Improving and Sustaining ICU Physical Rehabilitation with Data Collection and Evidence

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Conflict of Interest Disclosure

• Heidi Engel, PT, DPT receives grant money through the Gordon and Betty Moore Foundation for Project Emerge at UCSF Reducing 7 Harms in Critical Care

• Heidi Engel, PT, DPT has been a paid consultant for the Arjo-Huntleigh Medical Equipment Company

Learning Objectives

1. Convey the performance of data collection to achieve targets set for process and outcomes improvements relating to ICU early mobilization
2. Explain methods for quality improvement initiatives for ICU early mobility
3. Describe the opportunities for Physical Therapist initiated clinical improvements through research in ICU early mobility
4. Report on the APTA sponsored clinical practice guideline development process in progress for PT practice in the ICU
Working in the Intensive Care Unit 2015

What is the role for the Physical Therapist?
Are we necessary?
The impact of our interventions?
Part of the team?

Be Both Researcher and Clinician

“In our Brazilian ICU, mobilization therapy in critically ill patients was safe and feasible; however, similar to other countries, in-bed exercises were the most prevalent activity. During mechanical ventilation, only a small percentage of activities involved standing or mobilizing away from the bed.”


Why Data Collection is Worth the Time

Know Your Patients, Understand your Colleagues
Dedication to helping the patients you will never meet
Research makes you a better clinician, Being a clinician makes you a more effective researcher, and you can keep it simple

* Ohtake FL, Strasser DC, Needham DM: (2013).
KEY REFERENCES:

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


Outcomes from ICU Mobility QI Projects

- Decrease ICU and hospital LOS
- Improve overall physical functioning
- Decrease duration of mechanical ventilation
- Decrease incidence of delirium
- Decrease need for tracheotomies
- Greater ability to discharge to home rather than SNF

- Schweickert WD. Lancet. 2009 May;373:1874-82

QI Projects by Comparison

<table>
<thead>
<tr>
<th>QI Projects in ICU Early Mobility</th>
<th>Wake Forest N = 165</th>
<th>Johns Hopkins N = 27</th>
<th>UCSF N = 179</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective</td>
<td>Reduce weakness, inactivity/early PT</td>
<td>Reduce early physical therapy in ICU</td>
<td>Provide earlier &amp; more frequent PT in ICU</td>
</tr>
<tr>
<td>Planning/ Pre-intervention time frame</td>
<td>Multi-disciplinary group (time frame?)</td>
<td>1 year</td>
<td>1.5 years</td>
</tr>
<tr>
<td>Intervention</td>
<td>Intensive care mobility team (Critical care nurse, nursing assistant, physical therapist) initiate mobility protocol within 48 hrs of admission</td>
<td>Increase early ICU mobilization using 4 step (4Es) model: 1. Summarize evidence 2. Identify barriers 3. Establish performance measures 4. Ensure patients receive intervention</td>
<td>ICU early mobilization group: established guidelines to mobilize pts in the ICU, with a goal of initiating PT within 48 hours of admission in ICU</td>
</tr>
</tbody>
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QI Projects by Comparison

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<tr>
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<td>Objective</td>
<td>Reduce weakness, immobility with early PT</td>
<td>Provide early PT in the ICU</td>
<td>Provide earlier and more frequent PT in the ICU</td>
</tr>
<tr>
<td>Outcomes Measured</td>
<td>Number of patients receiving physical therapy</td>
<td>Proportion of ICU days with no therapy</td>
<td>Number of days to initiating PT (median)</td>
</tr>
<tr>
<td></td>
<td>First day out of bed</td>
<td>PT and OT consultations, proportion patients</td>
<td>ICU LOS median days</td>
</tr>
<tr>
<td></td>
<td>Pregnancy of therapy</td>
<td>Alert during sedation assessment</td>
<td>Hospital LOS median days</td>
</tr>
<tr>
<td></td>
<td>Number of days in ICU</td>
<td>Physiological stability, Unexpected events</td>
<td>Distance walked in ICU (median ft)</td>
</tr>
<tr>
<td></td>
<td>Number of days in hospital</td>
<td>proportion of treatments sitting edge of bed or higher level activities</td>
<td>Percentage of pts discharged to home</td>
</tr>
<tr>
<td></td>
<td></td>
<td>MRCU LOS</td>
<td>Level of assistance (ICF)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total Hospital LOS</td>
<td>Percentage of pts ambulating</td>
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QI Project Example

- **Objective:** Seek adoption of new practice patterns, translate evidence-based knowledge into practice, is your institution ready for change?
- **Utilizing the CFIR framework:** Consolidated Framework for Implementation Research
  - To examine the intervention, inner setting, outer setting, individuals involved, and process to accomplishing intervention
  - **Example:** Intervention characteristics of how specific and adaptable is the intervention? Inner setting of work load and staffing ratios in ICU, outer setting of Administrative support, self-efficacy of individuals, educational processes for implementation, evaluative surveys as follow-up


Outcomes Cost

- Decreased cost for protocol group
  - -$6,805,082 vs. $7,309,871
  - Attributed to decreased ICU and hospital LOS

- **Utilize administrative champions to make financial modeling**

Institute for Healthcare Improvement (IHI)

- IHI: a not-for-profit organization based in Cambridge, Massachusetts has led many innovative critical care efforts over the past seventeen years.
- Emphasis on setting individual goals, drawing on strength of local expertise.
- Model for Improvement: Plan, Do, Study, Act cycle, small tests of change.


Institute for Healthcare Improvement PDSA Cycle

- Plan:
  - Critically appraise the literature to select an evidence-based initiative.
  - Ensure QI team is interdisciplinary and represents key stakeholders—including frontline staff, quality “champions,” and key executives.
  - Evaluate resources within institution to provide support.
  - Anticipate changes in resource and personnel needs associated with process change; consider the opportunity costs of the initiative.
  - Utilize QI tools to identify opportunities for improvement, including root cause analysis, fishbone diagrams, run charts, Pareto charts, and prioritization matrices.

Institute for Healthcare Improvement PDSA Cycle

- Plan:
  - Identify SMART (specific, measurable, achievable, relevant, timely) goals/targets.
  - Identify a champion of the QI effort in each department or stakeholder group; create a back-up plan in the event of unexpected loss of a champion.
  - Perform work-flow analyses to assess how the initiative will affect the work environment.
  - Consider pilot testing and stepwise implementation.
  - Design an easy-to-use measurement tool that is integrated into the work flow and provide incentives for its use.
Institute for Healthcare Improvement PDSA Cycle

- Do:
  - Market the practice change with sound evidence provided in a concise format distributed to all stakeholders.
  - Remind clinicians of the process change using signage and compliance monitoring.
  - Communicate goals/targets and the time line for achievement.
  - Consider creating competition among various units to increase motivation and participation.
  - Ensure protocol or process change is effectively incorporated into practice through tools such as order sets: Create standard work.
  - Verify validity of data collection.

- Study:
  - Re-evaluate protocol.
  - Obtain clinician feedback.

Society of Critical Care Medicine (SCCM)
ICU Liberation Campaign

Implementing the entire ABCDEF Bundle is crucial!

Awakening and Assessing Pain
Breathing
Choice of Sedation, Coordination of AB
Delirium
Early Mobility
Family Engagement

- Vloemans M. Am J Respir Crit Care Med. 2015;191:292-301.

How Early Does This Need to Be?

Neurocognitive and Functional Benefits to ICU Patients

RCT- 104 patients on mechanical ventilation

intervention group- PT median of 1.5 days intubation
control group- PT median of 7.4 days

Intervention group-
less days of delirium and MV
50% return to independent function at hospital discharge 35% in control group

The dilemma of the young male patient
Agitated when lying in bed restrained
Fully alert able to communicate sitting up with clipboard


Timeliness of ICU Mobility in 9/13 ICU for Mechanically Ventilated Patients

<table>
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<tr>
<th>Event</th>
<th>Median Duration (3-2013 through 8-2013)</th>
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<tbody>
<tr>
<td>Admit to PT Eval</td>
<td>4.3 days</td>
</tr>
<tr>
<td>Admit to Ambulation</td>
<td>7.9 days</td>
</tr>
<tr>
<td>Eval to Ambulation</td>
<td>2.1 days</td>
</tr>
<tr>
<td>Admit to ICU to d/c (LOS)</td>
<td>19.4 days</td>
</tr>
<tr>
<td>Apache II</td>
<td>24.5</td>
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<tr>
<td>Adm to PT Eval</td>
<td>4.2 days</td>
</tr>
<tr>
<td>Adm to Ambulation</td>
<td>6.5 days</td>
</tr>
<tr>
<td>Eval to Ambulation</td>
<td>2.0 days</td>
</tr>
<tr>
<td>Adm to ICU to d/c (LOS)</td>
<td>18.0 days</td>
</tr>
<tr>
<td>Apache II</td>
<td>25</td>
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</table>
Timeliness of ICU Mobility in 9/13 ICU for Mechanically Ventilated Patients

Median for young vented cohort (N = 33)  
3-2013 through 8-2013

<table>
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<tr>
<th>Time Point</th>
<th>Median Days</th>
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<tr>
<td>Adm to PT eval</td>
<td>5.2</td>
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<tr>
<td>Adm to Ambulation</td>
<td>9.2</td>
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<tr>
<td>Eval to Ambulation</td>
<td>2.5</td>
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<td>24.2</td>
</tr>
<tr>
<td>Apache II</td>
<td>20</td>
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First Question to Ask: Did Our Patient Walk Today?

- Staff and culture of the ICU set the expectation
- Culture consists of automatic behaviors, self-directed, the right path (not always the easiest path) is chosen consistently without dictation
- Patients and families are willing participants

Feasibility of Walking

Data from UCSF March 2013 Through August 2013  
Mixed Medical-Surgical ICU  
563 patients admitted for > 48 hrs  
382 referred to PT (68%)

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<th>Measurement</th>
<th>Value</th>
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<tr>
<td>Median Age of PT Patients</td>
<td>64 (55,74) IQR</td>
</tr>
<tr>
<td>Median APACHE II Score</td>
<td>19 (13,25) IQR</td>
</tr>
<tr>
<td>Walk during their ICU stay</td>
<td>283 PT Patients</td>
</tr>
</tbody>
</table>

(74% in PT, 50% of all admits)
How Are We Doing?
Point Prevalence Studies:
In this 1-day point-prevalence study conducted across Germany
only 8% of patients with an endotracheal tube were mobilized out of bed as
part of routine care.

Terri Hough University of Washington Medical Center, Presenting at The 7th International Physical Medicine
and Rehabilitation of Critically Ill Patients Meeting 5/17/2014, Across the US.

64% of ICU patients experienced any activity
50% of those were bed level activity
20% of those were transfers to a chair
10% of those were walking

Barriers to Implementation
Nervous or skeptical clinicians
Minimal resources allocated
Awkward equipment
PT referrals still too late
Unclear protocol
Mobility prior to extubation is difficult concept
Rotating and changing personnel
Variations in sedation practices
New hospital and discharge course predictions required for
ICU and floor personnel

Resarching the Barriers
5 studies compared:
Physiologic instability
Sedation level
Fear of dislodging lines and tubes
Medical procedures
Medical orders
Patient refusal
Resistive or disengaged team members
Lack of staffing
Staff burden- too busy, work load perceived as too heavy
Inexperienced staff
Lack of equipment
Facilitators of Mobility

Adequate staffing
Dedicated ICU PT/OT
Cooperation, flexibility, collaboration of staff
Multi-discipline rounding

A mobility protocol to make new mobility behaviors routine
Hemodynamic stability of patient addressed specifically to facilitate mobility
Awake and alert patient: target RASS 0 to -1 achieved

Bakhru RN, Wiebe DJ, McWilliams DJ, Spuhler VJ, Schweickert WD. (2015)

Case Comparisons

13 ICU - standard PT care
• 51 yo M ARDS pt, I community level activity
• 50mcg propofol PEEP 8 FiO2 .6
• Bed rest activity orders, PT referral on HD 10
• Failed SBT, delirium
• LOS 1 month, 5 sessions PT
• d/c’d to acute care able to stand 30 seconds with minA of 2

9 ICU - early mobilization
• 25 yo F ARDS pt, I community level activity
• 100mcg propofol PEEP 16 FiO2 .9
• Activity as tolerated orders, PT referral on HD 1
• ICUAW, tracheotomy
• LOS 1 month, 19 sessions PT
• d/c’d to acute rehab able to walk SBA FWW 60’ X4

Case Series Demonstrating New Practice

• MD orders to disconnect patients from CVVH for 2 hours to allow for ambulation.

• All patients walk 200’ or more

• No adverse events, no loss of CVVH lines or filters
KEY REFERENCES: Laying the foundation for mobility for femoral catheters

- Perme C. Am J Respir Crit Care Med. 2009;179:A1586.

What About All Those Critical Lines?

Patient lines and drains can be accommodated

Including Femoral Lines

Mechanical ventilation and CVVH lines


Patient on Mechanical Ventilation AND CVVH with Femoral Catheter
What Did our Patient Achieve Today?

PHYSICAL THERAPY PROGRESS NOTE
This note does not include all documentation from the physical therapy session. For the complete physical therapy documentation, please see the report: PT Adult Day by Day
The following documentation is for a: Charting Type: Treatment

INPATIENT RECOMMENDATIONS
Physical Therapist Global Assessment of Mobility
Mobility Score (PT): 7: Stand >10 sec with any assistive device or level of assist

UCSF Mobility Score Defined- the Dependent Impaired Patient

0 Nothing/Passive- Bed rest, no activity or passive ROM only. Passively rolled or PROM by staff, not actively moving.

1 Active bed exercise / Edge of bed sitting < 5 minutes- Active bed level exercise including rolling self, lifting hips, cycle ergometry, active ROM. Patient participating in activity. Edge of bed sitting attempted, lasting less than 5 minutes

2 Tilt table positioning/ neuro chair- Requires some ability for patient to support self

3 Edge of bed sitting ≥ 5 minutes- Any level of assistance. Actively sitting on edge of bed with some trunk control

4 Passive transfer to chair (total assist) & maintains sitting in chair - Total assist to chair. Patient has trunk control to maintain sitting position in chair. SARA-3000 or ceiling lift transfer to chair.

UCSF Mobility Score Defined- the Deconditioned Patient

5 Active transfer to chair- Some level of assistance to chair. Assisted stand and pivot step or shuffle to chair.

6 Standing with assistance < 10 seconds- Standing with weight bearing < 10 seconds, some level of assistance or support device (e.g. STEDY)

7 Standing with or without assistance ≥ 10 seconds- Standing with weight bearing ≥ 10 seconds. With or without assistance. May include use of assistive device.
UCSF Mobility Score Defined- the Walking Patient

8 Walking > 5 feet, up to 200 feet-
Walking away from bed/chair at least 5 feet.
Assistive device may be used (or wheelchair mobility).

9 Walking ≥ 200 feet, up to 400 feet- Walking in hall 200-400 feet.
Any device or level of assist (or wheelchair mobility).

10 Walking ≥ 400ft Walking in hall ≥ 400 feet- With or without device, +/- supervision assist (or wheelchair mobility).

Opportunities
- APTA CPG
- APTA Next Conference for ICU as a Model of care and CPG
- Results of ICU Liberation mentoring, joint webinar SCCM and APTA
- UCSF Emerge Project- reducing harms with CUSP, PFAC, and technology
- Abstract for American Thoracic Society due 11/2015 on defining ICU EM as ICU Walking
- QI for our vented patients- next data collection 2016
- Creating Competencies for PTs working in the ICU
- New safe patient handling equipment trials
- Case Studies, Case Series

Can We Do Better?

- Clinical Outcomes for Survivors of ARDS
  - At One Year [Median age 45, N= 83]
    - 48% returned to work
    - Results of 6 minute walk test are 68% of predicted normal
  - At Five Years [Median Age 44, N=64]
    - 77% returned to work
    - Results of 6 minute walk test are 76% of predicted normal

12/9/2015
Can We Do Better?

• “There appears to be significant potential for harm arising from the current ICU culture of patient immobility and an often excessive or unnecessary use of sedation.”

• Herridge MS. Mobile, awake and critically ill. CMAJ. Mar 11 2008;178(6):725-726.

We Need The Entire Bundle for Success

“In adjusted models, those who implemented exercise with sedation interruption and delirium screening were 3.5 [CI 1.4-8.6] times more likely to achieve higher levels of exercise in ventilated patients than those who implemented exercise without both sedation interruption and delirium screening. “


Let patients speak for themselves, allow them the chance to surprise you

Research gives you their narrative rather than our view from the outside
Elements of a Clinical Practice Guideline

- Assembling an interdisciplinary task force with a core development group: (GDG) consisting of four PTs who bring a rich blend of strengths in clinical and research scholarship and whose professional affiliations span three APTA Sections.
- In addition, we will recruit approximately 12-15 additional interprofessional members (from critical care medicine, nursing, respiratory therapy, and physical therapy) who will be referred to as the content experts (CEs), resulting in an ICU CPG work group of 16-19 individuals.
- The core-GDG will be responsible for conducting a systematic review of the literature regarding physical therapy in the ICU.

Elements of a Clinical Practice Guideline

- Use of the Grading of Recommendations Assessment, Development and Evaluation (GRADE) method for evaluating the quality of the literature and impact of the interventions
- A professional librarian to conduct literature searches, a methodologist
- Maintaining a single electronic data base and providing transparency through out the process
- Development of clinical questions using the population, intervention, comparison, and outcome (PICO) format


Institute of Medicine Standards for Developing CPGs

- Predetermined criteria for achieving group consensus
- Equal voice of each task force member
- Establish transparency
- Disclosure and management of Conflicts of Interest
- Explain reasoning of recommendations
- External review
- Updating
APTA Sponsored Clinical Practice Guideline for PT in the ICU

1. Identify the effectiveness of physical therapist (PT)-directed interventions;
2. Develop an intervention schema that will inform PT management of patients during CI and help to reduce unwarranted variation in practice;
3. Identify key areas of future research.

Need for CPG for PT in the ICU

1. Improve PT management of patients with CI and reduce variation in practice;
2. Reduce disability among patients with CI by preventing or minimizing the negative sequelae associated with their condition;
3. Inform intervention strategies for this population;
4. Provide guidance for future effectiveness studies.

While other systematic reviews and CPGs have been written (or are currently in development) regarding mobility and rehabilitation in the ICU, this will be the first document to specifically address the provision of PT services.

Society of Critical Care Medicine Clinical Practice Guidelines for the Management of Pain, Agitation, and Delirium

Interpretation of PAD Guidelines

Quality of evidence: statements and recommendations
- High (A)
- Moderate (B)
- Low/Very Low (C)

Strength of recommendations: recommendations only
- Either strong (+), weak (0), or none (0)
- Either in favor of an intervention (+) or against an intervention (-)
Society of Critical Care Medicine (SCCM) ICU Liberation Campaign

• Implementation of PAD Guidelines:
• Multi-professional approach
• Utilize valid and reliable assessment tools
• Decrease sedation
• Prevent complications


KEY REFERENCES: Laying the Foundation for E of ABCDEF Bundle

Early progressive mobility interventions work

• Schweickert W. Lancet. 2009;373:1874-82.
• Kayambu G. Intensive Care Med. 2015;41:865-74.

References for Presentation

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