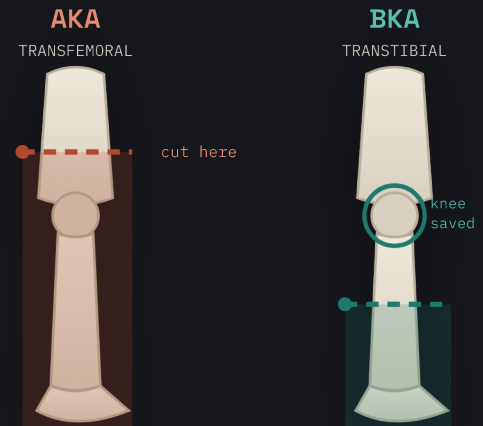


MED-SURG · MUSCULOSKELETAL · REHABILITATION

# Above-Knee (AKA) vs Below-Knee (BKA) Amputation

Nursing care, post-operative priorities, positioning, and residual-limb management — organized around the single fact that changes everything: whether the knee joint is saved.



## 01 Why the level matters

Every nursing priority that follows traces back to one question: was the knee joint preserved? A saved knee means dramatically less energy to walk, a higher chance of successful prosthetic use, and a different set of contractures to prevent.

**~25%**

Added energy cost to walk after a unilateral **BKA** vs an intact gait

**~65%**

Added energy cost after a unilateral **AKA** — the knee joint is what's lost

**24 hr**

Window in which hemorrhage and acute limb changes are most likely

**The governing principle:** surgeons preserve as much viable length and as many joints as possible. A knee saved (BKA) lowers the metabolic cost of walking, improves balance, and raises the odds the patient walks again with a prosthesis — which is why nursing care to protect the residual limb and prevent knee flexion contracture is not cosmetic, it is functional.

## 02 AKA vs BKA at a glance

The master comparison. Read it as: the more proximal the cut, the harder the rehab and the higher the stakes for joint preservation.

| FEATURE                    | Above-Knee (AKA) • Transfemoral                                                             | Below-Knee (BKA) • Transtibial                                  |
|----------------------------|---------------------------------------------------------------------------------------------|-----------------------------------------------------------------|
| Energy to ambulate         | Markedly higher (~50–65%+ above baseline)                                                   | Lower (~25% above baseline)                                     |
| Prosthetic outcome         | Harder to fit & control; lower rate of functional use, esp. in older / debilitated patients | Better functional prosthetic use and gait                       |
| Key contracture to prevent | <b>Hip flexion</b> + hip <b>abduction</b> / <b>external rotation</b>                        | <b>Knee flexion</b> (and hip flexion)                           |
| Positioning goal           | Keep hip <b>extended &amp; adducted</b> ; prone several times daily                         | Keep knee <b>extended</b> ; no pillow under the knee            |
| Balance / fall risk        | Higher — larger change to the center of gravity                                             | Lower — proprioception around the knee retained                 |
| Typical patient            | More proximal/severe disease, failed BKA, extensive ischemia or trauma                      | Disease limited below the knee with adequate proximal perfusion |
| Wound healing demand       | Larger residual limb, more soft tissue; still perfusion-dependent                           | Healing depends on adequate blood flow to the residual limb     |

## 03 Causes & indications

Most non-traumatic amputations in adults are vascular. That single fact shapes assessment, healing risk, and protection of the remaining limb.

### LEADING CAUSES

- **Peripheral vascular disease (PVD) & diabetes** — the dominant cause of lower-limb amputation; chronic ischemia and non-healing ulcers
- **Diabetic foot infection / osteomyelitis** — uncontrolled infection with poor perfusion
- **Gangrene** — wet or dry; non-viable tissue
- **Trauma** — crush, mangled extremity, severe open fracture (common cause in younger patients)
- **Malignancy** — bone or soft-tissue tumors (e.g., osteosarcoma)
- **Severe frostbite or burns** with non-viable tissue

### WHAT DRIVES THE LEVEL CHOSEN

- **Tissue viability & perfusion** — the surgeon amputates to the most distal level that will reliably heal
- **Save the knee when possible** — a BKA is preferred over AKA whenever the residual limb will heal, because outcomes are far better
- **Adequate blood supply** at the cut line is essential for wound healing
- **Infection control** — must clear non-viable, infected tissue
- **Rehab potential** — overall health, cognition, and the patient's goals factor into level and prosthetic candidacy

## 04 Pre-operative nursing care

Before surgery the nurse establishes baselines, begins teaching the patient will need on day one post-op, and supports the profound psychological adjustment ahead.

### ASSESSMENT & PHYSICAL PREP

- **Baseline circulation** of **both** limbs — pulses, color, temperature, capillary refill, skin integrity
- **Baseline pain** and current analgesia; document so phantom and incisional pain can be compared later
- **Glycemic control** — optimize blood glucose to support wound healing
- **Nutrition** — protein and overall status influence healing; address deficits
- **Upper-body & unaffected-limb strengthening** begun with PT for future transfers, crutch, and prosthetic gait
- Mark and assess the **contralateral limb** — it is now the patient's only intact leg and must be protected

### TEACHING & PSYCHOSOCIAL

- **Explain phantom limb sensation** ahead of time — it is normal, expected, and not a sign of complication
- Discuss the **rehabilitation course**, prosthetic timeline, and realistic expectations for the chosen level
- Support **grief and body-image** adjustment; acknowledge anticipatory loss
- Involve the patient in decisions; reinforce what they will be able to do
- Arrange **referrals early** — PT/OT, prosthetist, social work, support groups, home care planning
- Confirm informed consent and the correct surgical site/level

## 05 Post-operative priorities, in order

Same priority order for AKA and BKA. The difference is the volume of tissue and the joints at risk — but the sequence below holds for both.

- 1 Prevent & detect hemorrhage**  
 The most life-threatening early complication. Keep a large tourniquet at the bedside. Inspect the dressing AND beneath the limb (blood pools underneath). Mark drainage with date/time, monitor vitals for shock.
- 2 Maintain perfusion & airway/breathing first principles**  
 Assess residual-limb color, warmth, and any new bleeding; monitor for hypovolemia. Standard ABCs and post-anesthesia recovery apply.
- 3 Control pain — incisional and phantom**  
 Treat surgical pain with the prescribed regimen; recognize phantom limb pain as real and treat it with appropriate agents (see Phantom Pain section).
- 4 Prevent infection & support wound healing**  
 Aseptic dressing care, monitor incision and drainage, temperature trends, and glucose control. Higher vigilance in diabetic / PVD patients.
- 5 Position to prevent contractures**  
 Begin contracture-prevention positioning early — the specific position depends on AKA vs BKA (see Positioning).
- 6 Shape & protect the residual limb**  
 Figure-eight wrapping or shrinker to reduce edema and form a conical limb for future prosthetic fit; daily skin inspection.
- 7 Mobilize & prevent immobility complications**  
 Early PT, transfer training, DVT prophylaxis, ROM exercises, and protection of the remaining limb.
- 8 Support psychosocial adjustment**  
 Address grief, body image, and role changes; connect with resources and peer support.

## 06 Positioning to prevent contractures

This is where AKA and BKA care visibly diverge. A flexion contracture can make a residual limb unfit for a prosthesis, so positioning is functional rehabilitation, not comfort alone.

### Shared rules (both AKA & BKA)

#### ✓ Do

- **Elevate the residual limb on a pillow for the first 24 hours only** to reduce edema and pain
- After ~24 hours, **place the patient prone several times a day (20–30 min)** with the limb flat to extend the hip
- Keep the limb in **extension**; perform prescribed ROM exercises
- Elevate the **foot of the bed** rather than the limb itself if edema control is still needed
- Keep the residual-limb dressing/wrap smooth and re-applied

#### ✗ Avoid

- **Prolonged pillow elevation beyond 24–48 hours** — it promotes flexion contracture
- **Prolonged sitting** (in bed or wheelchair) — flexes the hip and knee
- Letting the residual limb **hang dependently** over the bed edge
- Placing a **pillow under the knee or hip**
- Leaving the patient in one position for long periods

#### AKA — ABOVE-KNEE

##### Prevent hip flexion + abduction + external rotation.

- Keep the hip **extended and adducted** (legs together, neutral rotation)
- **No pillow between the thighs** — it forces abduction
- **No pillow under the hip or lower back**
- Emphasize the **prone position** several times daily to fully extend the hip
- Avoid prolonged sitting, which holds the hip flexed

#### BKA — BELOW-KNEE

##### Protect the knee — keep it straight.

- Keep the knee in **full extension**
- **No pillow under the knee** — the classic cause of knee flexion contracture
- A **posterior knee splint / board** may be used to hold extension
- Avoid prolonged sitting with the knee bent
- Also guard the hip — prone positioning still applies

## 07 Residual limb (stump) care & bandaging

The goal is a clean, well-healed, cone-shaped residual limb with intact skin — the prerequisite for a comfortable, well-fitting prosthesis.

### FIGURE-EIGHT ELASTIC WRAPPING

- Wrap in a **figure-eight** pattern, never in circular turns (circular turns act like a tourniquet and impair circulation)
- Apply **more pressure distally, less proximally** — a distal-to-proximal gradient promotes venous return and shapes the cone
- **Rewrap every 4–6 hours** or whenever it loosens, slips, or wrinkles
- Keep wraps **smooth and wrinkle-free** — folds create pressure points and skin breakdown
- Remove, **inspect the skin**, then reapply
- A **shrinker sock** or rigid/elastic dressing may be used per protocol once the incision is healing

### SKIN & HEALING CARE

- **Inspect daily** for redness, blistering, drainage, or breakdown — use a mirror to see all surfaces
- Wash with **mild soap and water**, rinse, and **dry thoroughly**
- **Do not apply lotions, oils, or powders** to the limb unless prescribed, and not right before donning a prosthesis
- **Toughen / condition** the skin per protocol so it tolerates the prosthesis
- Wear a clean **residual-limb sock**; change it daily and keep it wrinkle-free
- Avoid **dependent positioning** and prolonged sitting, which worsen edema

**Why the cone shape matters:** a rounded, tapered residual limb seats evenly in a prosthetic socket. A bulbous or edematous limb, or one with a flexion contracture, will not fit — delaying or preventing prosthetic use.

## 08 Phantom limb sensation vs phantom limb pain

Both are real neurologic phenomena. The nurse's first job is to distinguish them and to validate the patient's experience — never dismiss it as imaginary.

### PHANTOM LIMB SENSATION

- A **non-painful** awareness that the limb is still present
- May feel like tingling, itching, or the limb's position
- **Very common**, especially early; usually **diminishes over time**
- Reassure the patient it is **normal and expected**

### PHANTOM LIMB PAIN

- **Painful** sensations — burning, cramping, throbbing, or "crushing" felt in the missing limb
- Neuropathic in nature; can be distressing and persistent
- More likely when **pre-operative pain** was significant
- **Validate it as real** and treat actively

## Managing phantom limb pain

### PHARMACOLOGIC

- **Anticonvulsants** — gabapentin, pregabalin (first-line for neuropathic pain)
- **Antidepressants** — TCAs such as amitriptyline; SNRIs such as duloxetine
- **Beta-blockers** for constant burning; antispasmodics for cramping/muscle spasm
- Calcitonin may be used in some early cases
- **Opioids are less effective** for neuropathic phantom pain than for incisional pain

### NON-PHARMACOLOGIC

- **Mirror therapy** — visual feedback to retrain the brain's body map
- **TENS**, massage, and gentle residual-limb handling
- Heat/cold, ultrasound, relaxation, and guided imagery
- **Distraction** and early activity / repositioning
- Acupuncture and biofeedback in some programs

## 09 Complications to monitor

Anticipate, detect early, and intervene. Several of these are more likely in the vascular/diabetic patients who make up most amputations.

### EARLY / ACUTE

- **Hemorrhage** — the priority early threat; keep a tourniquet available
- **Hematoma** under the flap — impairs healing and raises infection risk
- **Infection** — incisional or deeper; watch fever, drainage, increasing pain, odor
- **Skin flap necrosis / poor perfusion** — dusky, cool, or non-healing tissue
- **VTE** — DVT/PE from immobility

### LATER / FUNCTIONAL

- **Flexion contracture** — hip (AKA) or knee (BKA); a leading barrier to prosthetic use
- **Delayed wound healing** — especially with diabetes/PVD
- **Skin breakdown** on the residual limb or from a poorly fitting prosthesis
- **Chronic phantom limb pain**
- **Depression & body-image disturbance**; social and role changes
- **Neuroma** — painful nerve-end overgrowth at the residual limb

## 10 Mobility & rehabilitation

Rehab begins the day of surgery. The level of amputation sets the energy budget and the difficulty of the road ahead.

### EARLY MOBILITY & CONDITIONING

- Start **PT early** — transfer training, balance, and a trapeze for bed mobility
- Strengthen the upper body** and the unaffected leg for transfers and ambulation aids
- Maintain **ROM** at the hip and (for BKA) the knee to prevent contractures
- VTE prophylaxis** and progressive activity to counter immobility
- Teach safe use of **crutches, walker, or wheelchair**

### PROSTHETIC READINESS

- Prosthetic fitting follows **wound healing and edema resolution**, when the limb is shaped and stable
- BKA** patients generally achieve better, lower-energy prosthetic gait
- AKA** patients face higher energy demand and may rely more on a wheelchair, particularly older or debilitated patients
- Inspect skin after every prosthesis use for pressure areas
- Coordinate with the **prosthetist** for socket fit and adjustments

## 11 Patient & caregiver teaching

Discharge teaching protects the residual limb, the remaining limb, and the patient's ability to return home safely.

### RESIDUAL LIMB & PROSTHESIS AT HOME

- Daily **skin inspection** (with a mirror), washing, and thorough drying
- Correct **wrapping / shrinker** technique and contracture-prevention positions
- Prosthesis & sock care**; report poor fit, new pressure areas, or pain
- Avoid lotions/powders unless prescribed; nothing greasy before donning the prosthesis
- Continue **prone positioning** and ROM exercises at home

### PROTECT THE REMAINING LIMB

- Meticulous foot care** on the intact leg — most patients are diabetic/vascular and at risk of losing it too
- Inspect the foot daily; **never go barefoot**; wear well-fitting shoes
- Control **blood glucose**, blood pressure, and stop smoking
- Report any new ulcer, color change, or non-healing wound **promptly**
- Keep follow-up with vascular and rehab teams



## 12 Medications & their nursing focus

A working drug list for the amputation patient, grouped by purpose.

| PURPOSE                    | AGENTS                                                                                 | NURSING FOCUS                                                          |
|----------------------------|----------------------------------------------------------------------------------------|------------------------------------------------------------------------|
| Phantom / neuropathic pain | Gabapentin, pregabalin, amitriptyline, duloxetine; sometimes beta-blockers, calcitonin | Titrate gradually; watch sedation/dizziness; validate the pain is real |
| VTE prophylaxis            | LMWH (enoxaparin), heparin, ± sequential compression                                   | Monitor for bleeding; assess the residual-limb dressing for oozing     |
| Infection                  | Perioperative / targeted antibiotics                                                   | Give on time; monitor wound, temperature, and culture results          |
| Glycemic control           | Insulin / oral agents                                                                  | Tight control supports healing; monitor glucose trends                 |
| Vascular risk reduction    | Antiplatelets, statins (for PVD patients)                                              | Reinforce adherence to protect the remaining limb                      |

## 13 Delegation & scope of practice

The RN keeps assessment, teaching, and unstable care. Stable, routine tasks can be delegated — but the RN retains accountability.

| REGISTERED NURSE (RN)                                                                                                                                                                                                                                                                                                                                                                             | LPN / LVN                                                                                                                                                                                                                                                                                                                          | UAP / NURSING ASSISTANT                                                                                                                                                                                                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Initial &amp; ongoing assessment of the residual limb and circulation</li> <li>Detect and respond to hemorrhage or deteriorating perfusion</li> <li>Develop the plan of care and pain-management plan</li> <li>All patient/family teaching (limb care, positioning, prosthesis)</li> <li>Evaluate response to interventions and adjust the plan</li> </ul> | <ul style="list-style-type: none"> <li>Reinforce established teaching</li> <li>Sterile/clean dressing changes on a stable wound (per facility policy)</li> <li>Administer most routine medications</li> <li>Monitor and report findings on a stable patient</li> <li>Apply established residual-limb wraps per protocol</li> </ul> | <ul style="list-style-type: none"> <li>Assist with repositioning, including prone positioning, as directed</li> <li>Help with hygiene and ADLs</li> <li>Obtain and record vital signs and intake/output</li> <li>Assist with safe transfers and ambulation aids</li> <li><b>Report</b> bleeding, drainage, or complaints to the nurse</li> </ul> |

## 14 Mnemonic vault

Anchors for the highest-yield, most-confused points.

### STUMP

RESIDUAL-LIMB POST-OP CARE

- S** Shape it — figure-eight wrap, more pressure distally
- T** Tourniquet kept at the bedside for hemorrhage
- U** Upright/prone — prone positioning to extend the hip
- M** Monitor skin, bleeding, and the dressing
- P** Prevent contractures — extension, not flexion

### FLAT

POSITIONING TO PREVENT CONTRACTURE

- F** Flat & extended limb — keep it straight
- L** Limit sitting and dependent dangling
- A** Avoid pillows under knee/hip after 24 hr
- T** Turn prone several times daily

### KNEE

WHY BKA > AKA FOR REHAB

- K** Keeps the joint — proprioception retained
- N** Needs less energy to walk (~25% vs ~65%)
- E** Easier prosthetic fit and gait
- E** Extension must be protected (no pillow under knee)

### PHANTOM

PHANTOM PAIN — IT'S REAL

- P** Pain in a limb that is gone — validate it
- H** Higher risk if pre-op pain was severe
- M** Mirror therapy, TENS, massage
- T** Treat with gabapentin/pregabalin, TCAs/SNRIs

## 15 Report immediately

Findings that demand prompt nursing action or provider notification.

### ⚠ Escalate without delay

- **Bright-red bleeding** or rapidly enlarging drainage on/under the dressing
- **Signs of shock** — falling BP, rising HR, pallor, restlessness
- **Dusky, cool, or pale** residual limb (poor perfusion / flap compromise)
- **Fever, increasing pain, purulent or foul drainage** (infection)
- **Sudden, severe, uncontrolled pain** out of proportion
- **New calf swelling, warmth, or chest pain / dyspnea** (VTE / PE)
- **A developing flexion contracture** resisting passive extension
- **New ulcer or color change on the remaining limb**