Care for the Person with Amputation

Gait training for the person with lower extremity amputation

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Upon completion of this module, the attendee will be able to:

- Implement a gait training program for people with lower limb amputation
- Identify exercises to improve walking with a prosthesis
- Identify modifications for higher level activity
Major desire of most Amputees

- To walk
- Walking disability after structured traditional rehabilitation.
Prosthesis

- A tool for walking
- Does not make it easy
- Prosthetic componentry
  - No evidence that specific components impact gait
  - Improve endurance
- Myoelectric not as developed for LE as UE
Walking Needs

- Sufficient physical capacity
  - Aerobic capacity
  - Muscular force
  - Balance
  - Flexibility
  - Proprioception
  - Control
The patient must:

- Trust the prosthesis to accept the weight of the body.
- Feel/understand the capability of the foot/knee.
- Balance on one foot (SLS).
- Advance the limb forward.
- Adapt to environmental demands.
- Volume management.
Cocharane Reviews:

- “There is a lack of evidence from randomised controlled trials to inform the choice of prosthetic rehabilitation, including optimum weight of prosthesis, after unilateral TFA in older dysvascular people.” Cumming J et al. 2015

- “Randomised controlled trials to examine key interventions is urgently required” in the amputee population. Barr S, 2018
- Miller (2017) community based exercise program on balance, balance confidence and gait in individuals with LLA.
- Results: each participant experienced clinically meaningful improvements in balance, balance confidence, and walking ability.
- Better balance predicts increased participation in the community.
- No program has proven superior to another in improving walking ability in LE amputees.
More Statistics

- Obesity does not impact patient rehab outcomes:
  - 2MWT
  - L-test

Vivas et al. (2017)
Gait training

- Overground or treadmill
- Part task or full task training
  - Both show functional gains
Problems with walking after amputation

- Diminished proprioceptive input
  - Loss of ankle
  - Loss of knee
- Modified COM
- Fear of falling
Amputee postural changes

- COG is shifted over intact limb
- Small BOS
- External rotation intact
- Hyperextension of intact knee
- Retraction and elevation of pelvis (affected)
- Depression affected shoulder
Safety
Contractures

- Difficulty using a prosthesis and increased energy expenditure
  - Thomas test position for stretching
  - Prone TID x 20 minutes
  - Moist heat prior to manual therapy
Gait Training

- Find out capabilities of prosthesis
  - Foot
  - Knee
- Roll off prosthetic toe
Gait Training

- Must learn boundaries of prosthesis
- How to flex muscles in socket
- How to make heel contact
- How to load the toe
  - Push off
  - Flex knee
Energy Expenditure
Prosthetic Training progression

- Weight shifting and stepping forwards, sideways, backwards
- Higher level balance: ball toss, golf swing, tilt boards
- Sit to stand to sit with equal weight bearing
Weight shifting and stepping forwards, sideways, backwards

Eyes Open / Eyes Closed
Weight shifting and stepping forwards, sideways, backwards

Eyes Open / Eyes Closed
Weight shifting and stepping forwards, sideways, backwards

Eyes Open / Eyes Closed
Balance Re-education
Restoration of horizontal plane pelvic rotation
Prosthetic Training

- Higher level balance
Prosthetic Training

- Higher level balance
Prosthetic Training

- Higher level balance
Prosthetic Training
Strength and Balance

- Agility walking / gait
  - Side stepping / back stepping
  - Narrow walking
- Braiding
Balance
Strengthen with prosthesis?

- Do not add resistance to end of prosthesis if amputation was caused by vascular disorder or if patient is diabetic.
- May add to intact LE
Common gait deviations

- Lateral trunk lean
- Abduction
- Circumduction
- Vaulting
- Decreased trunk rotation
- Increased lordosis
- Uneven temporo-spatial parameters
- Poor knee control (TFA)
Shoes.. Heel height
Prosthetic Wear Schedule

- 1 hr BID for the first week
- Increase by 1-2 hours per week if no adverse skin reactions.
- Must learn to fall
- Must learn to recover from fall
Stairs
Stairs
Ramps

- Up ramp pylon tips back
- Down ramp pylon tips forward.
Secondary conditions associated with gait deviations

- Low back pain
  - Must do trunk strengthening/control

- Overuse of opposite limb
  - Arthritis
  - Excessive Pressure
Not enough time spent gait training
2-6 weeks acutely in the process
Limited access to structured exercise program
Must create a continuum of care
Prosthesis

- Donning/doffing
- Hygiene
- Weight loss with exercise program affects
- Prosthetic fit
  - Need for multiple socks
Does amputation affect your life?
If so check out **Who Needs Twenty!**
A grass-roots community-based initiative
dedicated to amputees, family/friends,
caregivers, and healthcare professionals,
or anyone affected by limb loss.

Find us at:
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or visit us online:

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Thank you