Learning Objectives

• Recognize the contribution that a systematic functionally-based approach to wheeled mobility and seating evaluation and intervention brings to successful outcomes
• Identify the role and importance of evidence-based practice related to wheeled mobility and seating interventions
• Identify the essential components of the wheeled mobility and seating evaluation and service delivery process to ensure successful outcomes
• Identify the fundamentals of seating biomechanics and the components of a physical motor assessment
• Differentiate between specific types of seating and positioning interventions and how they could affect functional performance

Proper Devices Facilitate:

• Ability to perform ADLs (Mills, Hohm, Schmeler, & Trefler, 2007)
• Participate in communities (Chaves et al, 2004)
• Reduction of secondary complications:
  • Upper Limb Repetitive Strain Injuries (Brenner & Dripping, 2007)
  • Pain & Discomfort (Crane & Hatton, 2003)
  • Pressure Sores (Breners et al, 2010)

Why is this Important?

• 2.2 million users in the USA (Kaye, Kang, & LaPlante, 2002)
  • More recent data indicates >3.4
• Important AT Devices in Rehab (Kirby et al, 2002)
• Complex intersection & compromise of user; device; and environment; Facilitates quality of life (Devitt, Chau, Jutai, 2003)
• Poorly fitted devices result in:
  • unnecessary expenses
  • duplication of effort
  • possible injury
  • Abandonment (Batavia, Batavia & Friedman, 2001)

Acknowledgements
United Nations

Convention on the Rights of Persons with Disabilities

Advocates For;
“effective measures to ensure personal mobility with the greatest possible independence for persons with disabilities”

less than 5% in need of a wheelchair have access and training resources are limited (WHO, 2011)

Evolution of the Profession

• 1970s & 1980s – Custom Rehab Evolved
• 1979 - RESNA Founded
• 1992 - NRRTS Founded w/ standards of practice
• 1995 – RESNA PSB formed
• 1996 - RESNA ATP/S Exam
• 2004 - TN State Licensure for Suppliers
• 2006 - Requirement of ATP in Medicare policy
• 2010 – Separate Benefit Legislation Initiated & SMS
• 2011 – Pilot Outcomes UDS/MDS
• 2012 – WHO training curriculum

1932

Herbert Everest and Harold Jennings

1950s – First Power Wheelchairs

The 80’s

1990s

2000’s
Then What Happened?

- 140% growth from 2001 to 2003 ($1.2B)
- Fraud & Abuse
- Outdated Coverage Policies
- Antiquated Product Codes
- Limited Documentation Requirements
- Bi-Passing the Continuum of Healthcare
- Limited knowledge by clinicians
- Voluntary Credentialing

2006 Coverage Policy

Eliminated:
- "Bed or Chair Confined"
- Certificate of Medical Necessity (CMN)

Added:
- Physician "Face to Face" assessment
- Mobility Assistive Equipment (MAE)
- Mobility Related Activities of Daily Living (MRADL)
- Functional Mobility not Defined
- "In The Home" restriction MORE prevalent

Evidence Based Practice

DEFINITION (Sackett et al, 1997)

- Systematic Process of:
  - Finding
  - Analyzing
  - Using
- Best available, scientifically sound research

Evidence Based Practice

- Guide to decision making
- Ensure treatment is most:
  - Powerful
  - Effective
  - Safe

Barriers to Use of EBP

(Dysar & Tomlin, 2002)

- Therapists only occasionally access research
- Cost of continuing education
- Time to research information
- Weak research analysis skills
- Value on clinical experience

Levels of Evidence

- Level I - systematic reviews or meta-analysis of well-designed studies
- Level II – one or more well-designed study using randomization
- Level III – a well-designed study but without randomization
- Level IV – well designed non-experimental study from more than one facility or research group
- Level V - subjective opinions of well known respected authorities based on clinical experience, case studies, or expert committee reports
  - also known as expert opinions
Professional Expertise in EBP
(Rappolt, 2003)

- Client Evidence
- Research Evidence
- Professional Expertise
- Integration
- Clinical Decision Making

Research Evidence

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*Search criteria: wheelchair, wheelchairs, & publication date

Examples of Earliest Articles:

Standards of Practice & Evidence Reports

AHRQ WC Service Report
Greer, Brasure, & Wilt (2012)
- Overview of the literature & expert opinions on service delivery
- Insufficient research on service delivery may lead to an absence of high-quality products for consumers
- Focuses on the elements that affect the quality of a match between patients and their devices
- Describes the process of the service delivery that affects how well a wheeled device meets patients’ needs
- Highlights the need for additional research in the field

RESNA Position Papers
- Consensus of Experts & Best-Available Evidence
- Teaching tool in colleges and universities
- Teaching tool in the clinical setting, whether to help educate other team members or the client
- Guide to practitioners in the development and provision of interventions
- Support material to help obtain funding
- Evidence in organized lobbying efforts for policy changes

Current Papers
Completed
- Seat elevation
- Wheelchair standers
- Pediatric Powered Mobility
- Tilt, Recline, and Elevating Leg-Rests
- Wheelchair Transportation
- Wheelchair Service Provision Guide
- Ultralightweight Manual Wheelchairs

Available at www.resna.org and/or Assistive Technology Journal (Medline Referenced)
RESNA WC Service Provision

- Generically outlines the process
- Based on the WHO ICF
- Consensus of Experts
- Vetted by the RESNA BOD
- Can serve as “road Map”
  - Policy
  - Clinical Practice Guidelines

Best Practice
RESNA Wheelchair Service Delivery Guide (Shea et al. 2011)

- Assessment by a knowledgeable clinician
- Face-to-face evaluation
- The individual’s medical history
- Physical abilities and needs
- Functional abilities and needs
- Seating and positioning abilities and needs
- Home accessibility
- Currently used assistive devices
- Environmental considerations
- Follow-up & Outcomes

Variables
International Classification of Functioning Disability and Health (WHO, 2001)

- Body Systems – Impairment, motor, sensory
- Equipment – Current & past experience
- Functional – Capacity, performance, participation
- Living Situation & Support
- Environmental – Physical, social, political
  - Home & Community
  - Transportation
  - Funding/Policy

HAAT
Human Activity Assistive Technology Model
Cook & Polgar (2007)

Learning Resources

- Online Fundamentals of Wheelchair Seating Mobility
  www.rstce.pitt.edu
- Wheelchair Service Training Package (WHO, 2012)
- Clinical Practice Guidelines

Outcomes & Research

- Need Evidence this Stuff Works
- Need Evidence Standards Work
- Consistent Means of Measurement
  - Uniform & Minimum Data Set (UMDS)
  - Functional Mobility Assessment (FMA)
**Shifting Paradigm**

- Patient Centered Outcomes Research
  - What is meaningful to the Person
  - Engage Stakeholders in Research Design
  - Rehab has always done this

- Comparative Effectiveness Research
  - Opportunities Rehab and AT

**Choosing a Tool**

- Validity
  - Does it Measure What You are Looking For
- Reliability
  - Consistently Repeatable (time & scorers)
- Sensitive to Change
  - Change in Scores Consistent with Clinical Observations
- Administrative Burden
  - Time, Apparatus, Clinical Routine

**Tools Have Evolved**

- **WHOM** - Wheelchair Outcome Measure
- **WST** - Wheelchair Skills Test
- **FEW** - Functioning Everyday with a Wheelchair
- **FMA** - Functional Mobility Assessment
- **PIADS** - Psychosocial Impact of Assistive Devices Scale
- **QUEST** - Quebec User Evaluation of Satisfaction with Assistive Technology
- **COPM** - Canadian Occupational Performance Measure

**Consumer Reported Outcomes**

(Mills et al, 2007) www.few.pitt.edu

- Operate
- Transport
- Outdoor mobility
- Indoor mobility
- Comfort
- Health needs
- Access surfaces
- Transfer
- ADL
- Durability/Reliability

**Functional Mobility Assessment (FMA) Questionnaire**

(Kumar et al, 2012) www.few.pitt.edu

1. Stability
2. Durability
3. Dependability
4. Comfort Needs
5. Health Needs
6. Operate
7. Reach
8. Transfers
9. Personal Care
10. Indoor Mobility
11. Outdoor Mobility
12. Transportation

**Scoring**

- 6 Completely Agree
- 5 Mostly Agree
- 4 Somewhat Agree
- 3 Somewhat Disagree
- 2 Mostly Disagree
- 1 Completely Disagree

- Area to provide comments for each item
- Can also rank items by importance
Meet Pete

- 50 years old
- 26 yrs post C6-C7 ASIA A SCI
- Upper extremity repetitive strain injuries
- 6’1” & 285lbs.
- Married
- MWC User
- Political Advocate
- Accessible Home
- Accessible Transportation
- Transition from MWC to PWC

Pete Pre-FMA

Pre FMA Scoring

| Daily Routine | Transfers | 5 |
| Comfort Needs | Personal Care | 5 |
| Health Needs | Indoor Mobility | 5 |
| Independence | Outdoor Mobility | 1 |
| Reach | Transportation | 5 |

Pre-Total: 35

Body Systems

- Diagnosis
  - Static
  - Progressive
- Secondary Conditions
  - Skin issues
  - Size & Weight
  - Cognitive & Sensory
  - Endurance
  - Falls
  - Pain
- Physical Motor Abilities
  - Mat Assessment

Documentation Criteria

(Medicare)

- Symptoms
- Related diagnoses
- History
  - How long the condition has been present
  - Clinical progression
  - Interventions that have been tried and the results
- Past use of walker, manual wheelchair, POM, or power wheelchair and the results
- Physical exam
  - Weight
  - Impairment of strength, range of motion, sensation, or coordination of arms and legs
  - Presence of abnormal tone or deformity of arms, legs, or trunk
  - Neck, trunk, and pelvic posture and flexibility
  - Sitting and standing balance

Documentation Criteria Cont’d

(Medicare)

- Functional assessment
  - Any problems with performing the following activities including the need to use a cane, walker, or the assistance of another person
  - Transferring between a bed, chair, and PMD
  - Walking around their home - to bathroom, kitchen, living room, etc.
  - provide information on distance walked, speed, and balance
Equipment

- Current Equipment
  - Status & Condition
- Other Technologies
  - Computer, EADL, AAC
  - Compatibility/Interfacing

Functional

- Activities of Daily Living
  - Basic & Instrumental
  - Transfers
  - Assistance
- Activity Endurance
- Work
- Leisure

Activities of Daily Living


ADLs
- Bathing, showering
- Bowel & Bladder management
- Dressing
- Eating & Feeding
- Functional mobility
- Personal device care
- Hygiene & Grooming
- Sexual activity
- Toilet hygiene & Grooming

Instrumental ADLs
- Care of Others (Supervising care-givers)
- Care of pets
- Child rearing
- Communication Management
- Community mobility
- Financial management
- Health management and maintenance
- Home establishment and management
- Meal preparation and clean-up
- Religious Observance
- Safety & Emergency Maintenance
- Shopping

Living Situation

- Roles & Routines
  - Parent
  - Spouse
  - Worker
- Assistance Available

Environmental

- Access in & Out of the Home
- Accessibility within the Home
- Other Accessibility
  - Work/school
  - Community
- Terrain
- Distances

Indoor Mobility
Outdoor Mobility

Transportation

• Personal Vehicle
• Passenger or Driver
• Accessibility
• Public Transportation & Paratransit
• Ride in Wheelchair Vs. Transfer Out
• Restraint System
• Airlines

Goals

• What do you want in a new system?
• What is currently working that you do not want to change?

Pete’s Goals

• Avoid pressure sores
• Get around easier
• Avoid tips & falls
• Interface with work station

Further Assessment

• simulation
• clinical trials
• discussion of options
• review of goals
• compromises
• home trials
• consensus and final decisions

In-Clinic Trials
Role Delineations

Clinician
- Physical Motor
- Function / ADL
- Cognition/Perception
- Sensory
- Environmental
- Treatment Plan
- Training
- Outcome
- Documentation
- Appeal

Supplier
- Equipment
- Integration
- Environment
- Specifications
- Funding & Policy
- Procurement
- Technical Training
- Service
- Documentation
- Appeal

Home Assessment & Trials

- Access/Egress
- Living room, kitchen, bathroom, bedroom
- Go through the daily routine
  - Transfers
  - Reaching
  - ADLs

Pete Post-FMA

Pete Pre & Post FMA Scoring

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Total: 35
60

Summary

- Thorough Assessment of Needs & Goals
- Simulations & Trials of Devices
- Clinical & Natural Environments
- Feature Trade-Offs for every intervention
- Match Variables, Goals, & Features
- Apply Evidence & Best-Practice
- Measure & Report Outcomes