Putting It All Together: Application of the WHO Wheelchair Service Training Program for Individuals with Neurological and Complex Medical Impairments, Part 2

Barbara Crane, PT, PhD, ATP/SMS
University of Hartford, West Hartford, CT
Judy Freyermuth, PT; RehabCare
Leta Kant, PT; RehabCare

Disclosure
None of the speakers in this presentation have any relevant financial relationships that could be viewed as creating a conflict of interest or that might bias the content of this presentation.

Session Learning Objectives
After this session, learner will be able to:
1. Explain the unique characteristics of the adult and older adult population that impact seating, mobility, and function.
2. Describe the appropriate hands-on techniques necessary to complete a comprehensive postural and mobility assessment.
3. Develop a comprehensive treatment plan based on postural and mobility issues.
4. Identify the concepts and clinical rationale related to postural support features.

Presentation Outline
I. Introduction – Complex issues related to the aging, neurologically involved patient
II. Review of key elements of the comprehensive evaluation, including hands on mat assessment
III. Commonly seen postural deviations, related impairments, mobility and functional deficits seen in the aging neurologically involved population
IV. Development of a comprehensive treatment plan including treatment and technology interventions to address impairments
V. Case studies with audience participation
VI. Concluding remarks
VII. Questions and answers

I. Introduction
• Complex seating/mobility issues related to the aging neurologically involved population:
  – Special considerations for older adults
  – Stroke (non-progressive condition)
  – Parkinson’s Disease (progressive condition)
  – People aging with neurological disabilities
  – Dementia (Alzheimers, Lewey Body, other related dementias)

The Geriatric Patient
• Medically complex
  – Multiple diagnoses and co-morbidities
  – Progressive diseases/disorders
  – Multiple medications
  – Aging
  – Nutrition
• Skin
• Vision
• Pain
• Balance/falls
• Cognitive deficits
• Psych issues
• Depression
Geriatric Population Challenges

- Changing environments
  - Living situation transitions
- Changing caregivers
  - Facility
  - Home health
  - Family – pool of available assistance “shrinks”
  - Lack of family support
- Dignity and self image, depression
- Regulations
  - Restraint
  - Skilled services

Considerations for Older Adults

- Increased prevalence of progressive conditions
  - Equipment may need modification in future
- Increased postural support
- Increased pressure management
- Adaptations to functional decline
  - Need to consider speed/pattern of progression
  - Consider progressive changes in posture as well as function
  - Ex. Parkinson’s Disease, dementia, OA

Common Co-morbidities in Older Adults

- Diabetes mellitus
- Osteoporosis
- Hypertension
- COPD/Asthma
- Balance impairments
- Nutritional challenges
- Various types of cancer
- Sensory impairments – vision, hearing, smell, taste

Special Considerations for Seating with Older Adults

- Higher risk of pressure ulcers
- Fragile skin – more susceptible to abrasions
- High likelihood of postural changes exacerbated by sitting
- Need careful assessment to determine whether to accommodate or correct postural asymmetries or deformities
  - Flexibility of postures
  - Co-morbidities such as osteoporosis
- Cognitive impairment

CVA Considerations

- Impaired mobility and ADL function
  - Hemiplegia/hemiparesis
    - Naturally asymmetric
    - Impaired trunk strength
  - Decreased postural control
    - Ex. “pusher syndrome”
  - May have difficulty with communicating
  - May have visual/perceptual impairments
  - Special support considerations
    - Critical to correct any pelvic asymmetries
    - Contoured seat support often helpful
    - Possible trough under strong leg
    - Lateral support of trunk may be needed

CVA Considerations

- Impaired upper extremity
  - Shoulder subluxation risk
  - Complex regional pain syndrome
- Special support considerations
  - Lap tray – ½ tray usually
  - Arm trough possibly
  - Mobile arm support
  - Overhead sling system
  - Trunk support for symmetry important
  - Kinesio taping
  - Bobath sling
CVA Considerations

- Equipment considerations
  - Methods of propulsion and impact on alignment
  - Same side upper and lower extremities
  - Seat height
  - Safe mobility device
    - May need to reduce speed of powered mobility device
    - Simulate and assess carefully
    - May need dependent mobility device

- Vision impairment
  - Careful vision assessment critical
  - Visual acuity
  - Visual fields
  - Tracking/scanning

CVA Considerations

- Presence of co morbidities – ex. Diabetes
  - Be sure sensation is evaluated carefully
  - Possible peripheral neuropathy

- Equipment considerations
  - Seat to floor height
  - Padding of any sharp/rough edges
  - Padded upper extremity support
  - Padded foot supports
  - Monitor contact of arm/leg with hard surfaces

CVA: Impact of Vision on Mobility

- Individuals with Right CVA
  - Often have left neglect
  - Difficulty with mobility
    - Veering to the right when walking
    - Veering to the left when driving powered wheelchair
    - May be speed dependent
    - Etiology unclear
    - Environment – safety considerations

Cognitive Impairment

- A clinical area with the potential to affect many older adults
- A far reaching impact:
  - Pain
  - Falls
  - Positioning
  - Wound care
  - Dysphagia
  - Communication
  - Continence

Causes of Dementia

- Alzheimer's Disease
- Vascular Dementia
- Lewy Body Dementia
- Frontotemporal Dementia

Alzheimer's Disease/Related Dementias

- Progressive, neurodegenerative disease
  - Decline in cognitive and functional abilities
- No cure but treatments attempt to delay onset and slow the progression
- Rehabilitative vs. Habilitative Approach
- Frequent re-assessment and modification of treatment, approach and equipment needs
Alzheimer’s Disease Statistics

- Most common form of dementia in people age 65 and over
- Another American develops Alzheimer’s disease every 69 seconds. In 2050, an American will develop the disease every 33 seconds.
- 60-80% of long term care residents have Alzheimer’s disease or related dementias
- Time of onset to death can be 3 - 20 years w/ average of 8 years
- On average, 40 percent of a person’s years with Alzheimer’s are spent in the most severe stage of the disease – longer than any other stage.

Lewy Body Dementia

- Symptoms
  - Memory problems, poor judgment, confusion
  - Movement symptoms are common, including stiffness, shuffling walk, shakiness, lack of facial expression, balance problems and falls
  - Excessive daytime drowsiness
  - Visual hallucinations
  - Mental symptoms and level of alertness may get better or worse during the day or from one day to another
- 20% of all dementia cases are due to Lewy body dementia

Considerations with Lewy Body Dementia

- Visual hallucinations
- Safety
- Restraint
- Tone/rigidity
- Muscle tightness/decreased range of motion/contracture
  - Cervical
  - Extremities
- Postural Deviations
- Positioning 24/7

Communication

What is my patient trying to tell me?

- “Behaviors” are often a means of communicating
  - Hunger
  - Thirst
  - Pain/discomfort
  - Need for movement
  - Toileting
  - Need of attention or something to do!
- Must get to the root of the problem
- Observation at different times of day is critical
- Requires teamwork and communication
- Cognitive assessments from OT and ST
  - Allen’s Cognitive Levels
- Think “outside the box”

Considerations: Dementia

- Mobility issues as disease progresses
  - Increased falls risk
  - Wandering/pacing
- Decisions around ambulation vs. use of wheelchair
- Wheelchair Propulsion
  - Safety
  - User and others
  - Methods
  - Feet
  - Upper extremities
  - Environment
- Requests for restraints
  - Attempts at rising/transferring when unable
  - Resists confinement
- Communication of needs
  - Moderate to end (find another word) Stages
  - Decreased postural control
  - Changes in tone
  - Range of motion limitations
  - Skin
  - Pain

Parkinson’s Disease

- Progressive decline in physical function
  - Increasing fall risk
- Late stage dementia
- Exaggerated postural changes
  - Increased kyphosis
  - Forward head posture
- Tremors
- Slowed movement
- Rigidity
### Aging with a Disability

Changes in life expectancy
- **1945:**
  - AB – 55 years
  - Down Syndrome – 16 years
  - SCI – 2 years post injury
- **2004:**
  - AB – 75+
  - Down Syndrome – 60+
  - SCI – 85% of AB

### Rehabilitation Philosophy

- **First age – 1900-1945:** focus on survival
- **Second age – 1940’s:** first real application of organized rehabilitation
  - “Overcome disability”
  - “Use it or lose it”
- **Third age – 1970’s:** disability meets aging
  - Re-evaluation of rehabilitation
  - “Conserve and preserve”

### Primary Concerns

- Complex physical aging changes
- Increased need for assistance
- Loss and aging of caregivers
- Transition to new environments
- Lack of family resources
- Poor community/governmental support
- Difficulty with appropriate health care

### Aging with Down Syndrome

- Overall faster aging rate
- Decreased muscle tone
  - vertebral and hip subluxations
  - bunions
- High risk for thyroid problems
- Susceptible to sleep apnea
- 50% develop cataracts
- More likely to have hearing loss
- Premature immune system aging
- Greater risk for Alzheimer’s disease – 40%

### Aging with Cerebral Palsy

- Degenerative joint disease and decreased mobility
- Pain in hips or other joints
- Overuse syndromes – upper extremities
- Increased risk for osteoporosis
- Speech and breathing complications
  - Aspiration pneumonia
- Increased urinary problems
  - Infections and incontinence
Aging with a Spinal Cord Injury

- Post SCI life expectancy has increased dramatically
- Primary causes of death now – respiratory complications, cardiovascular conditions
- Focus now is on preservation of function during this extended life span
- Increasing risk of pressure ulcers with age and time since injury
- Osteoporosis
  - Increased risk of LE fracture
- Shoulder pain – overuse injuries
  - Rotator cuff tears, other shoulder impairments
- Carpal Tunnel Syndrome and other entrapment neuropathies

Aging with a Spinal Cord Injury

- Decreased immune system function
- Increased incidence of UTI
- Increased risk of bladder cancer
- Respiratory complications – including increased risk for pneumonia
- Post traumatic syringomyelia (syrinx)
- Changes in body composition

Aging after Poliomyelitis

- Post polio syndrome
- Respiratory system decline
- Dysphagia
- Depression
- Overuse injuries and syndromes

Aging with a Disability: Conclusion

- Individuals with disabilities living longer – experiencing more impacts of aging
- Just beginning to learn of special issues related to aging with a disability
- Effects of aging with many disabilities still unknown
- Need to be proactive as rehabilitation specialists

THOUGHTS?
Putting It All Together: Application of the WHO Wheelchair Service Training Program for Individuals with Neurological and Complex Medical Impairments, Part 2

Friday, February 6, 2015 3:00 – 5:00

SHIFTING FOCUS.....

PATIENT FIRST.....

Wheelchair Evaluation

• The basic principles apply to all patients/clients.
• Comprehensive Approach
• Individualized Considerations

Questions to Ask:

• Is the patient in the right wheelchair?
• Is the cushion in the chair properly?
• Are the buttocks positioned all the way back in the chair?
• Is the pelvis level?
• Are the feet resting flat on the foot plates or floor?
• Is the clothing adjusted for comfort?
• Is there noted muscle imbalance – Tightness/weakness?
• Does the patient appear to be in pain?
• Does the patient need to be toileted or changed?
• Is the patient tired and needs to go back to bed?
• Is the patient hungry or thirsty?
• Does the patient appear as if they are looking for something to do?
• Is referral to rehab appropriate?

Comprehensive Evaluation

Consider the “big picture”

Interdisciplinary Team

• Communication is Key!
• Consider level of care: SNF, Homecare, Out patient etc.
• ALL therapy staff PT, OT, SLP
• Nursing staff including CNA’s/LNA’s
• Physician
• Dietary
• Administration
• Social Services/Business Office
• Laundry/Housekeeping/ Maintenance
• Vendor/supplier

Property of Crane, Freyermuth and Kant
not to be distributed without permission 7
Putting It All Together: Application of the WHO Wheelchair Service Training Program for Individuals with Neurological and Complex Medical Impairments, Part 2

Friday, February 6, 2015 3:00 – 5:00

Property of Crane, Freyermuth and Kant not to be distributed without permission

Patient and Family Involvement Essential
- Discuss plan of care with resident & family
- Seek
  - Personal wheelchair/equipment
  - Prior level of function
  - Comfort/likes and dislikes
  - Method of transfer
  - Needs/wants
  - Daily routine
  - Travel/transportation (both residents and short term)
  - Home setting
  - Financial

Hands-on Mat Assessment
- Must be on a firm surface (mat, not wheelchair!)
- Visual Inspection/palpation (hospital gown or shirt off)
- Assess in all planes
  - Consider impact of gravity
- Assess limitations and ability to correct
  - Fixed or flexible
  - Tends to/Corrects to
- Can I use my hands to apply pressure and correct the curve?
  - Note placement of hands and amount of pressure required
  - If necessary, what devices can be utilized to duplicate these forces required for optimal alignment?
- Note boney prominences are areas of potential skin breakdown
  - Palpate rib cage to determine rotation and note rib hump/flare if present

Mat Assessment
- Sitting, supine, sidelying
- Pelvis
  - Active/passive
  - Post/Ant tilt
  - Rotation
  - Lateral tilt/obliquity
  - Assess range of motion and postural deviations of all vertebral levels:
    - Cervical
    - Thoracic
    - Lumbar
    - Sacrum
- Upper and lower extremities
  - Alignment/position at rest
- Range of Motion
  - Hip flexion
  - Knee extension with hip flexed
  - Hip abduction/adduction
  - Hip rotation
  - Knee flexion/extension
  - Ankle all motions
  - Ankle dorsiflexion with hip and knee flexed
  - "Tends To"
    - Position at rest
  - Tone/strength

KEY ANGLES MUST BE MEASURED

A. Thigh to trunk angle without posterior pelvic tilt
B. Thigh to lower leg angle with hips flexed
C. Lower leg to foot angle with hips and knees flexed

Above measurements provide information needed to calculate the following wheelchair seating angles:
A. Seat to back support angle: _________
B. Seat to lower leg support angle: _________
C. Lower leg support to foot support angle: _________

Postural Deviations
Putting It All Together: Application of the WHO Wheelchair Service Training Program for Individuals with Neurological and Complex Medical Impairments, Part 2

Anterior/Posterior Pelvic Tilt
(WITH THE PATIENT ON THE MAT OR A FIRM SURFACE)

**Sitting**
- Observe from the front & side to see if pelvis is excessively tilted posteriorly/anteriorly.
- Grasp the pelvis and passively attempt to move the pelvis posteriorly/anteriorly – is there movement?
- Can the patient actively tilt the pelvis anteriorly/posteriorly?

**Supine**
- Note the position of the pelvis at rest.
- Look at the lower back, is it “flat” or “curved”?
- Grasp the pelvis and passively attempt to tilt the pelvis posteriorly/anteriorly – is there movement?
- Can the patient actively posteriorly/anteriorly tilt pelvis?

Pelvic Tilt

**Neutral**
- Sitting upright
- ASIS and PSIS at same level

**Posterior tilt**
- (leaning back)
- Sliding down in chair
- ASIS higher than PSIS

**Anterior tilt**
- Leaning forward
- PSIS higher than ASIS

Pelvic Obliquity

- Palpate both ASIS’s and look to see if they are level – do this **both** sitting and supine

**In sitting** to see if flexible?
- Build up under the lower side and then check to see if the pelvis is level

**In supine** to see if flexible?
- Grasp the pelvis on both sides and tilt pelvis (laterally) to determine flexibility

Pelvic Obliquity

<table>
<thead>
<tr>
<th>Right Pelvic Obliquity</th>
<th>Left Pelvic Obliquity</th>
</tr>
</thead>
</table>

Pelvic Rotation
(WITH THE PATIENT ON THE MAT OR FIRM SURFACE)

**Sitting on Firm Surface**
- Palpate ASIS’s and look at pelvis – is one side farther forward?
- Look at femurs/knees – one knee will be farther forward of the other & the pelvis on that side will be forward.
- Must determine whether there is rotation of the pelvis or a leg length discrepancy.
- Is the pelvis “back” on the right or the left?

**Supine on Firm Surface**
- Palpate ASIS’s and look at pelvis – is one side farther forward?
- Grasp the pelvis and attempt to passively “de-rotate” the pelvis.
- Measure leg lengths to determine the presence of a leg length discrepancy.
- Is the pelvis “back” on the right or the left?

Abnormal Curve of the Spine

**Scoliosis**
- Patient seen as leaning to one side
  - Looking from a frontal plane
  - Deflection to either side
  - Generally named by the convexity
  - Compensatory curve often seen in opposite direction
  - High shoulder on the side of convexity
  - Pelvic obliquity noted
  - Pelvis higher on the side of the concavity
- As spine curves (flexes laterally)
  - Vertebra rotate
  - Resulting “rib hump” posterior and rib “flare” anteriorly
Abnormal Curvature of the Spine

Kyphosis
- Looking from the side (sagittal plane)
- Abnormal increase in a “backward” curve
- Greater posterior convexity in thoracic region
- Poor posture, muscle imbalance
- Stronger in chest, weaker in upper back
- Often sees a compensatory curve in cervical and lumbar areas
- Watch for pressure/skin breakdown over the spinous processes and scapula(e)
- Can impact efficiency of swallow
- Can impact upper extremity mobility and function

Postural Impairments and Common Problems

“Best” Seated Posture for Function

- Neutral to slight anterior pelvic tilt
- Level pelvic landmarks (no obliquity)
- Neutral rotation of the femurs
- Normal lumbar curve
- Normal cervical curve
- Neutral trunk alignment
- Level shoulders, squarely positioned over hips

Posture vs. Position

- Dynamic
- State of readiness
- Sensory responsive
- Focus: Skeletal mobility/Kinesiology
- Motor function enhanced
- Static resting state
- Muscle inactivity
- Sensory unresponsive
- Focus: Skeletal alignment/pressure distribution
- Function not enhanced

Therapeutic Seating Principles

1. Stabilize proximally to allow for improved distal mobility and function.
2. Achieve and maintain good pelvic alignment.
3. After stabilizing pelvis, facilitate optimal postural alignment in other body areas, accommodating range of motion limitations.
4. Stabilize proximally to allow for improved distal mobility and function.
5. Achieve and maintain good pelvic alignment.
6. After stabilizing pelvis, facilitate optimal postural alignment in other body areas, accommodating range of motion limitations.

(Therapeutic Seating Principles information taken from: Waugh, Saffer (1989); Revised by Mason, Kant (2000))

Positioning Problems: Root Causes

- Musculoskeletal/ neurological impairments
- Abnormal tone/ strength/ motor control
- Muscle tightness/ contractures
- Muscle imbalance
- Cognitive impairments/ difficulty making needs known
- Poor positioning by caregiver
- Discomfort/ pain
- Pressure ulcer/ skin problems
- Incontinence
- Fatigue
- Equipment
- Poor transfer
- Any combination of above!!!!!!!
SLIDING

Sliding – Possible Causes
(Related to Patient)
- Posterior pelvic tilt/ limited pelvic mobility
- Thoracic kyphosis
- Tight hamstrings/ knee flexion contracture
- Limited ankle dorsiflexion
- Weakness/ poor control of trunk or head
- Abnormal muscle tone
- Increased extensor tone
- Low muscle tone
- Rigidity
- Abnormal reflexes
- Decreased vision
- Skin integrity problems
- Incontinence
- Use of brief/ pad
- Pain
- Back, buttocks, lower extremity
- Regularly scheduled pain medications?
- Cognition
- Attempting to make needs known
- “Old habit” (always sat “slouched”)
- Depression

Sliding – Possible Causes
(Related to Equipment)
- Not placed in the chair properly
- Wedge cushion In the chair backwards
- Patient trying to propel the wheelchair with their feet, but the feet don’t touch the floor adequately
- Improperly adjusted footplates/feet are not supported
- “Sagging” wheelchair seat
- Poorly positioned headrest
- Armrests too low
- Seat is too deep
- Back support too upright or low
  - Improper seat – back support angle
  - Lack of support of posterior pelvis

LEANING

Leaning – Possible Causes
(Related to Patient)
- Scoliosis
  - Fixed or flexible?
- Pelvic obliquity
- Pelvic rotation
- Muscle imbalance
  - Abnormal tone, muscle weakness
  - Tightness
- Decreased postural control
- Limited ROM in one lower extremity
- Skin issues
- Back pain
- Pain in one lower extremity
- Hip joint problems
  - Surgeries
  - Dislocation
- Fatigue
- Incontinence
- Bariatric patients
  - Lack of space posterior adipose tissue
  - Patient sliding/extending trunk to contact seat back
- Improper lower leg to foot support angle or lower leg support length
- Improper seat height
- Wheelchair propulsion – LE use
- Poorly positioned in the chair by self/caregiver
- Brief/pad or clothing need adjustment/change

Leaning – Possible Causes
(Related to Equipment)
- Wrong wheelchair
- Wrong wheelchair cushion
  - Improperly placed
  - More than recommended
  - Improper maintenance
- Inappropriate wheelchair size
- “Sagging” wheelchair seat
- Lack of pelvic support
- Improper seat angle
- Improper back support
  - Back height
  - Lateral support

Property of Crane, Freyermuth and Kant
not to be distributed without permission
Foot & Leg Support Issues

- Limited knee extension
  - Hamstring tightness
- Limited knee flexion
- Limited ankle ROM
  - Unable to maintain foot on footplate
- Abnormal muscle tone
- Pain
- “Old habit”
  - Slouched sitting posture with LE’s extended
- Chair too wide
- Bariatric patient
  - Difficult positioning lower extremities
  - LE’s abducted

THE ROOT OF THE PROBLEM:
What is the underlying issue?

- Inability to make needs known
- Pain
- Toileting/ incontinence
- Hunger or thirst
- Need for movement
- Fatigue
- Need for something to do
- Cognition

If the underlying issue is not addressed and the solution is just to provide equipment……

it won’t matter what equipment we use…..the issue will still be there and the positioning issues will continue or change……

OBRA

OMNIBUS BUDGET RECONCILIATION ACT 1987

“Each resident must receive, and the facility must provide, the necessary care and services to attain or maintain the highest practicable physical, mental and psychosocial well-being in accordance with the comprehensive assessment and plan of care”
Putting It All Together: Application of the WHO Wheelchair Service Training Program for Individuals with Neurological and Complex Medical Impairments, Part 2

Friday, February 6, 2015 3:00 – 5:00

OBRA – POSITIONING

The goal of rehab intervention, with regards to positioning, should be that the resident/patient is at their "highest possible level of function" (OBRA) with the least restrictive seating system (devices).

TREATMENT PLAN

Are you able to effectively TREAT the impairments that are impacting positioning?

OR

Are you going to provide a supportive system to ACCOMMODATE the impairments/deviations/deformities?

QUICK FIX

TREATMENT PLAN

- Identify impairments & develop TREATMENT plan appropriate to address them
  - ROM, strength, pain, skin
  - Treat the patient on the mat
  - Utilize a variety of therapeutic approaches
    - NDT
    - PNF
    - Contracture management
  - Consider the use of modalities
  - Provide adequate education to both patient and caregivers as indicated
    - Consider abilities of caregiver and complexity of plan
  - Provide necessary equipment needed to safely position resident (both in wheelchair and in bed) & modify as treatment progresses.
  - Consider use of an orthotic device
    - may be temporary

PRODUCTS: Talking Points

- There is no one "BEST" product (cushion, wheelchair, etc.)
- There is NOT one product that is appropriate for all patients
- Choice based on needs determined during evaluation and treatment process
- Trial – Monitor closely and check skin frequently
- Educate caregivers
  - Proper use per manufacturers instructions
  - Maintenance
  - Return demonstration from caregiver
- Utilize manufacturers and vendors/suppliers
  - Web
  - In-services

Assistive Technology Interventions

- Seating and positioning interventions
- Wheeled mobility interventions
- 24 hour positioning
Postural Support Device Features

1. Materials
   - firmness or softness, durability, weight, etc.
2. Shape or amount of contour
3. Adjustability – ability to accommodate changes over time and in condition

Materials - Foam

Advantages
- Light weight
- Inexpensive (relatively)
- Easy to work with – different shapes, etc.
- Can provide some pressure distribution

Disadvantages
- Insulates heat
- Absorbs fluids
- Limited envelopment/immersion capacity
- Wears out pretty quickly, depending on quality – Frequent replacement may be needed

Materials - Fluid

- Flows within some sort of bladder
- Heavier than foam
- Thermally neutral
- Allows envelopment of bony prominences
- Good pressure distribution

Materials - Air

- Acts like a fluid
- Flows freely from high pressure areas to low pressure areas
- Good pressure distribution
- Does not absorb fluids, can be cleaned and disinfected
- May feel “unstable” to some

Materials - Gel

- Very heavy
- Thinner than foam or fluid
- Reasonably good pressure management
- Often combined with foam base

Contours

- Planar (basically flat)
- Generically contoured
- Cut out
- Custom contoured
Putting It All Together: Application of the WHO Wheelchair Service Training Program for Individuals with Neurological and Complex Medical Impairments, Part 2

Adjustability
- Non adjustable
- Limited adjustability
- Maximum adjustability

Mobility Device Considerations
- Balancing priorities
  - Independence in mobility/function
  - Safety concerns related to co-morbidities and/or progressive conditions
  - Needs of environment
  - Transportation requirements
  - Caregiver management needs/abilities
  - Funding issues

Dependent or Independent Mobility?
- Dependent
  - May be safer in presence of dementia
  - May be needed for progressive condition
  - May be easier for caregiver to manage
  - May be easier for transportation
  - May be less costly, easier to fund
- Independent
  - May be better for overall function
  - May improve independence with ADLs
  - May enhance quality of life
  - Often powered mobility
  - May be more difficult to transport
  - May be harder to fund

AT Interventions:
- Manual Wheelchairs
- Powered Mobility Devices: Scooters

AT Interventions – Specialty
Lever Drive System for manual wheelchair
One arm drive axle configuration

AT Interventions – Powered Mobility Devices: Scooters
Elements of a 24-Hour Positioning Plan

1. Understand all potential “support surfaces” over 24 hours.
2. Understand effective methods of repositioning for pressure management.
3. Manage risks on all surfaces and optimize pressure distribution and redistribution.

24-HOUR POSITIONING/REPOSITIONING STRATEGIES

AT Applications – Powered Wheelchairs

AT Interventions – Ambulation Aids

24 Hour Positioning

- What are all of the support surfaces encountered?
  - Wheelchair
  - Bed
  - Shower/commode seat
  - Car/van seat
  - Floor
  - Couch/house furniture
- Important to keep in mind entire 24 hours!

Repositioning Strategies⁵

- Wheelchair
  - Lean forward and sideways
  - Power positioning systems – tilt, recline, standing¹⁵
- Bed
  - Head of bed elevation change⁵
  - Foot of bed elevation change
  - Turning side to side
Putting It All Together: Application of the WHO Wheelchair Service Training Program for Individuals with Neurological and Complex Medical Impairments, Part 2

Friday, February 6, 2015 3:00 – 5:00

Case Studies

• Discussion of your cases welcome!

Concluding Comments

• Don’t forget careful evaluation
• Perform a thorough mat assessment
  – Need to get people out of wheelchairs!
  – Pelvis assessment
  – Posture assessment
  – Determining “fixed” vs. “flexible” postures
• Lots of considerations with this population
  – Highly complex
• Don’t forget all realms of treatment intervention
  – Need to combine AT and non-AT treatments

Questions and Answers

Concluding Comments

• Remember to focus on the patient!
• Consider impairments as they impact posture
  – Muscle imbalance, tightness, tone etc……
• Consider diagnoses + history + meds + impairments as you develop a comprehensive plan including treatment, orthotics and equipment
• Address positioning in wheelchair, bed and alternate arrangements
• Be sure all patients have a firm seat under their cushion
  – Being careful of presence of fixed pelvic obliquity
  – Monitoring skin for development of pressure ulcers
• Never give out equipment “on the fly”

Resources: Equipment

• https://www.comfortcompany.com/
• http://www.sunrisemedical.com/home.aspx
• https://roho.com/
• http://www.spinalife.com/
• http://www.alimed.com/
• http://www.starcushion.com/
• http://www.ridedesigns.com/
• http://www.usatechguide.org/cushion_reviews.php

Resources

• The Internet Stroke Center. (2012) Site accessed 1/6/12.
  http://www.strokecenter.org/patients/about-stroke/stroke-statistics
  http://www.stroke.org/site/PageServer?pagename=REHABT

Property of Crane, Freyermuth and Kant not to be distributed without permission
References

1. Turton, A., Dewar, S. J., Lievesley, A., O'Leary, K., Gabb, J.,
   and Gilchrist, J. Walking and wheelchair navigation in
   patients with left visual neglect. Neuropsychological
   Rehabilitation 2009: 19(2); 274-290.
2. Foongchomcheay, A., Ada, L., and Canning, C. G. Use of
   devices to prevent subluxation of the shoulder after stroke.
   Physiotherapy Research International. 2005: 10(3) 134-145.
3. Sprigle S, Sonenblum S. Assessing evidence supporting
   redistribution of pressure for pressure ulcer prevention: A
   2011:48(3);203-213.
4. Aissaoui R, Lacoste M, Dansereau J. Analysis of sliding and
   pressure distribution during a repositioning of persons in a
   2001;9(2);215-224.

References (cont.)

5. Giesbrecht EM, Ethans KD, Staley D. Measuring the
   effect of incremental angles of wheelchair tilt on
   interface pressure among individuals with spinal cord
   JH, Gravenstein N, Caruso L. Effects of elevating the
   head of bed on interface pressure in volunteers. Crit
   Care Med. Nov 2008;36(11);3038-3042.

Additional Resources

- Allen C, Blea T, Earhart, C. Occupational Therapy Treatment
  Goals for the Physically and Cognitively Disabled. Bethesda,
- Batavia, Mitch. The Wheelchair Evaluation A Clinician’s
  Guide. 2nd ed. Sudbury, MA: Jones and Bartlett Publishers,
  2010.
- Neumann, Donald A. Kinesiology of the Musculoskeletal
  System Foundations for Rehabilitation. 2nd ed. St. Louis,
- "Durable Medical Equipment.” 25 Sept. 2005
- "Freeman Executive Collar.” 24 Sept. 2005
- Kendall, Florence P., Elizabeth K. McCreary, Patricia C. Provance,
  Mary M. Rodgers, and William A. Romani. 5th ed. Baltimore, MD:
  Lippincott Williams & Williams, 2005.
- "Products - Back Care and Lateralis/Positioning + Accessories.” 24
- Stinnett, Ms, OTR/L. Kelly A. “Issues in Geriatric Settings: Health,
- Thompson, M.D., Jon C. Netter’s Concise Atlas of Orthopaedic
### Treatment Interventions/Approaches

**Following the mat assessment, what is the most appropriate path to follow as you develop the individualized, comprehensive treatment plan?**

What are the “impaired areas” impacting alignment? Can I improve alignment through modalities/therapeutic techniques etc.? Is treatment indicated?

**Consider the following “paths”....**

<table>
<thead>
<tr>
<th>Provide appropriate seating system</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monitor resident’s tolerance of equipment making modifications as appropriate.</td>
</tr>
<tr>
<td>- Frequency and duration of intervention will vary depending on the complexity of the system provided.</td>
</tr>
<tr>
<td>Teach and train staff in:</td>
</tr>
<tr>
<td>- Appropriate use of equipment</td>
</tr>
<tr>
<td>- Transfer method</td>
</tr>
<tr>
<td>- Maintenance</td>
</tr>
<tr>
<td>- Indications of referral back to rehab/monitor skin</td>
</tr>
<tr>
<td>- Positioning schedule</td>
</tr>
<tr>
<td>Update Care Plan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Current system is appropriate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education required.</td>
</tr>
<tr>
<td>Provide additional, necessary teaching and training.</td>
</tr>
<tr>
<td>Teach and train Staff in:</td>
</tr>
<tr>
<td>- Appropriate use of current equip.</td>
</tr>
<tr>
<td>- Transfers</td>
</tr>
<tr>
<td>- Schedule based on tolerance</td>
</tr>
<tr>
<td>- Monitor and adjust appropriately</td>
</tr>
<tr>
<td>- Indications of referral back to rehab/monitor skin</td>
</tr>
<tr>
<td>Update Care Plan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Immediate safety concerns with identified impairments requiring treatment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provide safe (temporary) seating system.</td>
</tr>
<tr>
<td>Initiate treatment plan to address the noted impairments that are impacting optimal alignment (which could include, but not limited to the following)</td>
</tr>
<tr>
<td>- pain</td>
</tr>
<tr>
<td>- contractures</td>
</tr>
<tr>
<td>- strength/tone</td>
</tr>
<tr>
<td>- wound</td>
</tr>
<tr>
<td>- cognition</td>
</tr>
<tr>
<td>- poor tolerance</td>
</tr>
<tr>
<td>- safety/mobility</td>
</tr>
<tr>
<td>Utilize all available resources</td>
</tr>
<tr>
<td>- manual techniques</td>
</tr>
<tr>
<td>- modalities</td>
</tr>
<tr>
<td>- orthotics</td>
</tr>
<tr>
<td>Frequency and duration will vary pending severity of impairments</td>
</tr>
<tr>
<td>Modify seating system as progress is noted</td>
</tr>
<tr>
<td>- Ultimate goal is resident at highest level of function with minimal equipment.</td>
</tr>
<tr>
<td>- Determine positioning schedule</td>
</tr>
<tr>
<td>Continuous teaching and training as listed in previous interventions</td>
</tr>
<tr>
<td>Update Care Plan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Impairments affecting position are identified and treatment program is initiated with external device/orthotic used.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safe Temporary System Provided</td>
</tr>
<tr>
<td>External device/orthotic weaned as progress is noted</td>
</tr>
<tr>
<td>Seating is modified throughout this time period</td>
</tr>
<tr>
<td>Teach and train staff in:</td>
</tr>
<tr>
<td>- appropriate use of equipment and orthotics</td>
</tr>
<tr>
<td>- transfer method</td>
</tr>
<tr>
<td>- maintenance</td>
</tr>
<tr>
<td>- indications of referral back to rehab/monitor skin</td>
</tr>
<tr>
<td>- positioning schedule</td>
</tr>
<tr>
<td>Update Care Plan</td>
</tr>
</tbody>
</table>