PTJ SYMPOSIUM:

Rehabilitation of Patients with Critical Illness
(Handout – 18 pages)

Combined Sections Meeting 2013

San Diego, CA   January 21 – 24, 2013

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Symposium Speakers

Michelle Kho, PT, PhD
Neuromuscular Electrical Stimulation for Intensive Care Unit-Acquired Weakness:
    Protocol and Methodological Implications for a Randomized, Sham-Controlled,
    Phase II Trial

Darin Trees, PT, DPT, CWS
The Innovative Mobility Strategies for the Patient with Intensive Care Unit-
    Acquired Weakness: A Case Report

Diane Clark, PT, DScPT
Effectiveness of an Early Mobilization Protocol in a Trauma and Burn Intensive
    Care Unit: A Retrospective Cohort Study

Amy Pawlik, PT, DPT, CCS
Issues Impacting the Delivery of Physical Therapy Services for Individuals with
    Critical Illness
Rehabilitation in the critical care setting is emerging as an important strategy in improving functional outcomes in the acute care population. The latest research suggests that early interventions aimed at restoring and maintaining physical function in patients with critical illness are associated with improved physical function and well-being. During this session, authors who contributed the recent special issue of APTA's Physical Therapy journal (PTJ) will share their insights on the role of rehabilitation in the management of critical illness; outcome measures; new rehabilitative interventions; and issues related to optimal timing, intensity, and dosage.

Upon completion of this course, you'll be able to:

- Discuss the roles of physical therapy, occupational therapy, and other disciplines in the critical care setting.
- List underlying mechanisms of critical illness neuromyopathy.
- Describe the latest findings on efficacy and effectiveness of rehabilitation interventions on activities of daily living, quality of life, physical function, activity, participation, and disability.
- Explain what is known about the use of rehabilitative services by patients following critical illness.

Symposium Schedule:

3:00 – 3:20 Introduction to the Special Series Symposium
Patricia J Ohtake, PT, PhD
PTJ Editorial Board Member and Guest Co-Editor of this Special Series

3:20 – 3:45 Neuromuscular Electrical Stimulation for Intensive Care Unit-Acquired Weakness: Protocol and Methodological Implications for a Randomized, Sham-Controlled, Phase II Trial
Michelle Kho, PT, PhD

3:45 – 4:10 The Innovative Mobility Strategies for the Patient with Intensive Care Unit-Acquired Weakness: A Case Report
Darin Trees, PT, DPT, CWS

4:10 – 4:35 Effectiveness of an Early Mobilization Protocol in a Trauma and Burn Intensive Care Unit: A Retrospective Cohort Study
Diane Clark, PT, DScPT

4:35 – 5:00 Issues Impacting the Delivery of Physical Therapy Services for Individuals with Critical Illness
Amy Pawlik, PT, DPT, CCS
This Special Series on rehabilitation for people with critical illness is being published in two issues, December 2012 and February 2013, and presents recent advances in managing critical illness across the continuum of care, from the intensive care unit (ICU) to the community setting. The Special Series also serves to raise awareness of the essential role physical therapists and rehabilitation and critical care professionals play in providing strategies to improve health outcomes of this growing patient population. Both established and new investigators in this field, including physical therapists from across the United States and from Australia, have authored the articles in these two issues.

As presented in our Editorial in the December 2012 issue of PTJ, the challenge for the rehabilitation and critical care community is three-fold. First, we must continue developing effective rehabilitation interventions for the management of patients with critical illness while they are in the ICU and as they move to subsequent levels of care. Second, we must increase awareness of “post–intensive care syndrome,” helping our colleagues in acute care, subacute rehabilitation, skilled nursing, outpatient, and home care settings to recognize the clinical presentation and understand the role of critical illness in the functional limitations that exist for many ICU survivors. Third, we must endeavor to be committed members of interprofessional health care teams and promote collaborative practice across all health care settings. We hope that the articles in this Special Series will provide an enhanced understanding of, and new management strategies for, the many physical and cognitive challenges facing survivors of critical illness so that this unique and complex patient population achieves improved outcomes.

The manuscripts in this Special Series cover a wide range of topics important to this practice area and I encourage you to read both the December 2012 and February 2013 issues of PTJ. At the end of this handout is a complete listing of the articles.
Neuromuscular Electrical Stimulation for ICU-Acquired Weakness: Protocol and Methodological Implications for a Phase II RCT

Michelle E. Kho, PT, PhD
Assistant Professor, School of Rehabilitation Science, McMaster University, CANADA
Adjunct Faculty, Department of Physical Medicine and Rehabilitation, Johns Hopkins University, Baltimore, MD, USA
January 24, 2013

Acknowledgements
• Co-investigators
  – Alexander Truong, MD, MPH
  – Dale Needham, MD, PhD
• Study team
  – Blinded outcomes assessments – Jen Zanni, MSPT, DSc; Julie Skrzat, DPT; Nicole Yare, DPT; Amy Toonstra, DPT; Ladan Hakima, OT
  – Research sessions - Nancy Ciesla, DPT, MS; Karen Oakjones Burgess, RN; Dorianne Feldman, MD, MSPT
• Salary support (Kho)
  – Canadian Institutes of Health Research Fellowship and Bisby Prize
• Grant # U11 RR 025005 from the National Center for Research Resources, National Institutes of Health
• CareRehab, McLean VA

What is NMES?
Neuromuscular Electrical Stimulation

Also known as:
• Electrical Stimulation “E-stim”
• Functional Electrical Stimulation “FES”

To-date, NMES in the published ICU literature is completely passive.

Pflugers Arch. 1983;398(2):139-141.

Continuum of physical activity

Bedrest -> Completely Passive
Increasing physical activity and patient engagement in rehab

Selected contraindications to NMES
× Any pacemaker (e.g., cardiac, diaphragm) or implanted cardiac defibrillator
× Infected tissues, tuberculosis or wounds with underlying osteomyelitis
× Over confirmed / suspected malignancy
× Area of untreated DVT
× Areas of uncontrolled bleeding
× Damaged or at-risk skin
✓ OK in intact skin overlying implants containing metal, plastic, or cement

Full issue dedicated to Electrophysical Agents & Contraindications (NMES ch 4):
Physiotherapy Canada . 2010. 62(5).
Current evidence: NMES parameters and Outcomes

- NMES intervention parameters varied
  - Visible contraction (n=6); max tolerable (n=1)
  - Daily duration: 30 min (n=1); ~60 min (n=5)
  - Number of days per week: 4 – 7
- Outcomes
  - Body structure: microcirculation, muscle circumference/area/volume/thickness
  - Body function: muscle strength
  - Activity: time to transfer from bed to chair
  - None measured beyond ICU awakening


Current evidence: Selected results

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Patients</th>
<th>NMES</th>
<th>No NMES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscle strength1</td>
<td>Chronic</td>
<td>✓ 3.8/5.0</td>
<td>3.1/5.0</td>
</tr>
<tr>
<td>Transfer from bed to chair1</td>
<td>Chronic</td>
<td>✓ 11 days</td>
<td>14 days</td>
</tr>
<tr>
<td>Quadriceps muscle volume2</td>
<td>Acute</td>
<td>-20%</td>
<td>-16%</td>
</tr>
<tr>
<td>ICU-acquired weakness at awakening3</td>
<td>Acute</td>
<td>✓ 13%</td>
<td>39%</td>
</tr>
<tr>
<td>Leg muscle strength4</td>
<td>Acute</td>
<td>✓ 29/30</td>
<td>25/30</td>
</tr>
</tbody>
</table>

3Routs et al., Critical Care. 2010. 14:R74.

Ongoing research @ Johns Hopkins ICU

In mechanically ventilated adult ICU patients, does 60 minutes of daily NMES therapy applied bilaterally to lower extremity muscle groups compared to sham therapy reduce muscle weakness at hospital discharge?

**Screening & Eligibility**

**Inclusion criteria:**
- All patients receiving 1 day of MV and expected to require >=2 days ICU stay.

**Exclusion Criteria:**
- Unable to understand or speak English
- Unable to independently transfer at baseline
- Known primary neuromuscular disease
- Known intracranial process associated with localizing weakness
- Transferred from other ICU >4 consecutive days of MV
- Moribund
- Declined to participate

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**Trial Schema**

- **Primary outcome** (blinded): Strength @ hospital discharge
  - NMES 60 min
  - Sham

- **Secondary outcomes** (blinded where appropriate):
  - Lower extremity muscle strength (HHD)
  - Overall body strength (MMT, composite MRC score, HGD, MIP)
  - Functional status (FIS-ICU)
  - Duration of Mechanical Ventilation
  - LOS (ICU, Hospital)
  - Mortality (ICU, Hospital)
  - Total hospital charges
  - Hospital discharge destination

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**Outcome Measurement Timing**

- ICU Admission
- Study Entry >24h MV
- ICU Discharge
- Hospital Discharge

- Sample Size Calculation
  - N=54 maximum (27 per group)

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**Methodological Critical Appraisal**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>NMES Pilot RCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Randomization</td>
<td>✓</td>
</tr>
<tr>
<td>Allocation concealment</td>
<td>✓</td>
</tr>
<tr>
<td>Blinding – caregivers</td>
<td>✓</td>
</tr>
<tr>
<td>Blinding – outcome assessors</td>
<td>✓</td>
</tr>
<tr>
<td>Analysis by patients randomized</td>
<td>✓</td>
</tr>
<tr>
<td>Enrolled patients contributing to primary outcome analysis</td>
<td>Only those with hospital discharge Ax</td>
</tr>
</tbody>
</table>

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**Strengths and Limitations of NMES pilot RCT**

**Strengths**
- Pilot RCT
- Randomized, concealed allocation
- Sample size calculation
- Blinded outcomes assessors
- Outcome measures at hospital discharge

**Limitations**
- Muscle strength not patient-centered outcome
- Implications of results for clinical implementation unclear

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**Is NMES ready for clinical use?**

**Strengths**
- Can be initiated in sedated patients
- Can occur in supine
- Single person implementation
- Provides “something”

**Limitations**
- Completely passive modality
- Impaired current delivery: obesity, edema
- Opportunity cost of limited therapist time
- No outcomes beyond ICU awakening (yet)
Title: Innovative Mobility Strategies for the Patient with ICU-Acquired Weakness: A Case Report  
Presenter: Darin Trees, PT, DPT, CWS

Background and Purpose:
Although the benefits of early mobilization in the Intensive Care Unit (ICU) have been well-documented in recent years, the decision making process and customization of treatment strategies for patients with ICU-acquired weakness has not been well defined in the literature. This case report will describe a patient with ICU-acquired weakness in the long term acute care hospital (LTACH) setting and mobilization strategies that include novel devices for therapeutic exercise and gait training.

Case Description:
A 73-year-old active female underwent a routine cardioversion for atrial fibrillation but developed multiple complications, including sepsis and respiratory failure. The patient spent three weeks of limited activity in ICU and was transferred to our LTACH for continued medical intervention and rehabilitation. A four-phase graded mobilization program was initiated in the LTACH ICU. Within that program, the physical therapy interventions included partial weight-bearing antigravity strength training with a mobile leg press and gait training with a hydraulic-assist platform walker.

Outcome:
Prior to interventions, the patient had severe weakness (Medical Research Council [MRC] sum score of 18/60) and displayed complete dependence for all functioning. She progressed to being able to ambulate 150 feet using a rolling walker with accompanying strength increases to an MRC sum score of 52/60.

Discussion:
This report describes novel mobility strategies for managing a patient with ICU-acquired weakness. The application of a graded mobilization program using a mobile leg press and a hydraulic-assist platform walker was safe, feasible, and appeared to expedite the patient’s recovery process while decreasing the amount of manual lifting for the therapists.

Timeline of Significant Events

<table>
<thead>
<tr>
<th>Day</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Routine cardioversion</td>
</tr>
<tr>
<td>2-20</td>
<td>Respiratory failure requiring mechanical ventilation, sepsis, and pneumonia.</td>
</tr>
<tr>
<td>21</td>
<td>Transfer to LTACH. Dependent for all mobility. MRC sum score 18. Vent- CPAP 45% FiO2.</td>
</tr>
<tr>
<td>22-31</td>
<td>Physical therapy consisting of AAROM, leg presses, and assisted sitting activities.</td>
</tr>
<tr>
<td>32</td>
<td>Emergent thoracentesis. Transfer back to STACH.</td>
</tr>
<tr>
<td>33-55</td>
<td>STACH ICU stay for medical stability. PROM by nursing.</td>
</tr>
<tr>
<td>56</td>
<td>Transfer to LTACH. Dependent for all mobility. MRC sum score 18. CPAP 45% FiO2.</td>
</tr>
<tr>
<td>57</td>
<td>3 sets of 10 inclined squats at 30-45% BW. Assisted sitting with maximal assist.</td>
</tr>
<tr>
<td>61</td>
<td>4 sets of 12 inclined squats at 55% BW. Static sitting 5 minutes without assist.</td>
</tr>
<tr>
<td>62</td>
<td>Stood 30 sec with HAPW and moderate assist. Weaned to tracheal collar 28% FiO2.</td>
</tr>
<tr>
<td>69</td>
<td>Walked 5 feet with HAPW and moderate assist. Weaned to room air.</td>
</tr>
<tr>
<td>70</td>
<td>Walked 12 feet with HAPW and moderate assist.</td>
</tr>
<tr>
<td>77</td>
<td>Walked 55 feet with HAPW and minimal assist.</td>
</tr>
<tr>
<td>78</td>
<td>Walked 8 feet in parallel bars with moderate assist.</td>
</tr>
<tr>
<td>79</td>
<td>Walked 15 feet with rolling walker and moderate assist.</td>
</tr>
<tr>
<td>89</td>
<td>Walked 150 feet with rolling walker and supervision. MRC sum score 52.</td>
</tr>
</tbody>
</table>

MRC- Medical Review Council. CPAP- Continuous positive airway pressure. BW- Body weight.  
HAPW- Hydraulic-assist platform walker

PTJ Symposium: Rehabilitation of Patients with Critical Illness  
CSM 2013 January 24, 2013
## Graded Mobilization Program

<table>
<thead>
<tr>
<th>Phase 1</th>
<th>Phase 2</th>
<th>Phase 3</th>
<th>Phase 4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Description</strong></td>
<td><strong>Nursing:</strong>&lt;br&gt;- PROM to all extremities&lt;br&gt;- Sitting in stretcher chair or chair position 3 times/day, 20 min. +</td>
<td><strong>PT:</strong>&lt;br&gt;- AA/AROM of UEs and LEs in all planes&lt;br&gt;- Bed mobility skills&lt;br&gt;- Assisted sitting balance activities&lt;br&gt;- Mobile leg press for graded PWB exercise</td>
<td><strong>Patient is able to transfer and ambulate &gt; 10 feet with a walker and minimal or no assistance.</strong>&lt;br&gt;- Progressive walking and gait training&lt;br&gt;- High-level balance activities&lt;br&gt;- Endurance activities&lt;br&gt;- Promote independence with home exercise and walking program</td>
</tr>
<tr>
<td><strong>Patient unable to follow simple commands.</strong></td>
<td><strong>Patient able to follow simple commands. Severely weak and requires maximal assistance to stand or unable to stand.</strong></td>
<td><strong>Patients is weak, but only requires min-mod assistance to stand and can support the majority of body weight.</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Criteria for Progressing to Next Phase</strong></td>
<td><strong>Patient able to follow simple commands. Hemodynamic status and oxygenation stable.</strong></td>
<td><strong>Patient requires min-mod assistance to stand and can support the majority of body weight.</strong></td>
<td><strong>Patient requires minimal assistance to ambulate &gt;10 feet with a walker.</strong></td>
</tr>
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<td></td>
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</tbody>
</table>
Effectiveness of an Early Mobilization Protocol in a Trauma and Burns Intensive Care Unit: A Retrospective Cohort Study

Diane Clark, PT, MBA, DScPT
John Lowman, PT, PhD
Helen Matthews, PT

THE PROBLEM

- Emergency department visits > 70,000 / year
  - Diversion
  - Require critical care

- High census in Trauma and Burns ICU

QUALITY IMPROVEMENT PROCESS

- Strong evidence of reduced complication rate and LOS in respiratory and medical ICU
- Unknown effectiveness in trauma and burn population
- Acute physical therapy department proposes solution

PLN

- Identify and analyze the problem
- DO
  - Develop and test a possible solution
- CHECK
  - Measure effectiveness, look for improvement
- ACT
  - Implement the improved solution fully
**Partners in Crime at UAB Hospital**

- Donald Reiff, MD  
  Medical Director, TBICU  
- Helen Matthews, PT  
  Acute Care Manager  
- John Lowman, PT, PhD  
  Faculty  
- Russell Griffin, PhD  
  Statistician/Epidemiologist  
- Kelly Shields, RN  
  Nurse Educator  
- Physician assistants, nurses and managers, PTs, RTs  
- Trauma Registry Staff  
- Trauma Care Coordinator  
- Hospital Administration  
- Hospital Finance

**Initiative – Early Mobilization in TBICU**

**D = Do**

January – April 2009

Program development

Interdisciplinary team

Champions

Pilot evaluation

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**Planning the Intervention**

- Early Mobility Protocol (EMP) tailored to the trauma and burns population
- Contraindications to the protocol
- Personnel and resources
- Staff education
- Sedation management
- Barriers
- Communication and coordination

**TRAUMA AND BURN POPULATION**

<table>
<thead>
<tr>
<th>SYSTEM</th>
<th>INJURY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Musculoskeletal</td>
<td>Multiple fractures, skeletal traction, surgical fixation, immobilization, amputation, contusion, hematoma</td>
</tr>
<tr>
<td>Neurological</td>
<td>Spinal cord injury, peripheral nerve injury</td>
</tr>
<tr>
<td>Integument</td>
<td>Burns, abrasions, lacerations, degloving</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>Cardiac contusions, tamponade, shock, MI, aortic dissection, vascular trauma</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>Smoke inhalation, rib fractures, tension pneumothorax, contusion, lung collapse, diaphragmatic rupture</td>
</tr>
<tr>
<td>Visceral organs</td>
<td>Contusions, laceration, organ dysfunction and failure, hemorrhage</td>
</tr>
</tbody>
</table>

**Initial Patient Management**

- Physical therapy initial patient screening and assignment to mobility level
- Identification of passive range of motion (PROM) precautions†
- Physical therapy exam when appropriate

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**PROTOCOL**

**1.** Patient least able to participate

**2.** Able to follow motor commands

**3.** Sitting back supported in bed

**4.** Sitting edge of bed

**5.** Standing, transfers, walking

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**PTJ Symposium: Rehabilitation of Patients with Critical Illness**

CSM 2013  January 24, 2013
C = Check
May 2009 – August 2009
Pilot study: Safety and feasibility
Data collection
Analysis
\[VAP \text{ and } DVT\]
\[Pressure \text{ ulcers}\]

Initiative – Early Mobilization in TBICU

**Demographic Characteristics**

- Post EMP population
  - Older than pre-EMP (46.6 vs. 44.1 yrs)
  - Fewer males (70 vs. 75.1%)
  - Mean ISS lower (23.6 vs. 22.2)*
  - Higher incidence of comorbidities
    - Arthritis, CVD, diabetes, neurologic disorder, OSA, pulmonary disorder

**RESULTS**

<table>
<thead>
<tr>
<th>Complications</th>
<th>EARLY</th>
<th>LATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Airway</td>
<td>0.52</td>
<td>(0.35-0.70)</td>
</tr>
<tr>
<td>Pulmonary</td>
<td>0.84</td>
<td>(0.74-0.95)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>0.79</td>
<td>(0.66-0.93)</td>
</tr>
<tr>
<td>Vascular</td>
<td>0.58</td>
<td>(0.45-0.75)</td>
</tr>
<tr>
<td>DVT</td>
<td>0.67</td>
<td>(0.50-0.90)</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>1.81</td>
<td>(1.16-2.83)*</td>
</tr>
</tbody>
</table>

* Pericardial effusion/tamponade: Not attributed to mobility

**LOS**

- 19.2 – 16.8 but not statistically significant when ISS

**Adverse Events**

- None

**WHAT?**

- Earlier mobilization in TBICU was safe and reduced complications resulting in cost savings to the hospital
- Culture where mobility is cornerstone of non-emergent interventions
- Collaboration rather than coordination
- Dosage

**SO WHAT?**
Physical Therapy Roles

- Recognition as innovators
- Recognition as collaborators
- Working outside of silos
- Implementation of new programs

Take Home Message

- Be a leader at all levels
- Be involved in solutions
- Volunteer skills outside of your department
- Identify non-traditional partners

Above All...

Don't just ride a bike -

Don't just climb out of bed

In the morning -

Dare to be the pace setter!

Climb a mountain!
Issues Impacting the Delivery of Physical Therapy Services for Individuals with Critical Illness

Amy Pawlik, PT, DPT, CCS
University of Chicago Medicine
Combined Sections Meeting
January 24, 2013

Previously published reviews
- Effectiveness
- Feasibility
- Culture
- Multidisciplinary collaboration
- Sedation interruption

Issues Specific to Physical Therapists
- Competency
- Personnel
- Prioritization
- Functional outcome measures
- Post-acute care interventions

Competence-why?
- Rapid decision making due to change in status
- Maximize oxygen transport while addressing impairments
- Understanding of impact of bedrest and medical interventions
- Safely intervene in a complex environment

Clinical Competency
- Academic preparation
- Clinical competence
- Specialist certification
- Advanced clinical education

Academic Preparation
- APTA Minimum Required Skills of Physical Therapy Graduates at Entry-Level
- Normative Model of Physical Therapist Professional Education
- APTA Physical Therapists Clinical Education Principles
  - 10-12 weeks of clinical experience
Clinical education

- Lack of available sites
- 2:1 model
- Simulation

Clinical Competence

- Nursing, pharmacists
- Few published examples
- Harris KB. Acute Care Perspectives 2006.

Advanced Clinical Training

- Specialist certification
- Acute care residency

Personnel Resources

- Mobility teams
- PT or other?
- Reallocation of resources?
- Cost

Mobility Team

<table>
<thead>
<tr>
<th>Institution</th>
<th>Team members</th>
</tr>
</thead>
<tbody>
<tr>
<td>University of Chicago</td>
<td>Physical Therapist, Occupational Therapist</td>
</tr>
<tr>
<td>Wake Forest</td>
<td>Physical Therapist, Nursing Assistant, Critical Care Nurse</td>
</tr>
<tr>
<td>Johns Hopkins</td>
<td>Physical Therapist, Occupational Therapist, Rehabilitation Assistant</td>
</tr>
<tr>
<td>LDS Hospital</td>
<td>Physical Therapist, Respiratory Therapist, Registered Nurse, Critical Care Technician</td>
</tr>
</tbody>
</table>
Unique Skills of the PT
  - PT achieved higher level of mobilization
  - Different barriers identified
- Atrophy, deconditioning, cardiopulmonary compromise

Reallocation of Resources
  - 95% of control group received physical therapy
  - More sessions during ICU stay
  - More sessions during hospitalization

Cost
  - Usual care – intervention (mobility team) = $504,000+
  - Mobility team salary/benefits= $250,000+
- Decreased hospital and ICU LOS
- Increased ventilator-free days

Prioritization
- Hospital-wide
- Within the ICU
- Treatment vs. prevention
- Baseline functional level?

Outcome Measures
- Functional Independence Measure (FIM)
- Univ. of Rochester Acute Care Evaluation (URACE)
- Johns Hopkins Hospital Function Acute Care Score (JHH-FACS)
- Acute Care Index of Function
- Physical Function ICU Test (PFIT)

Outcome Measures
- Strength testing
  - Manual muscle testing
  - Dynamometry
Post-acute care follow-up

- Awareness
- Interdisciplinary clinics
- Outpatient group models
- Home-based programs

Future Directions

- Competency
- Personnel
- Prioritization
- Functional outcome measures
- Post-acute care interventions

Questions?
COMPLETE LISTING OF THE ARTICLES IN THE SPECIAL SERIES: REHABILITATION OF PEOPLE WITH CRITICAL ILLNESS

ProfessionWatch

- How the National Heart, Lung, and Blood Institute (NHLBI) Develops Research Priorities and Supports Critical Care Research Andrea L. Harabin and James P. Kiley (December 2012)

Perspectives

- Intensive Care Unit–Acquired Weakness: Implications for Physical Therapist Management Amy Nordon-Craft, Marc Moss, Dianna Quan, and Margaret Schenkman (December 2012)
- Physical Therapist Management of Patients with Ventricular Assist Devices: Key Considerations for the Acute Care Physical Therapist Chris L. Wells (February 2013)
- Issues Affecting the Delivery of Physical Therapy Services for Individuals With Critical Illness Amy J. Pawlik and John P. Kress (February 2013)

Research Reports

- Quantifying Physical Activity Levels of Survivors of Intensive Care: A Prospective Observational Study Linda Denehy, Sue Berney, Laura Whitburn, and Lara Edbrooke (December 2012)
- Physical Therapy on the Wards After Early Physical Activity and Mobility in the Intensive Care Unit Ramona O. Hopkins, Russell R. Miller III, Larissa Rodriguez, Vicki Spuhler, and George E. Thomsen (December 2012)
- Safety and Feasibility of an Exercise Prescription Approach to Rehabilitation Across the Continuum of Care for Survivors of Critical Illness Sue Berney, Kimberley Haines, Elizabeth H. Skinner, and Linda Denehy (December 2012)
- Simulation Experience Enhances Physical Therapy Student Confidence in Managing a Patient in the Critical Care Environment Patricia J. Ohtake, Marcielene Lazarus, Rebecca Schillo, and Michael Rosen (February 2013)

Research Reports – Outcome Measures

- The Clinical Utility of the Functional Status Score for the Intensive Care Unit (FSS-ICU) at a Long-Term Acute Care Hospital: A Prospective Cohort Study Aaron Thrush, Melanie Rozek, and Jennifer L. Dekerlegand (December 2012)
- Repeatability of the Six-Minute Walk Test and Relation to Physical Function in Survivors of a Critical Illness Jennifer A. Alison, Patricia Kenny, Madeleine T. King, Sharon McKinley, Leanne M. Aitken, Gavin D. Leslie, and Doug Elliott (December 2012)

Study Protocols


Quality Improvement Articles
- Effectiveness of an Early Mobilization Protocol in a Trauma and Burns Intensive Care Unit: A Retrospective Cohort Study Diane E. Clark, John D. Lowman, Russell L. Griffin, Helen M. Matthews, and Donald A. Reiff (February 2013)
- Safety and Feasibility of an Early Mobilization Program in Patients With Aneurysmal Subarachnoid Hemorrhage Brian F. Olkowski, Mary Ann Devine, Laurie E. Slotnick, Erol Veznedaroglu, Kenneth M. Liebman, Melissa I. Arcaro, and Mandy Jo Binning (February 2013)
- Move to Improve: The Feasibility of Using an Early Mobility Protocol to Increase Ambulation in the Intensive and Intermediate Care Settings Anne Drolet, Patti DeJuilio, Sherri Harkless, Sherry Henricks, Elizabeth Kamin, Elizabeth A. Leddy, Joanna M. Lloyd, Carissa Waters, and Sarah Williams (February 2013)

Case Reports
- Innovative Mobility Strategies for the Patient With Intensive Care Unit–Acquired Weakness: A Case Report Darin W. Trees, James M. Smith, and Steve Hockert (February 2013)
- Inspiratory Muscle Strength Training in Infants with Congenital Heart Disease and Prolonged Mechanical Ventilation: A Case Report Barbara K. Smith, Mark S. Bleiweis, Cimaron R. Neel, and A. Daniel Martin (February 2013)
- Physical Rehabilitation of Patients in Intensive Care Units Requiring Extracorporeal Membrane Oxygenation: A Small Case Series Rod A. Rahimi, Julie Skrzat, Dereddi Raja S. Reddy, Jennifer M. Zanni, Eddy Fan, R. Scott Stephens, and Dale M. Needham (February 2013)