UMC St Radboud

Workshop beademing astma/COPD

J.G. van der Hoeven

NVIC Mechanische Beademingsdagen 2010

Patiënt (1)

- 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
  - Onmiddelijke intubatie
  - Geen hoorbaar ademgeruis
  - Sinus tachycardie 140 per minuut - RR 70/40 mm Hg
  - E1,M1,Vtube

Medicatie?

Medicatie?

- O_2
- Inhalatie β_2-mimetica (of intraveneus)
- Inhalatie anticholinergica
- Corticosteroïden
- Sedatie + analgesie ± spier relaxans?
- (theophylline, magnesiumsulfaat, ketamine)

Wat wil je nu eerst weten?

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- pH 7.01
- PaCO2 71 mm Hg
- PaO2 321 mm Hg
- BE - 13.3 mEq/l
- Lactate 9.2 mmol/l
- Trachea aspiraat kweek (-)

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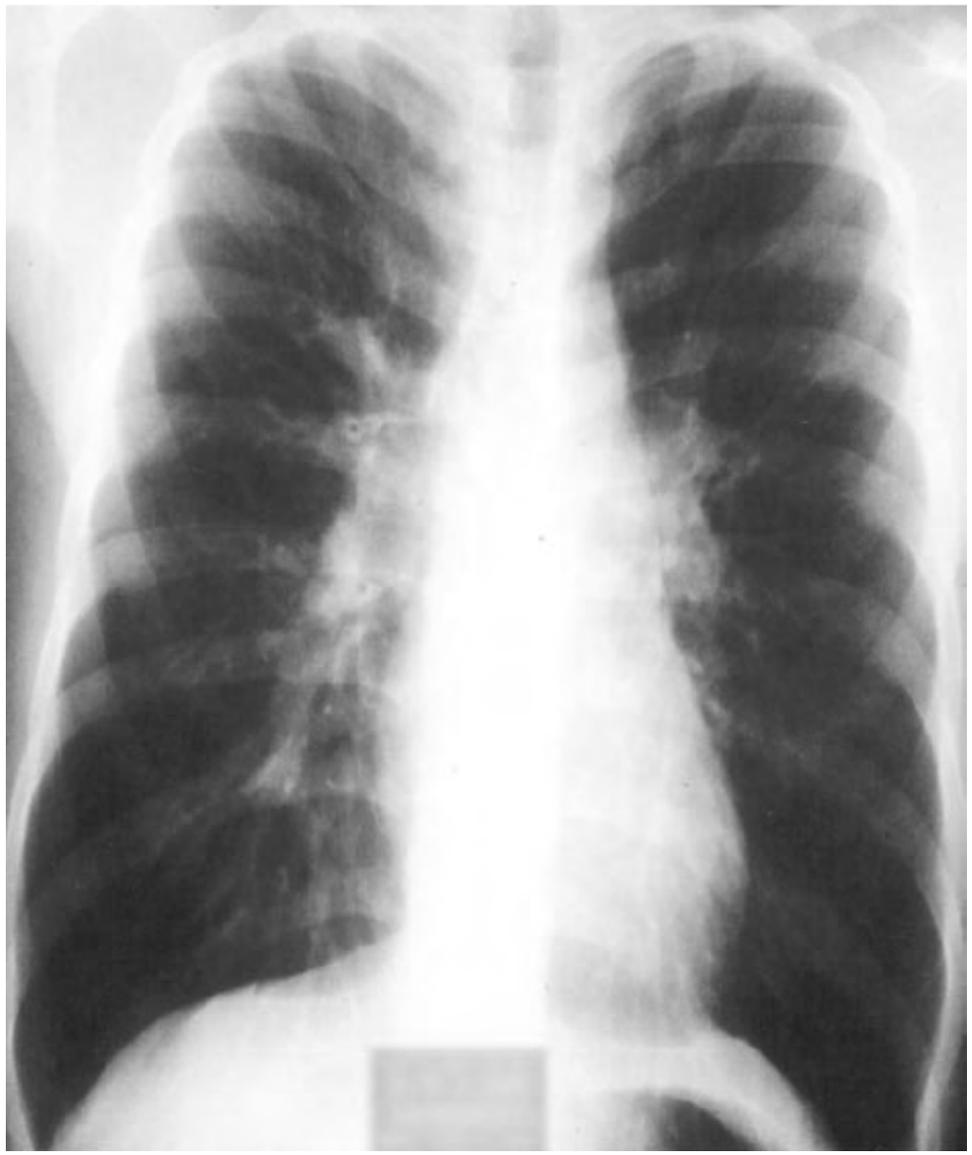


Uw instellingen?

Rodrigo GJ. Chest 2004

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

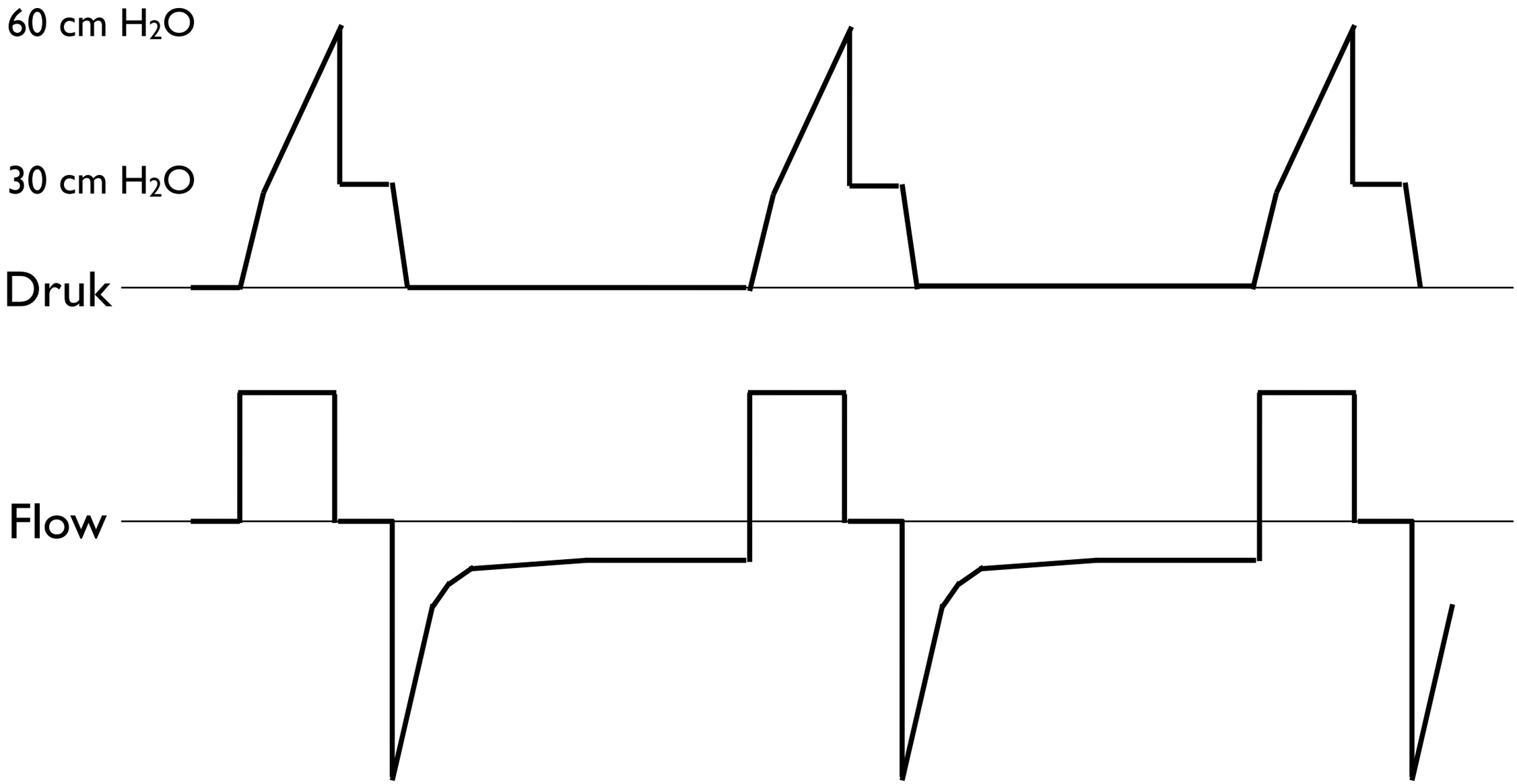
Rodrigo GJ. Chest 2004

60 cm H_2O

30 cm H_2O

Druk

Flow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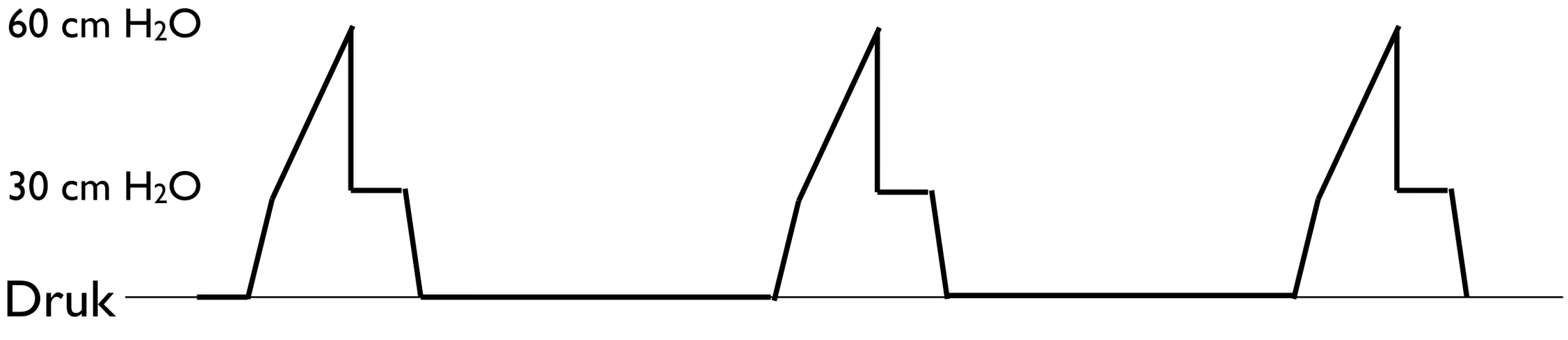

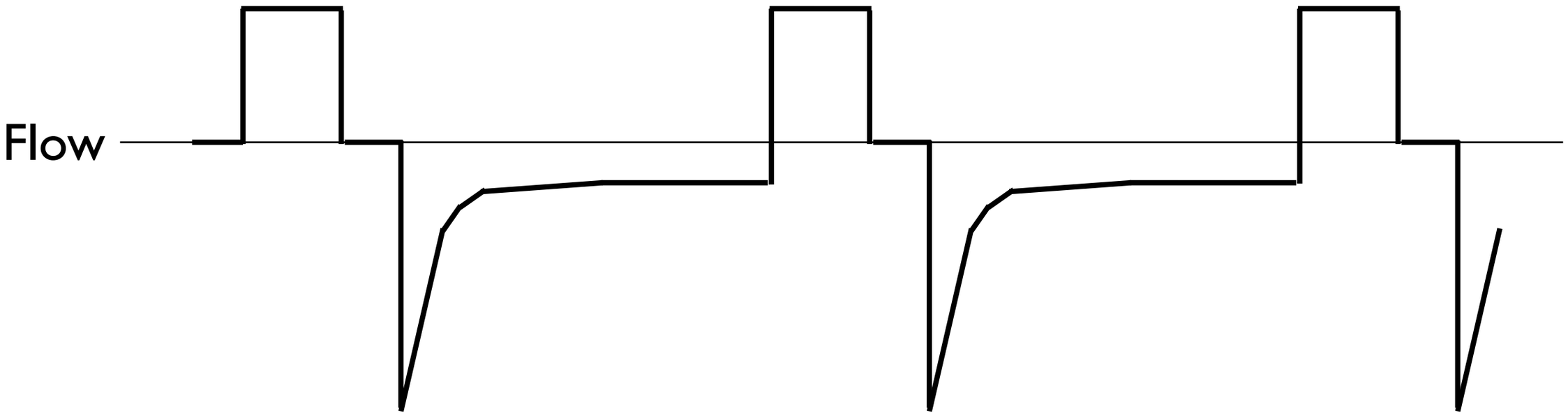

Wat ziet u hier. Kan er nog wat verbeterd worden?

Hoeveel autoPEEP accepteert U?

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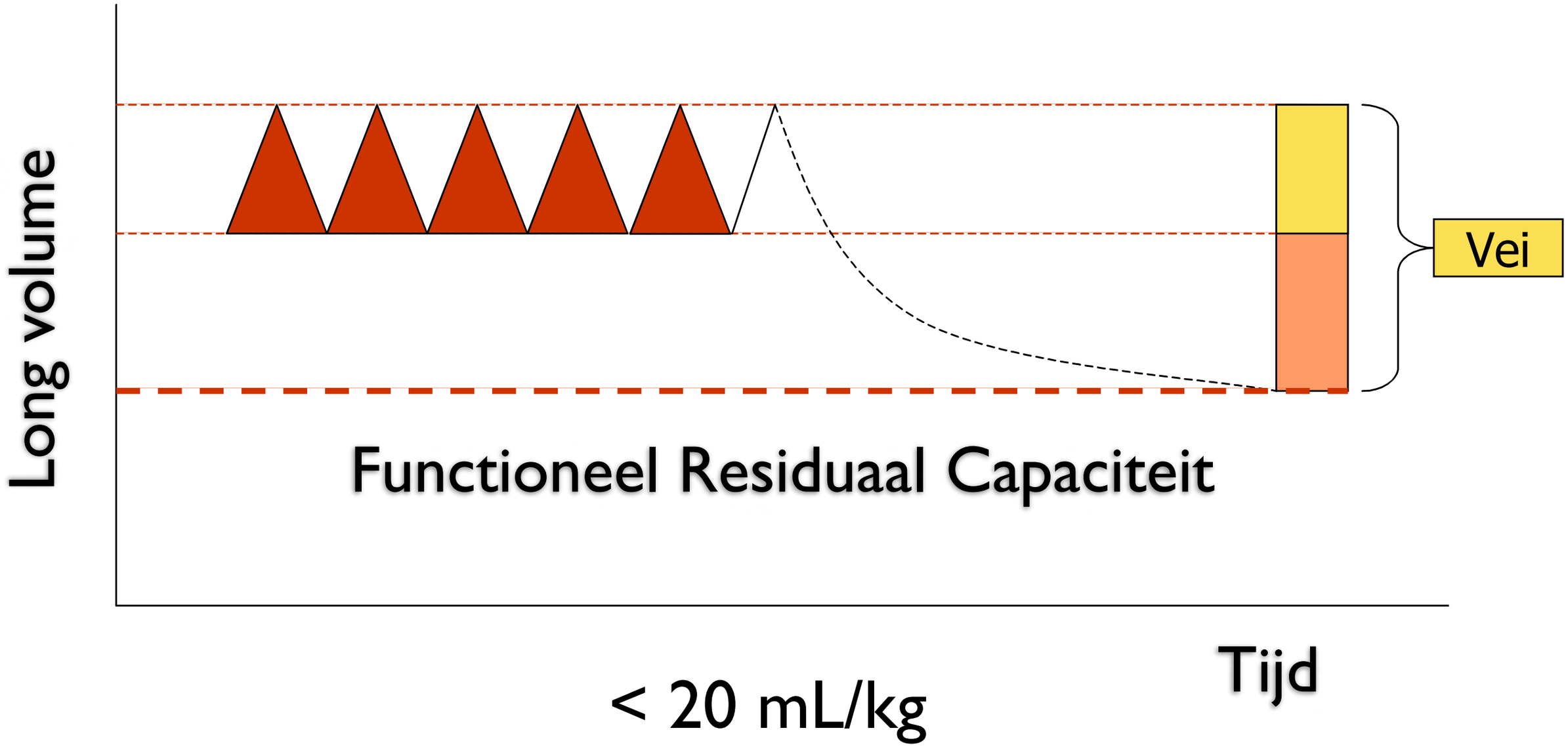


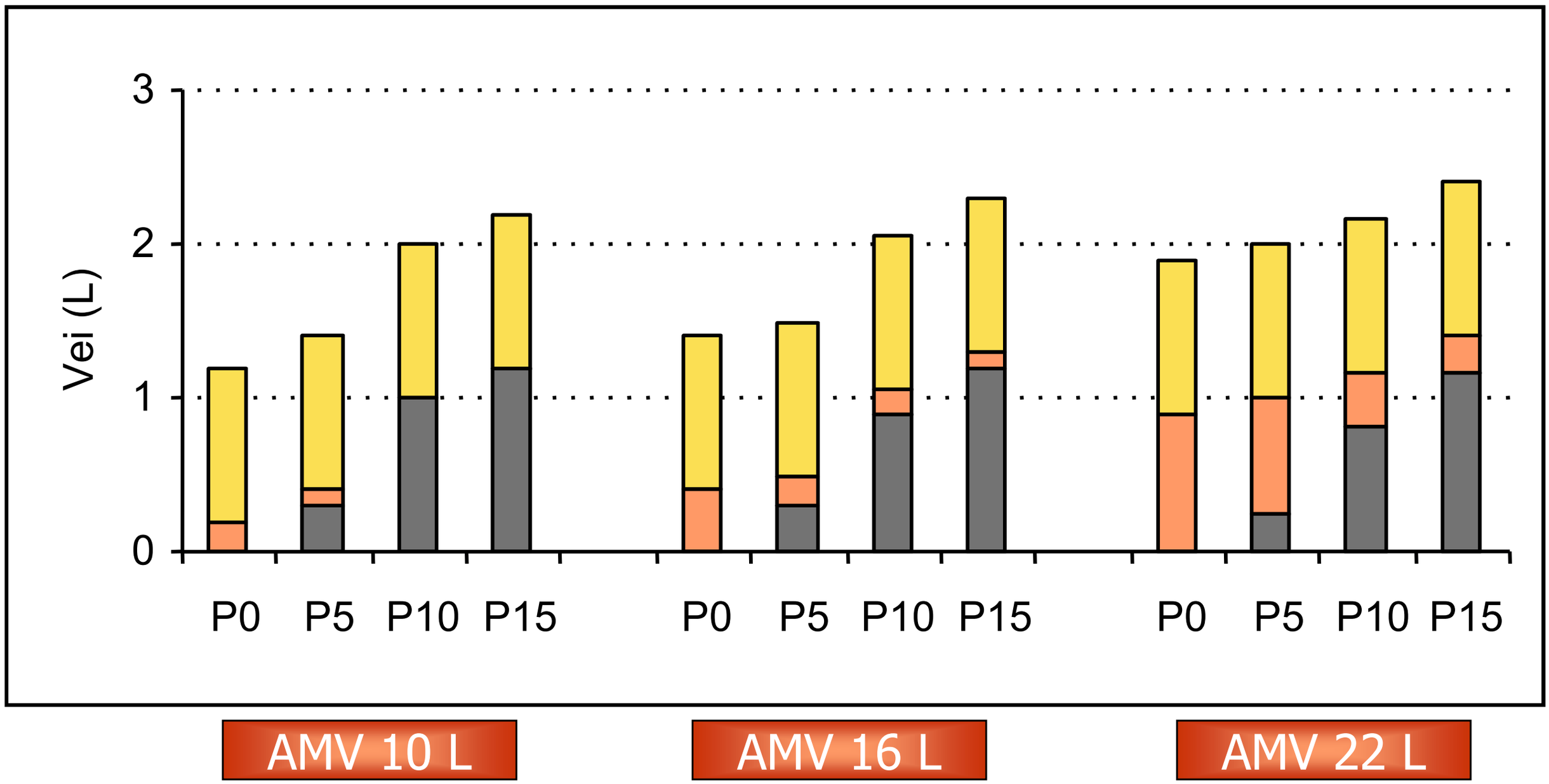
< 20 mL/kg

Alternatief

$$\frac{\text{Pplat} \times \text{teugvolume}}{\text{Pplat - PEEPi}}$$

- $PEEP_i$ (< 10 cm H_2O)
- Plateau druk (< 30 cm H_2O)

$PEEP_e$ en hyperinflatie



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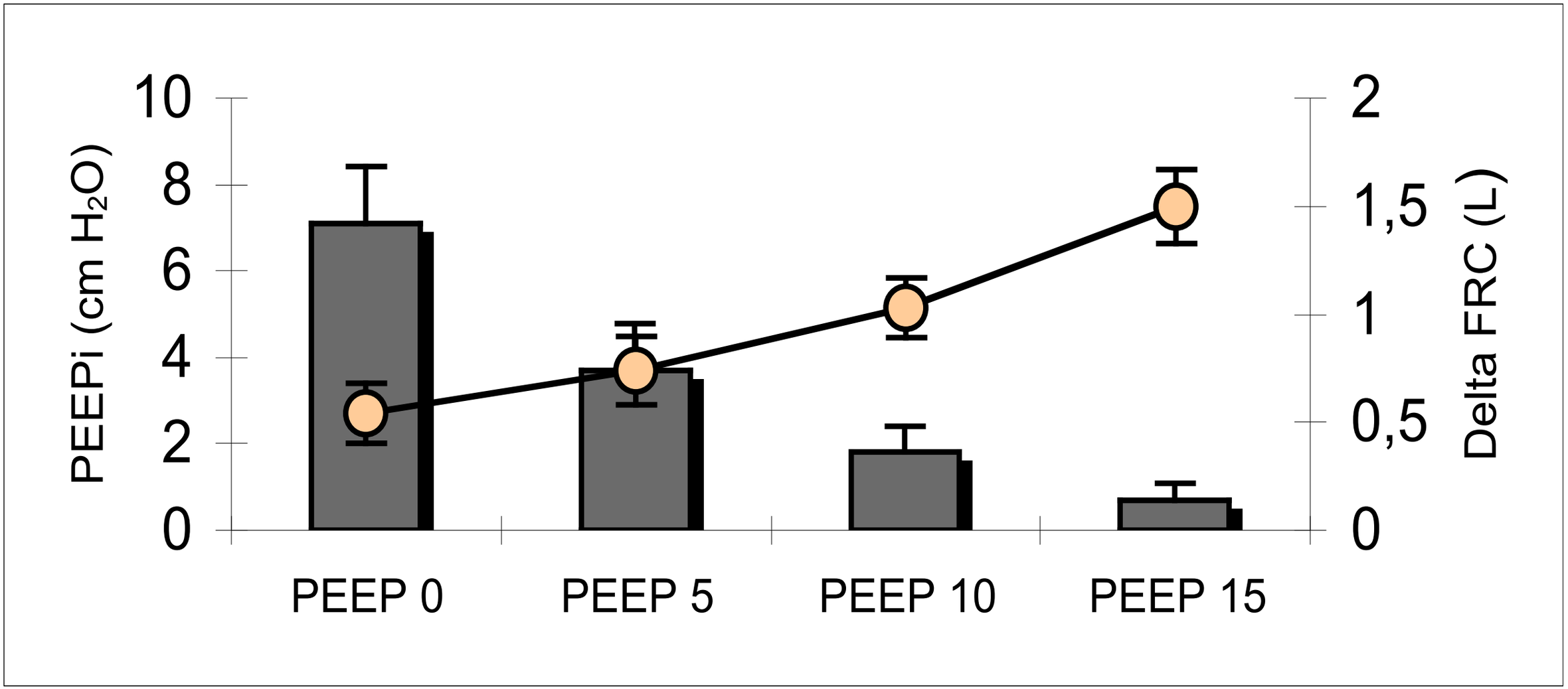

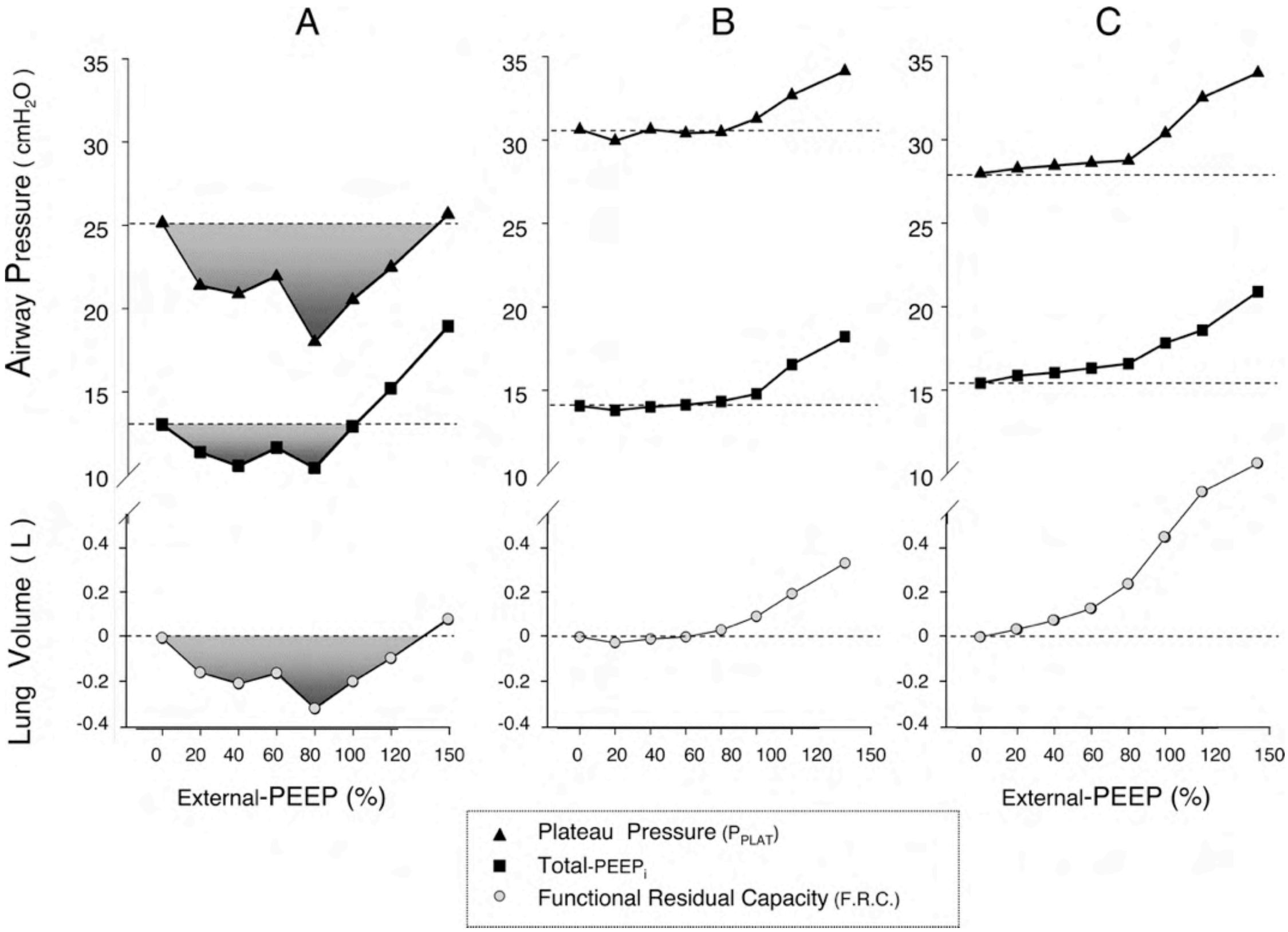

Paradoxaal

Bifasisch

Klassiek

Patiënt (3)

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

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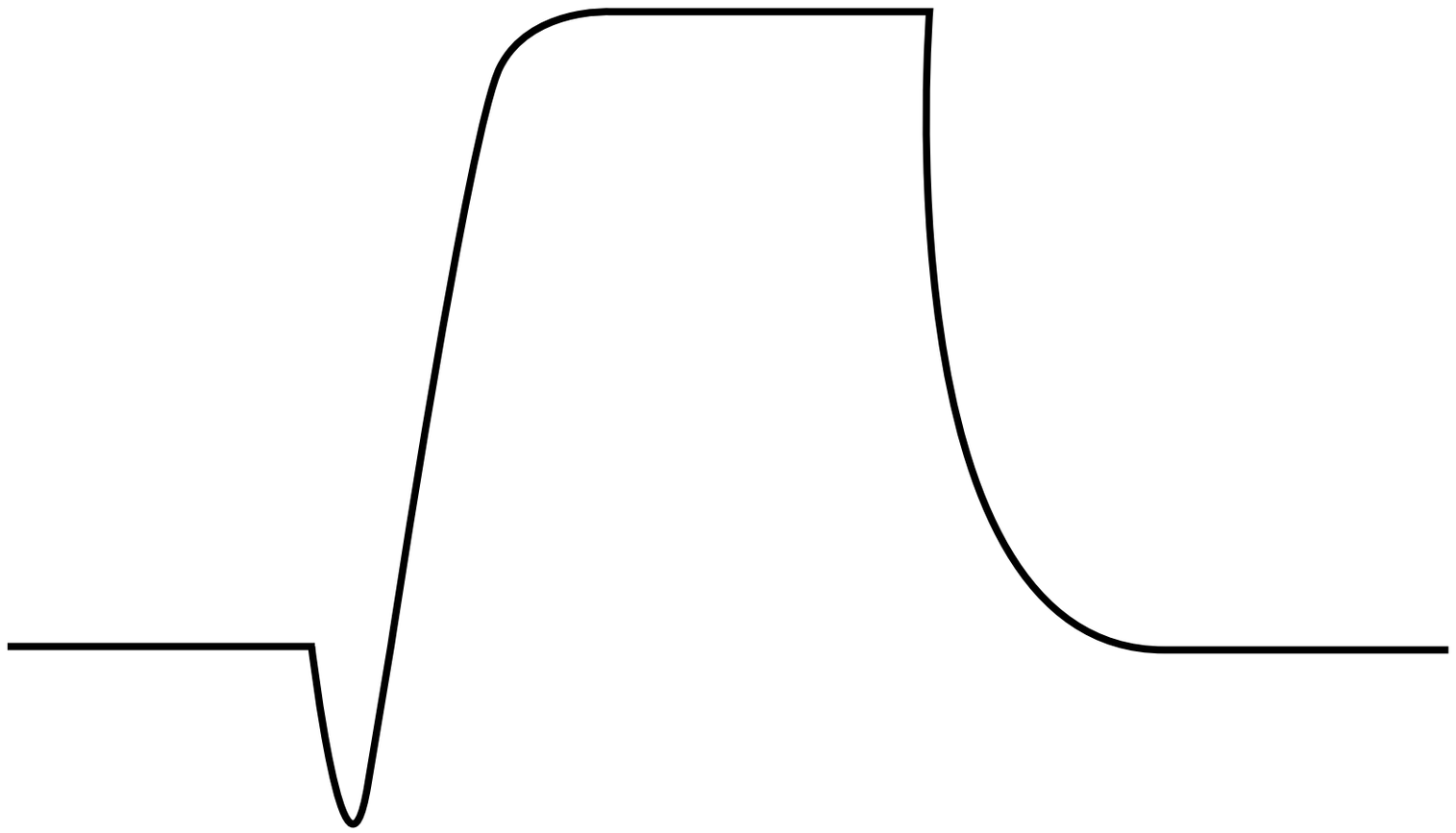
Welke problemen verwacht u?
Hoe lost u ze op?

Hoe stelt u PSV optimaal in?



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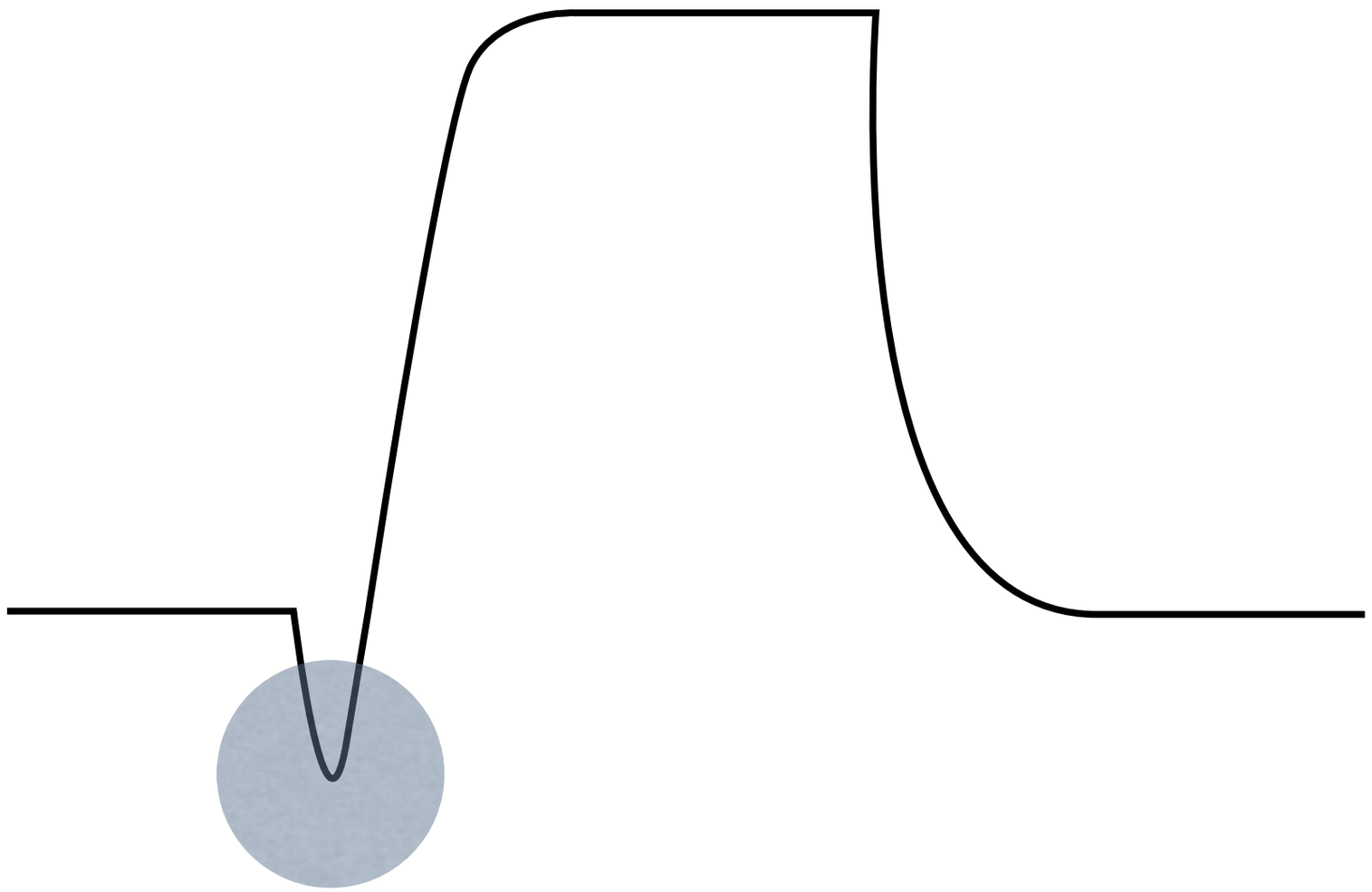
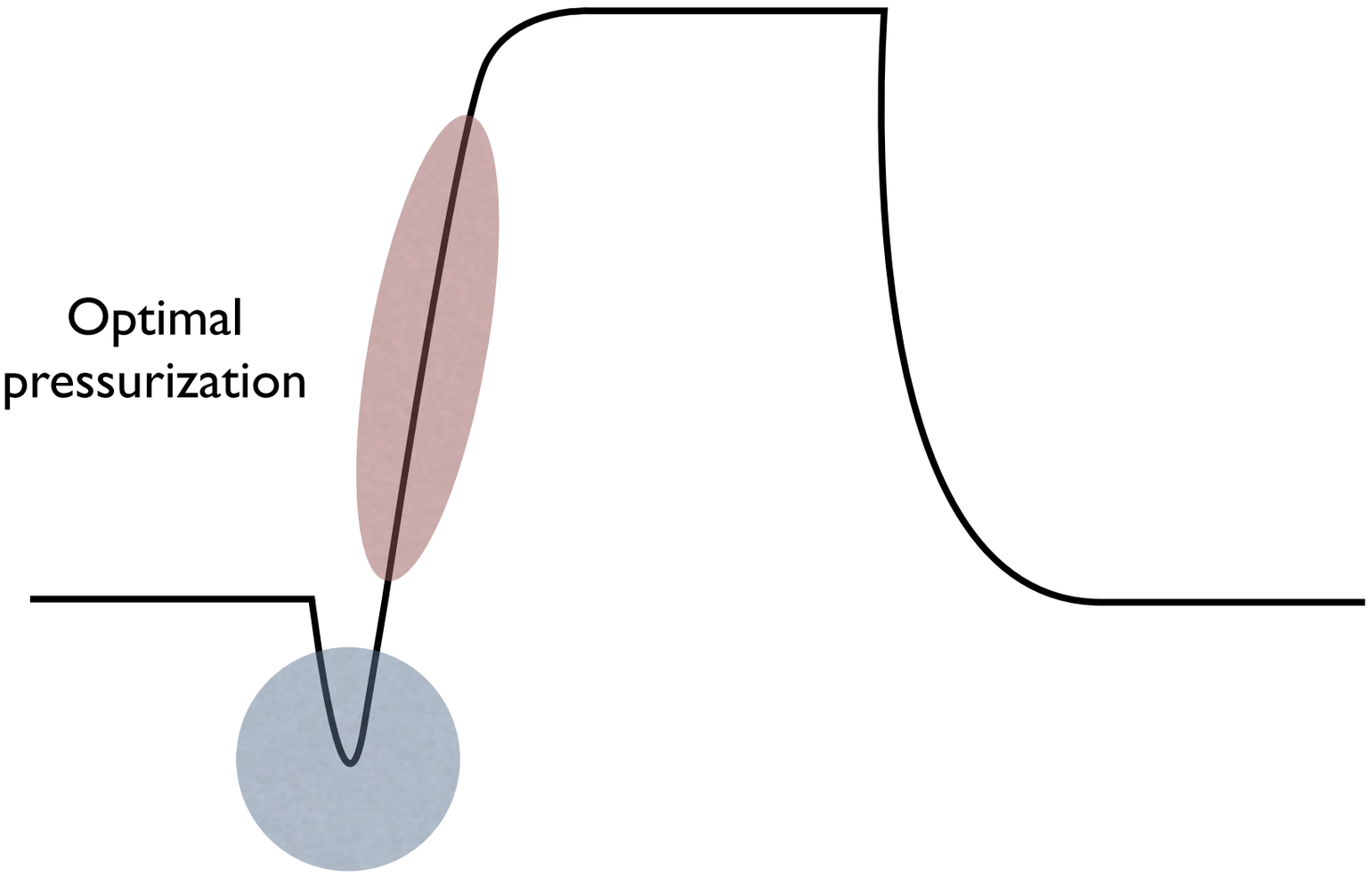


Minimal
trigger delay

Hoe stelt u PSV optimaal in?



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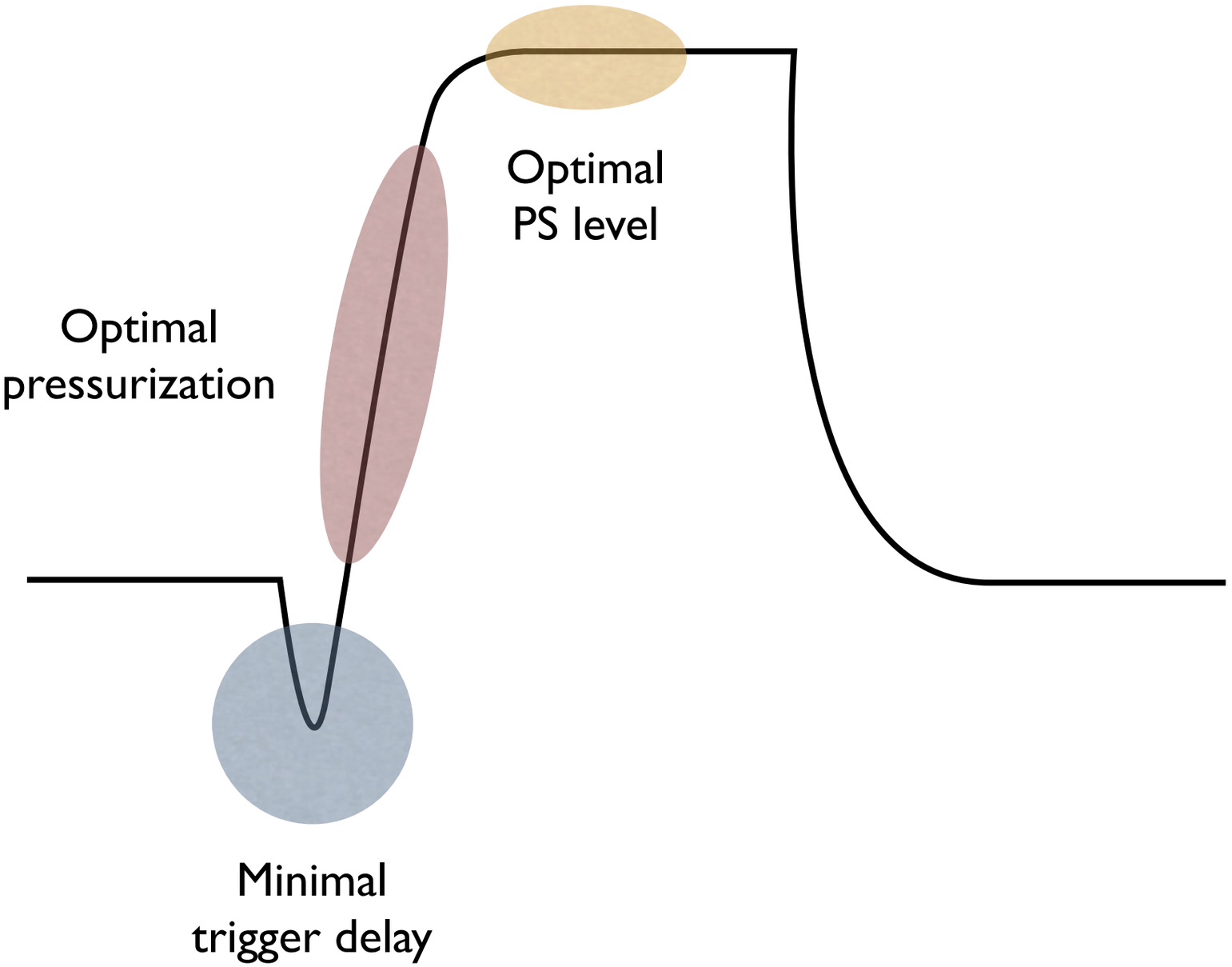

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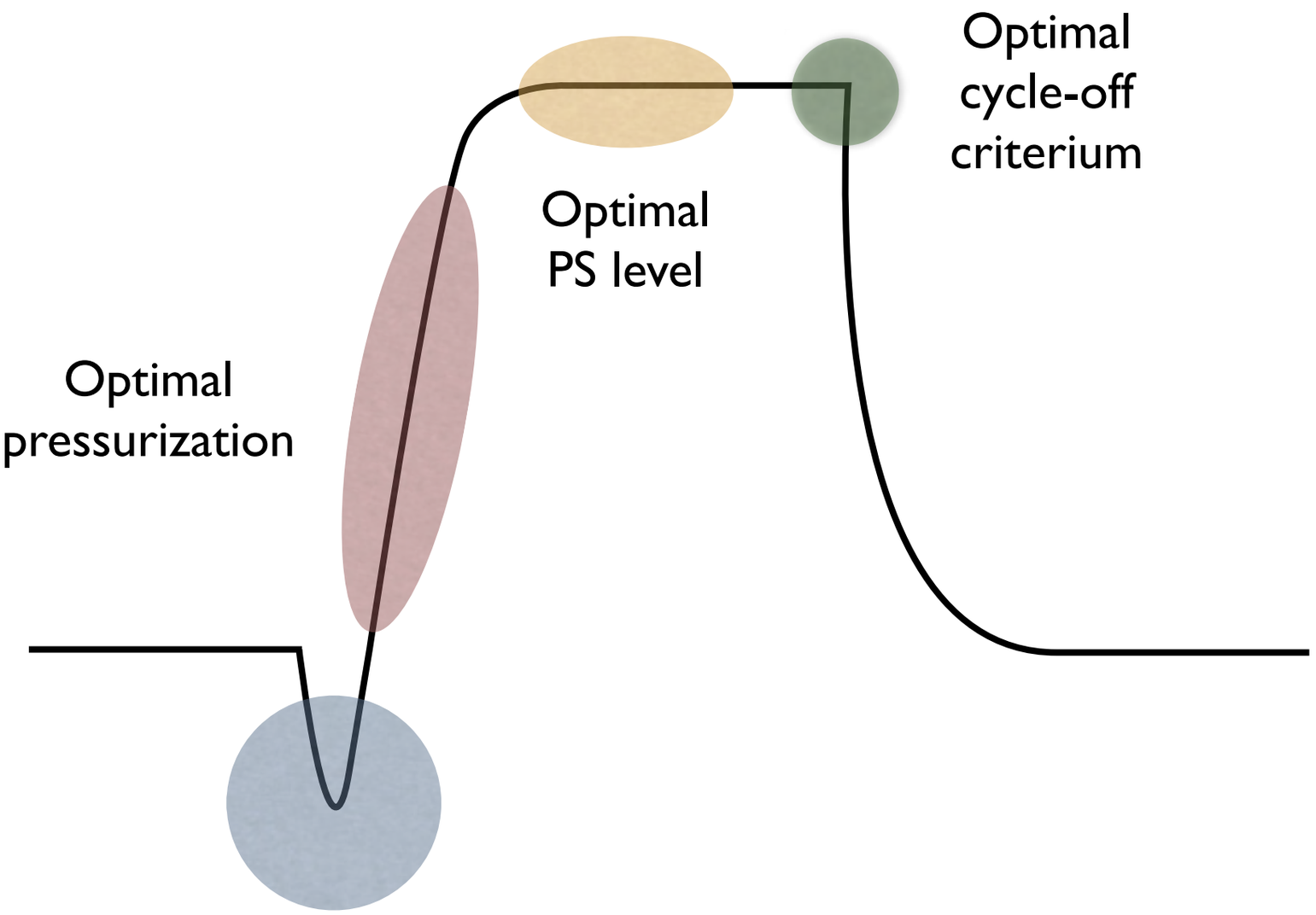


Minimale trigger delay

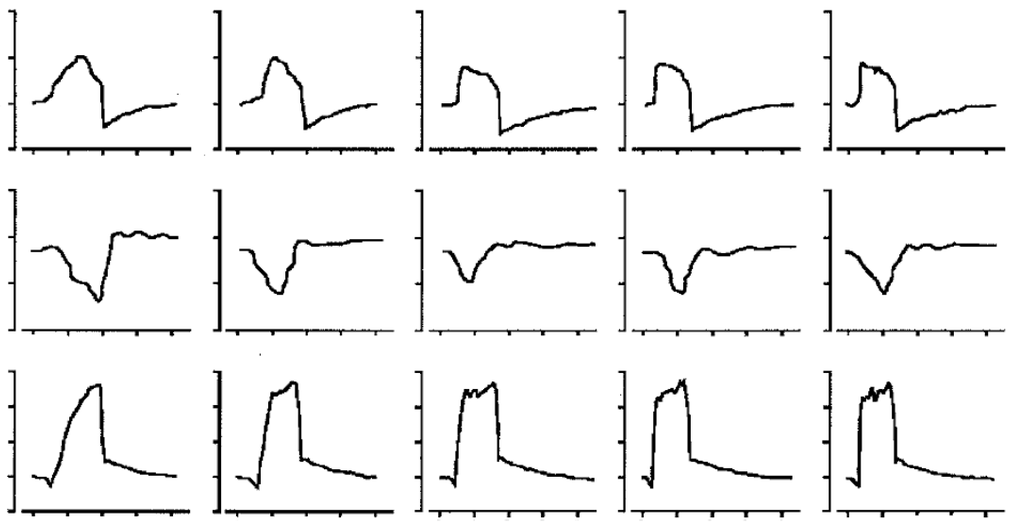
Flow trigger met maximale sensitiviteit
(tenzij “auto-cycling”)

Compenseer PEEPi met PEEPe op individuele basis

Optimale druk opbouw

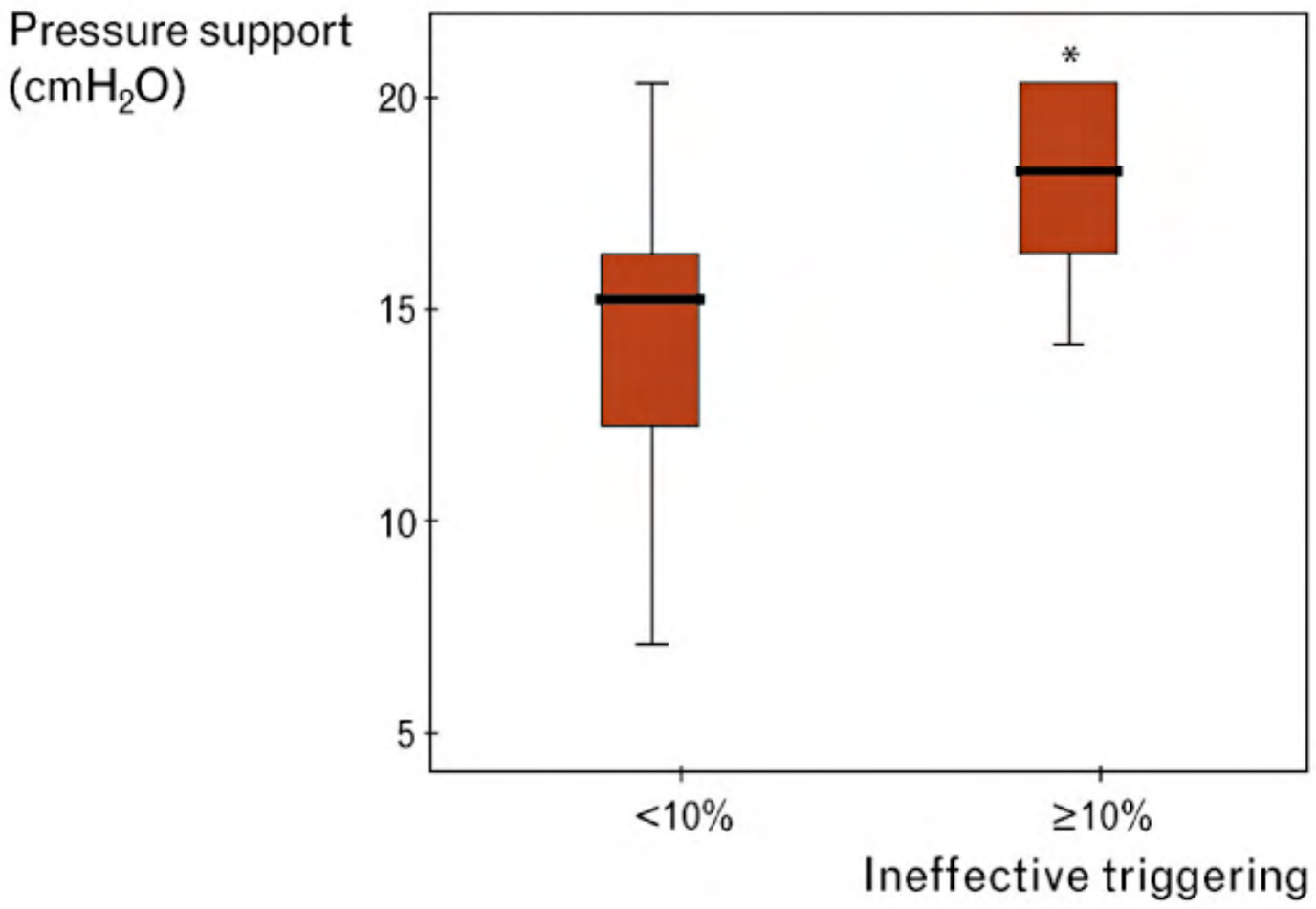
Literatuur duidt op laagste ademarbeid met snelste druk opbouw

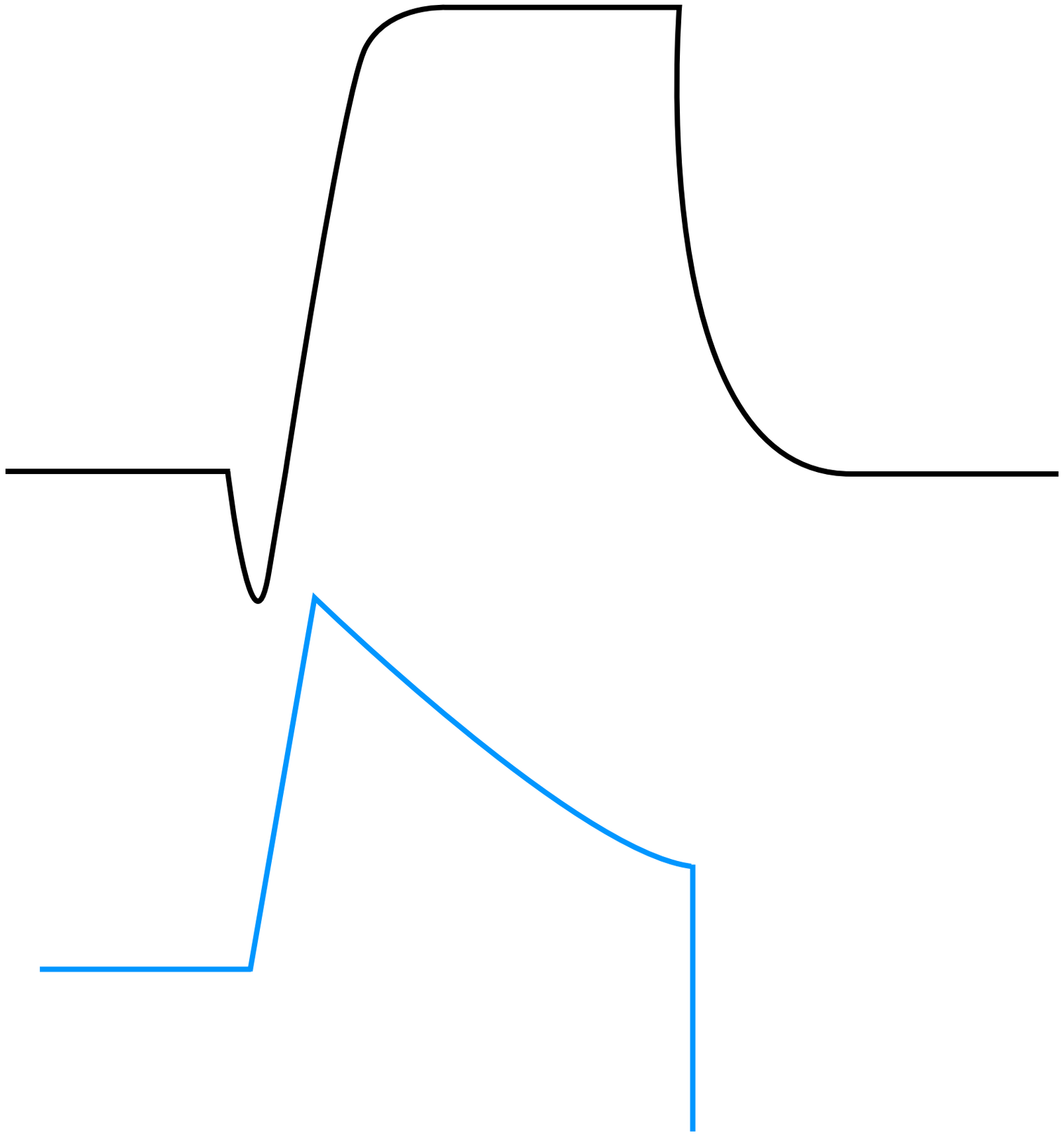
Individuele titratie lijkt echter noodzakelijk

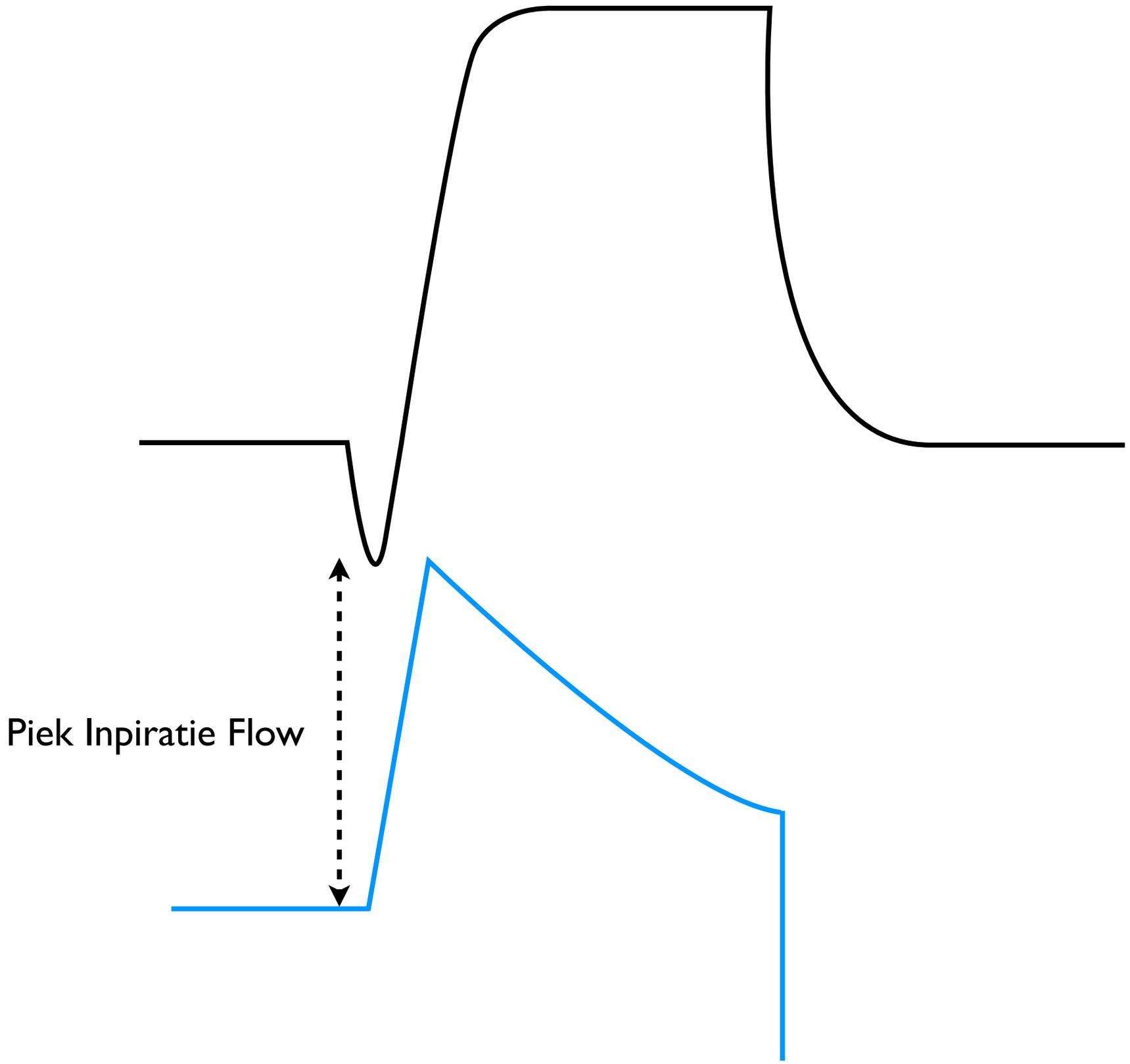


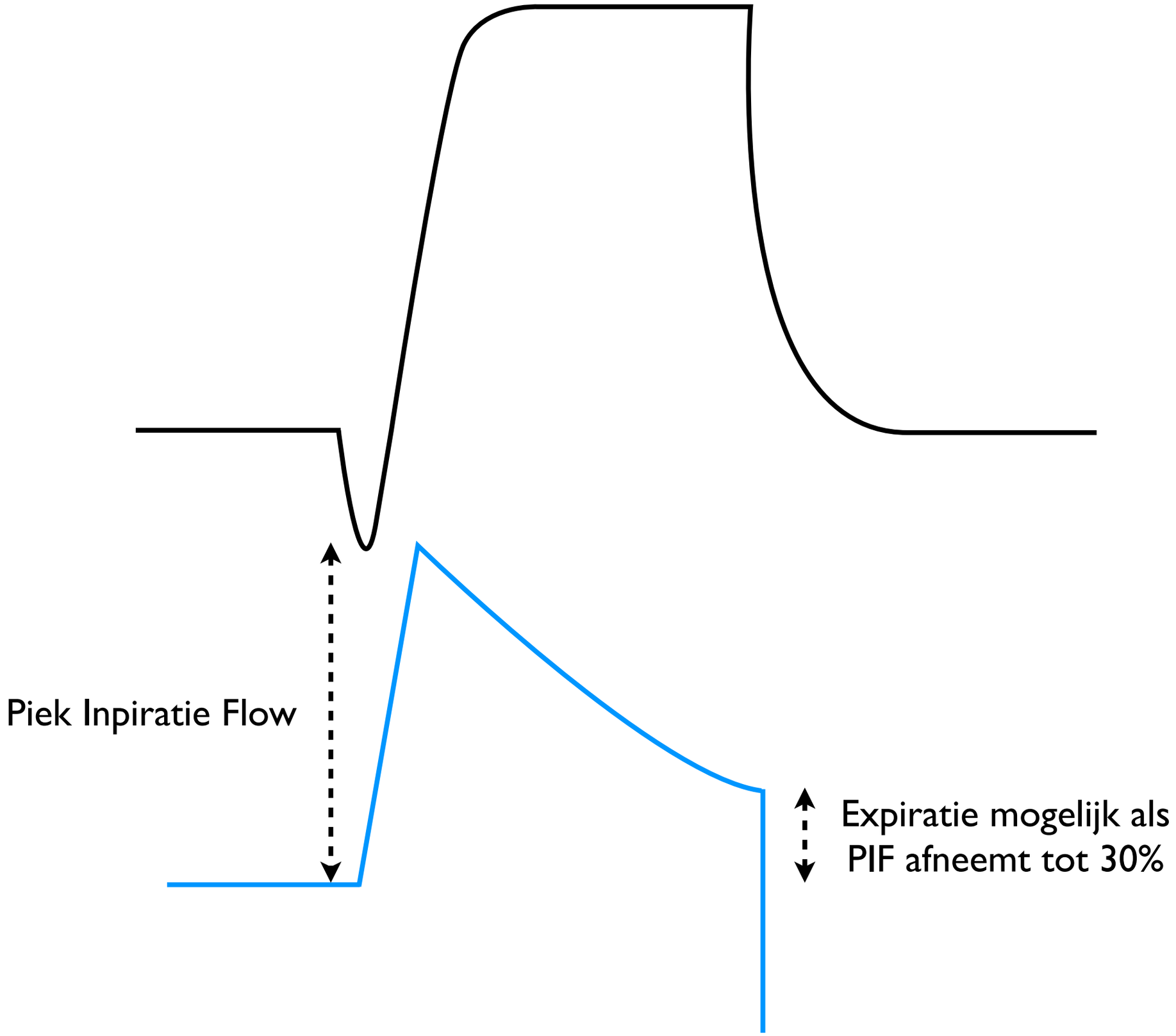
Optimale PS niveau

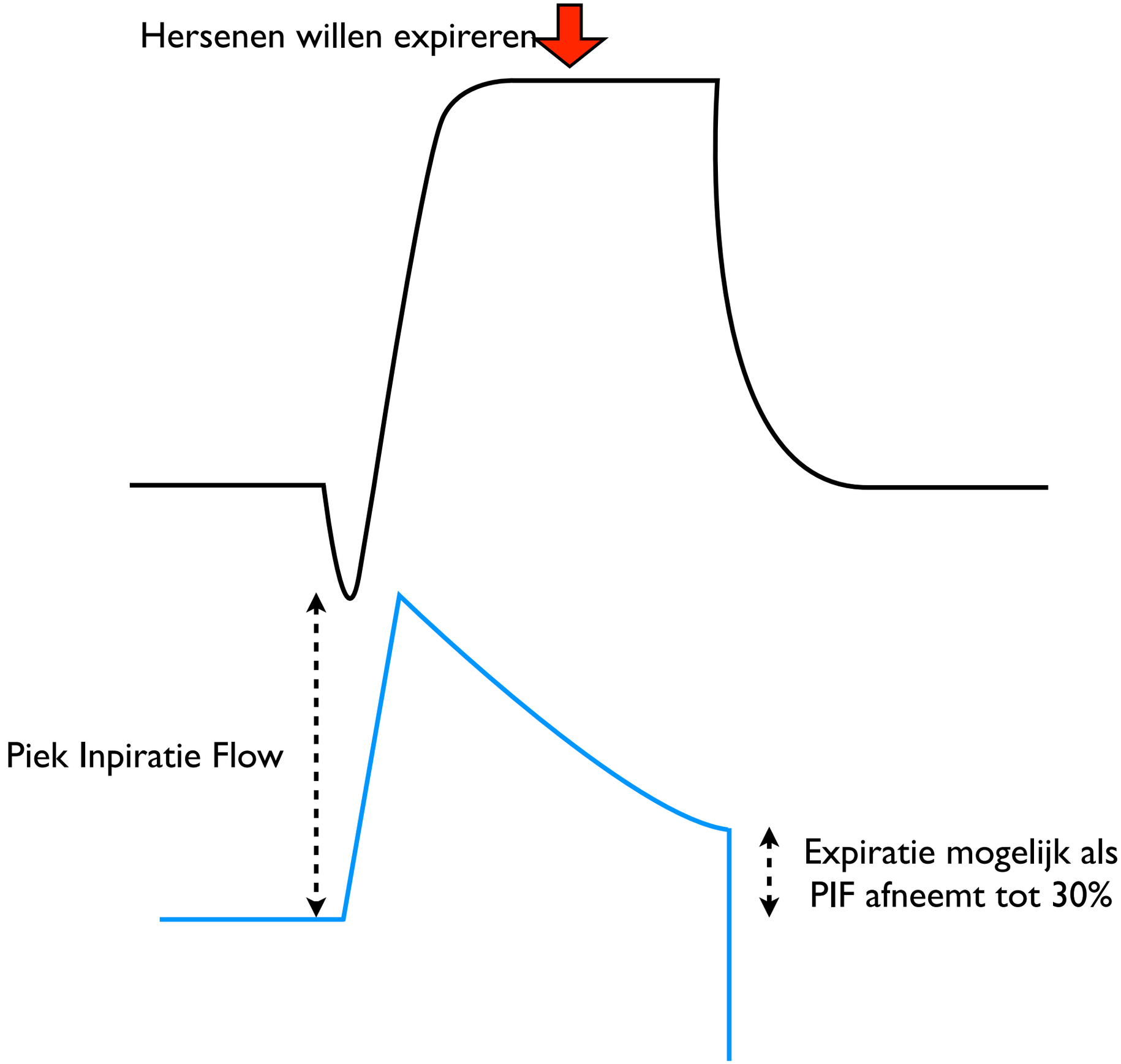
Individuele titratie is noodzakelijk





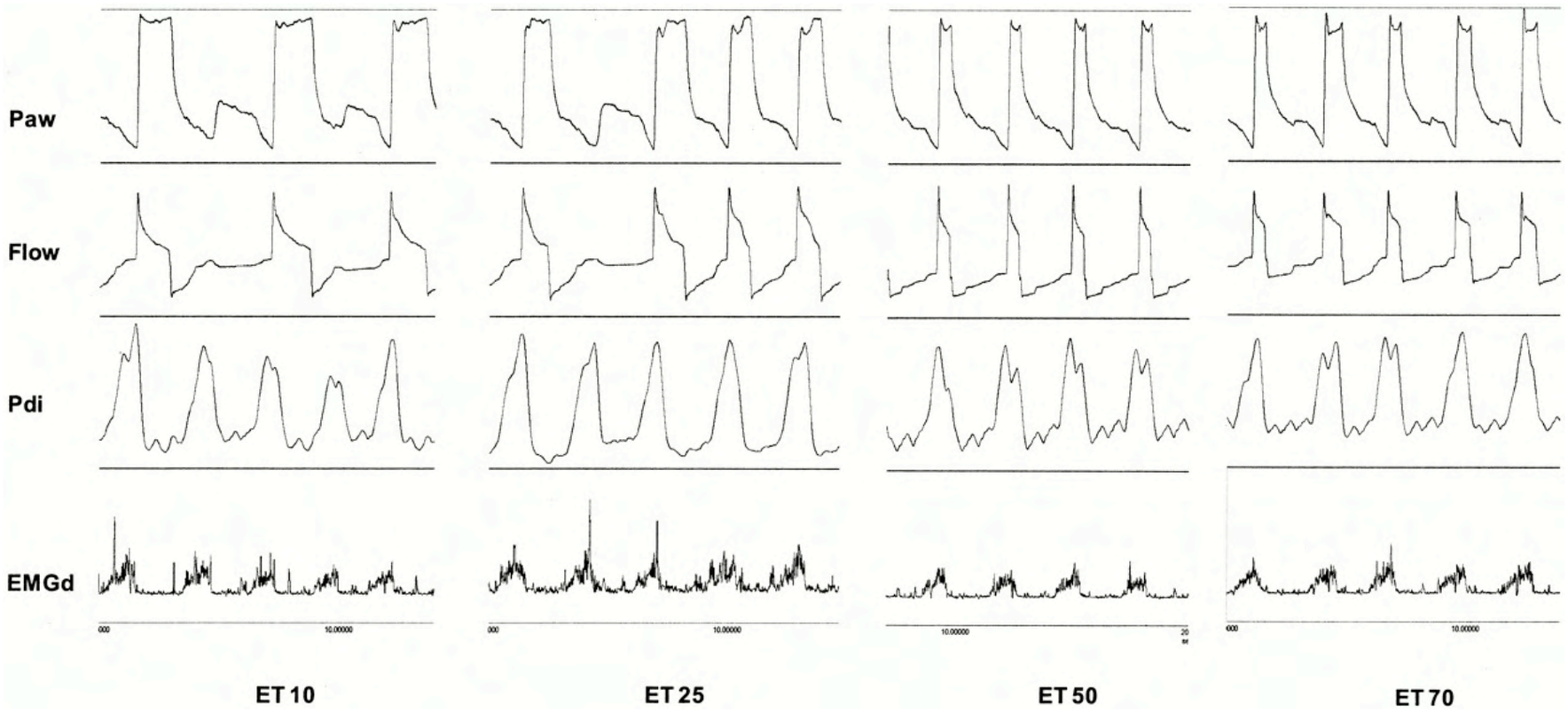

Piek Inpiratie Flow


Piek Inpiratie Flow
Expiratie mogelijk als
PIF afneemt tot 30%

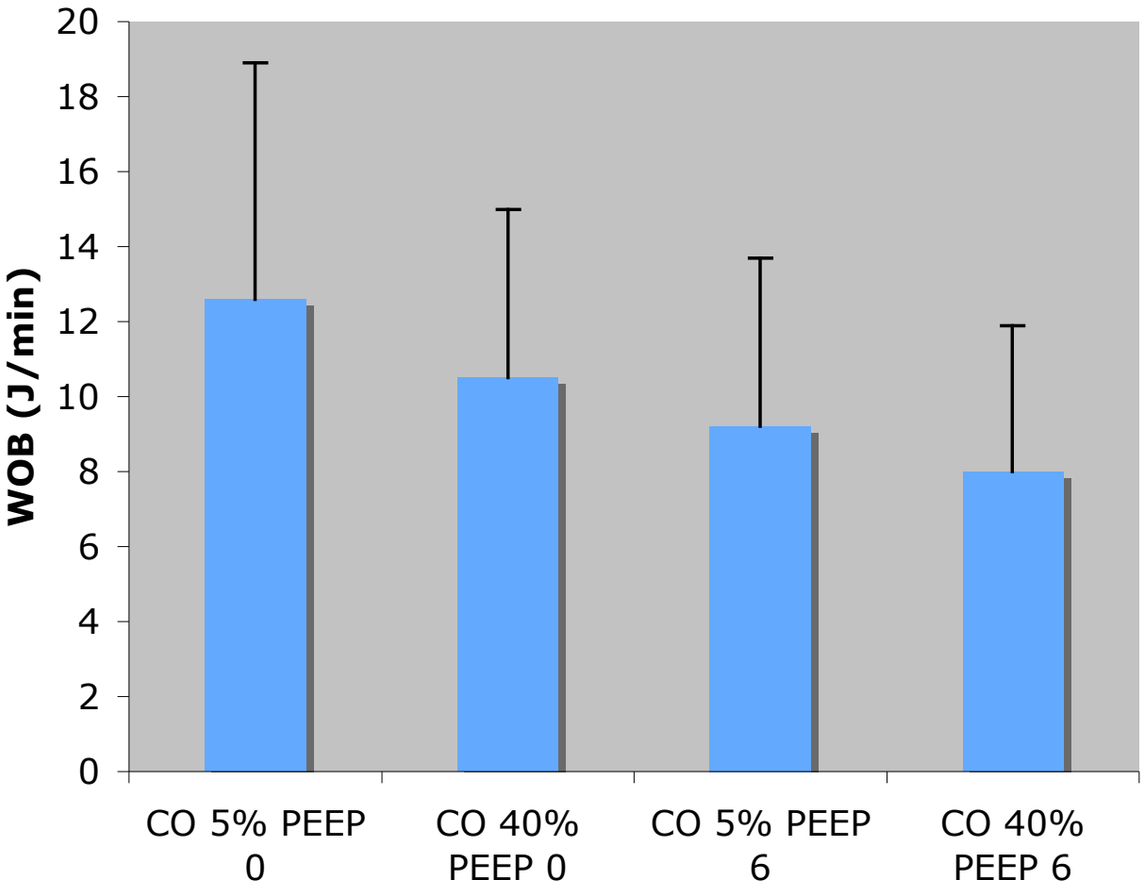

Hersenen willen expireren
Piek Inpiratie Flow
Expiratie mogelijk als
PIF afneemt tot 30%

Optimale cycle-off criterium

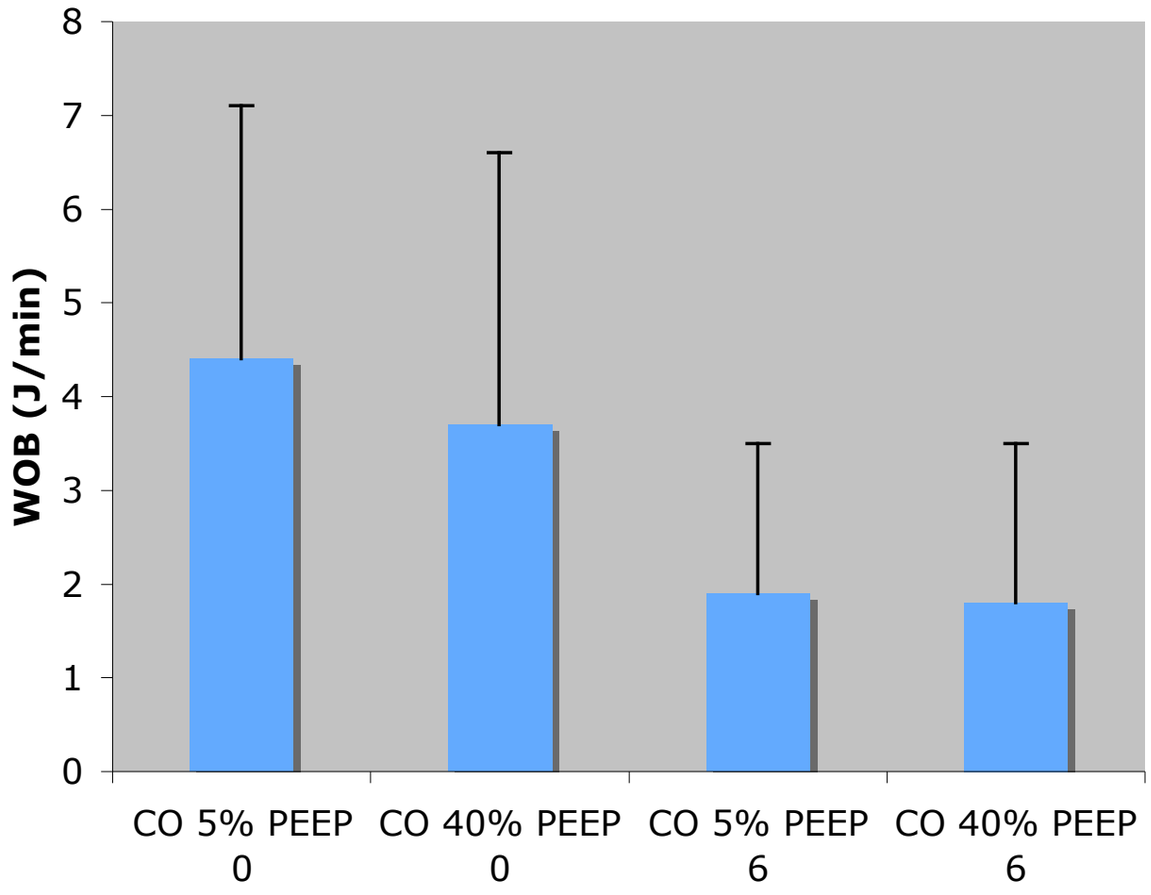
Individuele titratie maar hoog percentage in obstructieve longziekte



Toename "cycle off" criterium



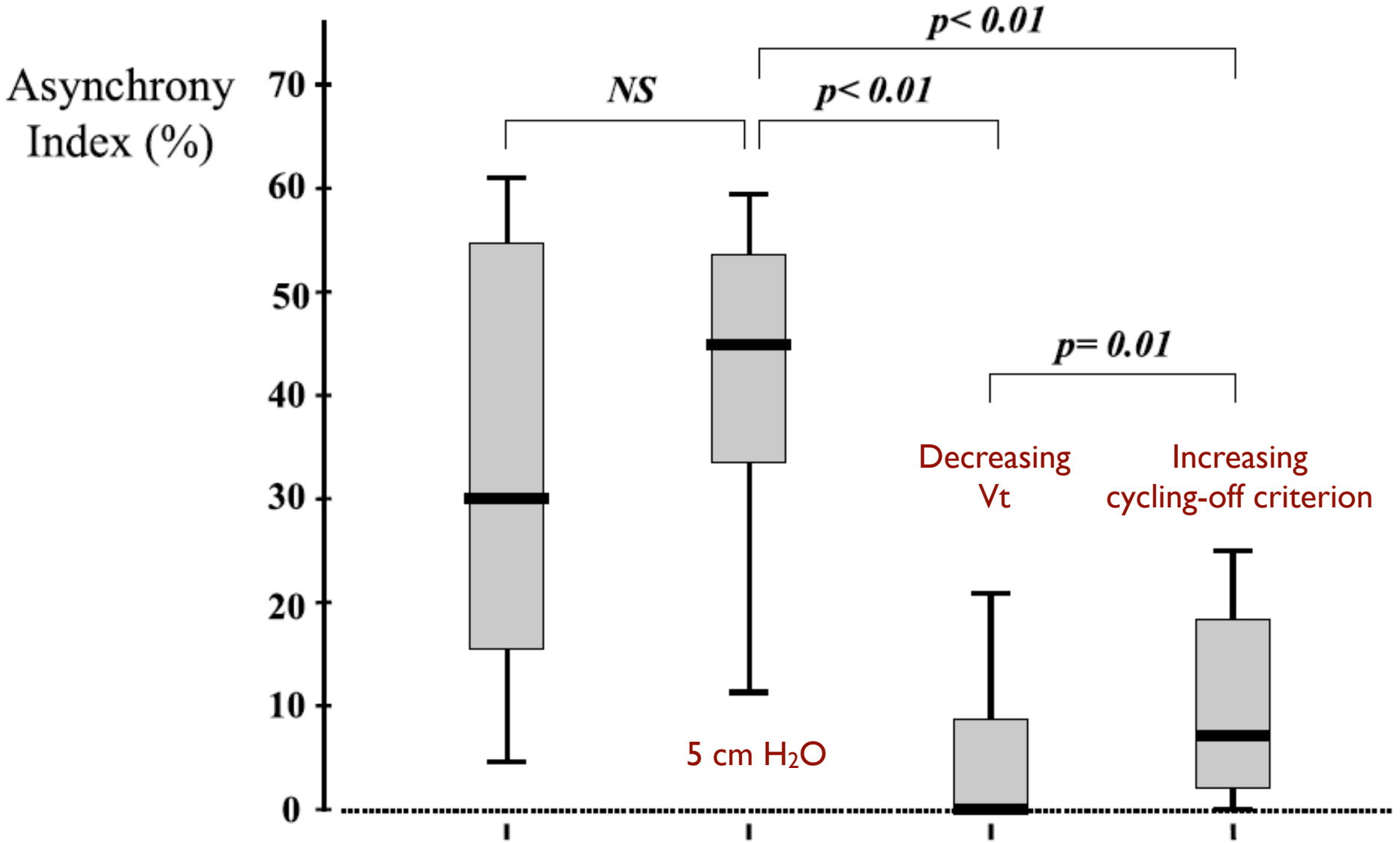
PSV 5 cm H_2O



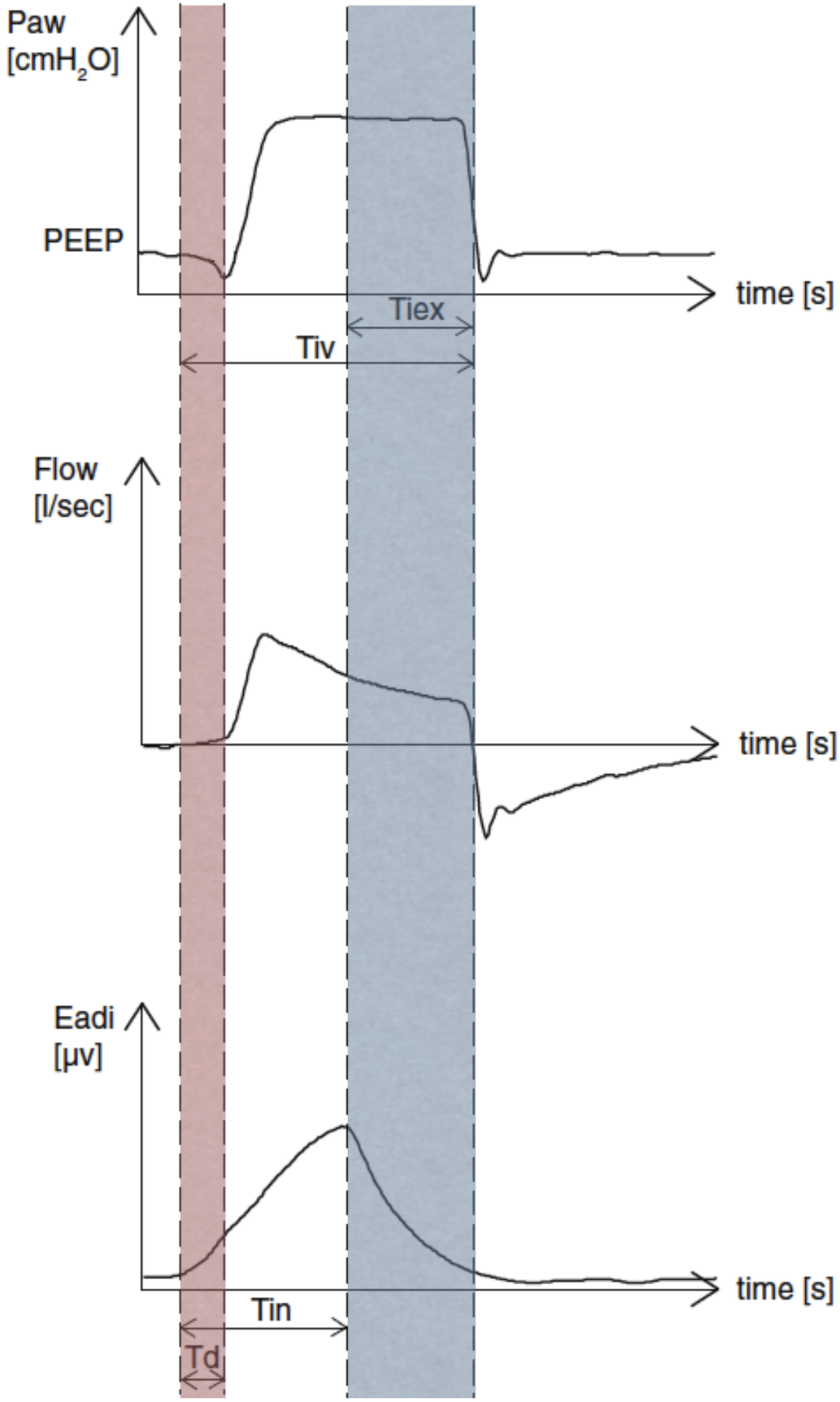
PSV 15 cm H_2O

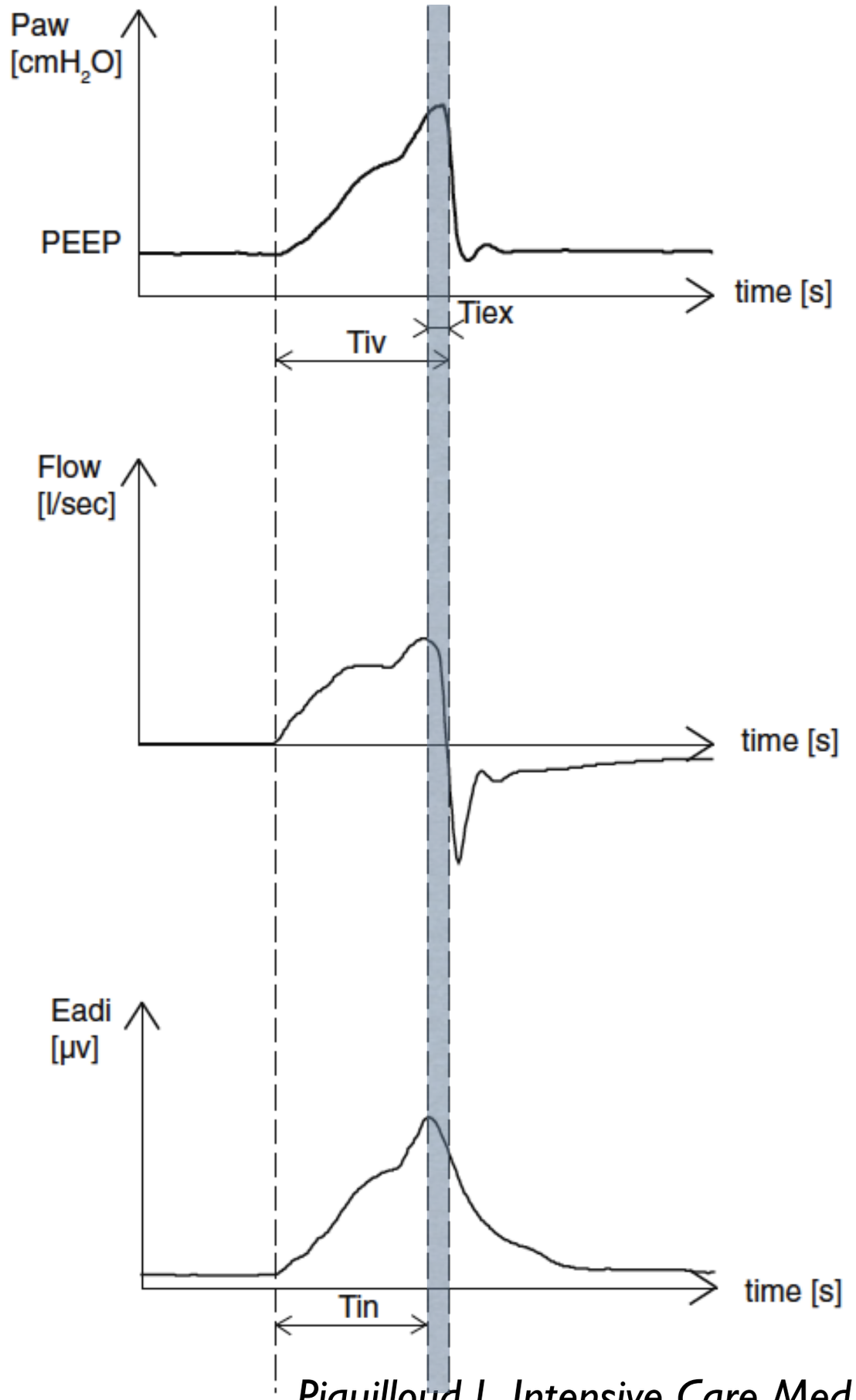
Chiumello D. Crit Care Med 2007;35:2547-2552

De oplossingen



	Baseline PS-ZEEP	Baseline PS-PEEP	Optimal PS	Optimal Ti
Vt (ml/kg)	7.8	10.2	5.9	7.0
Ti ventilator (s)	1.3	1.3	0.8	0.8

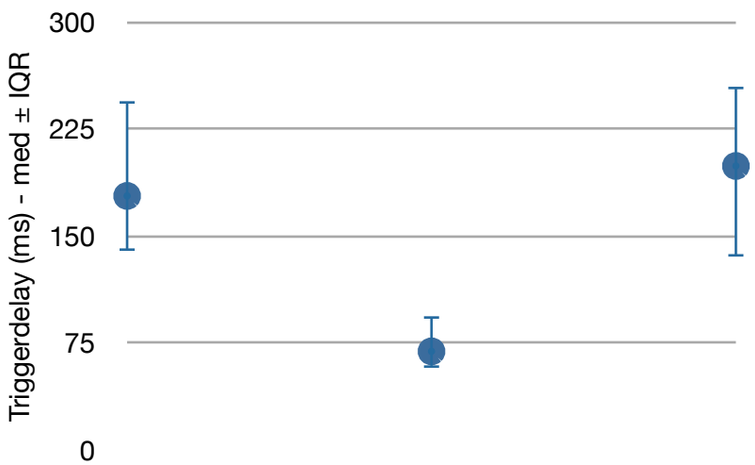




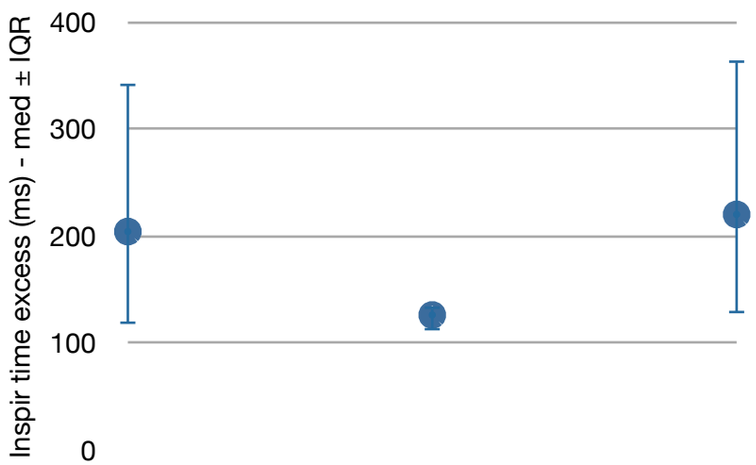
Piquilloud L. Intensive Care Med 2010

NAVA versus PSV

< 0.001



0.016



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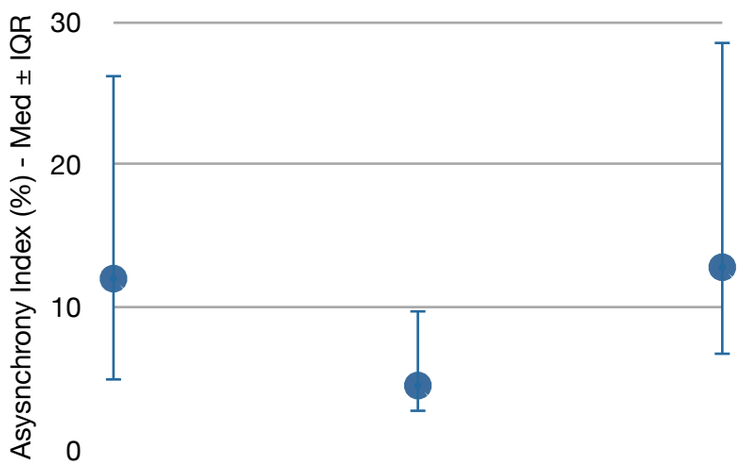
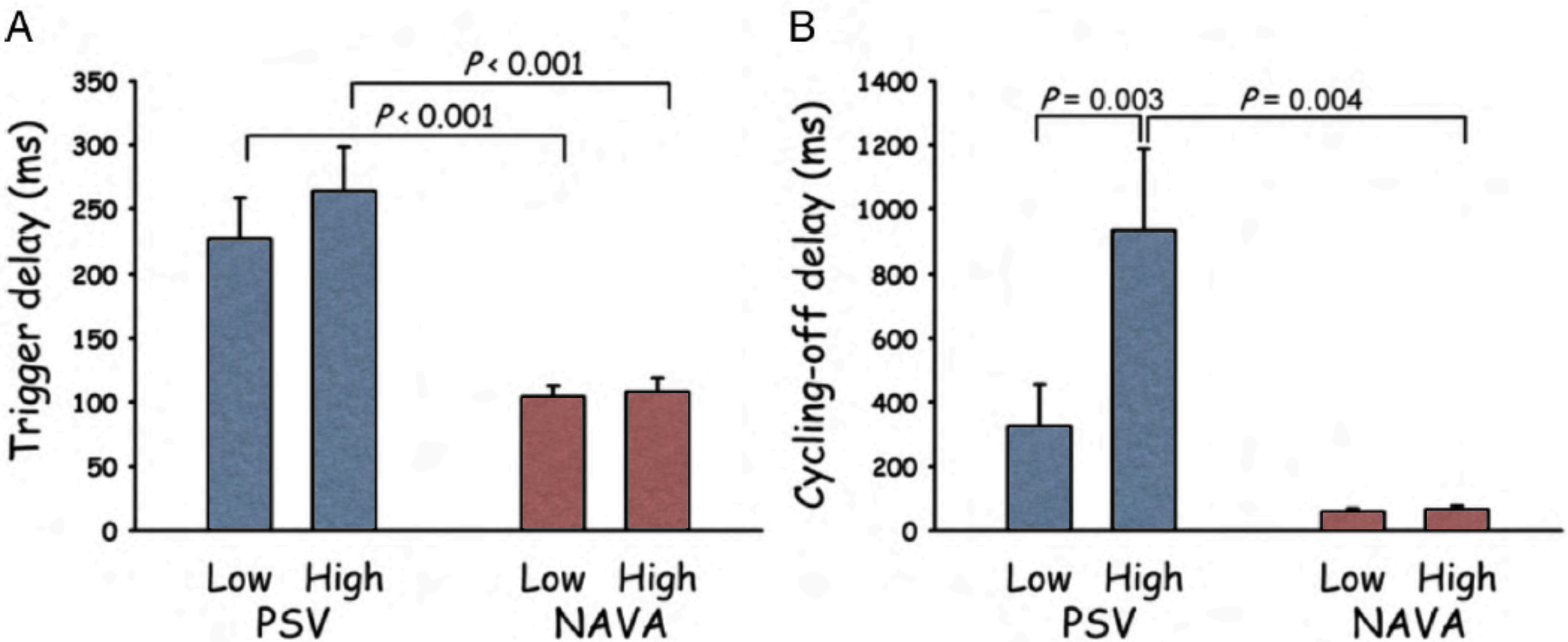


Total asynchronies (*n*/min)	3.15	1.18–6.40	1.21	0.54–3.36	3.04	1.22–5.31	0.032
Ineffective efforts (*n*/min)	0.81	0.02–1.92	0.00	0.00–0.00	0.67	0.11–1.70	<0.001
Late cycling (*n*/min)	0.12	0–0.63	0.00	0.00–0.00	0.09	0.0–1.15	<0.001
Double triggering (*n*/min)	0.00	0.00–0.04	0.78	0.46–2.42	0.00	0.00–0.00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

Piquilloud L. Intensive Care Med 2010

NAVA en trigger delay bij COPD



Spahija J. Crit Care Med 2010;38:518-526

Patiënt (5)

- Compleet herstel
- Extubatie volgende dag