Amputee Early Rehabilitation

Paul JW Tawney MD
Physical Medicine and Rehabilitation
Department of Orthopaedics
Duke University
North Carolina Orthopaedic Clinic
Limb Loss Statistics – References from the Amputee Coalition


Limb Loss Statistics

- There are nearly 2 million people living with limb loss in the United States (1).
- Among those living with limb loss, the main causes are vascular disease (54%) – including diabetes and peripheral arterial disease – trauma (45%) and cancer (less than 2%) (1).
- Approximately 185,000 amputations occur in the United States each year (2).
Limb Loss Statistics

• In 2009, hospital costs associated with amputation totaled more than $8.3 billion (3)
• African-Americans are up to four times more likely to have an amputation than white Americans (4)
Limb Loss Statistics

• Nearly half of the individuals who have an amputation due to vascular disease will die within 5 years. This is higher than the five year mortality rates for breast cancer, colon cancer, and prostate cancer (5)

• Of persons with diabetes who have a lower extremity amputation, up to 55% will require amputation of the second leg within 2-3 years (6)
Amputation Statistics by Cause, United States, 1988 to 1996

- **Congenital**
  - Lower limb: 41.5 per 100,000
  - Upper limb: 58.5 per 100,000

- **Cancer**
  - Lower limb: 23.9 per 100,000
  - Upper limb: 76.1 per 100,000

- **Trauma**
  - Lower limb: 31 per 100,000
  - Upper limb: 68.6 per 100,000

- **Dysvascular**
  - Lower limb: 3 per 100,000
  - Upper limb: 97 per 100,000

Inpatient Rehabilitation after Amputation

• Patients treated in a CIRU were 17% more likely to achieve mobility success. Multivariate model also showed that achieving mobility success was associated with younger age, higher social support score, no chronic obstructive pulmonary disease and underweight to normal BMI categories. Patients were 23% less likely to achieve mobility success if they had a major depressive episode diagnosed at 4 months or who had a greater alcohol use.


• Intangibles – Team approach is key
Inpatient Rehabilitation after Amputation

Improved functional outcomes in amputees who go through acute inpatient rehab
Improved mood in amputees who go through acute inpatient rehab
Higher level discharge disposition in amputees who go through acute inpatient rehab

Summary:
Encourage comprehensive inpatient rehabilitation options after amputation
Inpatient Rehabilitation after Amputation

• Criteria: WakeMed Rehab
• Require and be able to participate in physical, occupational, and/or speech therapy, if indicated, at least 3 hours a day, 5 days a week.
• Need more than one type of rehab therapy and have a potential for functional improvement.
• Have a supportive social system and a defined, expected discharge destination other than a skilled nursing facility.
• Be medically appropriate for an inpatient hospital environment and have stable vital signs.
Inpatient Rehabilitation after Amputation

• May need a medical condition or associated injuries to qualify for inpatient services
• Current Case Example:
• Fxnl status and assistance level needed - AKA
• Upper extremity weight bearing status may alter capacity for rehab
• Concern for radial nerve palsy
• Diabetes and pulmonary function
Medical Complications of Amputation

- Skin breakdown & wound complications
- Joint contracture
- Medication side effects
- Complications of comorbidities (i.e. diabetes) & associated injuries
- Depression
- Deconditioning - Energy Cost of Amputee Gait

Energy Expenditure – O2 Cost
Energy Expenditure – Gait Speed
Initial Amputee Rehab

- Edema control and shaping of the residual limb
- Wound healing
- Prevention of Contractures
- Pre-prosthetic training that focuses on independence in mobility, transfers & self care
- Education, ...
Initial Amputee Rehab

• Pain management
• Medical management and prevention of medical complications
• Save the other limb – diabetes, vasculopathy, wounds, infection
Medical Complications of Amputation

• Renal disease, cardiac issues, history of sepsis, steroid use, COPD, and increased patient age were identified as predictors of mortality after below-knee amputation. Renal disease, cardiac issues, history of sepsis, steroid use, contaminated/infected wounds, and alcohol use were also found to be predictors of postoperative complications. WBAMC, NSQIP

Medical Complications of Amputation

• Age alone is not an absolute contraindication to prosthetic limb prescription; however, it does influence the potential success of gait retraining. Other factors influencing prosthetic fitting and use include comorbidities, premorbid function, level of amputation, status of the remaining limb and patient motivation. Fleury, Australia.

Medical Complications of Amputation

• Most patients felt out of control and had a poor understanding of the events leading to their initial amputations. Prevention of subsequent amputations will require rehabilitation programs to address low health literacy and psychosocial obstacles to self-management. Feinglass, Northwestern.

Amputee Pain Management

• Phantom pain

• Awareness of pain in the portion of the extremity that has been amputated. It may accompany the phantom sensation, localizing in the phantom limb rather than in the residual limb.

• The pain has been described as cramping, aching, burning, and occasionally lancinating
Amputee Pain Management

• Etiology: phantom pain appears to be related to neuron deafferentation hyperexcitability.
• It may be diffuse throughout the entire limb or may be localized to a single nerve distribution.
• Studies have suggested that 50% to 85% of amputees experience some phantom limb pain.
Amputee Pain Management

- Recent data does not suggest a predisposition for phantom limb pain among traumatic amputees, elderly amputees, or those with pain in the amputated limb before amputation. There appears to be no correlation between phantom pain and amount of time after amputation or use of prosthesis.
Amputee Pain Management

• Phantom pain usually diminishes with time and chronic phantom pain is rare. The occurrence of phantom pain generally is considered to be a significant long-term problem in only 5% or less of the total amputee population.
• If pain persists longer than 6 months, prognosis for spontaneous recovery is poor.
• Phantom pain does not occur in congenital amputation.
Amputee Pain Management

- Surgical treatment often less favorable, with poor long-term success
- Severe cases may need nerve blocks, steroid injections, or epidural blocks
- Regional guanethidine or reserpine blocks have been tried with little success
- Sympathectomy and other neurosurgical procedures
Amputee Pain Management

• Tricyclic antidepressants
• Anticonvulsants
• Calcitonin
• Capsaicin
• Propanol
• Mexiletine—Na+ channel blocker
Amputee Pain Management

– Acupuncture
– Transcutaneous electrical stimulation (TENS)
– Vibration
– Ultrasound
Amputee Pain Management

• Hypnosis
• Biofeedback
• Cognitive Behavioral therapy
• Support groups
• Relaxation therapy
• Voluntary control of the phantom limb (mental imaging)
• Mirror therapy