

**Updates on Practical
Implementation of Early
Mobility in the ICU**

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DISCLOSURES

- I have no potential financial interests to report
- Every patient picture in this lecture has a signed consent from the patient and/or family


Learning Objectives

- Identify absolute and relative contraindications to mobilizing critically ill patients in the ICU
- Implement strategies for early mobilization of ICU patients

My clinical experience as
physical therapist in ICU for
more than 30 years...



**OVERVIEW OF EARLY
MOBILITY IN ICU**



Bailey P. Crit Care Med. 2007 Jan;35(1):139-4
Morris PE. Crit Care Med. 2008 Aug;36(8):2238-43
Schweickert WD. Lancet. 2009 May ; 373:1874-1882

- 70 years later...
 - Safe, feasible and improves physical function!
 - It can reduce Delirium!
 - It can reduce length of hospital stay and costs!

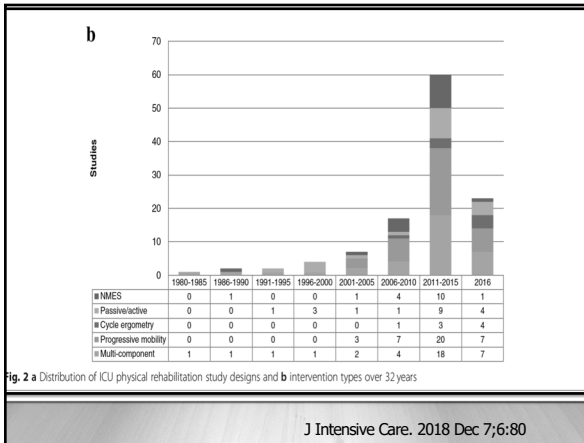
RESEARCH Open Access

Physical rehabilitation interventions in the intensive care unit: a scoping review of 117 studies

Julie C. Reid^{1*}, Janelle Unger², Devin McCaskell³, Laura Childerhose¹, David J. Zorko⁴ and Michelle E. Kho^{1,3}

- Scoping review to determine the extent of ICU Rehab interventions and how they were reported and measured
- Included 117 publications (out of 1429 full-texts)

J Intensive Care. 2018 Dec 7;6:80

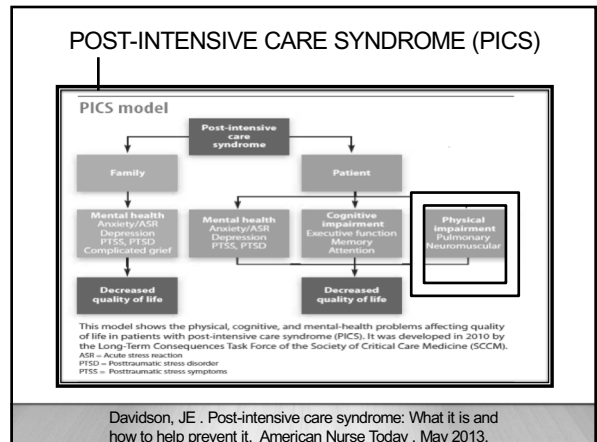


Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility and Sleep Disruption in Adult Patients in the ICU

John Devlin;Yoanna Skrobik;Céline Gélinas;Dale Needham;Arjen J. Slooter;Pratik Pandharipande;Paula Watson;Gerald Weinhouse;Mark Nunnally;Bram Rochweg;Michele Balas;Mark van den Boogaard;Karen Bosma;Nathaniel Brummel;Gerald Chanques;Linda Denehy;Xavier Drouot;Gilles Fraser;jocelyn Harris;Aaron Joffe;Michelle Kho;John Kress;Julie Lanphere;Sharon McKinley;Karin Neufeld;Margaret Pisanijean-Francois Payen;Brenda Pun;Kathleen Puntillo;Richard Riker;Bryce R. Robinson;Yahya Shehabi;Paul Szumita;Chris Winkelman;John Centofanti;Carrie Price;Sina Nikayin;Cheryl Misak;Pamela Flood;Ken Kidrowski;Waleed Alhazzani;

Crit Care Med. 2018 Sep;46(9):e825-e873

What is the reason for adding "immobility" to PAD?



**PADIS- IMMOBILITY
Question**

For adult critically ill patients:

- Is rehab/mobilization beneficial in improving patient, family, or health system outcomes compared with usual care, a different rehab/mobilization intervention, placebo, or sham intervention?

Crit Care Med. 2018 Sep;46(9):e825-e873

PADIS: IMMOBILITY

- Authors suggest performing rehabilitation or mobilization in critically ill adults
 - Conditional recommendation
 - Low quality of evidence

Panel members agreed that the desirable consequences for patients probably outweigh the undesirable consequences!

Crit Care Med. 2018 Sep;46(9):e825-e873

**CONSEQUENCES OF BEDREST AND
IMMOBILITY**

- Shifting of body fluids from the extremities in the thorax
- Decreased total blood volume
- Decreased ventilation, atelectasis, secretion retention
- Increased calcium excretion
- Muscle weakness and joint contractures
- Emotional and behavior disorders

Crit Care Med. 2018 Sep;46(9):e825-e873

**CONSEQUENCES OF BEDREST AND
IMMOBILITY**

- Pressure ulcers
- Deep vein thrombosis (DVT)
- Pneumonia
- Urinary tract infection (UTI) due to fluid stasis in kidneys
- Increased morbidity and mortality
- Prolonged length of stay
- Increased cost

Crit Care Med. 2018 Sep;46(9):e825-e873

Prolonged, unnecessary bed rest and immobility in ICU puts patients at risk for systemic complications!


AACN Advanced Crit Care 20(2009) 254-266

What is the impact of bedrest and immobility?



Skeletal muscle strength decline:

- Strict bed rest: ~ 1% to 1.5 % per day
- Limbs immobilized by cast: ~ 5% to 6% per day

Crit Care Clin 23(2007) 97-110

| 

*“Mobility and exercise **MUST** be a priority in the plan of care for every patient in ICU!”*

|

“Early Rehab” x **“Early Mobility”** in ICU...

| **“EARLY REHAB IN ICU”**

<p>PHYSICAL THERAPY:</p> <ul style="list-style-type: none"> • Education • Positioning • Exercises • Transfers • Walking Re-education • Chest Physical Therapy • Others... 	<p>OCCUPATIONAL THERAPY:</p> <ul style="list-style-type: none"> • Education • Positioning • Exercises/Transfers • ADLS • Splints • Cognition/Communication • Others...
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| **“EARLY MOBILITY IN ICU”**

<p>In-bed mobility:</p> <ul style="list-style-type: none"> ▪ Passive ROM exercises ▪ Turn side to side ▪ Sitting on the side of the bed ▪ Active exercises 	<p>OOB mobility:</p> <ul style="list-style-type: none"> ▪ Standing at bedside ▪ Sitting in a: <ul style="list-style-type: none"> ▪ Regular chair ▪ Stretcher chair ▪ Walking
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GENERAL MOBILITY IS BASIC NURSING CARE!

THE VENTILATOR-DEPENDENT PATIENT 469





FIGURE 36-4. A method of ambulating the ventilator-dependent patient using a pressure-cycled ventilator on wheels and powered by an O₂ cylinder.



Principles & Practice of Pulmonary Rehab
Casaburi/Petty, Chapter 36, 1993


| **What influences the nurses' decision to mobilize the critically ill patient?**

- Interview- 12 critical care nurses at a large urban district hospital
- Inconsistent knowledge about the benefits of mobilizing patients

Nurs Crit Care, 2019 Jul 18

What influences the nurses' decision to mobilize the critically ill patient?

- Decision-making was influenced by:
 - Time constraints
 - Staffing levels
 - Unit demands
- Mobilization was deemed to be a low priority!



Nurs Crit Care 2019 Jul 18

PADIS- Question #1
For adult critically ill patients...

- Is receiving rehab/mobilization commonly associated with patient-related safety events or harm?

Serious safety events or harms do not occur commonly during physical rehabilitation or mobilization!

Crit Care Med. 2018 Sep;46(9):e825-e873

PADIS- Question #2
For adult critically ill patients...

When is safe to initiate rehab/mobilization?

Stability in cardiovascular, respiratory, and neurologic status!

Crit Care Med. 2018 Sep;46(9):e825-e873

PADIS- Question #3
For adult critically ill patients...

When rehab/mobilization should be stopped?

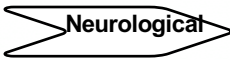
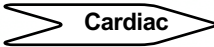
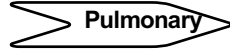
Development of new cardiovascular, respiratory, and neurologic instability!

Crit Care Med. 2018 Sep;46(9):e825-e873

EARLY MOBILITY AND REHAB IN ICU:
Patient selection

1. Safety screen
2. Absolute & relative contraindications for out of bed mobility

1. Safety screen

	Neurological	Minimally awake and able to participate with planned activities
	Cardiac	Hemodynamically stable
	Pulmonary	Stable ventilation and oxygenation status

RESEARCH Open Access

Expert consensus and recommendations on safety criteria for active mobilization of mechanically ventilated critically ill adults

Carol L. Hodgson^{1,2*}, Kathy Stiller³, Dale M. Neecham⁴, Claire J. Tipping⁵, Megan Harrold⁵, Claire E. Baldwin^{6,7}

	Low risk of an adverse event. Proceed as usual according to each ICU's protocols and procedures.
	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.
	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.

Figure 1 Color coding definitions.

Hodgson et al. Critical Care (2014) 18:658

Cardiovascular considerations	In-bed EXERCISE	Out-of-bed EXERCISE
Blood pressure		
Intra-aortic balloon pump or device for hypotensive emergency?	●	●
MAP?		
Below target range and/or symptoms	△	●
Below target range despite support (vasoactive and mechanical)	△	●
Greater than lower limit of target range while receiving no support or low level support	●	●
Greater than lower limit of target range while receiving medium level support	●	△
Greater than lower limit of target range on high level support	△	●
Known or suspected severe pulmonary hypertension	△	△
Cardiac arrhythmias		
Bradycardia:		
Requiring pharmacological treatment (e.g. isoprenaline) or awaiting emergency pacemaker insertion	●	●
Not requiring pharmacological treatment and not awaiting emergency pacemaker insertion	△	△
Tachycardia or episode of a arrhythmia:		
Dependent rhythm	△	●
Stable unduly high rhythm	●	●
Any other interventions:		
Ventilator rate >150 bpm	△	●
Ventilator rate 120 to 150 bpm	△	△
Any interventions with ventilator rate <120 bpm	●	●
Devices:		
Feared LARP*	●	●
ECMO:		
Feared ↑ or withdrawal (not single lateral dual lumen circuit)	●	●
Single lateral dual lumen circuit inserted into a central vein	●	△
Ventilator assist device	●	△
Pulmonary artery catheter or other continuous cardiac output monitoring device	●	△
Other cardiovascular considerations:		
Shock of any cause with lactate >normal L	△	△
Known or suspected acute DVT/PE	△	△
Known or suspected severe aortic disease	●	△
Cardiac ischemia (defined as ongoing chest pain and/or dynamic ECG changes)	△	△

Figure 3 Cardiovascular safety considerations.

Hodgson et al. Critical Care (2014) 18:658


WHO SHOULD BE OUT OF BED?

EVERYONE!

EXCEPT WHO SHOULD NOT BE OUT OF BED...


2. Absolute & relative contraindications for out of bed

- Unstable fractures
- Patients on neuromuscular blockade
- Hemodynamic instability: escalating dose/multiple vasopressors
- Significant oxygenation dysfunction requiring high levels of oxygen
- Open chest/open abdomen




2. Absolute & relative contraindications for out of bed

- Cerebral edema with uncontrolled intra-cranial pressure
- Active bleeding
- Pacer dependent with transvenous temporary pacemaker
- Femoral arterial sheath
- Intra-aortic balloon pump on femoral artery
- ECMO with femoral cannulation









Femoral ECMO: Weight Bearing on Moveo Table



EARLY MOBILITY AND REHAB IN ICU

RESOURCES AVAILABLE

ICU LIBERATION - ABCDEF BUNDLE

 <p>ASSESS, PREVENT, AND MANAGE PAIN Understand pain and find tools for its assessment, treatment and prevention.</p>	 <p>BOTH SAT AND SBT Both Spontaneous Awakening Trials and Spontaneous Breathing Trials</p>	 <p>CHOICE OF ANALGESIA AND SEDATION Understand the importance of defining the depth of sedation choosing the right medication.</p>
 <p>DELIRIUM: ASSESS, PREVENT AND MANAGE Understand delirium risk factors and find tools for its assessment, treatment and prevention.</p>	 <p>EARLY MOBILITY AND EXERCISE ICU early mobility involves more than changing the patient's position.</p>	 <p>FAMILY ENGAGEMENT AND EMPOWERMENT Involving the family in patient care can help recovery.</p>

<http://www.sccm.org/ICULiberation/ABCDEF-Bundles>


WWW.ICUDELIRIUM.ORG

CRITICAL ILLNESS, BRAIN DYSFUNCTION, and SURVIVORSHIP (CIBS) CENTER

for Medical Professionals for Patients and Families about the CIBS Center about the ICU Recovery Center

for Medical Professionals

Early Mobility and Exercise



ELSEVIER SAUNDERS

CRITICAL CARE CLINICS

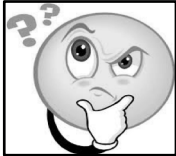
Crit Care Clin 23 (2007) 81-96

Transforming ICU Culture to Facilitate Early Mobility

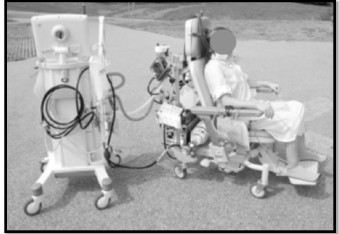
Ramona O. Hopkins, PhD^{a,b,*},
Vicki J. Spuhler, RN, MS^a,
George E. Thomsen, MD^a

EARLY MOBILITY IN ICU...

WHAT IS THE FUTURE?



DEVELOPED COUNTRIES...



http://www.mobilization-network.org/Network/News/Eintrage/2012/2/1_2MobilizationwithECMO.html (8.25.2014)

DEVELOPED COUNTRIES....

2013

Like a fish in water




Rehab in a swimming pool - only available in Netherlands!

FEEL LIKE A FISH IN WATER, APRIL 13TH IN NIMEGEN 22. März 2013

www.mobilizationnetwork.co/Network/News/Eintrage/2013/3/22_Feel_like_a_fish_in_water%2C_nil_13thInNimegen.html (8/25/14)

UNDERDEVELOPED COUNTRIES....




Strategies to implement Early Mobility & Exercises in daily practice...

Can we implement simple strategies for early mobility in ICU which can be used and sustained...


FOR EVERY PATIENT?

EVERY DAY?

IN EVERY ICU?



EARLY EXERCISES & OUT OF BED IN ICU



"EARLY" EXERCISES


➔

Leg raises and arm raises 100 times/day!

"EARLY" OUT OF BED ACTIVITIES

➔

EVERYONE!
Except the patients who **should not** be out of bed...





Strategies to implement early mobility & exercises in daily practice...





EARLY MOBILITY AND EXERCISE IN ICU


TAKE HOME MESSAGES



“Early mobility and exercise in ICU is everyone’s job!”



“Prevention of muscle weakness in ICU is much better than any treatment currently available!”




Learning Assessment - Question #1

- Which of the following are absolute contraindications for out of bed activities in ICU?
 - a. Unstable fractures
 - b. Patients on neuromuscular blockage
 - c. Hemodynamic instability requiring escalating doses of vasopressors/multiple vasopressors
 - d. All of the above

Learning Assessment - Question # 2

- Early mobility in ICU includes in bed and out of bed activities.
 - True
 - False



THANK YOU!

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