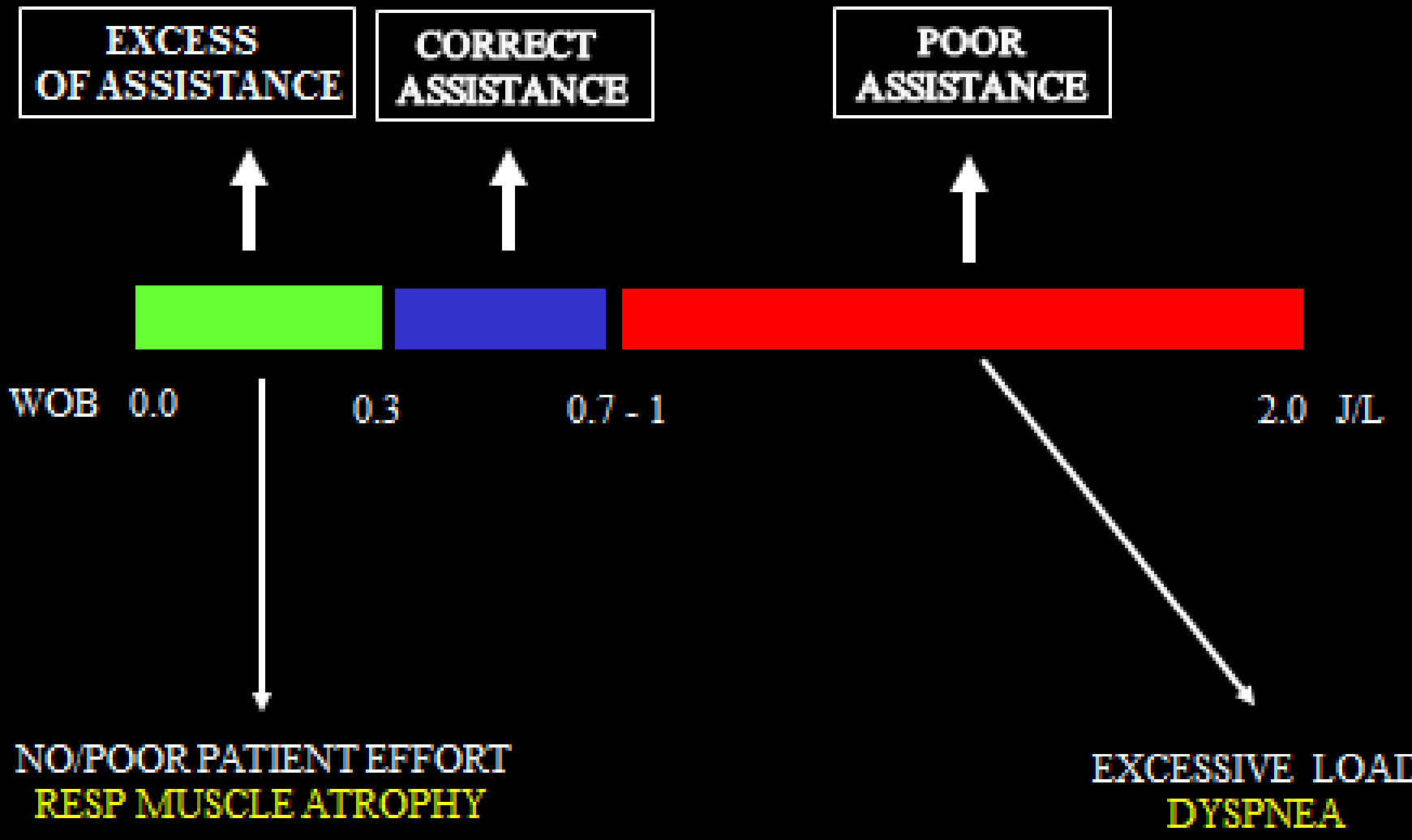
Metodica NAVA (Neurally Adjusted Ventilatory Assist), una alternativa per la NIV in Emergenza/Urgenza?

Francesco Stea

ASSISTED VENTILATION



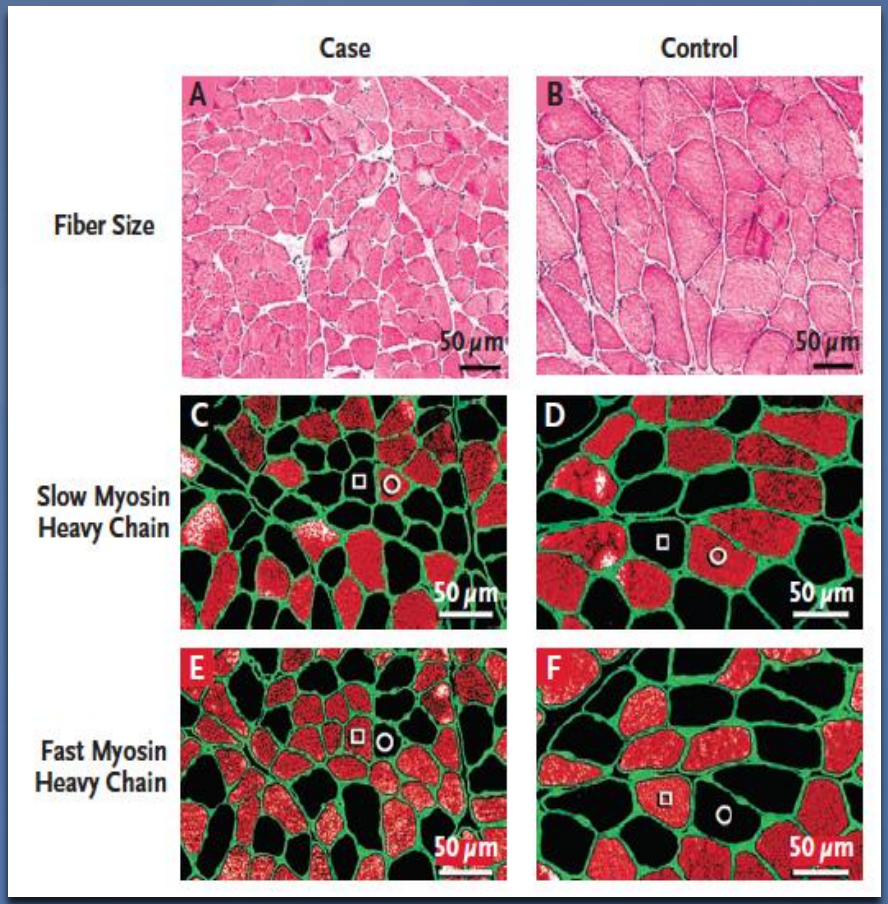
La ventilazione meccanica controllata induce una RAPIDA ATROFIA del diaframma, che è clinicamente importante già DOPO 72 ORE.

CMV 18-69 hrs CMV 2-3 hrs

The NEW ENGLAND JOURNAL of MEDICINE

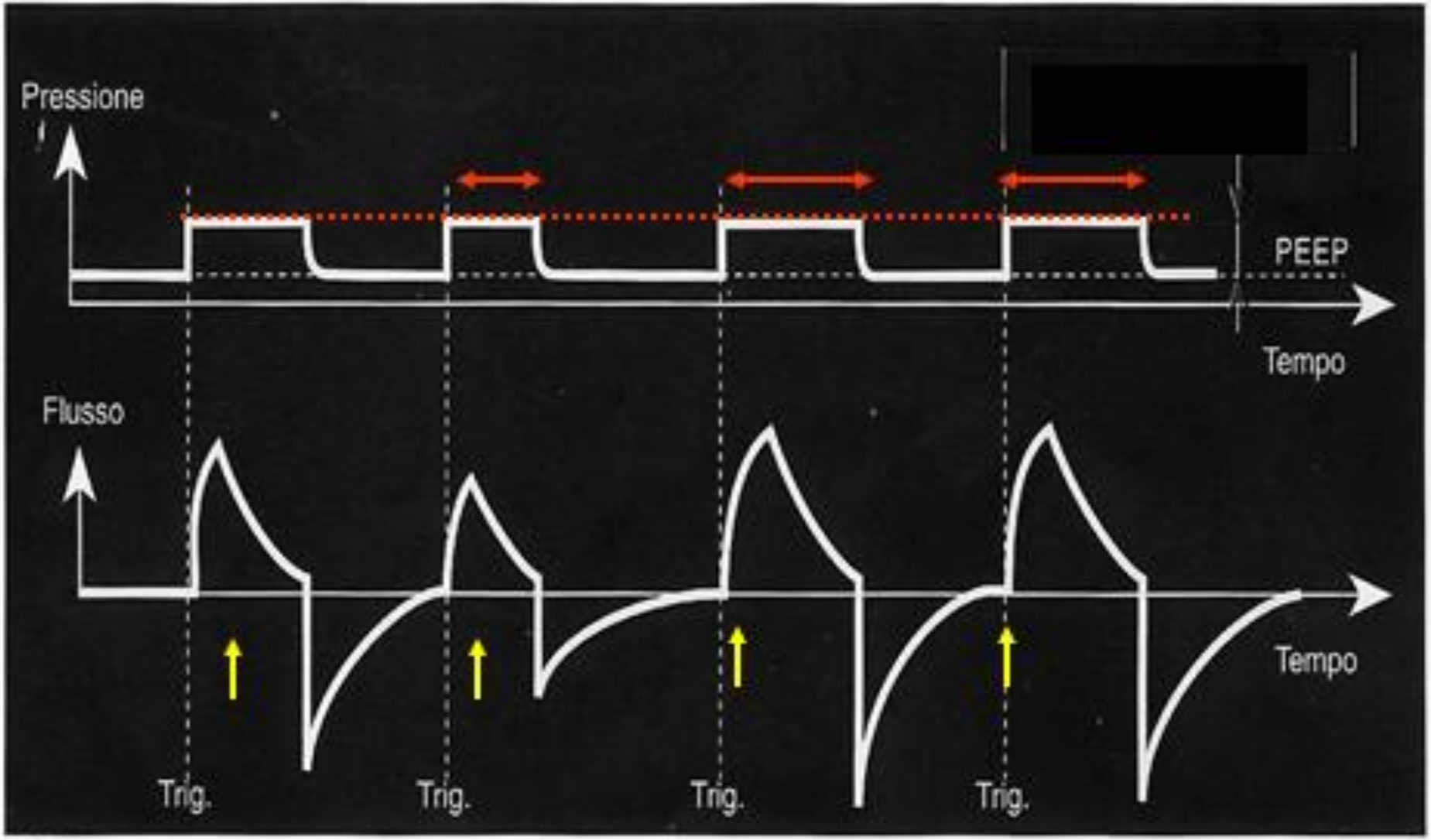
ESTABLISHED IN 1812 MARCH 27, 2008 VOL. 358 NO. 13

Rapid Disuse Atrophy of Diaphragm Fibers in Mechanically Ventilated Humans

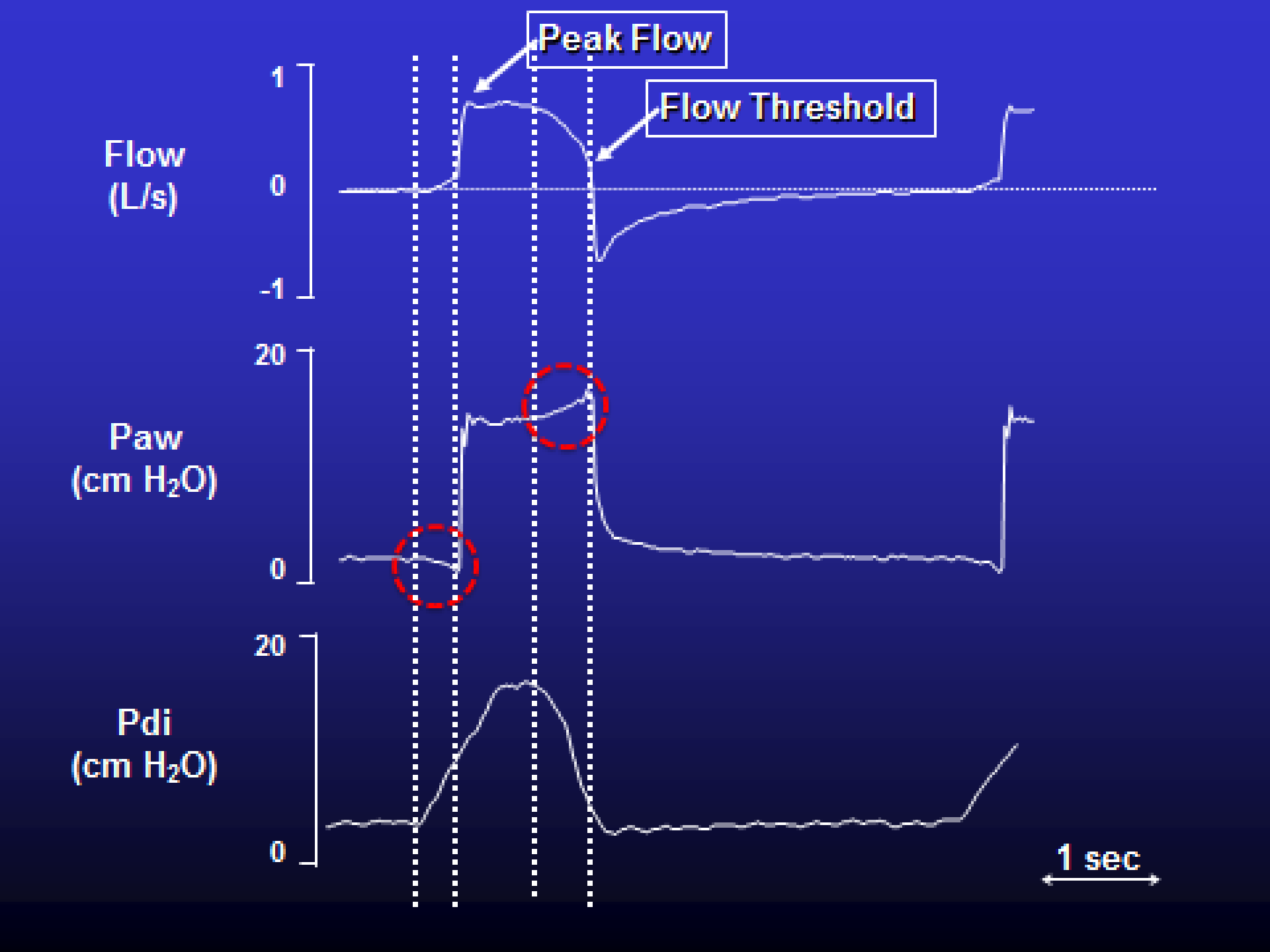


Levine, N Engl J Med 2008; 358:1327

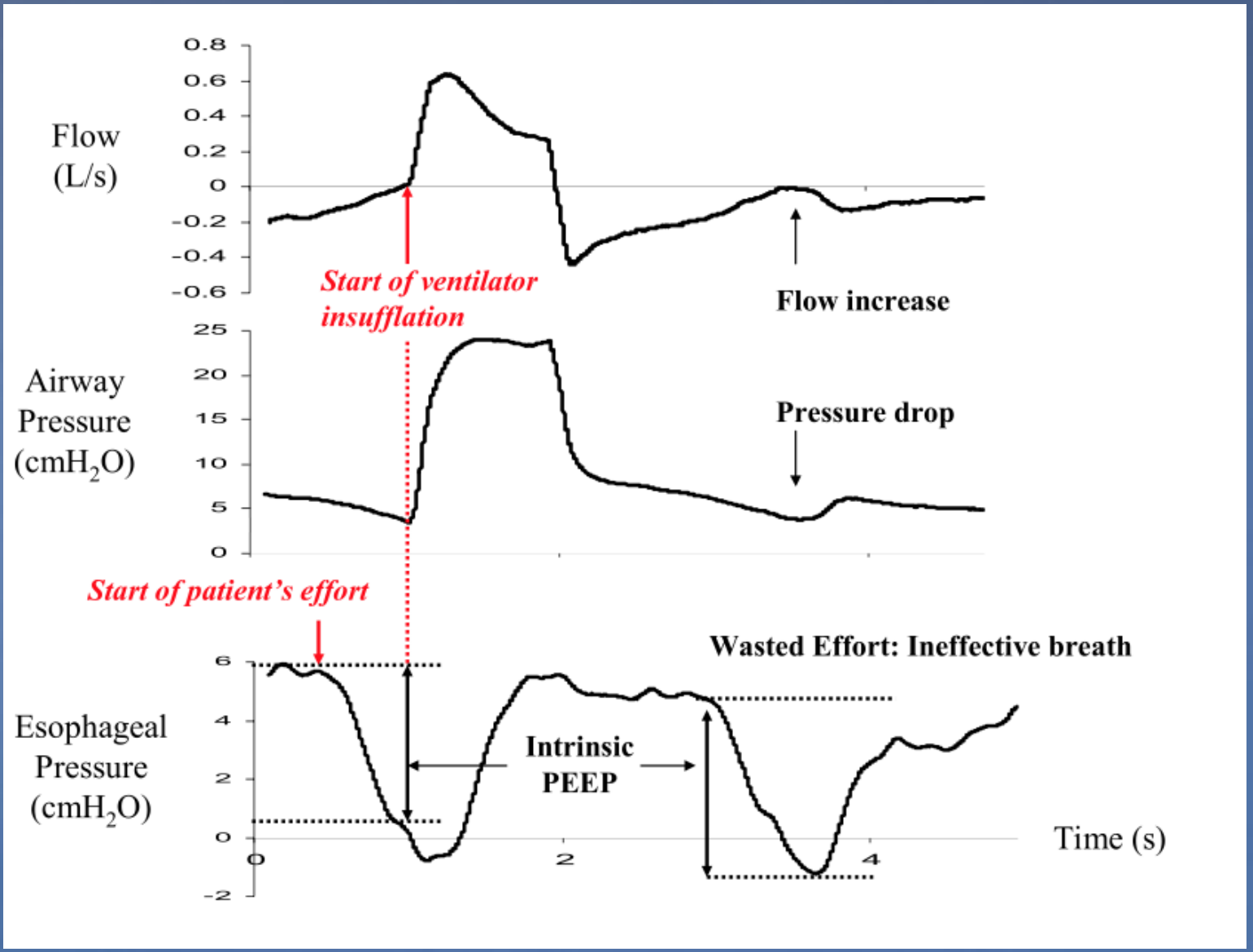
Pressure Support Ventilation: gold standard



300-H24I


Peak Flow
Flow Threshold
Flow
(L/s)
1
0
-1
Paw
(cm H_2O)
20
0
Pdi
(cm H_2O)
20
0
1 sec

PEEPi


Flow
(L/s)
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
Start of ventilator insufflation
Flow increase
Airway
Pressure
(cmH2O)
25
20
15
10
5
0
Pressure drop
Start of patient's effort
Wasted Effort: Ineffective breath
Esophageal
Pressure
(cmH2O)
6
4
2
0
-2
Intrinsic
PEEP
0
2
4
Time (s)

NAVA(Neurally Adjusted Ventilatory Assist)

.

La Neurally Adjusted Ventilatory Assist (NAVA), recentemente introdotta nella pratica clinica, è una modalità di ventilazione meccanica a supporto parziale in cui il ventilatore fornisce una pressione inspiratoria proporzionale all'attività elettrica diaframmatica (EAdi).

L' **EAdi** rappresenta il segnale di output neurale complessivo dei centri respiratori

↓

l'impulso nervoso viene veicolato al diaframma dal nervo frenico

↓

attivazione elettrica delle fibrocellule del diaframma e trasduzione del segnale in contrazione della fibrocellula stessa (neuroventilatory coupling)

↓

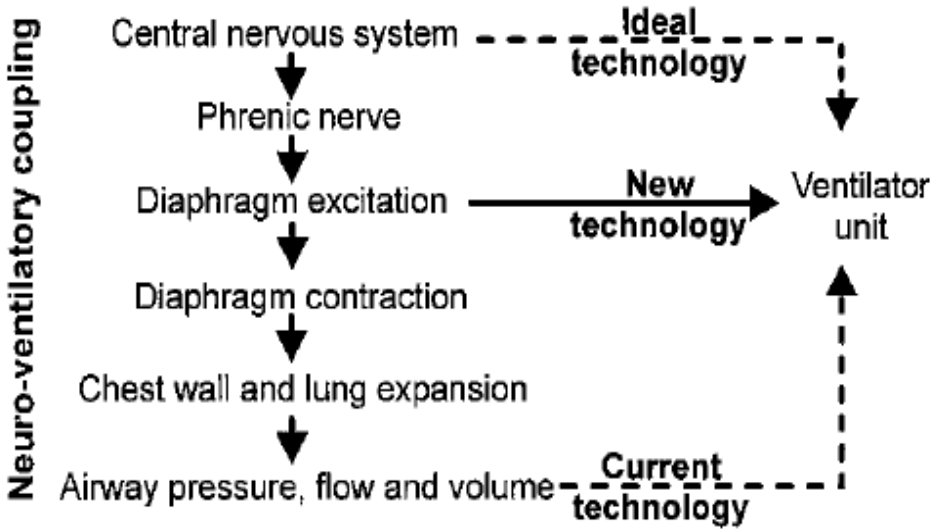
Espansione del torace e della gabbia toracica

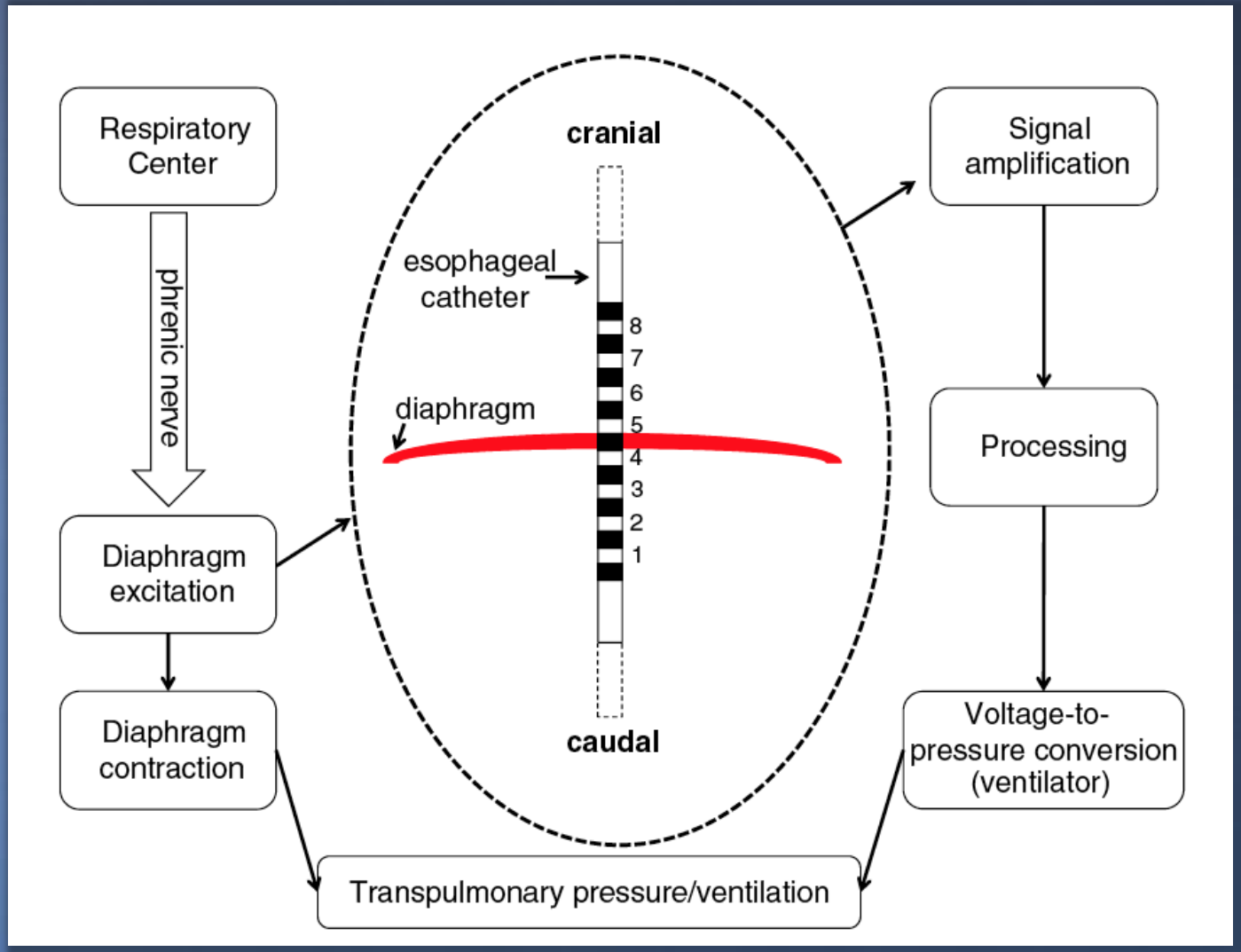
↓

Formazione di un flusso di aria diretto dall' apertura delle vie aeree agli alveoli polmonari

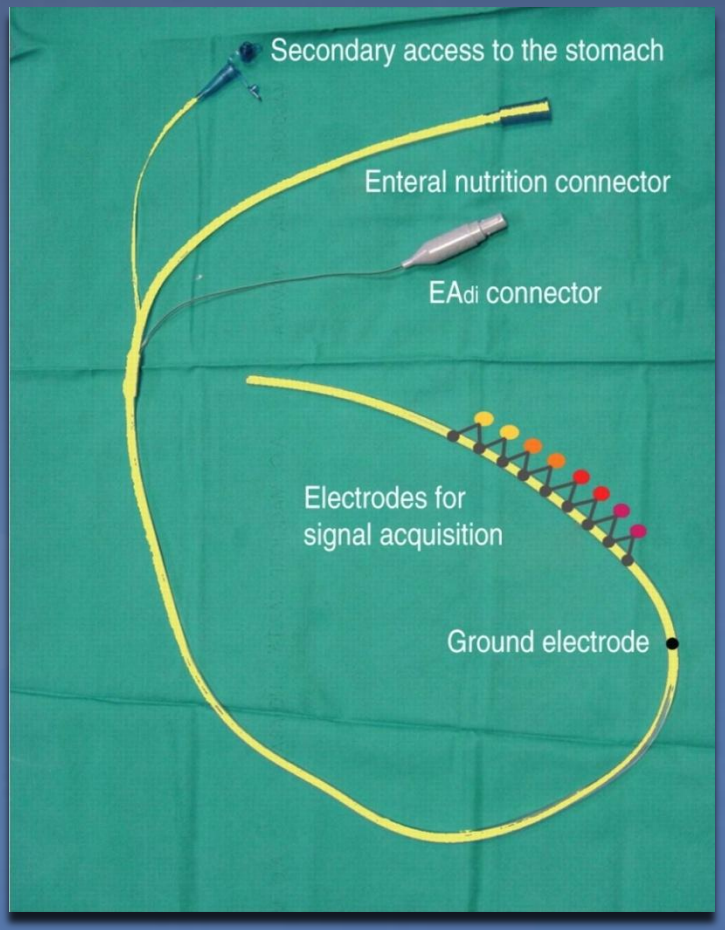
Neural control of mechanical ventilation in respiratory failure

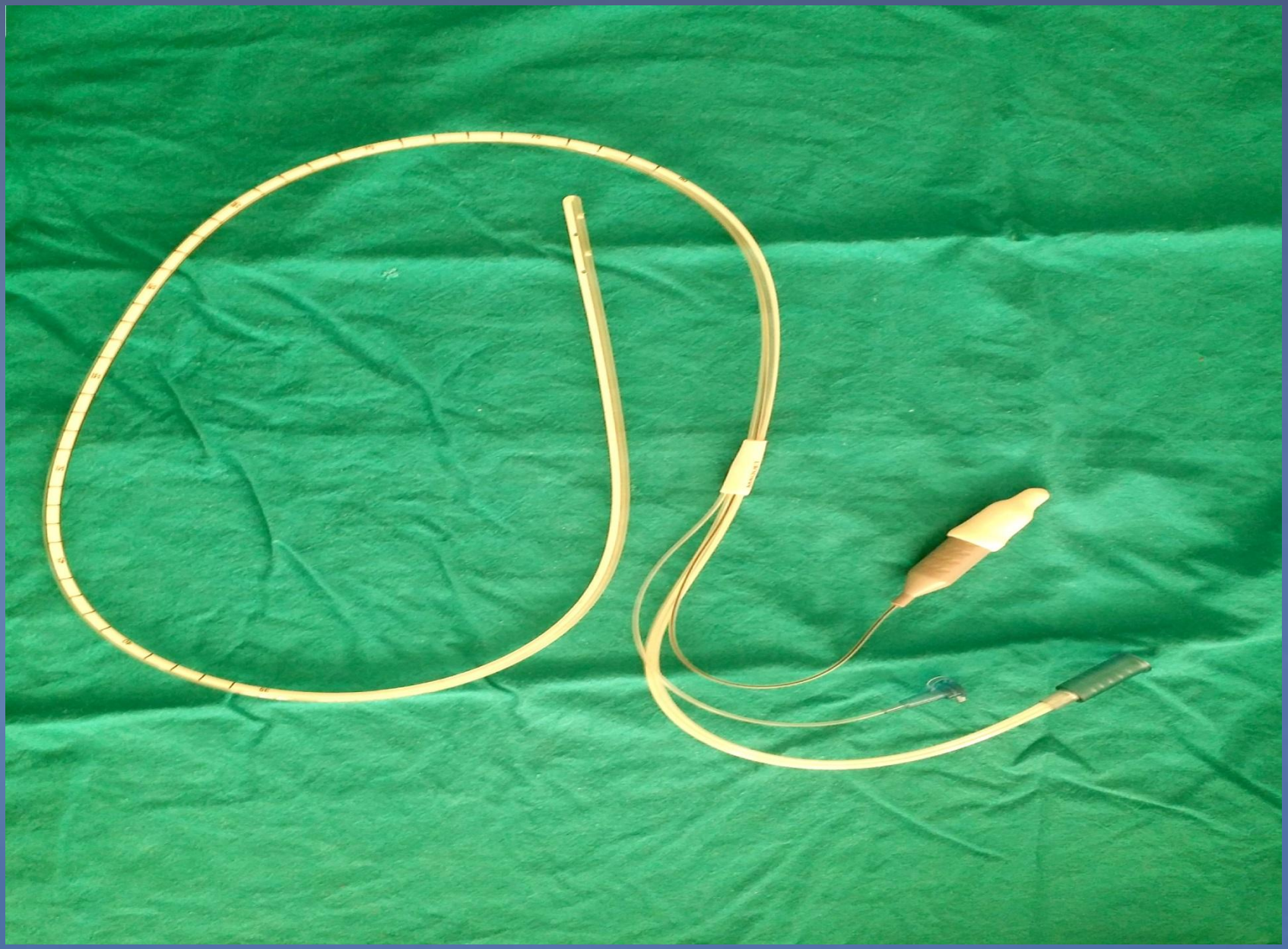
CHRISTER SINDERBY[1,2], PAOLO NAVALESI[3], JENNIFER BECK[4], YOANNA SKROBIK[1], NORMAN COMTOIS[1], SVEN FRIBERG[5], STEWART B. GOTTFRIED[6] & LARS LINDSTRÖM[5]

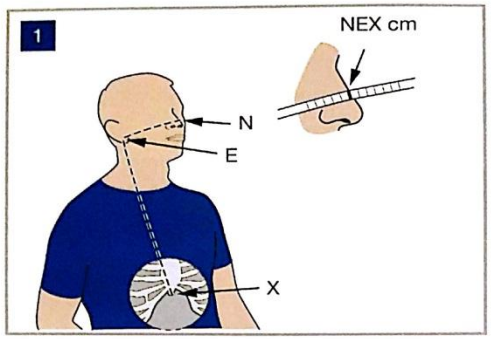


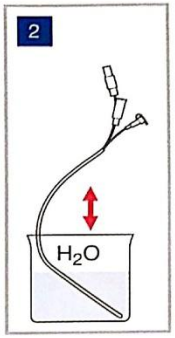

Respiratory Center
phrenic nerve
Diaphragm excitation
Diaphragm contraction
cranial
esophageal catheter
diaphragm
8
7
6
5
4
3
2
1
caudal
Signal amplification
Processing
Voltage-to-pressure conversion (ventilator)
Transpulmonary pressure/ventilation

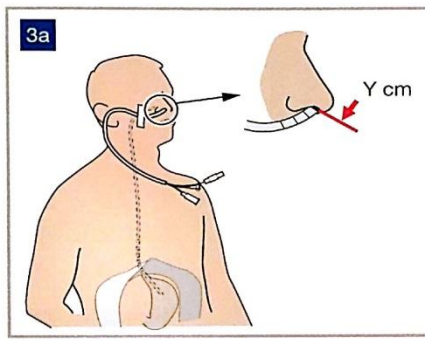
Al fine di acquisire il segnale elettromiografico del diaframma, è necessario il posizionamento di un sondino naso - gastrico denominato "NAVA catheter". Il sondino è costituito da 8 elettrodi, allineati e distanziati in misura diversa a seconda della lunghezza del sondino, più un sondino per la messa a terra del segnale.



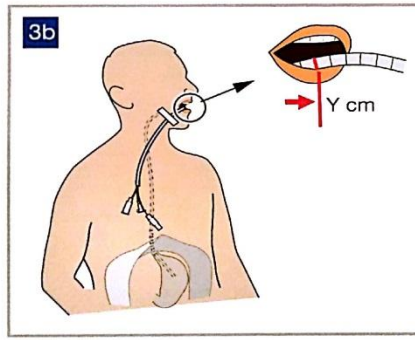








Insertion distance Y for nasal insertion	
Fr/cm	**Calculation of Y**
16 Fr / 125 cm	NEX cm × 0.9 + 18 = Y cm
12 Fr / 125 cm	NEX cm × 0.9 + 15 = Y cm
8 Fr / 125 cm	NEX cm × 0.9 + 18 = Y cm
8 Fr / 100 cm	NEX cm × 0.9 + 8 = Y cm
6 Fr / 50 cm	NEX cm × 0.9 + 3.5 = Y cm
6 Fr / 49 cm	NEX cm × 0.9 + 2.5 = Y cm



Insertion distance Y for oral insertion	
Fr/cm	**Calculation of Y**
16 Fr / 125 cm	NEX cm × 0.8 + 18 = Y cm
12 Fr / 125 cm	NEX cm × 0.8 + 15 = Y cm
8 Fr / 125 cm	NEX cm × 0.8 + 18 = Y cm
8 Fr / 100 cm	NEX cm × 0.8 + 8 = Y cm
6 Fr / 50 cm	NEX cm × 0.8 + 3.5 = Y cm
6 Fr / 49 cm	NEX cm × 0.8 + 2.5 = Y cm

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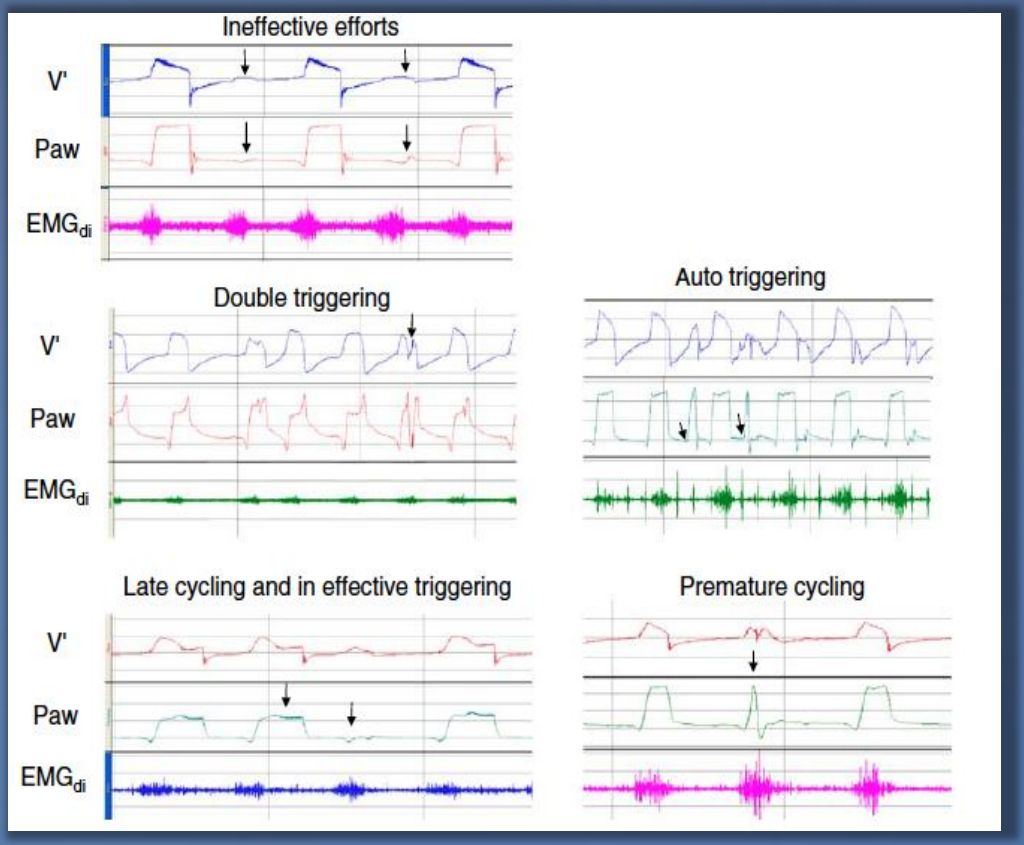
Eadi catheter positioning

Figure 2

ORIGINAL

Patient–ventilator asynchrony during non-invasive ventilation for acute respiratory failure: a multicenter study



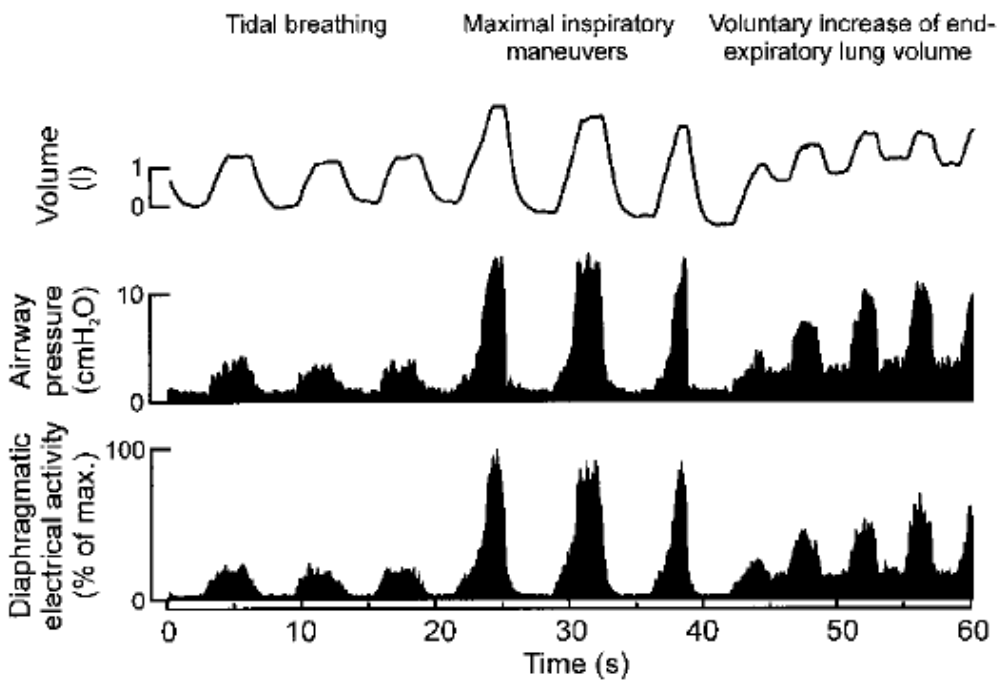
AI > 10%	
Absent ($n = 34$)	Present ($n = 26$)

AI > 10% in 43 % of pts during NIV !

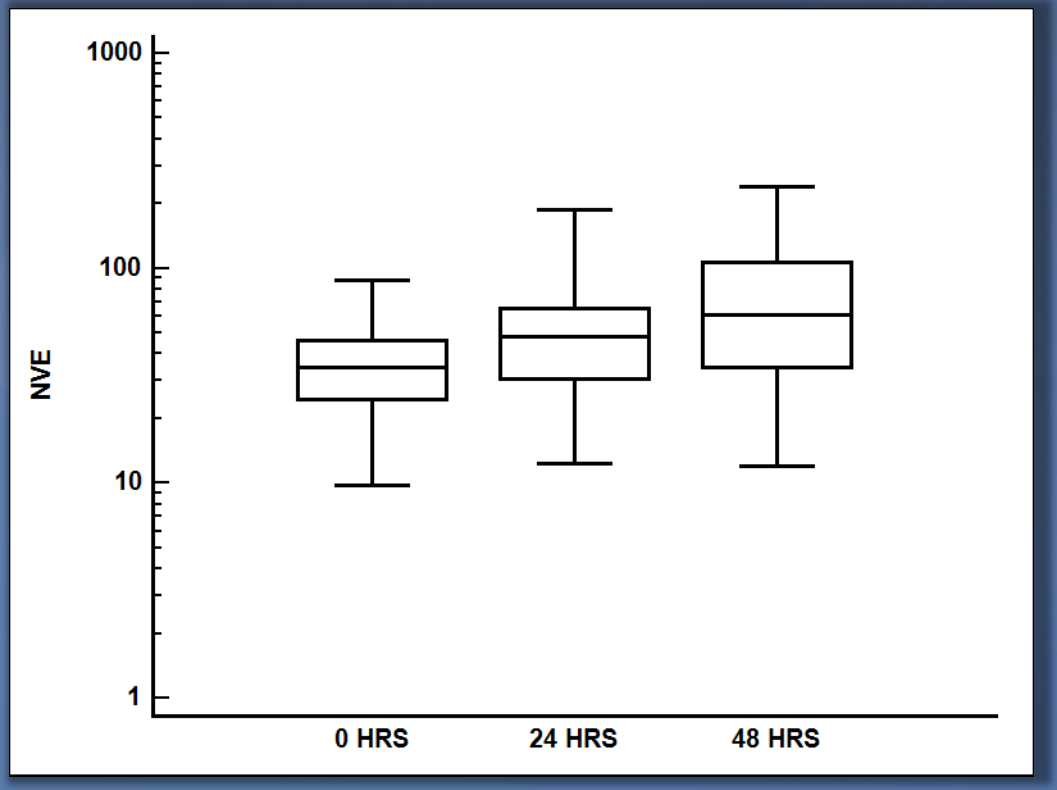
Neural control of mechanical ventilation in respiratory failure

Christer Sinderby[1,2], Paolo Navalesi[3], Jennifer Beck[4], Yoanna Skrobik[1], Norman Comtois[1], Sven Friberg[5], Stewart B. Gottfried[6] & Lars Lindstrom[5]

b



Neuro-Ventilatory Efficiency = VT/Eadi (12 pts)



Grasso S; 2014 unpublished data

Intensive Care Med
DOI 10.1007/s00134-010-2052-9

ORIGINAL

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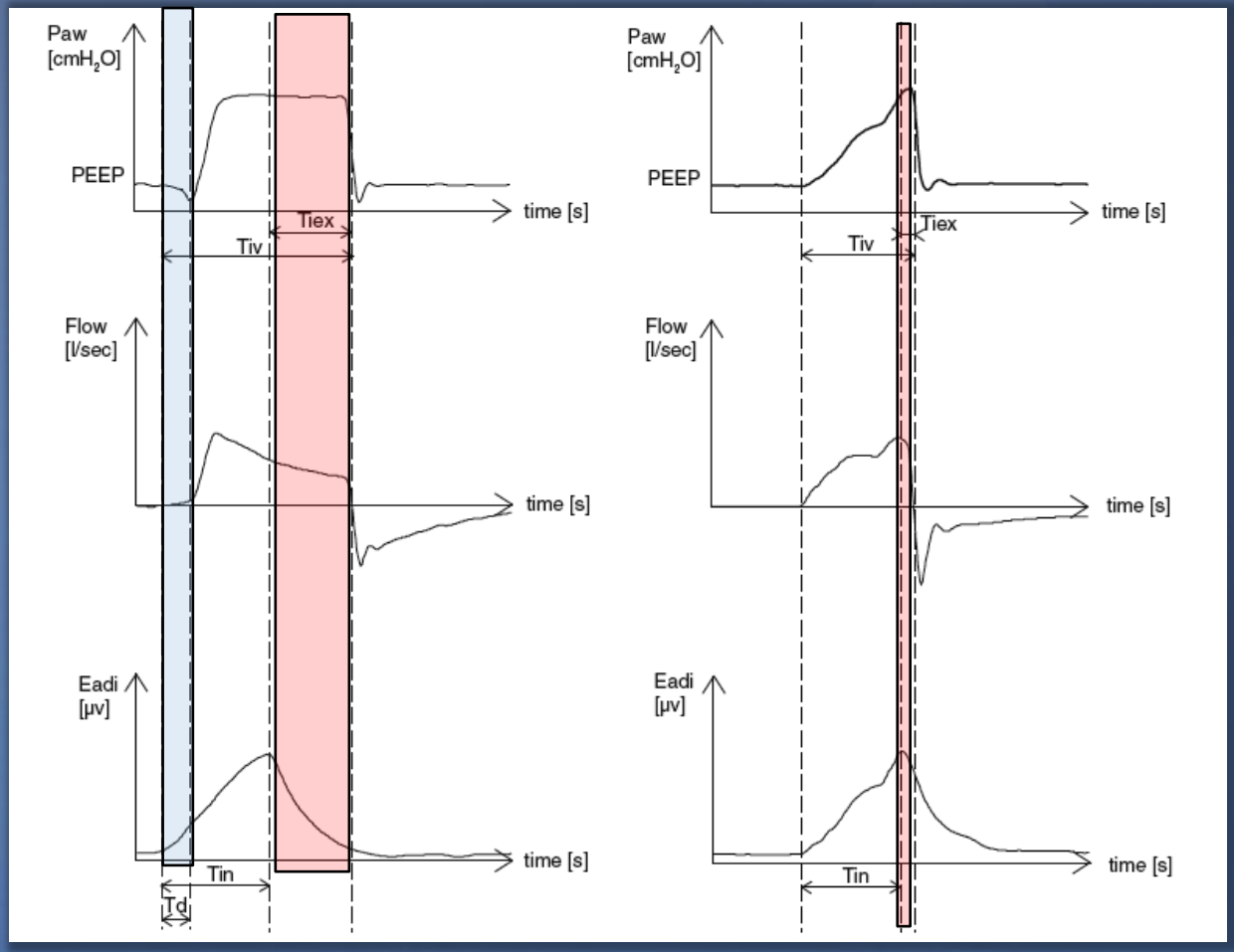
Pierre-François Laterre
Philippe Jolliet
Didier Tassaux

Neurally adjusted ventilatory assist improves patient–ventilator interaction



PROBLEMATICHE

- Formazione strutturata
- Location
- Monitoraggio continuo
- Dislocazione del sondino
- Unico fornitore software


" .... L' importante non è quello che trovi alla fine della corsa, ma quello che provi mentre corri ...."

Esamino di coscienza :

?

GRAZIE PER L'ATTENZIONE !!!!!!