Wheelchair Seating and Mobility for People Aging with Spinal Cord Injury

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Objectives:
At the end of this session, participants will be able to:
1. Name two common problems associated with aging with a spinal cord injury.
2. Describe one significant secondary complication associate with aging with a disability.
3. Discuss three wheelchair seating or mobility interventions that may be needed by a person aging with a spinal cord injury.
Aging and Disability

- First generation of individuals with disabilities living well beyond middle age
- Little known about combined effects of aging and disability
- First group to begin struggling – Poliomyelitis (1970’s – 1980’s)
- Late life complications not anticipated during early rehabilitation

Rehabilitation Philosophy

- First age
  - 1900-1940's
  - Focus on survival
- Second age
  - 1940’s-1970’s
  - First real application of organized rehab
  - "Overcome disability"
  - "Use it or lose it"
- Third age
  - 1970’s+: disability meets aging
  - Re-evaluation of rehabilitation
  - "Conserve and preserve"

Definitions

- Secondary condition –
  - Occurs as a result of a primary disabling condition
  - Can be a pathology, impairment, functional limitation or an additional disability
  - Examples: pain, pressure injuries, bowel and bladder problems
  - Defined by Institute of Medicine
- Health condition (associated with aging) –
  - Health conditions whose incidence normally increases with aging
  - "Premature aging" – when health conditions occur earlier than they normally would
  - Examples: diabetes, cardiovascular disease


Life Expectancy post SCI

Changes in life expectancy
- In 1945:
  - Able bodied life expectancy ~ 55 years
  - Life expectancy post SCI ~ 2 years post injury
- In 2004:
  - Able bodied life expectancy ~ 75 years
  - Life expectancy post SCI ~ 85% of able bodied


Poll #1:

1. How old is the oldest client you have worked who sustained a spinal cord injury at least 2 years ago?
   A. 30 – 40 years old
   B. 40 – 50 years old
   C. 50 – 60 years old
   D. Over 60 years old

Challenges in Aging and SCI
- Complex physical changes
- Increased need for assistance
- Loss and aging of caregivers
- Transition to new environments
- Lack of resources
- Poor community/governmental support
- Difficulty with accessing appropriate health care
SCI Secondary Conditions

- Pain – 31-84%
- Pressure injuries – 33% (depends on time frame of inquiry)
- Depression – 10-59%
- Bladder problems:
  - UTI – 46-48% “in the last year”
  - Urolithiasis – 38% “in the last year”
  - Bladder abnormalities/ cancer – 18%
- Muscle spasms – 53-87%
- Bowel problems – 58%
- Autonomic Dysreflexia – 30%
  - In cervical level injuries
- Fatigue – 36% (severe)

SCI Health Conditions

- Osteoporosis – 61%
- Coronary artery disease – 7-24%
- Hypertension – 6-25%
- Obesity – 4-32%
- Respiratory problems:
  - Respiratory infections – 8-13%
  - Current shortness of breath – 34%
  - General respiratory problems – 12%


SCI Secondary Conditions and the Wheelchair Clinic

- Pressure injuries
- Shoulder pain
  - Rotator Cuff Injuries
- Upper extremity Tendonitis (overuse)
- Carpal tunnel syndrome
- Fractures
- Fatigue – declining function
- Posture changes
  - Instability
  - Increased deformities or asymmetries
    - Thoracic kyphosis
    - Scoliosis
- Shoulder pain
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Seating and Mobility for Individuals Aging with SCI

- Rule #1: There are no rules (related to equipment)!
- Rule #2: The most important job of the clinical team is to LISTEN to the client!
- Wealth of experience with equipment
- Best source of knowledge re: problems and conditions
- Best way to establish a “partnership”
- Rule #3: See rule #1 and think outside the box!

In the Clinic...

- General screening...
  - Why are you here today?
  - Reason for referral
  - Recent problems encountered
  - Health history
- Ask about...
  - Pressure injury history
  - Pain
  - Fatigue
  - Current ADL levels
  - Current functional level

In the Clinic...

- Anticipate changes based on what you know about common problems related to aging with SCI
- Ask about change in abilities - probe for details
- Difficulty performing a task that was once part of their routine - question further
- LISTEN!!!!
Wheelchair and Seating Technology

- Consider equipment changes over the lifespan in the same way that you would consider equipment changes and modifications for growing children
- Focus on current problems:
  - Mobility function
  - Seating and positioning
  - Activities of daily living
  - Secondary complications
  - Health conditions that may impact equipment selection
- If it ain’t broke, don’t fix it!
  - I.e. no new problems, may not need new solutions

Wheelchair Mobility and Seating Technology: Solutions (i.e. Changes)

- Do ANY of us like to change things we’ve been doing for years?

  - How suggestions for change are made makes a huge difference
    - Provide thorough rationale
    - Provide education
    - Offer multiple possible solutions (if available) and leave final choice to the client
    - Thorough equipment trials

Poll #2:

1. What might be considered a “golden rule” of working with individuals aging with spinal cord injuries?
   A. If it ain’t broke, don’t fix it!
   B. Listen to your client
   C. Think about the future
   D. All of these!
Mobility Technology Solutions

- Manual wheelchairs
  - Adjustable vs. configured
  - Weight and materials
- Power assist systems
  - Power add on
  - Pushrim power assist
- Power mobility devices
  - Power wheelchairs
    - Mid vs. front vs. rear wheel drive
    - Power positioning options

Mobility Technologies: MWC

- Adjustable
  - Folding vs. rigid
  - Adjustable settings
  - Accommodates changes
  - Wide range of options and accessories
- Configured
  - Folding vs. rigid
  - Highly configured
  - "Dialed in" for user
  - Lighter in weight
  - Streamlined options and accessories

Manual Wheelchair Considerations

- If it ain't broke, don't fix it!
  - If changes are desired:
    - As light as possible – maximize efficiency
    - Optimally configured for wheel rim access – maximize propulsion effectiveness and minimize shoulder stress
    - Rear wheels positioned as far forward as possible
    - Minimize "accessories" (as much as possible)
    - Optimal rear wheel/ caster/ tire choices for needs
MWC: Power Assist Systems

- Examples:
  - Pushrim activated power assist systems
  - Power add-on system
- Maintain some benefits of MWC use (i.e. transportability), while minimizing shoulder strain and fatigue
- Trial in actual use environment (if at all possible)

Power Wheelchairs

- If it ain’t broke, don’t fix it!
- If changing to PWC for the first time:
  - Drive wheel configuration – Mid vs. Front vs. Rear
  - Trial all drive wheel configurations!
  - Trial in actual use environment (if possible)
  - Thorough understanding of mobility goals is key!

Power Wheelchair Considerations

- Mobility goals
- Environment(s) of use
- Transportation requirements
- Power positioning options
  - Tilt
  - Recline
  - Tilt and recline
  - Seat elevation
  - Leg elevation
  - Standing
Wheelchair Seating

- Remember, If it ain’t broke, don’t fix it!

- Main goals for seating and positioning
  - Pressure management
  - Redistribution
  - Off-loading
  - Positioning/Stability
    - Pelvis
    - Lower extremities
    - Back
    - Head/neck

Wheelchair Seating: Pressure Management

- Key concern: Pressure injuries
- Remember, if it ain’t broke, don’t fix it!
- Two main approaches:
  - Pressure re-distribution
    - Examples: Air inflation (Roho); fluid immersion (Jay), contoured foam
  - Off-loading
    - Examples: Isch-Dish; Java

Wheelchair Seating: Pressure Management - Redistribution

- Use materials that allow “immersion” of pelvis into the cushion:
  - Air filled bladder
  - Fluid filled bladder
  - Soft foam materials
  - Combination of above
Wheelchair Seating: Pressure Management - Off Loading

- Designed to “unweight” high risk bony prominence areas:
  - Ischial Tuberosities
  - Coccyx
  - Greater Trochanters
- Intentionally “loads” lower risk areas:
  - Femurs
  - Posterolateral pelvis (Java)

Wheelchair Seating: Pressure Mapping Assessment

- Important tool
  - Understand current pressure distribution
  - Determine effectiveness of technology for:
    - Re-distribution
    - Off-loading
  - Must combine with careful skin inspection
    - Current injuries
    - Healed past injuries

Wheelchair Seating: Positioning

- Pelvis support
  - Accommodate fixed asymmetries
  - Correct flexible deformities (carefully!)
- Back support
  - Light weight
  - Adjustable
  - Posterior and possibly lateral (as needed)
  - Accommodate fixed deformities
  - Correct flexible deformities (carefully!)
Wheelchair Positioning: Back Support

- Keep it simple (as simple as possible)
- Should work with seat support
- Options
  - Adjustable tension upholstery
  - Solid Back Supports
    - Height
    - Contour depth
    - Additional lateral supports
    - Adjustability
    - Removability

Wheelchair Positioning: Back Support

- Posterior pelvic and low back support is key
- May require key angle adjustability
- May want lower vs higher back support to provide optimal "lower back" region support (or biangular back support)

Conclusion

- Individuals with SCI are living longer
  - Significant increase in those surviving > 2 years
  - Experiencing more impacts of aging
- Just beginning to learn about aging with SCI
- Need to be proactive as rehabilitation specialists
- But, if it ain’t broke, don’t fix it!