral foot/limb protection while supine, seated, or weight bearing<br><br>Referral to specialists as indicated<br><br>Prescribe appropriate footwear and orthoses<br><br>Patient education about foot/limb protection and care | Contralateral foot/limb protection while supine, seated, or weight bearing<br><br>Referral to specialists as indicated<br><br>Assess footwear or orthoses as appropriate for functional progression<br><br>Patient education about foot/limb protection and care | Contralateral foot/limb protection while supine, seated, or weight bearing<br><br>Referral to specialists as indicated<br><br>Assess footwear or orthoses as appropriate for functional progression<br><br>Patient education about foot/limb protection and care | specialists as appropriate<br><br>Patient education about foot/limb protection and care |
| **3. Behavioral Health and Psychosocial Function** | Perform psychosocial assessment<br><br>Perform cognitive assessment (may inform prosthesis candidacy, return to driving, etc.)<br><br>Offer counseling for adjustment and other concerns<br><br>Provide resources based on needs<br><br>Consider pharmacologic interventions for management of psychological symptoms | Evaluate and address psychosocial needs<br><br>Offer counseling for adjustment and other concerns<br><br>Consider pharmacologic interventions for management of psychological symptoms or brain injury/dysfunction<br><br>Offer peer support services<br><br>Provide education and information on advanced care planning | Continue psychosocial evaluation and address psychosocial needs<br><br>Complete cognitive assessment (may inform prosthesis candidacy, return to driving, etc.)<br><br>Offer counseling for adjustment and other concerns<br><br>Consider pharmacologic interventions for management of psychological symptoms or brain injury/dysfunction | Address psychosocial needs and concerns<br><br>Provide resources (e.g., transportation, clothing allowance, support groups, community resources)<br><br>Offer counseling for adjustment and other concerns<br><br>Consider pharmacologic interventions for management of psychological symptoms or brain injury/dysfunction | Offer counseling for adjustment and other concerns<br><br>Provide outreach follow-up<br><br>Provide resources (e.g., transportation, clothing allowance, support groups, community resources)<br><br>Consider pharmacologic interventions for management of psychological symptoms or brain injury/dysfunction |

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| | or brain injury/dysfunction<br><br>Offer peer support services<br><br>Provide education and information on advance care planning | | Offer peer support services<br><br>Provide education and information on advance care planning | Offer peer support services<br><br>Provide education and information on advance care planning | Offer peer support services<br><br>Provide education and information on advance care planning |
| **4. Residual Limb Management** | Optimize limb prior to surgery by addressing skin issues, strength limitations, range of motion limitations, etc.<br><br>Assess functional and prosthetic implications of residual limb length and amputation level<br><br>Assess sensation of the affected limb and | Local wound care for surgical incision and other wounds (e.g., negative pressure wound therapy)<br><br>Monitor the surgical wound for signs and symptoms of ischemia or infection<br><br>Control edema and shape residual limb (e.g., elastic bandage wrapping or shrinker application)<br><br>Protect residuum using rigid dressings (e.g., rigid cast, rigid removable device, etc.) for transtibial amputations. Consider for transfemoral amputations. | Continue local wound care, limb shaping, edema management, and protection of the residuum<br><br>Patient education on residual limb management and desensitization techniques<br><br>Advance ROM and strengthening of proximal joints and muscles<br><br>Consider longer term residual limb protection for those with higher fall risk or skin risk (when not using prosthesis or if not a prosthesis candidate) | Reinforce use of residual limb compression (e.g., shrinker) when out of prosthesis<br><br>Progressive prosthesis wear schedule<br><br>Consider early prosthesis use only during therapy if there are safety concerns<br><br>Educate on skin checks and pressure points, skin hygiene, sock ply management, and wear schedule | Assess residual limb condition and intervene as needed<br><br>Re-emphasize importance of skin checks and pressure points, skin hygiene and sock ply management |

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| | | Promote ROM and strengthening of proximal joints and muscles | | | |
| **5. Patient Education** | • Pain management<br>• Manage expectations regarding pain post amputation (e.g., May not be resolved w/ amputation)<br>• Patient safety/fall precautions<br>• Prevention of complications<br>• Procedural/Recovery Issues<br>• Level of amputation<br>• Prosthetic options<br>• Postoperative dressing<br>• Sequence of amputation care<br>• Equipment<br>• Role of the interdisciplinary team and members<br>• Psychosocial anticipatory guidance<br>• Expected functional outcomes | • Positioning<br>• Rehabilitation process<br>• Pain management<br>• Residual limb care<br>• Edema control<br>• ACE wrapping or shrinker use<br>• Wound care<br>• Prosthetic timeline<br>• Equipment needs<br>• Coping methods<br>• Prevention of complications<br>• Contracture prevention<br>• Safety and falls prevention | • Positioning<br>• Rehabilitation process<br>• Pain management<br>• Residual limb care<br>• Edema control<br>• Application of shrinker<br>• Prosthetic timeline<br>• Equipment needs<br>• Coping methods<br>• Prevention of complications<br>• Continuum of care/annual follow-up<br>• Contracture prevention<br>• Safety and falls prevention | • Prosthetic goals and expectation management<br>• Pain management<br>• Residual limb care, including edema management<br>• Energy expenditure<br>• Prosthetic education<br>• Donning & doffing<br>• Care of prosthesis<br>• Skin integrity<br>• Sock management<br>• Equipment needs<br>• Coping methods<br>• Weight Management<br>• Contracture prevention<br>• Safety and falls prevention | • Pain management<br>• Equipment needs<br>• Prosthetic goals and expectation management<br>• Prevention of complications<br>• Weight management<br>• Safety and falls prevention<br>• Continuum of care/Annual follow-up |
| **6. Prosthesis management** | Patient visit / education | Limb care (see residual limb management) | Re-assessment of prosthesis candidacy by | Prosthetic fabrication, fitting, alignment, and | Prosthetic fabrication, fitting, alignment and |

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| | Preliminary assessment of prosthesis candidacy by amputation specialty MDT<br><br>Provide patient and family education addressing expectations, timeline and anticipated goals | Management of post-operative dressing:<br>• Casting changes<br>• Regular fit checks of rigid removable dressing (RRD)<br>• Soft dressing | amputation specialty MDT<br><br>Discussion of realistic goals w/ prosthetic use<br><br>Generate initial prosthetic prescription (if indicated), if cleared for weight-bearing/prothesis fitting by surgical team.<br><br>Develop and train for safe back-up or alternative mobility and ADL strategies when not using prosthesis (all patients) | modification<br><br>Teach donning/doffing of prosthetic system<br><br>Prosthetic gait and ADL training<br><br>Prosthesis management training (e.g., sock ply management, volume management, skin checks)<br><br>Suspension and interface training/management<br><br>Educate on prosthesis maintenance and cleaning (e.g., how to clean liners and sleeves) | modifications<br><br>Re-assess prosthesis prescription and functional goals<br><br>Annual visits for assessment of:<br>• Components<br>• Supplies<br>• Socket fit<br>• Activity specific components<br>• Assistive device for prosthetic ambulation |
| **7. Discharge Planning** | Discuss and educate the patient and family on potential:<br>• DME needs,<br>• Home modifications,<br>• rehabilitation setting options (acute rehab, SNF, home with home care, home with outpatient care), | Determine appropriate rehabilitation setting (inpatient rehabilitation facility, SNF, home w/ home care, home w/ outpatient care)<br><br>Determine caregiver and social support system<br><br>Initiate discharge care | Develop discharge plan for intermediate care setting, independent living, etc.<br><br>Determine caregiver and social support system<br><br>Continue discharge care education<br><br>Arrange peer | Establish goals for initial prosthetic training<br><br>Schedule follow up with multidisciplinary team<br><br>Schedule follow up with prosthetist.<br><br>Re-engage with PT and OT as goals progress and change | Implement annual follow-up schedule to address future prosthesis adjustments and replacements<br><br>Reevaluate goals and functional status and re-engage in PT and OT |

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| | • timeline of phases of rehabilitation, and<br>• anticipated lifelong care needs. | education<br><br>Arrange peer support/visitation with patient | support/visitation with patient<br><br>Schedule follow up with multidisciplinary team to determine readiness and timeline for prosthesis | | |
| **8. Rehabilitation** | | | | | |
| **8.1 Range of Motion** | Assess ROM in all joints proximal to planned/possible amputation and on contralateral side<br><br>Treat identified contractures<br><br>Educate on contracture prevention and initiate full body ROM HEP | Initiate full body ROM HEP<br><br>Educate on proper positioning to prevent contractures of hip and knee flexion contracture | Progress full body ROM HEP to include lengthening of specific muscle groups (hip and knee flexors) | Advance stretching program<br><br>Maximize ROM for prosthetic fit and training and include in HEP | Readdress ROM of LE and review home stretching program, if needed |
| **8.2 Strengthening** | Assess for preoperative strength deficits of UE and LE<br><br>Create a HEP to strengthen and optimize UE and LE addressing deficiencies and maximize above ROM strength, balance, etc. | Initiate strengthening program to optimize safe functional mobility and in preparation for potential prosthesis use. Target areas prone to overuse injuries (e.g., shoulders, low back, etc.). | Continue strengthening program to optimize safe functional mobility and in preparation for potential prosthesis use (specifically hip and knee musculature).<br><br>Target areas for strengthening to reduce overuse injuries (e.g., | Progress therapeutic exercise program for all extremities<br><br>Provide home exercise program when discharged from therapy | Educate on maintenance of strength for long-term activity |

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| | | | shoulders, low back, etc.). Integrate trunk and core stabilization exercises.<br><br>Create HEP and provide exercise supplies | | |
| **8.3 Cardiovascular** | Assess current CV fitness for increased energy requirement for prosthetic use<br><br>Educate regarding increased energy demand in walking with a prosthesis | Incorporate a CV component into the therapy program<br><br>Reinforce cardiac precautions as determined by cardiology team (heart rate, blood pressure, perceived exertion scales) | Advance CV aspect of program to meet needs of patient<br><br>Maintain cardiac precautions<br><br>Encourage reducing risk factors | Increase ambulation endurance to reach community distances and integrate into HEP<br><br>Maintain cardiac precautions<br><br>Encourage reducing risk factors | Encourage cardiology and primary care follow up<br><br>Encourage reduction of cardio-vascular risk factors |
| **8.4 Balance** | Assess preoperative balance considering central and/or peripheral neurologic conditions | Initiate a balance progression in static and dynamic sitting and standing | Progress sitting balance and single limb standing balance | Advance balance activities to equalize weight over bilateral lower extremities<br><br>Challenge balance with advanced activities | Reassess balance as it relates to gait |
| **8.5 Mobility** | Assess current mobility and use of assistive devices and/or durable medical equipment. | Establish upright tolerance<br><br>Initiate and progress to independent bed mobility, rolling, and transfers | Progress single limb gait from parallel bars to use of assistive device<br><br>Progress to independent wheelchair mobility | Increase symmetry of weightbearing, maximize weight shift, equalize step length, facilitate trunk rotation, teach reciprocal gait pattern | Address changes to medical status affecting prosthetic use (e.g., diabetes, heart disease, limb and goals)<br><br>Reassess gait and retrain |

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| | | Initiate wheelchair mobility<br><br>Progress to single limb gait in parallel bars | Seating and Mobility evaluation for appropriate custom wheelchair<br><br>Floor recovery strategies | Progress out of parallel bars to use of appropriate assistive device<br><br>Progress to advanced skills such as climbing/descending stairs, curbs, ramps and gait on uneven terrain<br><br>Increase ambulation endurance to community distances | gait as necessary |
| **9. Functional Activities and ADLs** | Assess preoperative activity level and independence with basic ADLs and IADLs to help establish post-operative goals and expectations | Promote functional independence with basic ADLs such as eating, dressing, grooming, bathing, toileting.<br><br>Ensure patient safety with basic transfers, including toilet/bedside commode, wheelchair, bedside chair, car transfers, etc. | Educate on adaptive techniques for dressing, bathing, grooming, and toileting without a prosthesis.<br><br>Assess for DME needs to promote functional independence with ADLs<br>Initiate wheelchair management and safety education.<br><br>Educate patient and family on understanding that non-prosthesis independence is an important set of functional goals | Instruct in proper care of prosthesis, suspension system, skin management, and donning/doffing of prosthesis.<br><br>Promote independence with functional transfers, ADLs, and IADLs (laundry, cooking, house management, etc.) with and without prosthesis<br><br>Educate on fall recovery and functional transitions from floor | Reassess functional status and educate on adaptive strategies to promote independence as status changes.<br><br>Educate patient and caregiver on energy conservation, injury prevention, home safety, and DME needs as patient status changes. |

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| **10. Community** | | | | | |
| **10.1 Vocation and recreation** | Obtain preoperative vocation and recreational interests | Offer and promote trained peer visitation | Initiate outings into the community without prosthesis<br><br>Train in use of public transportation without prosthesis, if appropriate<br><br>Complete vocational rehabilitation evaluation<br><br>Complete recreational training activities without prosthesis | Initiate vocational and recreational activities with a prosthesis<br><br>Train in the use of public transportation with a prosthesis if appropriate | Provide education on opportunities and precautions for long-term sport specific, recreation skills of resources, and prostheses or assistive devices that are available<br><br>Provide counseling and contact information regarding opportunities in sports and recreation (Paralympics, golfing, fishing, hunting, etc.) |
| **10.2 Home evaluation** | Determine patient's current home set-up, available durable medical equipment, and potential safety concerns.<br><br>Educate on potential home modifications to promote functional independence and safety. | Assess patient's home for accessibility and safety if not already completed.<br><br>Provide information on home modifications | Assess patient's home for accessibility and safety if not already completed | Assess prosthetics needs that may improve home safety (e.g., shower leg, shorties) | Continue assessment of DME needs to ensure home accessibility and safety as functional status changes |
| **10.3 Transportation and Return to Driving** | Educate on potential adaptations needed for return to driving.<br><br>Educate patient and | Provide patient with alternative transportation options if caregivers unable to assist with transportation. | Evaluate patient for adaptations to promote return to driving.<br><br>Recommend scheduling | Complete driver's training with adaptive equipment as needed<br><br>Educate patient and | Provide resources for alternative transportation options as needed. |

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| | family on variance between state requirements and insurance policies for driving with lower limb amputation. | | with Certified Driving Rehabilitation Specialist (CDRS) | family on variance between state requirements and insurance policies for driving with lower limb amputation. | |
| **11. Equipment** | Determine durable medical equipment and assistive devices available. | Assess living environment including stairs, wheelchair access, and bathroom accessibility for safe discharge to home<br><br>Educate regarding potential home modifications, including ramp, accessible shower, etc. | Seating and Mobility evaluation to assess, measure, and order appropriate wheelchair<br><br>Provide appropriate assistive device to promote independence with mobility<br><br>Assess for personal equipment<br><br>Assess for home adaptation and equipment | Provide appropriate assistive device for mobility with or without prosthesis | Provide appropriate assistive device for mobility with or without prosthesis<br><br>Provide appropriate wheelchair if ambulation is no longer an option |

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Access to the full guideline and additional resources is available at: https://www.healthquality.va.gov/.