ECLIPSE at CSUN

ECLIPSE

Prosthetic Rehabilitation Symposium 2016

Integration of care in lower extremity prosthetic rehabilitation

3.19.16

CSUN SHINE

ÖSSUR
LIFE WITHOUT LIMITATIONS

K Levels

- **K-Level 0 -** Does not have the ability or potential to ambulate or transfer safely with or without assistance, and a prosthesis does not enhance quality of life or mobility.
- **K-Level 1 -** Has the ability or potential to use a prosthesis for transfers or ambulation in level surfaces at a fixed cadence. Typical of the limited and unlimited household ambulator.
- **K-Level 2 -** Has the ability or potential for ambulation with the ability to transverse low-level environmental barriers such as curbs, stairs, or uneven surfaces. Typical of the limited community ambulator.
- **K-Level 3 -** Has the ability or potential for ambulation with variable cadence. Typical of the community ambulator who has the ability to transverse most environmental barriers and may have vocational, therapeutic, or exercise activity that demands prosthetic use beyond simple locomotion.
- **K-Level 4 -** Has the ability or potential for prosthetic ambulation that exceeds basic ambulation skills, exhibiting high impact, stress, or energy levels. Typical of the prosthetic demands of the child, active adult, or athlete.

Collaborative Clinical Management

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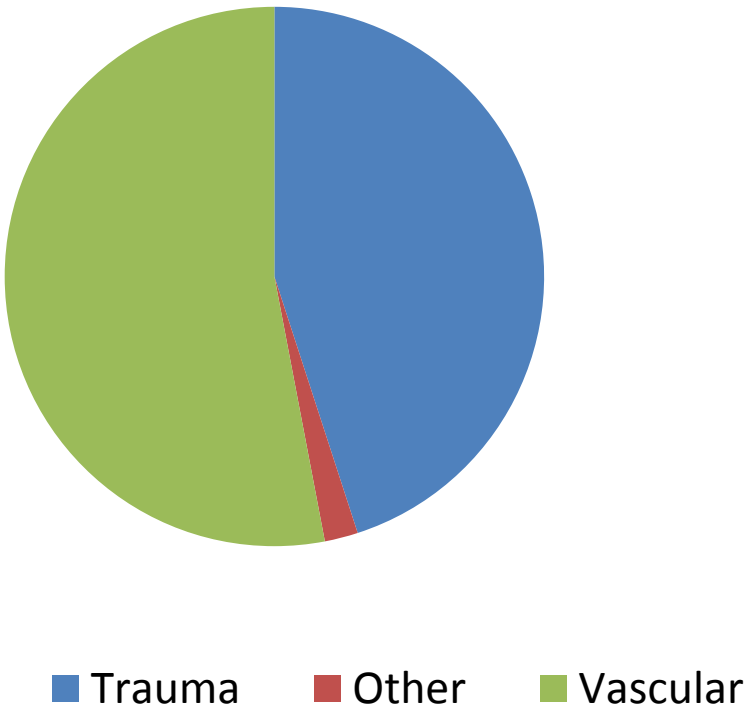
- Our Collaboration
- Case Study: Myles

What we will cover

- Describe challenges to successful patient outcomes following amputation
- Review resources available to practicing clinicians
  - To predict future function
  - To predict prosthetic use
  - To promote health and wellness
- Use a case study to describe collaboration

US Statistics



2 million people

185,000 new amputations annually

Amputations are commonly due to vascular disease

Vascular Disease Statistics are **not good**:

- Almost half of people die within 5 years after amputation due to vascular disease

- Over half of people with diabetes mellitus loose the second leg within 2-3 years of first amputation

Internal factors

Loss of limb often combined with poor adjustment and other factors that slow recovery: (Bhuvaneswar 2007)

- PTSD
- Depression
- DM
- Trauma

- Inactivity hastens death

Predictors of ↓QOL after amputation

- Depression – explained 30% of loss in QOL
- Perceived limitations in prosthetic mobility
- Poor social support
- Multiple comorbidities
- Prosthesis problems
- Low social activity participation
- Increased age (only non-modifiable factor)

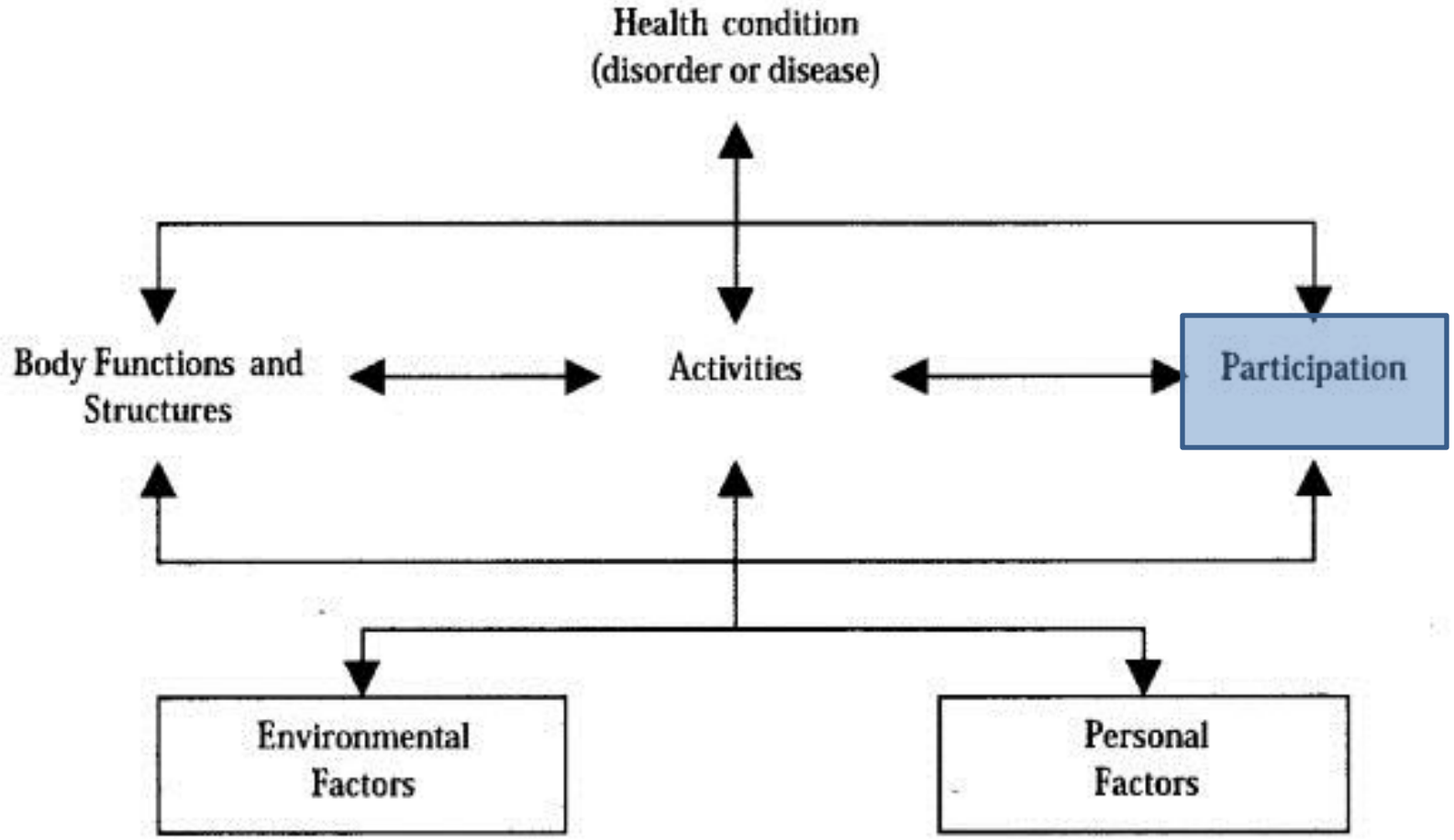
(Asano 2008)

CONSIDER NOT ONLY THE AMPUTATION, BUT THE INDIVIDUAL WITH THE AMPUTATION AS A WHOLE PERSON

GULICK, 2007

International Classification of Function

(WHO 1996)



Factors Affecting Outcomes

Affecting Participation

- Adjustment
- Pain
- Peer support

Affecting Access to Resources

- Cost
- Availability
- Transportation

Opportunities to Improve Outcomes

Participation

Positive adjustment predicted better functional success with

- Prosthesis
- Physical adaptation

(Unwin et al. 2009)

Access

Coordinated care before AND after amputation improves health and wellbeing

(Perkins 2012)

Factors Affecting Participation

- Adjustment
  - Poor adjustment common
  - Become less social, shame and body image problems
- Pain
  - Commonly reported up to 85% of cases
  - Reduces participation
- Peer support
  - Family support helpful
  - Peers provide specific information

Adjustment

Reaction may result in depression, body image problems, and a decline in social interactions (Hamill, Carson, & Dorahy, 2010)

50-70% of patients were less social after amputation

Most of free time spent at home

Limited social interactions (Burger & Marincek, 1997).

Patient concerns: Fear and Loss

Fear of the unknown - Fear of rejection

Loss of self-confidence - self-esteem & occupational roles

(Smurr, Gulick, Yancosek, & Ganz, 2008)

Loss of independence remains a lifelong struggle

- Social stigma perceived, with internalized embarrassment
- Lack of social acceptance was stressful (Hamill et al., 2010)

Pain

- Residual limb pain – up to 76%
- Phantom limb pain – up to 85%

Associated with
poorer adjustment & PTSD:
Concurrent report of both types

Residual limb pain is perceived as more disabling by patients than phantom limb pain. (Desmond 2008)

Read their op report – a great resource with surgical videos:
www.ampsurg.org

Peer Support

- May play a strong role in positive adjustment
- Needs further study to understand why

(Krenek & Vasquez, 2006)

Problem: Negotiating Healthcare

Barriers to care in U.S. (Kullgren 2012):

- Restricted funding
- Limited appointment availability
- Transportation challenges

Factors Affecting Outcomes

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Opportunities to Improve Outcomes

Participation

- Refer for support & services
- Measure to predict future function
- Read op report and manage pain with physician
- Involve in sports & recreation!

Access

- Maintain list of low cost resources
- Coordinate care
- Identify high risk patients early

Opportunities to improve Outcome:

Predictors of future physical mobility

- Activity Balance Confidence (ABC)
- Timed Up and Go & L-Test
- FSST
- 6 minute walk test
- Amputee Mobility Predictor

Predictors of future physical mobility

Activity Balance Confidence (ABC)

A subjective measure with 16 tasks

How confident are you that you can do ____ without becoming unsteady or losing your balance?"

(0-100 scale. Lower score - less confidence)

- Mean for transtibial 64.9/transfemoral=62.9
- Fall risk < 67%

Predictors of future physical mobility

- <u>Timed Up and Go & L-Test (Dite 2007, Deathe 2005)</u>
- Both test ability to:
  - Stand from a chair
  - Walk a distance
  - Turn
  - Sit down

Scores:

- TUG: >19” = fall risk
- L-Test – fall risk cut off not identified.
- Validated average scores
- Transtibial: 29.5 ±12.8” Transfemoral: 41.7±16.8

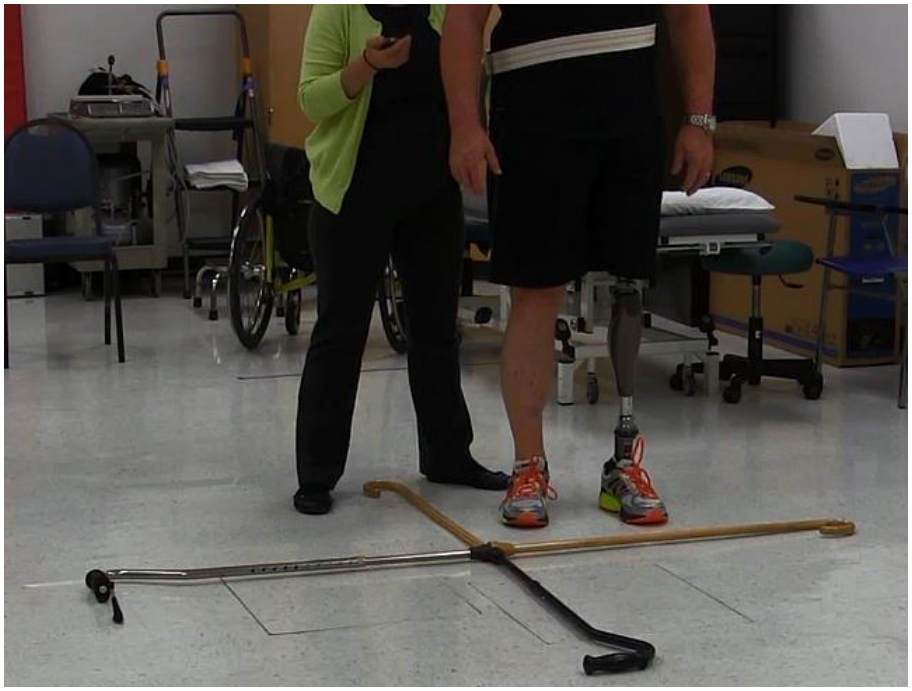
Predictors of future physical mobility

Four Square Step Test (Dite 2007)

- Step over 4 canes on the floor

Fall risk-

transtibial amputation >24”



Predictors of future physical mobility

6 minute walk test

Measure of cardiovascular endurance

Normative data:

K Level	Mean ±SD (meters)
K0-K1	50 ± 30
K2	190 ± 111
K3	299 ± 102
K4	419 ± 86

Predictors of future physical mobility

Amputee Mobility Predictor (Gailey 2002)

Brief test to determine future K level

Can be done with or without unilateral LE prosthesis

K Level	No prosthesis	With prosthesis
K0	0-8	0-14
K1	9-20	15-26
K2	21-28	27-36
K3	29-36	37-42
K4	37-43	43-47

Opportunities to Improve Outcome:

Predictors of prosthetic use:

- Roffman et al. Clinical prediction article
- Retrospective and prospective Australian study of 135 consecutive patients
- Medical records review, phone interviews, followed for 15 months post amputation
- Identified clinical prediction rules for prosthetic non-use at 4, 8 and 12 months post-op.

Significant Predictor Variables at all 3 times post discharge (p-value <0.001)

1. Use of mobility device
2. Unable to walk outdoors
3. Multiple comorbidities

<u>Additional predictor at 12 months:</u>

- Delay to prosthesis
- (>160 days)

Author recommendations:

Target subgroup of early high-risk patients with the following program components:

1. Independence with transfers
2. Independence with w/c mobility
3. Participating in a program of physical fitness
4. Refer for mental health services
5. Focus on adjustment

Running, sports and adaptive recreation

Why participate in sports? Deans 2014

Adaptive Sports Influence on QOL

- Positive influence on QOL, overall health and quality of social life
- People with disabilities who remain physically active:
- Are better adjusted,
- Have less pain, depression and anxiety
- Live longer
- More likely to be employed

Summary: Barriers to Participation

- Health benefits well established in non-impaired population, yet only 16-22% of Americans participate in sports or exercise regularly (CDC)
- Level of participation is not well studied in adaptive sports.
- Assumption that disability is a primary barrier may be false.

Prosthetic Running: for everyone

Benefits:

- Improves walking confidence
- Teaches basic skill needed for recreational sports
- Enhances positive body image
- Understand how to run away from threat
- Increases self - efficacy

Gailey et. al 2014

Prosthetic Running

Joint	Intact Limb-impact	ROLES REVERSED	Prosthetic limb
Hip	Minor role		Major role
Knee	Major role		Minor role
Ankle	Major role		Minor role

The roles for muscle groups are reversed with prosthetics. The main prosthetic issue is the socket fit.

The foot muscles are replaced with prosthetic componentry and the hip must generate 2-3 times more work (Czerniecki 1991).

Steps to develop and implement a customized recreational/adaptive sports program:

- Assess barriers to participation
- Provide education and support
- Refer to community based resources for ongoing peer/social support
- Ongoing access to integrated healthcare
  - Prosthetic components/fit
    - Submit application to CAF
  - Injury/rehab needs
    - to run they need to walk with fairly normal gait
  - Nutrition
  - Psychosocial services

Clinical Bottom Line

- Sports/recreation are essential for a well balanced, happy and healthy life
- People with disabilities have same benefits in participation
- Barriers to participation can be overcome with support and resources
- Running is essential skill for safety as well, so teach the basic skills
- Help our patients transition to recreation and sports….

- Go beyond "walking" as a therapeutic goal!!!!

By the end of the course, the participant would have scored 90% or better on the post-test questions involving these items:

1. Analyze fundamental concepts underlying the selection, application and functional training associated with prosthetic use in patient/clients with functional limitations.

2. Describe how to accurately perform, document and score five functional measures that predict future function.

3. Given functional measure scores, objectively quantify current abilities of patients with limb loss for care coordination and reimbursement.

4. Describe benefits of recreational exercise to clients with limb loss.

5. List steps to develop and implement a customized recreational/adaptive sports program to enhance wellbeing and health of clients with limb loss.

The rest of your day:

- Morning Lab sessions: **Choose 2 - In classrooms**
  - Interprofessional gait analysis
  - Functional measures
  - CAD/CAM Technology
- Community resources: North Field
  - Meet our community partners
  - Tour the CSUN Center of Achievement through Adaptive Physical Activity
- Afternoon Lab Sessions: After Lunch on North Field
  - Teaching running
  - Skills for managing environmental barriers
  - Improving gait quality

Resources

Physical Therapist List Serve:

Amputee Rehabilitation Focus Group now available!

Available at www.acutept.org under the 'Practice' tab

- Special Interest Groups being formed
- American Physical Therapy Association (apta.org)

Limb Loss Resources:

www. amputee-coalition.org

Prosthetic resources for clinicians:

Sign up for list serve at - www.oandp.com

Community event resources:

Check out updates at - www.csun.edu/eclipse

Do you want to be listed on our website?

- Let us know! We will be putting interested local clinicians on the ECLIPSE website this summer
- We will also have community resources on site for you and your patients to reference:
- Peer support
- Depression/adjustment
- Walking club at CSUN
- CSUN Center of Achievement
- Amputee Coalition
- Challenged Athlete Foundation

References

- Available on website