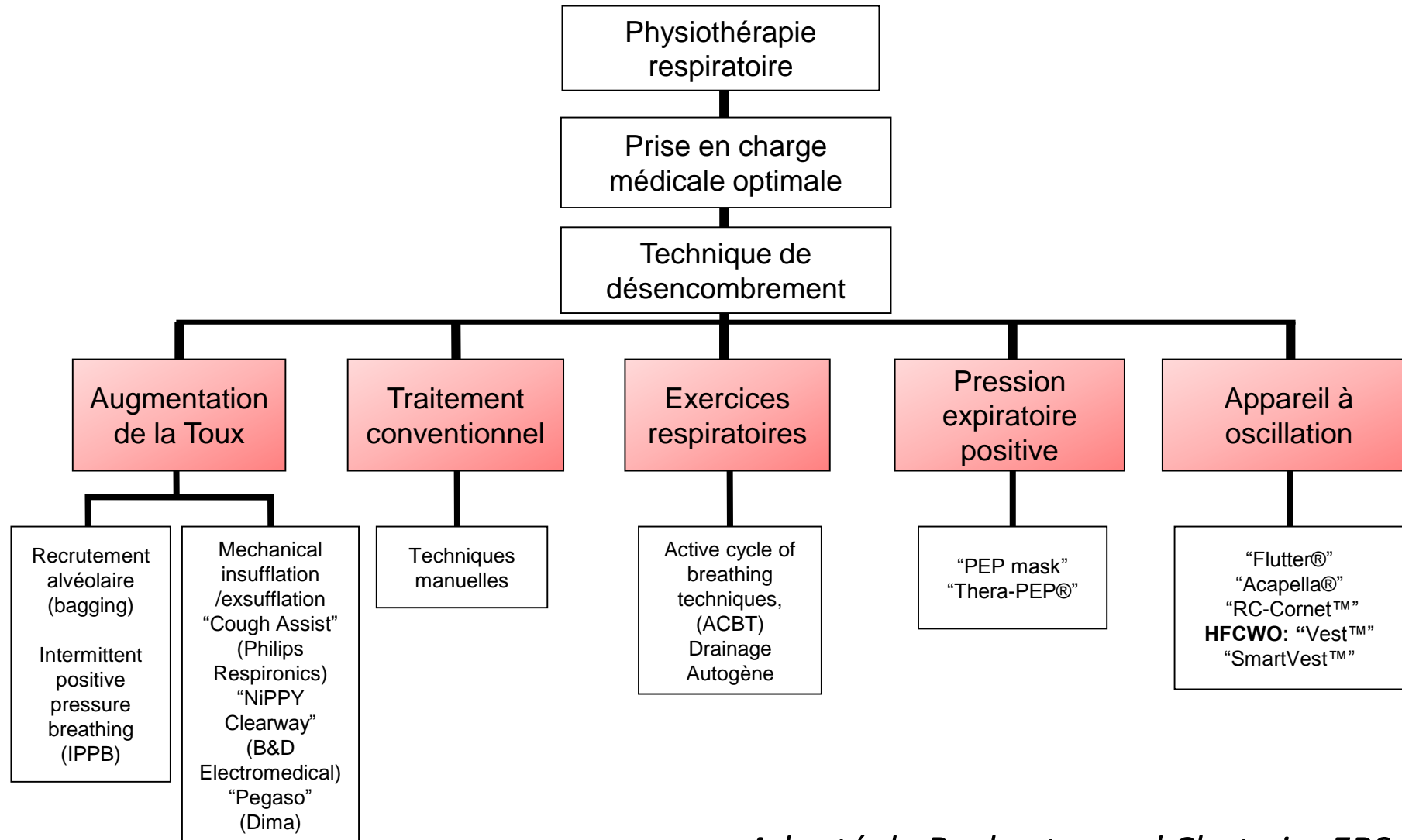


# Désencombrement du patient neuro-musculaire : quelles pratiques ?

Joseph El Mir, PhD  
Olivier Contal, PhD

# Méthodes de désencombrement



*Adapté de Rochester and Chatwin, ERS buyers guide, 2012*

# Stratégies de désencombrement

# Pourquoi utiliser des techniques instrumentales?

Objectifs		Principes
Ventilation alvéolaire	⇒	volume
		↕
désencombrement	⇒	Débit

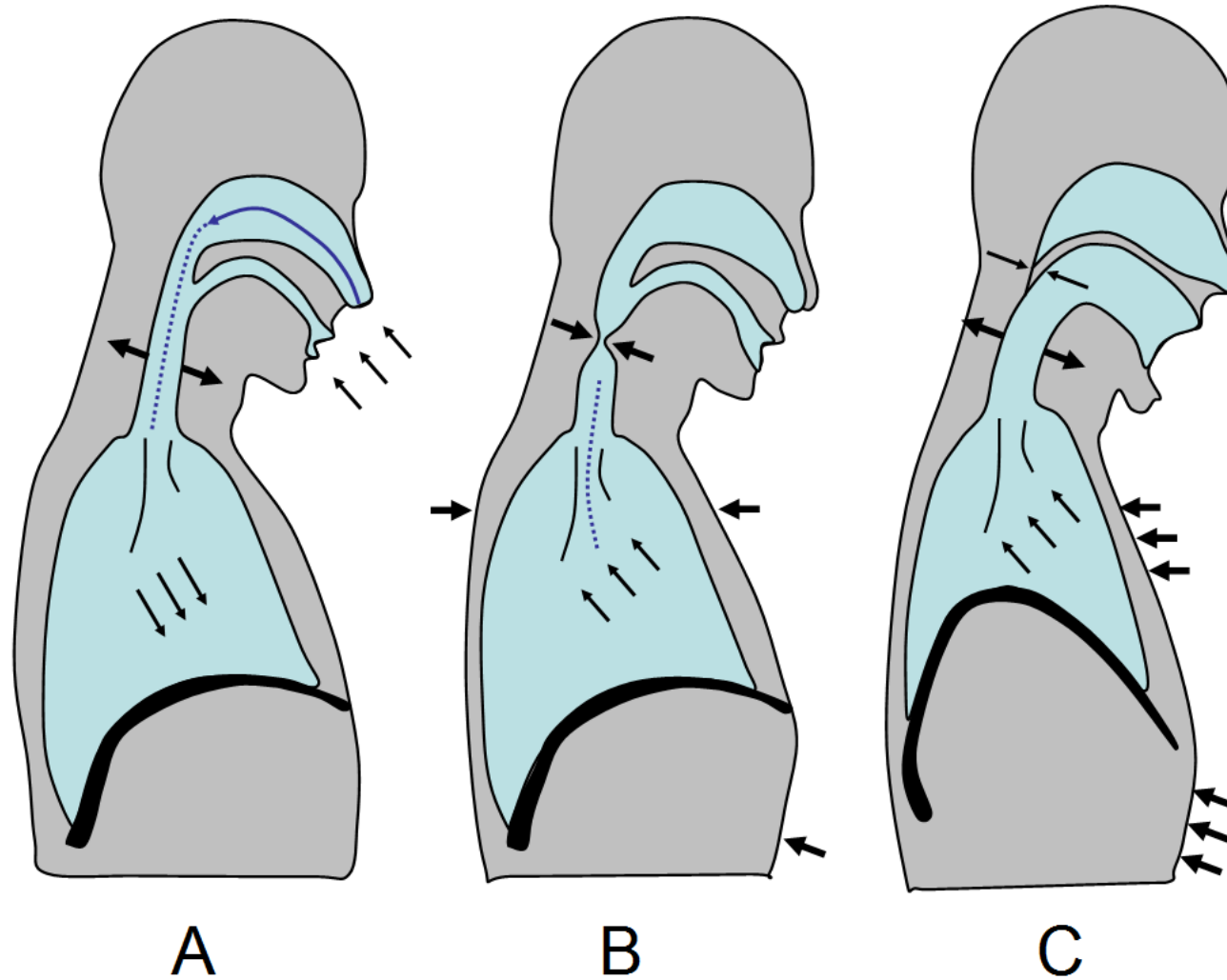
# Cas clinique 1

- Patient SLA
- 55 ans
- Mise en place de VNI au long cours
- Référé pour évaluer nécessité de désencombrement instrumental

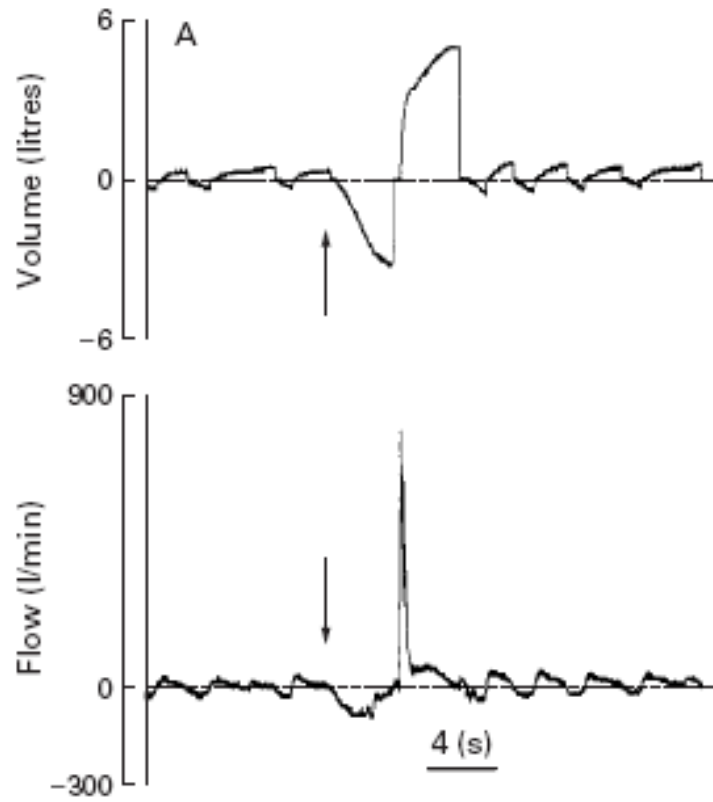
# Évaluation

- Encombrement
- Toux

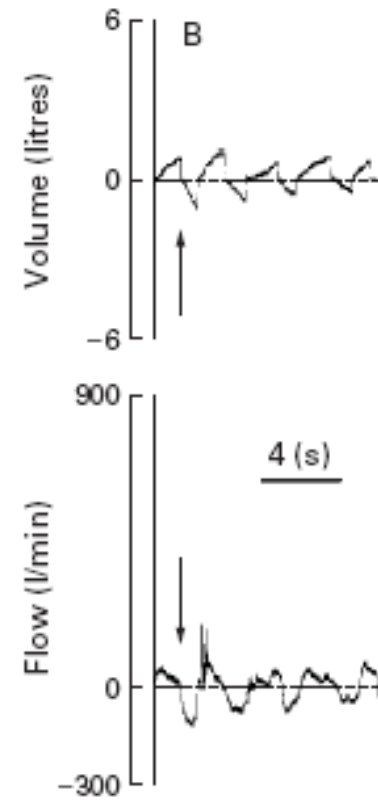
# Les 3 phases de la toux



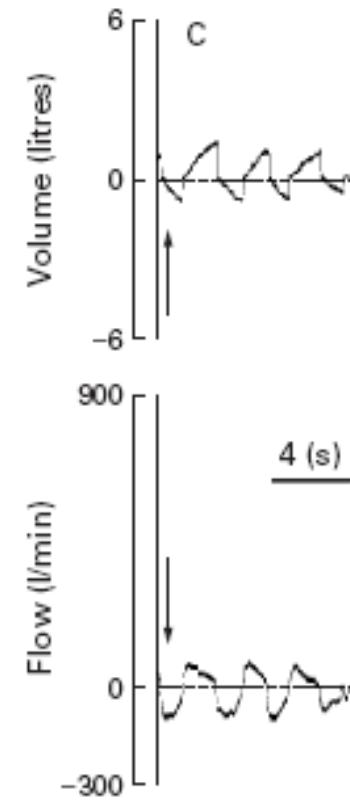
# La toux



Sujet Normal



BPCO



Maladie  
neuromusculaire



# La toux



<https://www.vitalweb.fr/EspacePro/EncycloVNI/>

# Débit de pointe à la toux

- Débit de toux normal entre 360 et 840 l/min

Leiner et al, 1963 Am Rev Respir Dis

- Patient à risque si débit de toux < 160 l/min

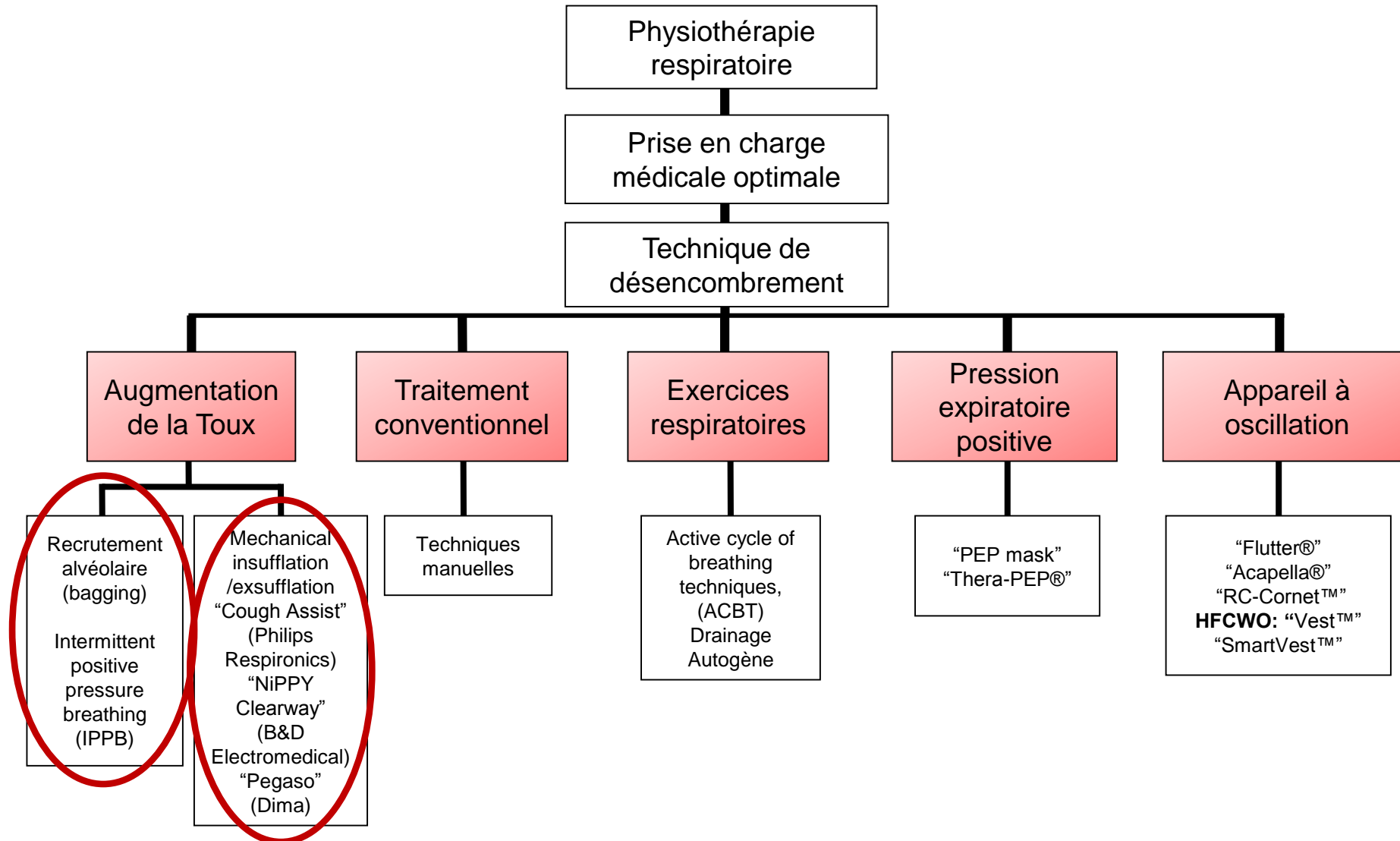
Bach et al., 1997, Chest

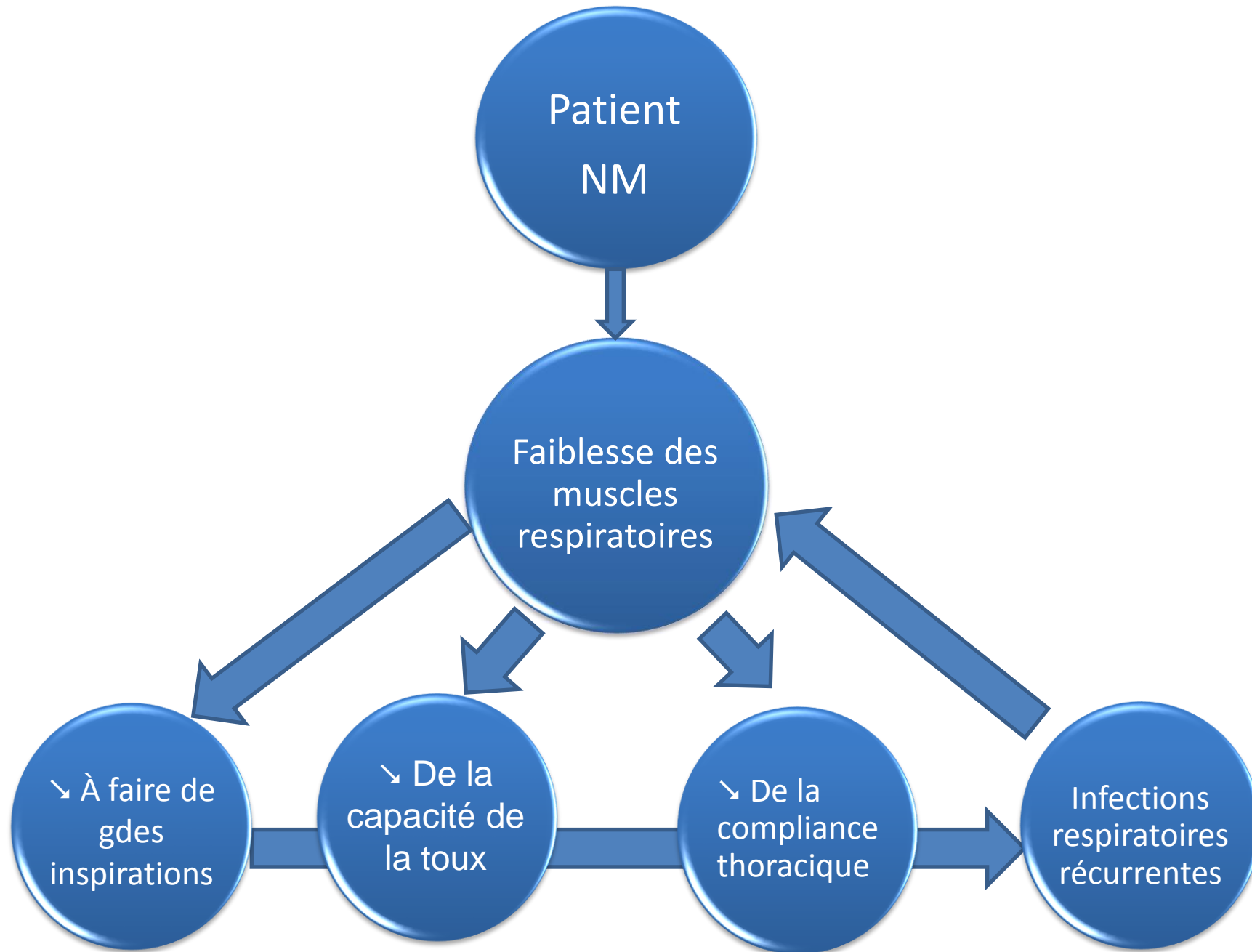
- Patient SLA avec atteinte bulbaire < 250 l/min

Sancho et al. 2007 AJRRCM

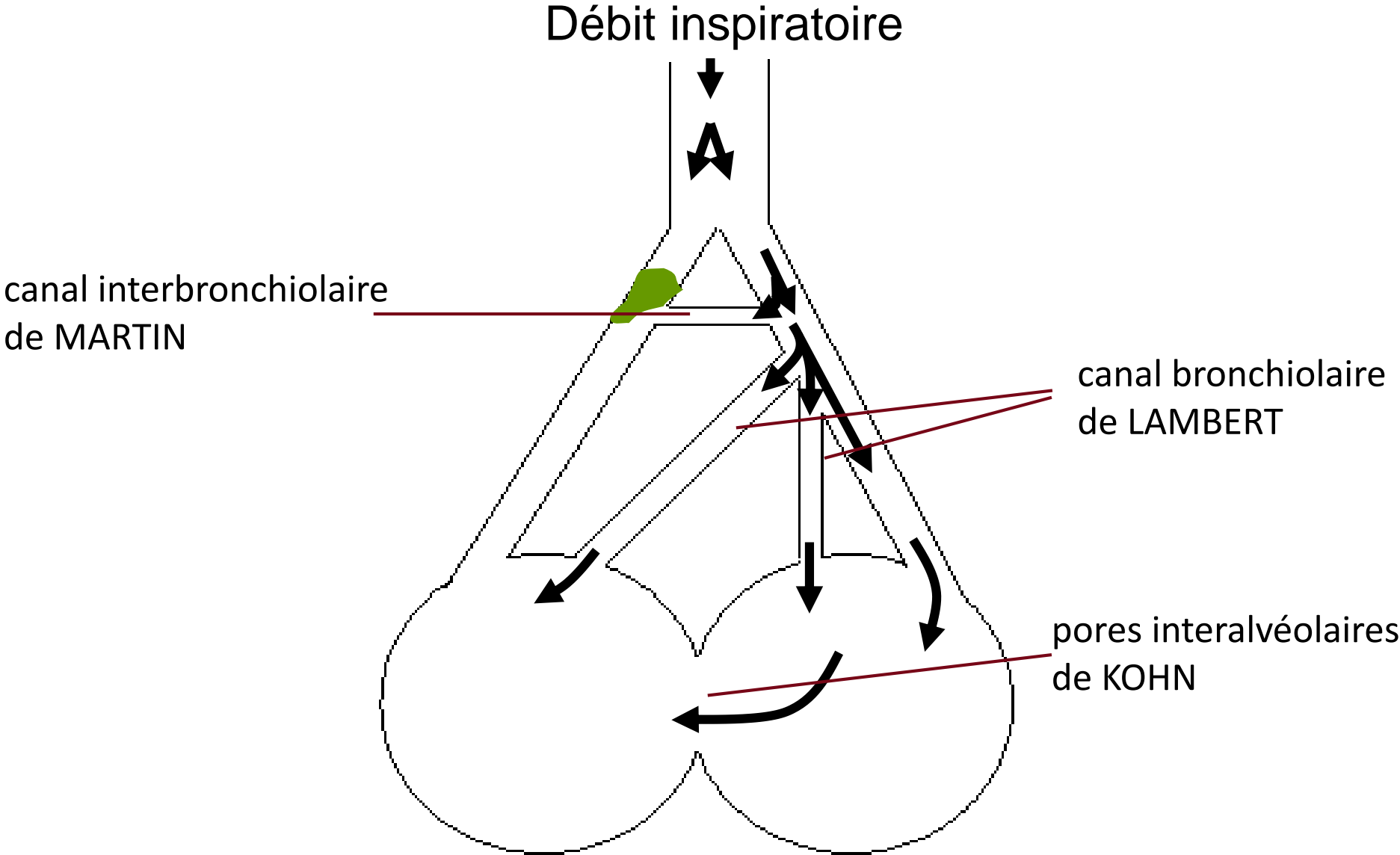


# Méthodes de désencombrement

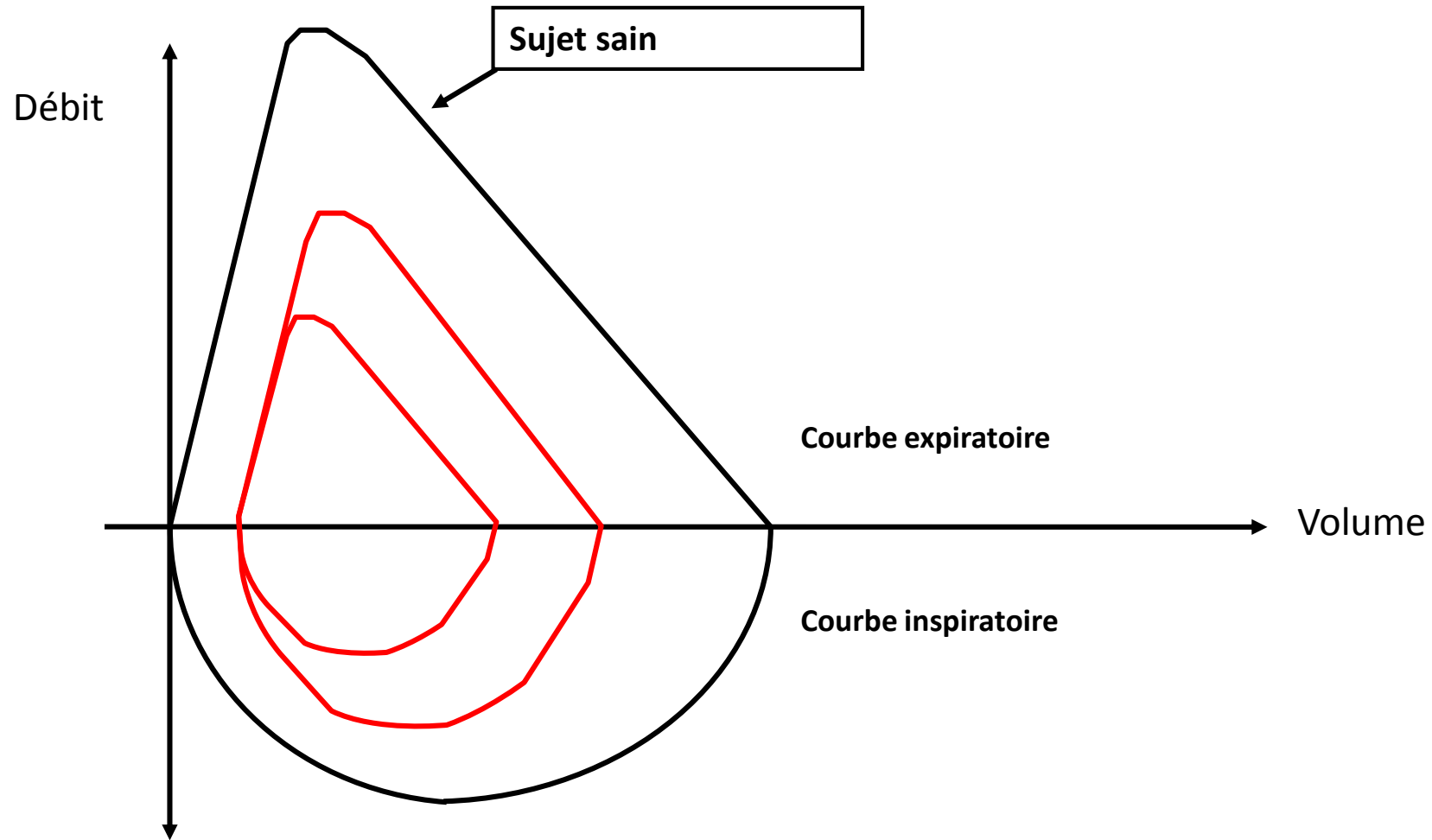




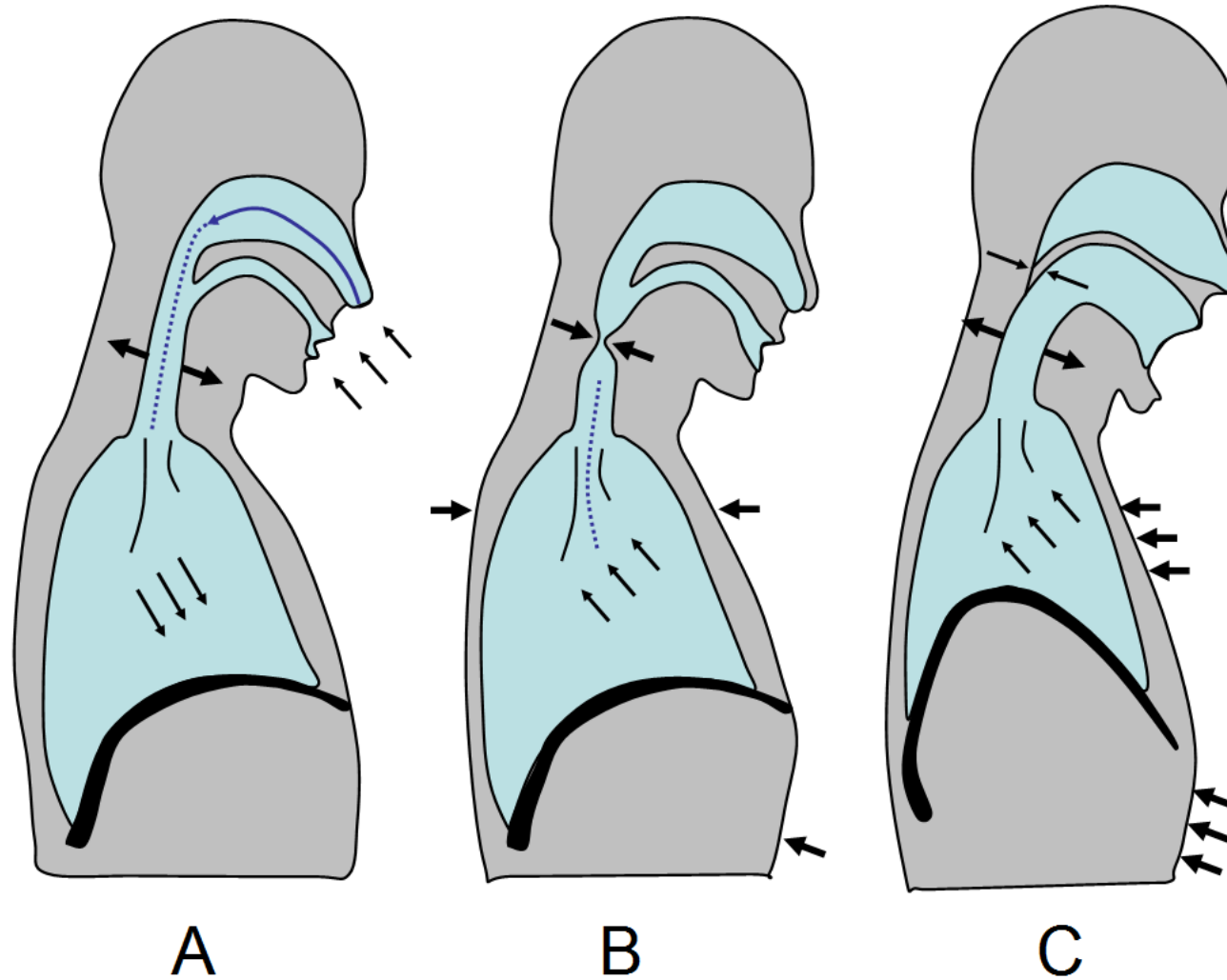
# Ventilation collatérale



# Courbe débit/volume dans le syndrome restrictif



# Les 3 phases de la toux



# Quels appareils





# Volume de réserve inspiratoire

- Différentes techniques pour augmenter le VRI
  - Ventilateur
  - IPPB
  - Ballon d'insufflation

# Intermittant Positive Pressure Breathing (IPPB)

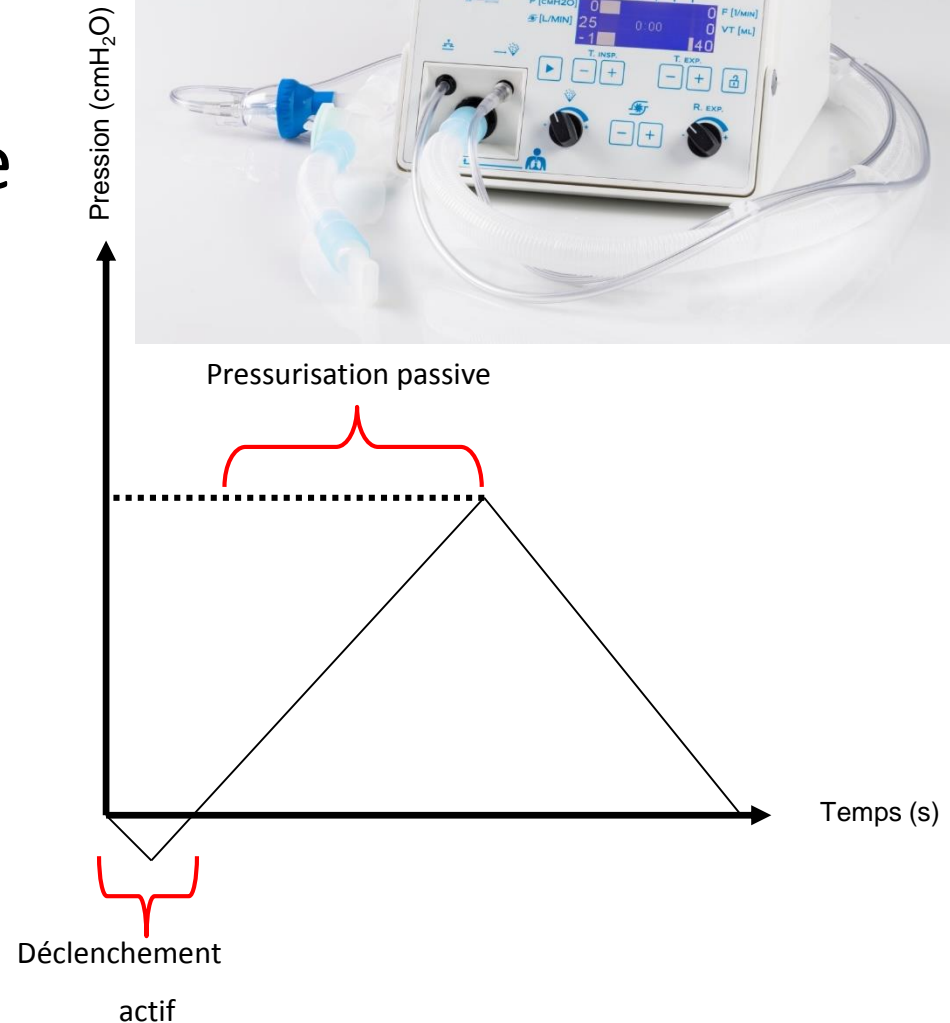
- Pression inspiratoire
- Administration passive
- Nébulisation
- Paramètres réglables

IPAP

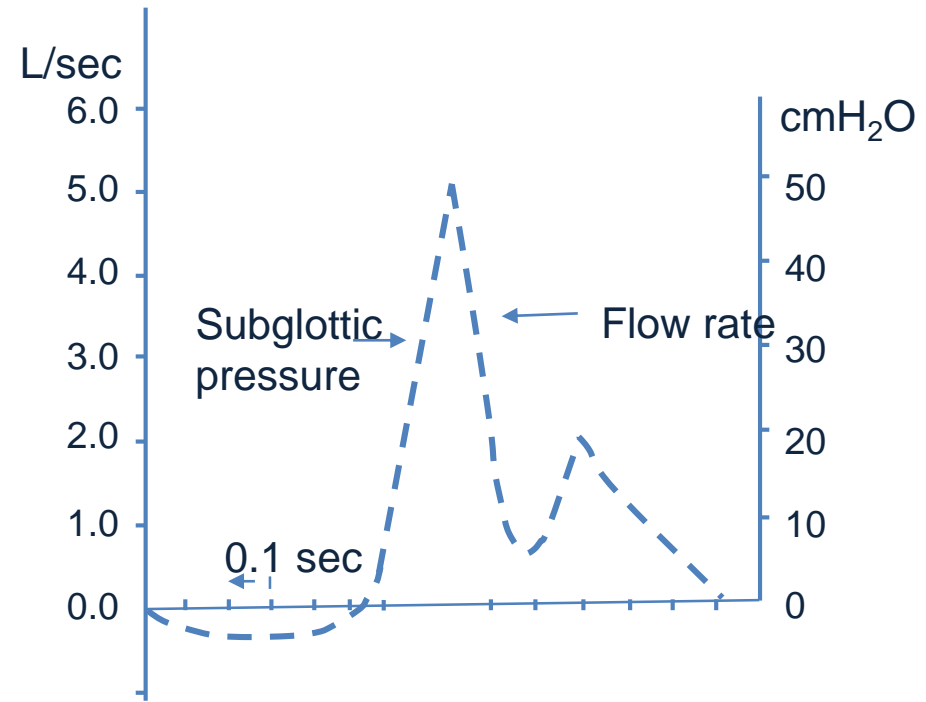
Débit inspiratoire (7-60 l/min)

PEP (éventuellement)

Sensibilité trigger



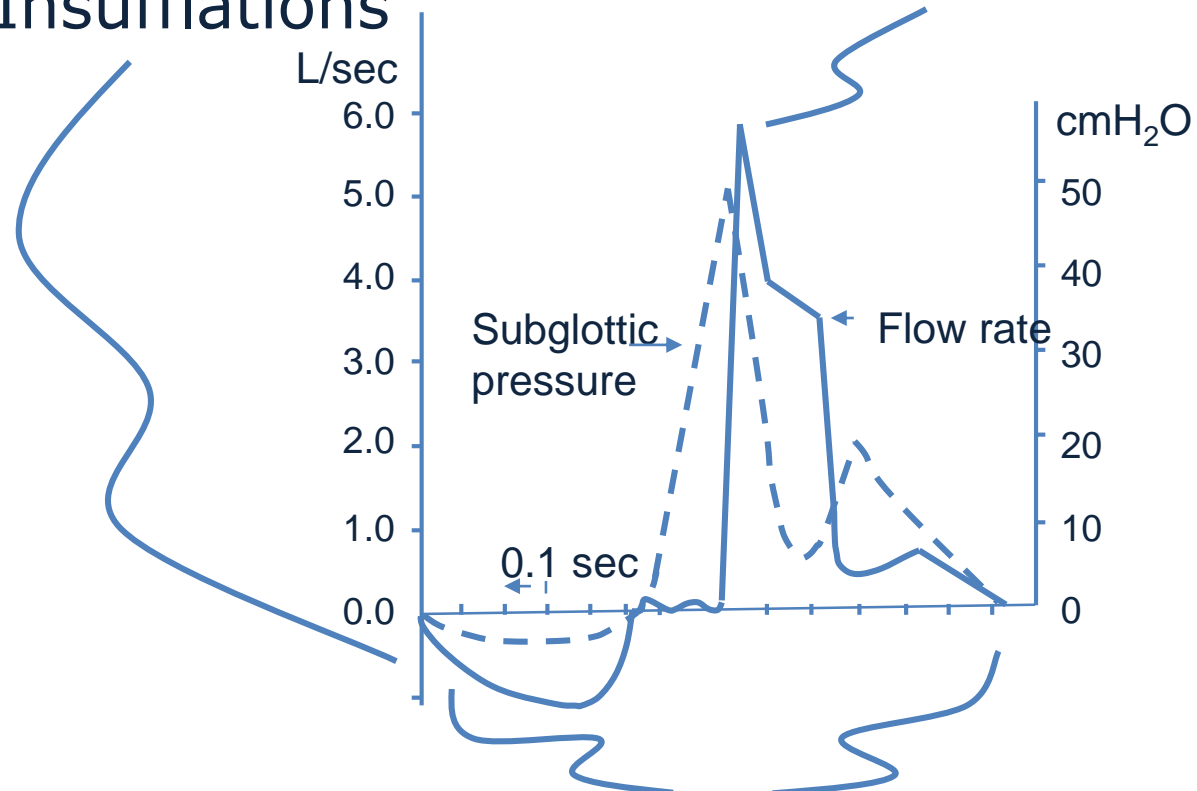
# Augmentation de la toux



# Augmentation de la toux

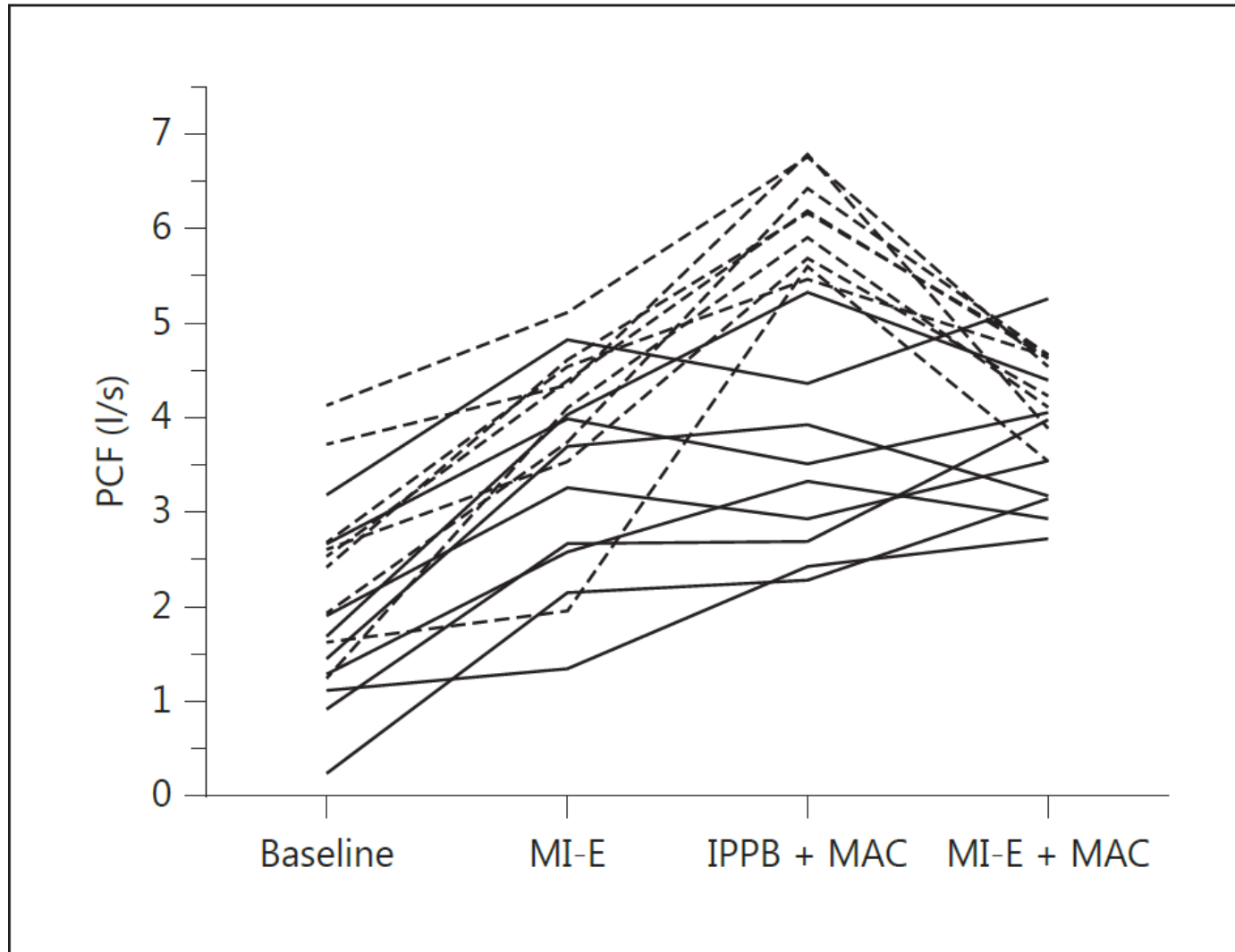
Breath Stacking, IPPB  
Manuel / Mechanical  
Insufflations

Assistance à la toux manuelle

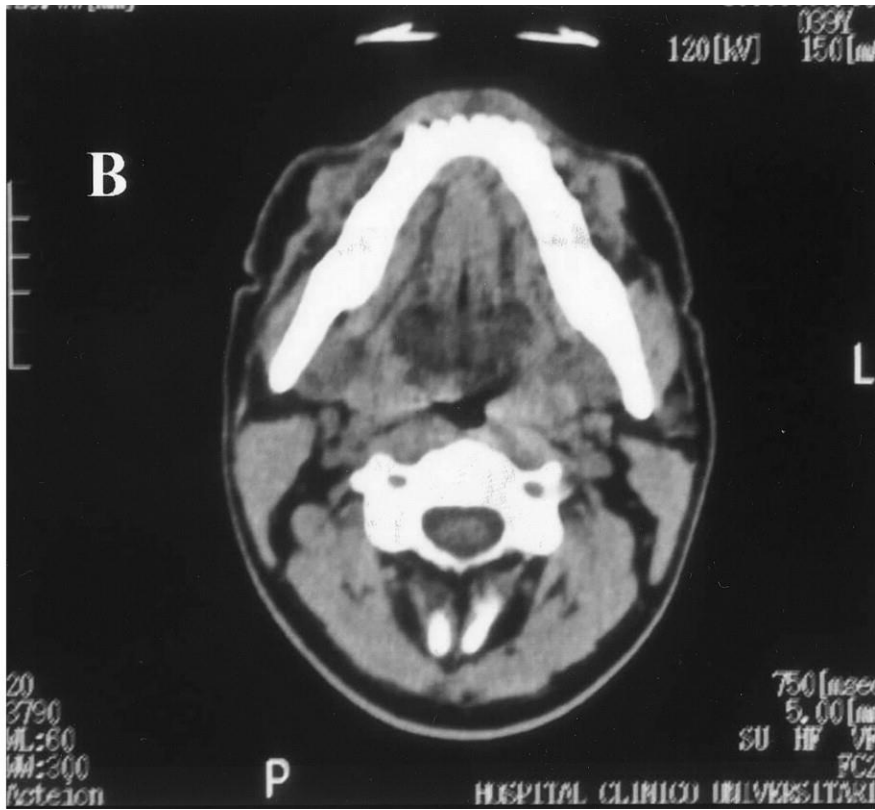
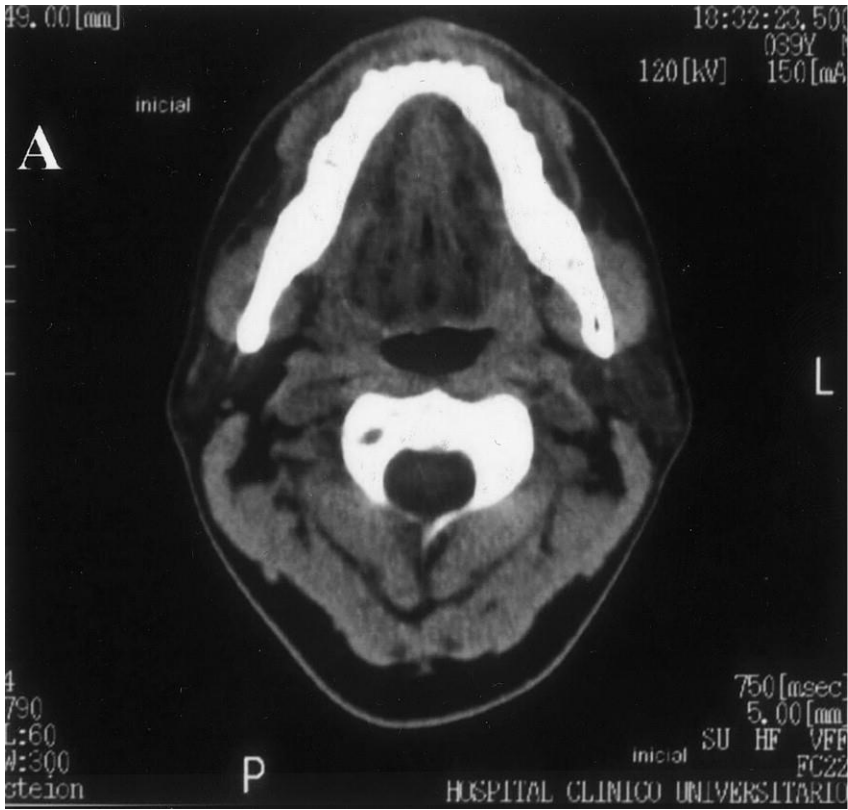


Mechanical Insufflation / Exsufflation

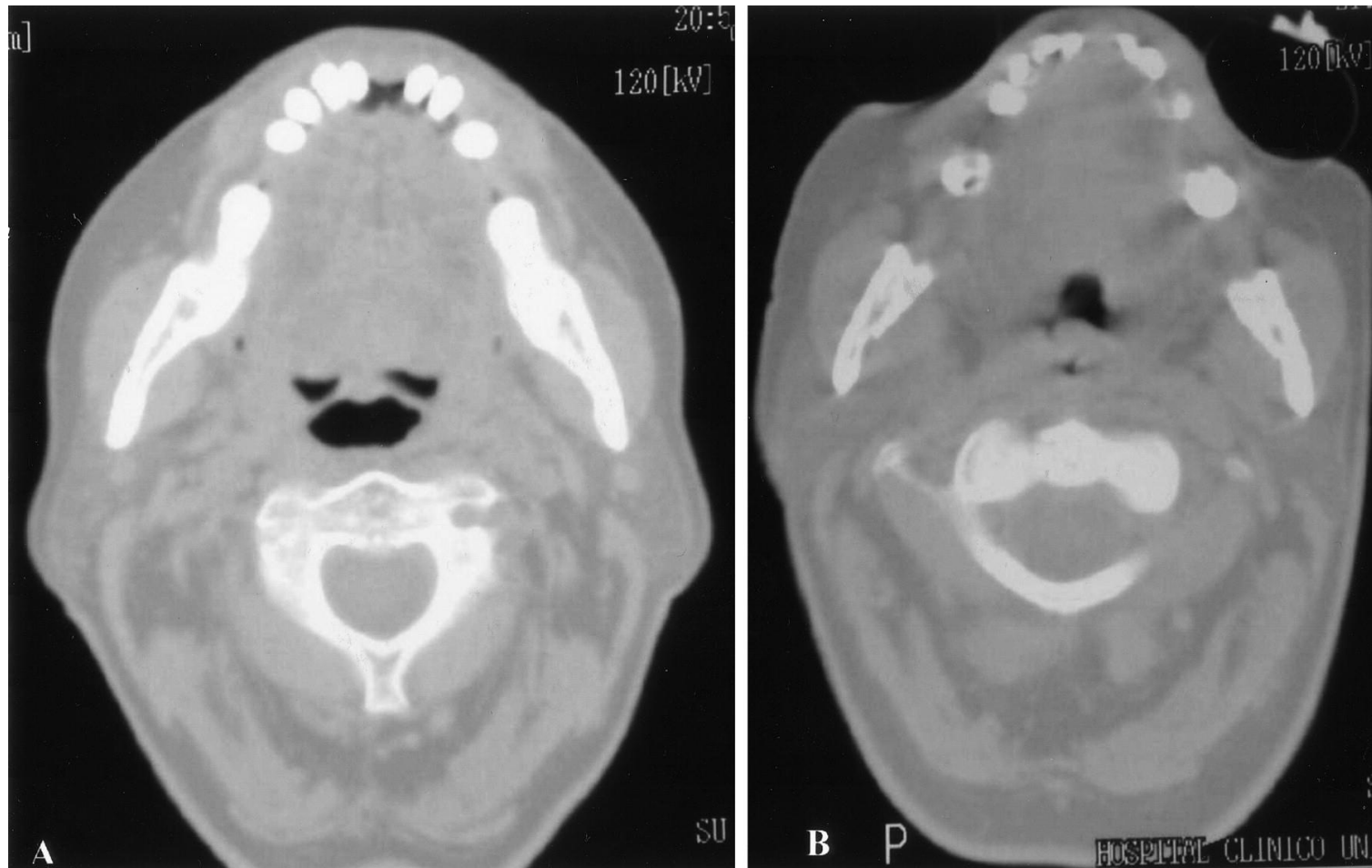
# Quels appareils



# Exsufflation chez un patient SLA



# Avec atteinte bulbaire



Laryngeal response patterns influence the efficacy  
of mechanical assisted cough in  
amyotrophic lateral sclerosis

**Supplementay video 1:**

ALS CASE WITHOUT BULBAR SYMPTOMS

Tiina Andersen, Astrid Sandnes, Anne Kristine Brekka, Magnus Hilland,  
Hege Clemm, Ove Fondenes, Ole-Bjørn Tysnes, John-Helge Heimdal,  
Thomas Halvorsen, Maria Vollsæter & Ola Drange Røksund



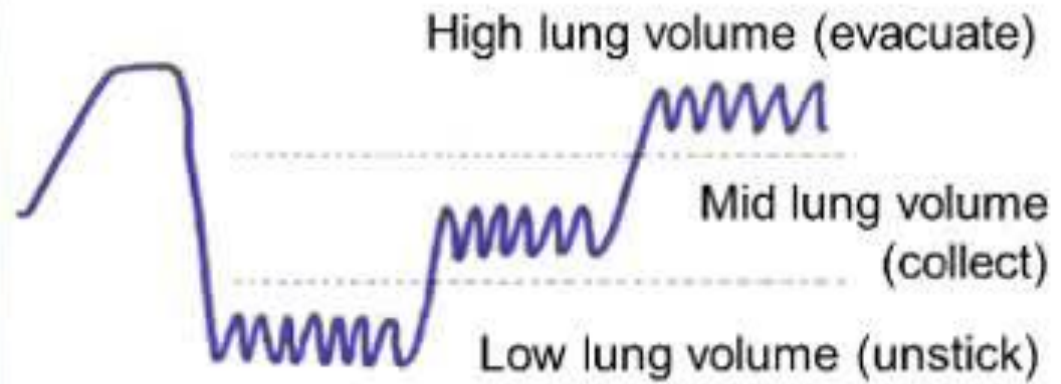
Laryngeal response patterns influence the efficacy  
of mechanical assisted cough in  
amyotrophic lateral sclerosis

**Supplementay video 4:**

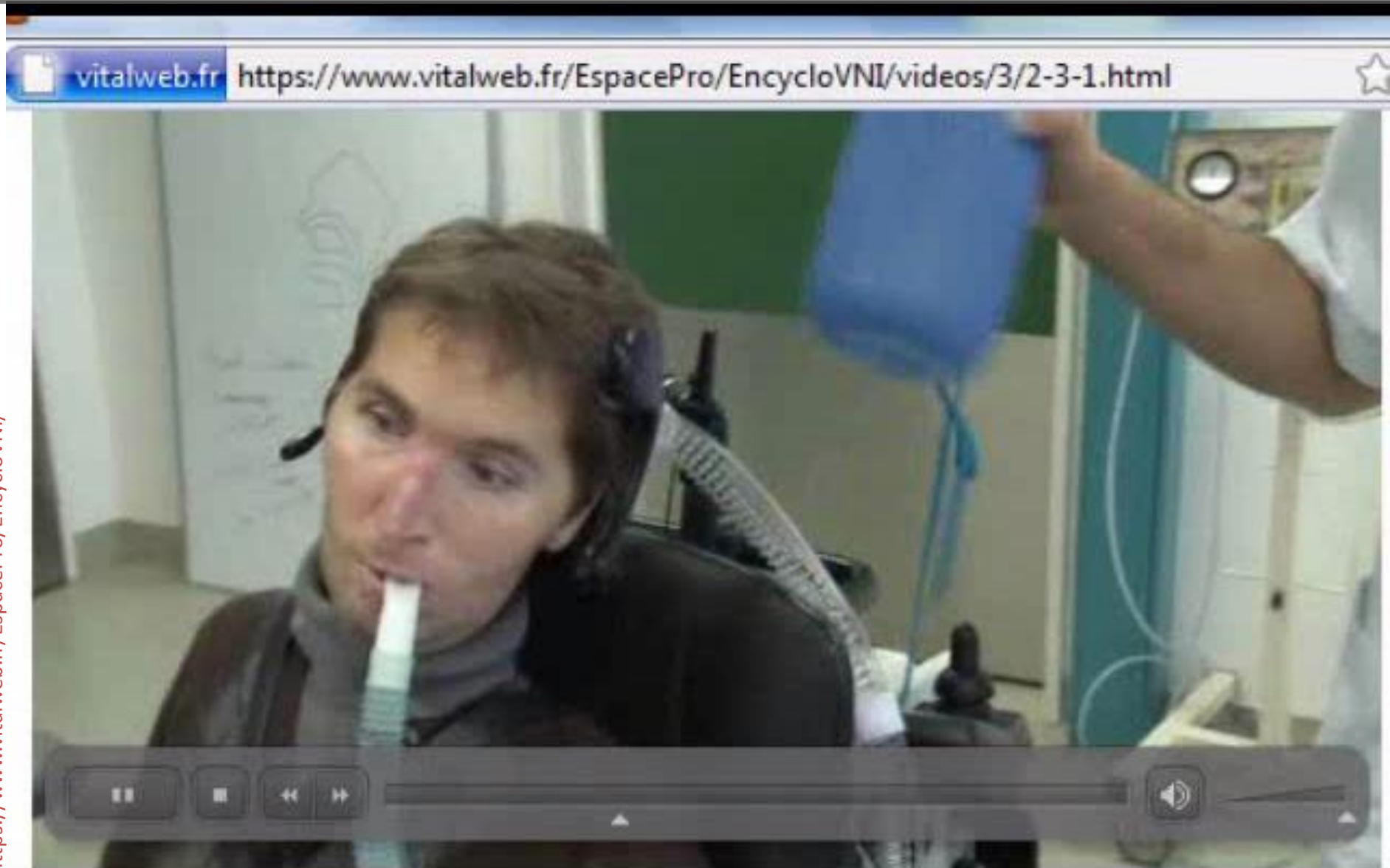
ALS CASE WITH PSEUDOBULBAR PARESE

Tiina Andersen, Astrid Sandnes, Anne Kristine Brekka, Magnus Hilland,  
Hege Clemm, Ove Fondenes, Ole-Bjørn Tysnes, John-Helge Heimdal,  
Thomas Halvorsen, Maria Vollsæter & Ola Drange Røksund

# Autogenic drainage on NIV



# Bagging



<https://www.vitalweb.fr/EspacePro/EncycloVNI/>

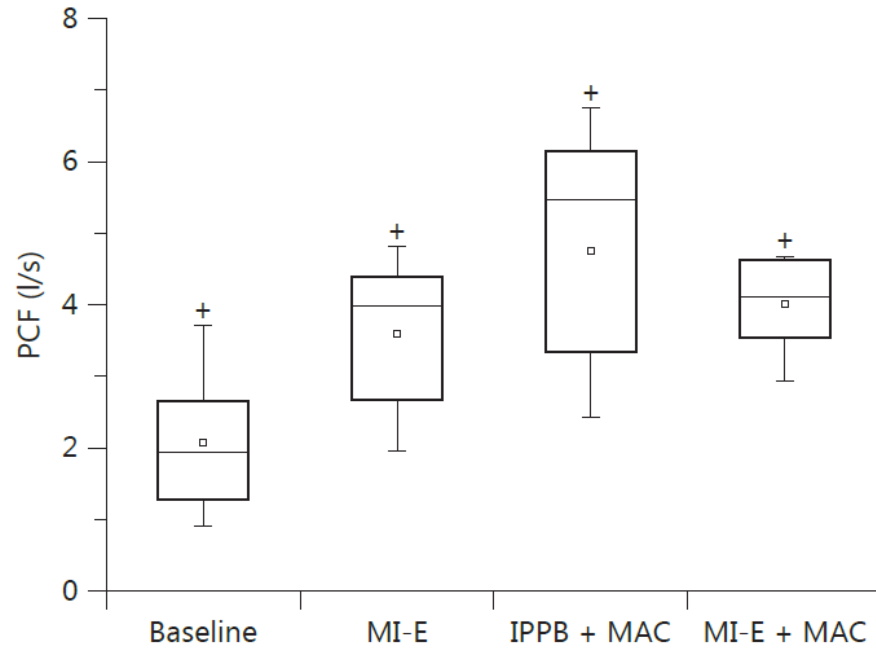
# Ventilateur VS bagging

	Ventilator ( <i>n</i> = 27)	Resuscitator Bag ( <i>n</i> = 25)	<i>P</i>
Age, y	25.3 ± 5.1	24.7 ± 5.7	.60
BMI, kg/m <sup>2</sup>	17 ± 6.5	17.1 ± 6.6	.96
FVC, mL	809 ± 555	807 ± 495	.99
FVC, % predicted	17 ± 10	16 ± 8	.95
P <sub>E<sub>max</sub></sub> , cm H <sub>2</sub> O	18.3 ± 10.9	17.7 ± 7.5	.82
CPF, L/min	132 ± 55	125 ± 52	.68
CPF <sub>MAC</sub> , L/min	210 ± 55	205 ± 52	.74
NIV tidal volume, mL	716 ± 88	724 ± 92	.75
MIPPV use, <i>n</i>	19	16	NA
Vent-free time, h	7.2 ± 6.3	7 ± 5.5	.90

	Ventilator	Resuscitator Bag	<i>P</i>
Able to perform air stacking, <i>n</i> (%)	24/27 (89)	22/25 (88)	NA
Insufflations to maximal insufflation capacity, <i>n</i>	2.6 ± 0.6	1.8 ± 0.6	<.001
CPF <sub>AS</sub> , L/min	199 ± 48	186 ± 50	.33
Maximal insufflation capacity, mL	1,481 ± 477	1,344 ± 520	.33
Expected expired volume, mL	1,770 ± 404	NA	NA
Ventilator leak, mL	289 ± 468	NA	NA
P <sub>E<sub>maxAS</sub></sub> , cm H <sub>2</sub> O	28 ± 10	26 ± 9	.45

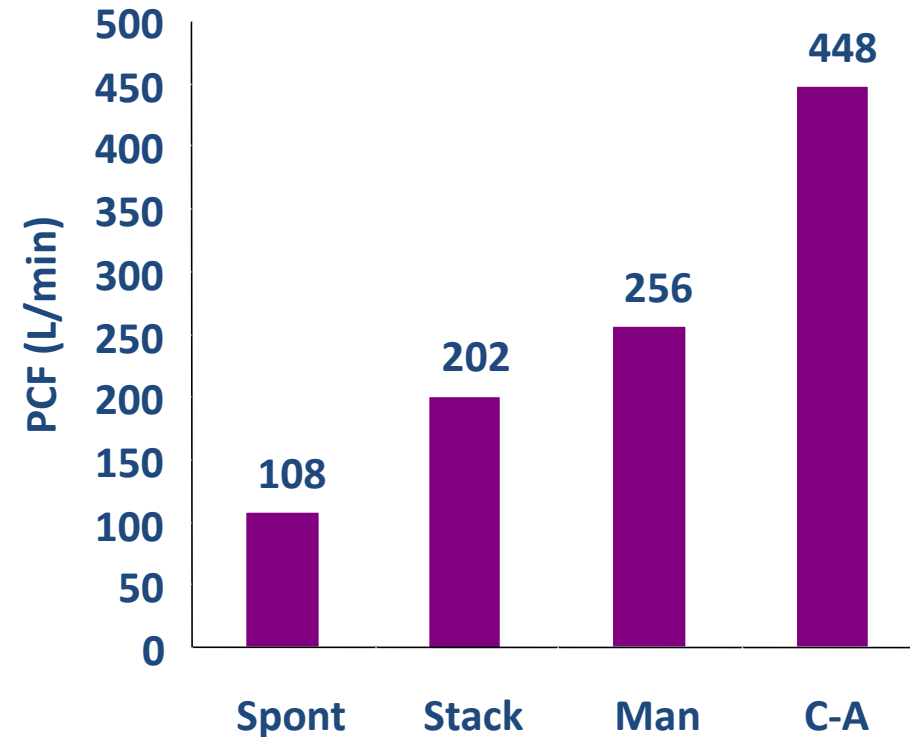
# Comparaison des débits à la toux avec différentes techniques de toux assistée

- 18 patients restrictifs



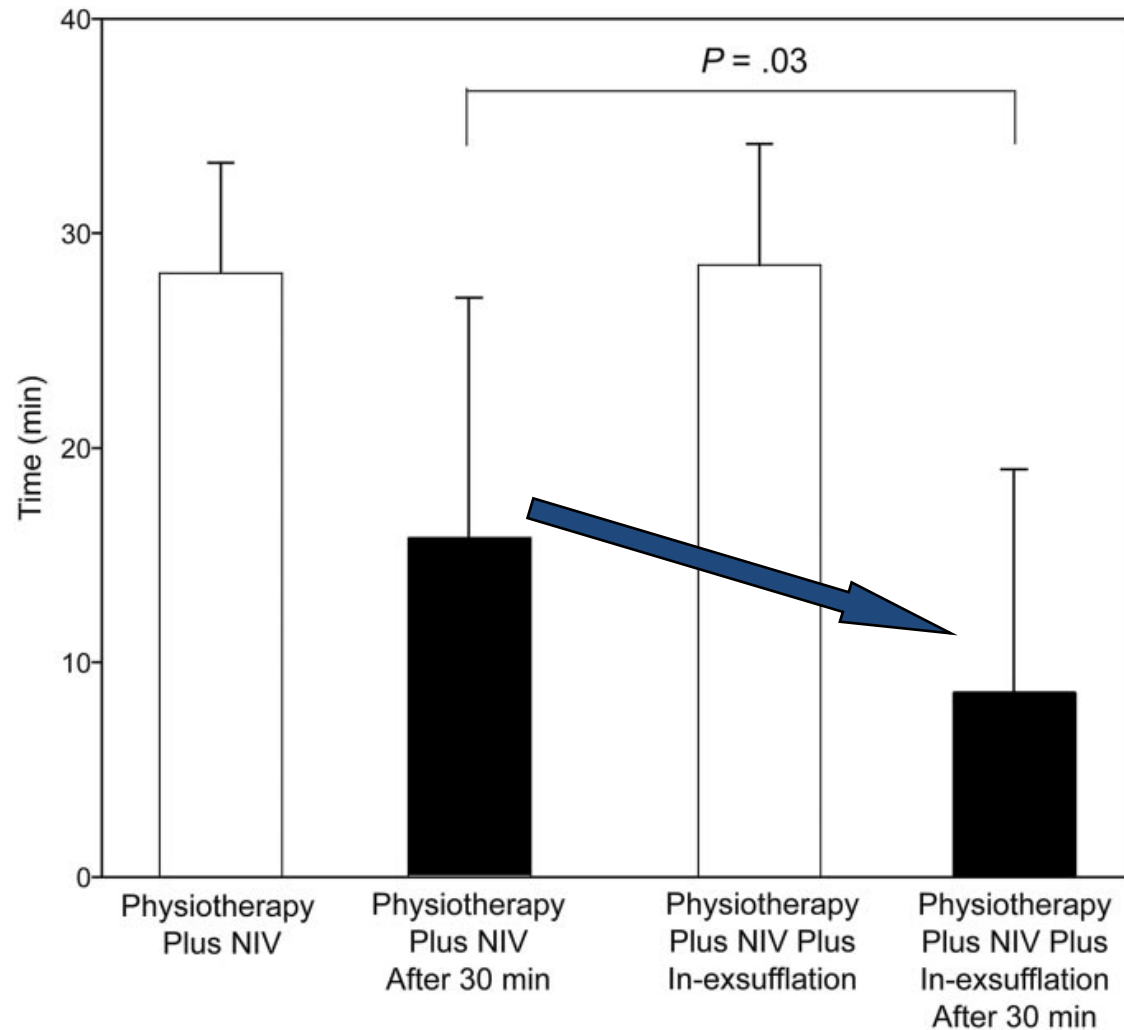
Lacombe; Respiration 2014

- 21 patients restrictifs



Bach; Chest 1993

# Comparaison des débits à la toux avec différentes techniques de toux assistée

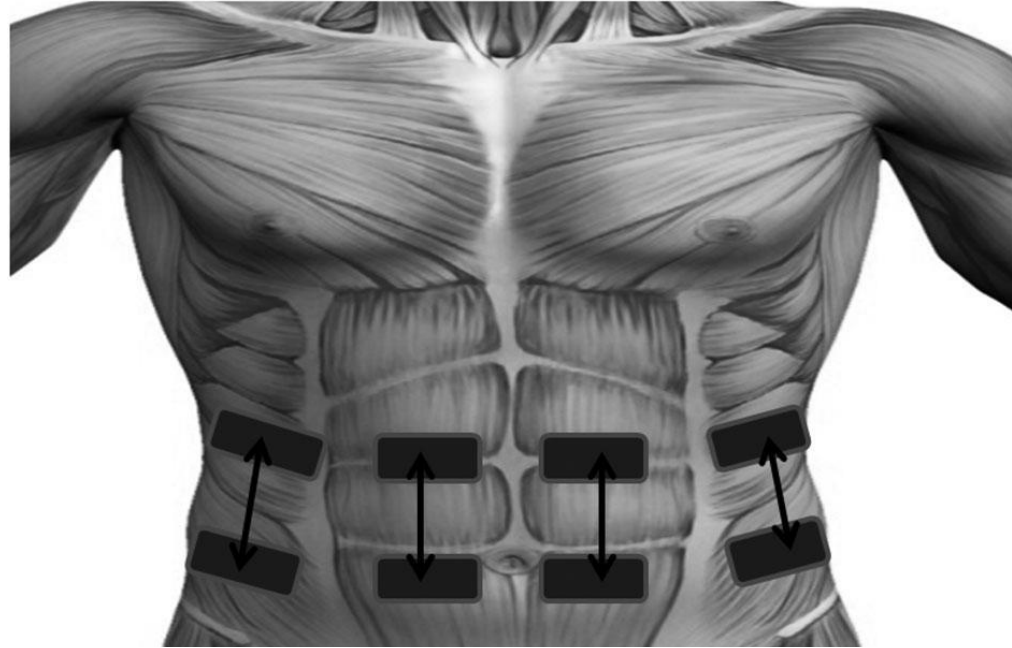


# Exemple pratique





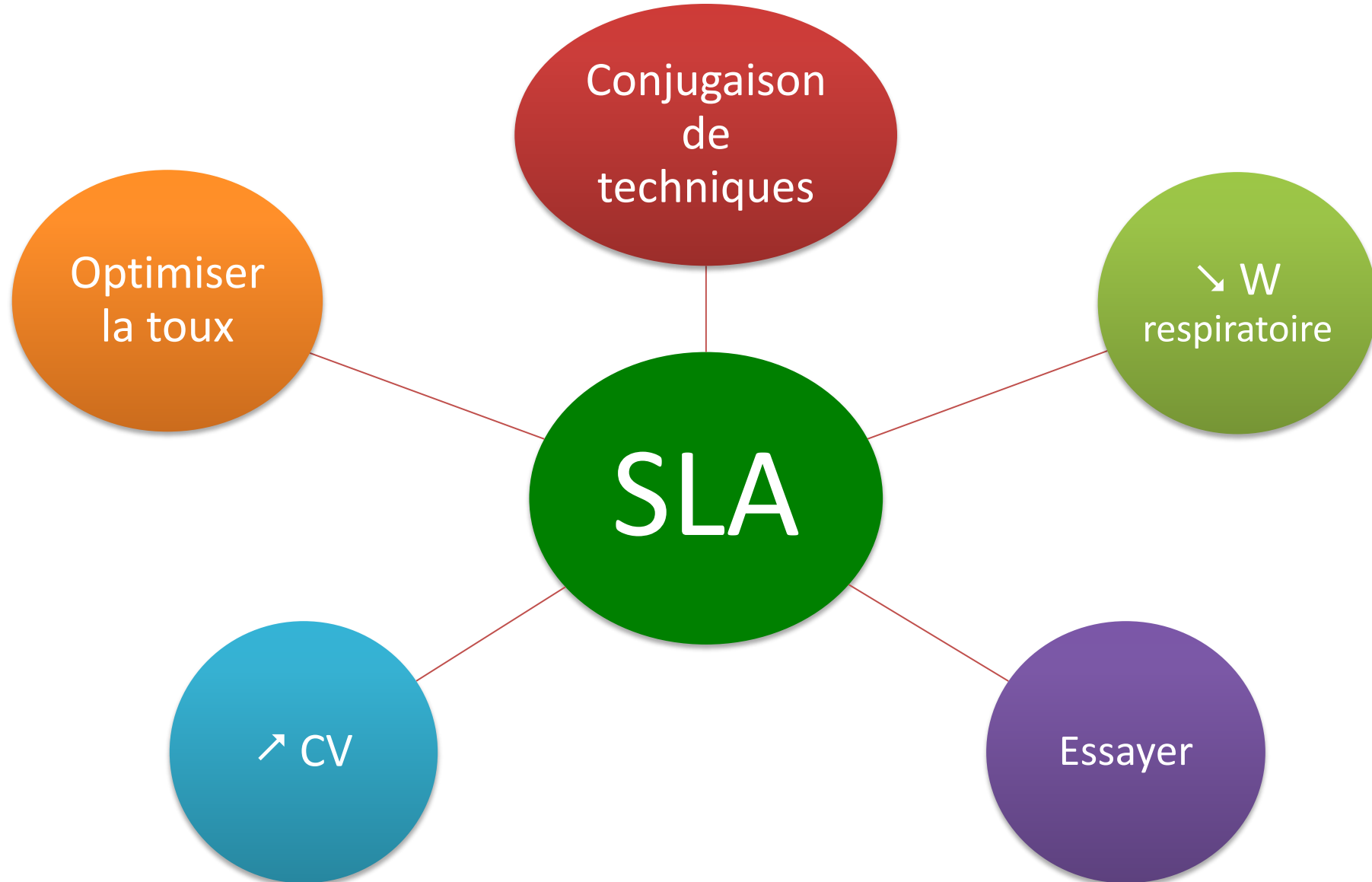
# Le Futur?



Assessment Session	FVC (L)		PEF (L/s)	
	Unstimulated	Stimulated	Unstimulated	Stimulated
A0	1.60	1.84	1.97	2.18
A7	1.99	2.28	2.00	2.39



# Conclusion cas clinique 1





# Cas clinique 2