

# Workshop beademing astma/COPD

J.G. van der Hoeven  
*NVIC Mechanische Beademingsdagen 2010*

# Patiënt (I)

- Man, 24 jaar
- Intrinsiek asthma
  - Onregelmatig gebruik van medicatie
  - Reeds eenmaal eerder beademd
- Zeer kortademig na schoonmaken toilet
- Collaps binnen enkele minuten - BLS door omstanders

# Patiënt (2)

- EHBO
  - Onmiddellijke intubatie
  - Geen hoorbaar ademgeruis
  - Sinus tachycardie | 40 per minuut - RR 70/40 mm Hg
  - EI,MI,Vtube

# Medicatie?

# Medicatie?

- O<sub>2</sub>
- Inhalatie  $\beta_2$ -mimetica (of intraveneus)
- Inhalatie anticholinergica
- Corticosteroiden
- Sedatie + analgesie  $\pm$  spier relaxans?
- (theophylline, magnesiumsulfaat, ketamine)

# Wat wil je nu eerst weten?

# Wat wil je nu eerst weten?

- pH 7.01
- PaCO<sub>2</sub> 71 mm Hg
- PaO<sub>2</sub> 321 mm Hg
- BE - 13.3 mEq/l
- Lactate 9.2 mmol/l
- Trachea aspiraat kweek (-)

# Wat wil je nu eerst weten?

- pH 7.01
- PaCO<sub>2</sub> 71 mm Hg
- PaO<sub>2</sub> 321 mm Hg
- BE - 13.3 mEq/l
- Lactate 9.2 mmol/l
- Trachea aspiraat kweek (-)



# Uw instellingen?

# Uw instellingen?

- Lage frequentie (8 - 12 per minuut)
- Klein teugvolume 6 - 8 ml/kg
- Hoge inspiratieflow (70 - 100 L/min)
- Accepteer hypercapnie (tot 90 mm Hg)
  - Uitzondering zwangerschap en ICP verhoging
- Beperk de mate van hyperinflatie

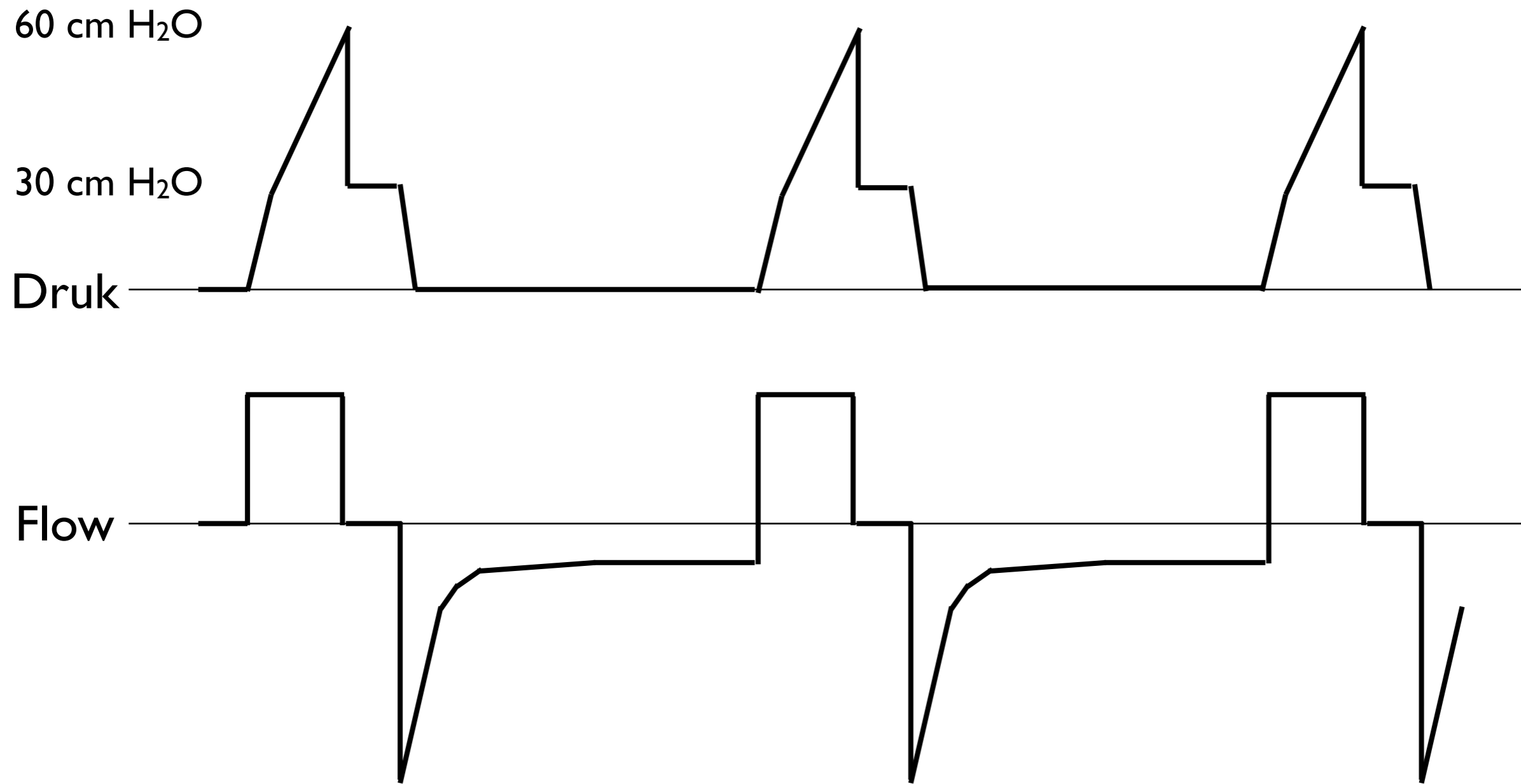
60 cm H<sub>2</sub>O

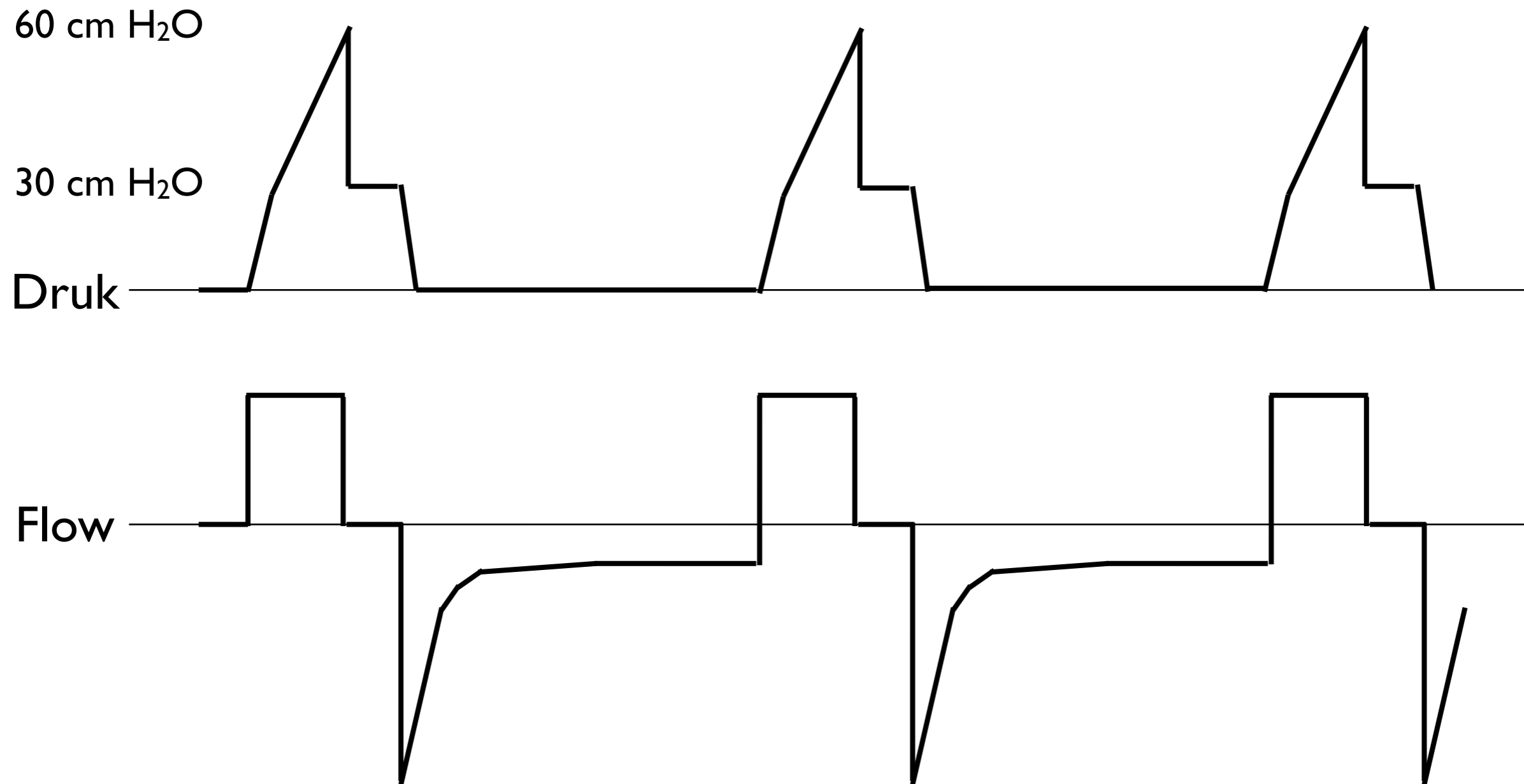
30 cm H<sub>2</sub>O

Druk —————

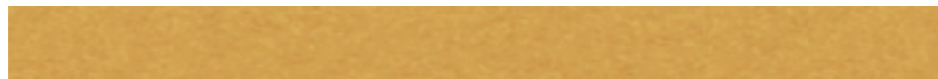
Flow —————





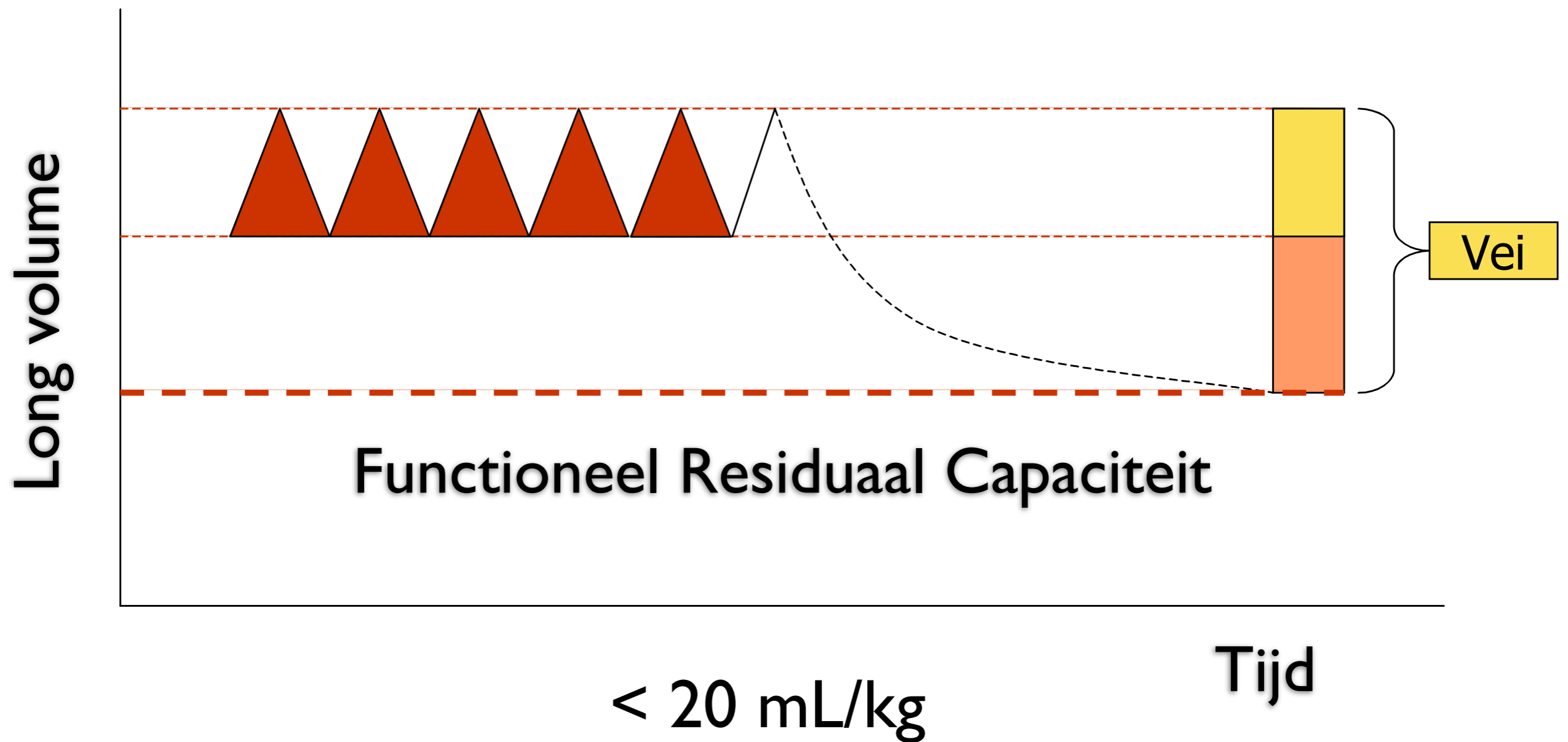


**Wat ziet u hier. Kan er nog wat verbeterd worden?**



# Hoeveel autoPEEP accepteert U?

# Hoeveel autoPEEP accepteert U?

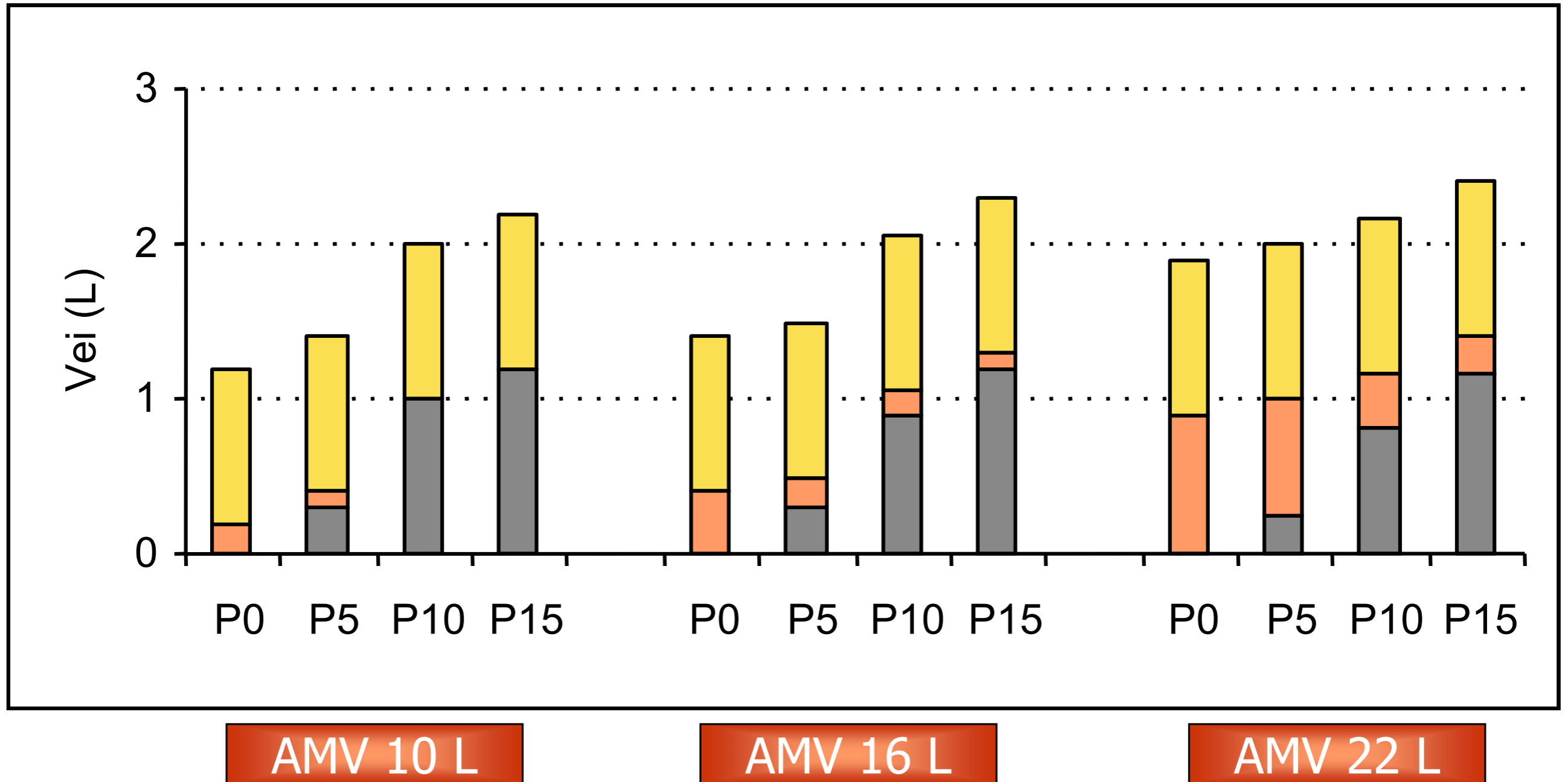


# Alternatief

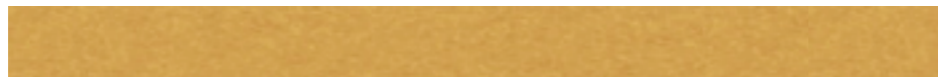
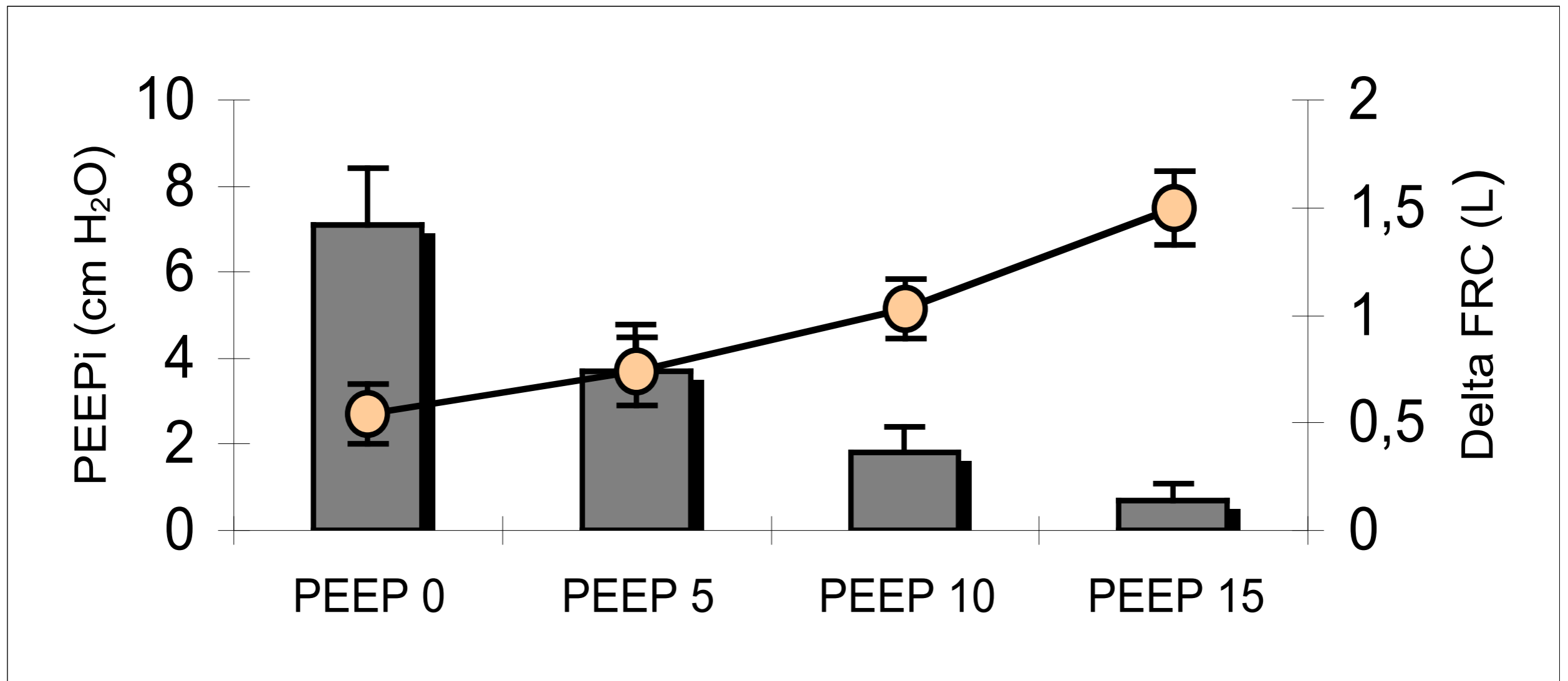
$$\frac{P_{\text{plat}} \times \text{teugvolume}}{P_{\text{plat}} - \text{PEEP}_i}$$

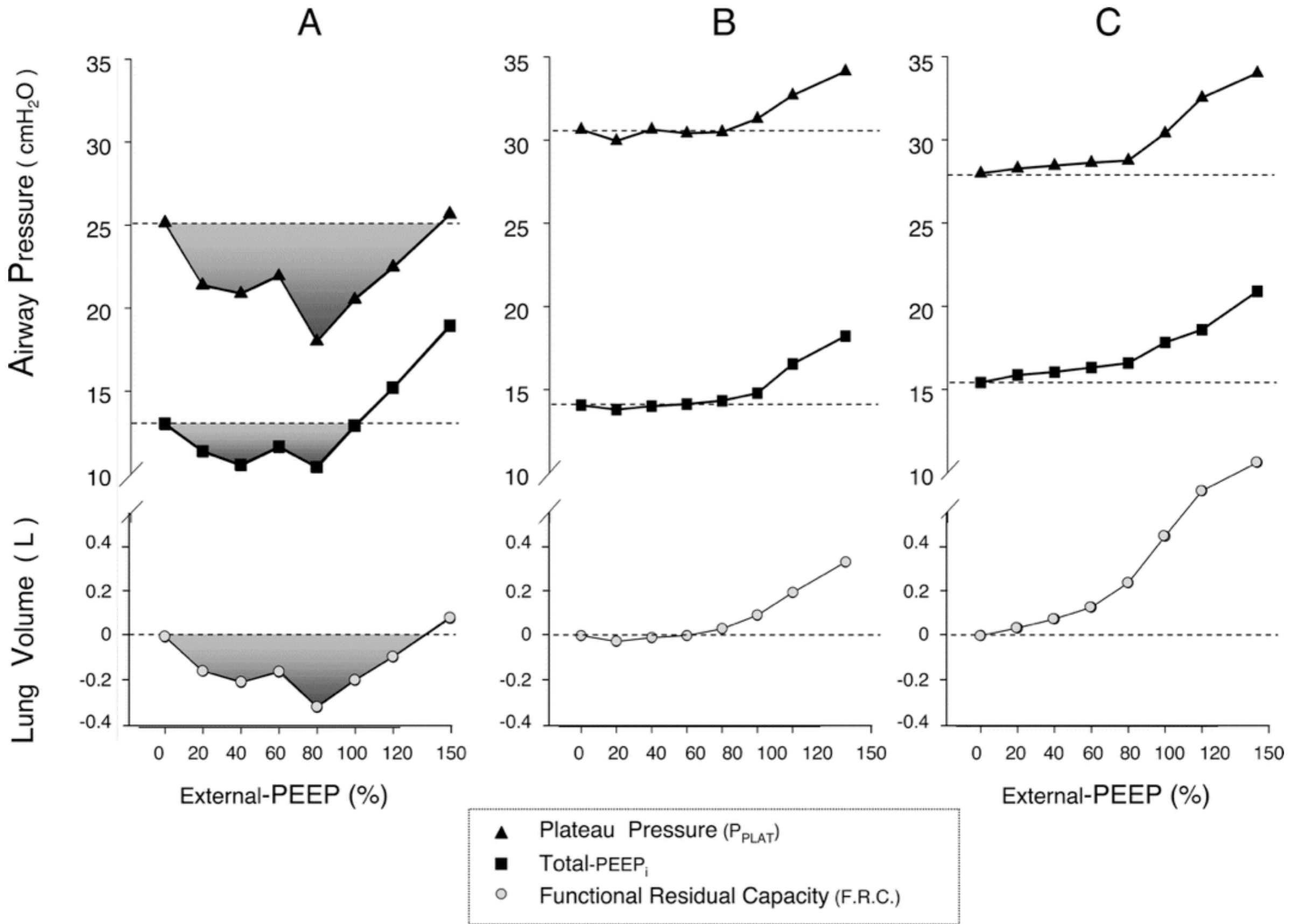
- $\text{PEEP}_i (< 10 \text{ cm H}_2\text{O})$
- Plateau druk ( $< 30 \text{ cm H}_2\text{O}$ )

# PEEP<sub>e</sub> en hyperinflatie



# PEEP<sub>e</sub> en hyperinflatie





Paradoxaal

Bifasisch

Klassiek

# Patiënt (3)

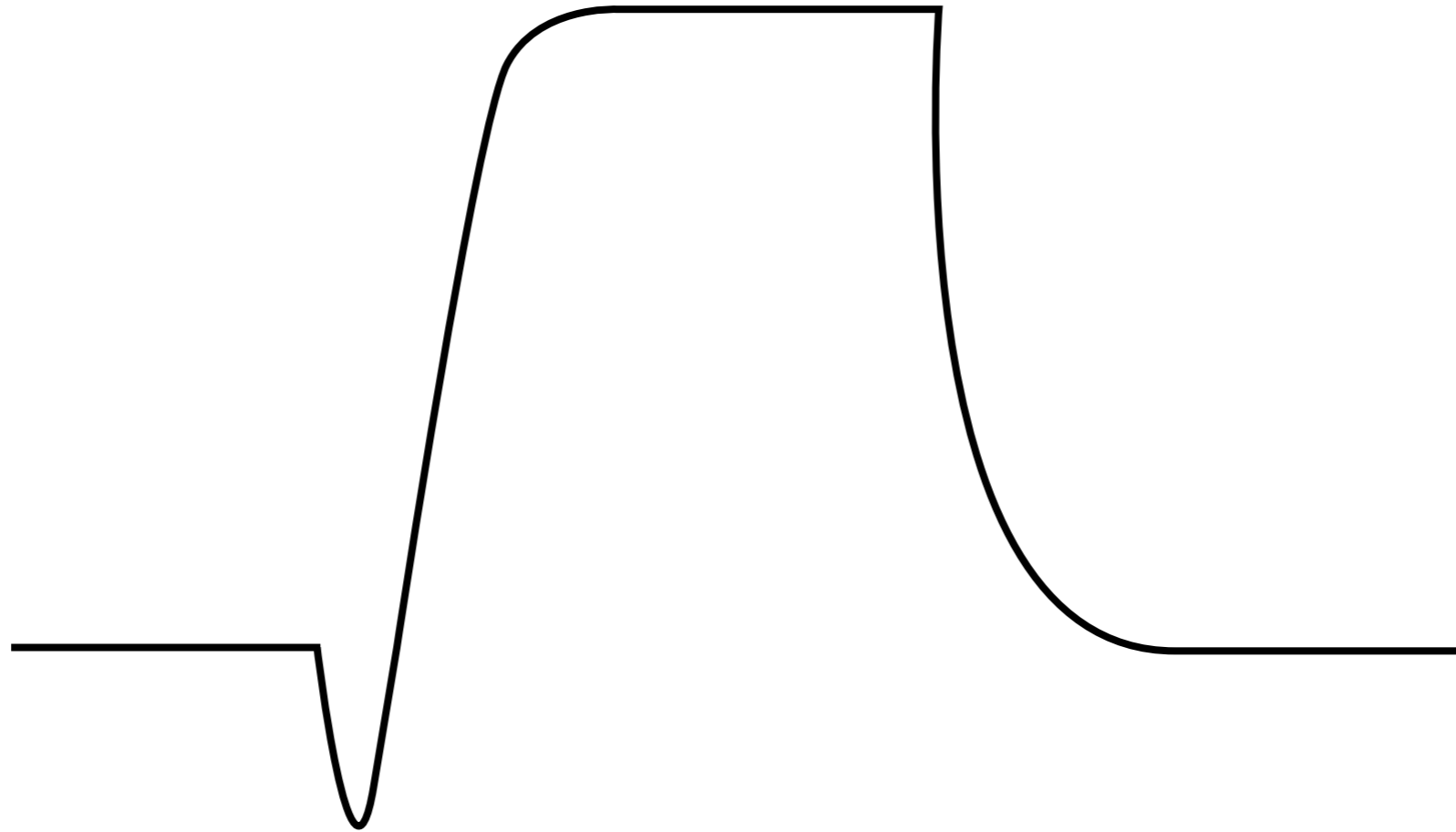
- Na 1 dag neemt bronchospasme af en patient wordt beademd met PSV

# Patiënt (3)

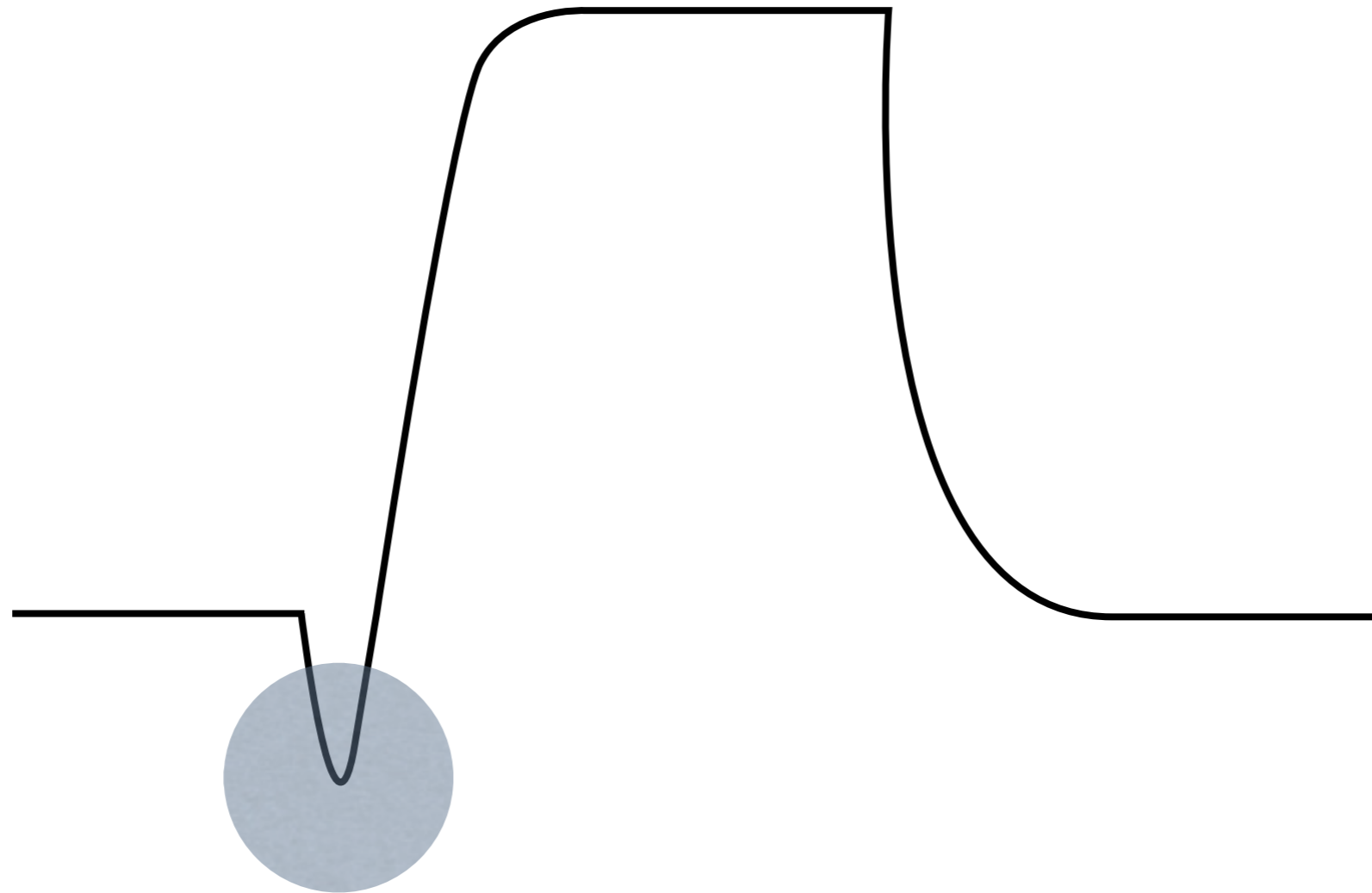
- Na 1 dag neemt bronchospasme af en patient wordt beademd met PSV

Welke problemen verwacht u?  
Hoe lost u ze op?

# Hoe stelt u PSV optimaal in?

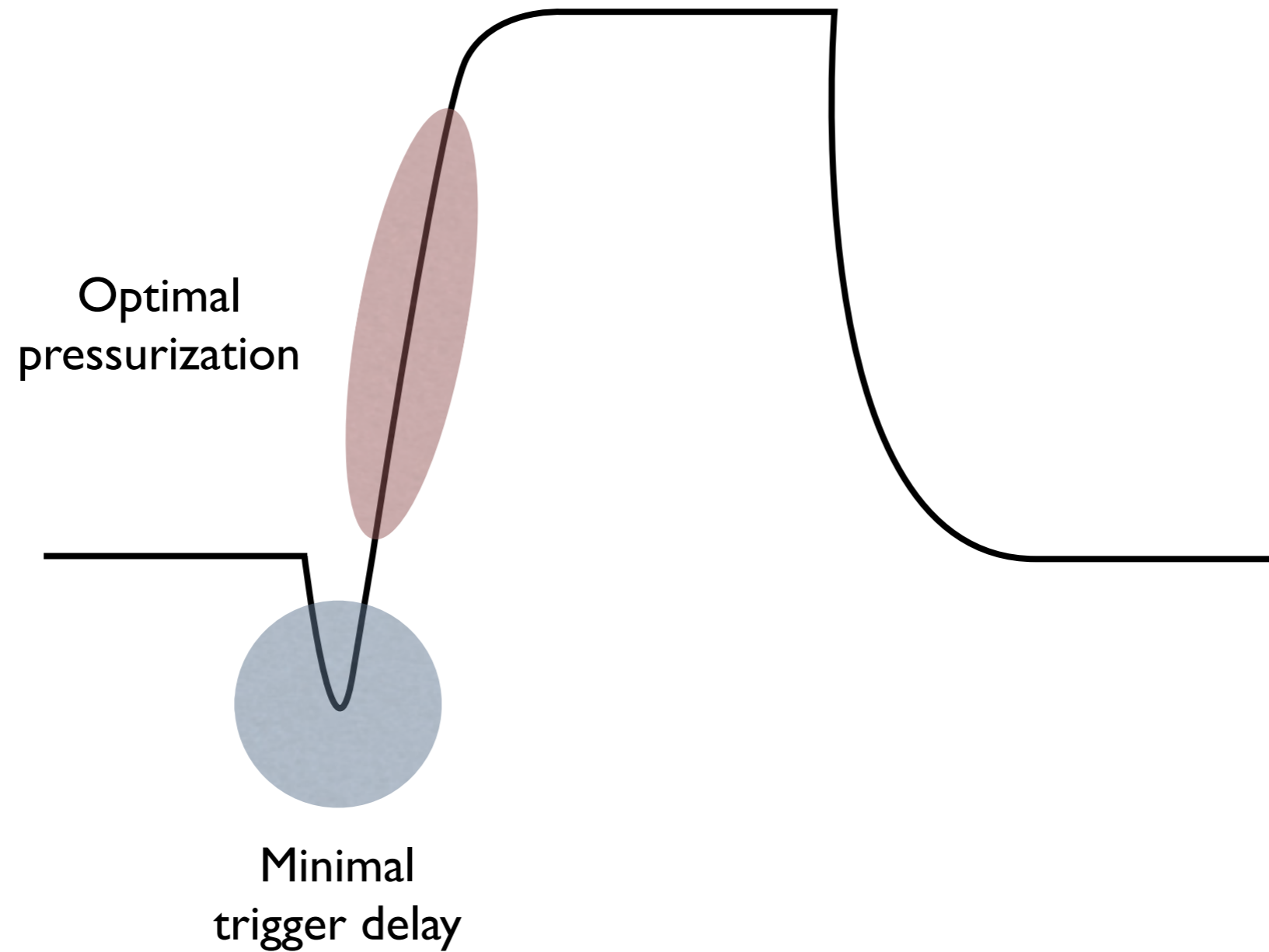


# Hoe stelt u PSV optimaal in?

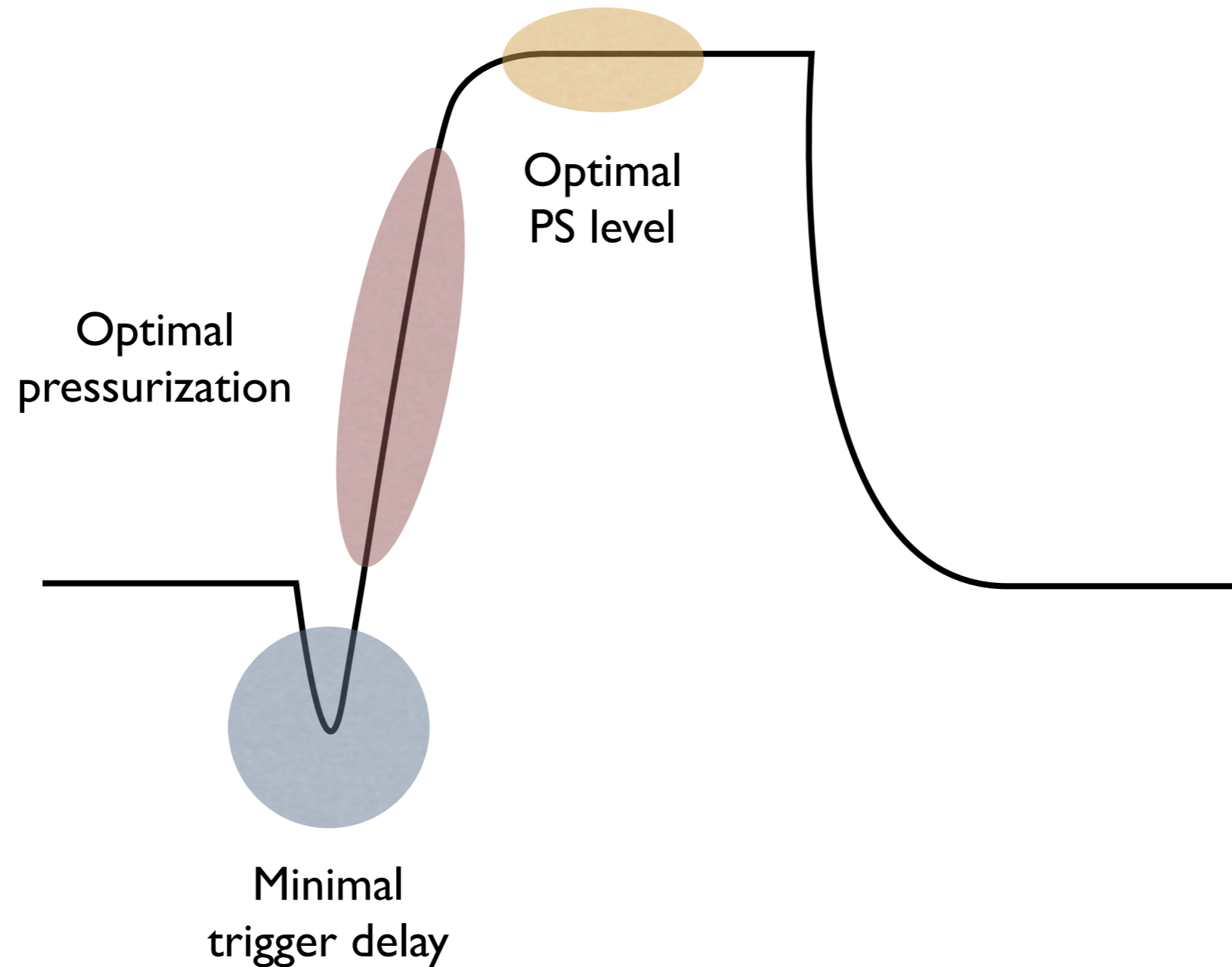


Minimal  
trigger delay

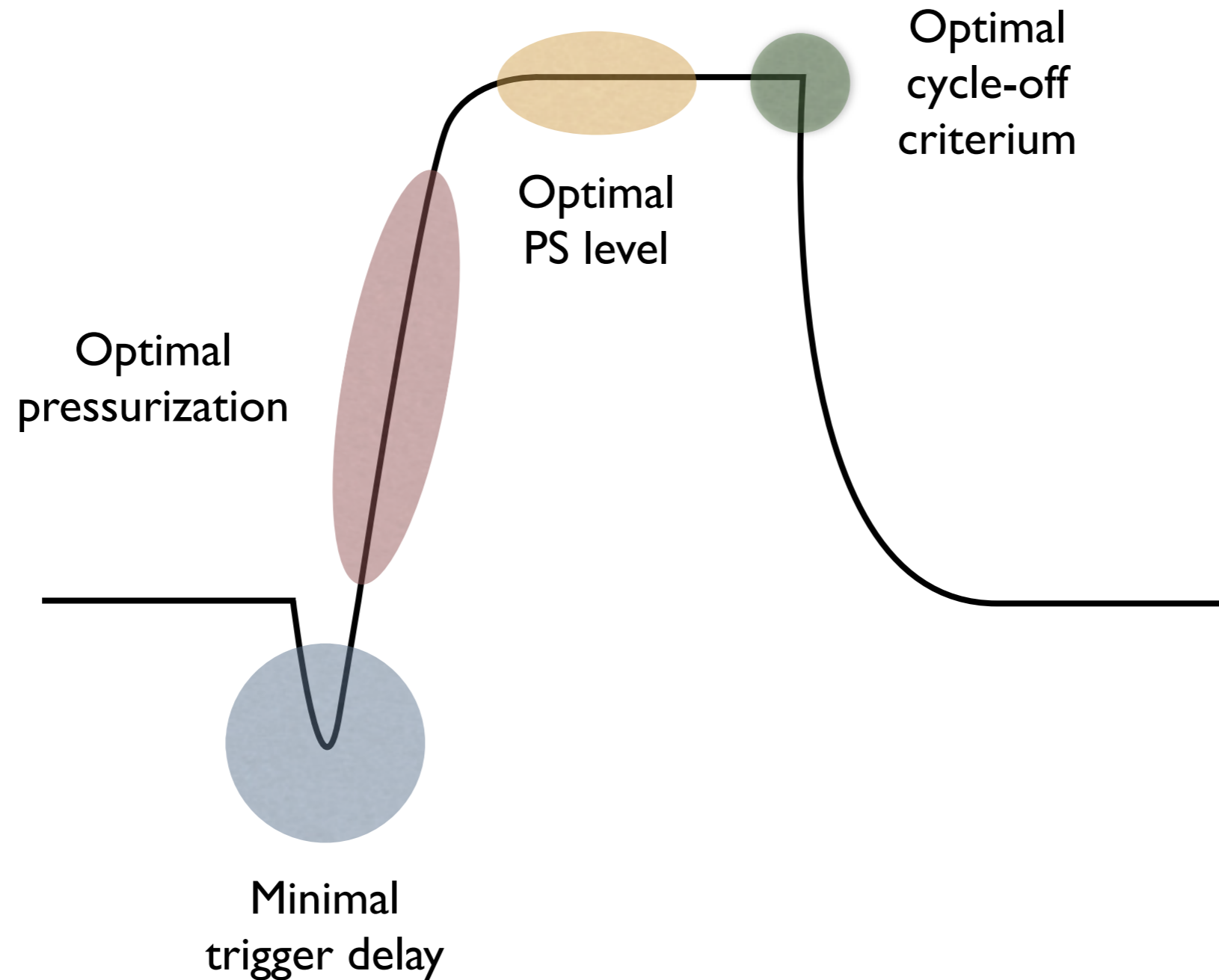
# Hoe stelt u PSV optimaal in?



# Hoe stelt u PSV optimaal in?



# Hoe stelt u PSV optimaal in?



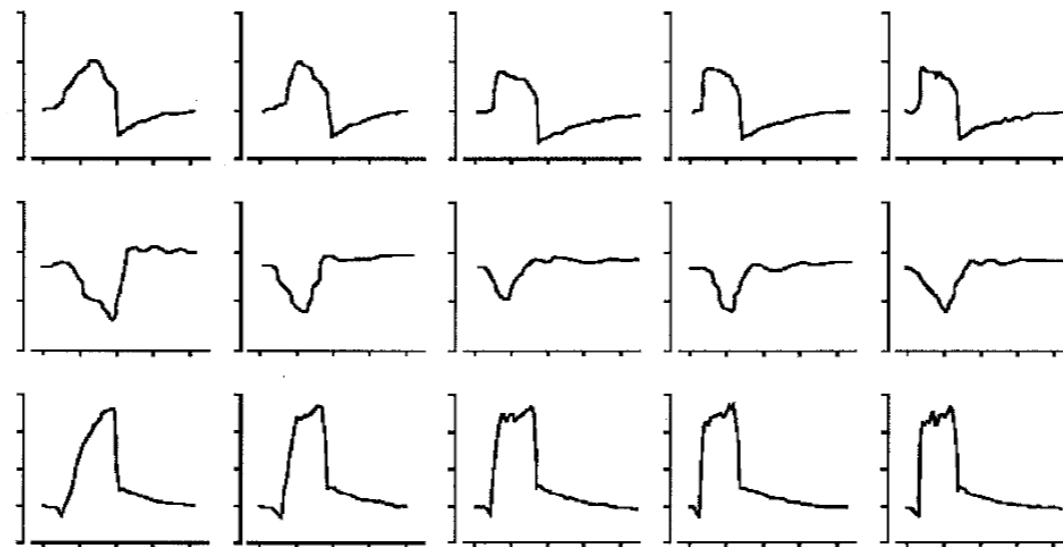
# Minimale trigger delay

Flow trigger met maximale sensitiviteit  
(tenzij “auto-cycling”)

Compenseer PEEP<sub>i</sub> met PEEP<sub>e</sub> op individuele basis

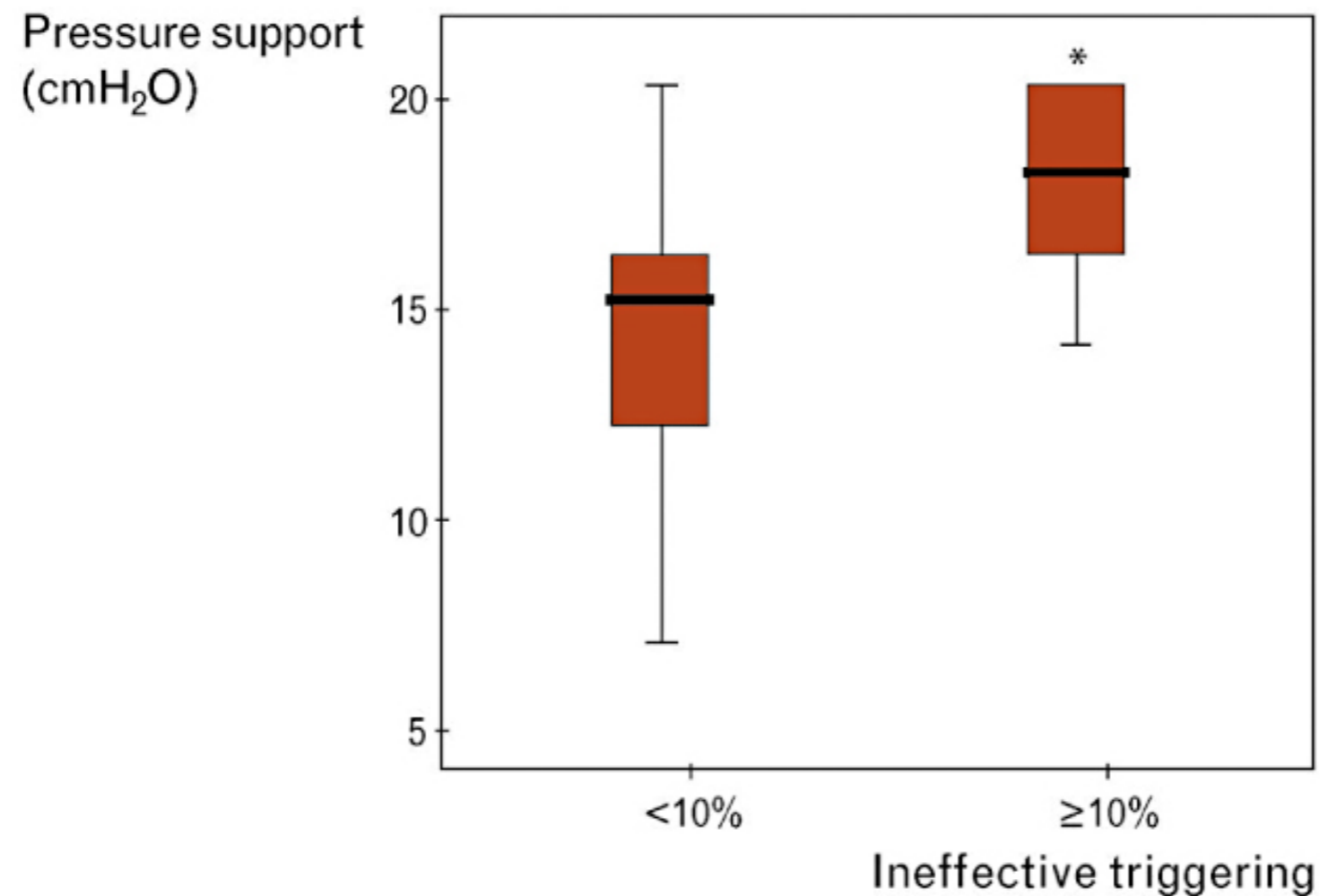
# Optimale druk opbouw

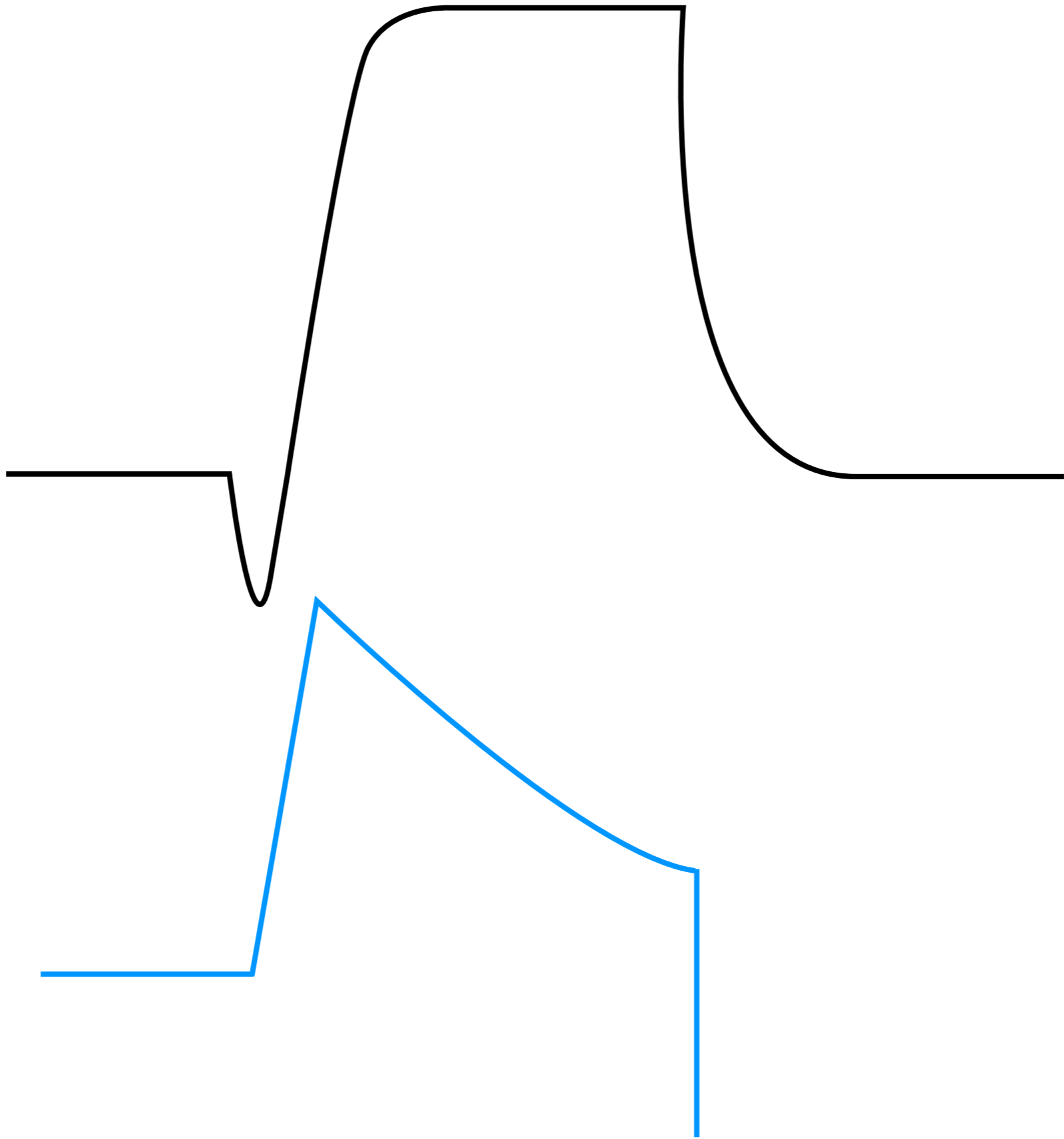
Literatuur duidt op laagste ademarbeid met snelste druk opbouw  
Individuele titratie lijkt echter noodzakelijk



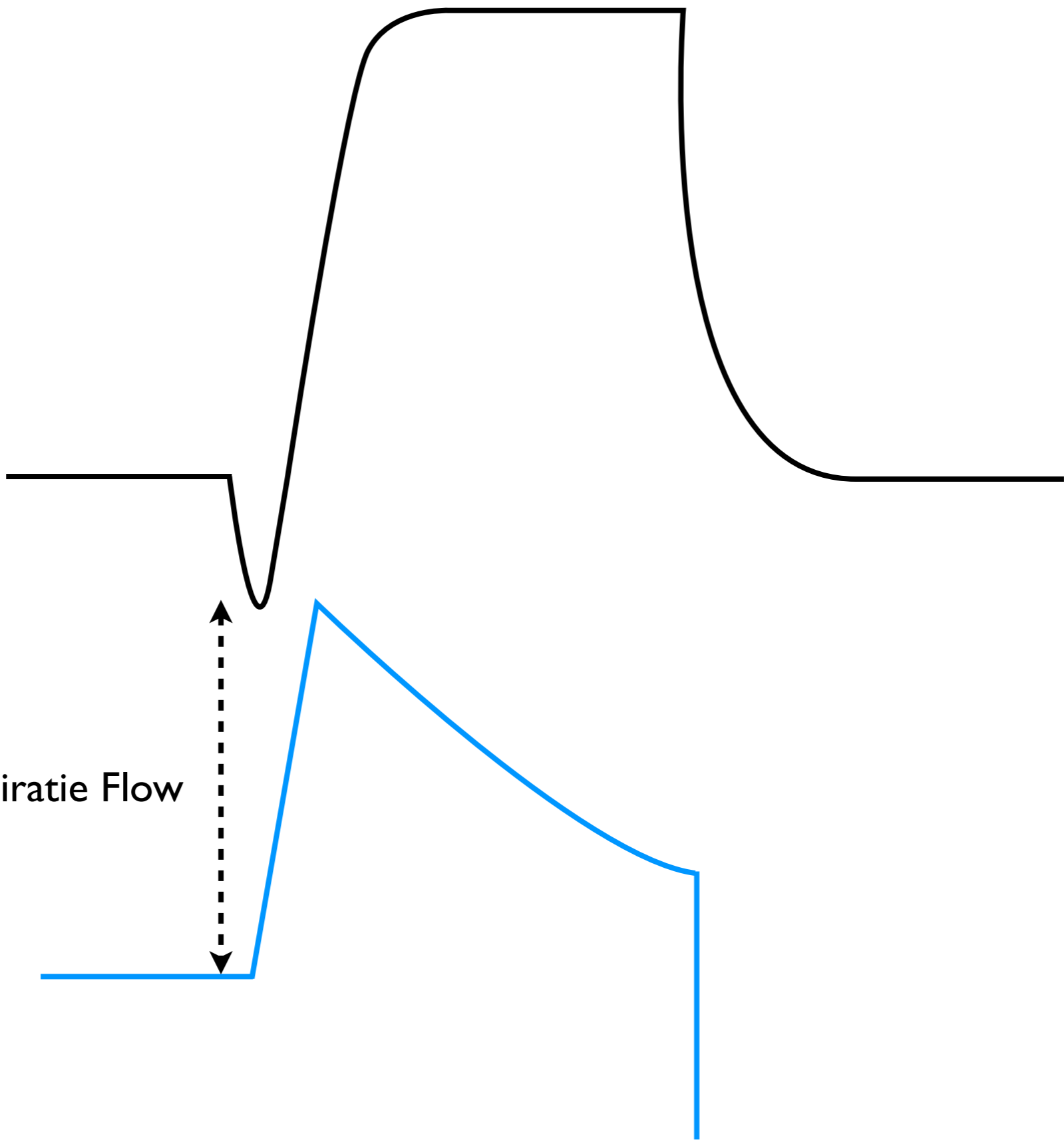
# Optimale PS niveau

Individuele titratie is noodzakelijk

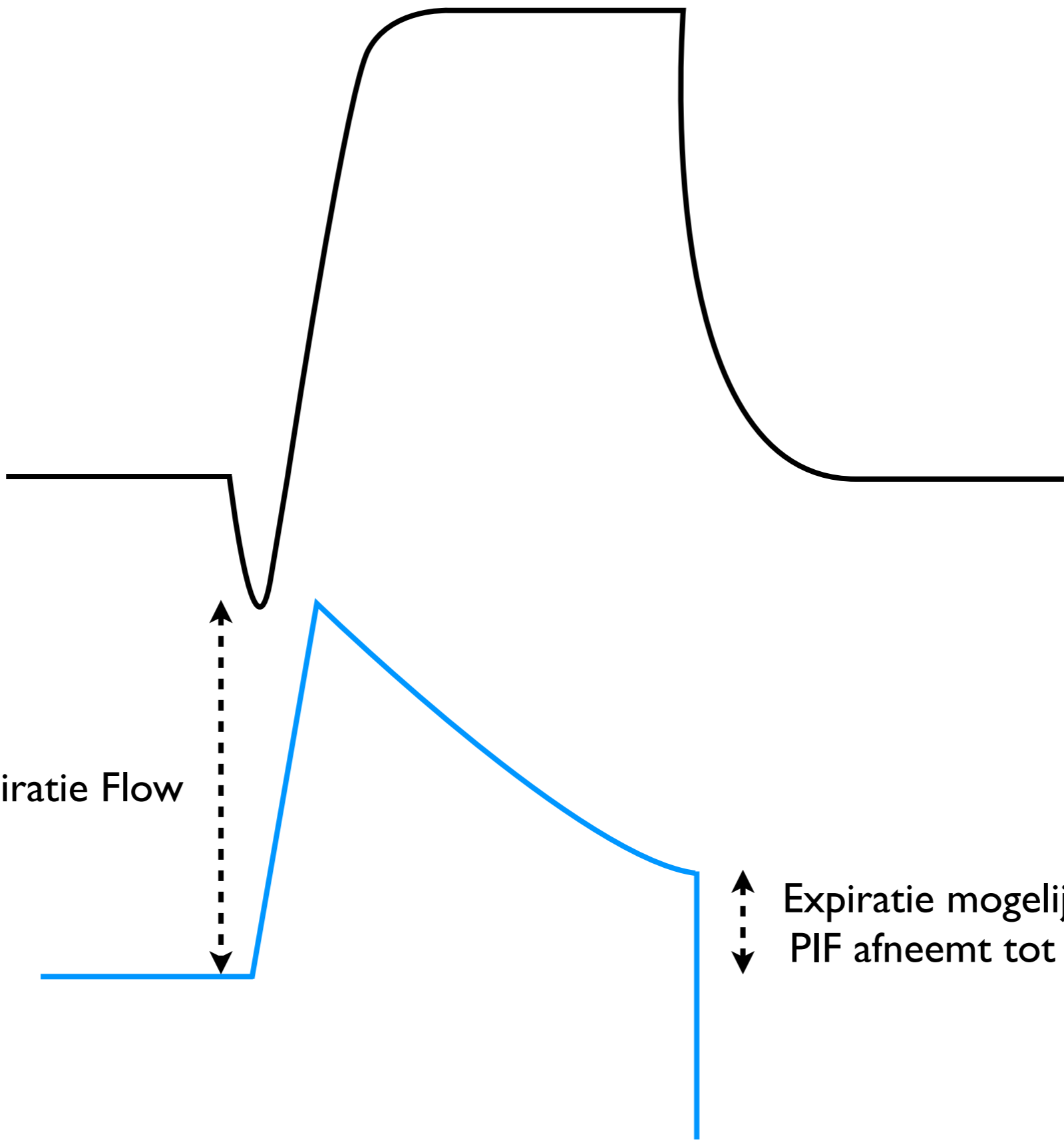




Piek Inspiratie Flow



Piek Inpiratie Flow



Expiratie mogelijk als  
PIF afneemt tot 30%

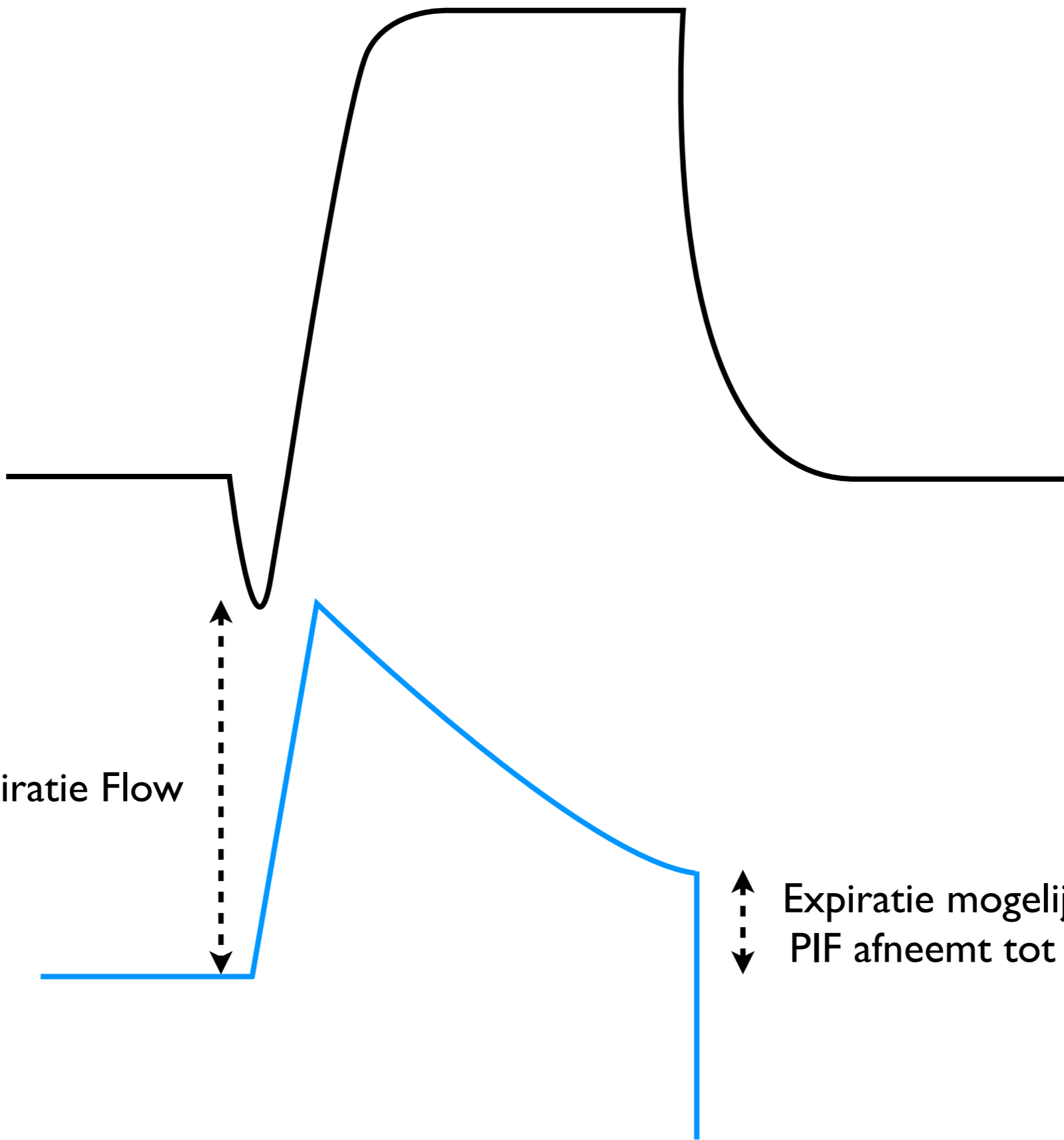
Hersenen willen expireren



Piek Inspiratie Flow

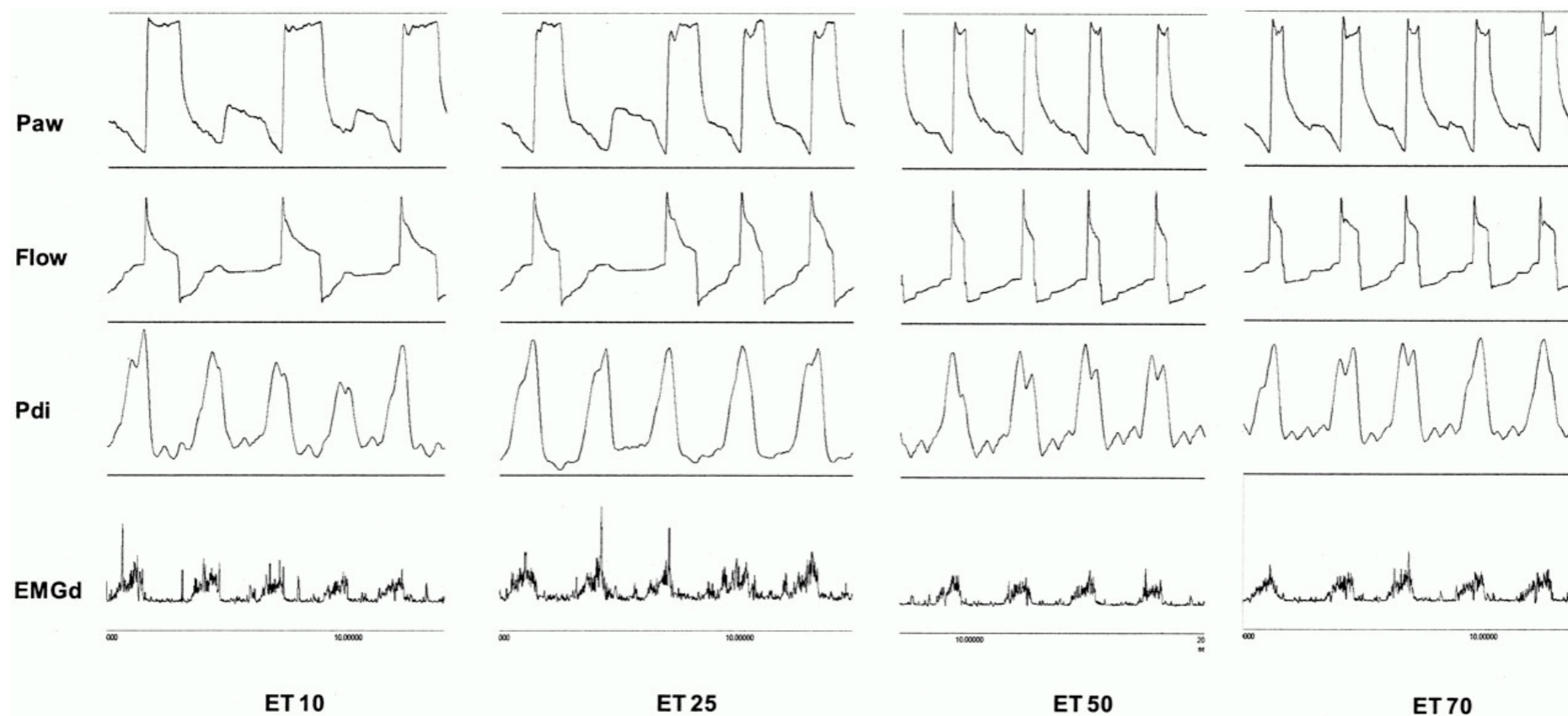


Expiratie mogelijk als  
PIF afneemt tot 30%

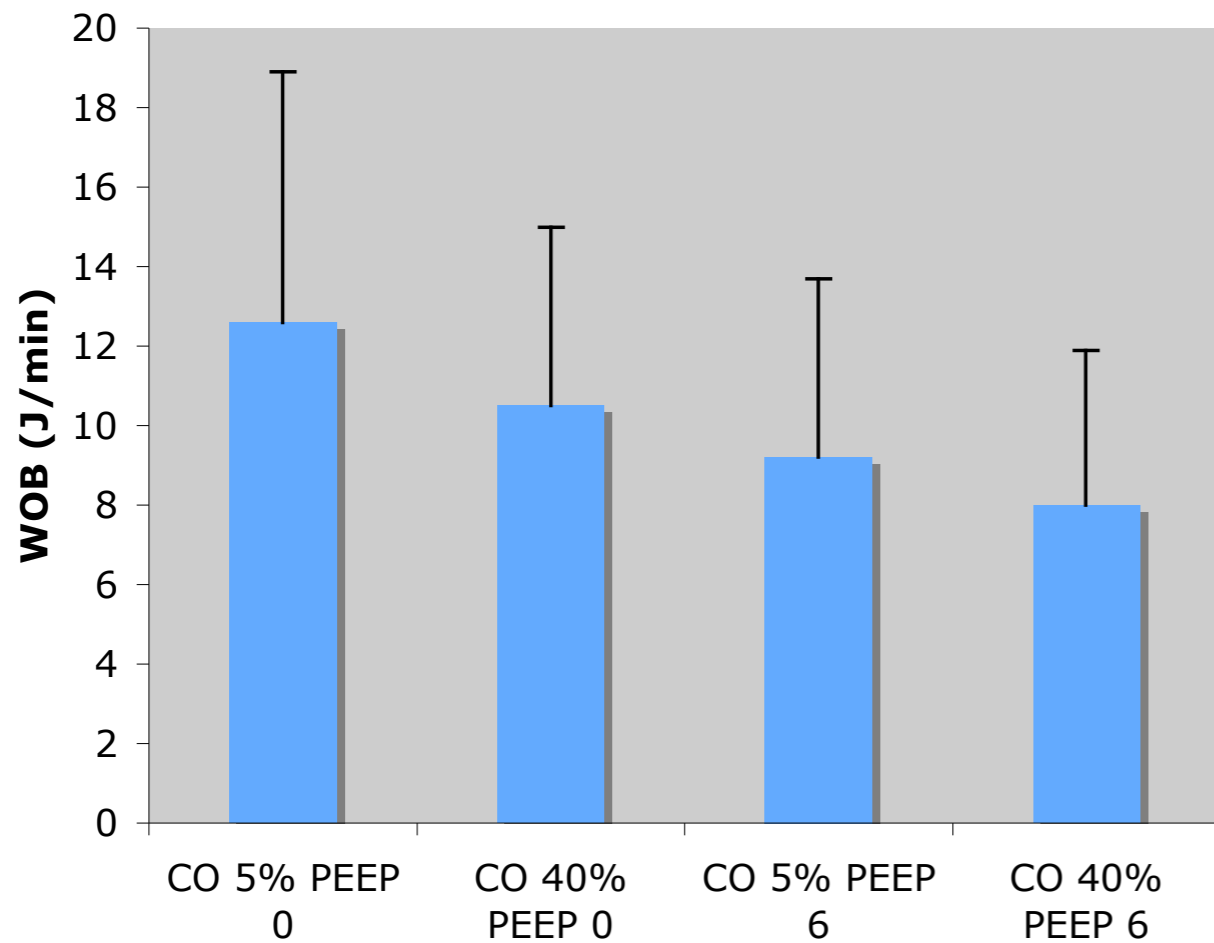


# Optimale cycle-off criterium

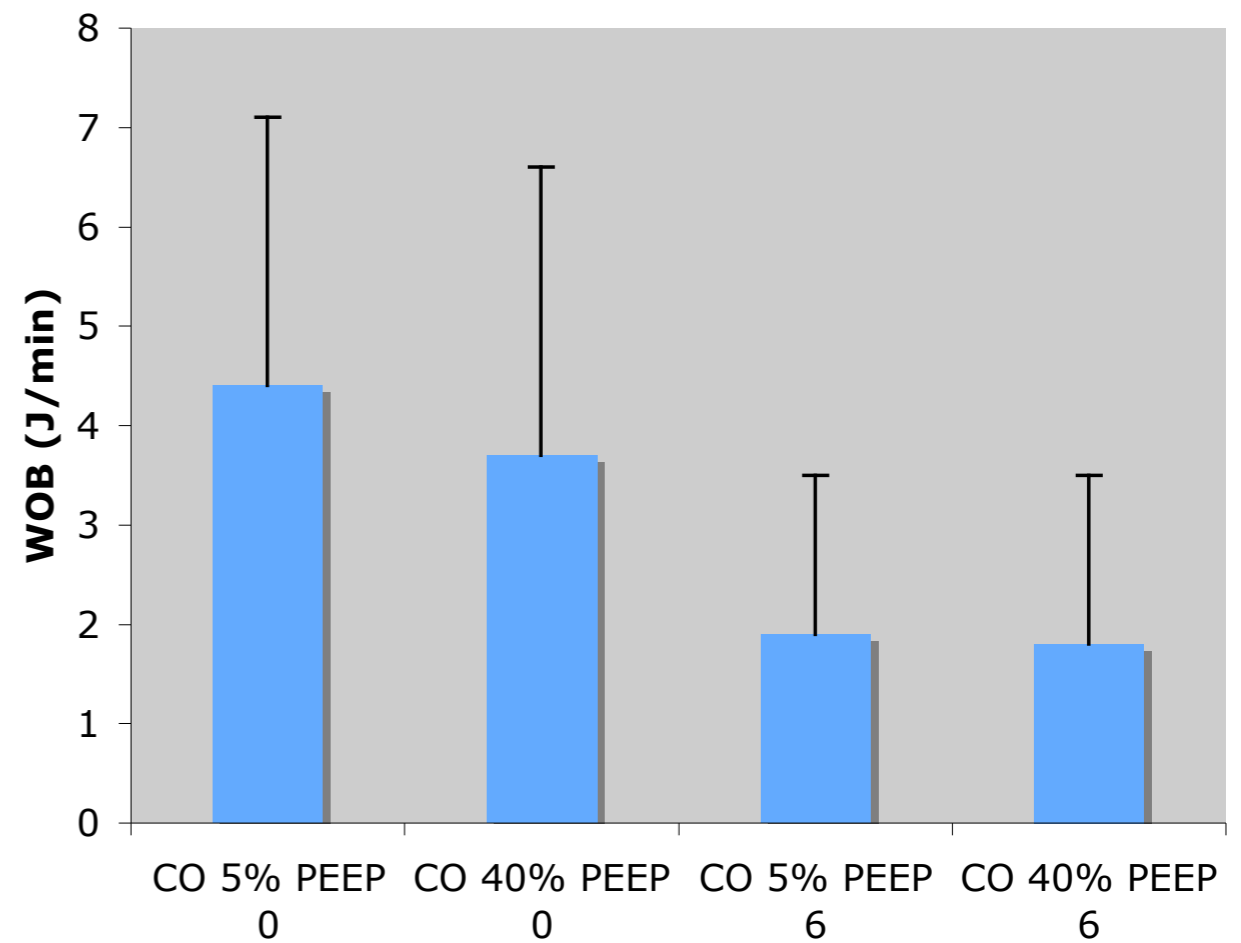
Individuele titratie maar hoog percentage in obstructieve longziekte



# Toename “cycle off” criterium



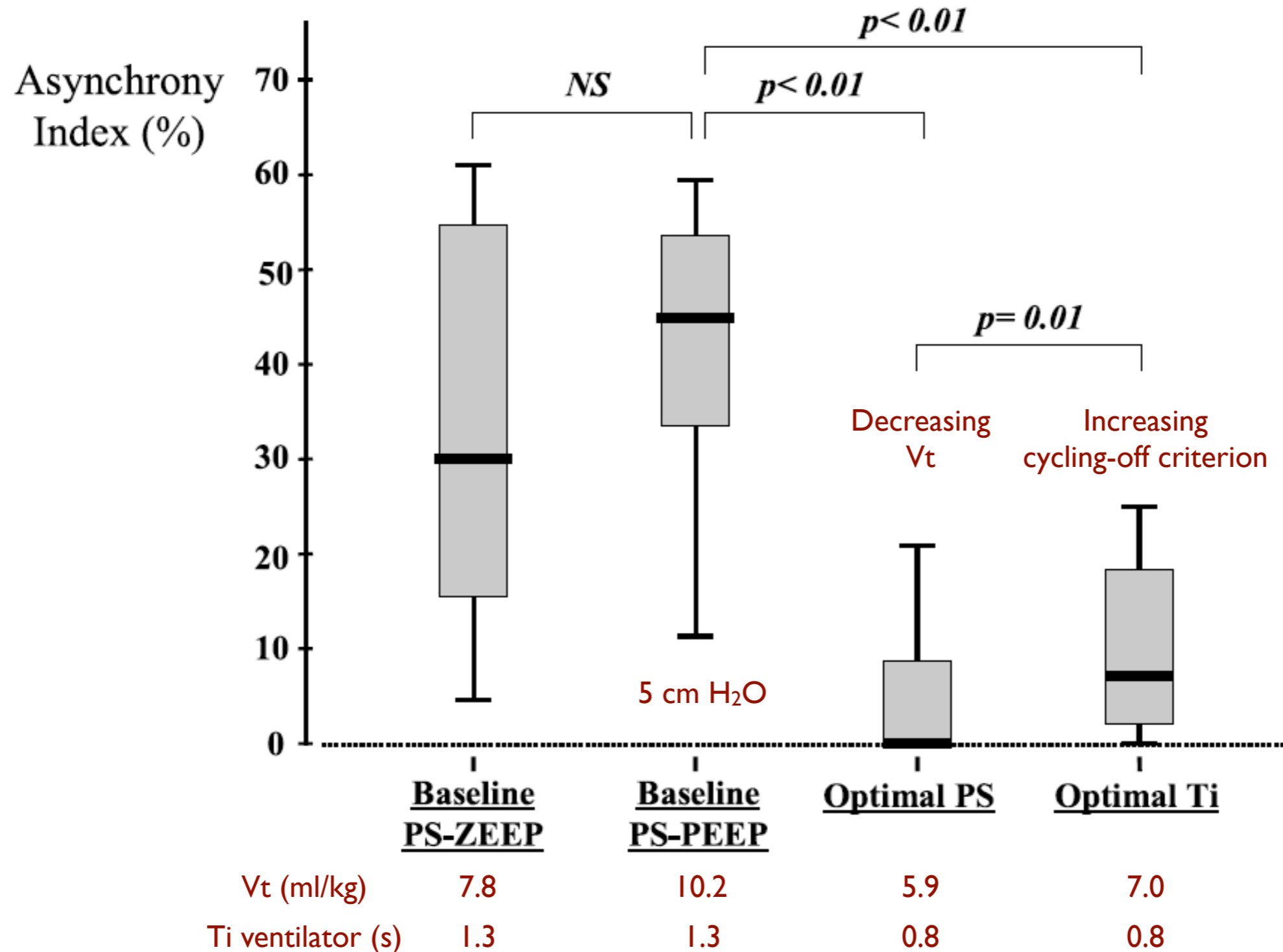
PSV 5 cm H<sub>2</sub>O

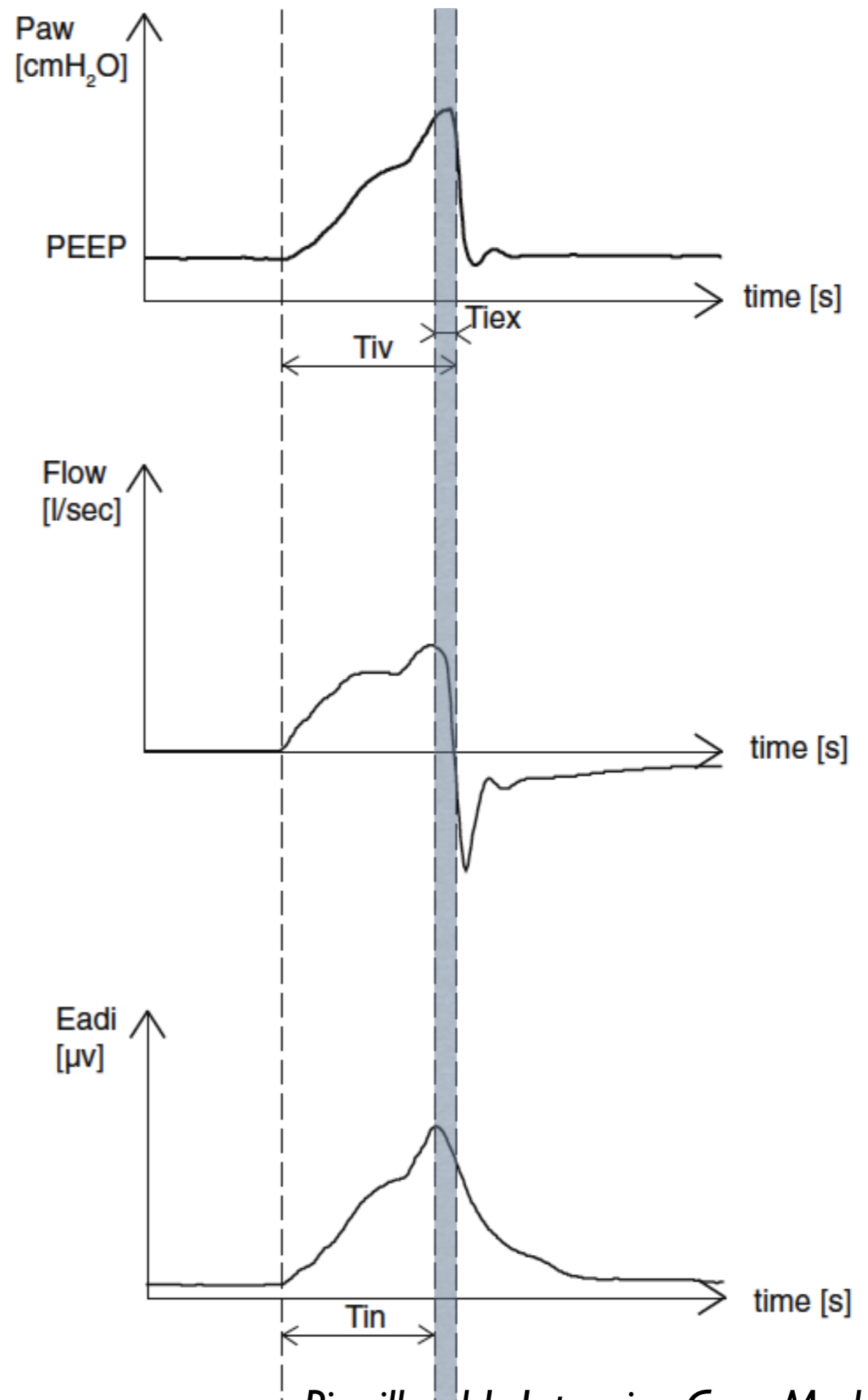
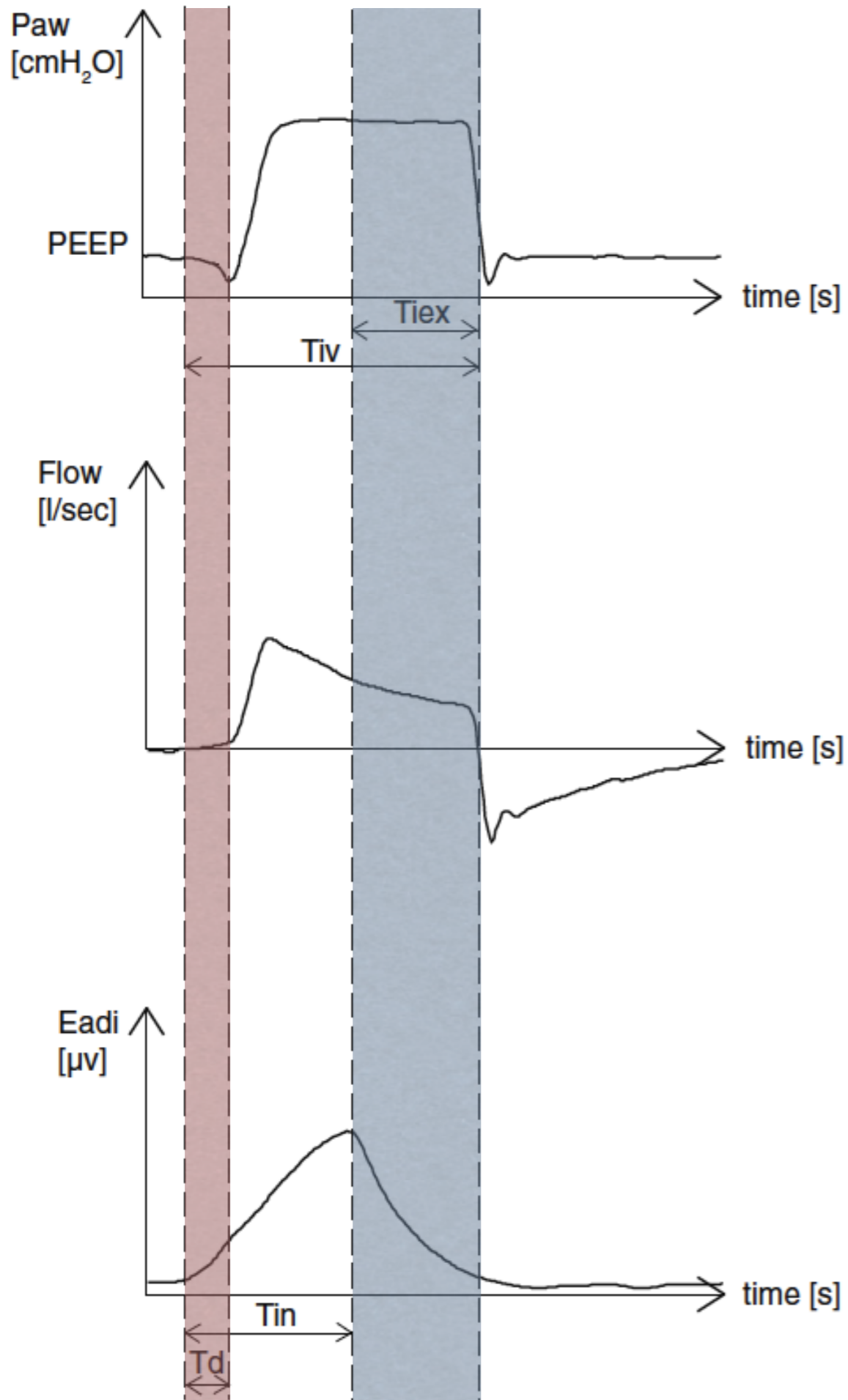


PSV 15 cm H<sub>2</sub>O

*Chiumello D. Crit Care Med 2007;35:2547-2552*

# De oplossingen

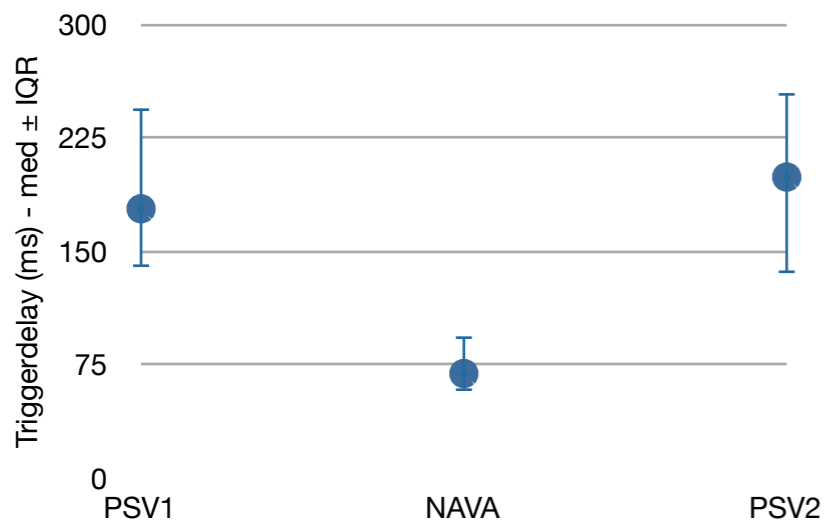




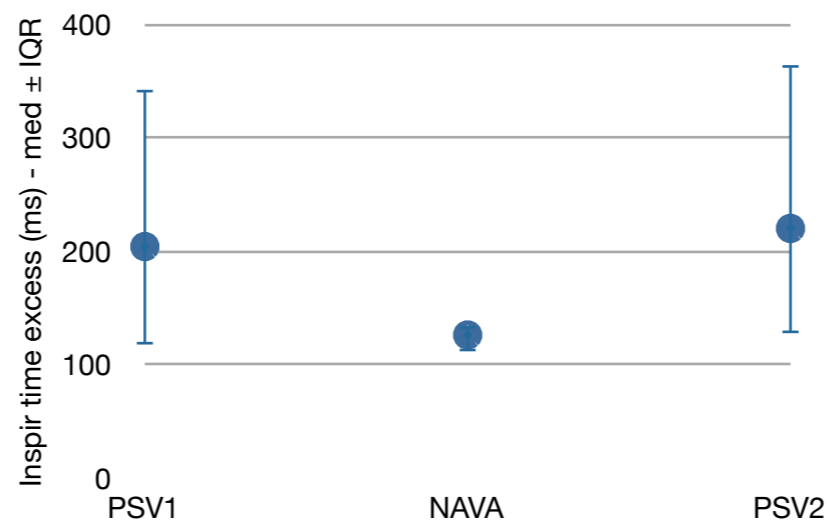
*Piquilloud L. Intensive Care Med 2010*

# NAVA versus PSV

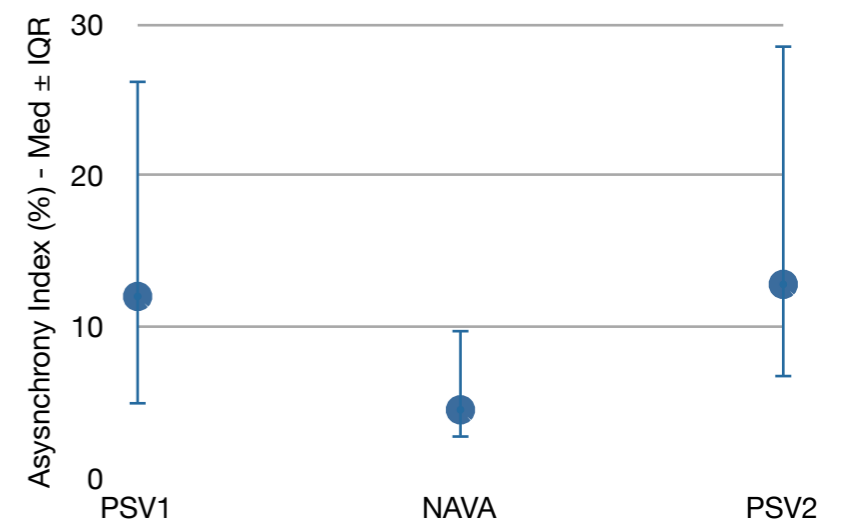
< 0.001



0.016

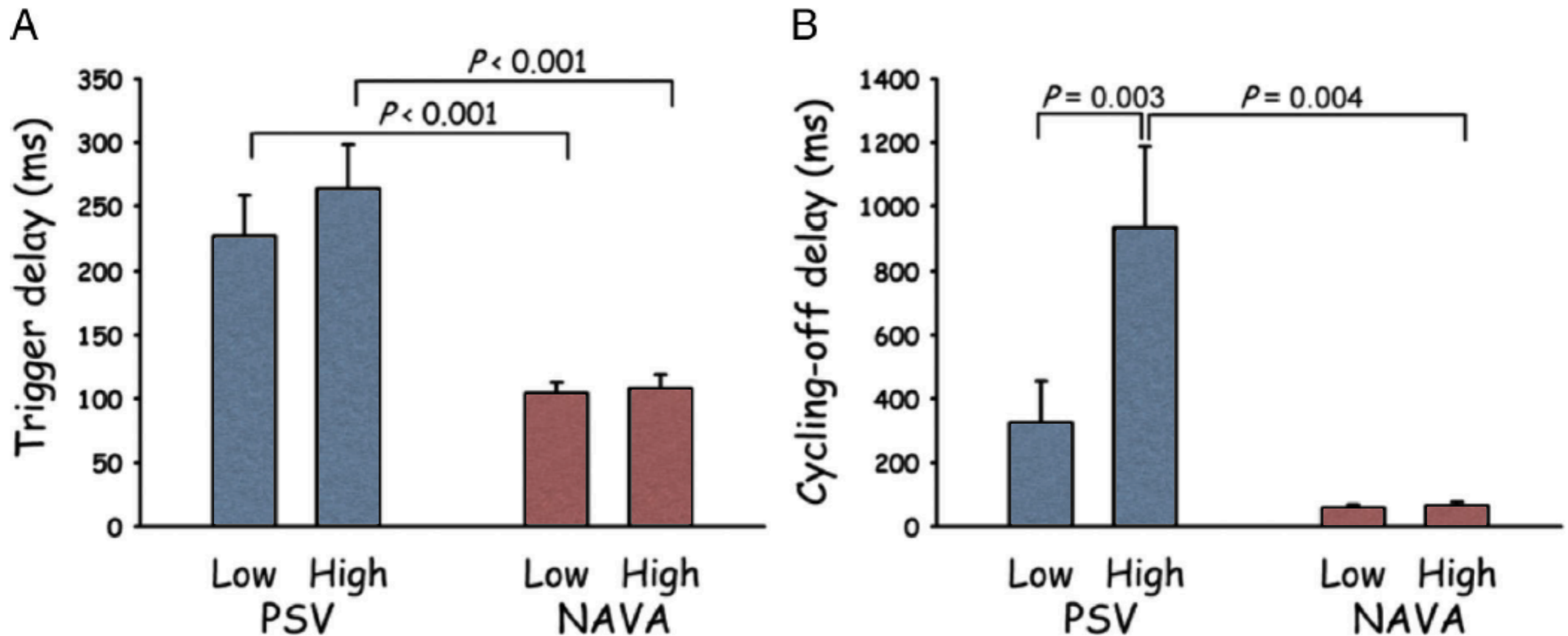


0.016



Total asynchronies ( <i>n</i> /min)	3.15	1.18–6.40	1.21	0.54–3.36	3.04	1.22–5.31	0.032
Ineffective efforts ( <i>n</i> /min)	0.81	0.02–1.92	0.00	0.00–0.00	0.67	0.11–1.70	<0.001
Late cycling ( <i>n</i> /min)	0.12	0–0.63	0.00	0.00–0.00	0.09	0.0–1.15	<0.001
Double triggering ( <i>n</i> /min)	0.00	0.00–0.04	0.78	0.46–2.42	0.00	0.00–0.00	<0.001
Premature cycling ( <i>n</i> /min)	0.14	0.00–0.41	0.00	0.00–0.00	0.00	0.00–0.48	<0.001
Autotriggering ( <i>n</i> /min)	0.14	0.00–0.65	0.09	0.00–0.74	0.09	0.00–0.69	0.555

# NAVA en trigger delay bij COPD



# Patiënt (5)

- Compleet herstel
- Extubatie volgende dag