Acute Care Physical Therapy

Guest Editor: Sharon Gorman, PT, DPTSc, GCS

Physical Therapy Virtual Conference

Mon 10/28	A Practical Approach to Managing Socially Complex Patients in Acute Care Mona Wong, PT, DPT
Tues 10/29	Beyond Bed Exercise in the Acute Neurologic Population Angela Rusher, PT, DPT, NCS
Wed 10/30	ALS in Acute Care: Taking the Fear Out of Hospitalizations Jennifer Liu, PT, DPT, NCS
Thurs 10/31	Management of Psychiatric Comorbidities for the Acute Care PT Emily Fleischman, PT, DPT, GCS
Fri 11/01	Beyond Burnout: Returning to Satisfaction and Purpose in Health Care John Corsino, PT, DPT

Beyond Bed Exercise in the Acute Neurologic Population

Angela Rusher, PT, DPT
Board Certified Neurologic Clinical Specialist

October 29, 2019 (12:00 -2:00pm)

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Introduction

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Board Certified Neurologic Clinical Specialist

Instructor/Assistant Director of Clinical Education
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Learning Outcomes

After this course, participants will be able to:

- Identify at least three strategies that utilize an interdisciplinary team approach incorporating mobility technology into treatment interventions for improved patient outcomes and discharge planning.
- List at least three therapeutic exercises that maximize trunk balance/control to improve functional outcomes.
- Identify at least three appropriate outcome measures for the acute neurologically involved patient.
- List at least three Aerobic Exercise activities, with focus on appropriate dosing and assessment, for the acute neurologically involved patient.

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Defining Acute Neuro Patient

- An individual with a NEW dysfunction and impairment/s
- Where might we treat them?
  - Acute care-hospital; ICU
  - SNF
  - Acute Rehabilitation Unit
  - Home Health
- Goals?
  - To promote optimal functional mobility to discharge to next level of care or link to community resources

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Hospitalization Risks – Bed Rest

- 4-5% loss of muscle strength for each week of bed rest
- ICU acquired neuromuscular weakness
- Pressure ulcers
- Bed rest contributes to:
  - Fluid loss
  - Postural hypotension
  - Tachycardia
  - Decreased stroke volume
  - Decreased cardiac output

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Hospitalization Risks & Risk for Re-hospitalization Factors

Hospitalization Risk

- Falls
- Delirium/Confusion
- Hospital acquired infections
- Increased disability and mortality

Re-hospitalization

- Results from:
  - Poor HH care/ SNF
  - No PT within 30 days of discharge
  - Racial & socioeconomic disparities
  - Poorly staffed inpatient nursing

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Rehab = Function

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Early vs. Progressive Mobility

EARLY MOBILITY

- Where? ICU
- When? Once medically stable
- Outcomes?
  - ↑patient function
  - ↓delirium
  - ↓ time on ventilator
  - ↑ likelihood home D/C

PROGRESSIVE MOBILITY

- Where? All care environments
- When? Throughout course of care
- Outcomes?
  - ↑patient function
  - ↓delirium
  - ↓ time on ventilator
  - ↑ likelihood home D/C

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Early & Progressive Mobility

- Mobility hallmarks
  - Weight-bearing
  - Progressive Vertical positioning
- Active & Passive devices
  - Passive as a step towards active participation
  - Example = Unresponsive patient
    - Turning schedule
    - Increased head of bed
    - Weight bearing on foot board
    - Bed-in-chair position

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Early & Progressive Mobility - Function

- Martinez-Velilla N et al 2019 showed that moderate intensity individualized programs that included walking and balance training 2x/day improved functional outcomes in acutely hospitalized frail elderly
- Lang CE et al 2015 addressed dose and timing in neuro-rehabilitation after stroke
  - Early Contact
  - More intense therapy

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Early & Progressive Mobility - Cognition

- Physical Exercise has been shown to improve:
  - Cognitive function such as executive function
  - Verbal fluency
- 5 days of individualized exercise in acute care can help REVERSE cognitive impairment associated with the acutely ill older adult

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Physical Therapist Role

- Continued dynamic assessment with rapid decision making for discharge planning considering patient mobility and safety
- Provides critical communication within patient care team

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Physical Therapy Goals – Acute Care

- Improve patient mobility
- Maintain patient safety
- Create optimal plan of care
- Appropriate discharge setting per individual patient

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Barriers to Early Mobilization

Clinician

- Expectations and knowledge
- Safety concerns surrounding line/tube management
- Environmental influences

Patient

- Hemodynamic instability
- Respiratory instability
- Sedation
- Agitation
- Patient refusal

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Rehabilitation – Barriers to Discharge

- Rehab therapist vs. triage therapist
  - How do we change the culture?

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Neuro Rehab: What we know

Kleim & Jones: *Principles of Plasticity* 2008

- Use It or Lose It
- Use It and Improve It
- Specificity
- Repetition Matters
- Intensity Matters
- Time Matters
- Salience Matters
- Age Matters
- Transference
- Interference

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Neuro Rehab: What we know

***Fell: Progressing Therapeutic Intervention in Patients with Neuromuscular Disorders: A Framework to Assist Clinical Decision Making* (2004)**

- Endurance
- Supportive Device
- Assistance Given
- Developmental sequence
- Work
- Regional
- Amplitude
- Velocity
- Environmental
- Variability
- Components of Movement
- Task Attention
- Feedback

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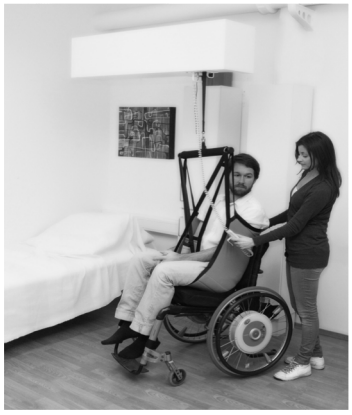
Early Mobility Technology – What?



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Can be found here: https://www.shermanoaksmedical.com/shop/product/liko-sabina-200-electric-sit-to-stand-lift

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Early Mobility Technology – What?

- Benefits:
  - Safe
  - Decrease patient effort
  - Decrease clinician burden
  - Accomplishes early mobility
    - Improve patient endurance
    - Improve patient strength
  - Decreases clinician time (5 min less than manual transfers)
    - *This includes time needed to locate and set up equipment*

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Early Mobility Technology- What?

- <$2,000
  - Slide sheet
  - Non-motorized sit-to-stand
  - Cycle ergometer
- $2,000 – $10,000
  - Motorized sit-to-stand
  - Floor lift
  - Tilt table
  - Recliner chair
  - ICU walker
- >$10,000
  - Critical Care Bed
  - Upright Lift Bed
  - Ceiling Lift

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Early Mobility Technology – Who?

- Physical Therapists
- Occupational Therapists
- Nursing Staff
- Caregivers/Family Members as appropriate

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Early Mobility Technology Interventions

- In Bed
- Around the Bed
- Beyond the Bed

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Interventions – Slide Sheet

Can be found here:
https://www.medicus-health.com/z-slider-patient-transfer-sheet.html

Can be found here:
https://www.medicaleshop.com/arjohuntleigh-maxislide-flat-sliding-sheet.html?source=ppc&gclid=CjwKCAjwzJjrBRBvEiwA867byhqUEC2AKLrrLFAsxKGNYte16jYnh6Ti_O5xxh0uRiQQoFD8QqlyZRoCtr8QAvD_BwE

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Interventions – In Bed Slide Sheet

- Functional Mobility
  - Rolling
  - Lateral shifting
  - Repositioning
  - Patient assist in self care
- Collaborative Team Approach
  - Nursing and Family training to use for bed mobility to allow active patient participation

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Interventions – Around Bed Slide Sheet

- Transfers
  - While utilizing a transfer board
  - Scooting in bed in long sit
  - Consider posterior scoot into wheelchair/chair/commode
- Seated
  - Anterior/posterior pelvic tilt
  - Lateral pelvic tilting
  - Reciprocal scooting

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Interventions – Tilt Table/Upright Tilt Bed/Geri Chair

https://www.tigermedical.com/Products/Therapy-Table-with-Electric-Tilt__HAU6040-709.aspx?invsrc=adwords_tm&gclid=CjwKCAjwzJjrBRBvEiwA867bykJSBjRDWz2ijhMAFoRfiLb-r6A16ByD9RqsumB2ZAMtMjETARMC7BoC2TsQAvD_BwE

Can be found here: https://hillrom.com/en-us/products/smart-beds-and-surfaces/critical-care/

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Interventions – In Bed
Tilt Table/Upright Tilt Bed

- Allows slow progression to upright
- Allows incremental weight bearing for longer duration
- Other exercises can be performed while tilting
- Facilitates arousal and acclimatize patient to position change
- Neuro Patients:
  - Improve: respiration, decrease tone with WB, orientation to upright/head righting, follow commands

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Interventions – In Bed
Ceiling Lift

https://www.multicaremedical.co.uk/product/gh3-ceiling-hoist-positioning-lock/

https://www.caretua.com/wp-content/uploads/2018/04/Caretua-Lifting-Solutions.pdf

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Interventions – In Bed Ceiling Lift

https://www.multicaremedical.co.uk/physical-therapy-rehabilitation-equipment/

https://www.shelden-healthcare.co.uk/robin-ceiling-track-hoist.html

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Interventions – In Bed Ceiling Lift

- Slings
  - Repositioning or Transfer sling
- Functional Mobility
  - "walking" along the bed while hovering
  - Supported upright sitting vs. sling on slack sitting EOB
  - Allows transition from supine to sit in decreased time to work on sitting activities and upright tolerance
  - Add task practice approach - ADLs
- Collaborative Team Approach
  - Have nursing/family incorporate patient participation

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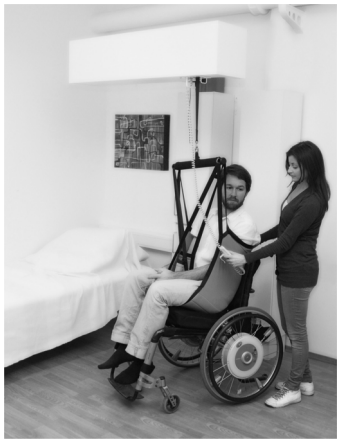
Interventions – Around Bed Ceiling Lift



- Slack sling in sitting to improve trunk activation but safe
- Consider walking sling to promote weight bearing

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Interventions – Beyond Bed Ceiling Lift vs. Hoyer/Liko Lift

https://www.caretua.com/wp-content/uploads/2018/04/Caretua-Lifting-Solutions.pdf

https://nice-healthcare.en.made-in-china.com/product/ACJQRfBPuHWr/China-Electrical-Mobile-Patient-Lift-for-Disable-People-Supplies.html

https://nice-healthcare.en.made-in-china.com/product/LBhEzsYVYPUD/China-Rehabilitation-Assistant-Classic-Patient-Lift-Bathing-and-Showering.html

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CONTINUED

Interventions – Beyond Bed Ceiling Lift vs. Hoyer/Liko Lift

- Expands patient's environment
- Orientation to executive function (ie: self care tasks)
- Consideration for higher functioning patients should progress towards more independent forms of locomotion.
- Facilitate balance reactions skills (ie: reactive)

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Interventions – In & Around Bed Cycle Ergometry

- Systems
  - Cardiopulmonary
  - Musculoskeletal
- Active Participation
  - Assisted cycling
  - Resisted cycling
- Can be set up by nursing staff once appropriate dosing is determined to get increased amount in during the day for improved endurance/strength
  - Adjunct to other skilled PT/OT interventions

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Interventions - Around Bed Sit-to-Stand Device

- Motorized
  - Static standing, transfers, ambulation
  - Therapy & Nursing tasks
    - BP, posterior wound care
- Non-Motorized
  - Can initiate stand, but may buckle

https://www.shermanoaksmedical.com/shop/product/liko-sabina-200-electric-sit-to-stand-lift

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Interventions – Beyond Bed Sit-to-Stand

- Transfers to bathroom or another part of the room for self care
- Some allow for ambulation
- Initiation of weight bearing activities in an absence of normalized strength

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Interventions – Around Bed Others

- Wheelchairs
  - Pressure relief, LE mobility, seated ADLs
  - Seated therex, posture, UE strengthening
  - Balance, reaching out of BOS
- Cardiac Chair
  - Improve upright tolerance, progressing to seated positions
- Walking device (FWW, SPC, etc.)
  - Side stepping along the bed
  - Standing tolerance
  - Balance

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Target the Trunk

- Proximal trunk control is pre-requisite for balance, distal limb control, and functional activities
- Early predictor for improved functional outcomes after stroke
- Spending time focusing on the trunk in acute care can help prepare a patient to progress functionally in their next discharge location.

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Low Tech – Target the Trunk

- Deshmukh & Kumar 2018
  - Compared trunk exercises with swiss ball vs.on bed in 40 people with stroke.
    - Six 45 min sessions a week for 2 weeks
  - Results found swiss ball exercises more effective than plinth exercises on trunk balance
  - Why swiss ball?
    - Postural perturbation with reactive balance responses in the trunk
    - Increased trunk lateral flexion and trunk rotation (compared to plinth exercises)

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Trunk Control - Physioball

- Exercises:
  - Supine
    - Pelvic bridging
    - Unilateral bridging
    - Trunk rotation
  - Seated
    - Static sitting balance
    - Trunk flexion
    - Trunk extension
    - Trunk lateral flexion
    - Trunk rotation

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Now we know what to do, but how do we measure it?

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Outcome Measures – Bed Level

- AM-PAC score (Activity Measure for Post-Acute Care Inpatient Short Form
  - Designed to assess from completely DEPENDENT to INDEPENDENT
  - The Short Form is often used – can be answered by patient or surrogates or PT's opinion on how they would perform.
- FIST = function in sitting
- 5x sit to/from stand

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Outcome Measures – Ambulatory

- Gait Speed
  - Quick measure of gait
  - Able to determine category of fall risk and level of mobility
- 6 minute Walk Test
- TUG
- DGI vs. FGA
  - Assesses higher level balance
  - Appropriate to help support need for Acute Rehab for ambulatory patients
  - Con = need stairs, cone, and blocks

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Tracking Progress Objectively

- Time
  - Cycle Ergometry time
    - Endurance
  - How long for each functional activity (transfers, bed mobility, etc.)
    - Shows efficiency
  - Weight Bearing or Tilt bed angle & Time
    - Endurance; Upright tolerance

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Tracking Progress Objectively

- Distance
  - Forward, backward, lateral along the bed
  - Rest breaks sitting vs. standing? How many?
- Assist level
  - With/without assistive device?
  - Assist provided?
  - How many therapists?
  - Use of mobility technology?
    - How much support used?
    - Sling on slack?

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Aerobic Exercise in Acute Care?

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Aerobic Exercise Application

- Aerobic Exercise (AE) improves aerobic capacity and reduces morbidity in neurologic populations
  - Contributes to other health benefits
- Application of AE in adult neuro-rehabilitation is often challenging
  - Barriers and perceived barriers
  - Lack of adaptive equipment
  - Lack of screening tools
    - RPE often used along with heart rate monitoring

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Post CVA AE Training Parameters

- Interventions
  - Walking (treadmill, overground)
  - Stationary cycle
  - UE and/or LE ergometry
  - Seated stepper (Nu-Step
- Parameters
  - 40-70% peak O2 uptake
  - 40-70% HRR
  - 50% - 80% Hrmax
- Parameters (cont)
  - RPE 11-14
  - 3-7 days/week
  - 20-60 min/session (at least 10 min bouts)
- Outcome Measures
  - VO2
  - 6 min walk test
  - 10 meter walk test
  - RPE
  - SF 36
  - Stroke Impact Scale

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Post SCI AE Training Parameters

- BWSTT
  - Ranges between 60-300 min/wk
  - 3-23 weeks
  - Enhances functional ambulation in ASIA C & D
- UE Ergometry
  - Intensity threshold of 70% HRmax
  - 20 – 60 min/day
  - 3 days/wk
  - 6-8 wks
- Functional Electrical Stimulation
  - 3 days/wk for 8 weeks

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Neurodegenerative AE Training Parameters

Multiple Sclerosis

- Interventions
- Parameters
  - 50-70% VO2max
  - 60-80% of Hrmax
  - RPE 12-14
  - 10-60 min
  - 2-3 days/wk

Parkinson's Disease

- Parameters
  - ≥ 150 mins moderate intensity/week
  - ≥ 75 mins of vigorous intensity/week – OR –
  - Combo of both
    - 3 days moderate + 2 days vigorous intensity

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Neurodegenerative AE Training Parameters

ALS

- Aerobic activities at submax levels

Huntington's Disease

- Use RPE, monitor vitals, S/S
- 3x/wk
- 30 min/sessions
  - 50-80% HRmax

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AE: When should you stop?

- Indications to terminate exercise session
  - Any abnormal response
  - New onset of ataxia
  - Dizziness, c/o feeling faint
  - Pt appears pale or cyanotic
  - Marked fatigue, SOB or wheezing
  - Severe leg cramps
  - C/o chest pain
  - The patient desires to stop!

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Take Home Messages

- Safe Patient Handling Mobility Tech
  - ↓ Therapist burden
  - ↓ Patient effort
  - ↑ Efficiency
  - ↑ Early mobility/Progressive mobility participation
  - ↑ interdisciplinary approach/collaboration
- Low tech equipment can enhance patient outcomes (target the trunk). Don't be afraid to use in Acute Care!

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Take Home Messages

- Aerobic Exercise should be considered in any neuro-rehabilitation program
- Use outcome measures to support your interventions to show need for rehab instead of triage

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Thank You

- Special Thanks to Dr. Sharon Gorman for her mentoring and support in developing this course
- Thank you, Dr. Kristen Ikeda for contributions to the Aerobic Exercise training parameters.

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References

- Please see attached PDF for References

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Questions??

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