Objectives

1. Discuss evidence proving the negative impacts of prolonged immobility.
2. Review evidence supporting early physical rehabilitation in mechanically vented patients.
3. Define Early Mobilization at MSKCC.
4. Describe PT specific assessment and intervention strategies for patients who qualify for early mobility.
5. Describe OT specific assessment and intervention strategies for patients who qualify for early mobility.

Negative Effects of Prolonged Immobility in the Intensive Care Unit (ICU)
Decreased Strength

- ICU-acquired weakness:
  - Critical illness polyneuropathy (CIP), critical illness myopathy (CIM) or combination of both
  - Associated with a prolonged need for mechanical ventilation and increased ICU and hospital length of stay1,2

- Immobility may result in 1.3 – 3.0 % loss in muscle strength per day in healthy individuals3

- Patients who survived ARDS lost an average of 18% body weight in ICU and were only able to walk 66% of their predicted value at 1 year after hospital discharge4

Impaired Functional Performance

- Significant delay in return to work with only 77% returned to work at 5 year follow up
  - Those who returned to work often required gradual transition, modified work schedule, or job retraining4

- At 3 month follow-up ARDS survivors describe profound disability that interfered with BADL

- Patient perspective: "to start with, when I tried to hold a cup, I spilled it in the bed. I could not brush my own teeth, I could not comb my own hair, and I wasn’t able to pick the covers up and move them."

Delirium

- Defined as a disturbance of consciousness with inattention accompanied by a change in cognition that develops in a short period and fluctuates over time

- ICU delirium has been associated with prolonged hospital stays and increased mortality rates2, 4, 6, 7

- Associated with higher incidence of short-term health problems independent from severity of illness6, 7
Cognitive Dysfunction

- ICU survivors report persistent difficulties with memory, concentration, and executive function (planning/organizing)\(^7\)
  - Negatively impacts QOL, IADL, decision making, managing finances, ability to function autonomously, ability to return to work
- 46% of ARDS survivors present with cognitive impairment 1 year post and 25% 6 years post\(^6\)
- 1/3 of ARDS survivors at 2 year follow-up were unemployed or permanently left the work force largely due to cognitive impairment\(^5\)
- Higher incidence of depression, anxiety, & PTSD in ICU survivors compared to non-ICU patients (23-41% vs. 5-20%)\(^10\)

Benefits of Early Mobility

Benefits of Participation in Early Mobilization:
- Decreased duration of delirium
- Reduced strength/ROM impairments
- Improved ability to perform BADL
- Reduced duration on mechanical ventilation
- Decreased ICU and hospital LOS\(^11, 12, 13\)

A study performed in 2012 by Winkelman et al. demonstrates patients who received early mobility vs. those who did not had better hospital discharge outcomes with less long term rehab required.\(^14\)
Early Rehabilitation is the Key!
• By 2026, the anticipated need for MV will increase by 80%¹⁵
• Long term physical disability (6 Minute Walk) persists up to 5 years post ICU³
• Lower levels of physical fitness are directly associated with mortality and cardiovascular disease¹⁶

Early Mobility Program Development
• A need for consistent PT/OT involvement with ICU patients was recognized
• A multidisciplinary effort to change the ICU “culture” and improve quality of patient care was initiated
• MSK EM definition: mobilization of a patient on mechanical ventilation once medically stable, often occurring within 24-48 hours of intubation

Early Mobility Program at MSKCC
Patient Identification Process

1. Day and Night RNs/RTs to identify patients on mechanical ventilation upon admission to ICU

2. Day RT staff will screen patients based on inclusion/exclusion criteria and discuss with bedside RN BEFORE team rounds.

3. RT obtains approval from ICU attending – wean sedation

4. EM is marked on daily grease board next to patients’ names to flag mobility candidates once appropriate.

** SEDATION MUST BE WEANED PRIOR TO EM ASSESSMENT TO COMMENCE.

Order identifying “Early Mobility” must be placed for PT/OT in CIS.
Early Mobility Criteria

All patients admitted to ICU requiring mechanical ventilation are considered to be a potential early mobility candidate.

EXCLUSION CRITERIA:
- BP: MAP < 65mmHg or > 110mmHg or SBP > 200mmHg
- HR: < 40 bpm or > 130 bpm
- SpO2: < 88%
- Active gastrointestinal blood loss
- Patient agitation requiring increase in sedation in past 30 minutes
- Unsecure/difficult airway
- Raised intracranial pressure
- Active myocardial ischemia
- Open abdomen

** These broad guidelines do not preclude sound clinical judgment to proceed with intervention.

Team Collaboration

Cultural Change for Mobilization in the ICU
• 4 Essential Elements for Effective Teams
  – Shared goals: a reason for working together
  – Interdependence: recognition of the need for individual experience, ability and judgment to arrive at mutual goals
  – Commitment: knowledge that working together leads to more effective decisions than working in isolation
  – Accountability: shared commitment as a functioning unit within a larger organizational context

• The ICU team must work collaboratively to create a care process that supports a consistent approach to daily patient mobilization.

Multidisciplinary EM Initial Assessment

Early Mobility Team

Physical Therapist
- Decide extent of mobilization
- Assess cognitive status
- Assist with mobility activities

Occupational Therapist
- Manage airway
- Monitor vent & respiratory status

Respiratory Therapist
- Monitor vitals
- Manage lines

Nurse

1st Early Mobility Intervention: ALL TEAM MEMBERS MUST BE PRESENT Early Mobility Team to discuss and coordinate time for intervention in AM.

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Role of Respiratory Therapy: Support Oxygenation & Ventilation
Maximize Respiratory status prior to, during and post mobility as needed
• Increase FiO2
• Increase Pressure support
• Alternate between modes
• Patient’s airway is clear of secretions
• Inner Cannula is patent – has been changed according to schedule
• Patient receives bronchodilator treatment prior to ambulation
• Keep 840 on "side" of the bed, not behind, to minimize pulling of artificial airway

Role of Nursing: Monitoring Sedation, Lines & Vitals
• General care provided prior to mobilization
• Management of pain medication at needed
• Room setup management to allow for optimal mobilization
• Managing patient medication/limiting sedatives for increased arousal
• Telemetry monitoring

Role of Rehabilitation
Assess cognition
Assist the patient to sit EOB
Transfer patient to a chair with pivot transfer or taking 1-2 steps
Stand patient from bed surface
Complete ADL tasks sitting or standing
Ambulation within room or in hall
Early Mobility Video

Ambulation with Use of Portable Vent

Rehabilitation Follow Up Plan

• After the initial Early Mobility session, PT and OT communicate and follow up with one of the following approaches:
  • PT/OT co-treat
  • Back to back PT/OT sessions
  • Coordinate specific times for PT and OT during the day to provide the patient with a rest break
Rehabilitation Follow Up Plan

- Determine if RT presence during follow up therapy sessions is needed
  - Increase FiO2
  - Decompensation
  - Securing airway
  - Mechanical ventilator monitoring and adjustments

Physical Therapy Early Mobility Assessment & Treatment

Physical Therapy Early Mobility Assessment

- Cognition
- General pulmonary assessment
  - Vitals
  - Vent settings
  - Breath sounds
- AROM/PROM, MMT
- Sensation, coordination, muscle tone
- Functional mobility
  - Bed – EOB – Transfers – Ambulation
- Balance
- Gait
- Endurance
**Physical Therapy Interventions**

**Impairments:**
- Mucociliary clearance/inability to expectorate
- Impaired lung volume
- V/Q mismatch
- Dyspnea
- Decreased expansion of ribs

**Treatment Interventions:**
- Chest physical therapy
  - Postural drainage
  - Percussion/vibration
  - Costophrenic assisted cough
- Deep breathing exercises
- Incentive spirometer
- Manual therapy

**Impairments:**
- Orthostatic hypotension
- Deconditioned state
- Impaired circulation
  - Blood
  - Lymphatics

**Treatment Interventions:**
- Therapeutic activities
  - Tilt table
  - Bed level ther-ex
  - Standing frame
  - SARA PLUS

**In Room Mobility with Vented Patient**
Treatment Equipment

Physical Therapy Interventions

• Impairments
  – Weakness
    • General or specific
  – Decreased endurance
  – Fatigue
  – Decreased bone density

• Treatment Interventions
  – Therapeutic exercise
    • PROM; A/AROM; Resisted ROM
  – Weight bearing activities
  – PNF diagonals
  – Functional training
    • Bed mobility, transfers
  – Gait training
    • Assistive device
    • Orthotics
  – Stair negotiation

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Physical Therapy Interventions

- Impairments
  - Impaired motor planning
  - Paresis/paralysis
  - Balance
  - Tone (Hyper or Hypo)
  - Coordination
  - Proprioception
  - Kinesthetic awareness
  - Delirium

- Treatment Interventions
  - Balance/trunk control
  - Static and dynamic
  - Coordination activities
  - Neuromuscular facilitation
  - NDT
  - PNF
  - Tapping/quick stretch

Physical Therapy 2 Week Goals

1. Pt will maintain oxygen saturation >90% on room air while participating in activities to promote functional mobility and endurance.
2. Pt will log roll into side lying positions with min assist to facilitate proper positioning for pressure relief.
3. Pt will demonstrate supine <-> sit with mod assist to increase sitting tolerance in preparation for transfers.
4. Pt will complete sit <-> stand utilizing a rolling walker with min assist to promote BLE strengthening and endurance.
5. Pt will ambulate 250’ with rolling walker with min assist to facilitate access to toilet and pantry.

Occupational Therapy Early Mobility Assessment & Treatment
Occupational Therapy Early Mobility Assessment

• Delirium Assessment
  – CAM-ICU
• Cognition
  – Orientation, attention, direction following
  – Montreal Cognitive Assessment (MOCA)
• Communication
• ADL Assessment
• ROM/MMT
• Sensation

Confusion Assessment Method for ICU (CAM-ICU)

4 Features:
1. Acute onset/fluctuating course
   • Use RASS or past CAM-ICU scores
2. Inattention
   • SAVEAHAART
3. Altered level of consciousness
   • RASS
4. Disorganized thinking
   • 4 yes/no questions, direction following

Score = Feature 1 + 2 and either 3 or 4

Occupational Therapy ADL Intervention

Patients often have multiple physical impairments limiting BADL performance

Impairment:
- Activity tolerance
- Balance (seated or standing)
- Impaired gross/fine motor coordination
- Decreased ROM/strength
- Neuropathy

Treatment Interventions:
- Grade time spent in various positions (EOB, OOB, standing)
- Neuro re-education
- Therapeutic activities
- Therapeutic exercises
- Remedial and compensatory strategies
- Use of meaningful patient-selected activities

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ADL Participation

Use of tilt-in-space wheelchair to accommodate for pressure relief.

Leisure Participation

Occupational Therapy Cognitive & Mood Dysfunction Interventions

Impairment:
- Orientation & arousal/attention
- Communication/expression
- Concentration/processing
- Command following
- Anxiety
- Sensory tolerance

Treatment Interventions:
- Establish routine for daily activities, sleep-wake cycle
- Orientation aides/devices
- Communication devices, adaptive strategies
- Environmental modification, task simplification
- Grade commands (1 step vs. multi-step)
- Relaxation strategies
- Introduction to various stimuli
Adaptive Communication

Communication Board

Writing

Occupational Therapy 2 Week Goals

1. Patient will participate in grooming task seated EOB x 5 min with min A demonstrating good sitting balance and tolerance with maintained attention to task 100% of time.
2. Patient will demonstrate A & O x 3 5/5 consecutive days with use of compensatory device without assist from caregiver.
3. Patient will demonstrate effective communication with caregiver/ medical team 100% time using adaptive communication device prn.
4. Patient/caregiver will be Independent with OT home program for increased BUE strength/coordination and activity tolerance in order to improve ADL performance.
5. Patient will complete all surface transfers (i.e. bed, chair, toilet) with moderate A demonstrating good safety awareness.

MSKCC Early Mobility Research

PURPOSE:
• To evaluate if pre ICU length of stay (LOS) influences outcomes in patients with cancer on MV receiving early PT/OT.

METHODS:
• Retrospective review of 42 critically ill patients with respiratory failure on MV who underwent early PT and OT (within 72 hours) from June 2010-July 2011.
• MSKCC Functional Assessment: (supine-sit, sit-stand, ambulation, bed-chair transfer, lower body dressing, grooming).
• MSKCC Cognitive Assessment: (orientation, direction-following, communication).
• Composite Scores analyzed at baseline ICU assessment, ICU discharge, and hospital discharge for two groups.
MSKCC Early Mobility Research

RESULTS:
- 42 patients received early PT/OT and were divided into two groups based on pre-ICU LOS.
  - Group 1 (n = 20) Pre-ICU LOS < 72 hours.
  - Group 2 (n = 22) Pre-ICU LOS > 72 hours.
- Both groups demonstrated similar improvement in PT/OT scores from baseline to ICU and hospital discharge.
- No significant difference between the two groups at each time studied.
- Group 1 had significantly lower total hospital LOS and mortality.

CONCLUSIONS:
- Early PT/OT appears equally beneficial in improving the functional status of critically-ill patients on MV with short or long pre-ICU LOS.

In Summary
- EM is beneficial for patients in the ICU
- PT and OT have a vital role in reducing the impairments related to prolonged immobility and MV in the ICU population
- A multidisciplinary approach is critical for a successful program

1 Year After Discharge from Hospital
References


