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Manœuvres d'hyperinflation manuelles Pour

Guillaume Maerckx
PT MsC
Soins Intensifs - Urgences

Cliniques universitaires SAINT-LUC
UCLouvain BRUXELLES

SKR
Société de Kinésithérapie de Réanimation

IREC
Institut de Recherche Expérimentale et Clinique

GRKR
GROUPE DE RECHERCHE EN KINESITHERAPIE RESPIRATOIRE

UCLouvain

Orateur : Guillaume MAERCKX, Bruxelles

☑ Je n'ai pas de lien d'intérêt potentiel à déclarer


Hyperinflation
manuelle

Une technique recommandée…

Intensive Care Med (2008) 34:1188–1199
DOI 10.1007/s00134-008-1026-7

ESICM STATEMENT

Physiotherapy for adult patients with critical illness: recommendations of the European Respiratory Society and European Society of Intensive Care Medicine Task Force on Physiotherapy for Critically Ill Patients

Recommendations for the intubated patient:

- Body positioning and mobilization can be used to enhance airway secretion clearance (level C).
- Manual or ventilator hyperinflation and suctioning are indicated for airway secretion clearance (level B).
- MHI should be used judiciously in patients at risk of barotrauma and volutrauma or who are hemodynamically unstable (level B).

Gosselink.R et al (2008) Intensive Care Med

REVIEW ARTICLE

Manual hyperinflation in children

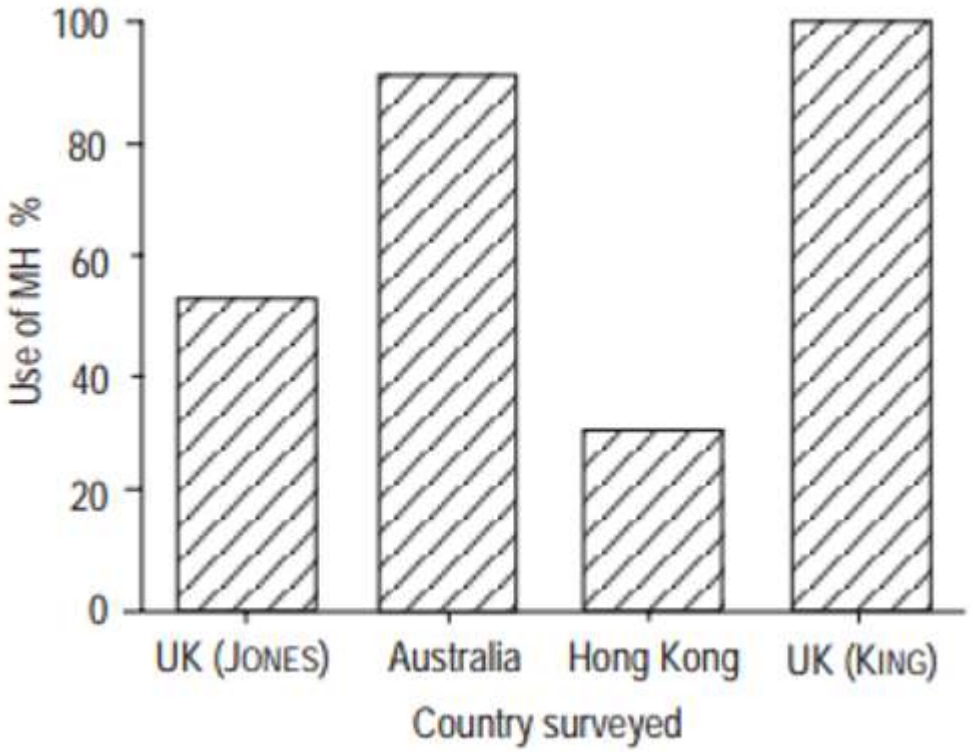
Hiperinsuflação manual em crianças

CONCLUSION

Six studies on the topic of study were included; of these, only two had high methodological quality. The main results provided information on the contribution of the positive end-expiratory pressure valve to the increase in lung volumes and the use of chest compressions to optimize the expiratory flow bias, with increased peak expiratory flow; the negative influence of operator experience on the increase in peak inspiratory flow; the performance of different manual resuscitators during the performance of the technique and the safety of its application, with the maintenance of hemodynamic stability and increased peripheral oxygen saturation. Thus, currently available studies point to a positive effect of the manual hyperinflation maneuver performed in children admitted to intensive care units.

Lorena (2021) Rev Bras Ter Intensiva. ;33(4):616-623

Une technique « populaire »



Denehy (1999) Eur Respir J;14:958-965

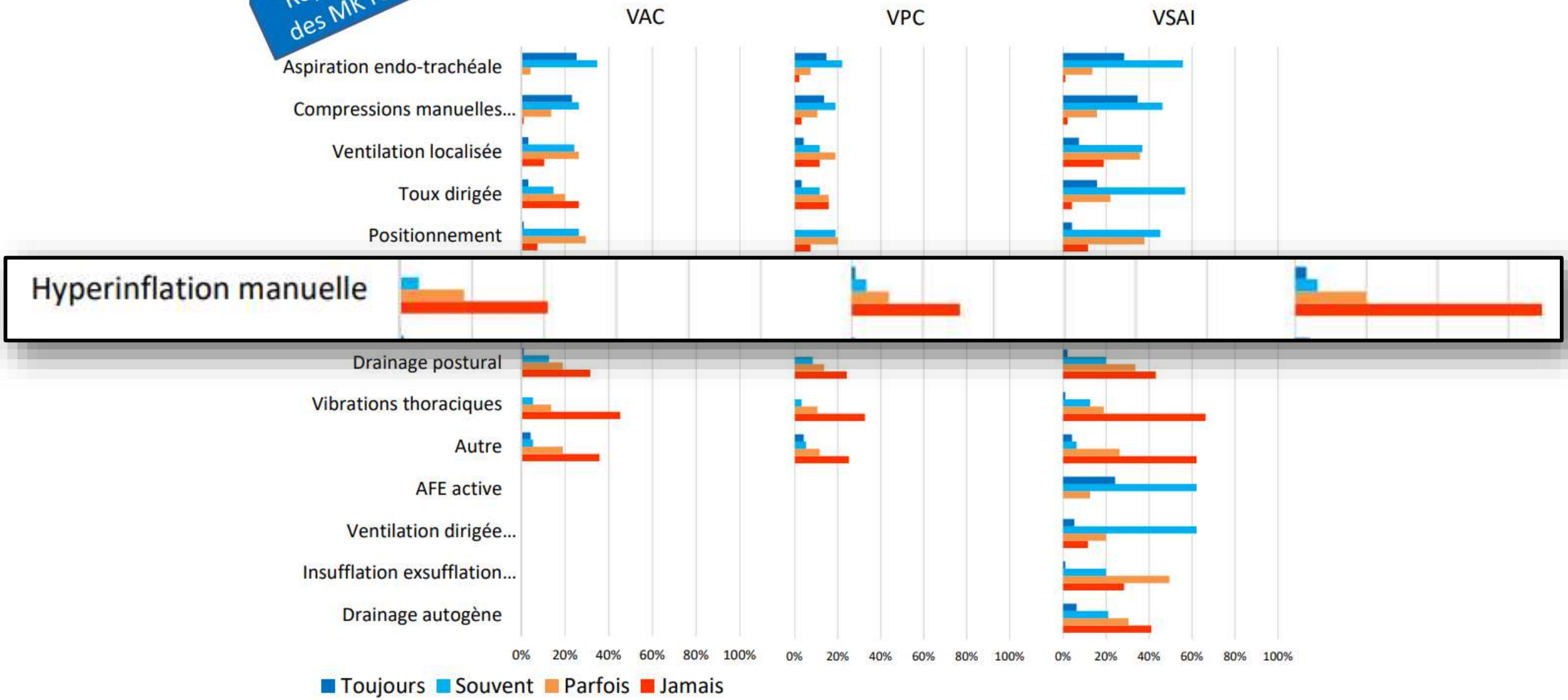
74% des kinésithérapeutes (Stilma (2021) J Clin Med;10:3381)

53,8% des kinésithérapeutes (Baidya S (2016) Indian J Crit Care Med;20:84-90.)

Pour 29% des patients (Ntoumenopoulos (2018) Austr Crit Care; 31:191-196)

Quelles techniques utilisent les MK réa ?

Réponses des MK réa



KINEVENT, Enquête de pratique Avec l'autorisation de Mme Caqueret G.

Hyperinflation manuelle : description

Problématique encombrement des patients de réanimation

- Sonde d'intubation
- Ventilation contrôlé
- Immobilisation
- Fonte musculaire

Bransson Respir Care; October 2007: Vol 52 No 10

OCTOBER 7, 1972 THE MEDICAL JOURNAL OF AUSTRALIA 829

"BAG SQUEEZING": A PHYSIOTHERAPEUTIC TECHNIQUE

HARRY M. WINDSOR, F.R.A.C.S., G. A. HARRISON, M.B., B.S., F.F.A.R.A.C.S., AND THURZA JUNE NICHOLSON, M.A.P.A.

Departments of Surgery, Anæsthesia and Physiotherapy, St Vincent's Hospital, Sydney

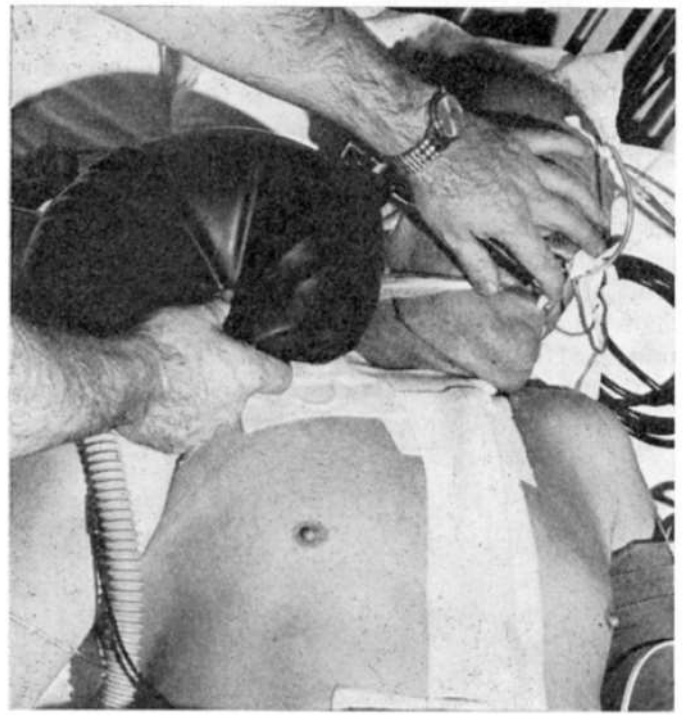


FIGURE 2: The four-litre bag.

- 1ère description 1968 (Clement AJ Physiotherapy 1968;54(10):355-359)

Windsor.HM, *Med J Aust 1972;2:829-832*

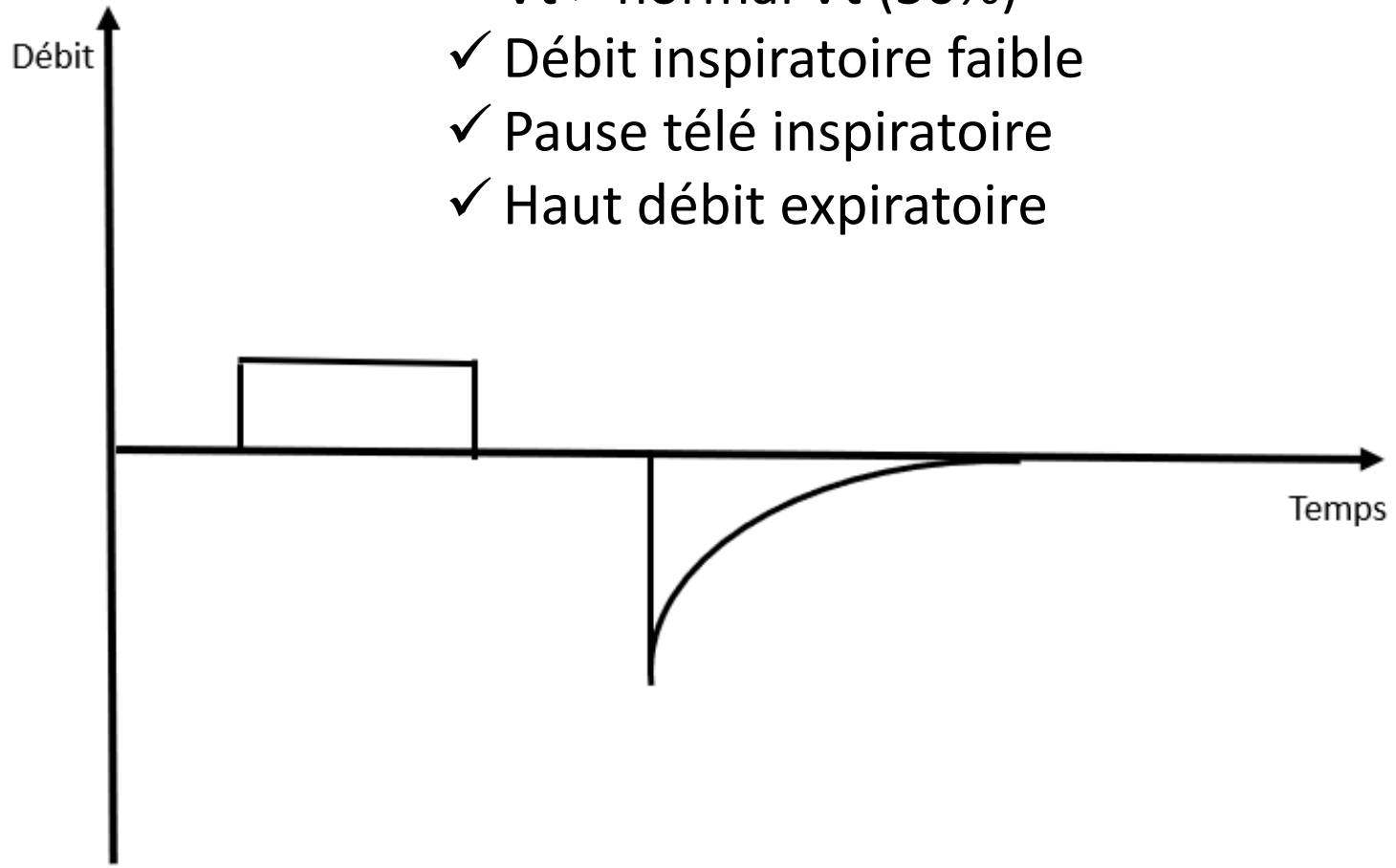
Hyperinflation manuelle : description

Description of the MH technique

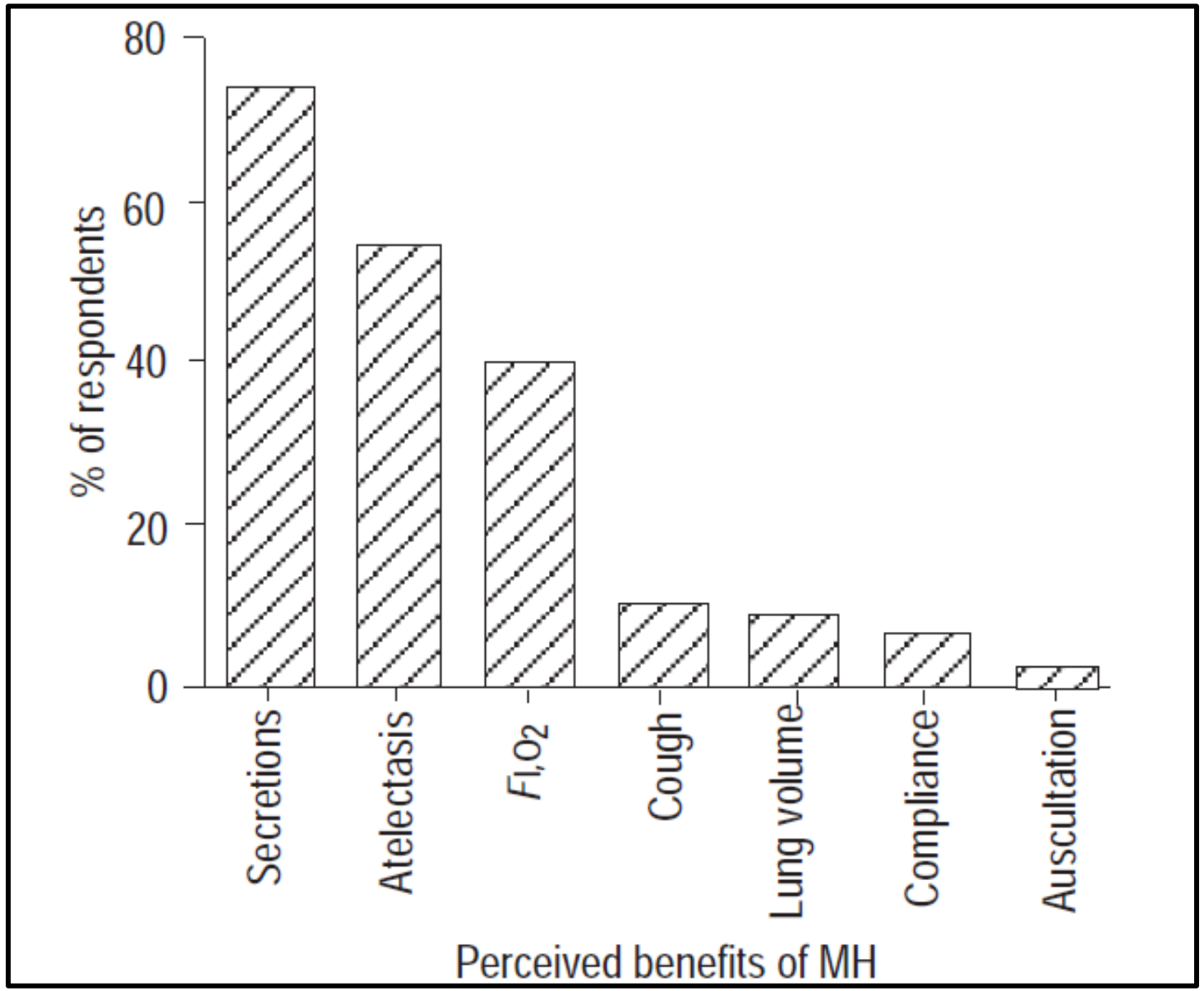
To enhance the clearance of airway secretions, MH was supposed to include the application of a larger than normal volume (up to one and one half the size of tidal volumes delivered by the ventilator) at a low inspiratory flow (achieved by a slow compression of the ventilation bag), an inspiratory pause (to allow complete distribution of the inflated air among all the ventilated parts of the lung), and a high expiratory flow. In particular, this last element seems important and can be achieved by a complete and rapid release of the ventilation bag [15,16]. As such, MH could resemble a forceful cough, with which a forced and rapid exhalation follows a deep and slow inhalation.

Paulus (2012) Crit Care 16:R145

- ✓ Vt > normal Vt (50%)
- ✓ Débit inspiratoire faible
- ✓ Pause télé inspiratoire
- ✓ Haut débit expiratoire

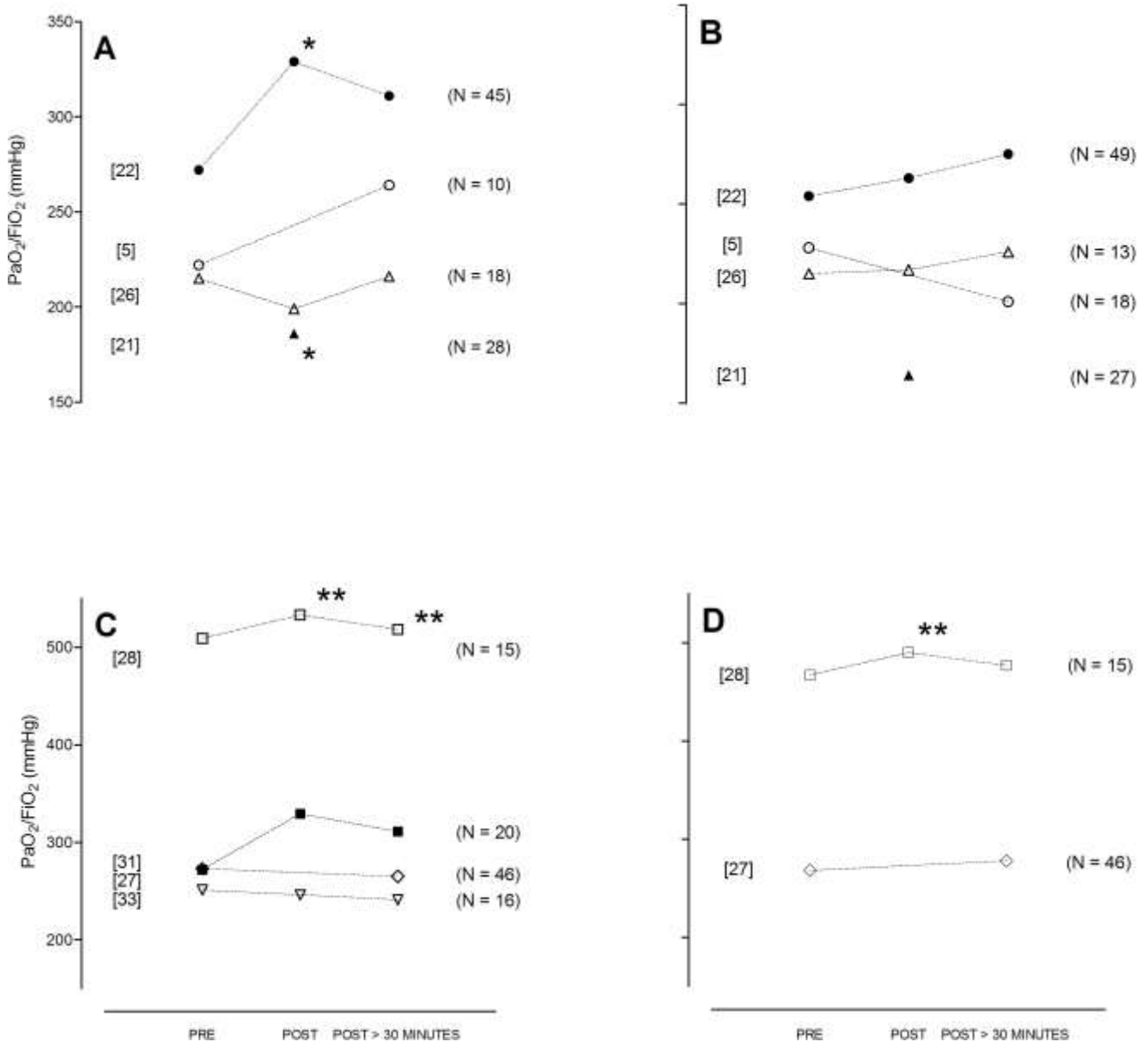


Hyperinflation manuelle : description



Denehy (1999) Eur Respir J;14:958-965

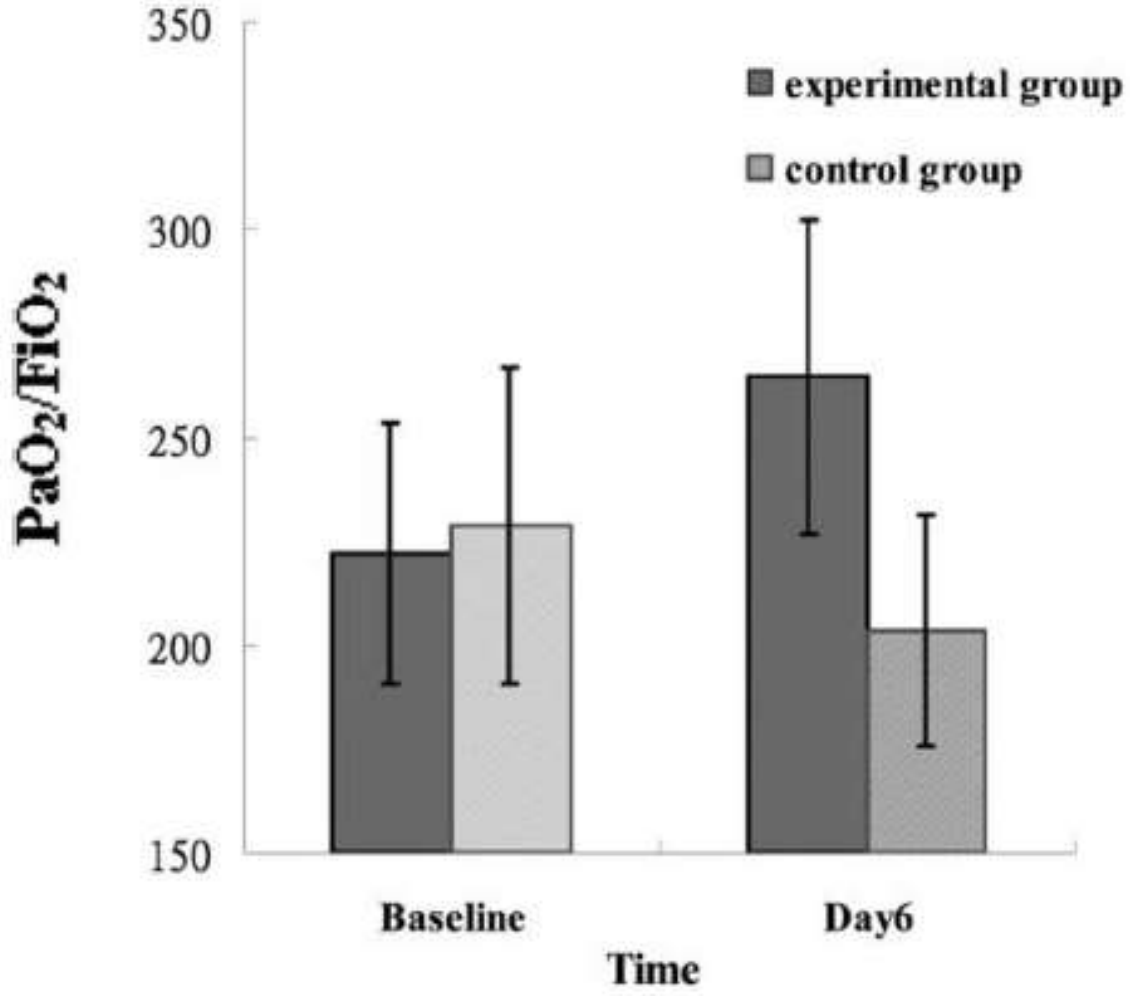
Effet sur l'oxygénation



Paulus, Critical Care 2012, 16:R145

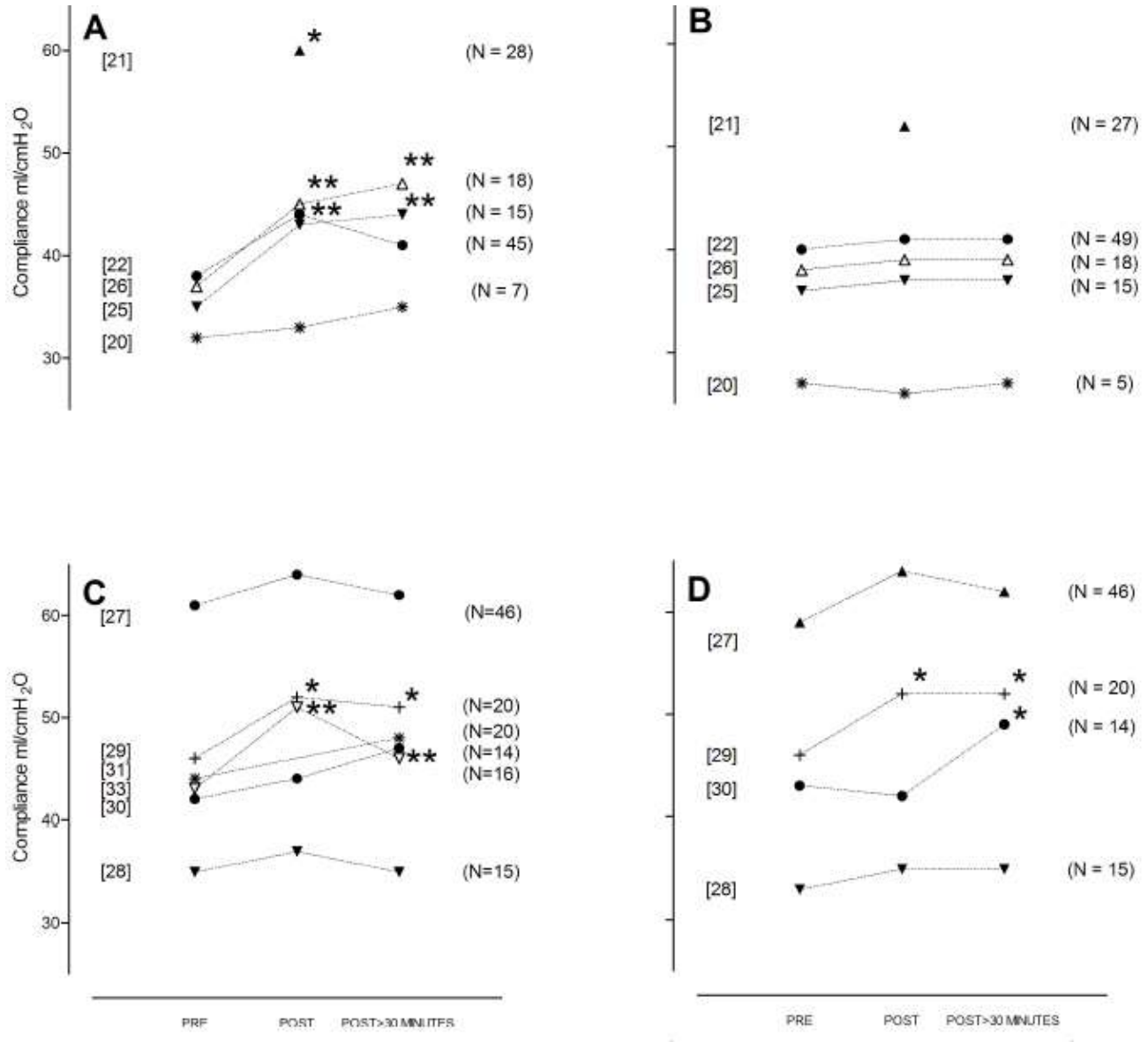
Effet sur l'oxygénation

Des effets qui perdurent



Maa (2005) CHEST; 128:2714–2721

Effet sur le recrutement alvéolaire



Paulus, Critical Care 2012, 16:R145

Effet sur le recrutement alvéolaire

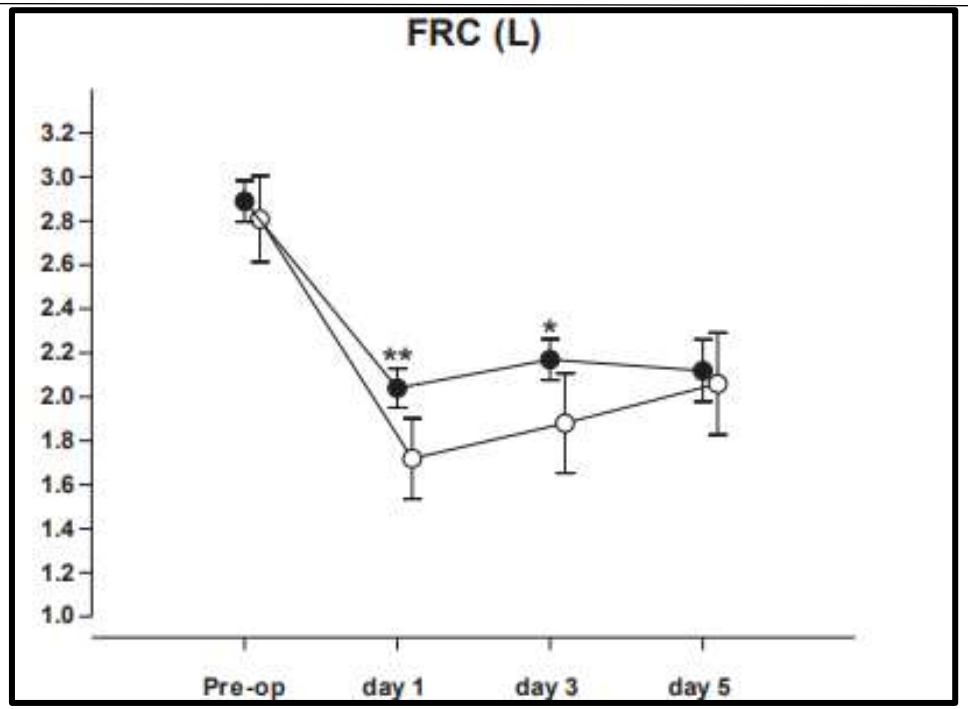


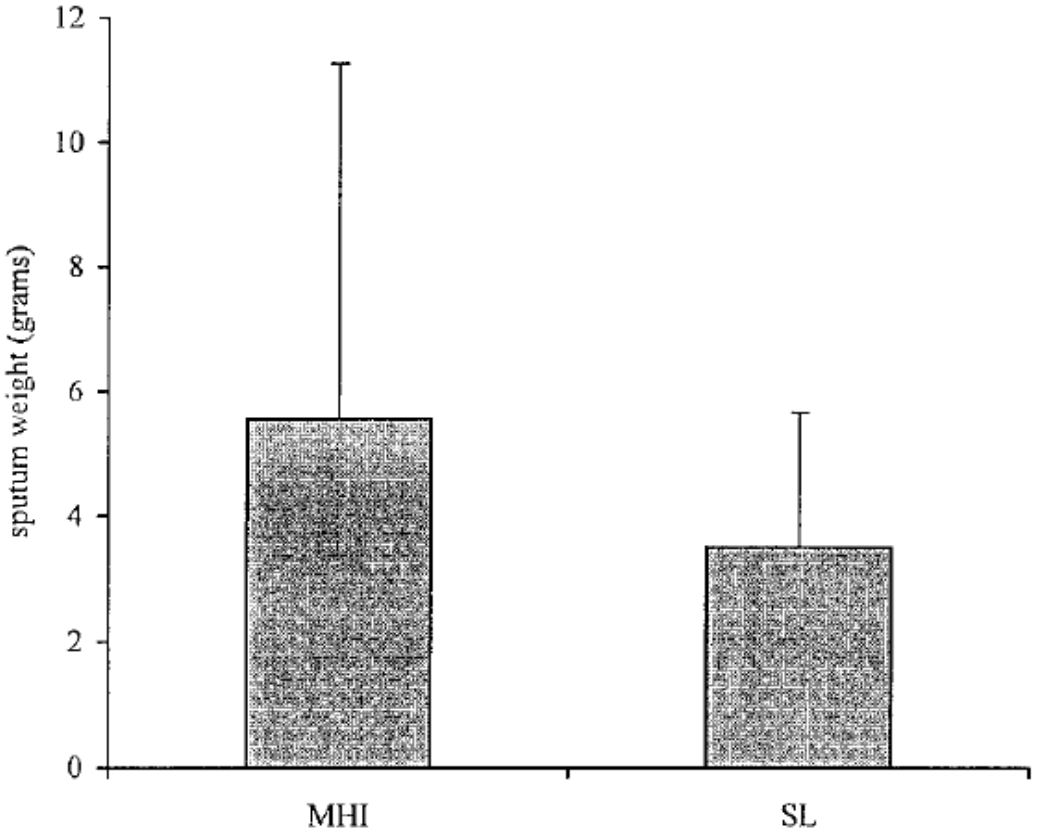
Table 4 Chest radiograph results

	routine MH group (N = 46)	control group (N = 47)	*P*-value
No atelectasis	8 (17)	0 (0)	$P = 0.002$
Plate/subsegmental atelectasis	20 (44)	22 (47)	$P = 0.10$
Segmental atelectasis (one of two segments)	18 (39)	23 (49)	$P = 0.55$
Lobar atelectasis	0 (0)	2 (4)	$P = 0.16$

Data are presented as percentages of N (%)

Paulus Critical Care 2011, 15:R187

MH et désencombrement



Hodgson (2000) Anaesth Intensive Care; 28: 255-261

ARTICLE ORIGINAL

Techniques manuelles de drainage bronchique des adultes et adolescents : quel niveau de preuve ?☆

Manual airway clearance techniques in adults and adolescents: What level of evidence?

Michel Cabillic[a,b,*], Pascal Gouilly[c], Gregory Reychler[d]

« Ce travaille souligne l'insuffisance des données scientifiques valables et les difficultés pour pouvoir déterminer les niveaux de preuve des techniques de désencombrement manuel (…) Il permet aussi de montrer les limites des critères d'évaluation permettant de mesurer la présence d'un encombrement et donc l'efficacité du désencombrement.»

Cabillic (2016) Rev Mal Resp

Amélioration du désencombrement ?

Short-Term Appraisal of the Effects and Safety of Manual Versus Ventilator Hyperinflation in an Animal Model of Severe Pneumonia

Gianluigi Li Bassi, Joan Daniel Martí, Talitha Comaru, Eli Aguilera-Xiol, Montserrat Rigol, George Ntoumenopoulos, Silvia Terraneo, Francesca De Rosa, Mariano Rinaudo, Laia Fernandez-Barat, Denise Battaglini, Andrea Meli, Miguel Ferrer, Paolo Pelosi, Davide Chiumello, and Antoni Torres

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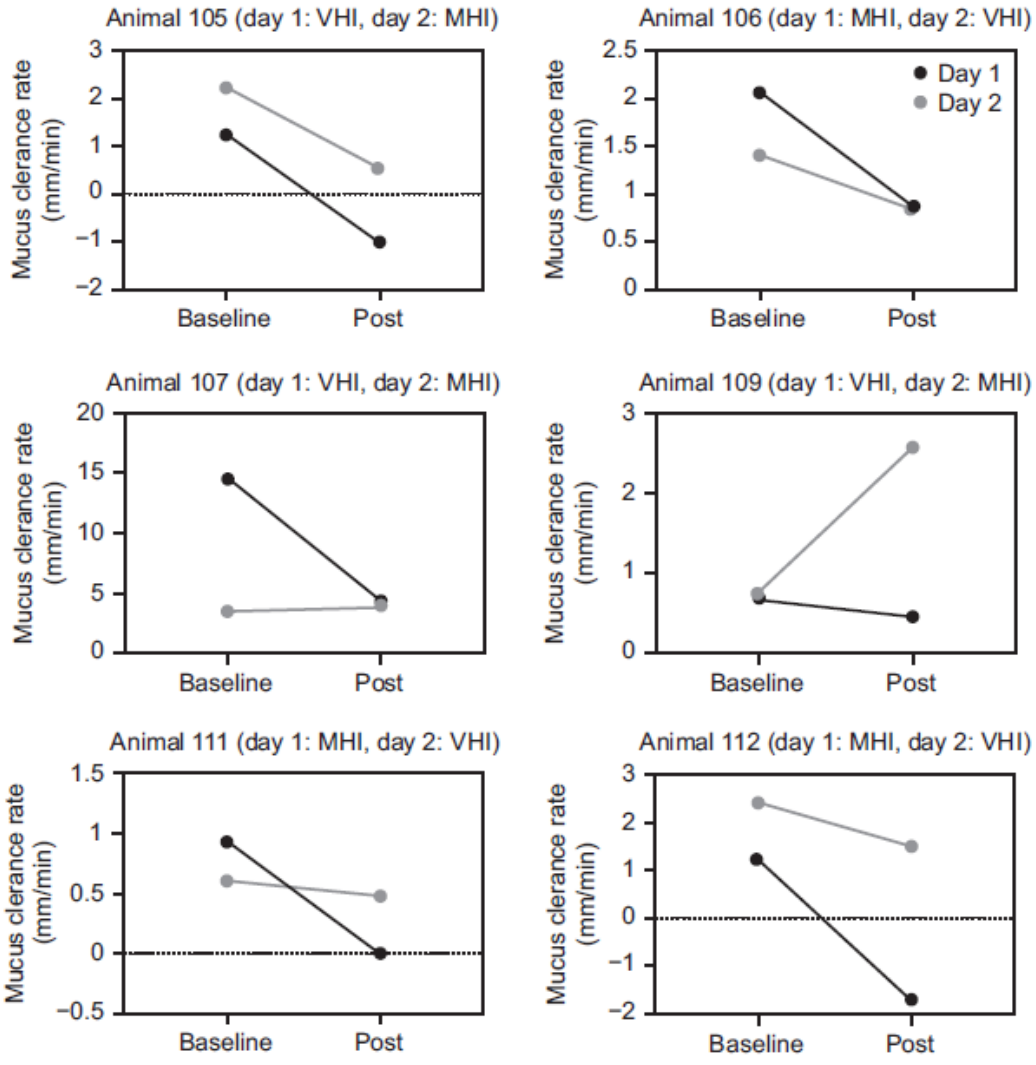
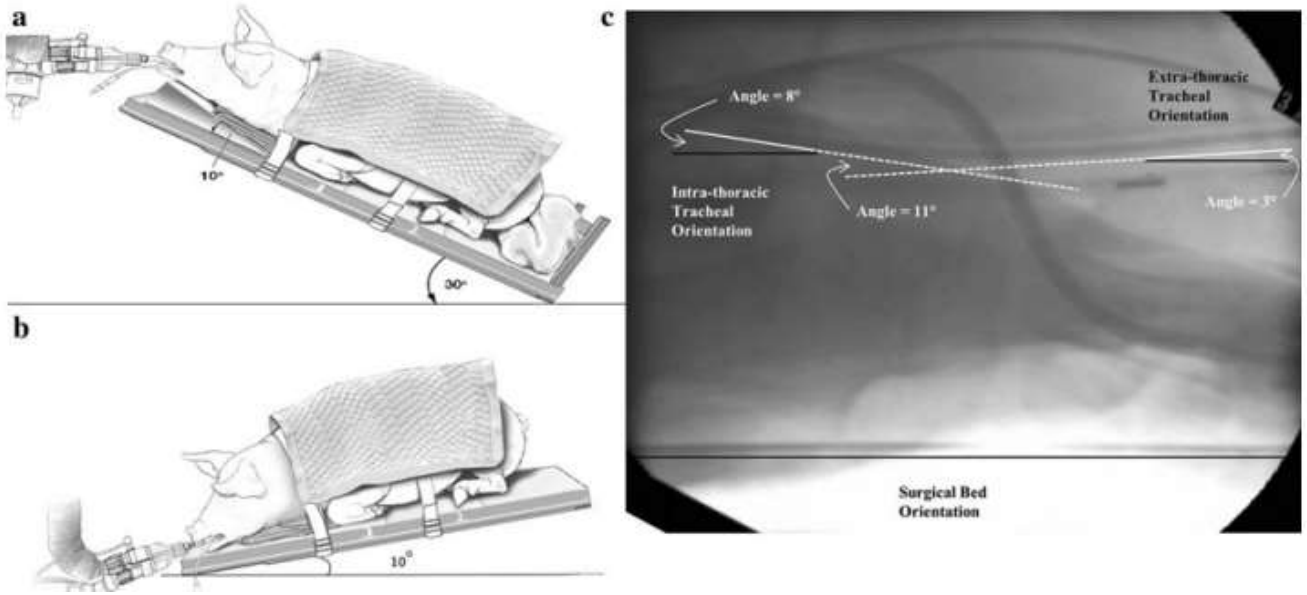
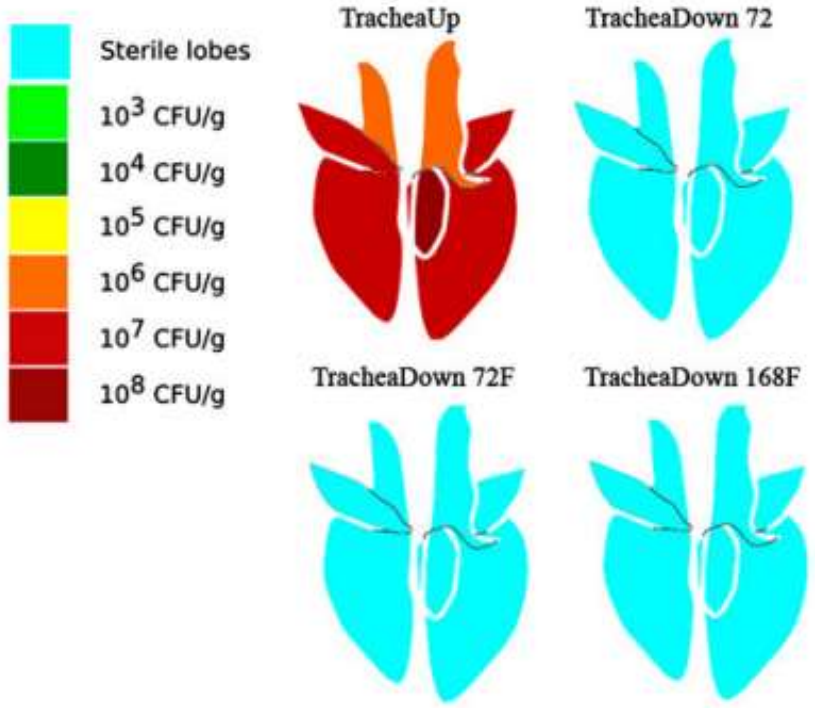


Li Bassi et al, 2019, Respir Care.

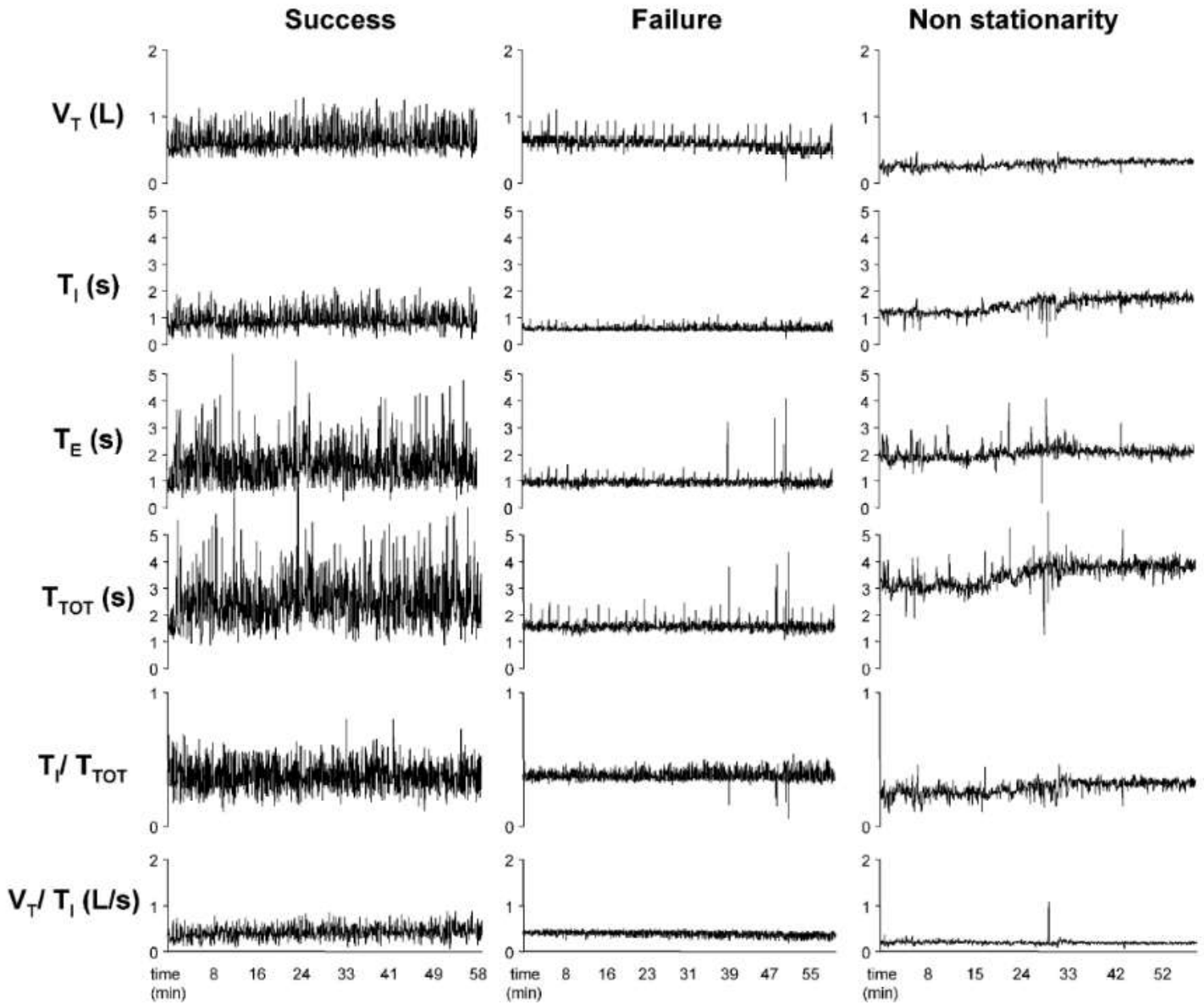
Amélioration du désencombrement ?





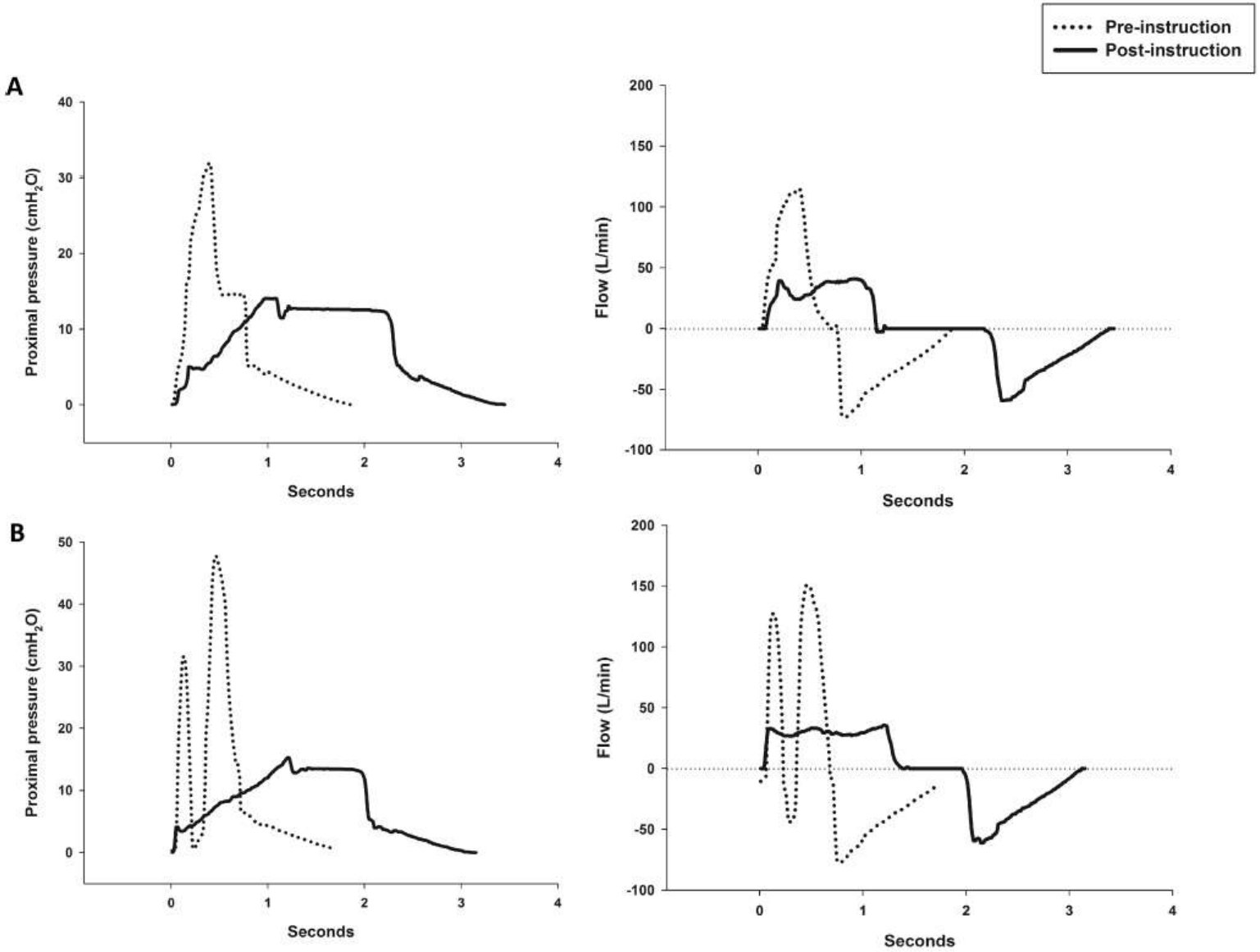
Zanella et al, 2012, Intensive Care Med.

Hyperinflation manuelle et variabilité ventilatoire



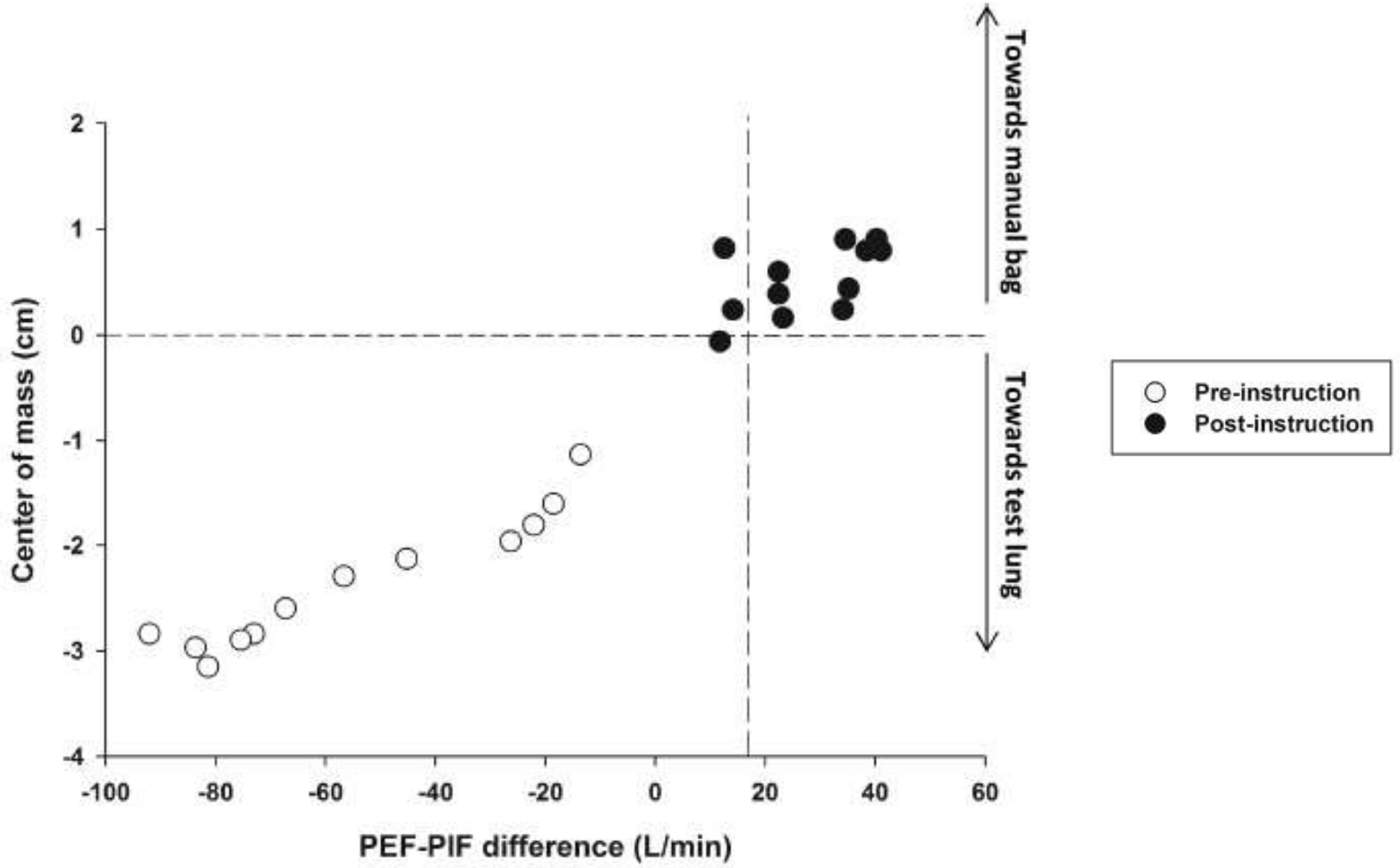
Wysocki Crit Care Med 2006 Vol. 34, No. 8

Réalisation de la technique



Volpe, PLoS ONE (2018);13(2)

Réalisation de la technique



Volpe, PLoS ONE (2018);13(2)

Hyperinflation manuelle : des effets probants ?

Hyperinflation manuelle et barotraumatisme ?

Papazian et al. Ann. Intensive Care (2019) 9:69
https://doi.org/10.1186/s13613-019-0540-9

Annals of Intensive Care

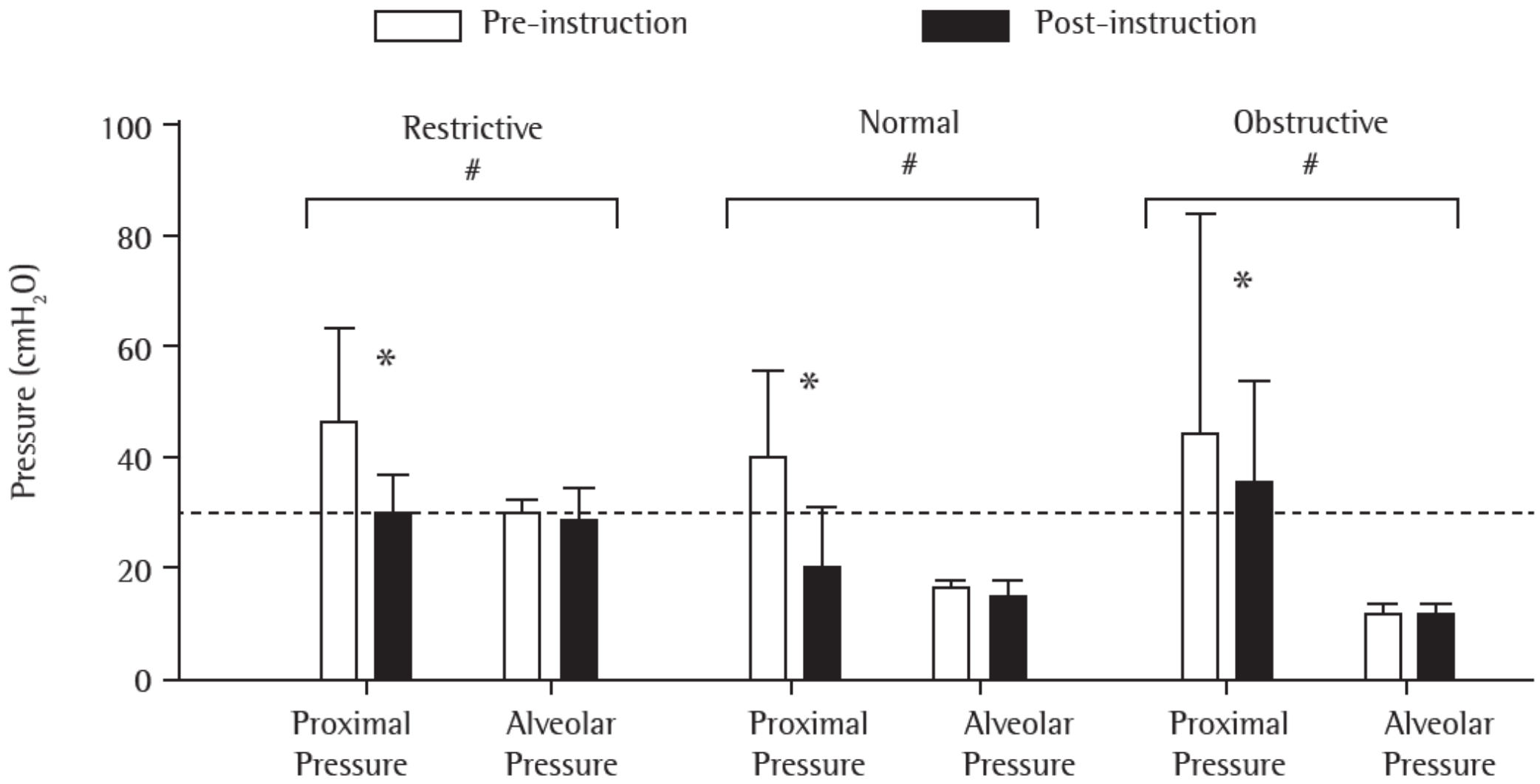
REVIEW Open Access

Formal guidelines: management of acute respiratory distress syndrome

same 7 studies (2625 patients) [21, 35, 49, 78–81]. There was no evidence that a recruitment maneuver increased the risk of barotrauma (RR = 1.25—95% CI [0.93–1.67]) in 6 studies [21, 35, 49, 78, 80, 81]. In contrast, there was significantly greater worsening of hemodynamic status (RR = 1.22—95% CI [1.04–1.45]) [35, 81].

Papazian.L et al, 2019, Ann of Intens Care

Hyperinflation manuelle et barotraumatisme ?



Ortiz et al J Bras Pneumol. 2013;39(2):205-213

Hyperinflation manuelle et volotraumatisme ?

- Recommandation HM: +50% Vt
- Recommandation Ventilation : 6 ml/kg poids prédit par la taille

9 mL/kg

Table 1 – Mechanical variables before and after verbal instruction (routine clinical practice vs. expert recommendations).

Variable	Pre-instruction	Post-instruction	p
Proximal pressure (cmH_2O)	44.5 (33.4-63.4)	26.8 (18.6-37.5)	0.004
Alveolar pressure (cmH_2O)	16.3 (11.6-25.8)	14.8 (11.7-23.8)	0.93
Peak inspiratory flow (L/s)	1.84 (1.28-2.19)	1.14 (0.87-1.44)	0.001
Peak expiratory flow (L/s)	1.04 (0.57-1.33)	0.99 (0.55-1.27)	0.28
Tidal volume (mL)	628 (497-699)	647 (518-746)	0.63
Inspiratory time (s)	0.95 (0.78-1.19)	1.71 (1.44-2.13)	<0.001
PIF/PEF ratio	1.80 (1.29-2.34)	1.15 (0.87-1.80)	0.004

Values are expressed as median (25-75% interquartile range). PIF: peak inspiratory flow; PEF: peak expiratory flow.

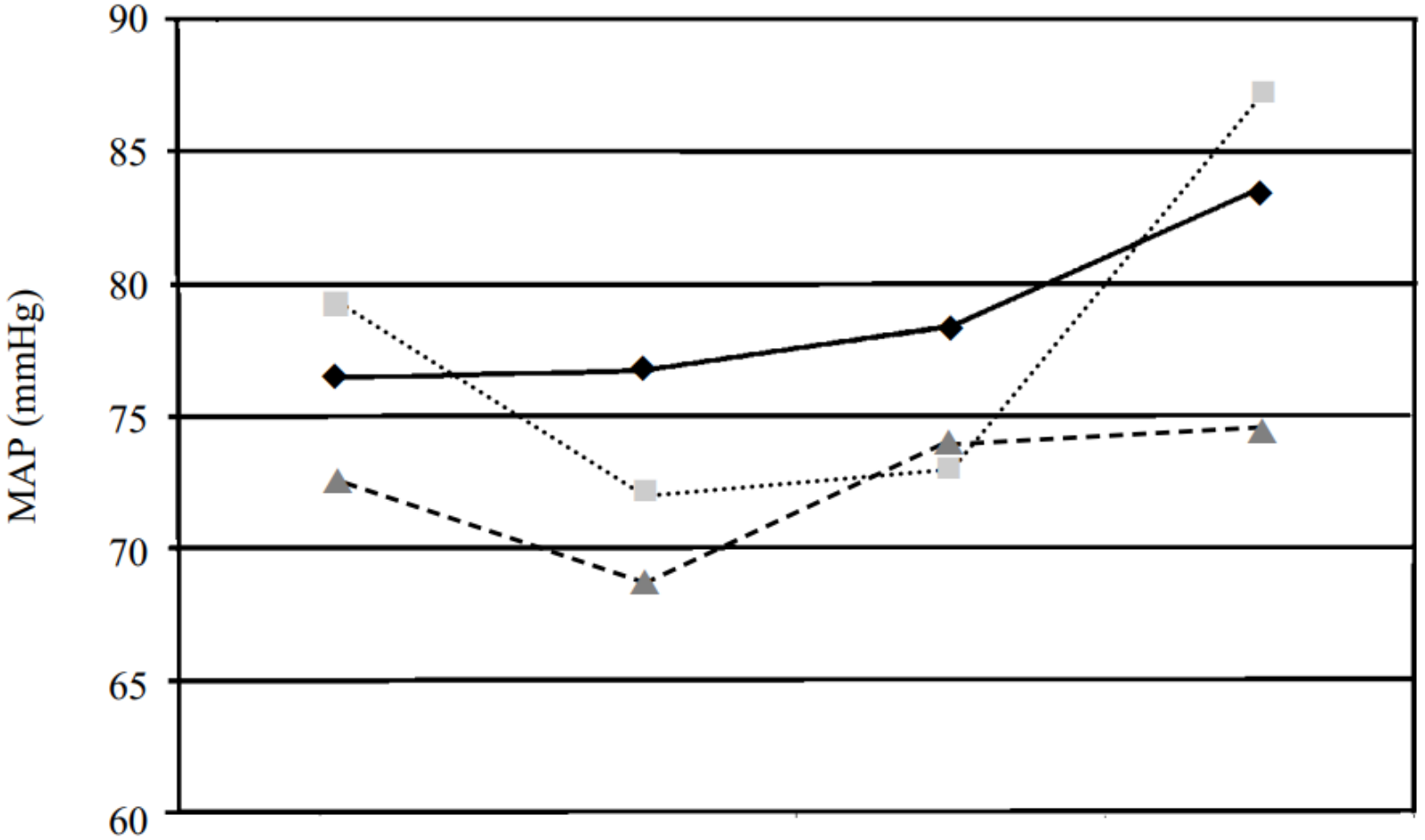
Ortiz et al J Bras Pneumol. 2013;39(2):205-213

Répercussions hémodynamique

étude	Patient	n	DC	FC	TA
Singer 1994	ICU	18	↓	↔	↔
Jellema 2000	Choc Septique	13	↔	↔	↔
Paratz 2002	ALI	16	↔	↔	↔
Paratz 2006	Choc	7	↓	↑	/
Hodgson 2000	ICU	18	/	↔	↔
Barker 2002	ALI	18	/	↑	↑
Paulus 2010	ICU	74	↑	/	↔
Patman 1998	Post-op cœur	30	↔	↓	↔

Paulus, Critical Care 2012, 16:R145

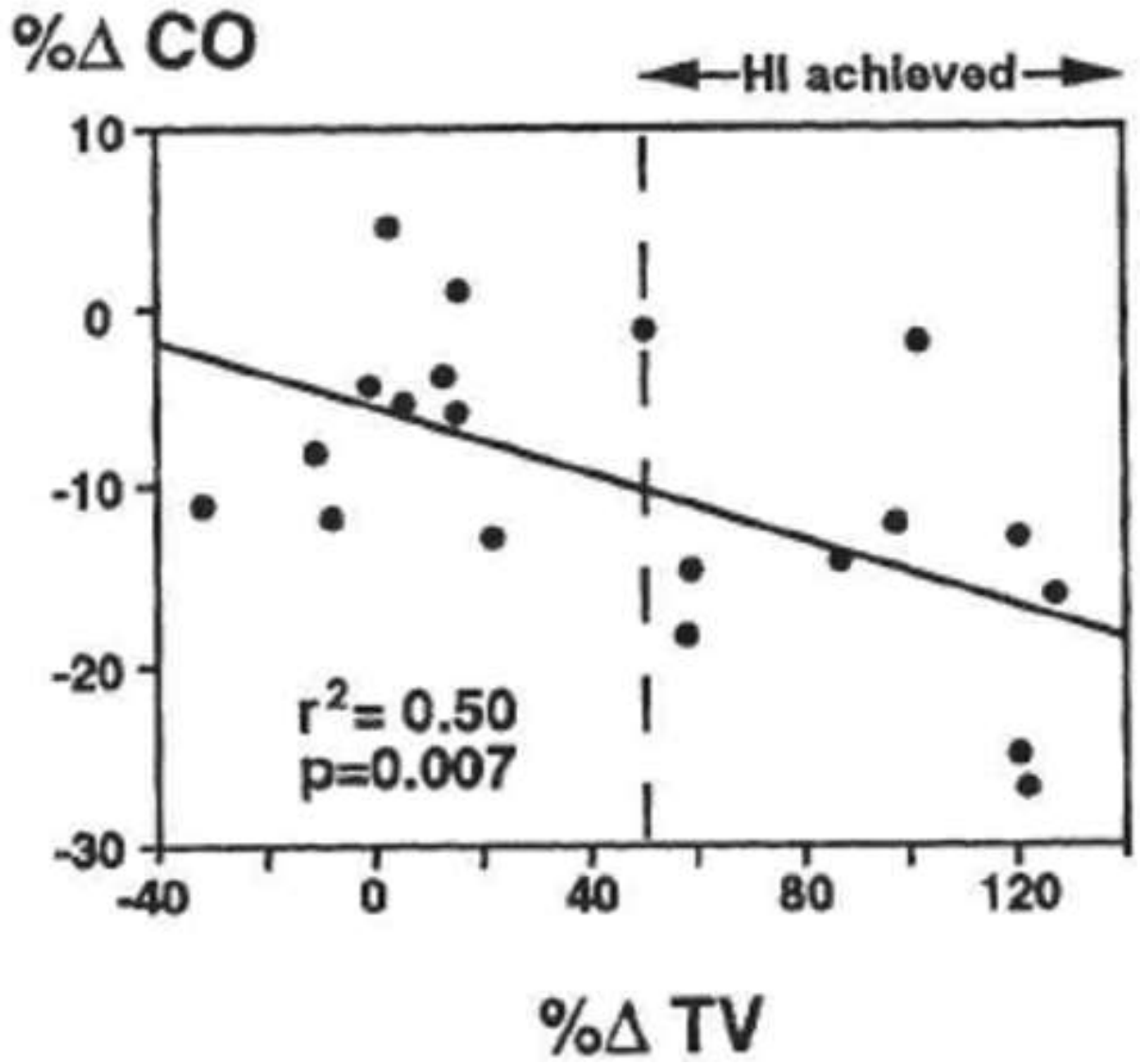
Répercussions hémodynamique



Répercussions hémodynamique identique lorsque aspiration seule

Barker (2002) Physiotherapy Research International, 7(3) 157–169

Répercussions hémodynamique



Singer (1994) Chest ; I06:II82-87

Répercussions Hémodynamique : Faites vous confiance !

Répercussions Hémodynamique : Faites vous confiance !

Manual Hyperinflation		
Practice of use	N = 72	
routine use		5 (7)
as treatment on indication		53 (74)
never used		16 (19)
Indications *	N = 58	
difficult oxygenation		44 (76)
presumed mucous presence		35 (60)
decrease in tidal volume		28 (48)
rising inspiratory pressures		24 (41)
Contraindications *		
unstable hemodynamics		35 (60)
active pneumothorax		33 (57)
intracranial hypertension		32 (55)
>15 cm H_2O PEEP		25 (43)

Stilma (2021) J. Clin. Med. 10, 3381

Répercussions Hémodynamique : Faites vous confiance !

Table 3 - Precautions and contraindications to treatment with manual hyperinflation

	Precaution	Contraindication	Neither of the two	No response
High peak inspiratory pressure	84.4%	12.5%	0.0%	3.1%
Undrained pneumothorax		100%		
Unstable cardiovascular system	31.3%	68.8		
Raised intracranial pressure or TBI[1]	25%	71.9%		3.1%
Bronchospasm	62.5%	31.3%	6.3%	0.0%
PEEP > 10cmH_2O[2]	62.5%	28.1%	3.1%	6.3%
Acute pulmonary edema	37.5%	43.8%	17 8%	0.0%
ARDS[3]	62.5%	28.1%	3.1%	6.3%
Hemoptysis	21.8%	75.0%	0.0%	3.1%

Note: [1]TBI – Traumatic Brain Injury, PEEP[2] - positive expiratory pressure, ARDS[3] - Acute Respiratory Distress Syndrome.

Cruz.R et al (2017), Fisioterapia em Movimento. 30. 241-248.

Pour conclure, l'hyperinflation manuelle oui, mais …. de façon raisonnée !

guillaume.maerckx@saintluc.uclouvain.be