

# Quelle kinésithérapie dans le pneumothorax ?

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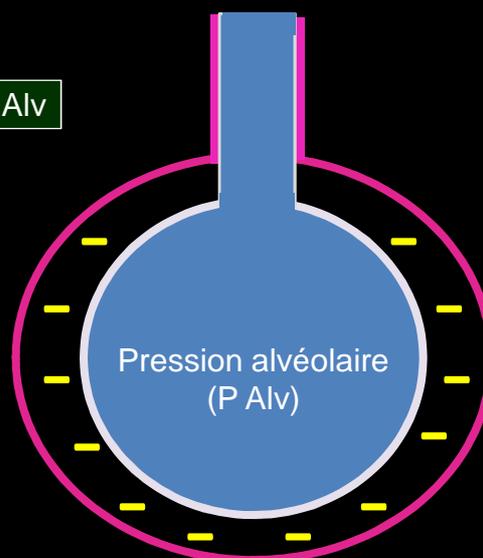
## Introduction

## *Le pneumothorax (PNO)*

### Pression intrapleurale

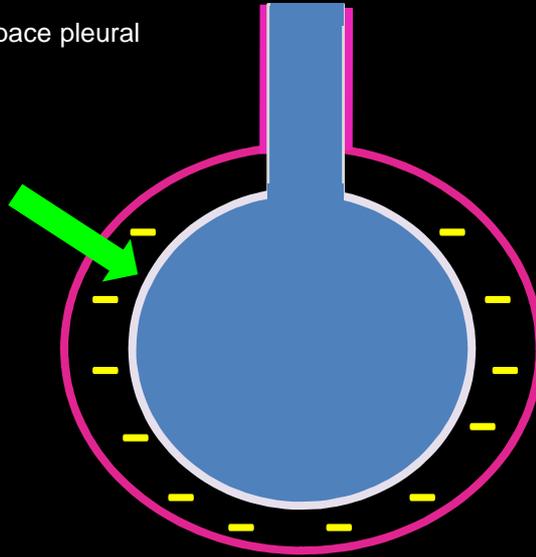
$$P_{\text{atm}} > P_{\text{intrapleurale}} < P_{\text{Alv}}$$

Pression atmosphérique  
( $P_{\text{atm}}$ )



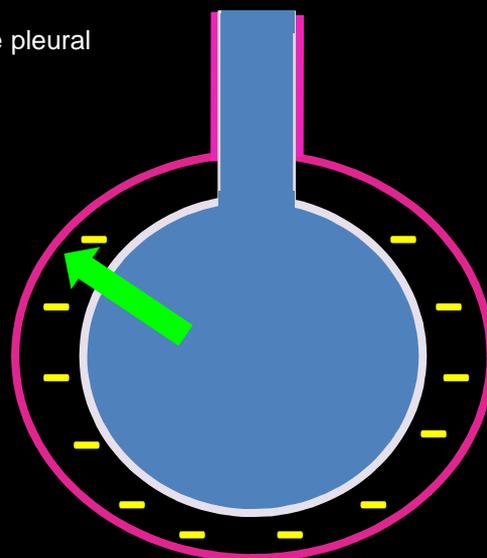
# Pneumothorax

collection de gaz dans l'espace pleural



# Pneumothorax

collection de gaz dans l'espace pleural



## Pneumothorax : classification (causes)

**Tableau I.**

Classification de pneumothorax.

Spontané	Primaire (PSP)	<i>Poumon globalement sain</i>
	Secondaire (PSS)	<i>Pathologies favorisantes</i>
Traumatique	Traumatisme fermé	<i>(ex : barotraumatisme)</i>
	Traumatisme pénétrant	<i>(ex : armes blanches)</i>
Iatrogène	Ponction de la veine sous-clavière	
	Biopsie trans-bronchique	
	Aspiration trans-thoracique par aiguille	

*Rev Mal Respir 2004; 21 : 372 - 80*

## Pneumothorax : classification (mécanismes)

Pneumothorax ouvert :

*Gaz circulant librement dans la cavité pleurale en fonction des  $\neq$  de pression*

Pneumothorax fermé :

*Gaz cloisonné dans la cavité pleurale*

Pneumothorax sous tension :

*Gaz s'accumulant dans la cavité pleurale par « un système de valve » (Pression intrapleurale positive)*

*JIACM 2008; 9(1) : 42 - 50*

## Pneumothorax : traitements

Tableau III.  
Pneumothorax : recommandations générales.

### Observation

- Pas de dyspnée significative
- Pneumothorax < 20 % ou < 2 cm

### Aspiration

- Dyspnée significative
- Pneumothorax > 20 % ou > 2 cm

### Drain thoracique

- Âge > 50 ans
- BPCO
- Pneumothorax récidivant ou bilatéral
- Aspiration initiale > 2,5 l
- Effusion pleurale
- Patients ventilés

*Rev Mal Respir 2004; 21 : 372 – 380*  
*JIACM 2008; 9(1) : 42 - 50*

***Kinésithérapie respiratoire***

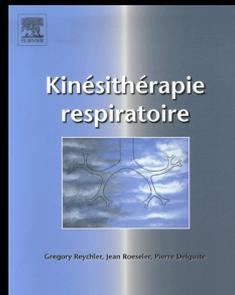
## Kinésithérapie respiratoire : champs d'action

Joint BTS/AC.PRC guideline

### Guidelines for the physiotherapy management of the adult, medical, spontaneously breathing patient

J Bott, S Blumenthal, M Buxton, S Ellum, C Falconer, R Garrod, A Harvey, T Hughes, M Lincoln, C Mikelsons, C Potter, J Pryor, L Rimington, F Sinfield, C Thompson, P Vaughn, J White, on behalf of the British Thoracic Society Physiotherapy Guideline Development Group

*Thorax 2009, 64 (suppl 1) : i1 – i51*

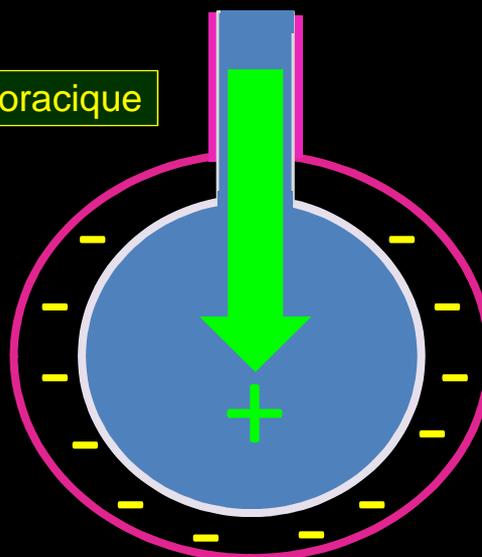


2008 Elsevier Masson SAS.

## Kinésithérapie respiratoire : « Classification »

### Pression positive intra-thoracique

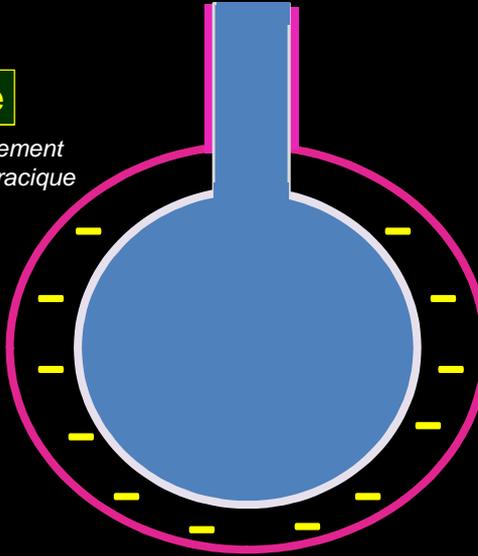
VNI (CPAP, BiPAP)  
Relaxateur de pression (IPPB)  
Insufflation - exsufflation mécanique  
...



## Kinésithérapie respiratoire : « Classification »

### « Compression » pariétale

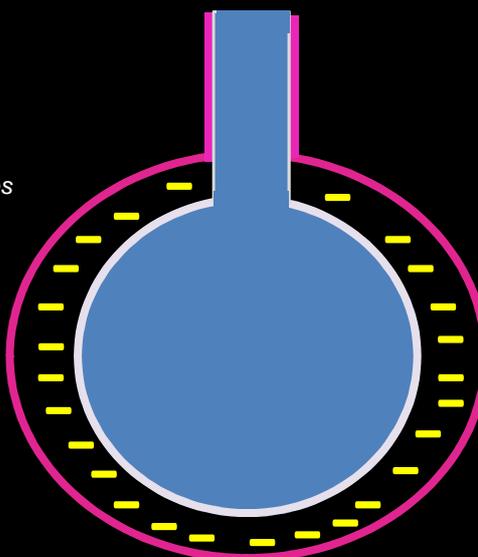
*Techniques manuelles de désencombrement*  
*Oscillation à haute fréquence extra thoracique*  
*Toux assistée*  
*Epreuves fonctionnelles respiratoires*  
...



## Kinésithérapie respiratoire : « Classification »

### « Expansion » pariétale

*Spirométrie incitative*  
*Renforcement des muscles inspiratoires*  
...

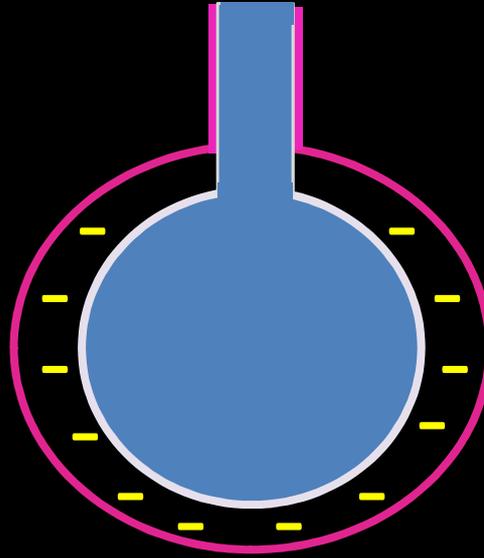


## Kinésithérapie respiratoire : « Classification »

### «Neutre»

Oxygénothérapie  
Aérosolthérapie

...



Kinésithérapie respiratoire,  
quels objectifs dans le pneumothorax ?

## Traiter les conséquences du pneumothorax ?

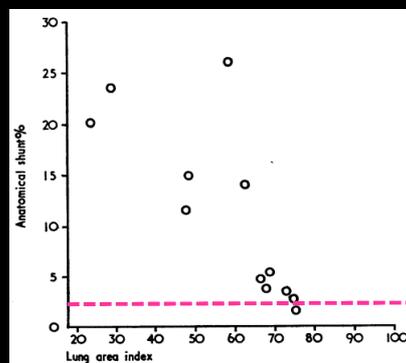
### Respiratory gas exchange in patients with spontaneous pneumothorax

R. M. NORRIS<sup>1</sup>, J. G. JONES, AND J. M. BISHOP

*From the Department of Medicine, University of Birmingham, Queen Elizabeth Hospital, Birmingham, 15*

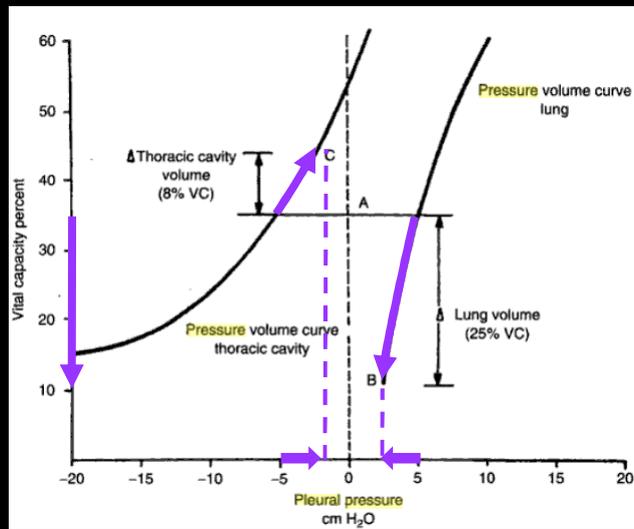
*Thorax 1968, 23; 427 - 433*

12 patients avec PNO spontané :



$r=0.796$   $p<0.01$

▪  $\nearrow$  Shunt anatomique (PNO > 25%)  $\implies$   $\nearrow$  A-aDO<sub>2</sub>



- ↓ de la capacité vitale
- ↓ de la ventilation alvéolaire

Richard W. Light, *Pleural Diseases Fifth Edition Lippincott Williams & Wilkins, p.18*

**Continuer les traitements initiés avant PNO ?**

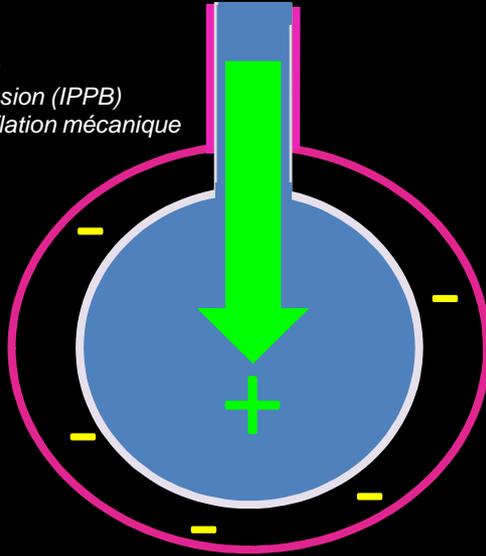
## Traitements respiratoires

- VNI chez les patients neuromusculaires
- Désencombrement chez les patients atteints de mucoviscidose
- Oxygénothérapie chez les BPCO
- Pression positive chez les post-op hypoxémiques
- ...

Quelle kinésithérapie respiratoire  
dans un pneumothorax ?

## Techniques à pression positive intra-thoracique

VNI (CPAP, BiPAP)  
Relaxateur de pression (IPPB)  
Insufflation - exsufflation mécanique  
...



**Pour l'industrie**



## 2.4 CONTRAINDICATIONS

Respironics Harmony 2003

The Harmony should not be used if you have severe respiratory failure without a spontaneous respiratory drive.

If any of the following conditions apply to you, consult your physician before using the Harmony:

- Inability to maintain a patent airway or adequately clear secretions
- At risk for aspiration of gastric contents
- Diagnosed with acute sinusitis or otitis media
- Allergy or hypersensitive to the mask materials where the risk from allergic reaction outweighs the benefit of ventilatory assistance
- Epistaxis, causing pulmonary aspiration of blood
- Hypotension

<http://global.respironics.com/UserGuides/UserGuideBiPAPHarmony.pdf>

VNI = Oui ?



## 2.4 CONTRAINDICATIONS

Respironics BiPAP S/T 2008

The BiPAP S/T should not be used if you have severe respiratory failure without a spontaneous respiratory drive. If any of the following conditions apply to you, consult your physician before using the device:

- Inability to maintain a patent airway or adequately clear secretions
- At risk for aspiration of gastric contents
- Diagnosed with acute sinusitis or otitis media
- Allergy or hypersensitivity to the mask materials where the risk from allergic reaction outweighs the benefit of ventilatory assistance
- Epistaxis, causing pulmonary aspiration of blood
- Hypotension

[http://global.respironics.com/UserGuides/BiPAP\\_ST\\_User\\_Manual.pdf](http://global.respironics.com/UserGuides/BiPAP_ST_User_Manual.pdf)

VNI = Oui ?



### 1.3.3 CONTRAINDICATIONS

### Respironics BiPAP Plus M series 2008

When assessing the relative risks and benefits of using this equipment, the clinician should understand that this device can deliver pressures up to 25 cm H<sub>2</sub>O. In the event of certain fault conditions, a maximum pressure of 35 cm H<sub>2</sub>O is possible. Studies have shown that the following pre-existing conditions may contraindicate the use of positive airway therapy for some patients:

- Bullous Lung Disease
- Pathologically Low Blood Pressure
- Bypassed Upper Airway
- Pneumothorax
- Pneumocephalus has been reported in a patient using nasal Continuous Positive Airway Pressure. Caution should be used when prescribing CPAP for susceptible patients such as those with: cerebral spinal fluid (CSF) leaks, abnormalities of the cribriform plate, prior history of head trauma, and/or pneumocephalus. (Chest 1989; 96:1425-1426)

The use of positive airway pressure therapy may be temporarily contraindicated if you exhibit signs of a sinus or middle ear infection. Not for use with patients whose upper airways are bypassed. Contact your physician if you have any questions concerning your therapy.

<http://global.respironics.com/UserGuides/BiPAPPlusMUserMan.pdf>

VNI = Non !



### Contraindications

The use of the VPAP III ST-A with QuickNav is contraindicated in patients with insufficient respiratory drive to endure brief interruptions in non-invasive ventilation therapy. The device is not a life support ventilator and may stop operating in the event of power failure or in the unlikely event of certain fault conditions.

The use of the device may be contraindicated in patients with:

- acute sinusitis or otitis media
- epistaxis causing a risk of pulmonary aspiration
- conditions predisposing to a risk of aspiration of gastric contents
- impaired ability to clear secretions
- hypotension or significant intravascular volume depletion
- pneumothorax or pneumomediastinum
- recent cranial trauma or surgery.

### RESMED VPAP III-STA Quick Nav

<http://www.ontvep.ca/pdf/Clinical-Manual-VPAP-III-ST-A-w-Quick-Nav.pdf>

VNI = Non !

## Relaxateur de pression (IPPB)

### USER'S GUIDE

Rev: 10/23/2008

#### VORTRAN™ IPPB

Unique single patient, multiple-use disposable IPPB

#### 7.4 Contraindications

- 7.4.1 Intracranial pressure > 15 mm Hg
- 7.4.2 Hemodynamic instability
- 7.4.3 Recent facial or skull surgery
- 7.4.4 Tracheoesophageal fistula
- 7.4.5 Recent laryngeal surgery
- 7.4.6 Active hemoptysis
- 7.4.7 Malignant neoplasm
- 7.4.8 Air swallowing
- 7.4.9 Active untreated tuberculosis
- 7.4.10 Radiographic evidence of bleb
- 7.4.11 Singulation (hiccups)

IPPB = Oui ?

<http://www.vortran.com/images/stories/printables/IPPB-User-Guide.pdf>

## Percussions intrapulmonaires (IPV)

#### INDICATIONS FOR USE

2

Use of Percussionaire® IPV® is indicated for the treatment of bronchospasm and raising of endobronchial secretions, bronchodilation, reducing mucosal edema, and resolution of diffuse patchy atelectasis in all patient populations.

#### CONTRAINDICATIONS

Contraindications for use include but are not limited to:  
Untreated tension pneumothorax  
Lack of adequate, skilled supervision

IPV = Non !

#### PHYSIOLOGICAL EFFECTS OF IPV®

Many positive effects of IPV® include:  
Recruitment of atelectatic lung

2009

<http://www.percussionaire.com/A50474-2alog.asp>

## Pour le clinicien



Procedures 19  
Continuous Positive Airway Pressure - CPAP  
Page 1 of 5

### Continuous Positive Airway Pressure - CPAP

APPROVED:   
EMS Administrator

  
EMS Medical Director

  
Assistant EMS Medical Director

#### 3. Contraindications

Issue Date: 7/1/2009  
Effective Date: 7/1/2009  
Review Date: 7/1/2011

- 3.1 **Absolute Contraindications: (DO NOT USE)**
- 3.1.1 Age under 8 years old
  - 3.1.2 Respiratory or cardiac arrest
  - 3.1.3 Agonal respirations or respiratory rate less than 8/min.
  - 3.1.4 Severely depressed level of consciousness
  - 3.1.5 Systolic BP < 90 mmHg
  - 3.1.6 Signs and symptoms of pneumothorax
  - 3.1.7 Inability to maintain a patent airway
  - 3.1.8 Major trauma, especially head injury (possible increased ICP)
  - 3.1.9 Facial abnormalities or trauma (e.g. burns, fractures preventing a good mask seal)
  - 3.1.10 Vomiting

**CPAP = Non !**

**Respiratory Care Services  
John Dempsey Hospital  
Policy and Procedure Manual**

**Subject: BiPAP Ventilatory Support System**

Issued: 10/28/94  
Revised: 12/94, 1/98, 11/00, 12/05

**Contraindications:**

- Severe air trapping
- Suspected barotraumas
- Pneumothorax**
- Severe Hypotension
- Severe Cardiac Arrhythmia
- Coronary Artery disease
- Diminished consciousness or inability to protect airway
- Sinus or middle ear infection
- Hypotension induced by PPV
- Allergic reaction to mask
- Vomiting
- Nausea

**BiPAP = Non !**

CMUB	Procédure Médecins
N° de version: 01	Date d'application: 19/06/2003
Ref.: CMUB - 005	Pagination: 1 / 5 pages



**COLLEGE DE MEDECINE  
D'URGENCE DE BOURGOGNE**

Procédure N°005

Rédacteurs	Dr [REDACTED]
Date	15/06/03

**CPAP DE BOUSSIGNAC ET OAP  
PROTOCOLE D'UTILISATION EN SMUR ET AUX URGENCES**

Contre-indications formelles

- **Le pneumothorax non traité**
- L'emphysème majeur
- L'hypercapnie clinique majeure (troubles de la conscience, agitation)
- L'hypercapnie biologique (Pco2>50 mm Hg), sauf pour les insuffisants respiratoires chroniques : demander avis au réanimateur

**CPAP = Non !  
si PNO non traité**

Pour imprimer ce contenu utilisez le lien en bas de page, à droite:

**C.P.A.P**

Avalisation : [redacted] 25 août 2010  
Avalisation GRESI le 3 août 2008

Groupe de travail: [redacted]

Annule et remplace la version de juin 2002 et le projet de mai 2008.

**Contre-indications**

**Absolues :**

- Obstruction pulmonaire chronique décompensée
- Emphysème
- Suture haute du tube digestif
- Pneumothorax non drainé
- Oedème cérébral
- Hypertension intracrânienne
- Fracture de la base du crâne
- Crise d'asthme

**CPAP = Non !**  
si PNO non drainé

Respiratory Therapy Leaders  
The Ottawa Hospital

April 2007

**ABSOLUTE CONTRA-INDICATIONS**

Supplemental oxygen should not be used on the MI-E circuit. Oxygen will pass through the fan system during exsufflation, resulting in a potential fire hazard.

Contraindications include: untreated or recent pneumothorax, bullous emphysema, severe COPD, severe asthma and recent lobectomy.

Contraindications include: increased intra cranial pressure (ICP) including ventricular drains.

Contraindications include: impaired consciousness / inability to communicate in instances where the patient does NOT have an artificial airway.

**I-E mécanique = Non !**  
si PNO non traité

## Dans la littérature

### Concise Clinical Review

#### Cystic Fibrosis Pulmonary Guidelines Pulmonary Complications: Hemoptysis and Pneumothorax

Patrick A. Flume<sup>1</sup>, Peter J. Mogayzel, Jr.<sup>2</sup>, Karen A. Robinson<sup>3</sup>, Randall L. Rosenblatt<sup>4</sup>, Lynne Quittell<sup>5</sup>, Bruce C. Marshall<sup>6</sup>, and the Clinical Practice Guidelines for Pulmonary Therapies Committee\*

*Am J Respir Crit Care Med* 2010; Vol 182, pp 298 – 306

TABLE 4. PNEUMOTHORAX STATEMENTS AND PANEL RATINGS

Statements	Median	IQR	Consensus
The patient with <i>small</i> PTX, but clinically stable, may be observed in the outpatient setting.	7	5.5–8	Good
The patient with <i>large</i> PTX should always be admitted to the hospital.	9	9–9	Very good
The patient with <i>small</i> PTX, but clinically <i>unstable</i> , should always have chest tube drainage.	1	1–2	Very good
The patient with <i>small</i> PTX, but clinically <i>unstable</i> , should always have chest tube drainage.	8	5.5–9	Good
The patient with <i>large</i> PTX, but clinically <i>stable</i> , should always have chest tube drainage.	9	7–9	Good
The patient with <i>large</i> PTX, but clinically <i>unstable</i> , should always have chest tube drainage.	9	9–9	Very good
The patient with a <i>first</i> <i>small</i> PTX should always undergo pleurodesis to prevent recurrence.	0.5	0–2	Good
The patient with a <i>first</i> <i>large</i> PTX should always undergo pleurodesis to prevent recurrence.	1	0–2	Very good

For the patient with *small* PTX and using BiPAP as a chronic therapy, the BiPAP should be discontinued as long as the PTX is present. **8** **5–9** **Good**

For the patient with *large* PTX and using BiPAP as a chronic therapy, the BiPAP should be discontinued as long as the PTX is present. **8** **6–9** **Good**

For the patient with <i>large</i> PTX and using BiPAP as a chronic therapy, the BiPAP should be discontinued as long as the PTX is present.	8	6–9	Good
The patient with <i>small</i> PTX should not fly on a plane for 2 wk after it has resolved.	9	8–10	Good
The patient with <i>large</i> PTX should not fly on a plane for 2 wk after it has resolved.	9	8–9	Very good
The patient with <i>small</i> PTX should not lift weights for 2 wk after it has resolved.	7	5.75–9	Good
The patient with <i>large</i> PTX should not lift weights for 2 wk after it has resolved.	8	6–9	Good
The patient with <i>small</i> PTX should not perform vigorous aerobic exercise.	4	2–6	Some
The patient with <i>large</i> PTX should not perform vigorous aerobic exercise.	6.5	6–7.5	Some
The patient with <i>small</i> PTX should not perform spirometry for 2 wk after it has resolved.	9	6–9	Good
The patient with <i>large</i> PTX should not perform spirometry for 2 wk after it has resolved.	9	8–9	Very good
The patient with <i>small</i> PTX and severe lung disease should always be referred for lung transplant evaluation.	2	0–3	Some
The patient with <i>large</i> PTX and severe lung disease should always be referred for lung transplant evaluation.	5	1–7	None
The patient with recurrent PTX and severe lung disease (FEV <sub>1</sub> < 40% predicted) should always be referred for a lung transplantation evaluation.	5	2–8	None

Definition of abbreviations: BiPAP = bilevel positive airway pressure; IQR = interquartile range; PTX = pneumothorax.

Stop VNI

## State of the Art

### Noninvasive Ventilation

SANGEETA MEHTA and NICHOLAS S. HILL

*Am J Respir Crit Care Med* 2001; Vol 163. pp 540–577

TABLE 13  
FREQUENCY OF ADVERSE SIDE EFFECTS AND COMPLICATIONS OF NPPV WITH POSSIBLE REMEDIES

	Occurrence (%)*	Possible Remedy
Mask-related		
Discomfort		Check fit, adjust strap, new mask type
Facial skin erythema		Loosen straps, apply skin protectant
Claustrophobia		Smaller mask, chin strap, mask type
Nasal bridge ulceration		Loosen straps, mask type
Acneiform rash	5–10	Topical antibiotics
Air Pressure		
Nasal	20–50	Humidifier, decrease leak
Nasopharyngeal	10–30	Humidifier, decrease leak
Nasal cannula	10–20	Humidifier, decrease leak
Eye	10–20	Humidifier, decrease leak
Gastric insufflation	5–10	Decrease PEEP, decrease leak
Air Leaks	80–100	Check mouth closure, try chin straps, oronasal mask using nasal mask, reduce pressures slightly
Major Complications		

**Pneumothorax** < 5 Stop ventilation if possible, reduce airway pressure if not  
Thoracostomy tube if indicated

Stop VNI ! (si possible)

VNI = Oui !  
si patients dépendants  
avec drains thoraciques

## American Thoracic Society

### International Consensus Conferences in Intensive Care Medicine: Noninvasive Positive Pressure Ventilation in Acute Respiratory Failure

ORGANIZED JOINTLY BY THE AMERICAN THORACIC SOCIETY, THE EUROPEAN RESPIRATORY SOCIETY, THE EUROPEAN SOCIETY OF INTENSIVE CARE MEDICINE, AND THE SOCIÉTÉ DE RÉANIMATION DE LANGUE FRANÇAISE, AND APPROVED BY THE ATS BOARD OF DIRECTORS, DECEMBER 2000

*Am J Respir Crit Care Med* 2001; Vol 163. pp 283–291

#### CONTRAINDICATIONS TO NPPV

- Cardiac or respiratory arrest
- Nonrespiratory organ failure
- Severe encephalopathy (e.g., CO<sub>2</sub> narcosis)
- Severe upper gastrointestinal obstruction
- Hemodynamic instability, severe cardiac arrhythmia
- Facial surgery, trauma, or facial injury
- Upper airway obstruction
- Inability to cooperate, protect the airway
- Inability to clear respiratory secretions
- High risk for aspiration

VNI = Oui ?



## AARC Clinical Practice Guideline

### Intermittent Positive Pressure Breathing—2003 Revision & Update

*Respiratory Care 2003, Vol 48 (5) : 540 - 546*

#### IPPB 5.0 CONTRAINDICATIONS:

There are several clinical situations in which IPPB should not be used. With the exception of untreated tension pneumothorax, most of these contraindications are relative.<sup>39</sup>

- 5.1 Tension pneumothorax (untreated)
- 5.2 Intracranial pressure (ICP) > 15 mm Hg
- 5.3 Hemodynamic instability
- 5.4 Recent facial, oral
- 5.5 Tracheoesoph
- 5.6 Recent esoph
- 5.7 Active hemopt

**IPPB = Non !**  
si PNO non traité

## Concise Clinical Review

### Cystic Fibrosis Pulmonary Guidelines

#### Pulmonary Complications: Hemoptysis and Pneumothorax

Patrick A. Flume<sup>1</sup>, Peter J. Mogayzel, Jr.<sup>2</sup>, Karen A. Robinson<sup>3</sup>, Randall L. Rosenblatt<sup>4</sup>, Lynne Quittell<sup>5</sup>, Bruce C. Marshall<sup>6</sup>, and the Clinical Practice Guidelines for Pulmonary Therapies Committee\*

*Am J Respir Crit Care Med Vol 182. pp 298 – 306, 2010*

TABLE 5. RATINGS OF WITHHOLDING OF AIRWAY CLEARANCE THERAPIES FOR HEMOPTYSIS\* AND PNEUMOTHORAX†

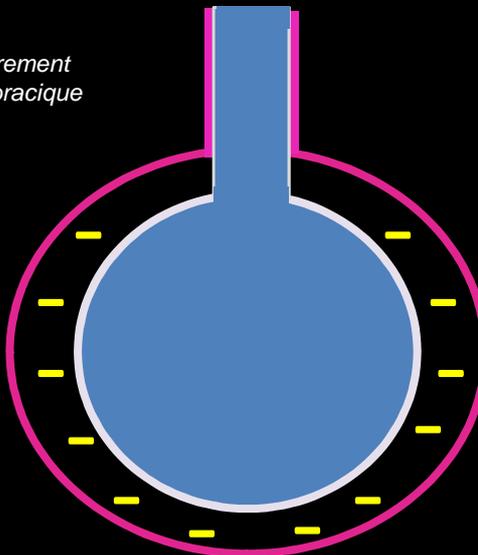
Therapy	Small Pneumothorax			Pneumothorax		
	Median	IQR	Consensus	IQR	Consensus	
All	2-6	2-6	7	4-8.5	Some	
P&PD	2-6	2-6	7	3.5-9	Some	
ACBT/AD	1.5-5	1.5-5	Some	6	3-8	None
PEP/oPEP	4.25-9	4.25-9	None	8	6-9	Good
IPV	5.25-9	5.25-9	Good	9	7-9	Good
HFCC	2-6	2-6	Some	7	3.5-9	Some
Exercise	2-6	2-6	Some	7	4.5-9	Some

**Stop IPV !**

**Stop PEP therapie !**

## Techniques de « compression » pariétale

Techniques manuelles de désencombrement  
 Oscillation à haute fréquence extra thoracique  
 Toux assistée  
 Epreuves fonctionnelles respiratoires  
 ...



## Concise Clinical Review

### Cystic Fibrosis Pulmonary Guidelines

Pulmonary Complications: Hemoptysis and Pneumothorax

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*Am J Respir Crit Care Med* Vol 182. pp 298 – 306, 2010

TABLE 5. RATINGS OF WITHHOLDING OF AIRWAY CLEARANCE THERAPIES FOR HEMOPTYSIS\* AND PNEUMOTHORAX†

Therapy	Small Pneumothorax			Large Pneumothorax		
	Median	IQR	Rating	Median	IQR	Rating
All	5	3-6	Good	6	4-8	Some
<u>P&amp;PD</u>	5	2-6	<u>Good</u>	6	3.5-9	Some
<u>ACBT/AD</u>	5	1.5-5.5	<u>Some</u>	6	3-8	<u>None</u>
PEP/oPEP	6	4.25-9	None	8	6-9	Good
IPV	7	5.25-9	Good	9	7-9	Good
<u>HFCC</u>	4	2-6	<u>Some</u>	7	3.5-9	<u>Some</u>
Exercise	4	2-6	Some	7	4.5-9	Some

Stop Percussions !  
 « La veste » = à voir !

W expi = à voir !

# AARC Clinical Practice Guideline

## Directed Cough

*Respiratory Care 1993; 38(5):495-499*

### DC 5.0 CONTRAINDICATIONS:

Directed cough is rarely contraindicated. The contraindications listed must be weighed against potential benefit in deciding to eliminate cough from the care of the patient. Listed contraindications are relative.

- 5.1 Inability to control possible transmission of infection from patients suspected or known to have pathogens transmittable by droplet
- 5.2 Presence of an abdominal aortic aneurysm
- 5.3 Presence of reduced consciousness or acute myocardial infarction(14)
- 5.4 Acute unstable head injury

**Toux assistée = Non ?  
si PNO non traité**

Manually assisted directed cough with pressure to the epigastrium may be contraindicated in presence of

- 5.5 increased potential for regurgitation/aspiration (eg, unconscious patient with unprotected airway)
- 5.6 acute abdominal pathology, abdominal aortic aneurysm, hiatal hernia, or pregnancy
- 5.7 a bleeding diathesis
- 5.8 untreated pneumothorax

# AARC Clinical Practice Guideline

## Spirometry, 1996 Update

*Respiratory Care 1996; 41(7):629-636*

### S 5.0 CONTRAINDICATIONS:

The requesting physician should be made aware that the circumstances listed in this section could affect the reliability of spirometry measurements. In addition, forced expiratory maneuvers may aggravate these conditions, which may make test postponement necessary until the medical condition(s) resolve(s).

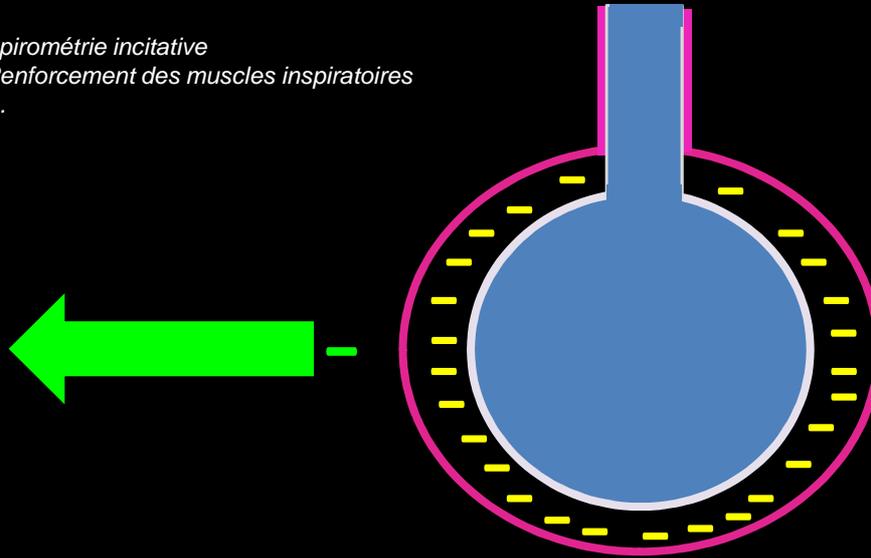
Relative contraindications(9,10) to performing spirometry are

- 5.1 hemoptysis of unknown origin (forced expiratory maneuvers may aggravate the underlying condition);
- 5.2 pneumothorax;
- 5.3 unstable cardiovascular status (forced expiratory maneuver may worsen angina or cause changes in blood pressure) or recent myocardial infarction or pulmonary embolus;
- 5.4 thoracic, abdominal, or cerebral aneurysms (danger of rupture due to increased thoracic pressure);
- 5.5 recent eye surgery (eg, cataract);
- 5.6 presence of an acute disease process that might interfere with test performance (eg, nausea, vomiting);
- 5.7 recent surgery of thorax or abdomen.

**EFR = Non ?**

## Techniques « d'expansion » pariétale

Spirométrie incitative  
Renforcement des muscles inspiratoires  
...



## AARC Clinical Practice Guideline

### Incentive Spirometry

*Respiratory Care 1991; 36(12) :1402 - 1405*

#### IS 5.0 CONTRAINDICATIONS:

- 5.1 Patient cannot be instructed or supervised to assure appropriate use of the device.
- 5.2 Patient cooperation is absent(2,16) or patient is unable to demonstrate proper use of the device.(16)
- 5.3 IS is contraindicated in patients who cannot breathe effectively (eg, with vital capacity [VC] less than about 1 L or inspiratory capacity [IC] less than about one third of predicted).
- 5.4 The presence of an open tracheal stoma is not a contraindication but requires adaptation of the spirometer.

**Spirométrie incitative = Oui !**

## Renforcement des muscles inspiratoires (IMT)

### Contraindications

POWERbreathe training is completely safe for the vast majority of patients. IMT has no known side effects, no interactions with medications, and no adverse events have been reported. However, there are some small theoretical risks associated with the following conditions: Inspiratory muscle training is NOT recommended for patients with a history of spontaneous pneumothorax.

Inspiratory muscle training is only recommended for patients with a history of traumatic pneumothorax after complete recovery.

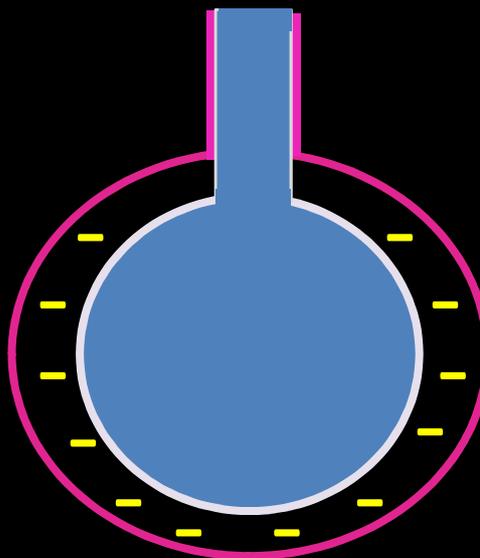
Inspiratory muscle training is NOT suitable for asthma patients who have low symptom

**IMT = Non !**

[www.powerbreathe.com](http://www.powerbreathe.com)

## Techniques « neutres »

Oxygénothérapie  
Aérosolthérapie  
...



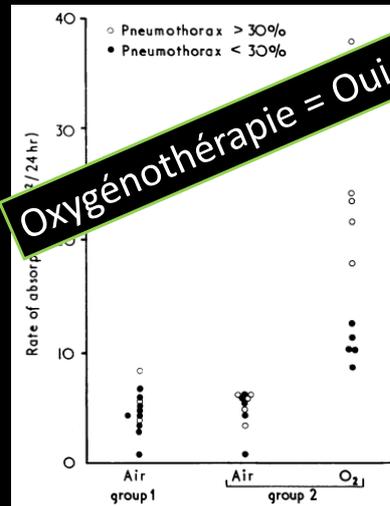
# Oxygen Therapy for Spontaneous Pneumothorax

T. C. NORTHFIELD

British Medical Journal 1971, 4, 86 - 88

O<sub>2</sub>thérapie : 9 à 38 heures  
Ré-expansion : 8 à 45 jours

Complications :  
- lésions nasales  
- Ø toxicité



Oxygénothérapie = Oui !

Joseph Barr, MD<sup>III</sup>  
Gili Lushkov<sup>III</sup>  
Ruth Starinsky, MD<sup>III</sup>  
Baruch Klin, MD<sup>III</sup>  
Matitahu Berkovitch, MD<sup>III</sup>  
Gideon Eshel, MD<sup>III</sup>

## Heliox Therapy for Pneumothorax: New Indication for an Old Remedy

Ann Emerg Med August 1997; 30 : 159-161

**Table.**  
Pneumothorax size in the three groups (Lapins)

Treatment Group	Treatment	Pneumothorax Size	
		60 Minutes After Treatment	120 Minutes After Treatment
Heliox (n=3)	17.50±.50	7.5±.50	.17±.29
Oxygen (n=3)	17.83±2.25	2.00±2.00	.50±.50
Air (n=3)	18.50±3.12	17.83±.28	17.33±.25

Data expressed as mean±SD.

Heliox = Oui !

- Pas de différence entre Gr. O<sub>2</sub> et Gr. Heliox après 120 minutes
- Toxicité O<sub>2</sub> vs Heliox (ex : BPCO)

## Conclusions

## Conclusions

**Tableau II.**  
Options de traitement pour un pneumothorax.

Observation simple
Aspiration par aiguille
Drain thoracique
Instillation d'irritant pleural
— Talcage
— Autres (par exemple tétracycline)
Vidéo-thoroscopie
Thoracotomie, sternotomie

*Pneumothorax = traitement médical*

## Conclusions

*Kinésithérapie et pneumothorax = Evidence based ?*

Parachute use to prevent death and major trauma related to gravitational challenge: systematic review of randomised controlled trials

Gordon C S Smith, Jill P Pell

BMJ 2003; 327; 1459 - 1461



*Kinésithérapie et pneumothorax = le bon sens !*

## Conclusions

- Techniques à pression positive :
  - Pneumothorax non drainé = NON
  - Pneumothorax drainé = O.K + vérifier les effets (bulles !)
  - Pneumothorax avec drains clampés = O.K + surveillance
- Bénéfices escomptés > risques encourus
- Signes cliniques = STOP kiné !

Pré-programme CPLF 2013...

# CHEST<sup>®</sup>

Official publication of the American College of Chest Physicians



## Yoga and Pneumothorax

Deane Hillsman and Vijai Sharma

*Chest* 2005;127;1863  
DOI 10.1378/chest.127.5.1863