Evaluation and Treatment of Adults with Lower Extremity Amputation:

A Clinical Practice Guideline for Therapists
Introduction

- Sarah Smith, MPT
  - Advanced Clinician, Inpatient MedSurg at University Hospital
- Sarah Jones, MOT, CLT
  - Rehab Manager of Inpatient OT at University Hospital
- Susanne Angileri, MPT
  - Clinician, Acute Rehab at UW Health
  - Clinician, Inpatient MedSurg at University Hospital
- Sandy Grady, PT
  - Advanced Clinician, Outpatient Middleton Neuro/Rehab Clinic at UW Health
  - Prosthetic Clinic
Course Objectives

• Participants will have an understanding of the key practice recommendations from the UW Health Rehab Lower Extremity Amputations Clinical Practice Guideline for Therapists.

• Participants will have an understanding of rehab goals and key interventions at each phase of care for adults with LE amputations.

• Participants will have an understanding of resources for patients and clinicians.
Course Objectives

• Participants will have an understanding of the assessment tools appropriate for use at each phase of care.

• Participants will have an understanding of Durable Medical Equipment recommendations at each phase of care and how to assist with procurement.
Key Recommendations

- Included throughout presentation
- Highlight best practice in the phases of recovery
Understanding UW Health

What is UW Health?

UW Health is the integrated health system of the University of Wisconsin-Madison serving more than 600,000 patients each year in the Upper Midwest and beyond with more than 1,500 physicians and 17,000 staff at six hospitals and 80 outpatient sites.

UW Health is governed by the UW Hospitals and Clinics Authority and partners with UW School of Medicine and Public Health to fulfill their patient care, research, education and community service missions.

UW Health Madison Hospitals
- University Hospital
- American Family Children's Hospital
- UW Health at The American Center
- UW Health Rehabilitation Hospital

UW Health Regional Hospitals
- SwedishAmerican Hospital, Rockford, IL
- Belvidere Medical Center, Belvidere, IL

UW Health Clinics Throughout Wisconsin and Northern Illinois

UW Medical Foundation
UW faculty physician practice

UW Carbone Cancer Center Comprehensive Cancer Center, designated by the National Cancer Institute (NCI)

Unity Health Insurance and Gundersen Health Plan
Highly rated health plans

University Health Care
Regional relationships and contracting

Joint Ventures and Affiliations
Cancer centers, surgery centers, dialysis programs, home health, infusion and many other programs and services
Nationally Ranked

*U.S. News and World Report* Rankings are out:

- Ranked in nine specialties and high performing in another three

- University Hospital named **BEST** hospital in Wisconsin fifth year in a row!
<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Employees</td>
<td>11,856</td>
</tr>
<tr>
<td>Nurses</td>
<td>3,065</td>
</tr>
<tr>
<td>Physicians</td>
<td>1,407</td>
</tr>
<tr>
<td>Residents</td>
<td>617</td>
</tr>
</tbody>
</table>

Wisconsin locations
Therapy Department

• Inpatient
• Home Health
• Outpatient
• Acute Rehab Joint Venture
• Approximately 135 PT/PTAs
• Approximately 63 OT/OTAs
Patient Care

Fiscal Year 2016*

- Beds 698
- Patient Admissions 30,794
- Outpatient Visits 1.84 million
- Emergency Visits 55,660
- Laboratory Tests 3.5 Million
- Surgical Procedures 32,773

*Wisconsin locations
Where UW Health Patients Come From

Local (Dane County)
Ring Counties
Statewide
Eastern Iowa
Northern Illinois
Beyond
This clinical guideline is a guide for the rehabilitation process for adult patients after lower extremity amputations across the phases of recovery. It was developed by Physical Therapists and Occupational Therapists at University of Wisconsin Hospital and Clinics in collaboration with vascular surgery, the physical medicine and rehabilitation department, and local prosthetists. An evidence based approach was utilized in development of this standard of care.
• The Center for Clinical Knowledge Management (CCKM) is responsible for interdisciplinary guidelines which include various types of interventions (e.g., pharmacological and non-pharmacological recommendations). These guidelines often describe care for an entire population and/or cross care settings and clinical disciplines.

• [https://uconnect.wisc.edu/clinical/cckm-tools/cpg/](https://uconnect.wisc.edu/clinical/cckm-tools/cpg/)
GRADE algorithm

Step 1: Identify Type of Evidence
- Randomized controlled trial (HIGH)
- Observational study (LOW)
- Expert consensus (VERY LOW)

Step 2: Consider Downgrade or Upgrade
- Risk of bias
- Inconsistency
- Indirectness
- Imprecision
- Publication bias
- Large consistent effect
- Dose response
- Confounders only reducing size of effect

Step 3: Assign Quality of Evidence
- High
- Moderate
- Low
- Very Low

Step 4: Consider External Factors
- Balance of benefits/harms
- Patient preferences
- Cost-effectiveness

Step 5: Assign Strength of Recommendation
- Strong
- Weak/Conditional
Introduction

- Currently, over 2 million people are living after limb loss in the United States.

- This number is expected to more than double by 2050. (Zielgler-Graham, et al 2008).

- Causes of lower extremity amputation include vascular deficits, trauma, or oncologic issues, with vascular conditions being the leading cause of amputation (Ziegler-Graham, et al 2008).
Introduction

- Limb loss impacts a person’s ability to engage in regular activities including mobility, self-cares, relationships, and productivity.

- Rehabilitation is an important part of the process after amputation to provide opportunity for people to return to fully functioning members of society.
Health Disparity

- Fall risk with injury is increased for women and racial minorities.
- Rehabilitation professionals should ensure fall prevention exercises and recommendations are provided to all patients with lower extremity amputations.
- Rehab Professionals should ensure women and racial minorities receive this education (Wong, et al, 2016)
Phases of Recovery

- Pre-Amputation Phase
- Acute Post-Amputation Phase
- Acute Rehabilitation Phase
- Community Reintegration Phase
- Long Term Management
Pre-Amputation Phase

• The period of time prior to the surgical procedure for an amputation.
• Can be in the clinic, or a pre-operative consult in the hospital
• At this stage, education, counseling, and pre-operative mobility assessment are the primary objective
Precautions

• Generally not limited by any weight bearing restriction
• May have nerve block (usually placed 1 day prior to OR)
• Falls risk
Rehab Goals

• Education on what to expect
  – Estimated length of limb
  – Length of time it may take to get to prosthetic
  – Disposition options and role of PT and OT

• Discussion of home modifications
Rehab Goals

• Pre-operative mobility assessment
• Recommend bringing in comfortable clothing and supportive shoe for non-operative foot
Mobility/Assessment Tools

- Bed mobility, transfers
- Could consider single leg stance
- Could consider Timed Up and Go
  - (Cutoff score for community dwelling adults: 13.5. For LE Amputees: 19)
- Sensory testing on sound limb
Any mobility and assessment at this point may be limited by pain and emotional considerations
Patient Education

• Issue copy of First Step magazine
  – Published by Amputee Coalition of America

• Begin discussion on home modifications. Can issue information on ramp specs if appropriate.
  – 12 inches of run for every 1 inch of rise

• Acknowledge the patient’s grief at impending loss of limb
Considerations for Patients with Bilateral Amputations

• If the patient has an amputation on the non-surgical limb, ask the patient if they use a prosthesis and if it can be brought to the hospital.

• Ask them to bring their shrinker sock and wear it post-op, or wear their roll on gel liner to manage edema, so that prosthesis will maintain good fit
Acute Post Amputation Phase

• The period of time from post op day #0 to approximately 10-14 days post-operative

• Typical Hospital length of stay is 3-5 days post operatively

• PT/OT consults are in for POD #1

• Health Psych is also included in the order set for all new amputees
Precautions

- Sciatic and Femoral Nerve Blocks
- IV, may have foley, will usually discontinue day 1
- Surgical dressing (ACE wrap) and knee immobilizer (20 inch most often appropriate)
- Occasionally a cast; stays on 3-5 days
Knee Immobilizer

- To protect, and prevent knee flexion contracture
- Adjust to fit
- **No straps** over patella!
All patients with lower extremity amputations are at risk of falls. A fall can lead to further surgery, prolonged time to prosthetic limb, and progression to higher level of amputation.
Incidence and Risk Factors of Falling in the Postop LE amputee While on the Surgical Ward

- Retrospective cohort study of 3 acute care hospitals, 370 patients
- 16.5% fell at least once
- 60.7% of those who fell sustained injuries
- Falls group had significantly longer length of stay
  - (Yu et al, 2010)
Health Disparity related to Falls (Wong, et al 2010)

- Fall risk with injury is increased for women and racial minorities.
- Fall prevention exercises and recommendations should be provided to all patients with lower extremity amputations.
- Rehab therapists should ensure women and racial minorities receive this education.
Assessment Tools

- Range of motion for upper extremities and lower extremities
- Manual muscle test for upper extremities and lower extremities
- ADL assessment
- Mobility assessment
- Pain – phantom and/or surgical
- Sensation – upper and lower extremity
- Edema
- Skin integrity – observation of incision and residual limb, observation of non-surgical limb
- Cognition and learning assessment
- Activity tolerance
- AM-PAC
Rehab Goals- PT

- Initiate lower extremity home exercise program
- Patient will perform bed mobility with stand-by assistance.
- Patient will perform bed to chair transfers with assist. Use of walker, gait belt, seated slideboard as needed.
Rehab Goals - PT

• Progress to ambulation with appropriate assistive device and use of gait belt
• Patient will propel wheelchair 150 feet with bilateral upper extremities, demonstrate good use of brakes, with stand-by assist and verbal cues
Rehab Goals - PT

• Patient will verbalize understanding of limb protection and use of compression, rigid removable dressings, and knee immobilizers as applicable.

• Patient will demonstrate non-pharmacological pain relief techniques such as gentle skin desensitization and mirror therapy.
Rehab Goals - OT

• Initiate upper extremity home exercise program
• Patient will maintain seated balance at edge of bed while performing activities of daily living (ADLs)
• Patient will perform commode transfers with assist. Use of walker, gait belt, seated slideboard as needed.
• Assist patient and family in progressing to most appropriate next level of care with ongoing therapies after hospital discharge.
Guillotine Amputation

• Usually in the setting of gas gangrene
  – bacterial infection creates gas in gangrenous tissues; medical emergency, can be fatal

• Amputation is performed without closure, to allow wound to drain; often Syme’s level
Therapy Considerations: Guillotine

• Pt’s are often cleared to dangle or pivot. We do not remove knee immobilizer.
• Minimize time spent with limb dependent, if bleeding observed, notify RN
• Back to OR for closure/completion BKA usually after 1-3 days.
  – Helpful to talk to patients about limb length
Mobility

• Bed Mobility
• Dangle
• Seated balance
  – Remember base of support and center of gravity has shifted
  – Don’t leave a new amputee at edge of bed alone
Mobility

• If seated balance is good, will attempt sit to stand on POD 1
• If attempt unsuccessful, will consider slideboard transfer for POD 2
Stand Pivot

• Easier towards the sound leg.
• FWW for first attempt (crutches require more coordination, balance, difficult with lines)
• May need to rearrange the room. Include nursing in recommendations!
• If a patient is really fearful of standing, get to edge of bed and lock in the Sara Plus lift

• Raise to a comfortable height in seated position, then stop moving it and let patient practice putting weight on leg while feeling they are in a safe position and won’t fall
Slideboard

• Wheelchair with removable arm
• Slideboards can be found on D4/5 or in H6/2 equipment storage.
• Hospital wheelchairs do have a barrier in the non-removable leg rests
• Place slideboard under the middle 1/3 of patient’s thigh
• Towards sound limb is easier, good for a first attempt
Slideboard Transfer

- Head leaning away from hips
- Straightforward vs over the patient’s shoulder technique
- Block knee to prevent sliding forward
Self Cares

• Initiate lower body bathing and dressing
  – Consider readiness to look at and handle limb

• Seated balance is key
  – Consider what surface and position is most appropriate and safe
  – If in bariatric bed, try to obtain alternative mattress
Self Cares

• Bariatric Drop Arm Commode ideal for inpatient, regardless of size
• Flat surface allows for lateral weight shifting and sliding transfers
Wheelchair

• Basic skills
  – BRAKES
  – Teaching patient and staff about the swing away legs (unfortunately attached)
  – Can use slideboard on calf rest of elevating leg rest for makeshift limb rest

• DME for home
  – Letter of Medical Necessity, vendors, etc. will be covered in Acute Rehab phase
• Prevent knee and hip flexion contractures in each phase of recovery for maximal functional outcomes and eventual prosthetic use as well as preventing skin breakdown. (Karacoloff 1992) (O’Sullivan 2007) (Klarich 2014)

(UW Health: Low quality evidence, strong recommendation)
Key Practice Recommendation

To prevent contractures, focus on:

- Positioning
- Use of a knee immobilizer
- Education
- HEP
Lower Extremity Exercises - BKA

- Prevention of knee flexion contracture
- Possible quad lag associated with nerve block
- Supine vs Side-lying
- Single Leg Bridge
Key Practice Recommendations

• Strengthen all four extremities and trunk to prevent deconditioning during recovery and to reach highest functional outcome. (Karacoloff 1992) (O’Sullivan 1994) (Klarich 2014)

(UW Health: Low quality evidence, strong recommendation)
Upper Extremity Exercises

- Increase UE endurance
- Prevent hospital deconditioning
- Preparation for increased UE use
- Pressure Relief
- UE Assessment is key to function and mobility
Key Practice Recommendations


(UW Health: High quality evidence, strong recommendation)
Phantom Pain

• Statistics vary, most agree ~70-80% of patients with amputations will have phantom pain or sensation at some point.
• Discuss with your patients that while the limb is gone, phantom pain is real.
• Encourage patient to look at and touch their limb (with clean hands!!) when they are ready.
Mirror Therapy

- Educate patient on theory before attempting; suggest YouTube videos
- Must remove the footboard of the bed
- Let patient assist you in placing the mirror for best view
- [https://www.uwhealth.org/healthfacts/pvs/7540.html](https://www.uwhealth.org/healthfacts/pvs/7540.html)
Mirror Therapy

- Perform basic exercise program - ankle pumps, circles, quad sets, heel slides, hip abduction - while patient watches the reflection

- Adjust based on patient response.
  - If emotional, dizzy, or nauseated, discontinue

- If good response, continue for 5-10 minutes. Leave mirror in the room, issue educational handout
Edema Management: Shrinker Socks

- Surgical dressing: Kerlix and ACE wrap
- If surgeon agrees, shrinker sock is applied POD 3. For patients with AKA, may be POD 1 as surgical dressing generally falls off.
- At UW Hospital, PT department stocks shrinker socks, amputee socks and sock donners. You may also make contact with a prosthetist to provide these.
Above Knee Shrinker Socks

- Grey in color
- Have a waist belt for suspension
- We carry sizes Small, Medium, and Large
  - “Fits Circumference” is written on the packaging
- At 50% stretch, provides 25-30 mmHg compression. Double layer=double compression
Above Knee Shrinker Socks

• If goal is to progress to prosthesis and sock is being used for shaping, snug the ring up to the distal end of the limb, trim the length of the sock, and reflect backwards in a second layer.

• If sock is being used primarily to hold on dressing, MD does not want strong compression, or patient does not tolerate second layer, snug ring up to the distal end of the limb, and tie additional fabric in a knot.

• May need to trim at groin for best fit
Below Knee Shrinker Socks

- White in color
- No suspension belt
- Sizes:
  - 5x24 (size x length)
  - 6x24
  - Also carry 4 and 5x18, and 5 and 6x30
Below Knee Shrinker Socks

• At 50% stretch, 20-25 mmHg. Double layer = double compression
• When it comes to compression, remember: Light is Right!
Amputee Sock Donner
Using an Amputee Sock Donner

1. Drop the short end of the shrinker sock down through the middle of the donning tube.

2. Open the sock, stretch it around the tube, and roll it down the sides. Try not to let the sock curl over the bottom of the tube.

3. Holding onto the sock and the tube, place your limb into the center of the tube.
• Protect residual limb and manage edema to aid healing and limb shaping, and to facilitate pre-prosthetic care. Prevent additional skin breakdown and maintain health of contralateral lower extremity to avoid delay in prosthesis fitting.

• Rigid Removable Dressings (RRD) are associated with reduced time to wound healing, initial prosthetic casting, and independent walking. *(Hordacre et al, 2013)*

(UW Health: High quality evidence, conditional recommendations)
Rigid Removable Dressing

• If ordered by MD, will usually be applied POD 3-5

• Remove ACE wrap, Kerlix, inspect limb. Ask RN if they need a picture in Electronic Medical Record (Image Mover)
• Telfa over incision
• Apply shrinker sock with sock donner
• We fabricate using a distal residual end pad and fiberglass casting tape
• A prosthetist also fabricates these
Rigid Removable Dressing

- 4 hour skin check
- If no redness, can wear 23 hrs/day as comfortable
- Continue daily skin checks. If redness, remove RRD until PT/prosthetist can address
- If patient chooses not to wear overnight, they should wear shrinker sock and knee immobilizer
Rigid Removable Dressing

• Should wear anytime they are mobilizing
• As limb shrinks, can add 2, 3, or 5 ply non-compressive amputee socks as filler
• After ~10 ply, pt should have a new one fabricated
Patient Education

• Health Facts for You on Mirror Therapy, Sock Donner, Limb Wrapping
  – All searchable on www.uwhealth.org

• First Step Magazine
  – Available through http://www.amputee-coalition.org/

• LE and UE HEP

• List of local Prosthetists

• List of local Vendors for DME
Durable Medical Equipment

- If progressing to Acute Rehab/SNF, will defer DME to next level of care
- If discharging directly home
  - Slideboards often require prior authorization
  - Rental Wheelchairs
  - Custom high strength manual wheelchairs or power chairs, consult a seating specialist/vendor
Considerations for Patients with Bilateral Amputations

- Check integrity of both limbs
- Check fit of prosthesis, if present
- May need shrinker on prior limb post-operatively, to prevent edema
- Seated balance will be a bigger challenge, and have a larger treatment focus
Considerations for Patients with Bilateral Amputations

- Unable to use mirror therapy
- Recent evidence supports observing therapist’s limbs moving while attempting the movements in their phantom limbs may significantly reduce phantom pain in bilateral amputees. (Tung, et al, 2014)
- May consider straight anterior/posterior transfers (limited by UE strength, lines)
• Immediate Intra-Operative Prosthesis
• In most cases, patients will be Touch Down Weight-Bearing on their surgical limb
  – Need strong UE’s to be a good candidate
• Cast should be supported during exercise program and transitional movements to prevent pressure/chafing on a fresh incision.

• If possible and therapist feels comfortable, the foot piece may be removed to decrease weight of device during exercises.
• While the elastic support can be loosened at rest, it should be tightened before any mobility or ambulation is attempted. It should be snug, to prevent any pistoning of the limb inside the cast.
• Have close contact with the prosthettist, post contact information in room so all staff may call with any questions, concerns, or in case of sudden need to remove cast.
• The therapist’s role in recovery for a patient with a new amputation is very important.

• In the acute care setting, we have a great opportunity to start them on a path to acceptance and independence.
Acute Post Amputation Phase

• Questions?

PHYSICAL THERAPY

YOU’RE AWESOME

YOUR FIRST STEP TO BEING AWESOME

JUST REMEMBER, THE ODDS OF WINNING TONIGHT’S POWERBALL

ARE THE SAME AS MEETING A RANDOM STRANGER THAT KNOWS THE DEFINITION OF OCCUPATIONAL THERAPY
Acute Rehabilitation Phase

• The period of time focusing on improving function to return to safe mobility and self-care skills, most often before returning home.

• Most often occurs in an inpatient rehabilitation hospital vs skilled nursing facility
Acute Rehabilitation Phase

• Length of stay typically 5 days to 3 weeks.
• Interdisciplinary team approach is utilized to address patient needs comprehensively.
Acute Rehabilitation Phase

• Collaborate with team to safely progress functional mobility and engagement in self-cares as appropriate at each phase of recovery in order to meet patient’s goals for return to community.
Key Practice Recommendation

- High level, acute inpatient rehabilitation with interdisciplinary approach is recommended for best functional outcomes
  (Sauter 2013) (Czerniecki 2012)

(UW Health: Low quality evidence, strong recommendation)
Sauter article (2013)

- Prospective cohort study, 297 patients
- Included TMA, BKA, AKA and Bilateral amputation levels
- Compared patients discharged to Rehab, SNF and directly home after amputation
- Patients at Acute Rehab had improved functional outcomes at 6 months vs SNF and home discharge locations
Fall Risk (Pauley et al 2006)

- Retrospective cohort, 1267 patients
- 1 in 5 patients (20%) with lower limb amputation will likely fall at least 1x during IP Rehab.

- Independent predictors of falling
  - Greater 70 years old, multiple co-morbidities
  - Longer length of stay, cognitive deficits
  - Multiple PRN meds (benzos, opiates)
Fall risk prevention

• Recommend fall risk assessment, medication management and continuous wheelchair skills training (Latlief 2012)

• Many falls occur during self-transfers and reaching activities (Dyer et al 2008)

• Key recommendations:
  – Bed in lowest position
  – Chair and bed alarm when appropriate
  – Seated and standing balance concerns
  – Tub/shower considerations
Outcomes

- 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.

- Of persons with diabetes who have a lower extremity amputation, up to 55% will require amputation of the second leg within 2-3 years.

[Link to Amputee Coalition resources on limb loss statistics]
Rehab Goals - PT

- Modified independent with transfers and bed mobility
- Independent with home exercise program
- Independent with residual limb care including daily skin checks
- Modified Independent with wheelchair mobility x 500-1000 feet, including thresholds, ramps and accessing hallways and bathrooms.
- Independent with car transfers, including management of all assistive devices.
- Independent with floor transfers or be able to direct caregivers in proper technique.
- Modified Independent with ambulation x 50-150 feet with appropriate assistive device
Self Cares

NEWEST EVENT ADDED TO THE WORLD’S STRONGEST MAN COMPETITION:

IADL’S
Rehab Goals - OT

- Modified Independent with ADLs
- Modified Independent with toilet and tub/shower transfers
- Modified independence with IADLS with use of adaptive equipment/techniques, including light meal preparation, home management
- Independent with energy conservation techniques
- Independently incorporates shoulder joint protection in functional tasks
- Family training as needed to assist with all of the above if independence is not achieved
- Patient/Family will verbalize understanding of necessary home modification recommendations and DME use
• Functional Independence Measure (FIM)
• Cognitive screen
• ADL assessment
• IADL assessment
• UE strength and ROM
• Sensation
• Vision
• Kitchen safety assessment
• Independence in room assessment
Assessment Tools - PT

- Hip and knee ROM and flexibility
- Functional Reach Test
- Single limb stance
- Seated and standing balance
- FIM scale
- Semmes Weinstein
  - 10g monofilament to assess sound foot for protective sensation
Functional activities

• Bed Mobility
• Transfers to varying surfaces
  – Start with sitting balance and scooting
  – Slideboard vs squat pivot to stand pivot
  – Wheelchair set-up
  – Standing trials with walker and parallel bars
Mobility

• Pre-gait exercises
  – Postural control in standing, weight shifting
  – Single limb stance
  – Hopping

*Keep in mind: Patients may have loss of distal sensation in sound limb

• Progress to gait if able
• Stairs
Car Transfers

- Family Training
- Car Simulator or patient’s actual car
- Don’t wait until day of discharge
Continuous wheelchair skills training as fall prevention strategy (Latlief, et al, 2012)
– Shown to decrease incidence of repeat falls and severity of injuries
  - Incorporate in every PT and OT session
  - Educate pts in proper set-up and manual propulsion
  - Long, smooth push stroke
Wheelchair skills training

https://www.youtube.com/watch?v=BD9kp4u89Gc
Activities of Daily Living

- **Grooming**
  - Seated vs standing, balance

- **Dressing**
  - Adaptive equipment (inspection mirror)
  - Seated vs standing, balance
  - Clothing & footwear recommendations
  - Transport of items

- **Showering**
  - Skin care
  - Adaptive equipment/technique

- **Toileting**
  - Clothing management, hygiene

- **Commode Transfers/Tub-Shower Transfers**
  - Wheelchair set-up, surface height
  - DME recs
Instrumental Activities of Daily Living

- Kitchen activities
- Home management
- Compensatory strategies for diminished sensation with self-cares
  - Water temperature
  - Hot stove, Exposed pipes
- Driving
Home modifications

- Ramp
- Grab bars, railings
- Environmental set-up
- Fall prevention strategies
Upper Extremity Exercises

- Strength to perform pressure releases, assist with transfers, mobility, self cares, Core Strength
- Prevention of shoulder over-use injuries
Lower Extremity Exercises

• Strength is the key to preventing dysfunction
• Contracture prevention
  – At hip and knee
• Supine
• Seated
• Prone
• Side-lying
• Standing
Core Exercises

- Supine pelvic bridges
- Seated
  - Trunk rotation, ball toss diagonals, bosu ball, medicine ball
- Quadruped
Considerations for Patients with Bilateral Amputations

- May need wheelchair re-assessment
  - More stable cushion or postural support
  - Anti tippers, or may need to adjust hip angle (dump) in the chair
  - Consider power wheelchair if appropriate due to UE weakness, comorbidities
Considerations for Patients with Bilateral Amputations

- Seated balance of even more concern
- May consider direct anterior or posterior scooting transfers (B AKA)
Durable Medical Equipment- ADL

• Commode
• Tub transfer bench
• Grab bars
• Reacher
• Dressing and bathing adaptive equipment
• Long handled mirror
• Wheelchair gloves
Durable Medical Equipment - Mobility

- Transfer board
  - May need longer board for car transfer
- Walker/crutches
- Wheelchair and cushion
  - Recommendation is for all amputees to have a wheelchair
  - Custom Lightweight vs Power
Custom Wheelchair

- High strength lightweight manual wheelchair
  - Residual limb support
  - Swing away arm rests
  - Swing away leg rest with heel loop
  - Adjustable tension backrest
  - Cushion
Letter of Medical Necessity

• Need wheelchair vendor and Physician
  – Face-to-Face MD note

• Justification
  – List of components from Vendor
  – Rehab IP ALL PT Letter of Medical Necessity

• Most insurances cover 80% of custom chair. Medicaid = 100%

• Most insurances will not cover w/c at SNF. Medicaid is the exception.
Patient Education

- Home Exercise program
- Adaptive techniques with self-cares and mobility
- DME use
- Pre-prosthetic preparation
- Skin protection, footwear
Family Training

• Caregiver attends a therapy session prior to discharge
  – OT: ADL/IADL, home modifications, transfers
  – PT: Transfers, car transfer, stairs, wheelchair skills

• Discharge recommendations
  – Level of assist, ongoing therapy

• Family will be trained in all areas in which patient requires assistance
Referrals

- Ongoing therapy
- Prosthetist
- Amputee Clinic
- Follow-up Rehab MD
- Wheelchair fitting appointment
- DME providers
Questions

ANY questions?
Community Reintegration Phase

• The period of time after an amputation when a person has returned home and is beginning to reintegrate into their previous roles and functional tasks.

• A person may be receiving Home Health therapies or Outpatient therapies.
Home Health

• Reasons for referral
  – Patient is home from rehab/hospital, and is unable to gain access to Outpatient
  – Home Safety Concerns
  – May have nursing needs (wound VAC or wound care if incision is open, IV antibiotics)
Mobility/Assessment Tools

- Assess functional mobility in the home
- Home Safety Assessment Checklist HFFY 6626, accessibility
  - [https://www.uwhealth.org/healthfacts/geriatrics/6626.html](https://www.uwhealth.org/healthfacts/geriatrics/6626.html)
- Comprehensive physical/medical assessment in addition to Therapy Eval and Treat (PT Only)
  - Complicated and exhaustive evaluation of patient’s current status in the home
  - Federal regulations
  - Important for this patient population
Durable Medical Equipment

- OT and PT involved in obtaining and justifying equipment in the home if has not already been acquired
- Wheelchair vendor can come to the home if needed in coordination with therapist
Referrals

Referrals to community resources
- Bright Star – paid caregivers
- Independent Living – home modifications and paid caregivers, grants for equipment
- Accessibility Plus – home modification
- Independence Mobility First Store - DME
- Project Home – home modification
- Access to Independence – temporary ramps
Outpatient Physical Therapy

- Eval patient pre-prosthetic if possible
- Prosthetics-contact prosthetist
- Return to ambulation
- Skills for long term management
Outpatient Occupational Therapy

• Focus on transition to home and community environments for ADLs and IADLs
• Provide therapy to support re-engagement in roles, activities, and routines
Falls Risk increased

Patient is encouraged to slowly increase wearing time and weight bearing

Monitor skin-use mirror

– Response to prosthetic use, weight bearing
Assessment Tools

- Hip and knee ROM/Flexibility
- Strength assessment
- Functional Reach
- Gait Velocity testing
- 6 minute Walk Test
- Video Gait throughout training
Rehab Goals - Short Term

• Achieve normal scar mobility
  – You will not achieve normal prosthetic use without near normal scar mobility
Desensitization

- Achieve tolerance to light touch, pressure, tapping, exposure to varying textures all prior to prosthetic use
- Weight bearing through the distal end of limb-if appropriate
- Address phantom pain
- Address any lingering surgical pain
Initiating Prosthetic Use

- Establish prosthetic wearing schedule
- Establish standing and walking schedule with prosthesis in place
Wearing and Walking Schedules

• Initial schedule may be established by prosthetist, progressed by Physical Therapist

• Wearing schedule of prosthesis
  – Initial Goal 15 min-6 hours, LTG 8-12 hours

• Progressive standing/walking with prosthesis schedule
  – Initial Goal 5 min-3 hours, LTG of 8-12 hours throughout the day
Rehab Goals – Short Term

- Independent donning and doffing of prosthetic components in correct sequence
- Independent assessment of fit and management of fit of prosthesis using amputee ply socks
Prosthetics - Above Knee
K Level

Defined by CMS as anticipated functional status

- **K0**: Prosthesis does not enhance quality of life, no ability to transfer or ambulate with prosthesis.
- **K1**: Has potential to use prosthesis for transfers and ambulation on level surfaces; household ambulatory
- **K2**: Ambulates on uneven surfaces and can negotiate environmental barriers; limited community ambulatory
K Levels

- K3: Ambulates with variable cadence; has vocational, therapeutic or exercise activity beyond simple locomotion.
- K4: Exceeds basic ambulation skills, exhibits high impact, stress, energy levels; active adults, children and athletes.
• Achieve ability to independently attain equal weight bearing prosthetic limb vs intact limb in static stand.
• Achieve equal anterior/posterior and lateral weight shifting performance
• Learn to use proprioceptive input of the limb against the socket interface to better control the prosthesis.
Rehab Goals – Short Term

- Patient to tolerate household distances (100 feet) on indoor or level outdoor surfaces with prosthesis in place and appropriate gait device
- Progress to ambulation without use of gait device if safe and with minimal gait deficits
- Independent floor to upright transfers with prosthesis in place
1. Begin in tall kneeling with use of a stable environmental object such as a chair or bed in front of you.

2. Place hands on this object and weight bear thru the prosthetic knee/leg while bringing the sound leg forward.

3. Press weight thru the arms onto the environmental object and also thru the sound foot until upright is achieved or once partially up spin/rotate trunk and pelvis and sit on the surface of the environmental object.
Floor Transfers with Prosthesis

1. Begin in kneeling on sound knee with hands on the floor
2. Move prosthetic leg out to the side so that the knee is locked (into extension by position)
3. Press weight thru hands and prosthetic foot while bringing sound foot forward until you can place weight on that foot
4. Walk hands back towards feet
5. Push up into standing and bring prosthetic leg under you. Before placing weight on the prosthetic leg tighten the hip extensors (buttock muscles) to lock the knee.
Floor Transfers with Prosthesis

1. Start in side-lying on sound side
2. Roll forward so that you can press weight thru your hands and sound foot.
3. Increase weight onto hands to allow the sound leg to move forward and be centered
4. Walk hands back
5. Press up into standing and bring prosthetic limb forward. Before placing weight on the prosthetic leg tighten the hip extensors (buttock muscles) to lock the knee.
1. Begin in tall kneeling
2. Shift weight onto prosthesis and bring sound leg forward so that the weight is on the foot
3. Lean weight slightly forward and press up using the sound leg until you are able to bring the prosthetic leg under you
4. Once in standing on your sound leg, lock your prosthetic knee using your hip extensors (butt) before weight bearing on it.
Rehab Goals – Long Term

• Safe/indep side stepping, stepping over/around obstacles, stepping back

• Patients with AKA must be carefully trained in stepping backwards due to forefoot loading resulting in loss of knee control

- Exceptions Genium/X3 and C-Leg 4
Rehab Goals – Long Term

• Safely ascend/descend a standard curb with gait device as needed, in a reciprocal pattern if possible
• Safely ascend/descend 12 stairs with use of gait device utilizing step-on or step-over-step as appropriate
Rehab Goals – Long Term

• AKA’s:
  - C Leg can perform controlled step-over-step descending, step-on for ascending.
  - Genium/X3 knee can perform step-over-step ascending/descending
Rehab Goals – Long Term

- Initiate gait training on grass, gravel, stones, mulch or other uneven terrain.
- Safely ascend/descend coded ramps or hills with angles of varying degrees with gait device as needed.
- Walk with prosthesis and gait device at varying speeds
Rehab Goals – Long Term

- Achieve independence with car transfers with prosthesis in place, including management of any/all assistive devices.
- Improve aerobic capacity as indicated by reduced perceived rate of exertion during the 6 minute walk test.
Rehab Goals – Long Term

- Normalize gait pattern: eliminate/reduce asymmetry, achieve a base of support of 2-4 inches, eyes looking a minimum of 5 feet forward, achieve trunk/pelvic rotation and reciprocal arm swing.
- Maximize independence of functional mobility with and without prosthesis
Exercise Programs

• Prevent contracture at hip and knee
• Core Strengthening
• Flexibility
Exercise Programs

- Treatment and prevention of back pain
• Ehde DM, Smith DG, et al

“Back pain as a secondary disability in persons with lower limb amputations.”

• High prevalence of back pain within a previous 4 week period for prosthetic users as compared to the general population
Exercise Programs with Prosthesis

- Hip strengthening
- Weight shifting
- Sidestepping
Exercise Programs with Prosthesis

- Narrowing base of support
- Balance and strengthening
- Treadmill
- Stepping over obstacles w/o circumduction
Long Term Management

• The period of time when a person has achieved stable functional skills including mobility and self care skills, they have returned to previous roles or modified their roles. Most people in this phase are no longer receiving skilled therapy and are at a self-maintenance level of care.
Key Practice Recommendation

- Begin planning for long-term home management immediately and continue through all phases of care. This should be an interdisciplinary approach, and should include social support, addressing environmental barriers, need for ongoing services and obtaining needed durable medical equipment.

(UW Health: Very low quality evidence, strong recommendation)
Prosthetic Maintenance

• Maintain contact with prosthetist
  – Fit issues related to
    Limb volume changes or
    Limb shape changes
    • May not be symmetrical
  – Need for additional ply sock use or changes
    within the pelite insert or socket
  – Skin issues
  – Repairs
Prosthetic Maintenance

• Prosthetic Clinic
  – MD, PT, and Prosthetist
  – Middleton Clinic
  – First Friday morning of every month
Questions

PRESENTATION FINISHED

ANY QUESTIONS?

memegenerator.net
References


References


References


References


• Churilov I, Churilov L, Murphy D. Do rigid dressings reduce the time from amputation to prosthetic fitting? A systematic review and meta-analysis. Ann Vasc Surg. 2014 Oct;28(7):1801-8

References

References


•
References

- Yu, et al. Incidence and risk factors of falling in the postoperative lower limb amputee while on the surgical ward. PM R 2010;2:926-934
References


• Complications. Retrieved 5/20/13 http://www.amputee-coalition.org/inmotion/may_jun_03/meddir.html

• http://www.rehabmeasures.org