Early Mobility and Exercise
What About All Those Critical Lines?

Lines, catheters and drains can be accommodated, secured
EVD line stationary bike
What About All Those Critical Lines?

Patient lines and drains can be accommodated

Including Femoral Lines

Mechanical ventilation and CVVH lines


Activity Intensity and Dosage

Individualized treatments based on patient prior activity, goals

PT consults for chronic patients, delirious patients, patients unable to lift full leg from mattress

Lines, catheters and drains can be accommodated, secured
PTs optimize intensity of mobility

When Is It Time to Stop and Rest?

- Patient remains unresponsive
- Fatigued, pale appearance
- Respiratory rate consistently > 10 bpm above baseline
- Decreasing muscle recruitment
- Loss of balance
- Decreasing weight bearing ability
- Diaphoresis
When Quality of Life Is Restored

Avoiding Post Traumatic Stress Disorder in Patients and Families


ICU Diaries


"Intensive care diaries reduce new onset post traumatic stress disorder following critical illness: a randomised, controlled trial." Crit Care Med
KEY REFERENCES: Laying the Foundation for E of ABCDEF Bundle

ICU-acquired weakness and cognitive deficits: occur quickly and resolve slowly

Early progressive mobility interventions work

KEY REFERENCES: Laying the Foundation for E of ABCDEF Bundle

Safety of early progressive mobility

• Winkelman C. Crit Care Nurse. 2011;31:70-3.
• Bailey P. Crit Care Med. 2007;35:139-45.
• Hopkins R. Crit Care Clinics. 2007;23:81-96
KEY REFERENCES: Laying the foundation for mobility for femoral catheters

KEY REFERENCES: Laying the foundation for Nursing Progressive Mobility Program in ICU


Mobility is basic nursing care!
We Need The Entire Bundle for Success

Key references: Laying the foundation for implementing the entire bundle

Implementing the entire ABCDEF Bundle is crucial!

• Klompas M. *Am J Respir Crit Care Med.* 2015;191:292-301.
Objectives

1. Understand the deficits ICU survivors face and describe the benefits of early mobility in ICU
2. Identify strategies for successful implementation of early mobilization programs in your ICU
3. Discuss potential barriers to early mobilization programs
Question to Ask During Rounds: Did the Patient Achieve his or her Maximal Mobility Activity Today?
Did the Patient Achieve his or her Maximal Mobility Activity Today?

YES!

• Mobility is everyone’s job!
  • RN, PT, OT, etc.
• Communicate patient’s current mobility status to all ICU team members
• Encourage patients to perform active movements if possible
Did Our Patient Achieve his or her Maximal Mobility Activity Today?

NO!

• Why not?
• Was the patient walking before admission?
• Is the patient hemodynamically stable?
• Is the patient awake?
Why Mobilize Patients in ICU?
Side Effects of Bed Rest

• Muscle strength in a healthy person can decrease 1.3% to 3% for every day spent on bedrest.¹

• Effects are more profound in older people and in those with critical illness.²

• A new study suggests that 3% to 11% strength loss occurs for every day in bed in an ICU setting.³
  • Age and days on bedrest are independent predictors of worsening function.


Evidence-Based Benefits of Early Progressive Mobility

• Decrease ICU and hospital LOS
• Improve overall physical functioning
• Decrease duration of mechanical ventilation
• Decrease incidence of delirium

Early Activity is Feasible and Safe in Respiratory Failure Patients

Results:

1,449 activity events in 103 patients

- Sit on bed: 233 (16%)
- Sit in chair: 454 (31%)
- Ambulate: 762 (53%)

Patients with an endotracheal tube in place:

- 593 activity events
- 249 were ambulatory (42%)

There were < 1% activity-related adverse events

Conclusion:

• A majority of survivors (69%) were able to ambulate >100 feet at RICU discharge

• Patients who went home ambulated farther (mean = 337 feet) than patients who went to a skilled nursing facility (Mean = 293 feet)

Early ICU Mobility Therapy in the Treatment of Acute Respiratory Failure

- **LEVEL I**
  - Unconscious
  - MT: Passive ROM 3x/d
  - MT: q2Hr turning

- **LEVEL II**
  - Conscious
  - Passive ROM 3x/d
  - q2Hr turning
  - Active Resistance PT
  - Sitting Position Minimum 20 minutes 3x/d
  - Can move arm against gravity

- **LEVEL III**
  - Conscious
  - Passive ROM 3x/d
  - q2Hr turning
  - Active Resistance PT
  - Sitting on edge of bed PT + MT
  - Sitting on edge of bed PT + MT
  - Can move leg against gravity

- **LEVEL IV**
  - Conscious
  - Passive ROM 3x/d
  - q2Hr turning
  - Active Resistance PT
  - Sitting on edge of bed PT + MT
  - Active Transfer to Chair (OOB) PT + MT
  - PT Minimum 20 minutes/d

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Morris P. Crit Care Med. 2008;36:2238-43
Early ICU Mobility Therapy in the Treatment of Acute Respiratory Failure (cont’d.)

Results

• ICU length of stay:
  • Protocol: 5.5 days
  • Usual care: 6.9 days
• Hospital length of stay:
  • Protocol: 11.2 days
  • Usual care: 14.5 days

Conclusion

• Reduced sedation levels in patients
• Increased activity sessions during ICU stay
• Net cost savings
• No adverse events during mobility sessions

Morris P. Crit Care Med. 2008;36:2238-43
Early Physical and Occupational Therapy in Mechanically Ventilated, Critically Ill Patients: A Randomised Controlled Trial

Results

• 104 patients on mechanical ventilation
  • Intervention group: OT/PT median of 1.5 days after intubation
  • Control group: OT/PT median of 7.4 days after intubation
• 1 adverse event with no harm to patient in 498 mobility sessions

Early Physical and Occupational Therapy in Mechanically Ventilated, Critically Ill Patients: A Randomised Controlled Trial (cont’d.)

Conclusion

• Intervention group had:
  • Decreased days of delirium (50%) and MV
  • ICU LOS reduced by 2-day median
  • 59% return to independent function at hospital discharge vs. only 35% in control group

STARTING AN EARLY PROGRESSIVE MOBILITY AND EARLY REHABILITATION PROGRAM
Functional Progress Requires an EARLY Investment for the Greatest Return

Education for ICU Staff

• Long-term impact for patients and families
• Benefits of early progressive mobility
• Role of all team members
• Specific processes
Keys for Successful Early Progressive Mobility and Rehabilitation Program in ICU

• Program tailored toward specific needs of each ICU
• Strong nursing mobility program with general nursing guidelines to consistently promote early mobility
• Strong physical therapy mobility program
• Specific guidelines for referral to physical and occupational therapy
• Strong interprofessional program staff commitment
Keys for Successful Early Progressive Mobility and Rehabilitation Program in ICU (cont’d.)

• Shared vision for early mobility and mutual goals among all members of the team
• Color signs near the bed to alert staff and families about patient’s mobility status
• Patient and family educational material
• Appropriate resources
• Adequate equipment
Changing Behaviors to Improve Patient Outcomes in ICU

• Greatly impacts practices at institutions
• Varies among facilities
Early Progressive Mobility in ICU

<table>
<thead>
<tr>
<th>In-bed mobility</th>
<th>Out-of-bed mobility</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Passive range-of-motion exercises</td>
<td>• Standing at bedside</td>
</tr>
<tr>
<td>• Turning side to side</td>
<td>• Sitting on a regular chair</td>
</tr>
<tr>
<td>• Sitting on the side of the bed</td>
<td>• Sitting on a cardiac chair</td>
</tr>
<tr>
<td>• Active strengthening exercises</td>
<td>• Walking</td>
</tr>
</tbody>
</table>

MOBILITY IS EVERYONE’S JOB IN THE INTENSIVE CARE UNIT!
Equipment

General equipment
- Chair
- Portable cardiac monitor
- Walker
- Wheelchair
- IV poles
- Oxygen tank
- Transport ventilator

Specific rehabilitation equipment
- TheraBand
- Cuff weights
- Overhead trapeze and pulleys
- Standing frame
- Cycle ergometers
- Leg press
- Moveo table
- Video game systems
Considerations Before Mobilizing Patients in ICU

• Neurologic: Level of alertness
• Cardiac: Hemodynamic stability  
  • Vasoactive medications
• Pulmonary: Ventilation/oxygenation needs
• Risk vs. benefit
• Guidelines vs. Protocols  
  • Fewer absolute contraindications
  • Importance of interdisciplinary collaboration
**Expert consensus and recommendations on safety criteria for active mobilization of mechanically ventilated critically ill adults**


<table>
<thead>
<tr>
<th>Color</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Low risk of an adverse event. Proceed as usual according to each ICU’s protocols and procedures.</td>
</tr>
<tr>
<td>Yellow</td>
<td>Potential risk and consequences of an adverse event are higher than green, but may be outweighed by the potential benefits of mobilization. The precautions or contraindications should be clarified prior to any mobilization episode. If mobilized, consideration should be given to doing so gradually and cautiously.</td>
</tr>
<tr>
<td>Red</td>
<td>Significant potential risk or consequences of an adverse event. Active mobilization should not occur unless specifically authorized by the treating intensive care specialist in consultation with the senior physical therapist and senior nursing staff.</td>
</tr>
</tbody>
</table>

Perceived Barriers to Progressive Early Mobility

- Severity of disease
- Severity of weakness
- Premorbid level of function
- ICU culture that promotes bed rest
- Nutritional state
- Sleep deprivation
- Level of delirium
- Pain
- Obesity
Absolute Contraindications to Progressive Mobility in ICU

- Patients on neuromuscular blockade
- Hemodynamic instability requiring escalating dose or multiple vasopressors
- Significant oxygenation dysfunction requiring high level of oxygen
- Unstable fractures
- Cerebral edema with uncontrolled intracranial pressure
- Active bleeding
- Intra-aortic balloon pump on femoral artery
- Pacer dependent with transvenous temporary pacemaker
- ECMO with femoral cannulation
- Femoral arterial sheath
- Open chest/open abdomen
Patient on Mechanical Ventilation AND CVVH with Femoral Catheter

Interprofessional Team in ICU

- Patient
- Physician
- Nurse
- Respiratory therapist
- Physical therapist
- Occupational therapist
- Dietitian

- Pharmacist
- Nurse assistant
- Social worker
- Case manager
- Chaplain
- Family
- Speech therapist
Different Teams Mobilizing Patients in ICU

- Physical therapists and nurses
- Physical therapists and rehabilitation technicians
- Physical therapists and occupational therapists

# Roles of Physical Therapy and Occupational Therapy

## TABLE 1. Roles in Acute Care

<table>
<thead>
<tr>
<th>PT Roles</th>
<th>OT Roles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strength</td>
<td>Bathing</td>
</tr>
<tr>
<td>Range of motion</td>
<td>Dressing</td>
</tr>
<tr>
<td>Bed mobility</td>
<td>Grooming</td>
</tr>
<tr>
<td>Transfers</td>
<td>Feeding</td>
</tr>
<tr>
<td>Ambulation/gait training</td>
<td>Activity endurance for activities of daily living</td>
</tr>
<tr>
<td>Balance</td>
<td>Splinting</td>
</tr>
<tr>
<td>Stair negotiation</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: OT, occupational therapist; PT, physical therapist.

Therapeutic Interventions

Physical Therapy
- Education
- Positioning
- Exercises
- Transfers
- Walking re-education
- Chest physical therapy

Occupational Therapy
- Education
- Positioning
- Exercises
- Transfers
- ADLS
- Splints
- Cognitive training
Keys to Optimizing Therapy Interventions

• Developing individualized plans of care
• Not protocolizing
• Stepwise progression
• Reassessing frequently for changes in status
Mobility as a Vital Sign and as an Investment

Consider the patient activity tolerance on a daily basis

Gradual progression of activity with adequate rest and recovery

Delirium and altered mental status
Patient and Family Collaboration

Promote:

- Patient autonomy
- Communication strategies
- Use of ICU Diaries
- Proper sleep/wake cycle
- Ways to connect to the outside world
- Family engagement in progressive mobility
Early Progressive Mobility in ICU: It’s Worth the Effort!