



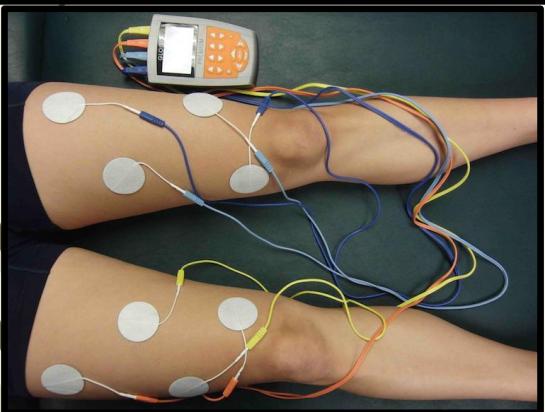
# La Réhabilitation Préopératoire

Anne Freynet  
Masseur-kinésithérapeute  
Réanimation Magellan

# REHABILITATION



- ▶ **Définition classique** (Larousse): Mesure individuelle, judiciaire ou légale, qui efface une condamnation pénale et ses conséquences.
- ▶ **Définition médicale**: processus qui vise à amener un patient à l'état de santé le plus proche possible de celui qui était le sien avant de tomber malade. Cela concerne aussi bien les facultés intellectuelles que physiques.
- ▶ **Fast-track rehabilitation**: prise en charge pluri-disciplinaire péri-opératoire pour réduire la durée d'hospitalisation et les complications post-chirurgicales.



# Techniques de réhabilitation préopératoire

Makhabah et al. *Multidisciplinary Respiratory Medicine* 2013, 8:4  
<http://www.mrmjournal.com/content/8/1/4>

**MR** Multidisciplinary  
Respiratory Medicine

**REVIEW** Open Access

Peri-operative physiotherapy

Dewi Nurul Makhabah<sup>1</sup>, Federica Martino<sup>2</sup> and Nicolino Ambrosino<sup>1,2,3\*</sup>

## Physiotherapy modalities

- **Muscle training (AET, RET, travail des membres)**
- **Réhabilitation respiratoire (cyclo-ergomètre..)**
- **Renforcement des muscles inspirateurs (IMT)**
- **VNI préopératoire**
- Stimulation électrique musculaire / TENS
- Spirométrie incitative

# Notion de Prehabilitation?

- ▶ Réhabilitation

- ▶ Cardio-vasculaire post chirurgie cardiaque
- ▶ Cardio-vasculaire post IDM
- ▶ Post-chirurgicale après chirurgie majeure
- ▶ Post réanimation (neuromyopathie de réanimation)

- ▶ Prehabilitation

- ▶ Notion de prise en charge pré-opératoire
- ▶ Patients à risque de complications post-opératoires
- ▶ Sous-groupes de patients (BPCO)



### Prehabilitation:

- Optimisation médicale
- Optimisation physique
- Optimisation nutritionnelle
- Optimisation psychologique

- [The ability of \*\*prehabilitation\*\* to influence postoperative outcome after intra-abdominal operation: A systematic review and meta-analysis.](#)
3. [The ability of \*\*prehabilitation\*\* to influence postoperative outcome after intra-abdominal operation: A systematic review and meta-analysis.](#)

Moran J, Guinan E, McCormick P, Larkin J, Mockler D, Hussey J, Moriarty J, Wilson F.

**Surgery.** 2016 Nov;160(5):1189-1201. doi: 10.1016/j.surg.2016.05.014.

PMID: 27397681

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Physiotherapy 100 (2014) 196–207

Physiotherapy

Systematic review

## Effect of total-body prehabilitation on postoperative outcomes: a systematic review and meta-analysis

D. Santa Mina <sup>a,b,c,\*</sup>, H. Clarke <sup>d,e</sup>, P. Ritvo <sup>b,f</sup>, Y.W. Leung <sup>d,e</sup>, A.G. Matthew <sup>a,d</sup>,  
J. Katz <sup>c,d,e</sup>, J. Trachtenberg <sup>a,d</sup>, S.M.H. Alibhai <sup>d,e</sup>

- ▶ 22 études / chirurgie ortho / chirurgie organes (cœur, colon, poumon)
- ▶ 8 études étudiant les exercices préopératoires avant chirurgie organes
- ▶ résultats significatifs sur gain de force musculaire préopératoire concernent uniquement les études de chirurgie orthopédiaue

# Diversité des techniques et des programmes



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Rosenfeldt *et al.* [28]

Design: RCT

*N* = 117 (TX: *n* = 60; CON: *n* = 57)

Sample characteristics: elective coronary artery bypass graft and/or cardiac valve surgery

Mean age (range) in years: TX = 62.5 (59.0 to 68.5);

CON = 68 (58.0 to 77.0) (between-group difference *P* = 0.06)

cool-down

Intervention design/setting: first 2 weeks, supervised, facility-based; from 2 weeks to surgery, exercise was unsupervised, home-based

F: 4 days/week for first 2 weeks (2 days in facility plus 2 days at home); I: up to 60% of maximum heart rate; D: 15 to 40 minutes; L: 8 weeks

Exercise specifics: AET circuit including cycle ergometry, treadmill walking and arm ergometry. After the first 2 weeks, participants were encouraged to continue exercising (walking) at home for 4 days/week (provided with heart rate monitor for intensity observation)

Ancillary intervention components [treatment arm (s) only]: four 60-minute mental stress reduction therapy delivered by an occupational therapist for first 2 weeks

Intervention design/setting: 'pulmonary exercises' were conducted in the 'rehabilitation room', 5000 steps per day were to be completed independently (not facility-based)

F: recommendation of 5000 steps everyday (F of 'pulmonary exercises' NR); I: NR; L: ~2 weeks

Exercise specifics: 'pulmonary exercises' were conducted for 30 minutes plus 5000 steps daily

Ancillary intervention components [treatment arm (s) only]: extensive breathing exercises

Sekine *et al.* [29]

Design: case-control study (prospectively enrolled participants into the intervention vs historical data from patients that did not receive the intervention)

*N* = 82 (TX: *n* = 22; CON: *n* = 60)

Sample characteristics: patients with non-small-cell lung carcinoma and chronic obstructive pulmonary disease

Mean age (SD) in years: TX = 69.0 (5.5); CON = 70.4 (4.6)

AET, aerobic exercise training; CON, control/usual care group; D, duration of exercise session; F, frequency of exercise (days or sessions per week); I, intensity; L, length of exercise programme; NR, not reported, RCT, randomised controlled trial; RM, repetition maximum; reps, repetitions; RET, resistance exercise training; RPE, rating of perceived exertion; SD, standard deviation; TX, treatment/exercise group; VO<sub>2</sub>, oxygen consumption.

## Systematic review

## Effect of total-body prehabilitation on postoperative outcomes: a systematic review and meta-analysis

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J. Katz <sup>c,d,e</sup>, J. Trachtenberg <sup>a,d</sup>, S.M.H. Alibhai <sup>d,e</sup>

## ► Post-operative outcomes:

- QDV: résultats significatifs pour une seule étude (chir coronarienne)
- Performance fonctionnelle: TD6M augmenté significativement à 6 mois après la chirurgie colorectal (1 étude)
- Fitness aerobic: 5 études analysées: 2 avec résultats significatifs
- Durée d'hospitalisation: 2 études significatives
- Complications péri-opératoires: 2 études significatives contradictoires

## Systematic review

## Effect of total-body prehabilitation on postoperative outcomes: a systematic review and meta-analysis

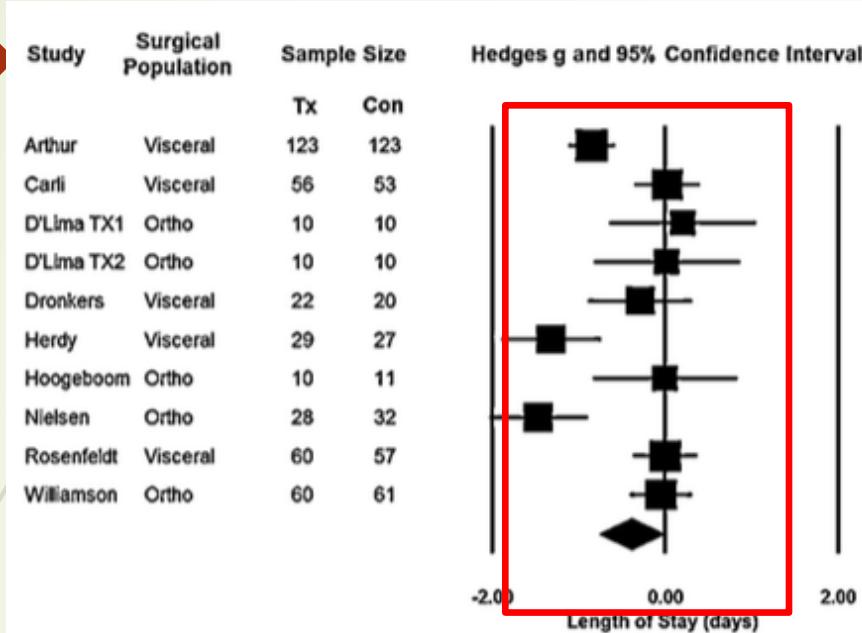
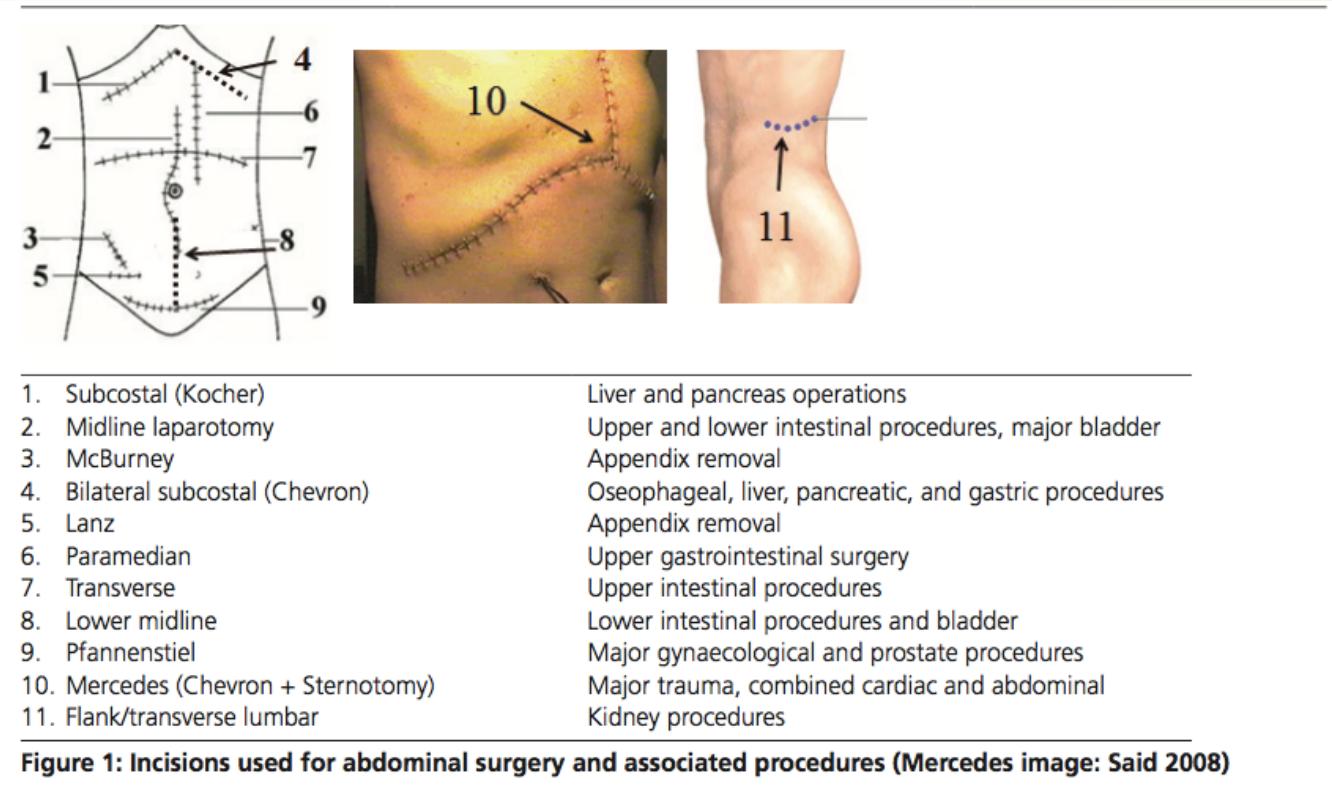
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Fig. 1. Forest plot of length of stay. Ortho, orthopaedic surgery; Tx, treatment; Con, control; TX1, treatment arm 1 vs control; TX2, treatment arm 2 vs control; visceral, internal organ surgery.

- LOS: seul critère évaluable par la Méta-analyse.
- Significatif en faveur des groupes préhabilitation



Evidence from six clinical trials (Bourn et al 1991, Castillo and Haas 1985, Condie et al 1993, Denehy 2001, Fagevik Olsén et al 1997, Samnani et al 2014) suggests that a single preoperative physiotherapy session significantly reduces PPC rates. In the

## Preoperative education

postoperative care. These studies demonstrate the effectiveness of preoperative education and DB&C training, independent of postoperative physiotherapy, in reducing the incidence of PPCs.

### **Key Points:**

1. A single face to face session of preoperative education and DB&C training should be administered to all patients undergoing open upper abdominal surgery.
2. It is currently unknown if other forms of this education and training, eg video or booklet, are effective.

### **Prehabilitation**

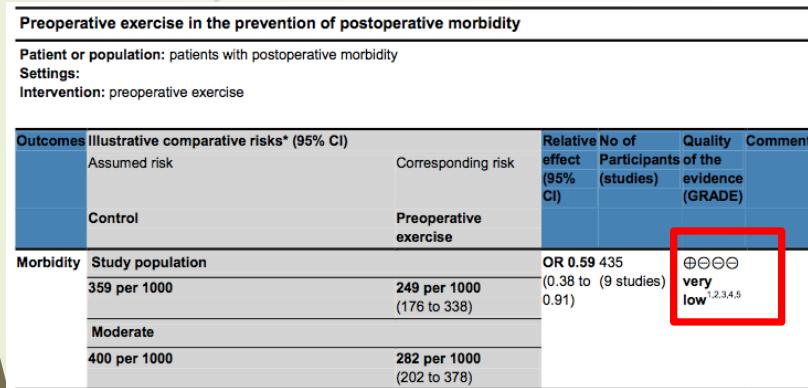
Prehabilitation refers to the use of exercise-based interventions aimed at optimising preoperative function to improve postoperative outcomes or to increase surgical options in those patients who have borderline fitness for surgery. Evidence of the

### **Key Point:**

Given the small number of studies, the heterogeneity of interventions and costs involved in providing such services, the routine provision of prehabilitation in all patients undergoing abdominal surgery cannot be recommended. However, it may be worthwhile in high-risk UAS patients, given the assumed cost of complications. This remains to be confirmed with cost-benefit studies.

# The ability of prehabilitation to influence postoperative outcome after intra-abdominal operation: A systematic review and meta-analysis

Jonathan Moran, BS,<sup>a</sup> Emer Guinan, PhD,<sup>a</sup> Paul McCormick, MD,<sup>b</sup> John Larkin, MD,<sup>b</sup> David Mockler, BS,<sup>c</sup> Juliette Hussey, PhD,<sup>a</sup> Jeanne Moriarty, FFARCSI,<sup>d</sup> and Fiona Wilson, PhD,<sup>a</sup> Dublin, Ireland



## MORBIDITÉ

Usual Care: pas de ttt / Exercices respiratoires  
 Interventions: IMT / Marche / exercices Resistance / aerobic exercices

Gpe control: Usual care + marche + IMT à faible intensité  
 Interventions: Haute intensité

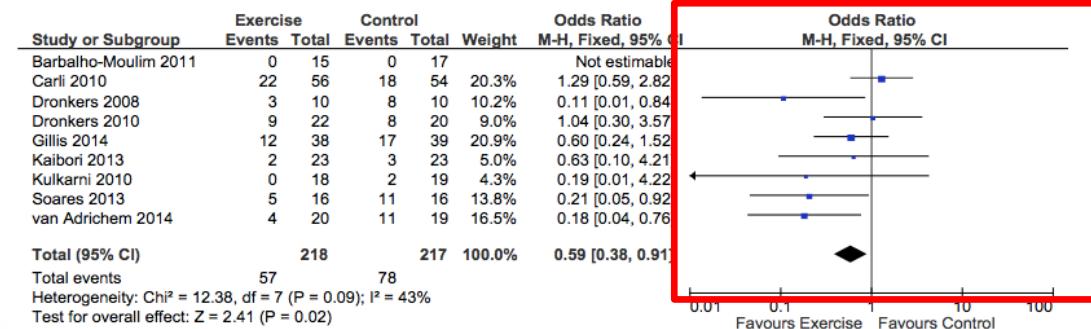


Fig 4. Exercise versus control: Morbidity. (Color version of this figure is available online.)

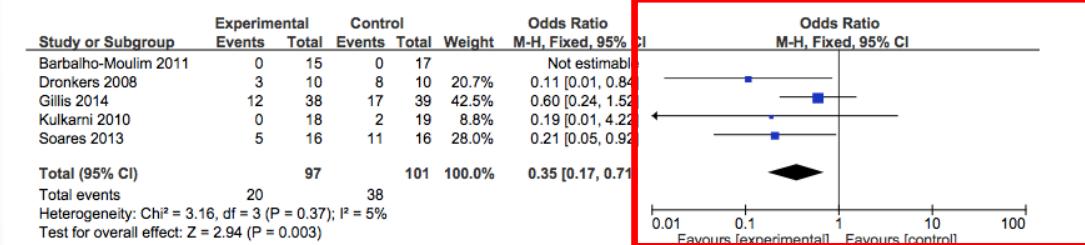


Fig 5. Exercise versus usual care: Morbidity. (Color version of this figure is available online.)

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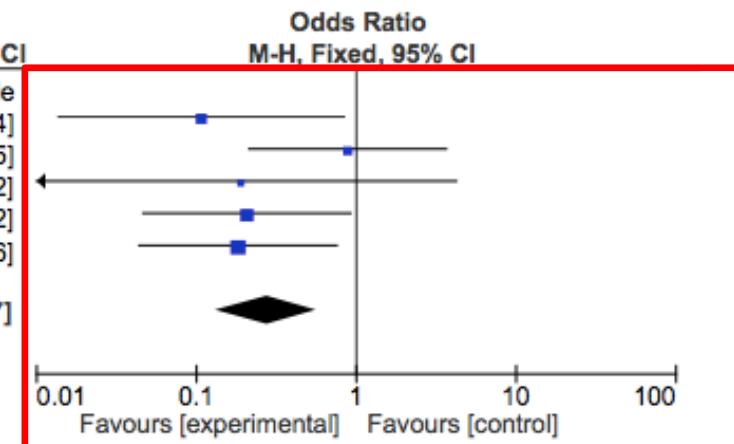
Jonathan Moran, BS,<sup>a</sup> Emer Guinan, PhD,<sup>a</sup> Paul McCormick, MD,<sup>b</sup> John Larkin, MD,<sup>b</sup> David Mockler, BS,<sup>c</sup> Juliette Hussey, PhD,<sup>a</sup> Jeanne Moriarty, FFARCSI,<sup>d</sup> and Fiona Wilson, PhD,<sup>a</sup> Dublin, Ireland

Gpe control: usual care ou faible intensité

Interventions: IMT seul / IMT + aerobic ex + ex resistance membres

## PPC

Study or Subgroup	Experimental		Control		Weight	Odds Ratio M-H, Fixed, 95% CI
	Events	Total	Events	Total		
Barbalho-Moulim 2011	0	15	0	17		Not estimable
Dronkers 2008	3	10	8	10	19.6%	0.11 [0.01, 0.84]
Dronkers 2010	5	22	5	20	14.1%	0.88 [0.21, 3.65]
Kulkarni 2010	0	18	2	19	8.3%	0.19 [0.01, 4.22]
Soares 2013	5	16	11	16	26.4%	0.21 [0.05, 0.92]
van Adrichem 2014	4	20	11	19	31.5%	0.18 [0.04, 0.76]
<b>Total (95% CI)</b>		<b>101</b>		<b>101</b>	<b>100.0%</b>	<b>0.27 [0.13, 0.57]</b>
Total events	17		37			
Heterogeneity: Chi <sup>2</sup> = 3.91, df = 4 (P = 0.42); I <sup>2</sup> = 0%						
Test for overall effect: Z = 3.50 (P = 0.0005)						



**Fig 6.** Exercise versus control: Postoperative pulmonary complications. (Color version of this figure is available online.)

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4 études dans méta-analyse  
Autres études: very low

Prehabilitation:  
IMT  
Aerobic exercices  
Resistances Training

# LOS

## Preoperative exercise to decrease postoperative length of stay

Patient or population: patients with to reduce postoperative length of stay

Settings:

Intervention: preoperative exercise

Outcomes	Illustrative comparative risks* (95% CI)		Relative No of effect (95% CI)	Participants of the (studies)	Quality evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
Control	Preoperative exercise					
Length of stay	The mean length of stay	The mean length of stay	232	⊕⊕⊕⊕		

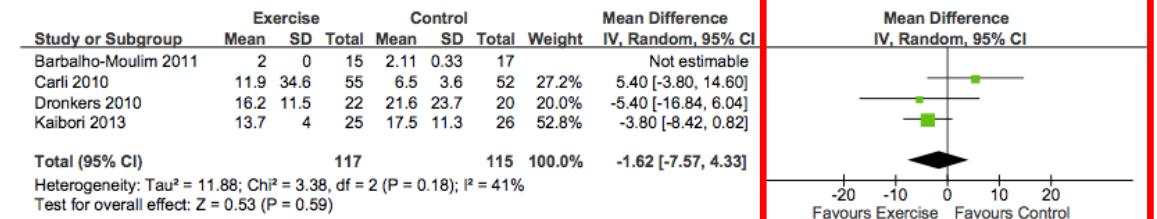


Fig 7. Exercise versus control: Length of stay. (Color version of this figure is available online.)

# The ability of prehabilitation to influence postoperative outcome after intra-abdominal operation: A systematic review and meta-analysis



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Dublin, Ireland

In conclusion, prehabilitation can improve postoperative outcome by decreasing all-cause and pulmonary complications. The effect of prehabilitation is strongest when compared with no treatment or breathing exercises. The ability of prehabilitation to decrease postoperative mortality and LOS is inconclusive due to the low rate of mortality and the low number of studies reporting postoperative LOS. Although prehabilitation can decrease postoperative complications, the results of this meta-analysis should be considered with caution due to the relatively low methodologic quality of the included studies. Further RCTs are needed to validate the protective effects of prehabilitation.

**ERS/ESTS TASK FORCE**

ERS/ESTS clinical guidelines on fitness for radical therapy in lung cancer patients (surgery and chemo-radiotherapy)

A. Brunelli\*, A. Charlioux\*, C.T. Bolliger, G. Rocco, J-P. Sculier, G. Varela, M. Licker, M.K. Ferguson, C. Falvè-Finn, R.M. Huber, E.M. Clini, T. Win, D. De Rysscher and L. Goldman on behalf of the European Respiratory Society and European Society of Thoracic Surgeons joint task force on fitness for radical therapy

## **PATIENT CARE MANAGEMENT**

### ***The role of rehabilitation before and after lung resection surgery***

#### **Recommendations**

- 1) Smoking cessation of sufficient duration (2–4 weeks) before surgery should be recommended, since it may change the smoking behaviour peri-operatively and decrease post-operative complications. Level of evidence 2+; grade of recommendation B.
- 2) Early pre- and post-operative rehabilitation should be recommended, since it may produce functional benefits in resectable lung cancer patients. Candidate selection, late outcomes (*i.e.* post-operative complications and death), and programme content and duration need to be further investigated. Level of evidence 2+; grade of recommendation C.

## Réhabilitation et VNI avant exérèse pulmonaire chez les patients à haut risque opératoire<sup>☆</sup>

Pulmonary rehabilitation and non-invasive ventilation before lung surgery in very high-risk patients

P. Bagan<sup>a,\*</sup>, V. Oltean<sup>b</sup>, A. Ben Abdesselam<sup>a</sup>,  
B. Dakhil<sup>a</sup>, C. Raynaud<sup>c</sup>, J.-C. Couffinhal<sup>a</sup>,  
H. De Crémoux<sup>c</sup>



- le sevrage tabagique avec consultation systématique avec un tabacologue ;
- l'optimisation du traitement médicamenteux de la BPCO (ajout d'un bronchodilatateur de longue durée d'action si absent et/ou de corticoïde inhalé) et traitement de l'addiction à l'alcool ou aux drogues ;
- une éducation respiratoire par des séances avec kinésithérapeutes et des séances de 20 minutes en groupe de gymnastique ventilatoire ;
- un soutien par une équipe de psychologues ;
- une assistance nutritionnelle par une diététicienne pour diminuer le surpoids ou supplémenter une dénutrition préopératoire ;
- un programme d'exercice musculaire périphérique aérobie par réentraînement à l'effort en 15 séances de 30 minutes sur un ergocycle à une charge de 20 à 30 watts ;
- un contrôle de la douleur après l'effort ;
- une thérapie de relaxation par séances de 30 minutes dirigées par un sophrologue.

Le protocole VNI a inclus trois heures (une heure toutes les huit heures) de ventilation à double niveau de pression (pression expiratoire à 6 cm H<sub>2</sub>O, pression inspiratoire à 12 cm H<sub>2</sub>O), commençant deux semaines avant la chirurgie et continuant en postopératoire immédiat dès la deuxième deux heures après l'extubation.

Tableau 2 Comparaison des tests fonctionnels et épreuves d'effort prédictifs postopératoire avant et après protocole de réhabilitation préopératoire (valeurs moyennes et écarts moyens).

Valeurs	Avant réhabilitation préopératoire	Après réhabilitation préopératoire	p
VEMS ppo			< 0,0001
Valeur moyenne en %	36,1	49,6	
Écart moyen en %	(4,3)	(9)	
VO <sub>2</sub> max ppo			< 0,0001
Valeur moyenne en %	42,4	53,8	
Écart moyen en %	(14,7)	(17,5)	

VEMS : volume maximal expire en 1 seconde exprimé en % de la valeur théorique ; VO<sub>2</sub> max : consommation maximale d'oxygène exprimée en % de la valeur théorique ; Ppo : prédictif (ve) postopératoire.

Le protocole VNI a inclus trois heures (une heure toutes les huit heures) de ventilation à double niveau de pression (pression expiratoire à 6 cm H<sub>2</sub>O, pression inspiratoire à 12 cm H<sub>2</sub>O), commençant deux semaines avant la chirurgie et continuant en postopératoire immédiat dès la deuxième deux heures après l'extubation.



## Best evidence topic - Thoracic oncologic

## Is preoperative physiotherapy/pulmonary rehabilitation beneficial in lung resection patients?

Kumaresan Nagarajan<sup>a</sup>, Ashley Bennett<sup>a</sup>, Paula Agostini<sup>a</sup>, Babu Naidu<sup>a,b,\*</sup>

Author, date and country Study type (level of evidence)	Patient group		
Cesario et al., (2007), Lung Cancer, Italy, [2]	n=8 Lung cancer Surgeon's selection  Pilot trial (level 2b)	Four-week inpatient PRP	Varela et al., (2006), Eur J Cardiothorac Surg, Spain, [6]
Jones et al., (2007), Cancer, USA, [3]	n=18 Lung cancer Surgeon's selection  Feasibility study (level 2b)	Three-week cycle (xfive/week)	Historic case control study (level 2b)
Bobbio et al., (2008), Eur J Cardiothorac Surg, Spain, [4]	n=12 Lung cancer COPD VO <sub>2</sub> max < 15 ml/kg/min  Feasibility study (level 2b)	Four-week IMT (IS)+ PMT (xfive/week)	Weiner et al., (1997), J Thorac Cardiovasc Surg, Israel, [7]
Sekine et al., (2005), Jpn J Thorac Cardiovasc Surg, Japan, [5]	n=22 (2005) vs. 60 (1995–1999) Lung cancer COPD  Historic case control study (level 2b)	Two-week IMT (IS)+ PMT (5000 steps) (xfive/week)	Prospective randomised control trial (level 1b)
			n=119 (2002–2004) vs. 520 (1994–2002)
			One day IMT (IS)+ PMT vs. IS alone
			n=32 Lung cancer COPD
			Preoperative two-week IMT (IS) (xsix/week) vs. no training
			Postoperative 12-week

Variabilité des programmes

Best evidence topic - Thoracic oncologic

## Is preoperative physiotherapy/pulmonary rehabilitation beneficial in lung resection patients?

Kumaresan Nagarajan<sup>a</sup>, Ashley Bennett<sup>a</sup>, Paula Agostini<sup>a</sup>, Babu Naidu<sup>a,b,\*</sup>

We conclude that a preoperative physiotherapy/pulmonary rehabilitation programme improves exercise capacity in patients undergoing thoracotomy and lung resection, and in patients with COPD preserves pulmonary function following surgery. Whether these benefits translate into a reduction in the development of PPCs is uncertain.

---

# Prophylactic use of noninvasive ventilation in patients undergoing lung resectional surgery

2007

Christophe Perrin<sup>a,\*</sup>, Valérie Jullien<sup>a,1</sup>, Nicolas Vénissac<sup>b</sup>,  
Frédéric Berthier<sup>c</sup>, Bernard Padovani<sup>d</sup>, Françoise Guillot<sup>e</sup>,  
Alain Coussement<sup>d</sup>, Jérôme Mouroux<sup>b</sup>

- Etude contrôlée randomisée
- Patients avec  $FEV1 < 70\%th$  / chirurgie lobectomie par thoracotomie
- Prise en charge 7 jours avant et 3 jours après chirurgie pulmonaire
- Gpe contrôle: Aérosol VA +CPT (2/ jour: exercices respi, SI, Toux dirigée
- Gpe intervention: VNI masque facial , 2 niveaux de pression, 5X 1H / jour

# Prophylactic use of noninvasive ventilation in patients undergoing lung resectional surgery

Christophe Perrin<sup>a,\*</sup>, Valérie Jullien<sup>a,1</sup>, Nicolas Vénissac<sup>b</sup>,  
Frédéric Berthier<sup>c</sup>, Bernard Padovani<sup>d</sup>, Françoise Guillot<sup>e</sup>,  
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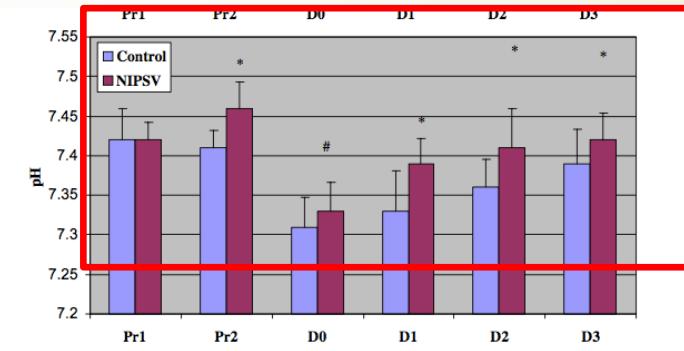
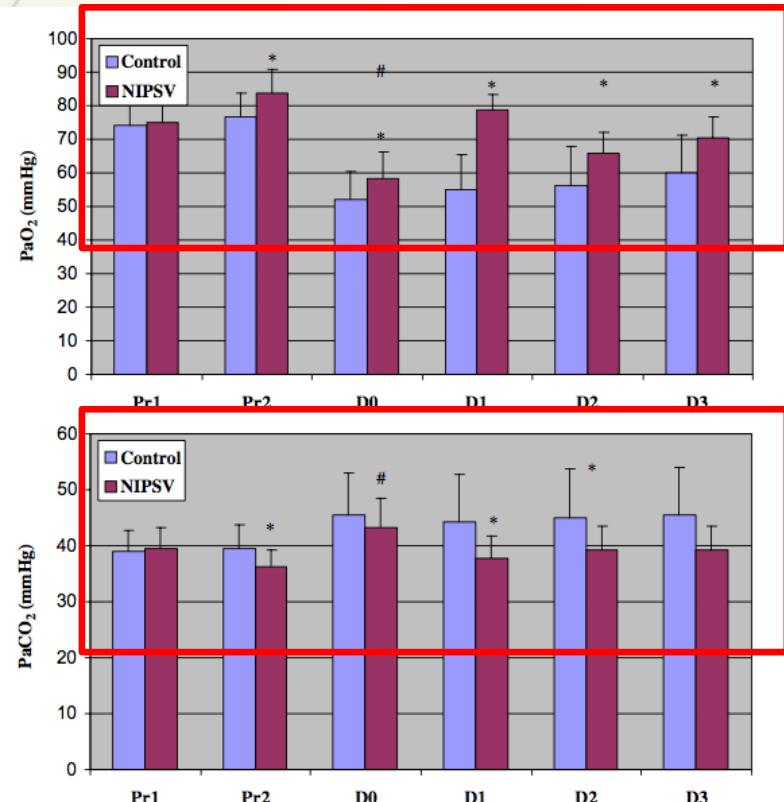


Figure 1 Effect of NIPSV on  $\text{PaO}_2$ ,  $\text{PaCO}_2$  and pH (on room air). Patients had standard treatment (control group) or standard treatment plus NIPSV (NIPSV group) during 7 days at home before surgery and 3 days postoperatively. Arterial blood gases were performed preoperatively (before Pr1 and after Pr2 treatment) and postoperatively (2 h after surgery (D0) and on day 1, day 2 and day 3). Note that arterial blood gases were performed before NIPSV sessions in the NIPSV group. Data are mean  $\pm$  SD. \* $p < 0.05$  (control versus NIPSV groups); # $p < 0.05$  (Pr2 versus D0).

Pour le groupe VNI:

- $\text{PaO}_2$ ,  $\text{PaCO}_2$ , pH significatif entre Pr1 et Pr2 (préop)
- $\text{PaO}_2$ ,  $\text{PaCO}_2$  et pH significatif entre Pr2 et D0 (préop / postop)
- $\text{PaO}_2$ ,  $\text{PaCO}_2$  et pH significatif entre D0, D1, D2 et D3.

# Prophylactic use of noninvasive ventilation in patients undergoing lung resectional surgery

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Frédéric Berthier<sup>c</sup>, Bernard Padovani<sup>d</sup>, Françoise Guillot<sup>e</sup>,  
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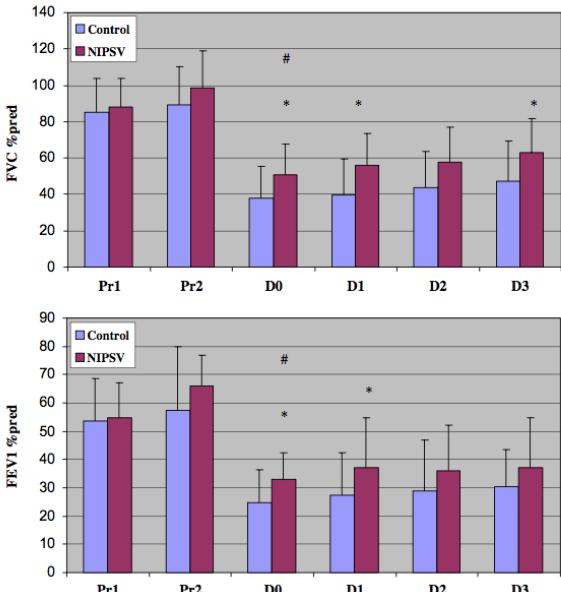


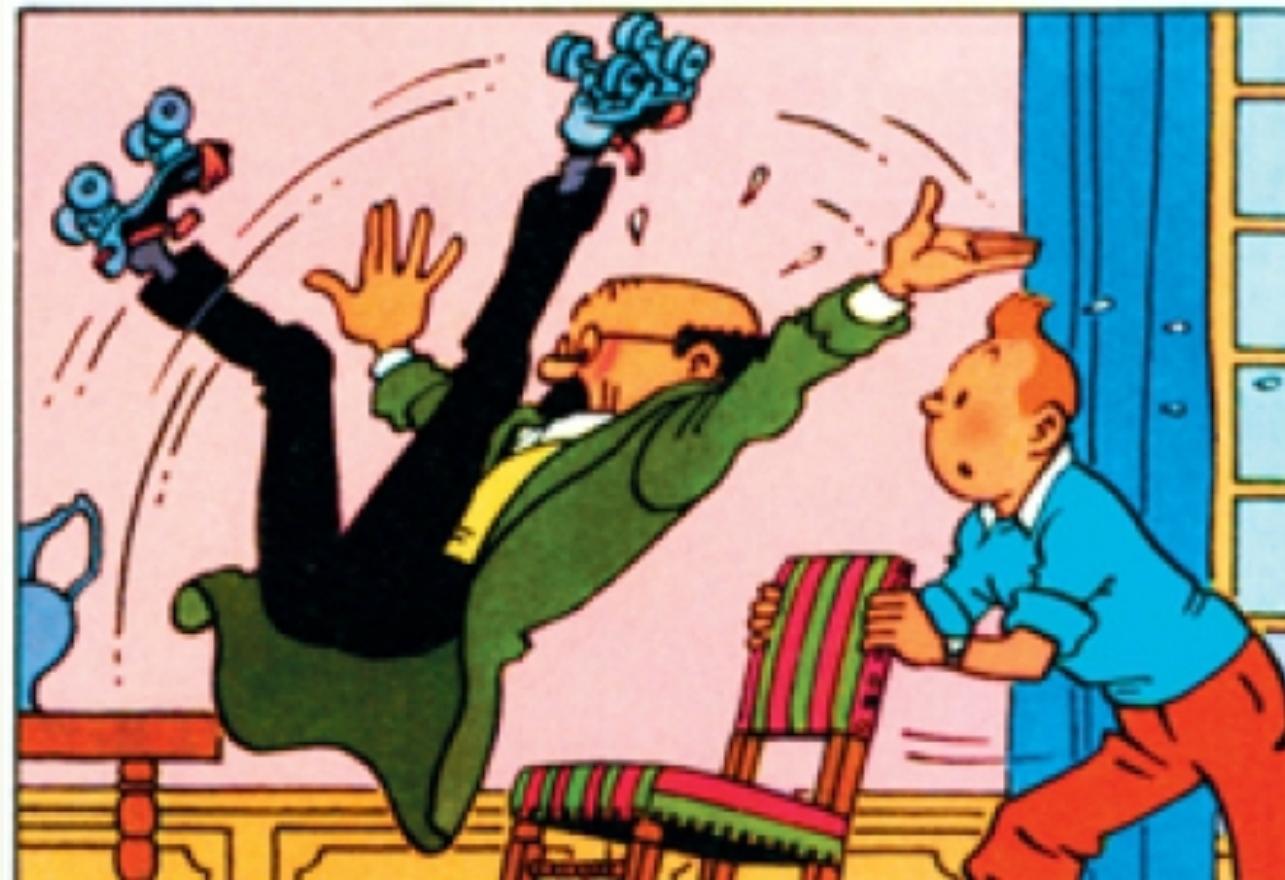
Figure 2. Effect of NIPSV on FVC and FEV<sub>1</sub>. For the method, see legend of Fig. 1. Data are mean  $\pm$  SD. \* $p < 0.05$  (control versus NIPSV groups);  $^{\#}p < 0.05$  (Pr2 versus D0).

- Entre pré et post op: FEV1 et FVC évolue de façon significative dans le groupe VNI / Gpe contrôle (Pr2 / Do)
- Entre Pr2 et postop immédiat, baisse significative de FEV1 et FVC dans les deux groupes
- Retour aux valeurs préop rapidement
- Evolution significative au 1<sup>er</sup> et 3<sup>ème</sup> jour dans le groupe VNI / contrôle

# Conclusion Préhabilitation

- ▶ Préhabilitation permet:
  - ▶ Augmentation des paramètres musculaires ET FONCTIONNELS(force)
  - ▶ Tests d'effort (TD6M...)
  - ▶ Aspect psy
- ▶ **MAIS**
- ▶ Préhabilitation:
  - ▶ Parfois pas assez de temps: aspect carcinologique
  - ▶ Outcomes post-opératoires PAS ASSEZ DOCUMENTÉS
  - ▶ Protocoles trop différents d'une équipe à l'autre
  - ▶ Méta-analyse peu fiables (méthodologie)
- ▶ **Etudes ultérieures +++ avant recommandations**
- ▶ **Notion de patients à risque post-opératoires (chirurgie pulmonaire: ppoVEMS...)**

Et le Fast-track??



REVIEW

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## Peri-operative physiotherapy

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### Fast-track rehabilitation

Fast-track rehabilitation programs include easy methods that have the potential to decline morbidity, hospital stay, and increase pain control when compared with conventional care. Patients with lung cancer who undergo lobectomy can be treated with fast-track rehabilitation. Fast-track rehabilitation is based on: minimally invasive

surgical techniques using video-assisted and muscle sparing incisions, normovolemia, normothermia, good oxygenation, euglicaemia, no unnecessary antibiotics, epidural patient-controlled analgesia, systemic opioids-free analgesia, early ambulation and oral feeding [37].

# Feasibility and results of a fast-track protocol in thoracic surgery

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Morgan LE GUEN <sup>1</sup> and the Foch Thoracic Anesthesiology Group

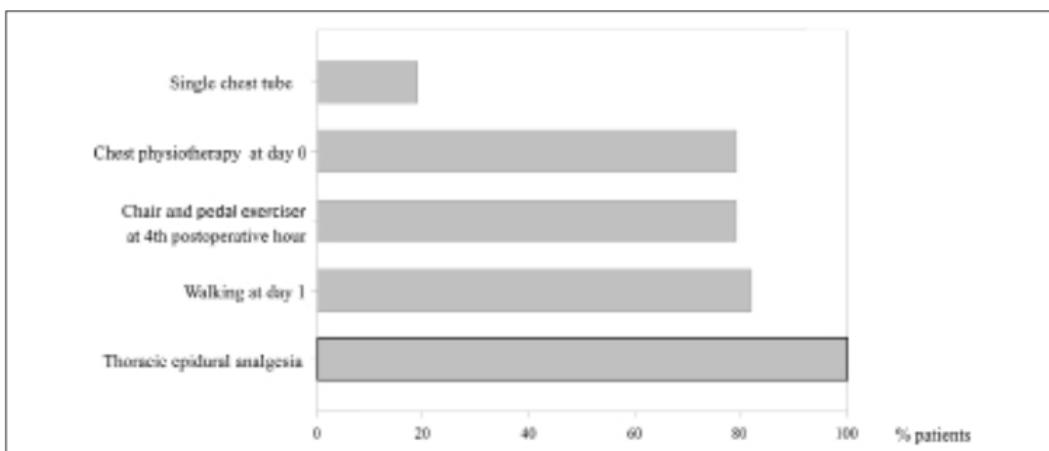


Figure 2.—Follow-up of rehabilitation protocol.

The rehabilitation program, designed jointly by the surgical and anesthesia teams, included four periods:

— The preoperative period: the patient was informed of the procedure during surgical and anesthesia consultations. The day before surgery, the nurse coordinator met the patient to describe his or her stay, and to teach respiratory physiotherapy.

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## Discussion

This rehabilitation program did result in a trend towards reduction in postoperative hospital stay compared to the comparative period (historical patients from the previous year) ( $P=0.06$ ). Moreover, our study shows that the

### Key messages

- A multimodal strategy of rehabilitation after thoracic surgery is feasible.
- Implementation of such a program should be accompanied by a coordinator to achieve every objective.
- In our experience, insertion of two thoracic chest tubes was a limiting factor for reduction of the length of stay.
- A multimodal program involves multi-professionals and patients and their family to reduce time between theoretical day of discharge and real day of discharge.

# En conclusion

## ► En chirurgie viscérale:

- VNI préop: Pas d'études
- Préhabilitation: **S sur education, LOS, Morbidité, et PPC (recos faibles)**
- Méthodologies bof et programmes divers +++
- SI préop: pas d'étude
- Electro préop: pas d'étude

## ► En chirurgie thoracique:

- Préhabilitation : **S sur les capacités musculaires, VO2maxppo, VEMSppo, fonction pulmonaire chez le BPCO**
- VNI préop: attente de résultats futurs. **S sur GDS ET VEMS ET CVF, VEMSPPO ET VO2MAX ppo**
- SI préop: pas d'étude
- Electro préop: pas d'étude



	<b>CHIR THORACIQUE</b>	<b>CHIR DIGESTIVE</b>
SI préop	Pas explorée	Pas explorée
VNI préop	Tendance S	Pas explorée
Préhabilitation	S	S
Electro préop	Pas explorée	Pas explorée



► Merci de votre attention