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Upper Limb Prosthetic Rehabilitation for Occupational Therapists: MANAGEMENT

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Disclosures

- ▶ Consumer
- ▶ Clinician
- ▶ Contributor
- ▶ Consultant



Disclosures

▶ **Financial:**

- Receives payment for this series
- Owner, **Single-Handed Solutions, LLC**
- Inventor of record of patented prosthetic technology and method of use
- Business relationship with **TRS**, Boulder, CO
- Business relationship with **Handspring**, Middletown, NY
- Business relationship with **Liberating Technologies Inc.**, Hopkinton, MA
- Business relationship with **Shriners Hospitals for Children**
 - owner of patented technology mentioned in the series

▶ **Non-financial**

- Member, **Upper Limb Advisory Council, Amputee Coalition of America (ACA)**
- Member, **Association of Children's Prosthetic Orthotic Clinics (ACPOC)**
- Member, **American Occupational Therapy Association (AOTA)**
- Member, **American Telemedicine Association (ATA)**

Learning Objectives

By the end of the course, the participant will be able to:

- ▶ Identify the different factors involved with prosthetic management.
- ▶ List three areas of the preparatory phase.
- ▶ List three areas of prosthetic training.
- ▶ Identify three adaptive strategies.

OT

- ▶ Critical component of UL prosthetic rehabilitation
- ▶ Rarely see an individual with an UL amputation
- ▶ Often unfamiliar with UL prosthetic technology
- ▶ Specialty training is beneficial

OT

- Limb preparation
- Adjustment-Accommodation
- Prosthetic training
 - specific tasks
 - motor skills
 - positioning
 - posture
- Accelerates the rehabilitation process
- Essential to success in functional independence and achieving quality of life.

MANAGEMENT

It is the fourth and final in a series
building upon a foundation of understanding

- the types of limb deficiency/loss
- the diverse technologies available
- approaches to evaluation and management
- patient education and consumer advocacy



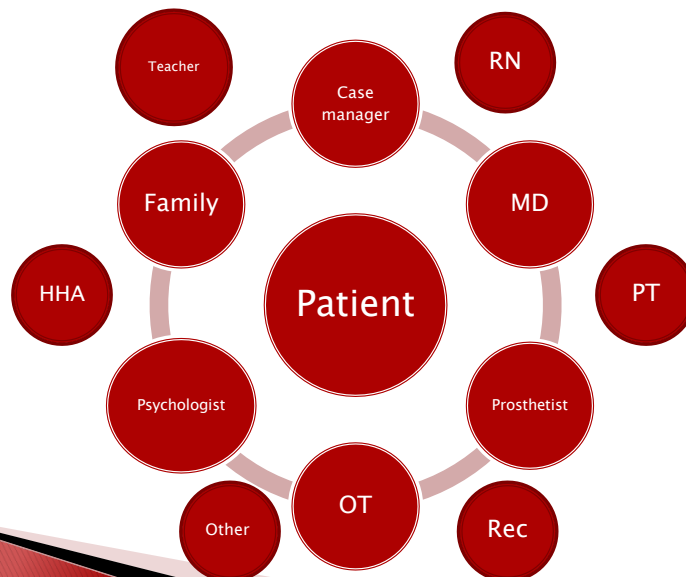
Course SERIES Overview

- ▶ Course 1: Overview and Introduction
- ▶ Course 2: Understanding Technology
- ▶ Course 3: Evaluation
- ▶ Course 4: Management and Resources

Management and Resources

- ▶ Phases of Treatment
- ▶ Treatment Methods
- ▶ Adaptive Strategies
- ▶ Assistive Devices
- ▶ Team Approach
- ▶ Psycho-Social Aspects
- ▶ Case Studies
- ▶ Resources and References

TEAM APPROACH



PHASES OF CARE

- ▶ Pre-prosthetic Readiness
- ▶ Prosthetic Training
- ▶ Refinement

PRE-PROSTHETIC readiness

- ▶ Patient Education
- ▶ Limb preparation
- ▶ The Goals:
 - Emotional Readiness
 - Physical Readiness
 - Functional Readiness



Patient Education

- ▶ Grieving the loss of a limb
- ▶ Peer Support
- ▶ Rehabilitation Psychology

PATIENT EDUCATION

- ▶ Understanding Condition
- ▶ Psycho-Social Support
- ▶ Prosthetic Options
- ▶ Understanding the Technology
- ▶ Choosing a Prosthetist



PATIENT EDUCATION

Prosthetic Options

- ▶ Components
- ▶ Function
- ▶ Relationship of technology to amputation level
- ▶ Benefits and Limitations

Expectations of Technology

- ▶ UL vs LL
 - LL: → Replacement
 - UL: → Tool
- ▶ Defining success
- ▶ Importance of tolerance
- ▶ Importance of use
- ▶ Client-centered choices

PATIENT EDUCATION

Understanding the Condition

- ▶ Accurate information
- ▶ Perception of Impact
- ▶ Function
- ▶ Social Implications
- ▶ Parent and Caregiver



PATIENT EDUCATION

Psycho-Social Support

- ▶ Professional Counseling
- ▶ Peer Support/ Modeling
- ▶ Family/ Caregiver Support
- ▶ Positive Vision



PATIENT EDUCATION

Choosing a Prosthetist

- ▶ Certification
 - Specialty training
- ▶ UL Experience
 - Myoelectrode Position
 - Fit of Socket
- ▶ Collaborative Approach
 - Communicate with Client
 - Consult with OT
 - Access to peer support



Limb preparation

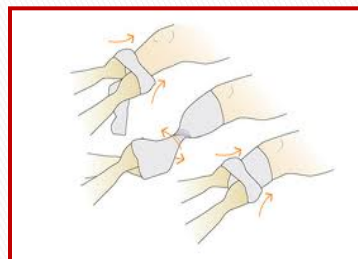
- ▶ Edema Control
- ▶ Shaping of the Residual Limb
- ▶ Desensitization
- ▶ Management of the Scar
- ▶ Mirror Therapy
- ▶ Functional Movement and Strength
- ▶ Body Symmetry
- ▶ Change in Hand Dominance
- ▶ ADLs
- ▶ Myosite Training

Edema Control

Strategies to Shape the Residual Limb:



Compression Wrap



Shrinker

Desensitization

- ▶ Wands
- ▶ Soft tissue management
- ▶ Brushes
- ▶ Self-massage



Scar Management

- ▶ Wound care
- ▶ Soft tissue management
- ▶ Self-massage



PHANTOM PAIN

**15 minutes/day
5-6 days/week
4 weeks**



Mirror Therapy

**Graded schedule
30 minutes/session
2-3 sessions/day
5-6 days/week**



Preparatory Socket

Myosite Training

- ▶ Isolate muscles
- ▶ Co-contractions
- ▶ Home exercise program
- ▶ Pattern Recognition



prosthesis simulator

- Limb length
- Weight
- Grasp/release
- Skills drills
- Bilateral integration
- Movement in space



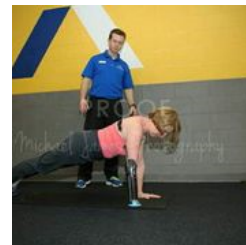
Functional Movement and Strength

- AROM
- Stretching
 - Glides
- Strengthening
- Weight-bearing
- Core strength
- Balance



Body Symmetry

- ▶ Muscle strength
- ▶ Posturing
- ▶ Mirror work



TRANSITIONING Hand Dominance

- ▶ Coordination
- ▶ Radial digit
- ▶ Separation of radial-ulnar sides
- ▶ Handwriting Programs
- ▶ Keyboarding Programs



PROSTHETIC training

- ▶ Limb Awareness
- ▶ Care of the Prosthesis
- ▶ Skills Drills
- ▶ Functional Tasks
- ▶ To Wear /Use or To Not Wear/Use
- ▶ Adaptive Strategies~ Assistive Devices

Limb Awareness

- ▶ Skin Checks
- ▶ Pain
- ▶ Deep redness/purple
- ▶ Boney prominences
- ▶ Folds of skin, invaginations

Care of the Prosthesis

- ▶ Basic care
- ▶ Cleansing
- ▶ Batteries
- ▶ Maintenance of prosthetic components and accessories
- ▶ Repair
- ▶ Upgrades to software/technology

Initial use

- ▶ Wear Schedule
- ▶ Donning and doffing the liner
- ▶ Donning and doffing the prosthesis
- ▶ Positioning the residual limb in the socket
- ▶ Dealing with the harness

Controls training

- ▶ Terminal device function
 - Basic opening and closing
 - Grasp/release at various speeds
- ▶ Wrist function
 - Flexion/extension
 - Rotation
- ▶ Elbow function
 - Flexion/extension
- ▶ Shoulder function
 - Flexion/extension
 - Rotation

Skills Drills

- ▶ Repetitive Skills Drills
- ▶ Diverse objects
- ▶ Diverse Weights
- ▶ Varied planes
- ▶ Varied Positions
- ▶ Pre-positioning the terminal device

ADLs

- ▶ Toileting
- ▶ Eating
- ▶ Dressing
- ▶ Bathing
- ▶ Grooming
- ▶ Writing



collaboration

- ▶ Confer with prosthetist
- ▶ Adjustments to the prosthesis:
 - alignment and controls
 - modifications to the shape of the interface/socket.
- ▶ Work together to quickly resolve any prosthetic and therapeutic issues
- ▶ Maintain steady progress toward patient's functional goals

The Question:

- ▶ To Wear/Use or To Not Wear/Use?

BIMANUAL INTEGRATION



Adaptive Strategies~ Assistive Devices

SKILLS/TASK REFINEMENT

- ▶ Post-prosthetic care
- ▶ To develop greater independence, address higher level skills
- ▶ Home Evaluations
- ▶ Work/school evaluations
- ▶ Leisure activities
- ▶ Referrals to resources for home modifications, driver rehabilitation services and work hardening programs
- ▶ Driver training

SKILLS/TASK REFINEMENT

- ▶ Home Management
- ▶ Caring for Others
- ▶ Community
- ▶ The World of Work and School
- ▶ Leisure Time and Pursuing Passions
 - Music, Sports
- ▶ Social Integration
- ▶ Moving Beyond...

Home Management

- ▶ Cooking
- ▶ Laundry
- ▶ Vacuum/Sweep/Rake
- ▶ Trash
- ▶ Dusting, Windows
- ▶ Making Beds



Caring for Others

- ▶ Spouse
- ▶ Children
- ▶ Aging parents



Community

- ▶ Driving
 - Evaluation
 - Modifications
- ▶ Banking
 - Signatures
 - ATM machines
- ▶ Shopping
 - Pushing cart
 - Reaching
 - Lifting
 - Cashing out
 - The Dressing Room

Work AND SCHOOL

- ▶ Site evaluation
- ▶ Ergonomic station
- ▶ Duties and responsibilities
- ▶ Modifications



Pursuing Passions

- ▶ Work-Play Balance
- ▶ Physical Activity
- ▶ Sports
- ▶ Music
- ▶ Crafts and The Arts
- ▶ Other



Social Integration

- ▶ Greetings
- ▶ Shaking Hands
- ▶ Embracing
- ▶ Holding Hands
- ▶ Answering Questions
- ▶ Stares
- ▶ Personal Statements



Moving Beyond:

- ▶ Prosthetic success rates improve dramatically...
- ▶ Move beyond basic prosthetic operation
- ▶ Address specific activities, interests of individual client
- ▶ Home
- ▶ Vocational
- ▶ Recreational
- ▶ Integration!



Pediatric

- ▶ Parents; grandparents
- ▶ Siblings
- ▶ Friends
- ▶ Developmental
- ▶ Prosthetic technology



BILATERAL INVOLVEMENT

- ▶ Prosthesis use dependent on levels
- ▶ Not always symmetrical deficiency/loss
- ▶ Importance of core strength and balance
- ▶ Use of feet; toes as manipulators
- ▶ Skills 4 Life
 - San Antonio, TX
 - October 2015

PRECAUTIONS

- ▶ Posturing
- ▶ Asymmetry
- ▶ Spine Health
- ▶ Overuse of Presumed Intact Side

Adaptive Strategies



Use of surfaces to support



Use of body parts, tools

Assistive Devices



Case Studies



continued™

A



Acquired Loss

Prosthesis Simulators

B



Acquired Loss



Initial Trial

B



Vincent Digit

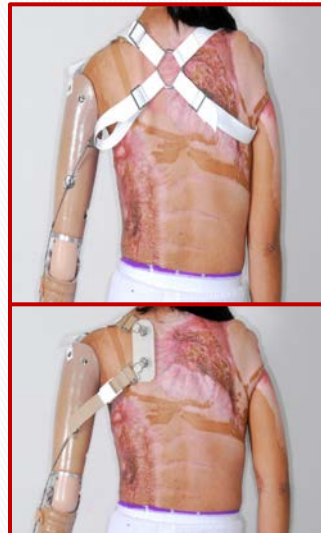


Passive Aesthetic Functional

C



Acquired Loss



Harnessing Trials

C



Function

Self-Esteem

D



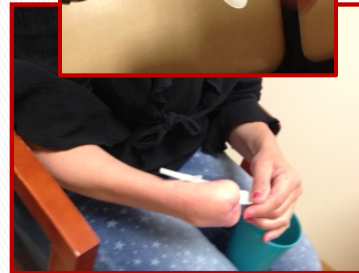
Acquired Loss

Pro Digits

D



Digit Adaptation



TAB assistive device

E



Adaptive Strategies

E



Posturing

RESOURCES

Amputee Coalition:	www.amputee-coalition.org
Amplitude:	www.oandp.com
Amputee Empowerment Partners:	www.empoweringamputees.org
Association of Children's Prosthetic and Orthotic Clinics:	www.acpoc.org
American Occupational Therapy Association:	www.aota.org
American Academy of Orthotics and Prosthetics:	www.oandp.com
American Orthotic and Prosthetic Association:	www.aopanet.org

RESOURCES

CampNoLimits	www.nolimitsfoundation.org
Helping Hands Foundation	www.helpinghandsgroup.org
Lucky Fin Project	www.luckyfinproject.org
Paddy Rossbach Youth Camp	www.amputee-coalition.org
Shriners Hospitals for Children	www.shrinershospitalsforchildren.org
Skills for Life 4	www.usispo.org/skills_for_life.asp
Local Support Groups	

RESOURCES

COAPT Engineering	coaptengineering.com
Fillauer	fillauer.com
Infinite Biomedical Technologies	i-biomed.com
Liberating Technologies	liberatingtech.com
Livingskin	touchbionics.com
Motion Control	utaharm.com
Otto Bock	ottobockus.com
RSL Steeper	steeperusa.com
Texas Assistive Devices	n-abler.org
Touch Bionics	touchbionics.com
TRS Prosthetics	trsprosthetics.com
Vincent Systems	vincentsystems.de

TIP Sheet

- ▶ Certified by the American Board for Certification (ABC)
- ▶ Minimum of five years of current UL experience and has fit >10 patients in the last year
- ▶ Can specify what types of electrically-powered prostheses they have fit in the past two years
- ▶ Received certification /training from the following prosthetic component manufacturers:
 - Motion Control:
 - Otto Bock:
 - RSLSteeper:
 - Touch Bionics:
 - Liberating Technologies:
 - Hosmer:
- Works with an OT who has extensive UL prosthetic rehabilitation experience
- ▶ Will arrange for you to speak with some of their patients to discuss care experience

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- ▶ Postema, K et al, Clin Rehab 13 (3): 243-9.
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QUESTIONS?



THANK YOU!



continuedTM

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