



Österreichische
Wachkoma
Gesellschaft

Bed rest Syndrom – Neurosensorielle Stimulation beim bewusstseinsgestörten Patienten: Praevention oder Rehabilitation“

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Head of the Acute Neurorehabilitation Unit,
Department of Clinical Neurosciences,
CHUV
Lausanne, Switzerland



I. Common trap: Bed rest: immobility ↑



"HE'S RESTING
COMFORTABLY."

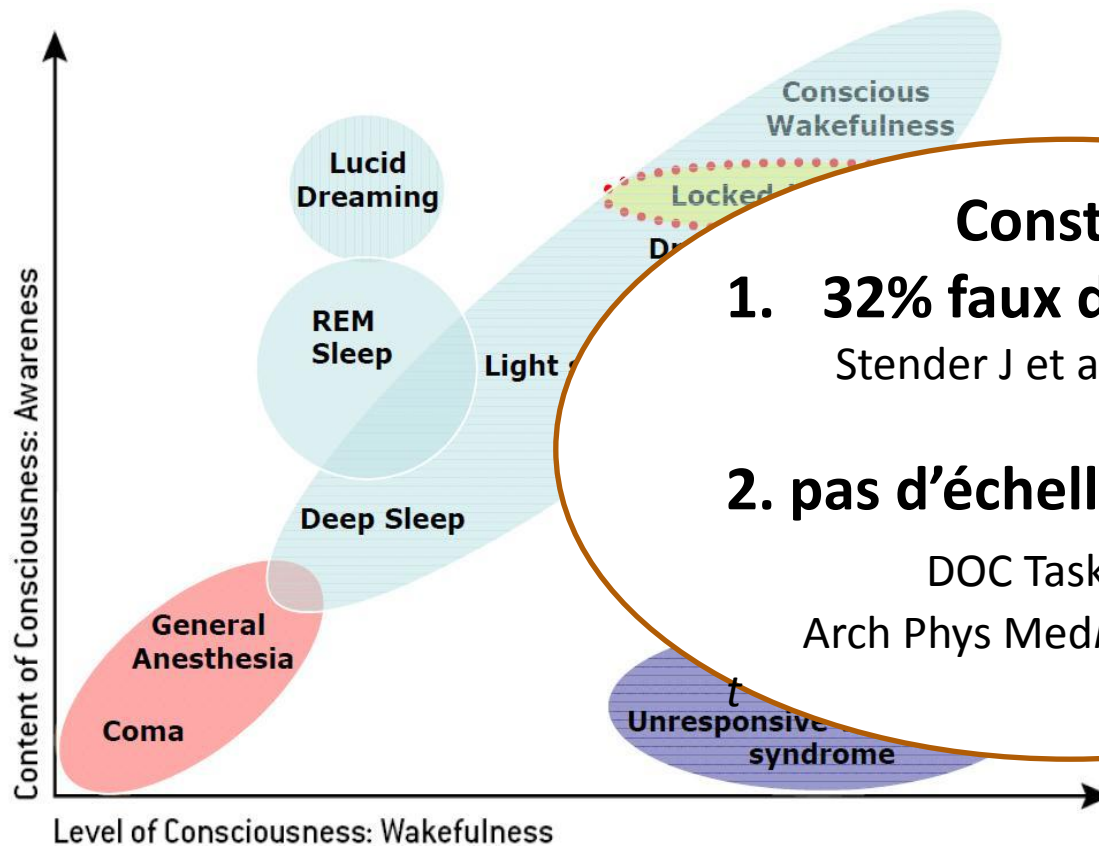


"There's nothing we can do...
he'll always be a vegetable."

II. Common Trap



: Misdiagnosis



Constat

1. 32% faux diagnostics

Stender J et al. *Lancet* 2014

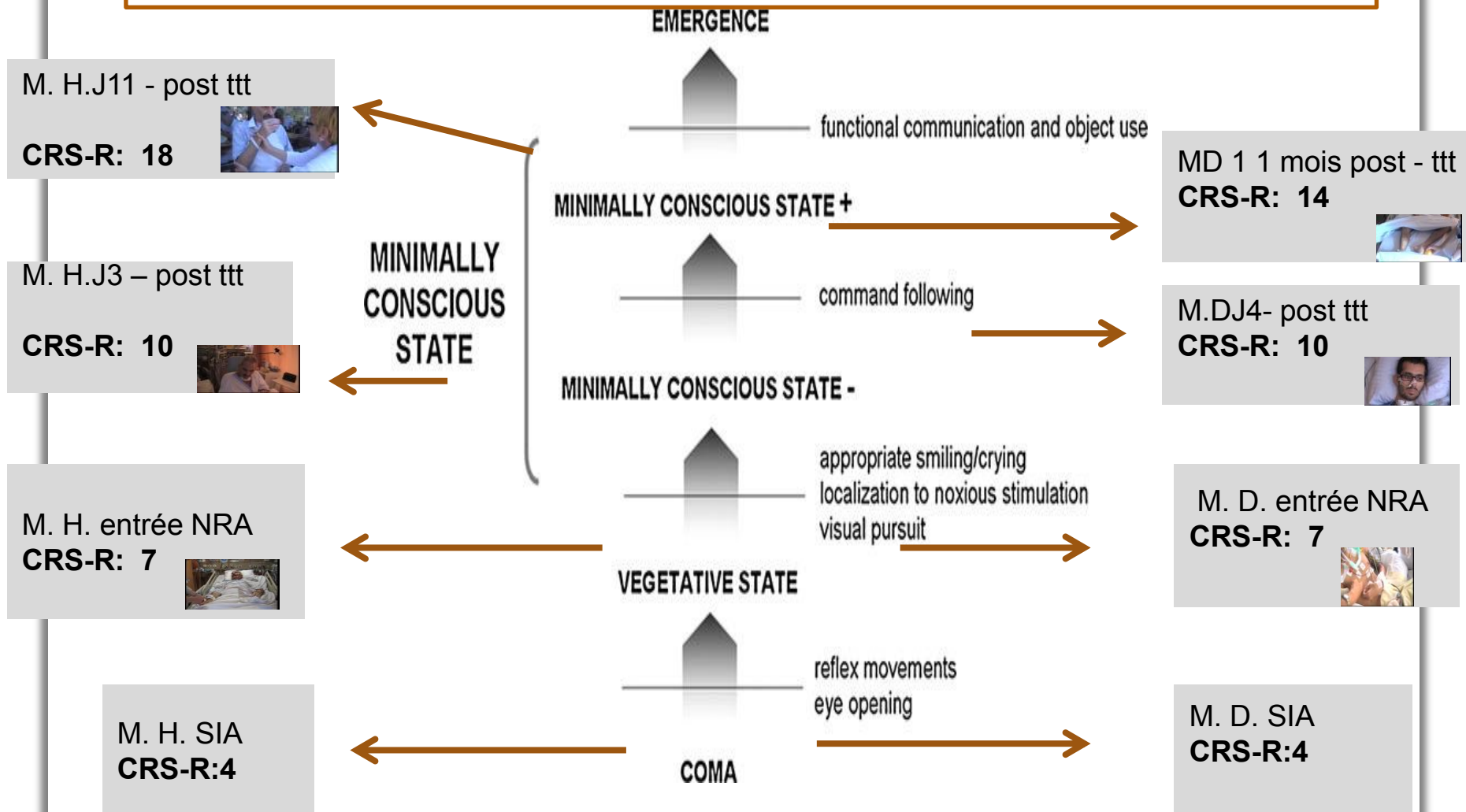
2. pas d'échelle prédictive

DOC Task Force

Arch Phys Med Rehabil 2010

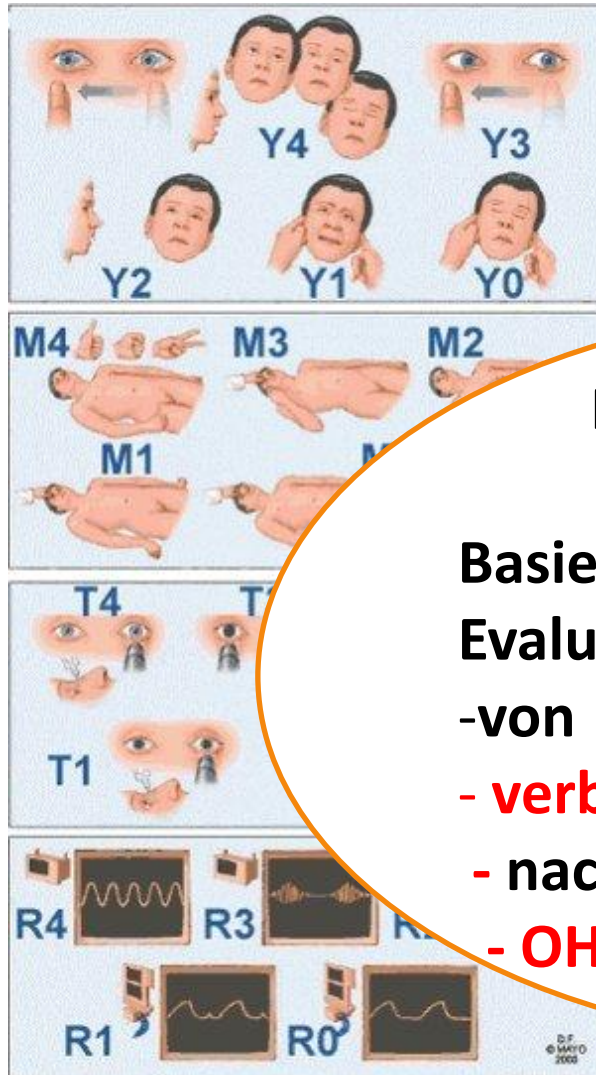
II. Common Trap

: Misdiagnosis



Validierte Skalen

Glasgow/ Four/ Coma recovery scale (CRS)..



Y

Réponse oculaire

4 = ouvre les yeux et suit du regard à la demande

3 = ouvre les yeux mais ne suit pas du regard

2 = ouverture des yeux à l'ordre à voix haute

1 = ouverture des yeux à la stimulation nociceptive

0 = pas d'ouverture des yeux

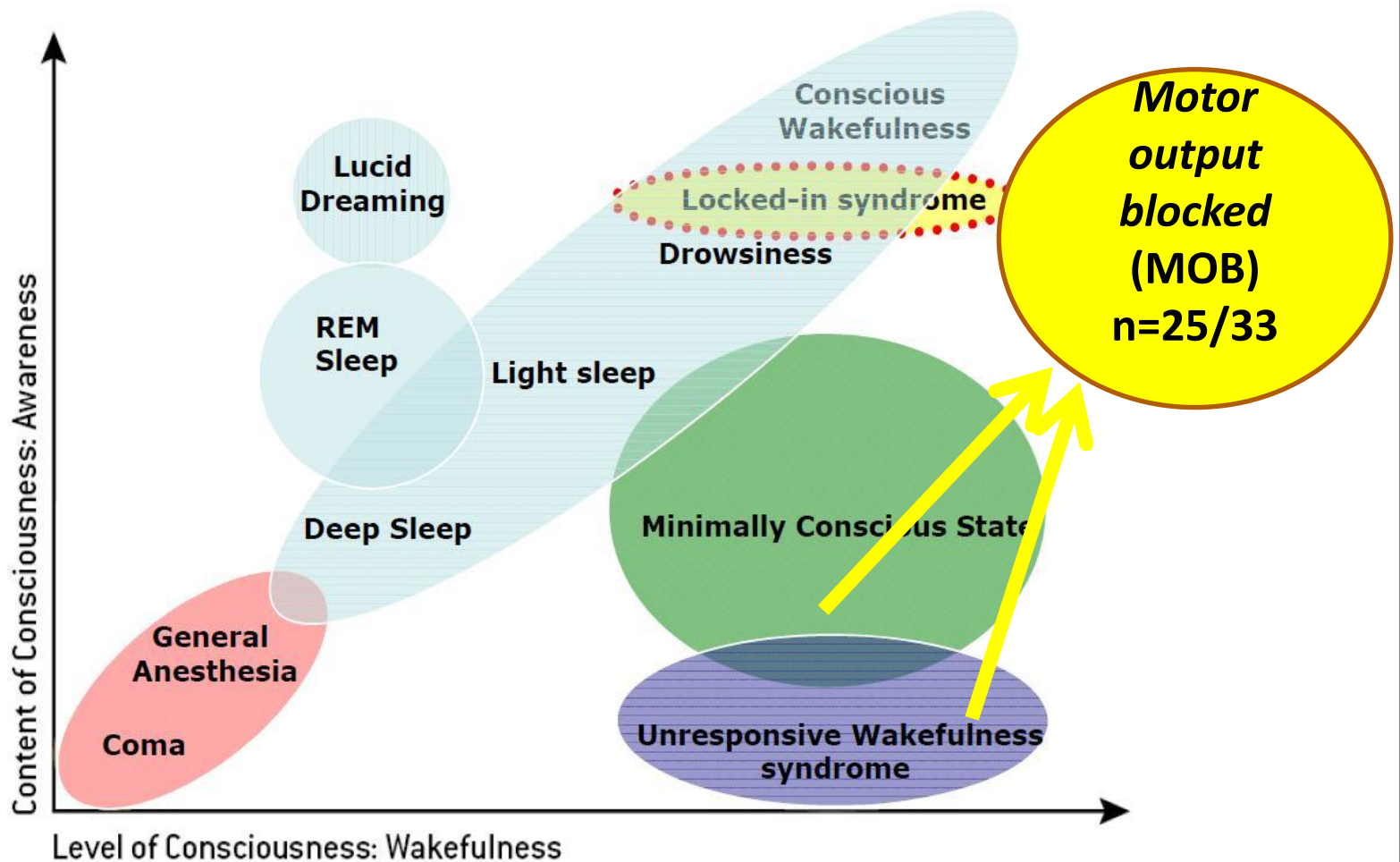
Fallinterpretation der Validierten Skalen

Basieren sich **nur** auf
Evaluation

- von **motorischen**
- **verbalen** Antworten
- nach **schneller** Stimulation
- **OHNE** Beobachtung

0 = en VC : fréquence patient = fréquence machine

Resultate



III. Trap : DOC- deafferentation : motricity ↓

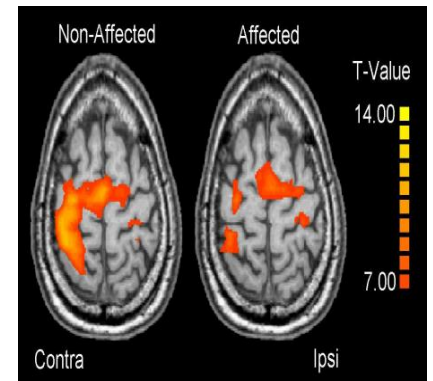
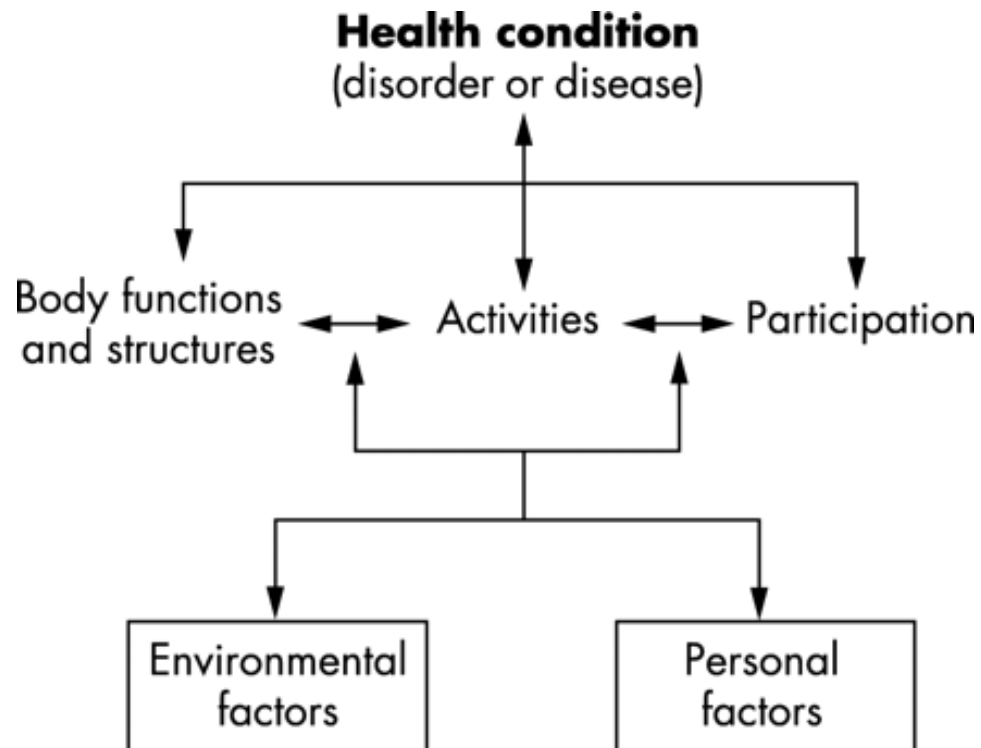
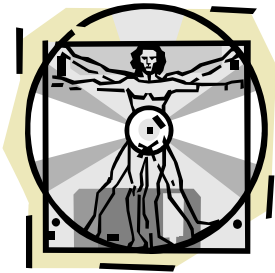


IV. Common challenge





OMS; 2001



Early Mobilisation after Stroke: Review of the Literature

Karin Diserens^{a,b} Patrick Michel^a Julien Bogousslavsky^a

Article

Early mobilization out of bed after ischaemic stroke reduces severe complications but not cerebral blood flow: a randomized controlled pilot trial

Karin Diserens¹, Tiago Moreira¹, Lorenz Hirt¹,
Mohamed Faouzi², Jelena Grujic¹, Gilles Bieler³,
Philippe Vuadens⁴ and Patrik Michel¹

CLINICAL
REHABILITATION

Clinical Rehabilitation
26(5) 451–459
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DOI: 10.1177/0269215511425541
cre.sagepub.com

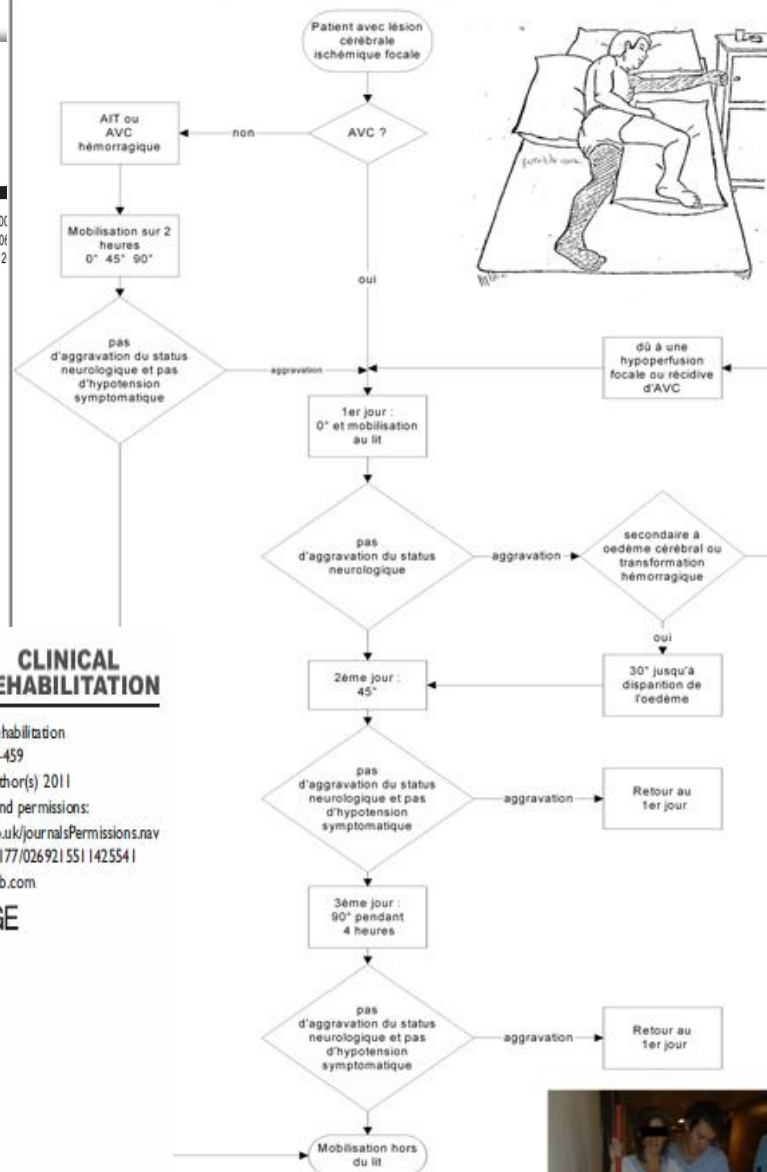


Table 2. Study results according to protocol assignment

	Early protocol	Delayed protocol	P-value
Complications: <i>n</i> (%)	7 (28%)	8 (47%)	ns
No complication	18 (72%)	9 (53%)	ns
Minor	5 (20%)	0 (0%)	0.07
Severe	2 (8%)	8 (47%)	0.006
NIHSS day 0	14.4 (7.4)	17.1 (4.91)	ns
NIHSS day 2	14.2 (6.80)	14.6 (7.83)	ns
NIHSS day 5	13.1 (8.87)	15.8 (4.17)	ns
Rankin score 0–2 at 3 months	10 (40%)	6 (35%)	ns
Mean length of hospital stay	13.7 (6.82)	11.71 (4.66)	ns
Transcranial Doppler (in cm/s)			
PSV at 24 hours	75 ± 5	64 ± 6	ns (chart)
PSV at 72–96 hours	75 ± 6	73 ± 6	ns (time)
EDV at 24 hours	29 ± 2	30 ± 4	ns (chart)
EDV at 72–96 hours	30 ± 3	30 ± 3.5	ns (time)
PI at 24 hours	1.05 ± 0.05	1.02 ± 0.09	ns (chart)
PI at 72–96 hours	1.07 ± 0.05	1.03 ± 0.07	ns (time)
RI at 24 hours	0.61 ± 0.02	0.59 ± 0.03	ns (chart)
RI at 72–96 hours	0.62 ± 0.02	0.6 ± 0.03	ns (time)

Evidence based research



Original Paper

Cerebrovascular Diseases

Cerebrovasc Dis 2009;28:378–383
DOI: [10.1159/000230712](https://doi.org/10.1159/000230712)

Very Early Mobilisation and Complications in the First 3 Months after Stroke: Further Results from Phase II of A Very Early Rehabilitation Trial (AVERT)

D. Sorbello^{a,b} H.M. Dewey^{a,c,f} L. Churilov^{a,c} A.G. Thrift^{a,d,e} J.M. Collier^a
G. Donnan^{a,c} J. Bernhardt^{a-c}

Original Paper

Cerebrovascular Diseases

Cerebrovasc Dis 2008;26:475–481
DOI: [10.1159/000155984](https://doi.org/10.1159/000155984)

Economic Evaluation alongside a Phase II, Multi-Centre, Randomised Controlled Trial of Very Early Rehabilitation after Stroke (AVERT)

K. Tay-Teo^{a,c} M. Moodie^c J. Bernhardt^{b,d,g} A.G. Thrift^{e-g} J. Collier^g
G. Donnan^{b,g,h} H. Dewey^{b,g,h}

ICU early physical rehabilitation programs: financial modeling of cost savings.

Lord RK¹, Mayhew CR, Korupolu R, Manthey EC, Friedman MA, Palmer JB, Needham DM.

+ Author information

Abstract

OBJECTIVE: To evaluate the potential annual net cost savings of implementing an ICU early rehabilitation program.

DESIGN: Using data from existing publications and actual experience with an early rehabilitation program in the Johns Hopkins Hospital Medical ICU, we developed a model of net financial savings/costs and presented results for ICUs with 200, 600, 900, and 2,000 annual admissions, accounting for both conservative- and best-case scenarios. Our example scenario provided a projected financial analysis of the Johns Hopkins Medical ICU early rehabilitation program, with 900 admissions per year, using actual reductions in length of stay achieved by this program.

SETTING: U.S.-based adult ICUs.

INTERVENTIONS: Financial modeling of the introduction of an ICU early rehabilitation program.

MEASUREMENTS AND MAIN RESULTS: Net cost savings generated in our example scenario, with 900 annual admissions and actual length of stay reductions of 22% and 19% for the ICU and floor, respectively, were \$817,836. Sensitivity analyses, which used conservative- and best-case scenarios for length of stay reductions and varied the per-day ICU and floor costs, across ICUs with 200-2,000 annual admissions, yielded financial projections ranging from -\$87,611 (net cost) to \$3,763,149 (net savings). Of the 24 scenarios included in these sensitivity analyses, 20 (83%) demonstrated net savings, with a relatively small net cost occurring in the remaining four scenarios, mostly when simultaneously combining the most conservative assumptions.

CONCLUSIONS: A financial model, based on actual experience and published data, projects that investment in an ICU early rehabilitation program can generate net financial savings for U.S. hospitals. Even under the most conservative assumptions, the projected net cost of implementing such a program is modest relative to the substantial improvements in patient outcomes demonstrated by ICU early rehabilitation programs.

Integrated pathway



Acute
Hospitalisation

Intensive
Care

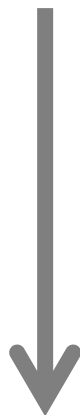


Coma unit NRA
Intermediate Care

Neurology

Neurosurgery

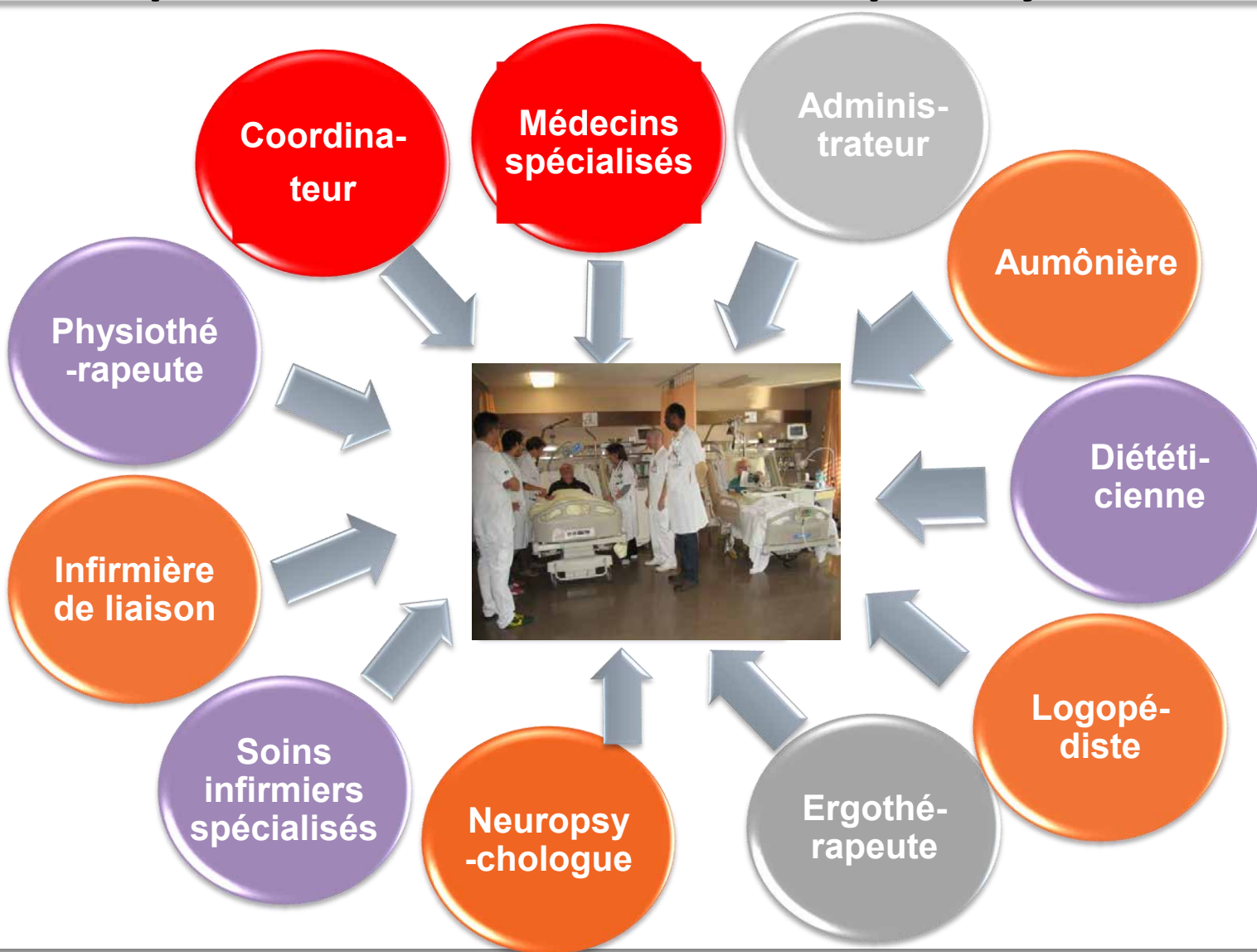
**Transversal mobile team of the Acute
Neurorehabilitation team (NRA)**



Post- acute
Neurocenters

1700
New
DOC cases/
year

Complete coordinated interdisciplinary team



Influence of passive leg movements on blood circulation on the tilt table in healthy adults

David Czell*¹, Reinhard Schreier¹, Rüdiger Rupp², Stephen Eberhard¹, Gery Colombo^{1,3} and Volker Dietz¹

Address: ¹Spinal Cord Injury Center, Balgrist University Hospital, Zurich, Switzerland, ²Orthopaedic Hospital of Heidelberg University, Department II, Heidelberg, Germany and ³Hocoma AG, Medical engineering, Volketswil, Switzerland

Email: David Czell* - dczell@balgrist.unizh.ch; Reinhard Schreier - schreier@hocoma.ch; Rüdiger Rupp - ruediger.rupp@ok.uni-heidelberg.de; Stephen Eberhard - stephan.eberhard@balgrist.ch; Gery Colombo - colombo@hocoma.ch; Volker Dietz - dietz@balgrist.unizh.ch

* Corresponding author

Published: 25 October 2004

Journal of NeuroEngineering and Rehabilitation 2004, 1:4 doi:10.1186/1743-0003-1-4

Received: 30 August 2004

Accepted: 25 October 2004

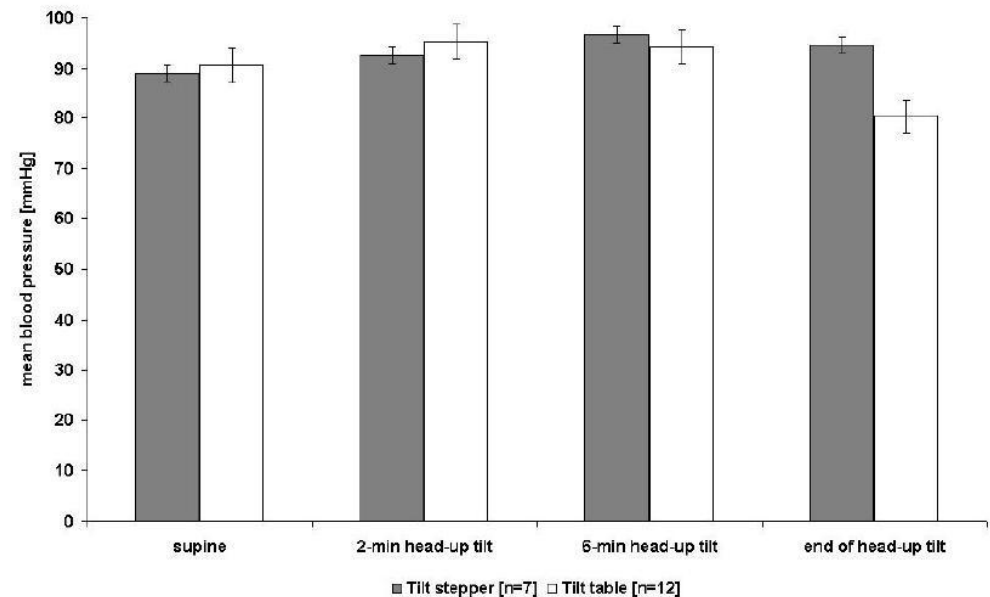
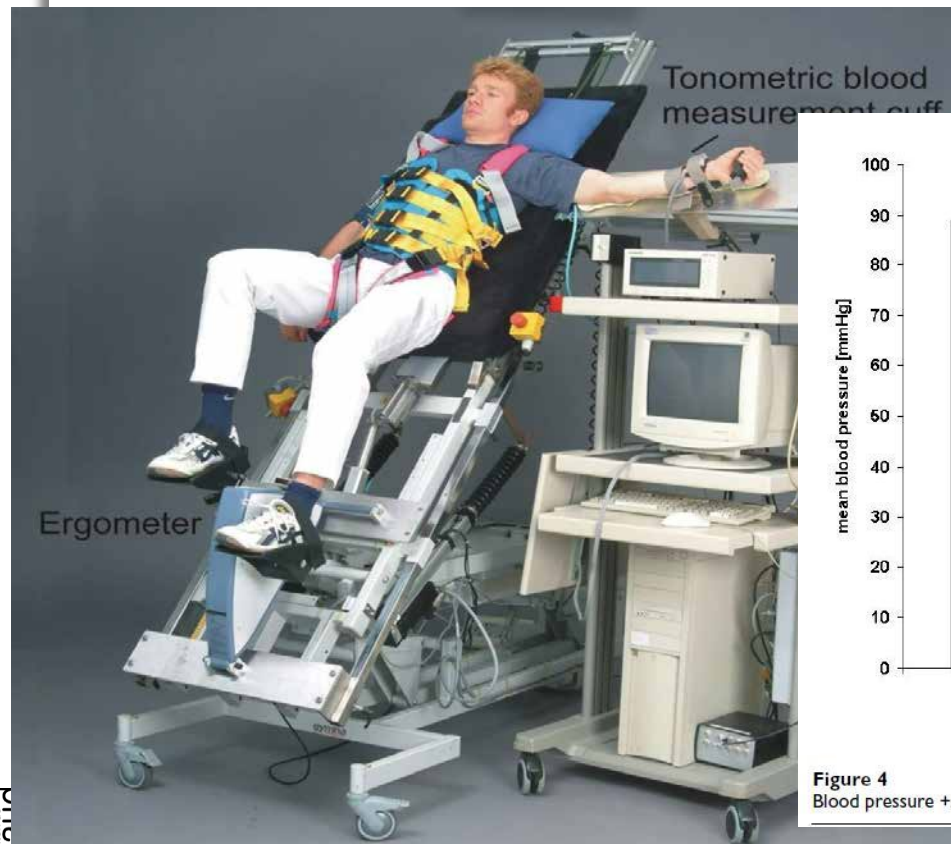


Figure 4
Blood pressure $\pm$ SE during 75° the tilt table and tilt stepper test

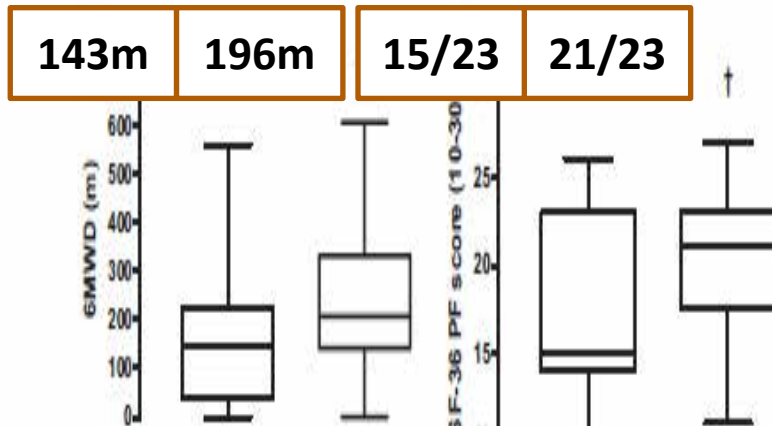
Early exercise in critically ill patients enhances short-term functional recovery.

Burtin C, Clerckx B, Robbeets C, Ferdinande P, Langer D, Troosters T, Hermans G, Decramer M, Gosselink R.

Faculty of Kinesiology and Rehabilitation Sciences (CB, BC, CR, DL, TT, RG), Katholieke Universiteit Leuven, Leuven, Belgium.



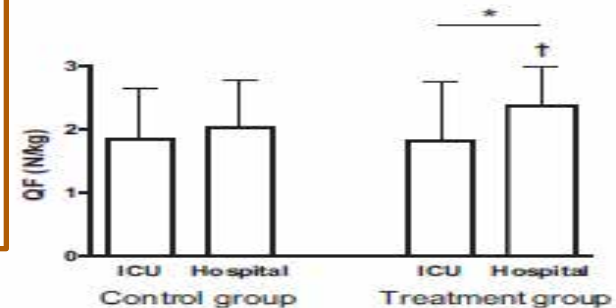
Treatment group n= 26
Control :n=32
20 min, 5th day, 5/7
Median cycling
sessions: 7 (4-11)



**Improvement of the 6 m walking test
And quality of life (SF-36 PF)**

1.83 kg

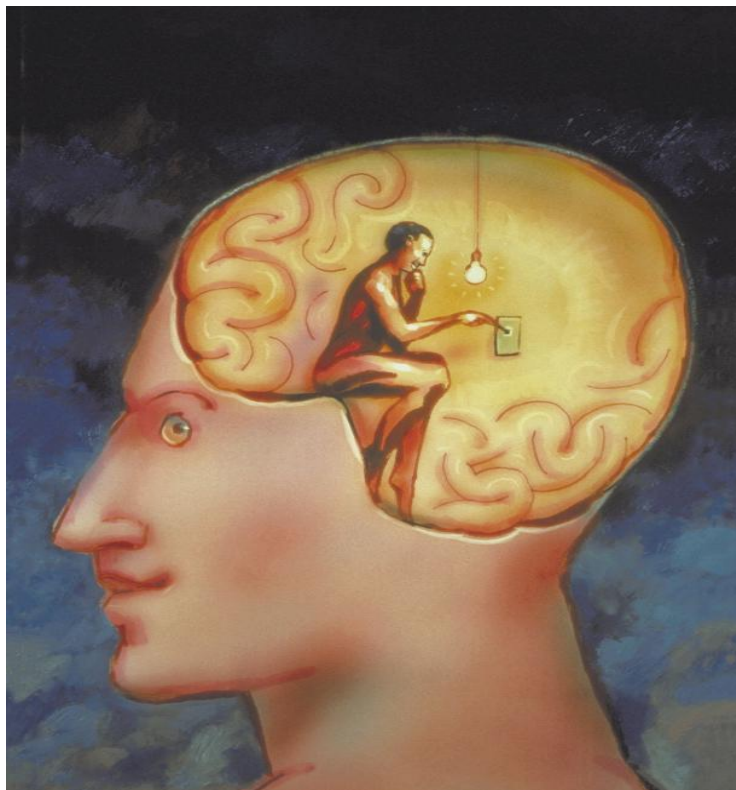
2.37 kg



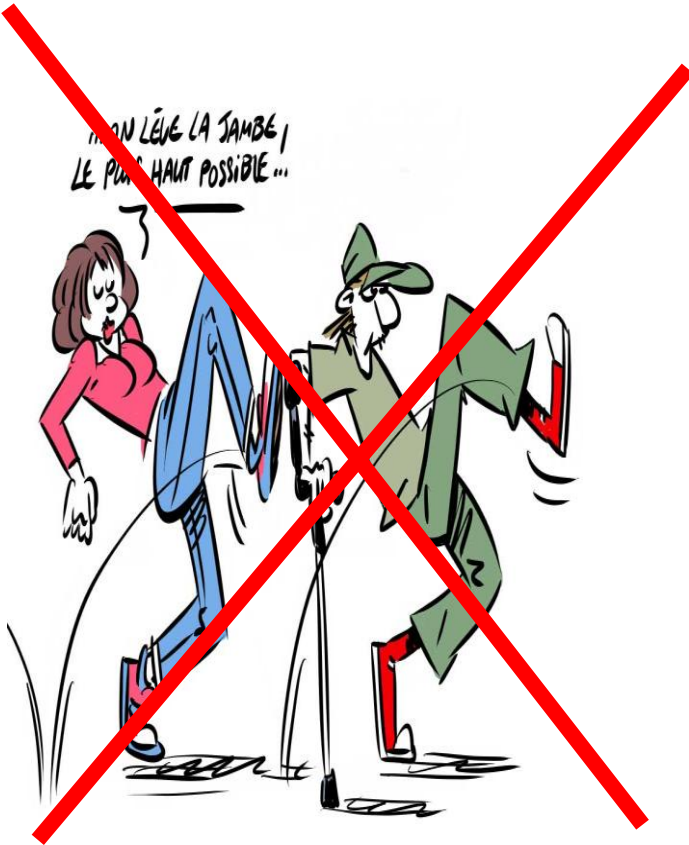
**Improvement of quadriceps force, $p < 0.01$
between ICU and hospital discharge and
 $p < 0.05$ between control group**



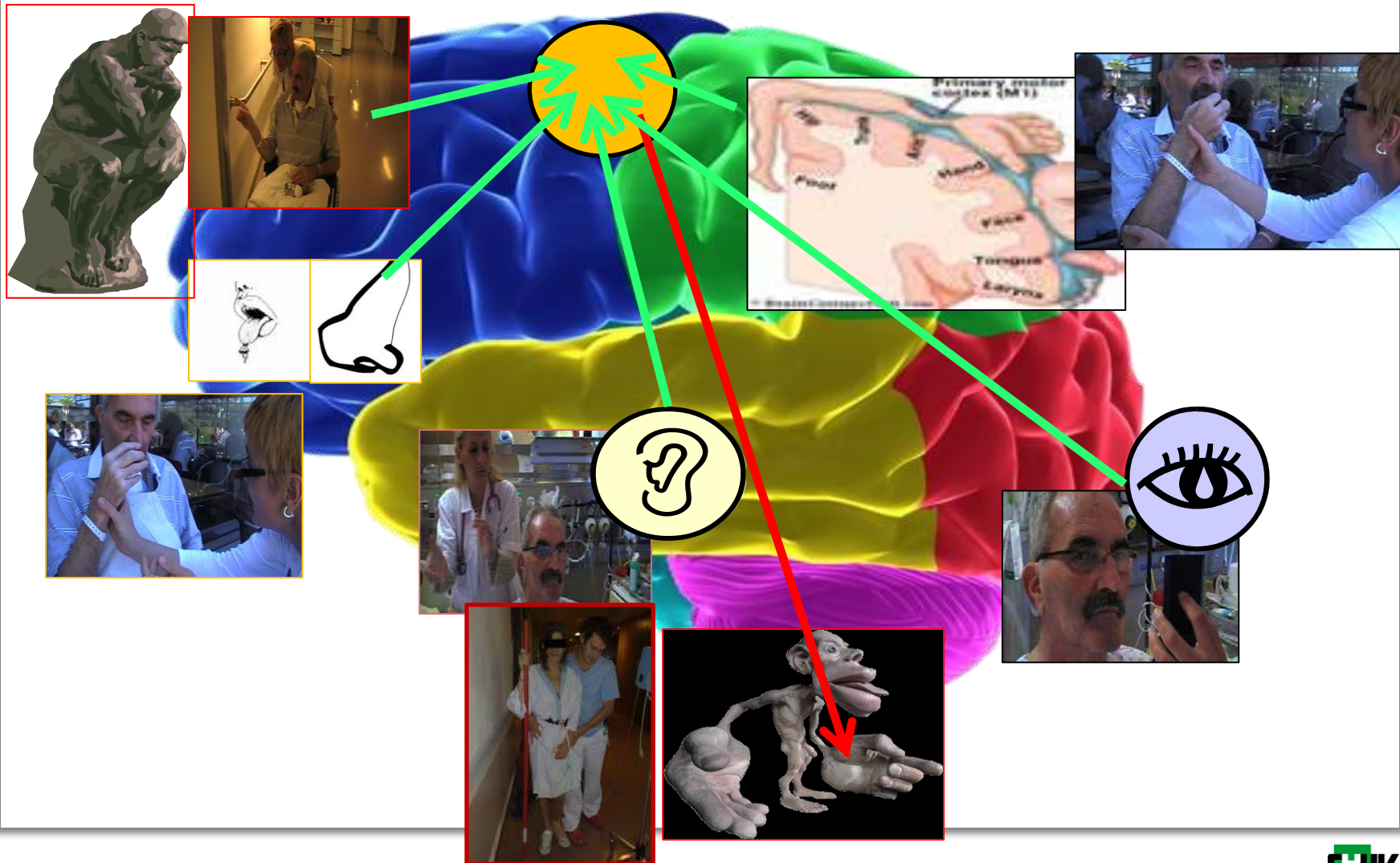
Neurosensorial Program



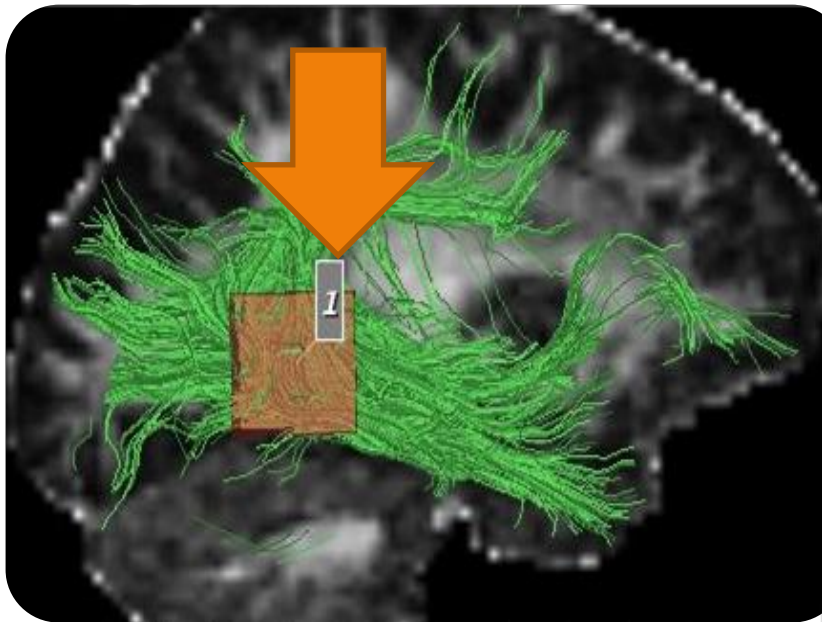
Stimulation of motivation and Comfort



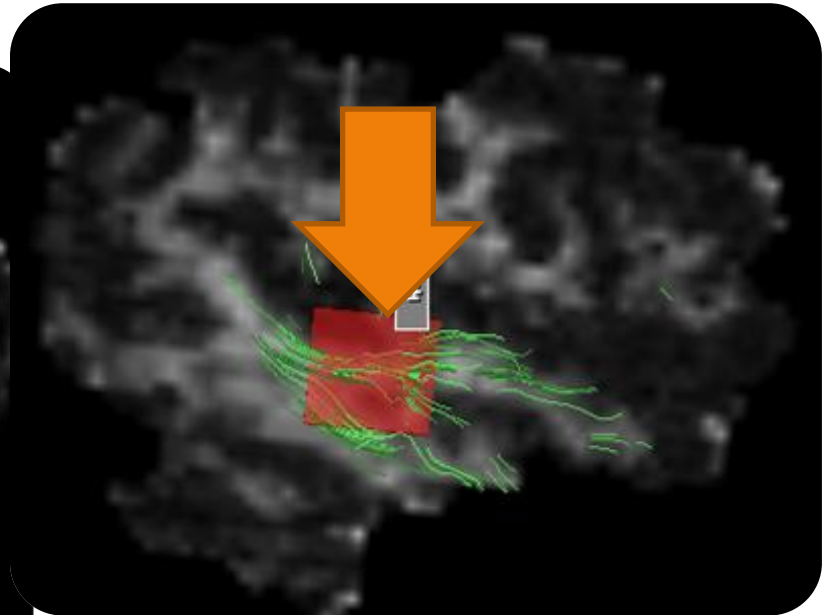
Stimulation of associative pathways



Tractography



Control



Vegetative Patient

Temporal Lobe

REVIEW

Acute management of acquired brain injury Part III: An evidence-based review of interventions used to promote arousal from coma

MATTHEW J. MEYER¹, JOSEPH MEGYESI^{2,3}, JAY MEYTHALER^{4,5},

Table IV. Sensory stimulation for promotion of arousal from coma post-ABI.

Study	n	Study design	PEDro	D&B	Interventions	Results
[28]	14	RCT	3	14	Sensory stimulation vs. control	(+) 3M-4H (ND) HR, SC
[29]	24	Non-RCT	NS	17	Sensory stimulation vs. control	(+) coma duration
[33]	12	Non-RCT	NS	16	Sensory stimulation vs. control	(+) RLA, DRS, SSAM (ND) GCS
[39]	16	Case series	NS	15	Sensory stimulation	(+) HR, respiration
[30]	6	Non-RCT	NS	15	Specific Directed Stimulation (SDS) vs. non-directed stimulation (NDS)	(+) Rader scores (ND) WNSSP, GCS, RLA
[40]	24	Case series	NS	14	Sensory stimulation	(+) Eye movement, reflex
[31]	8	Non-RCT	NS	12	Sensory stimulation vs. control	(+) LOS, GCS, RLA
[32]	31	Non-RCT	NS	11	Sensory stimulation vs. control	(ND) coma arousal, GOS

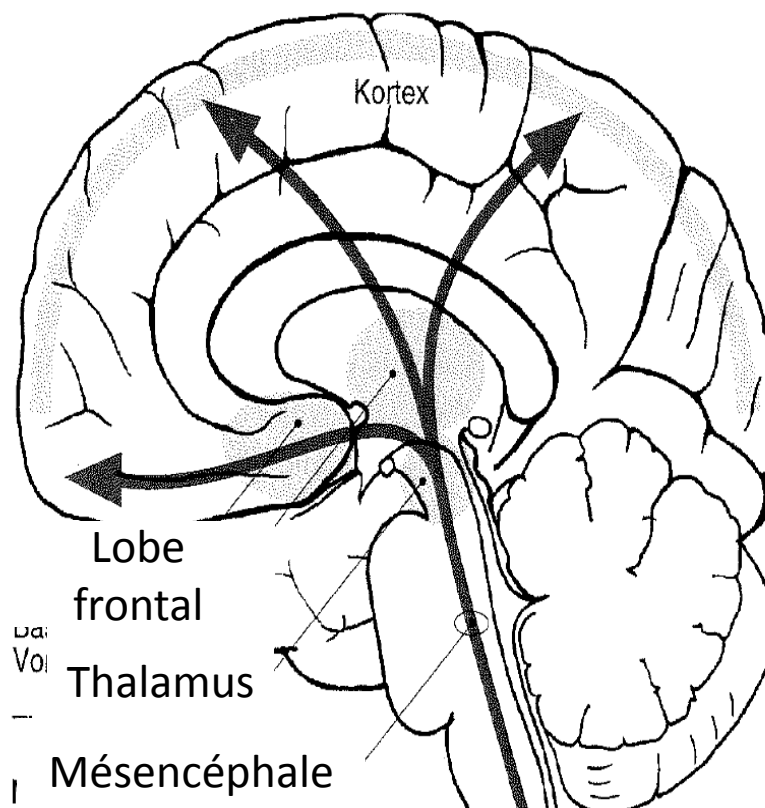
PEDro = Physiotherapy Evidence Database rating scale score [9]; D&B = Downs and Black [10] quality assessment scale score; (+), beneficial result; (ND), no difference; (–), negative result; (NS), no score; 3M-4H, 3-methoxy 4-hydroxyphenylglycol; HR, heart rate; SC, skin conductance; RLA, Rancho Los Amigo scale; DRS, disability rating scale; SSAM, sensory stimulation assessment measure; GCS, Glasgow Coma Scale; WNSSP, Western neurosensory stimulation profile; LOS, length of stay; GOS, Glasgow outcome scale.

Sympathetic
activity ↑

Wakefulness ↑

Length of stay ↓

La motivation et verticalisation stimule la motricité

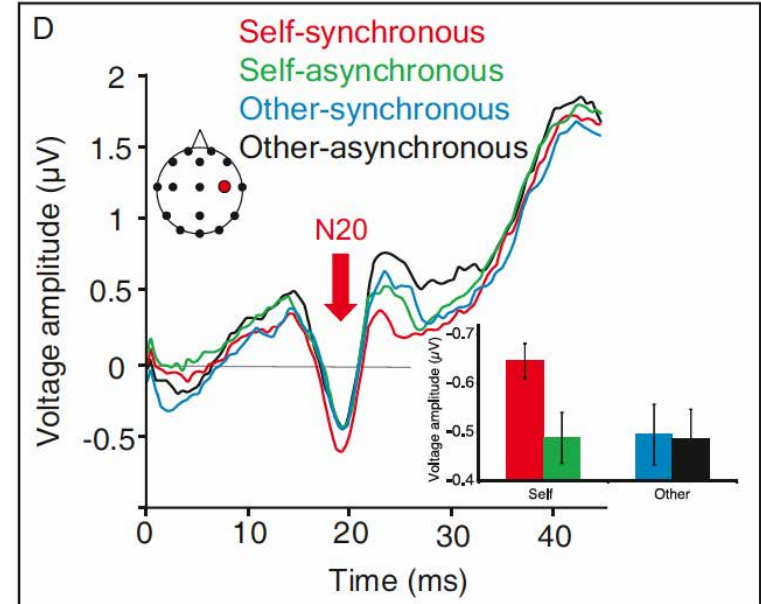


Aufste
Aktivität

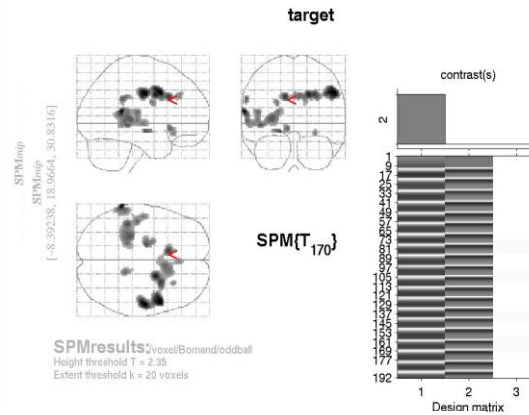
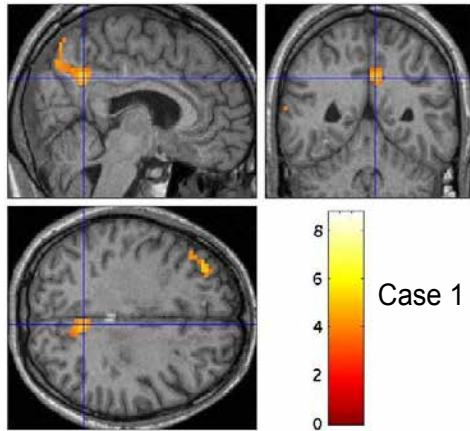
ARAS
Système ascendant réticulaire



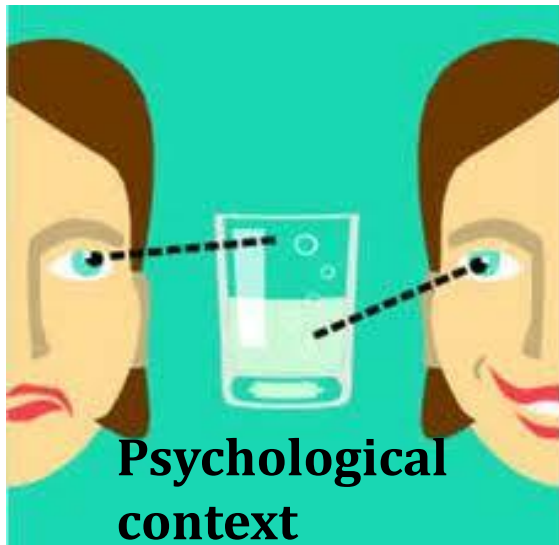
Self-touch and self-awareness



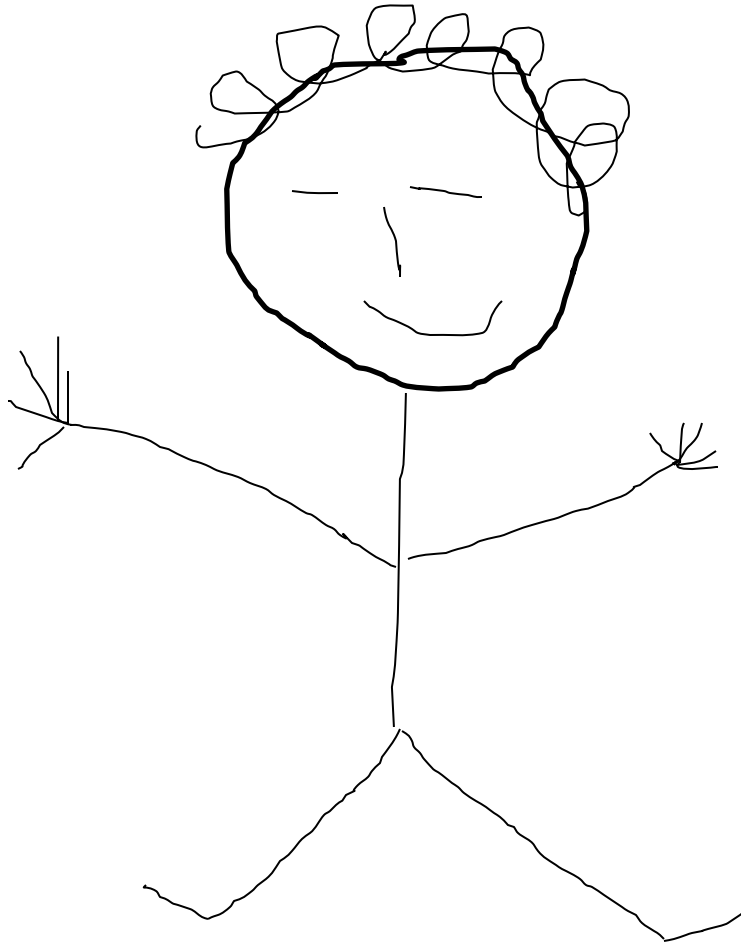
Stimulation Auditive



Patient's context factors



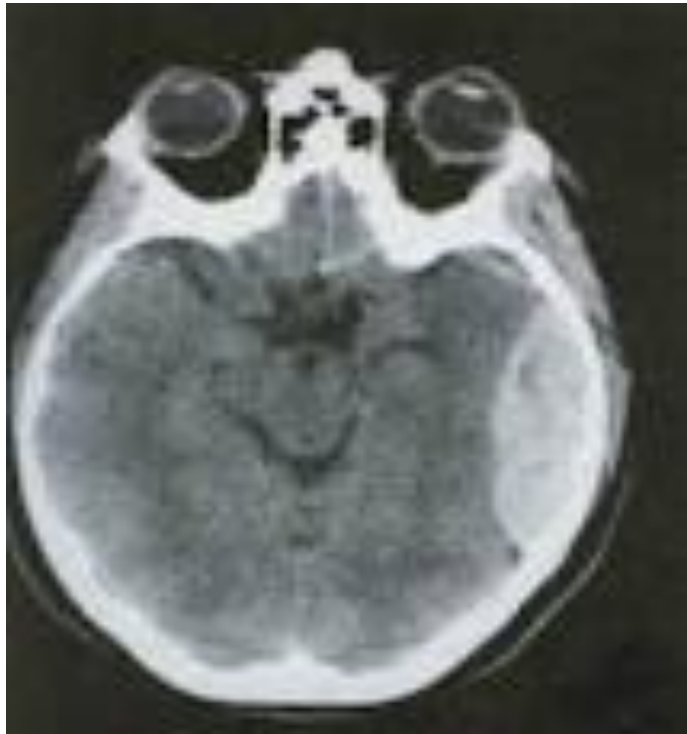
Specificity of the patient's organic lesion



Coordinated Nurse programme

Integration of Fröhlich « Basale Stimulation »

Left lesion



Approach first by the right



coordinated nurse approach

Date : 05.01.2010.....

II. STIMULATION BASALE – TECHNIQUE

ACTIVITE

SPECIFITE DU PATIENT

Parésie MSG et MID incomplète, hypertonie plutôt de type paratonique (oppositionnel) ddc.,

Sy frontal

Trachéotomie

A) COMMUNICATION

1) INFORMER EN FAISANT DES PHRASES SIMPLES

Sujet – Verbe – Objet

Malgré pas de réponse à continuer

Vouvoyez mais avec prénom

2) STIMULER LA COMMUNICATION

- En « nommant le contexte »

Exemples : voici le repas
 voilà la fourchette
 voici l'eau

- Si on constate une non-compréhension, alors effectuer une guidance manuelle
- Code de communication

ACTIVITE

B) HYGIENE-TOILETTE

1. APPROCHE UNIFORMISEE

- Température de l'eau légèrement inférieure à celle du corps (effet stimulant et tonifiant)
- Utiliser un gant de toilette (meilleure perception par contraste)
- Englober les membres (info de l'enveloppe du corps)
- Utiliser un toucher clair et assez ferme (les informations claires sont plus faciles à intégrer)
- Aller du proximal au distal

2. SCHEMA DEFINI POUR LE DEROULEMENT DE LA TOILETTE :

1. Visage
2. Bouche
3. Torse
4. Bras droit, de l'épaule à l'extrémité des doigts
5. Bras gauche, de l'épaule à l'extrémité des doigts
6. Jambe droite du haut de la cuisse au bout des orteils
7. Jambe gauche du haut de la cuisse au bout des orteils
8. Toilette intime
9. Dos
10. Siège
11. Coiffer les cheveux

coordinated nurse approach

NEURO-REEDUCATION PRECOCE NEURO-REEDUCATION PRECOCE
Dr Karin DISERENS Dr Karin DISERENS

ACTIVITE

C) REVEIL LE MATIN

APPROCHE UNIFORMISEE

- Approche depuis la gauche vu l'hémianopsie.
- 1^{er} toucher proximal (épaule)
- Se présenter
- Dire la date et le temps qu'il fait
- Tirer les rideaux (stores) pour laisser entrer la lumière du jour
- Expliquer ce qu'on lui fait en faisant des phrases simples,
 - o par ex. : - Je contrôle la perfusion
 - Je vous mesure la pression

ACTIVITE

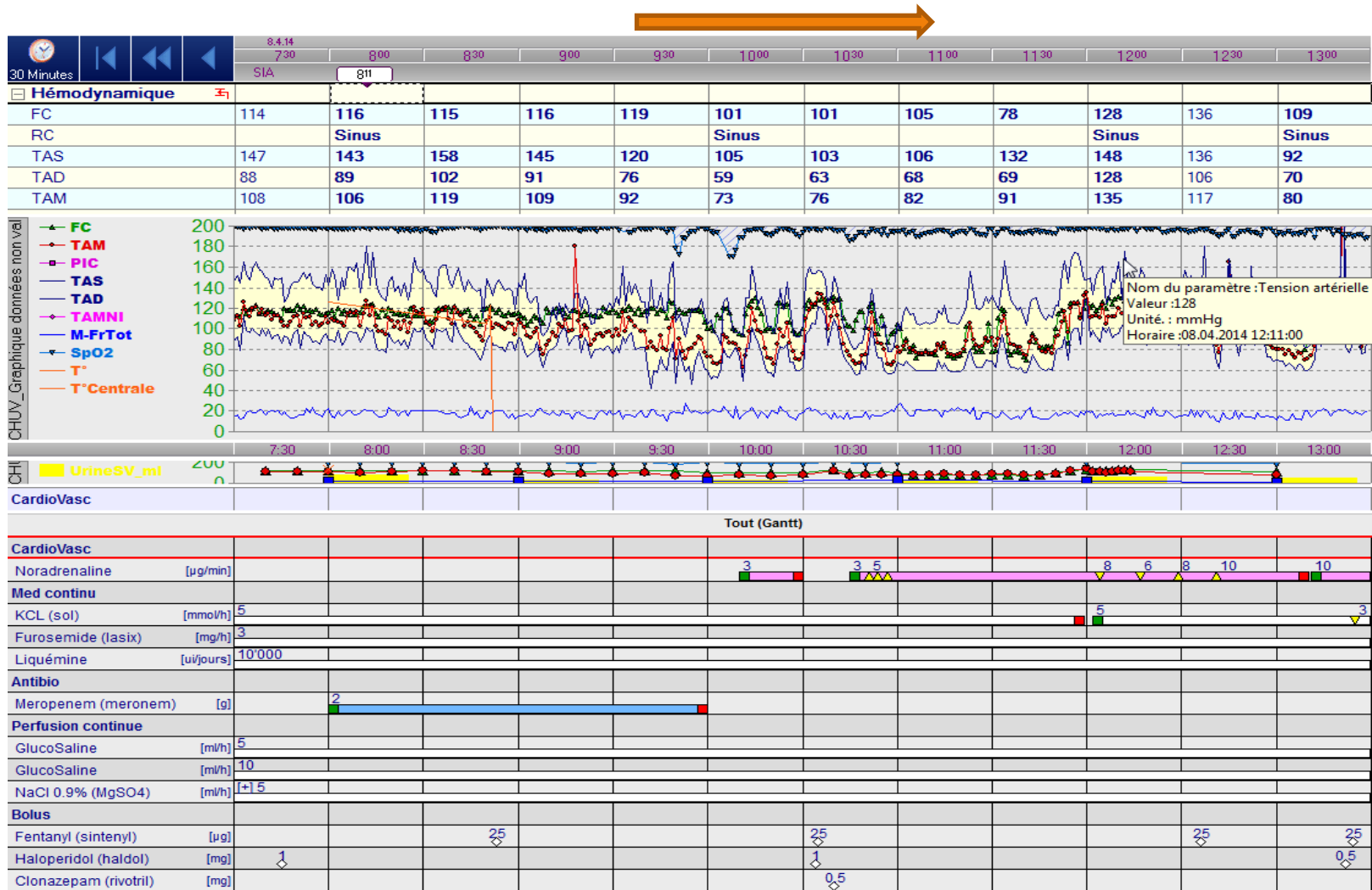
SPECIFICITE DU PATIENT

D) POSITIONNEMENT - MOBILISATION

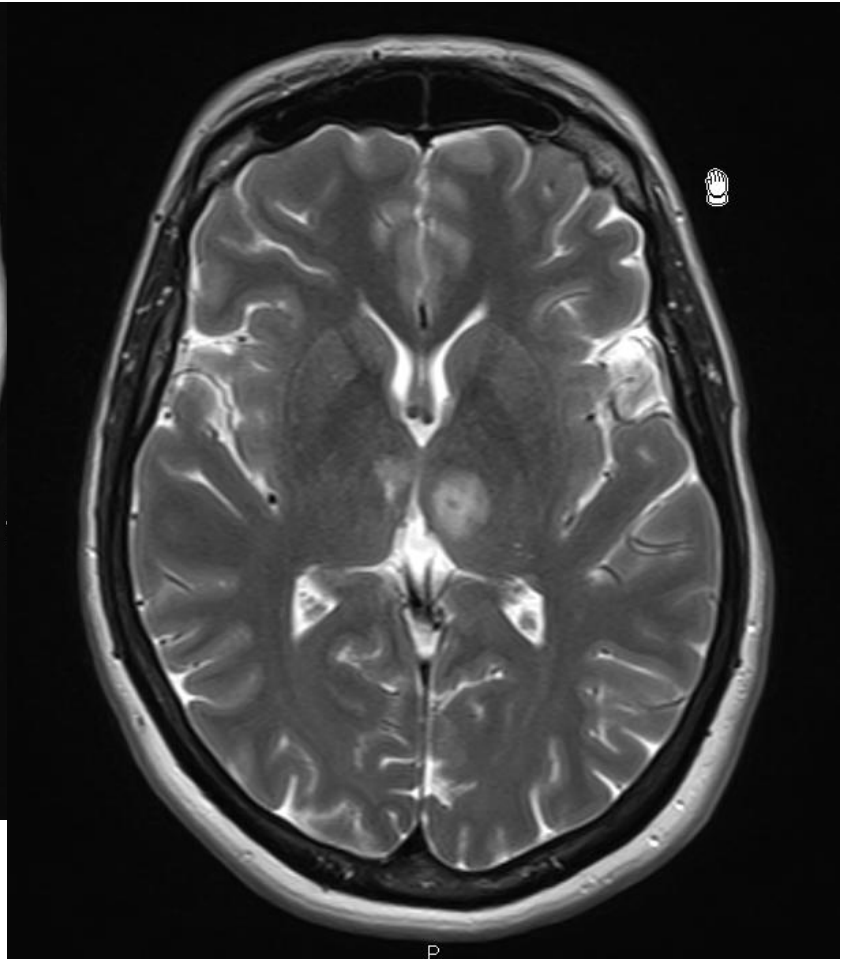
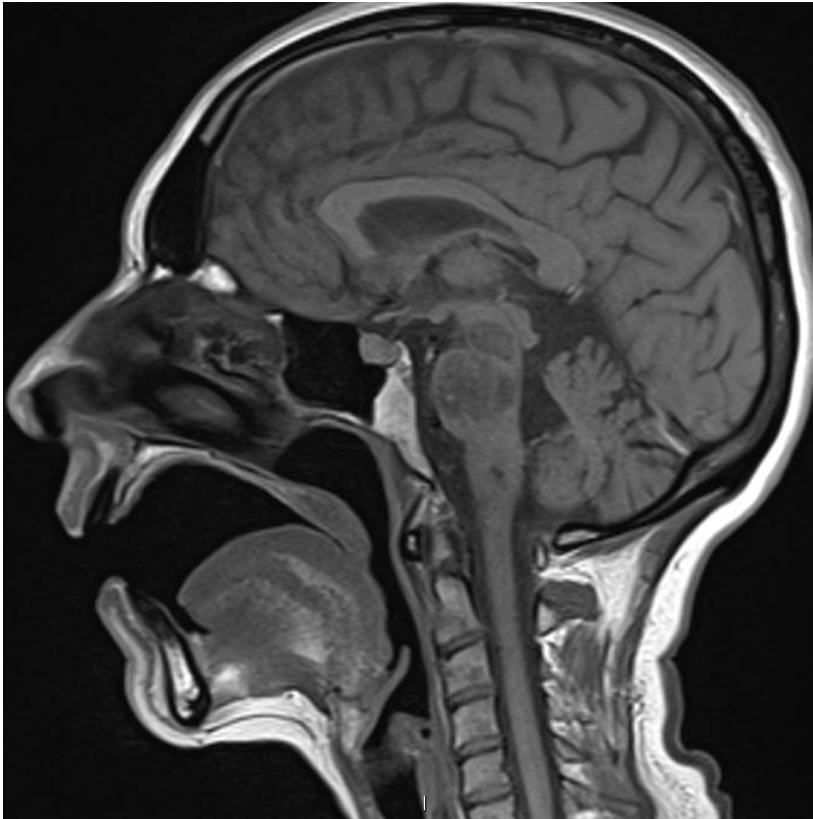
APPROCHE UNIFORMISEE

- **VERBALISER-INFORMER**
 - Avant ou pendant chaque mouvement qui amène un changement de position, il devrait sentir les points de repère (appui) soit par votre corps ou l'environnement matériel (lit, chaise, ...)
- Faire les transferts par étape et attendre quelques secondes pour introduire l'étape suivante
- Favoriser stimulation et éveil en position assise ou hors du lit ou en standing en alternant avec des siestes après la toilette et entre 12h et 13h (horaire à voir selon le rythme du service)
- **POUR LA FAMILLE :**
 - Qu'elle offre au patient :
 - Goût familiarisé
 - Touché familiarisé

« measurable observations »



Cf second trap of DOC



Outdoor



Indoor



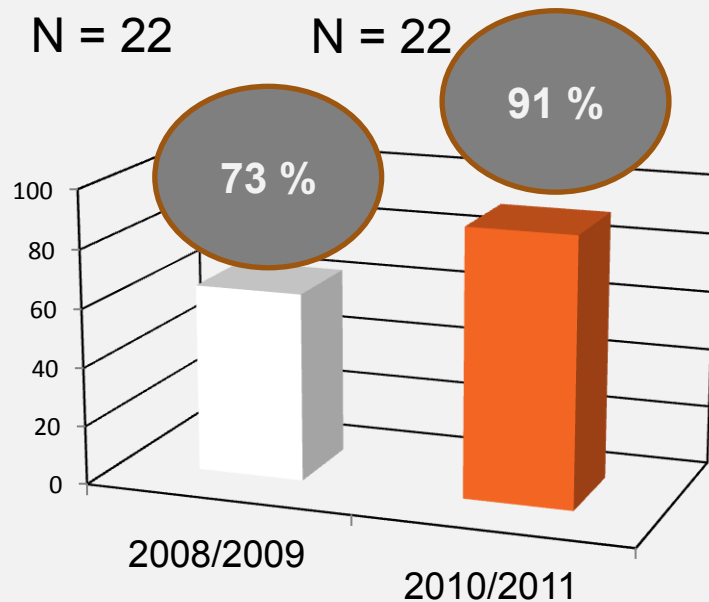
Acute neurorehabilitation: Does a neurosensory and coordinated interdisciplinary programme reduce tracheostomy weaning time and weaning failure?

Loric Berney^{a,*}, Jean-Blaise Wasserfallen^a, Kathleen Grant^b, Marc Levivier^c, Christian Simon^d, Mohamed Faouzi^e, Roland Paillex^f, Valérie Schweizer^g and Karin Diserens^a

Results

Indicator(tracheotomy)

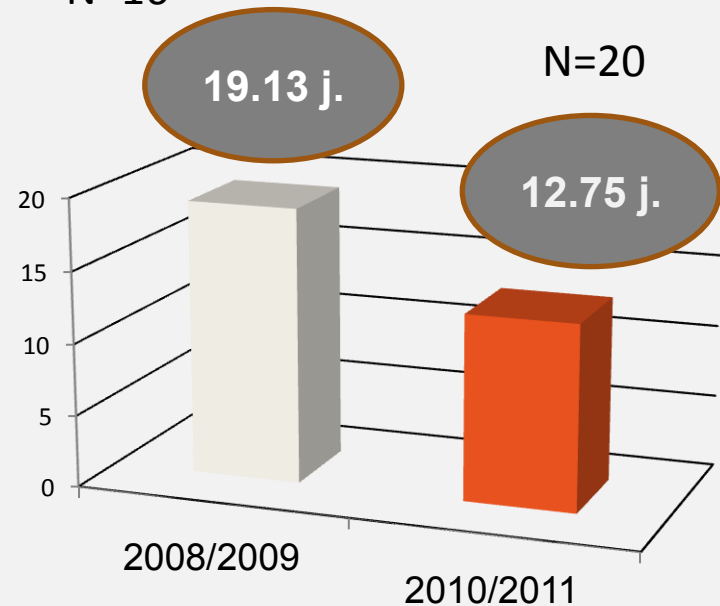
Patients without tracheo



Gain of 18 %

Time of weaning

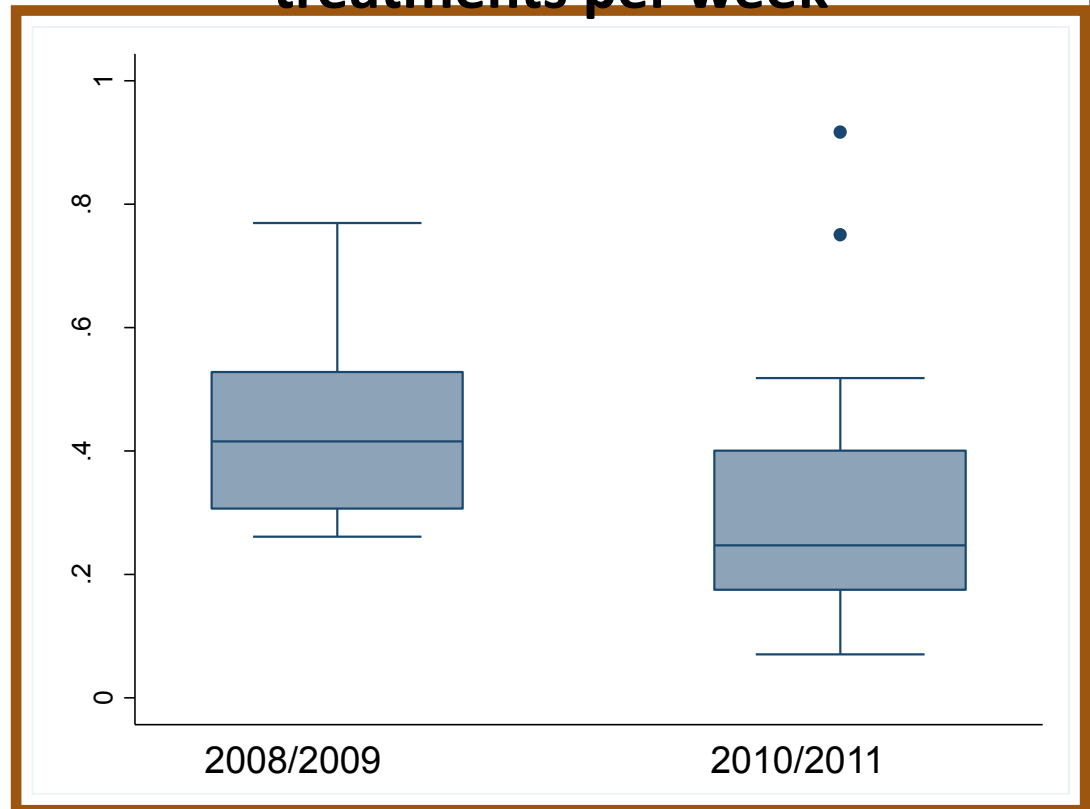
N=16



Gain of 33%

Results Coordinated pathway

**Increase of 18
treatments per week**

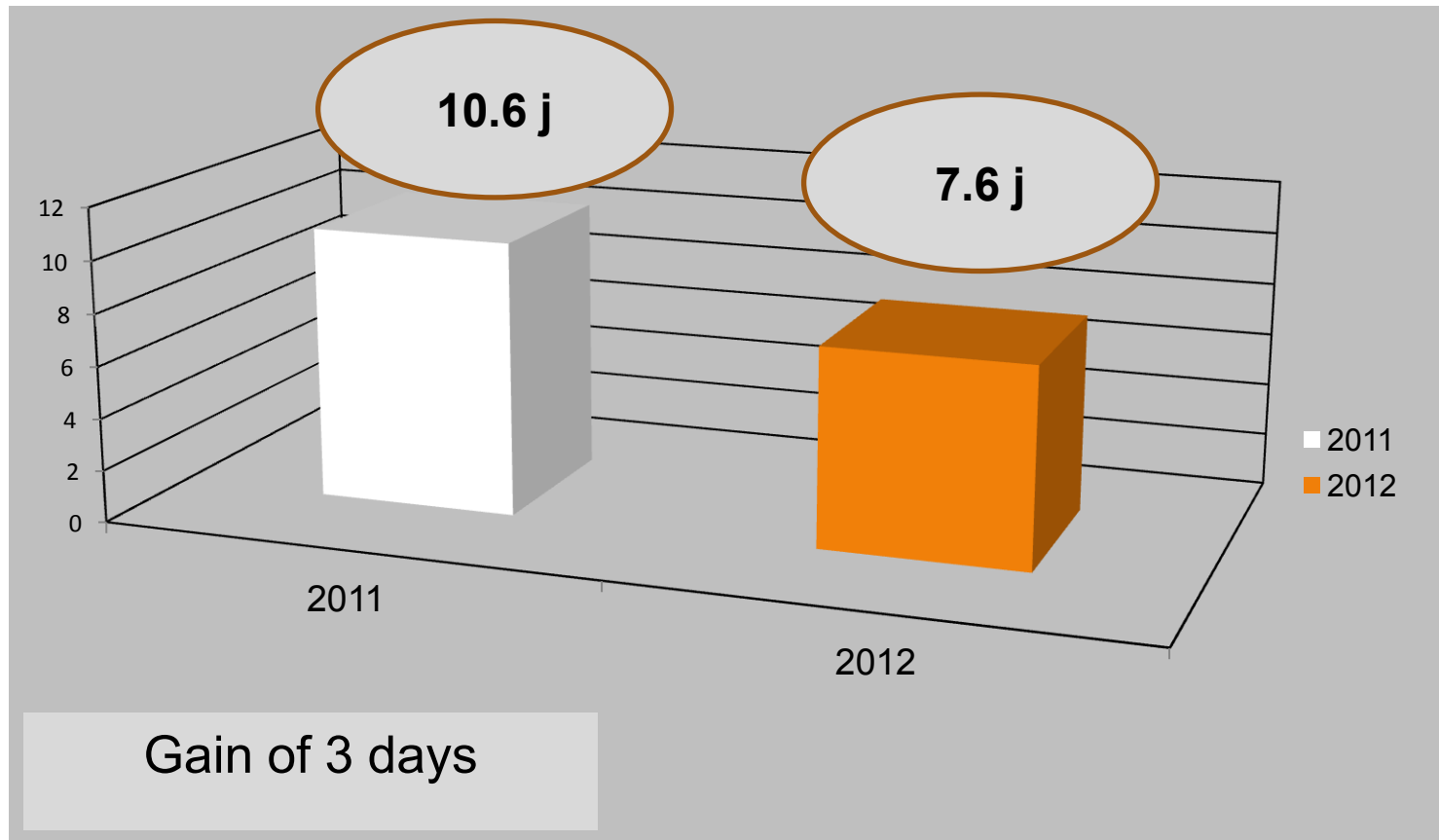


(p = 0.0032)

Results

Indicateurs :Lenth of Stay (LOS)

Length of Stay (LOS)



Conclusion



The Right Person at the Right Time to the
Right Place

Acknowledgements

