

Lower Limb I/Rehab

Barriers to Successful Prosthetic Use

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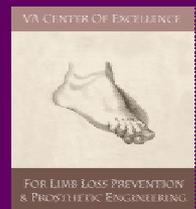
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Objectives

- Identify the barriers to use of current prostheses.
 - Create a comprehensive list of why amputees fail to ambulate effectively.
- Identify research topics that address those barriers in creative, healthcare setting and amputee user-friendly ways.
 - Create plans to address issues related to removing barriers to use

Lower Limb Amputee Statistics

US Patient Population

- 1.4% of general population

VA Patient Population

- Vascular and Traumatic
- 10 000 discharges in FY2002

Active Duty Population

- Traumatic
- 13 000 amputees



Mayfield et al. (2000), *J Rehab Res Dev* 37(1):23-30

Moore, Barron et al. 1989

Lower Limb Amputee Statistics

Vascular Patient Prognosis

- 10 to 30% post-surgical mortality
- 40 to 50% mortality at 2 years
- 30 to 40% mortality at 5 years
- 15 to 20% contralateral amputation at 2 years
40% at 4 years

Lower Limb Amputee Statistics

Trauma Patient Prognosis

- 9% died during acute admission
- 3.5% died after discharge

Amputees Ambulators

- Unsuccessful Ambulators
 - ↓ Muscle strength (less muscle, poor fixation, atrophy)
 - ↓ Aerobic capacity (walk slower, higher cost of locomotion)
 - ↑ Skin Problems (grafting, scar adhesion, dermatitis, ulcers, edema)
- Inactive Ambulators
 - Remain in home environment

Barriers for Prosthetic Use

- Prosthetic non-acceptance
- Poor patient education
- Poor socket fit
- Clinician skills (prosthetist, physical therapist)
- Inconsistent care
- Poor physical conditioning pre- and post-amputation
- Missing patient goals
- Psychosocial aspects of limb loss
- Gentamycine – solves battlefield infection problem but is also ototoxic

Future Directions

- Education
- Research
- Clinical Service
- Partnerships

Recommendations for Education

NEED:

Lack of continuity and uniformity of care across services and sites

SOLUTION:

1. Expert panel to identify appropriate and specific treatment protocol
2. Immediate dissemination
hire instructor for in-facility 1 or 2 day training courses for therapists
3. Long-term dissemination
educational materials through media such as web, telemedicine, brochures, audio/visual for clinicians, therapists, prosthetists, nurses, patients, and family

Recommendation for Research

Needs

- Define phases of prosthetic and amputee rehabilitation
- Determine optimal gait pattern for various levels of lower limb amputees
- Determine the outcomes for evidenced-based amputee rehabilitation

Recommendations for Research

Needs

- Determine the outcomes for high-level activity for traumatic amputee
- Determine the outcomes for secondary disabilities
- Determine a valid instrument for measuring change over time for traumatic / diabetic amputee

Recommendations for Research

Specific Needs:

- Comparative studies to identify clinical, laboratory, and field metrics of treatment strategies
- Long-term outcome studies:
 - effect of componentry on low-back pain, osteoarthritis
 - 5 to 10 years to see degeneration
 - identify early markers
- Computational modeling to identify features of components and development of new components
- Generation of evidence to develop prescription guidelines

Solution:

- Funding to develop new technologies, accumulation of evidence, and treatment approaches

Ultimate Goal: Match prosthetics to patient

Clinical Recommendations

- **Evolutionary process – use existing experience based knowledge**
- Short-term guidelines
expert panel to achieve consensus
- Medium-term guidelines
short-term research
- Long-term guidelines
outcome studies

Recommendations for Clinic Service

- Specific Needs:
 - Documentation of treatment
 - identify metrics to assess performance
 - identify various rehabilitation strategies
 - outcome analysis
- Solution:
 - Programming support to create unified database integrated across services and sites
 - Research funding to support analysis

Recommendations for Partnerships

- APTA, AAOP
provide forum for training at regional, national, and international meetings
- NIH, NSF, DARPA
support for funding for independent researchers
- ACA
obtain patient input, potential participants
- Solution:
funding of multidisciplinary and multi-site research teams

Conclusions

General Recommendations

- Evidence-based Assessments.
- Evidence-based Prosthetic Component Selection and Development.