

Nouvelles technologies

Les aides à la Mobilisation précoce



Cheryl HICKMANN
Doctorant Université Catholique de Louvain (UCL)
Intensive Care Unit, Saint-Luc University Hospital, Brussels, Belgium

Déclaration de liens

**mon intervention
ne présente aucun conflit d'intérêt**

Introduction

Early ambulation

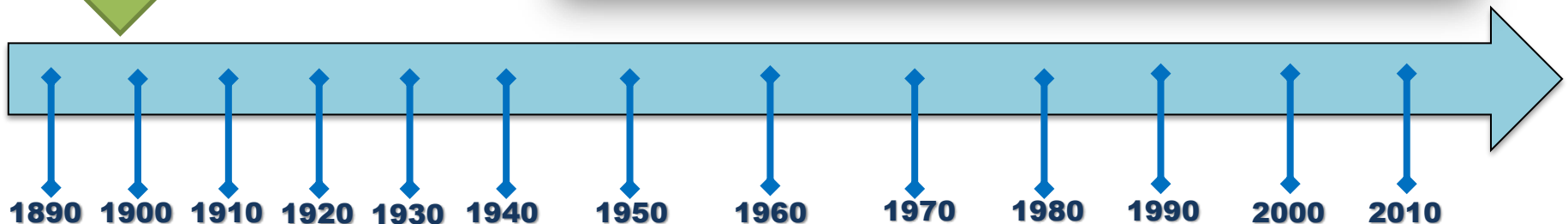
Ries, E. Some radical changes in the after-treatment of celiotomy cases, *J.A.M.A.*, 1899, 33:454.

SOME RADICAL CHANGES IN THE AFTER-TREATMENT OF CELIOTOMY CASES.*

BY EMIL RIES, M.D.

PROFESSOR OF GYNECOLOGY, POST-GRADUATE MEDICAL SCHOOL,
CHICAGO.

The purpose of the changes which I have worked out within the last four years has been to free the patients from many irksome and disagreeable features of the after-treatment as usually carried out, and at the same time to make their recovery more rapid and more complete, so that they are able to leave the hospital at a much earlier date than has been customary and in such a condition of strength that they can follow their wonted occupations within a few days after their discharge from the hospital.



1899

Introduction

A Method for Augmenting Ventilation During Ambulation

GEORGIA FOSS, B.S.

Exercise for the patient requiring continuous mechanical ventilation has been limited in the past by the patient's dependence on a respirator. Progressive ambulation is possible in patients with unmeasurable tidal volumes while off the respirator. Ventilation may be supported by the use of a self-inflating bag, i.e., Hope.® * attached to the tracheostomy tube. Supplemental oxygen is provided by portable oxygen sources (Fig. 1).



Fig. 1. The nurse-therapist team is shown assisting ambulation of a patient recovering from a bout of respiratory failure.

Mrs. Foss is a physical therapist with The Respiratory Care Team, University of Colorado Medical Center, 4200 East Ninth Avenue, Denver, Colorado 80220.

* Ohio Medical Products, 3030 Arco Dr., Madison, WI 53701.

Volume 52 / Number 5, May 1972

519

Mermingas, K.: Early Rising after Operation. Zentralbl. f. Chirurgie, 27, 1930.

Violet, H.: On the Subject of Early Rising after Operation. Zentralbl. f. Chirurgie, 27, 1930.

EARLY AM

A REVIEW

Chalier, A.: Early Rising after Operation. Zentralbl. f. Chirurgie, 27, 1930.

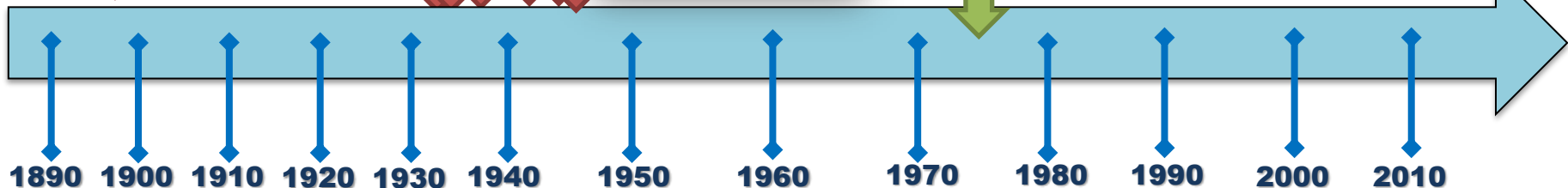
Charbonnier, A.: Early Rising after Operation. Zentralbl. f. Chirurgie, 27, 1930.

Deil, Oro B.: The Immediate Postoperative Ambulation. Zentralbl. f. Chirurgie, 27, 1930.

Vincent, G.: Early Rising in Abdominal Surgery. Zentralbl. f. Chirurgie, 27, 1930.

Rise, E. Some radiographic studies of the early postoperative ambulation. J.A.M.A., 1809, 33:565.

In conclusion, our experience of many surgeons postoperative ambulation, patients and is deserving of a



1972

Early Ambulation of Patients Requiring Ventilatory Assistance

J. Robert Burns, M.D., F.C.C.P.
and Frederick L. Jones, Jr., M.D., F.C.C.P.

CHEST, 68: 4, OCTOBER, 1975

Mermingas, K.: Early Rising after Operation. Zentralbl. f. Chirurgie, September 27, 1930.

Violet, H.: On the Subject of Early Ambulation. J. Am. Med. Ass., September-October 1930, 247-250.

EARLY AM

A REVIEW

Chalier, A.: Early Rising after Surgery after Four Years. J. Am. Med. Ass., November-December, 1930, 247-250.

Charbonnier, A.: Early Rising after Surgery. J. Am. Med. Ass., November-December, 1930, 247-250.

Deil, Oro B.: The Immediate Postoperative Ambulation. J. Am. Med. Ass., January, 1931, 25-29.

Vincent, G.: Early Rising in the Postoperative Period. J. Am. Med. Ass., September 24, 1936, 1809, 1810.

Canad. M. A. J., Sept. 1947, vol. 57.

EARLY AMBULATION IN PRACTICE OF OBSTETRICS

E. Cullen Bryant, M.D.

Toronto, Ont.

THE modern practice of early ambulation of surgical patients, now widely practiced throughout America and Europe, is intimately related to the early rising in the puerperium. The ambulation is practised more widely

disturbed as a result of confinement, all prolonged labour, and prolonged immobility. Lack of exercise of the chest muscles impaired pulmonary metabolism, lead to decreased vital capacity, circulation stasis, thrombosis, phlebitis, and embolism. Intestinal and muscular atony from immobility prolongs the period of recovery and undermines the patient's general health and morale.

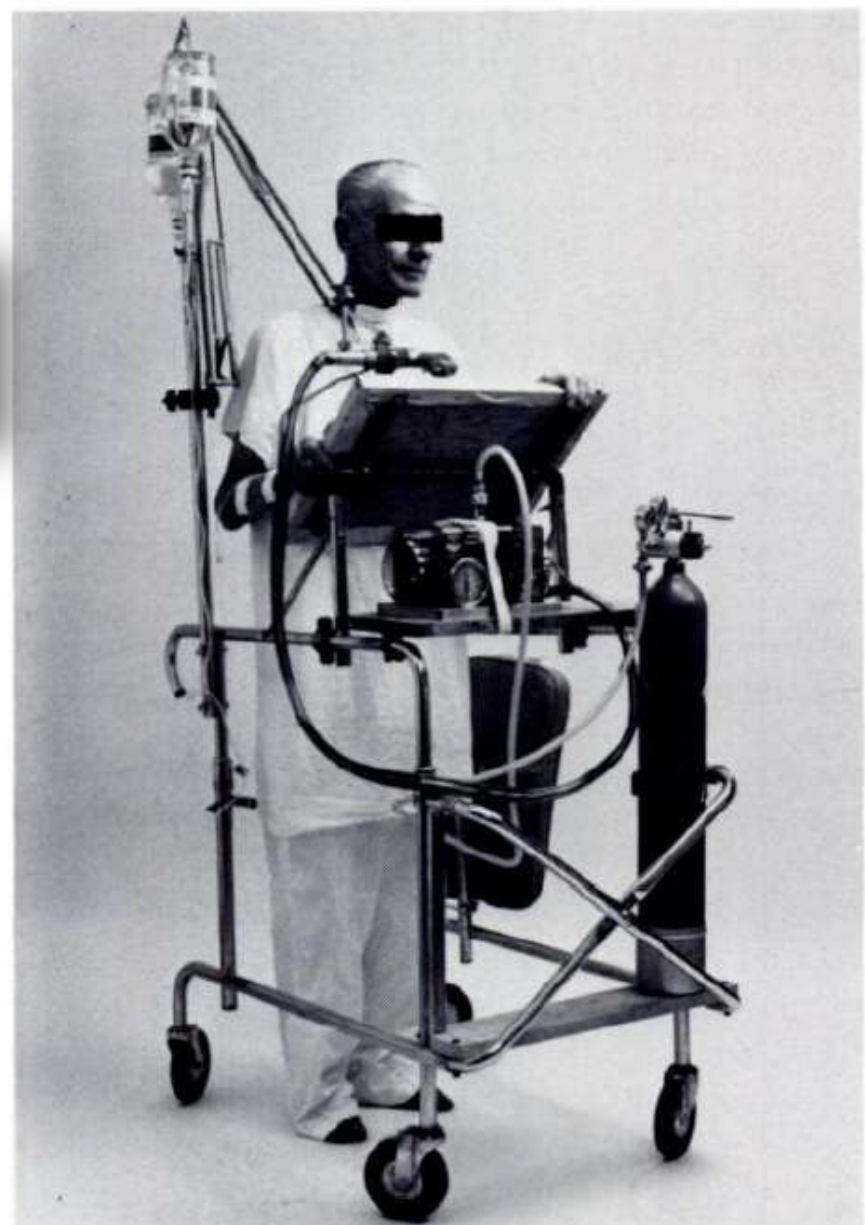
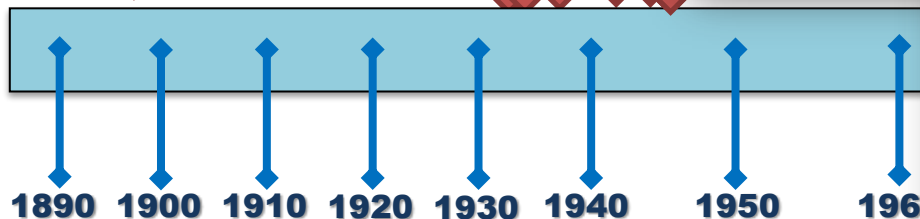


FIGURE 1. Device for early ambulation of patients requiring ventilatory assistance.

1975



*Clinical
Investigation*

Early Mobilization of LVAD Recipients

Who Require Prolonged Mechanical Ventilation



Fig. 1 A portable ventilator, used in the intensive care unit, enabled a significant increase in distance walked and activity tolerance.



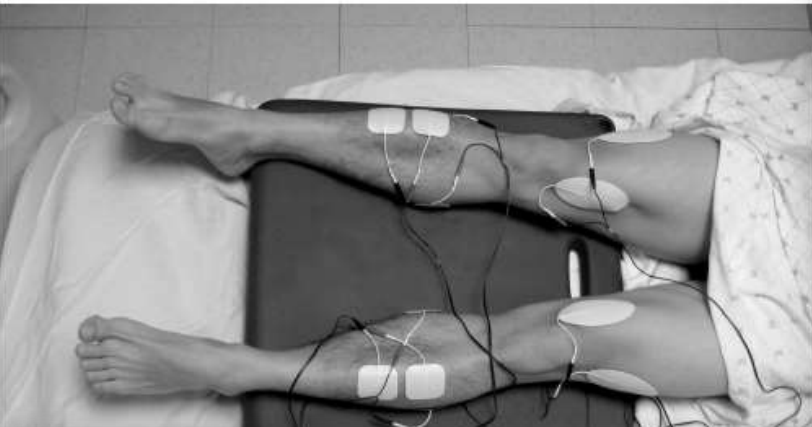
1890 1900 1910 1920 1930 1940 1950 1960 1970 1980 1990 2000 2010

2006

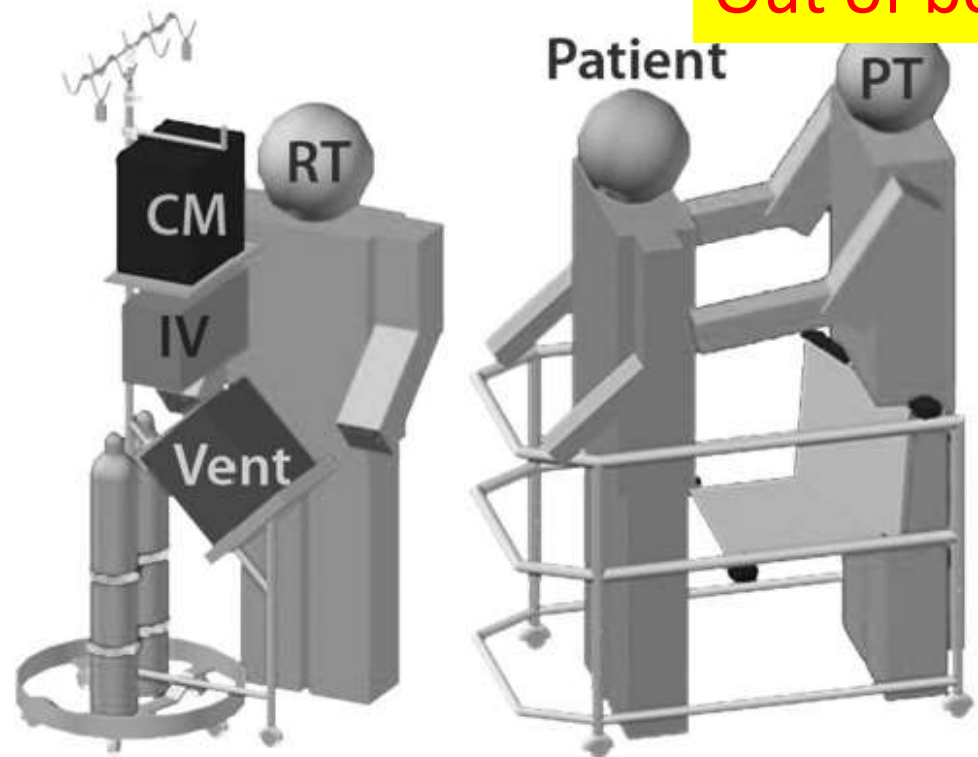


Technology to enhance physical rehabilitation of critically ill patients

Dale M. Needham, MD, PhD; Alex D. Truong



Out of bed



Physiotherapy in the Intensive Care Unit

R Gosselink, B Clerckx, C Robbeets, T Vanhullebusch, G Vanpre, J Segers



In bed



Out of bed



FUNCTIONAL RECOVERY FOLLOWING PHYSICAL TRAINING IN MECHANICALLY VENTILATED PATIENTS

In bed



Fig. 2. Supported (A) and unsupported (B) limbs exercise during daily rehabilitation sessions.



Tilt Table Practice Improved Ventilation in a Patient with Prolonged Artificial Ventilation Support in Intensive Care Unit

Verticalisation



Physiotherapy in the Intensive Care Unit

R Gosselink, B Clerckx, C Robbeets, T Vanhullebusch, G Vanpee, J Segers

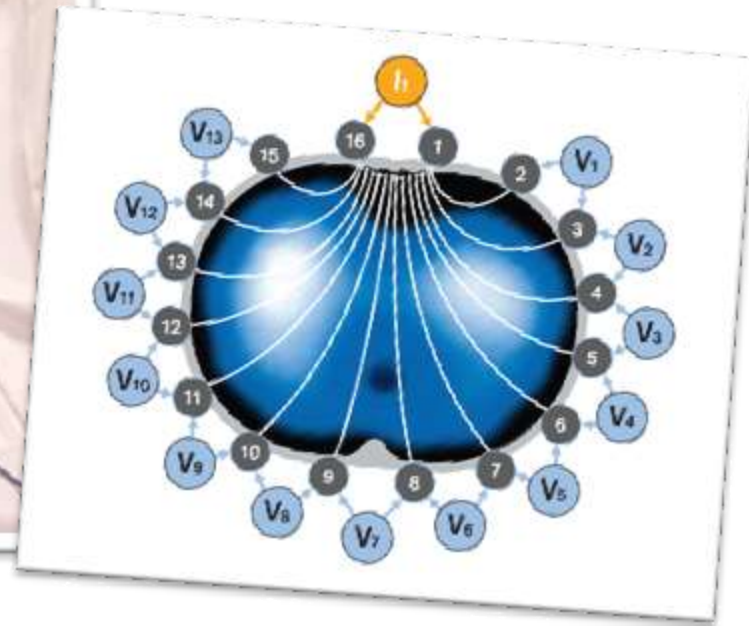
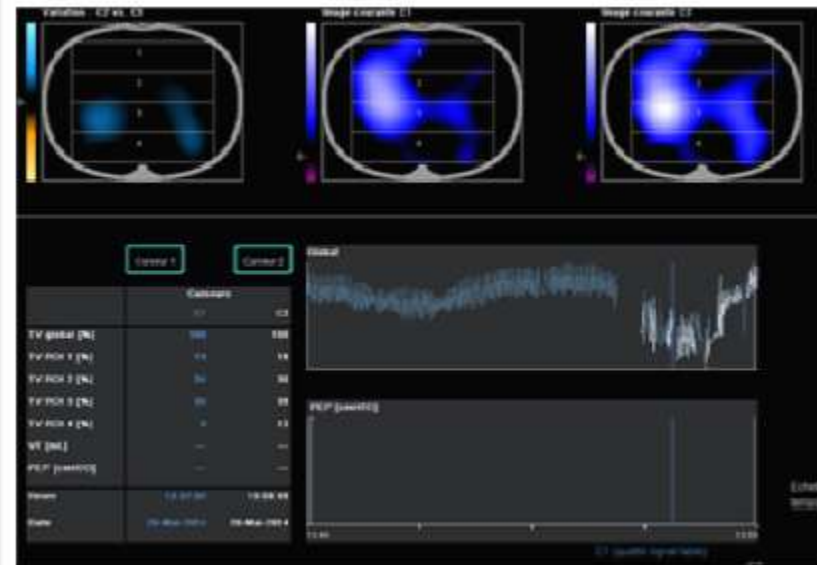
In Chair



Activity Monitoring !



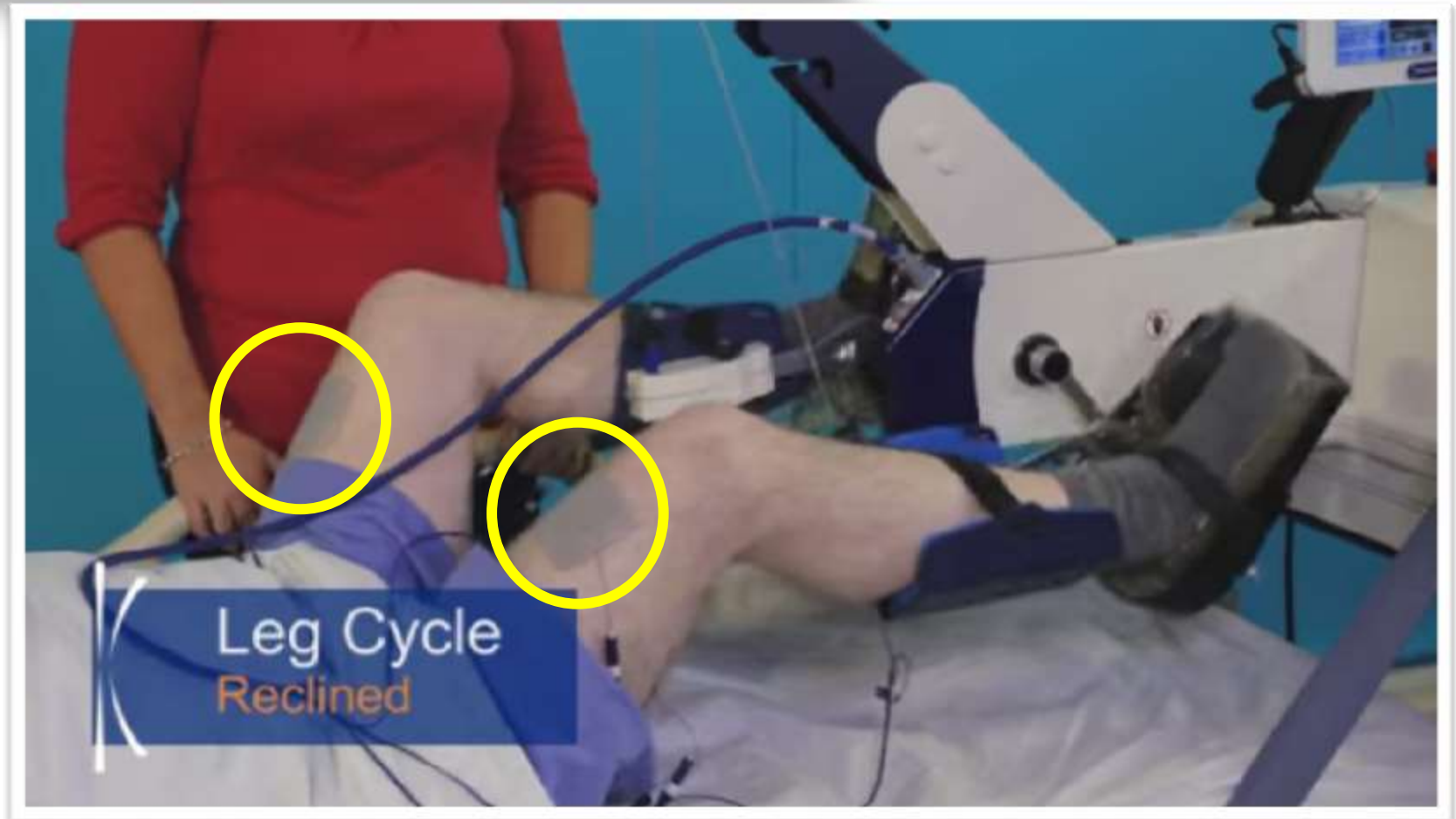
Respiratory Monitoring !



Early rehabilitation in critical care (eRiCC): functional electrical stimulation with cycling protocol for a randomised controlled trial

Selina M Parry,^{1,2} Sue Berney,² René Koopman,³ Adam Bryant,¹ Doa El-Ansary,¹
Zudin Puthuchery,⁴ Nicholas Hart,⁵ Stephen Warrillow,⁶ Linda Denehy¹

Australian and New Zealand Clinical
Trials Registry ACTRN12612000528853



Functional electrical stimulation (FES)



Pictures from
<http://www.cyclonemobility.com/f.e.s/rt300-supine>

RESEARCH ARTICLE

Open Access



Sympathetic activity and early mobilization in patients in intensive and intermediate care with severe brain injuries: a preliminary prospective randomized study

A. Rocca^{1*}, J.-M. Pignat², L. Berney², J. Jöhr², D. Van de Ville³, R. T. Daniel¹, M. Levivier¹, L. Hirt⁴, A. R. Luft⁵, E. Grouzmann⁶ and K. Diserens²



Functional electrical stimulation (FES)



<https://www.hocoma.com/usa/us/products/erigo/>

In Chair **transfert**



Experimental Chair



Bed in sitting position

Bed System



Progressa™ Bed System



Progressa™ Bed System



Progressa™ Bed System



Feasibility and Safety of Early Physical Therapy and Active Mobilization for Patients on Extracorporeal Membrane Oxygenation

YOUNGJUN KO,* YANG HYUN CHO,† YUN HEE PARK,‡ HYUN LEE,§¶ GEE YOUNG SUH,§¶ JEONG HOON YANG,¶||
Chi-Min PARK,¶ # KYEONGMAN JEON,§¶ AND CHI RYANG CHUNG¶

Bed in sitting position



Innovative Mobility Strategies for the Patient With Intensive Care Unit–Acquired Weakness: A Case Report

Darin W. Trees, James M. Smith, Steven Hockert



Figure 2.
The patient using a hydraulic-assist platform walker for upright standing on day 69.



Figure 3.
The patient using the parallel bars for gait re-education and balance training on day 78.



Figure 4.
At discharge on day 89, the patient walked 150 ft using a rolling walker under supervision.

Early activity is feasible and safe in respiratory failure patients*

Polly Bailey, RN, APRN; George E. Thomsen, MD; Vicki J. Spuhler, RN, MS; Robert Blair, PT; James Jewkes, PT; Louise Bezdjian, RN, BSN; Kristy Veale, RN, BSN; Larissa Rodriguez, AS; Ramona O. Hopkins, PhD

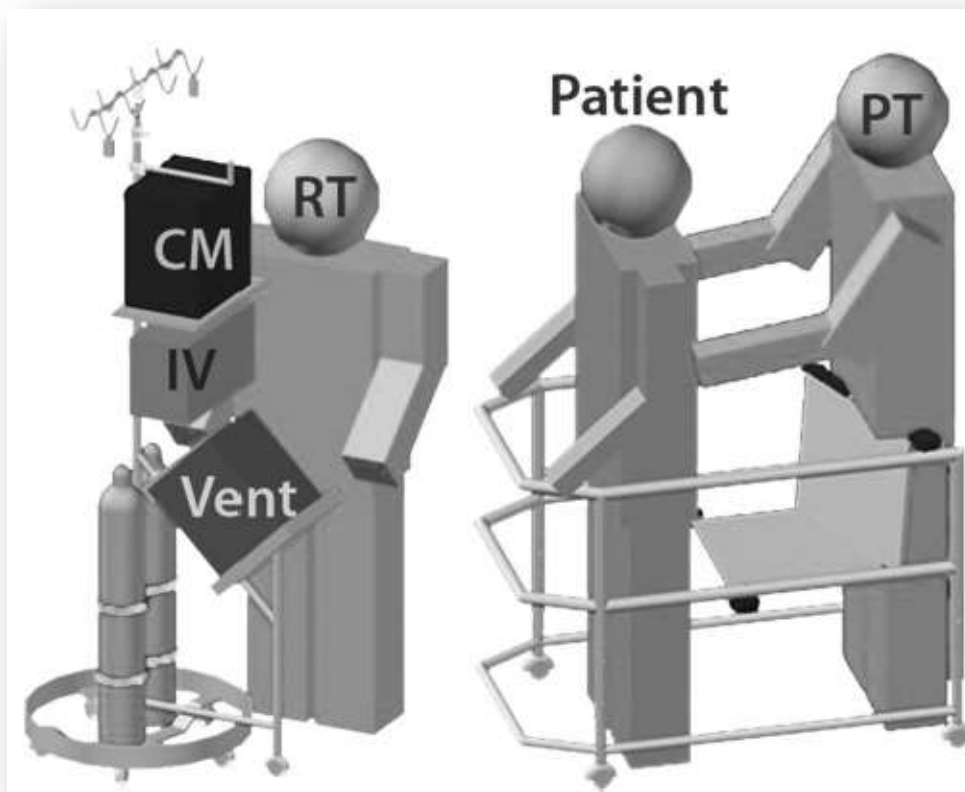


Walking device

Technology to enhance physical rehabilitation of critically ill patients

Walking device

Dale M. Needham, MD, PhD; Alex D. Truong, MD, MPH; Eddy Fan, MD



John Hopkins hospital - USA

Feasibility and Safety of Early Physical Therapy and Active Mobilization for Patients on Extracorporeal Membrane Oxygenation

YOUNGJUN KO,* YANG HYUN CHO,† YUN HEE PARK,‡ HYUN LEE,§¶ GEE YOUNG SUH,§¶ JEONG HOON YANG,¶||
Chi-Min PARK,¶# KYEONGMAN JEON,§¶ AND CHI RYANG CHUNG¶

Walking device



Samsung Hospital - South Korea

Active rehabilitation and physical therapy during extracorporeal membrane oxygenation while awaiting lung transplantation—a practical approach

David A. Turner, MD; Ira M. Cheifetz, MD, FCCM; Kyle J. Rehder, MD; W. Lee Williford, RRT; Desiree Bonadonna, BSE, CCP, LP; Scott J. Banuelos, MD; Stacey Peterson-Carmichael, MD; Shu S. Lin, MD, PhD; R. Duane Davis, MD; David Zaas, MD



Figure 1. Sixteen-year-old patient ambulating while being managed with venovenous extracorporeal membrane oxygenation.



Figure 2. Twenty-four-year-old patient ambulating while being managed with venovenous extracorporeal membrane oxygenation.

Walking with human assistance

Physiotherapy in the Intensive Care Unit

R Gosselink, B Clerckx, C Robbeets, T Vanhullebusch, G Vanpee, J Segers



KUL
Leuven – Belgium



Image used with permission
courtesy of Vincent Lo,
UHN – Toronto General Hospital

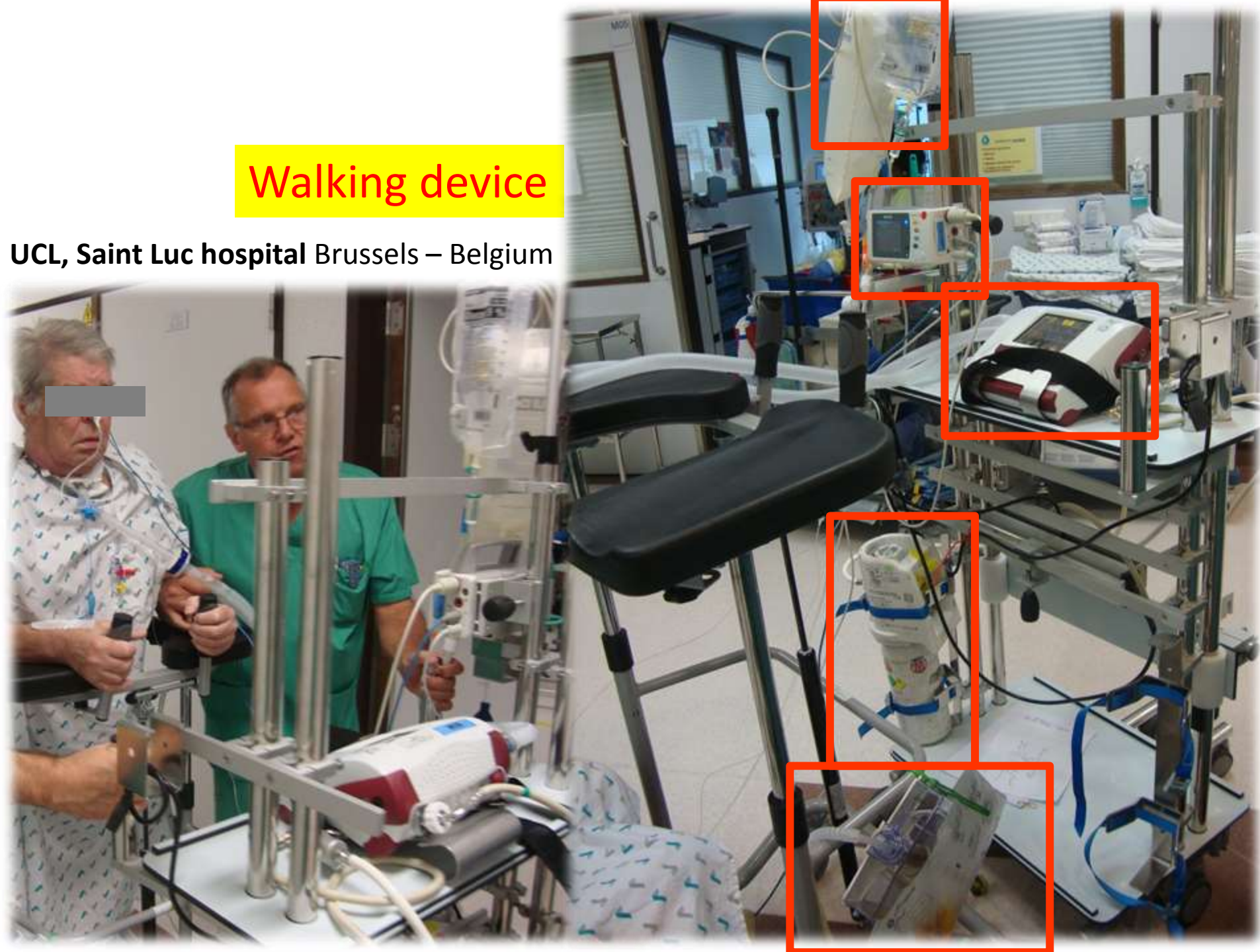
Walking device



UCL, Saint Luc hospital
Brussels – Belgium

Walking device

UCL, Saint Luc hospital Brussels – Belgium



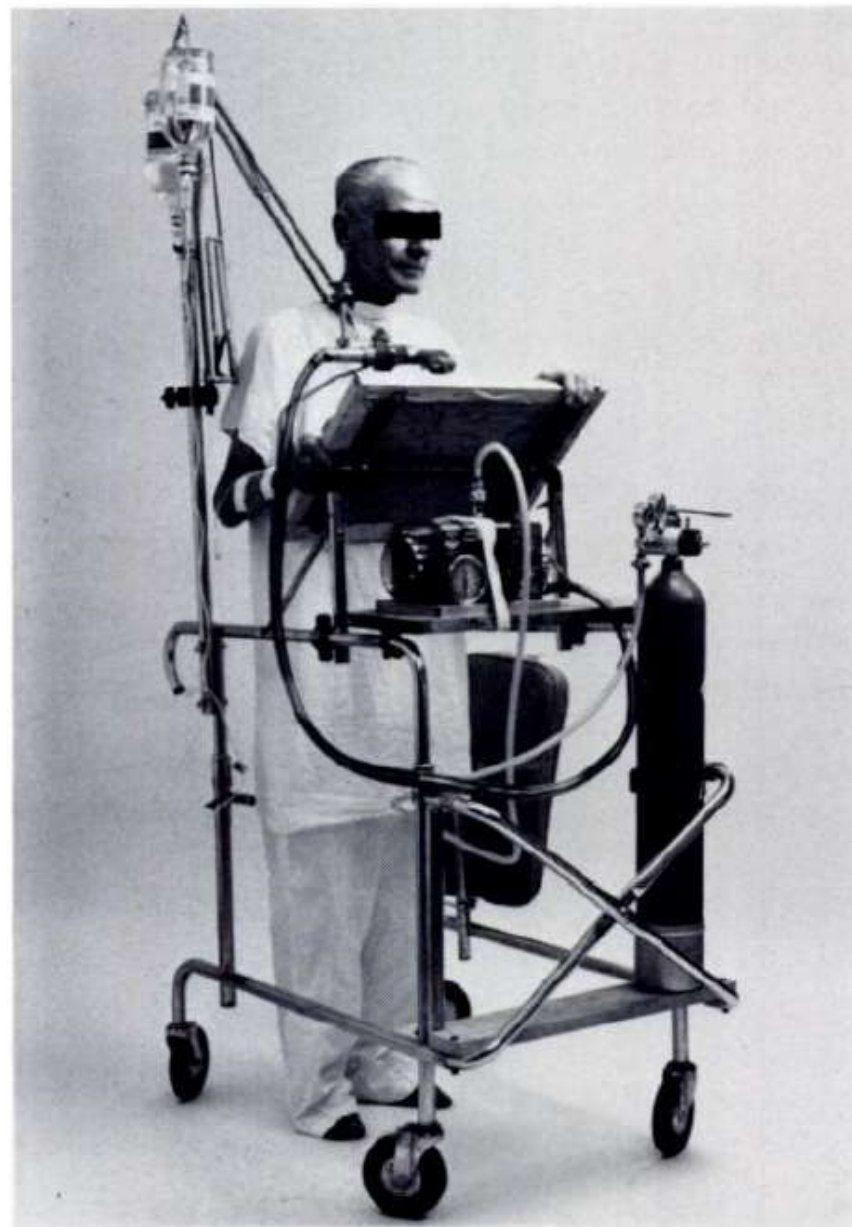


FIGURE 1. Device for early ambulation of patients requiring ventilatory assistance.

1975



**47 y.o. female end-stage emphysema
VV ECMO via R IJ bridge to transplant**

Image used with permission courtesy of Vincent Lo, **UHN – Toronto General Hospital**



22 y.o. male prev DLTx deteriorating,
placed on VV ECMO as bridge to
retransplantation

Image used with permission courtesy of
Vincent Lo, **UHN – Toronto General Hospital**



29 y.o. male on VV ECMO via subclavian cannula x 3 months before re-transplantation

Image used with permission courtesy of Vincent Lo, **UHN – Toronto General Hospital**



Image used with permission courtesy of Vincent Lo, **UHN – Toronto General Hospital**



VA ECMO – central cannulation - Pulmonary capillary hemangiomatosis

Images used with permission courtesy of Dr. Rodrigo Orrego, Clínica las Condes, Santiago (Chili)



VV ECMO, femoral catheter – H1N1



VA ECMO – central cannulation - miocarditis viral

Images used with permission courtesy of Dr. Rodrigo Orrego, Clínica las Condes, Santiago (Chili)

Active Rehabilitation in a Pediatric Extracorporeal Membrane Oxygenation Patient

Carleen Zebuhr, MD, Amit Sinha, MD, Heather Skillman, MS, RD, CSP, CNSC, Shannon Buckvold, MD

January 2014



Figure 1. A cannula-support device was developed by using the patient's ski helmet. Patient consent was obtained.

Active Rehabilitation in a Pediatric Extracorporeal Membrane Oxygenation Patient

Carleen Zebuhr, MD, Amit Sinha, MD, Heather Skillman, MS, RD, CSP, CN
Shannon Buckvold, MD





36 y.o. female ARDS, Rehab post ECMO

Image used with permission courtesy of Vincent Lo, **UHN – Toronto General Hospital**



Rehab after 5 weeks on ECMO and complete bed rest

Image used with permission courtesy of Vincent Lo, **UHN – Toronto General Hospital**



Paralysed rugby player uses robot skeleton controlled by his THOUGHTS to walk again



Picture provided by:

REX
BIONICS



UCL, Saint Luc hospital
Brussels – Belgium



UCL, Saint Luc hospital Brussels – Belgium

Going outside...



UCL, Saint Luc hospital Brussels – Belgium

Interactive video games for rehabilitation in the ICU



Feasibility and observed safety of interactive video games for physical rehabilitation in the intensive care unit: a case series

Michelle E. Kho PT, PhD ^{a,*}, Abdulla Damluji MBChB, MPH ^b,
Jennifer M. Zanni PT, MSPT, ScD ^{a,c}, Dale M. Needham MD, PhD ^{a,d}

2011



http://www.uhn.ca/corporate/News/Pages/behind_the_scenes_at_uhn_ics_wii_bit_of_exercise.aspx

EARLY NEUROCOGNITIVE REHABILITATION IN INTENSIVE CARE © (ENRIC)

de NEUROPSYCHOLOGY RESEARCH, FPT hace 2 años | más

<https://vimeo.com/102908289>



Shower in MV patients



Pictures used with permission
courtesy of **Heidi Engel, PT, DPT**
San Francisco, USA

The ventilated patient undergoing hydrotherapy: a case study.

Taylor S¹.



Active
exercise



Walking



CONCLUSION

Previously published references to hydrotherapy for ventilated GBS patients have not been found, although this therapy is not uncommon for the unventilated GBS patient. It was found that, with appropriate preparation and staff numbers, hydrotherapy could be safely included as part of a patient's exercise regimen. For this patient, hydrotherapy was effective in increasing muscle strength through active exercises, improving range of movement in a weight supporting environment and improving her morale. Ventilation via tracheostomy need not delay access to the rehabilitation benefits of hydrotherapy in severe GBS.

CORRESPONDENCE

Feasibility and Safety of Hydrotherapy in Critically Ill Ventilated Patients

Felten-Barentsz K. *AJRCCM* 2015



**ICU
Recovery
Network**

Felten-Barentsz K.
Congress communication
Copenhagen - 6 nov 2015

Conclusion

This study presents the recovery process of eleven critically ill ventilated patients treated with HT, the content of the treatment sessions and the way they experienced this new therapy modality. HT is highly appreciated by patients and seems to have a positive effect on the psychological and mental recovery from critical illness.



Communication



Intensive Care Med (2014) 40:1057–1058
DOI 10.1007/s00134-014-3315-7

Peter H. Egbers
Renske Bultsma
Harmen Middelkamp
E. Christiaan Boerma

**Enabling speech in ICU patients
during mechanical ventilation**

Ventilator setting: Passy Muir[®] one-way speaking valve in *red circle*

iPad use to communicate while mechanically ventilated

0

OACIS Group

Suscribirse

44

×



0 1 2 3 4 5 6 7 8 9 10

Pain

Breathing

Toilet

Thirst

Family

My well-being

Comfort

Hygiene

Hot/cold

Feelings

ABCDEF

Enter your text

Thanks

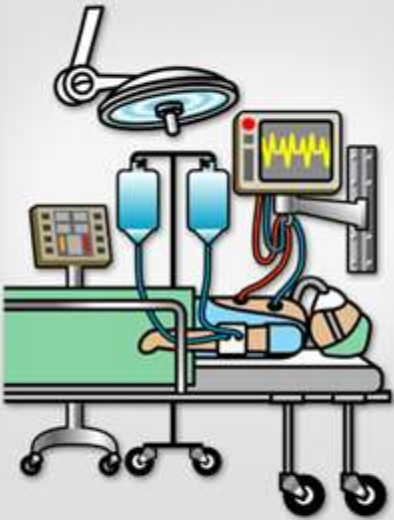
Yes

No

How long have you been ventilated
Connie: "About one and



Lingraphica
The Aphasia Company



SmallTalk
Intensive Care

i

Info

Intensive Care

⚙️

Settings

ICU



I have chest pain



I am short of breath



I need suction



I feel lightheaded



I am in pain

New technologies

Can help with:

- ✓ Feedback on patient response
- ✓ Monitor progress over time
- ✓ Improve length of PT session
- ✓ Interact as the patient's coach and personal trainer
- ✓ Heavy maneuvers

They can not replace:

- x Physical assessment
- x Expertise of a rehabilitation specialist



Should always be applied with guidance of experts

Definitively can not replace...

Closeness of family members



Benefits to UCSF- ICU Early mobilization

Tremendous positive feedback from family members

Vies Intensives

LES SOINS INTENSIFS, LA RENCONTRE DE LA TECHNOLOGIE ET DE L'HUMANITE



You're looking good today,
top fit.

Vies Intensives

LES SOINS INTENSIFS, LA RENCONTRE DE LA TECHNOLOGIE ET DE L'HUMANITE



Why do you want to wait?
Until she comes back?

Vies Intensives

LES SOINS INTENSIFS, LA RENCONTRE DE LA TECHNOLOGIE ET DE L'HUMANITE



Caregivers

Nurs Philos. 2008 Jan;9(1):55-61.

Beleaguered by technology: care in technologically intense environments.

Almerud S¹, Alapack RJ, Fridlund B, Ekebergh M.

Author information

Abstract

Modern technology has enabled the use of new forms of information in the care of critically ill patients. In intensive care units (ICUs), technology can simultaneously reduce the lived experience of illness and magnify the objective dimensions of patient care. The aim of this study, based upon two empirical studies, is to find from a philosophical point of view a more comprehensive understanding for the dominance of technology within intensive care. Along with caring for critically ill patients, technology is part of the ICU staff's everyday life. Both technology and caring relationships are of indispensable value. Tools are useful, but technology can never replace the closeness and empathy of the human touch. It is a question of harmonizing the demands of subjectivity with objective signs. The challenge for caregivers in ICU is to know when to heighten the importance of the objective and measurable dimensions provided by technology and when to magnify the patients' lived experiences, and to live and deal with the ambiguity of the technical dimension of care and the human side of nursing.

News feature from
NBC Nightly News:
**Looking at the
benefits of
pet therapy
in the
Intensive Care
Unit**



DOGS BRING COMFORT TO HOSPITAL PATIENTS

http://www.nbcnews.com/nightly-news/video/meet-the-dogs-helping-patients-bounce-back-from-intensive-care-719861827717?cid=eml_on-site

« La première fois que je suis entrée ici, j'étais dans la confusion totale »
 « Au début on ne gère pas l'incertitude, on vit au jour le jour »
 « Faudrait les voir les médecins, les infirmières, ils courent dans tous les sens. Ils sont motivés vraiment, ils cherchent une solution, c'est fantastique. Et c'est là qu'on a l'espoir, et on se dit : on doit y arriver ! »



« Notre but c'est de prendre en charge l'incertitude des familles, pour ne pas qu'ils la portent »
 « Parfois, au niveau psychologique, on aurait besoin d'avoir plus d'outils parce que pour moi, ça fait partie des soins »
 « Quand on a vécu une situation difficile, on a aussi la nécessité de discuter entre nous. On forme une équipe »



Merci aux patients et à leurs familles, aux équipes médicales et paramédicales ainsi qu'au personnel de l'accueil des Soins Intensifs des Cliniques universitaires Saint-Luc

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 Son : Lionel Hallants
 Montage : Mélanie Le Clech
 Mixage : François Fripiat et Hans VDO (Somicville)
 Etalonnage : Bertrand Leclipteux

DVD PAL
 format écran 16:9
 version longue : 41 min
 version courte : 6 min
 Version originale française
 Sous-titres néerlandais / anglais

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TAKE FIVE
 Film & Image

FONDATION SAINT-LUC
 Centre de Soins Intensifs

DVD
 VIDEO

TAKE FIVE
 PRÉSENTE

VIES INTENSIVES

VIES INTENSIVES

UN DOCUMENTAIRE DE MARIE ET ANNE-FRANÇOISE LELEUX

LES SOINS INTENSIFS, LA RENCONTRE
 DE LA TECHNOLOGIE ET DE L'HUMANITÉ

Merci beaucoup

cheryl.hickmann@uclouvain.be