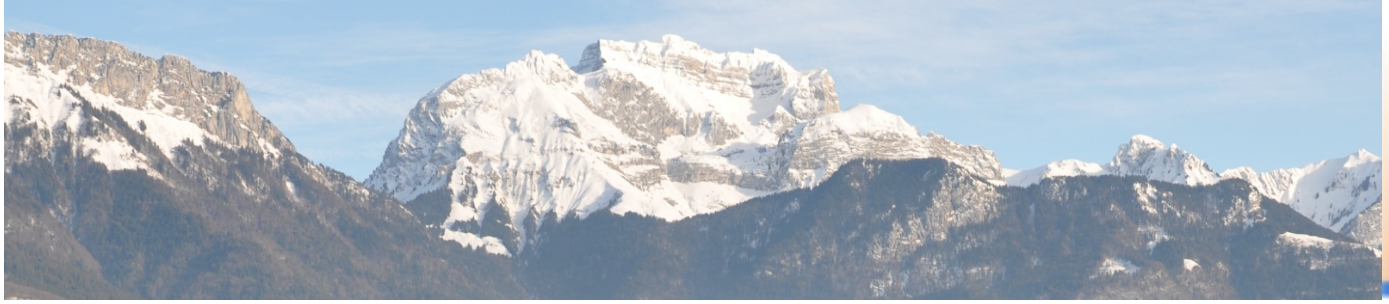


NOUVEAUTES DANS LA VENTILATION DE L'ARRET CARDIAQUE

Jean-Christophe M Richard, MD PhD

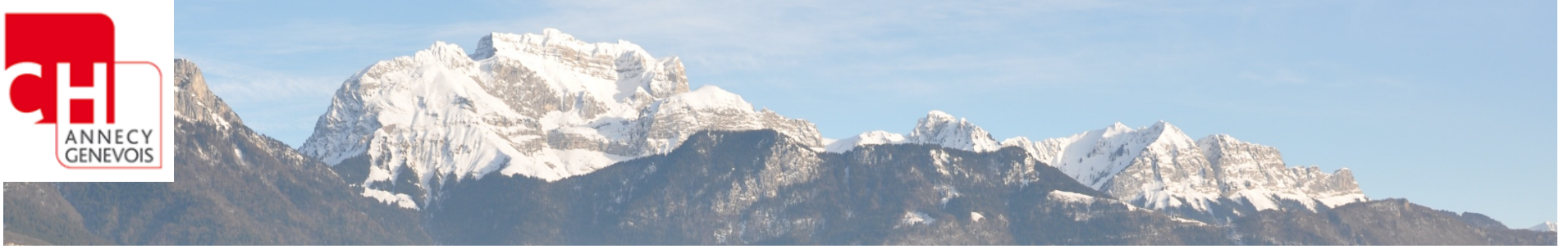
Pôle SAMU 74 Urgence et Réanimation Centre Hospitalier Annecy Genevois
INSERM UMR 955 Eq13

CONFLICTS OF INTEREST

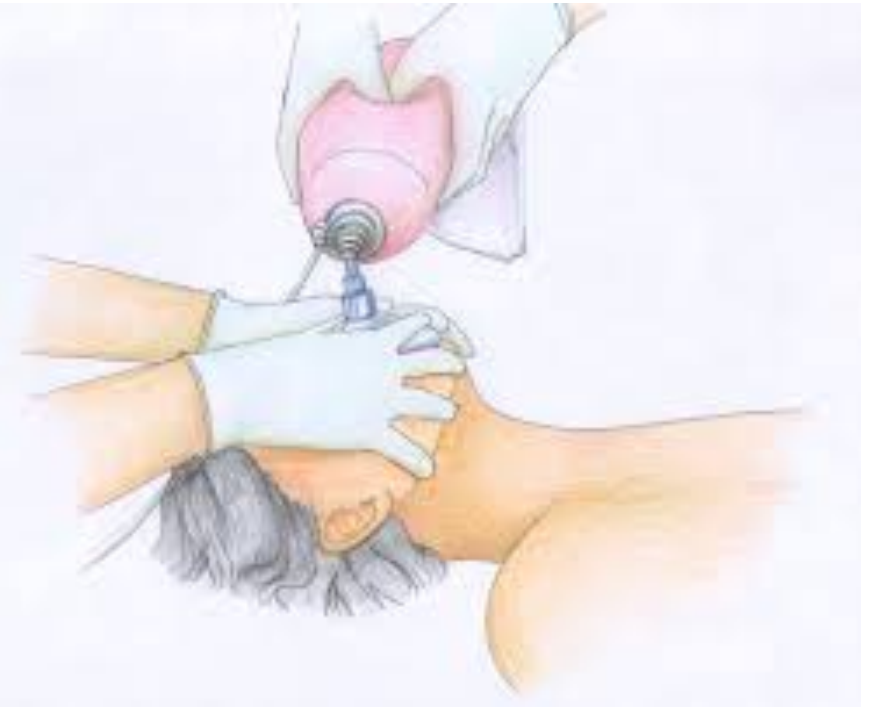
- Air Liquide Medical Systems (part time)

Financial support for research (Genève /Annecy/Angers)

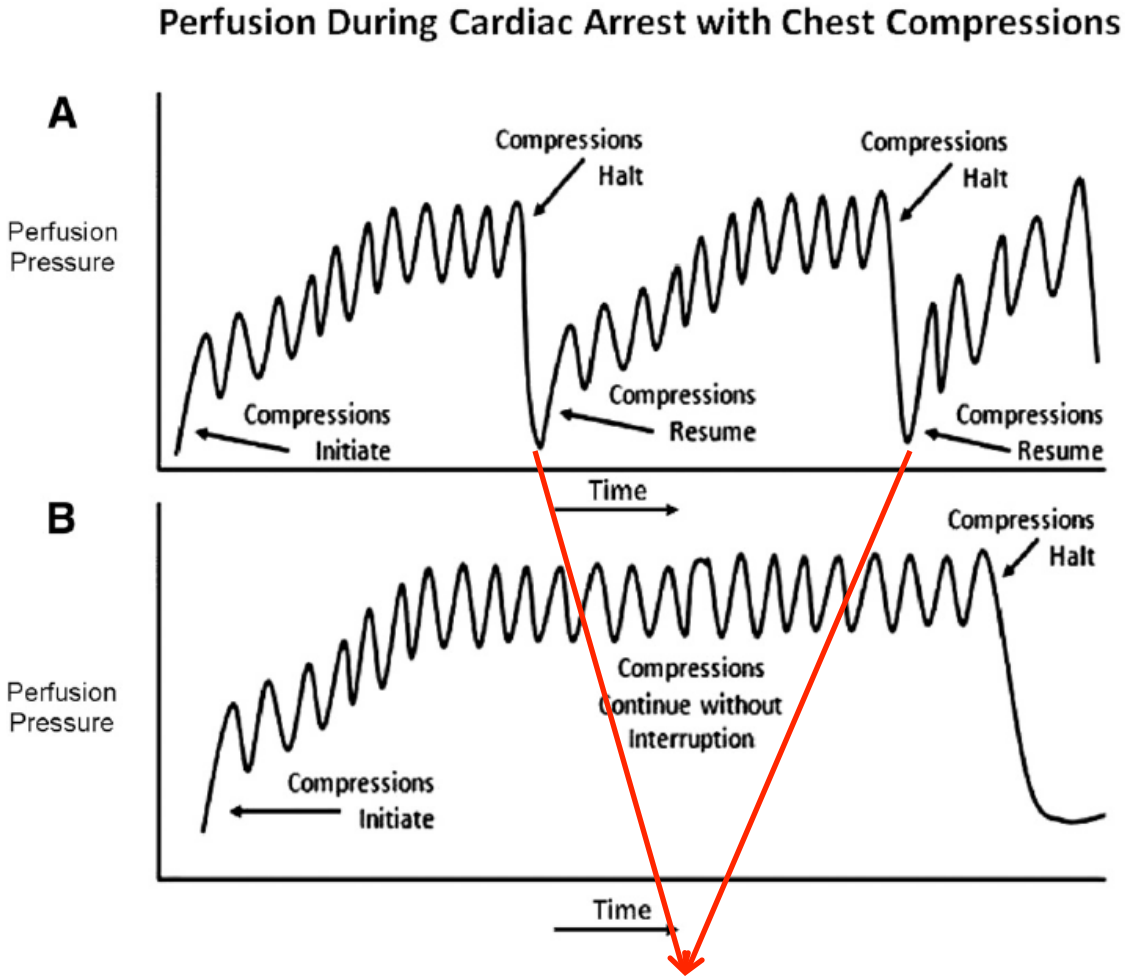
- **VYGON** (personal fee for lectures)
- **SHILLER**
- MAQUET (NAVA)
- COVIDIEN (PAV+) (personal fee for lectures)
- DRAGER (SmartCare)
- GE (FRC)



Usual CPR ventilation's practice worldwide

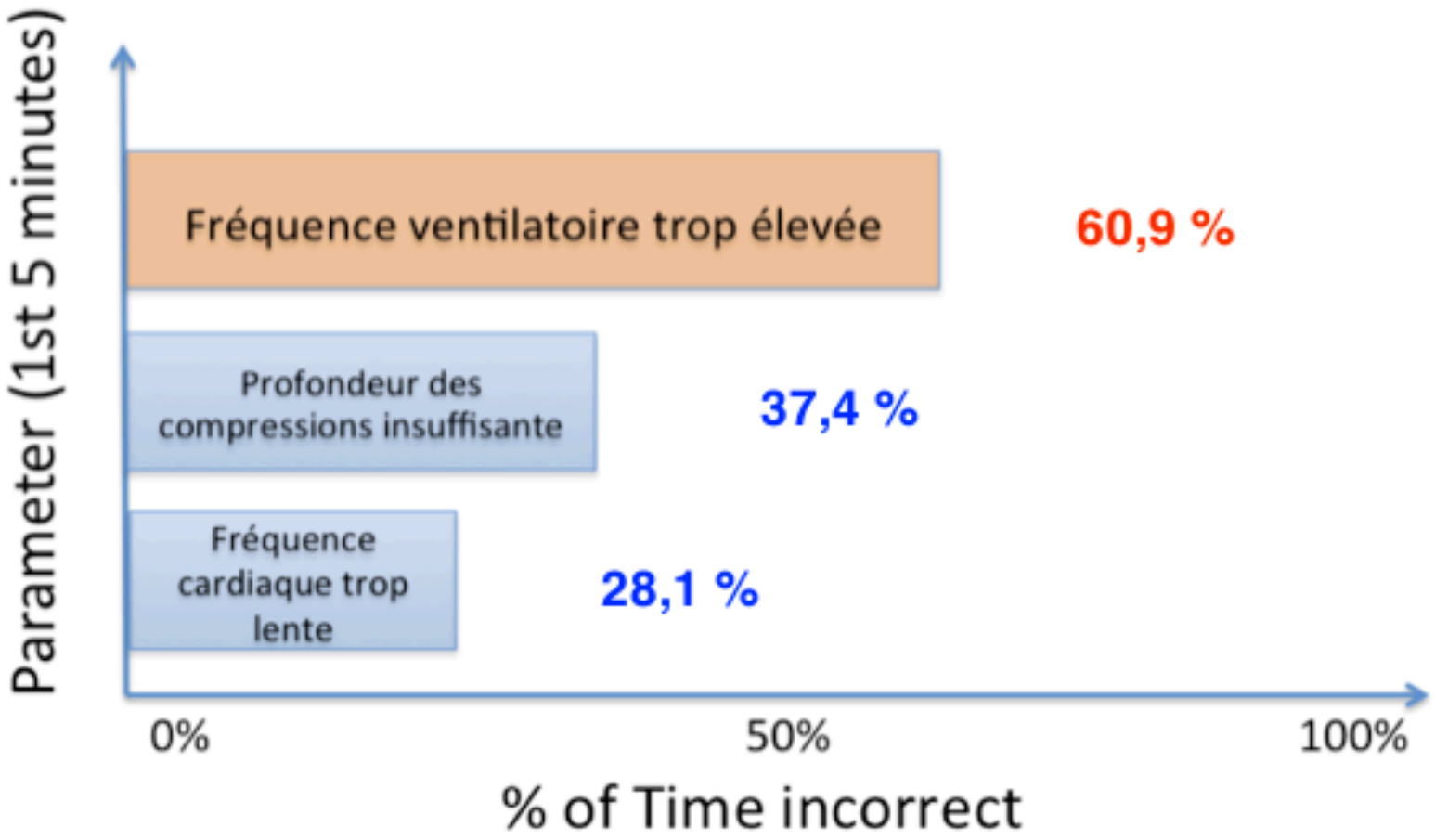


Risks associated with chest compressions interuptions



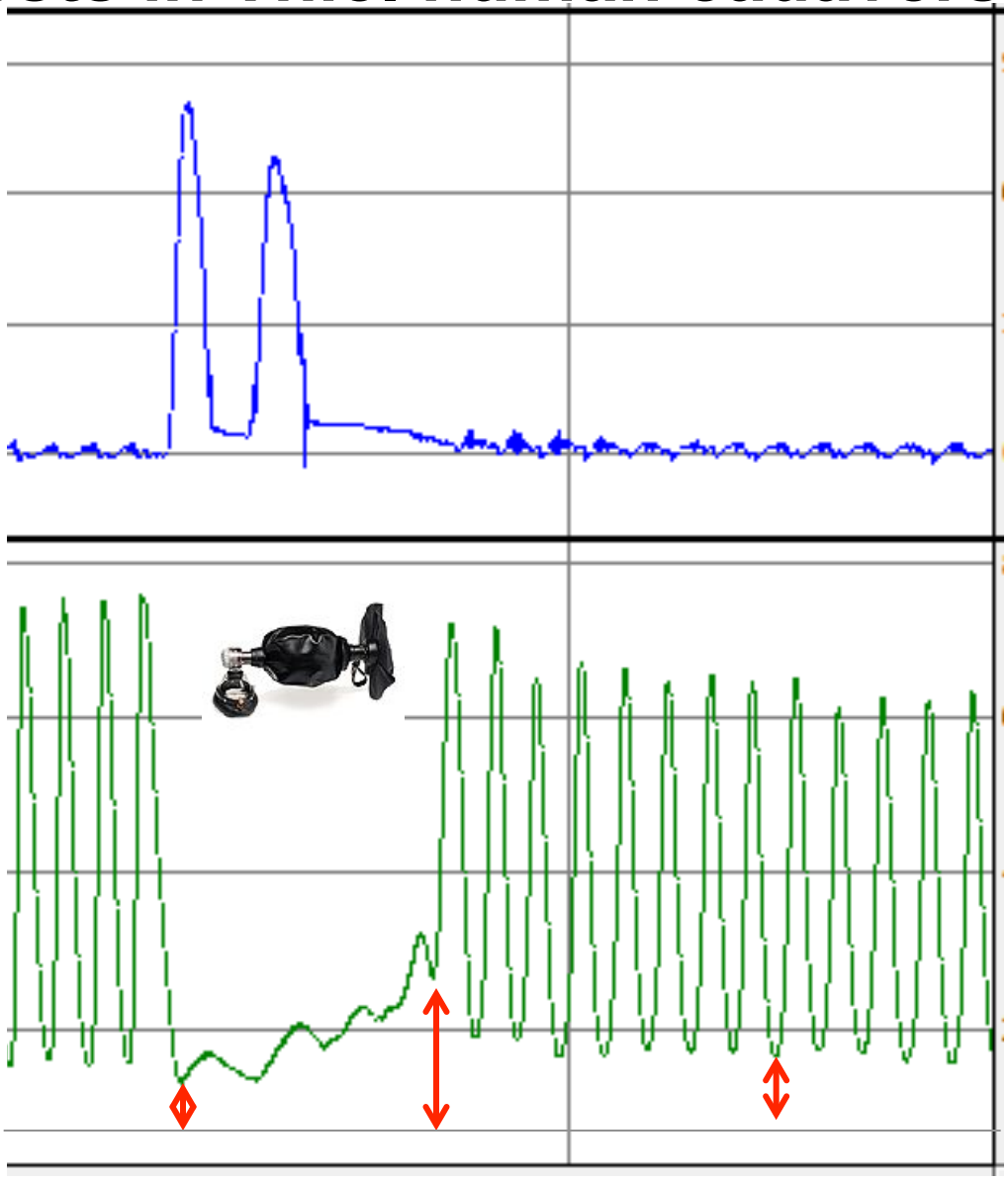
Ventilation/Fatigue/ Rythm Analysis

HARMFUL EFFECTS OF HYPER VENTILATION



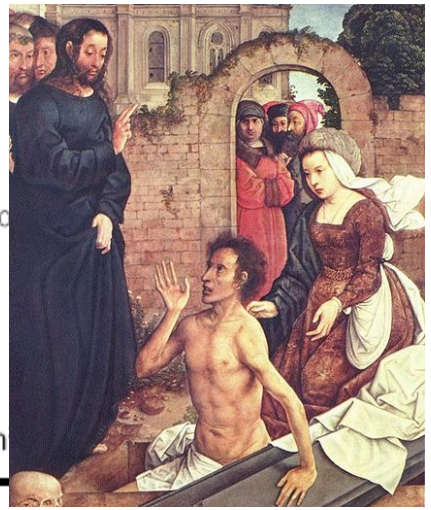
JAMA 2005

tests in Thiel human cadavers



30:2 CPR performed by 2 rescuers

Risks associated with Hyperventilation



JOURNAL OF THE ROYAL SOCIETY OF MEDICINE Volume 100

EWS

The Lazarus phenomenon

Vedamurthy Adhiyaman[1] Sonja Adhiyaman[2] Radha Sundaram

J R Soc Med 2007;**100**:552–557

Even though Lazarus phenomenon is rare, it is probably under reported. There is no doubt that Lazarus phenomenon is a reality but so far the scientific explanations have been inadequate. So far the only plausible explanation at least in some cases is auto-PEEP and impaired venous return. In

considered as a cause and a short period of apnoea (30–60 seconds) should be tried before stopping resuscitation. Since ROSC occurred within 10 minutes in most cases, patients should be passively monitored for at least 10 minutes after the cessation of CPR before confirming death.

eight had obstructive airways dis include ruptured abdominal aortic artery rupture, gastrointestinal haem due to renal failure, trauma, digox overdose with opiates and cocaine.

PHYSIOLOGICAL BACKGROUND

Rev Med Suisse 2013; 9: 2318-23

R. L. Cordioli
V. Garelli
A. Lyazidi
L. Suppan
D. Savary
L. Brochard
J.-C. M. Richard

Blood circulation
Cardiac output

Lung volume displacement
Ventilation

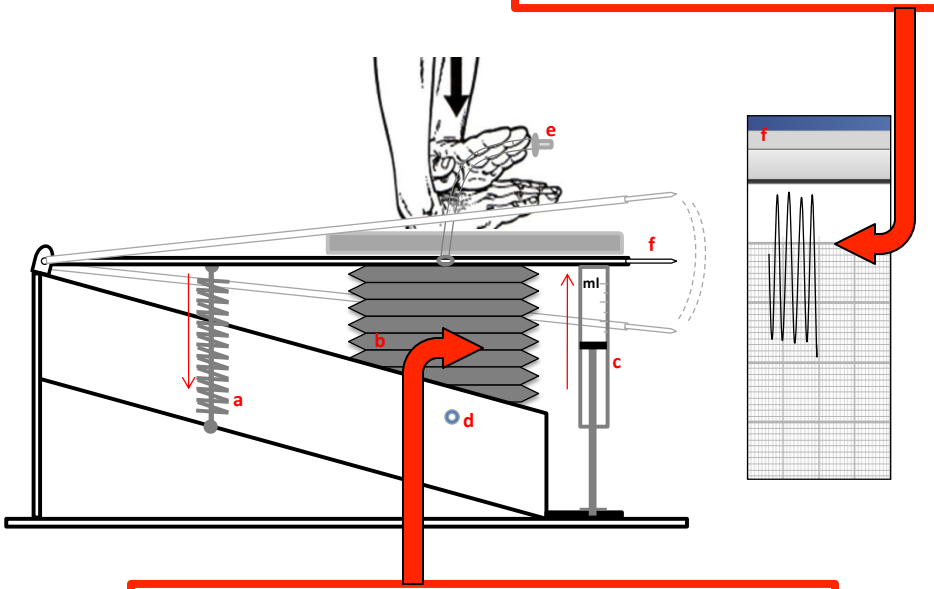
J Appl Physiol 120: 000–000, 2016.
First published November 19, 2015; doi:10.1152/japplphysiol.00632.2015.

Impact of ventilation strategies during chest compression. An experimental study with clinical observations

Ricardo L. Cordioli[1,2,3], Aissam Lyazidi[1,4,5] Nathalie Rey[6], Jean-Max Granier[1],

Dominique Savary[7], Laurent Brochard [8,9,10], Jean-Christophe M Richard[7,10]

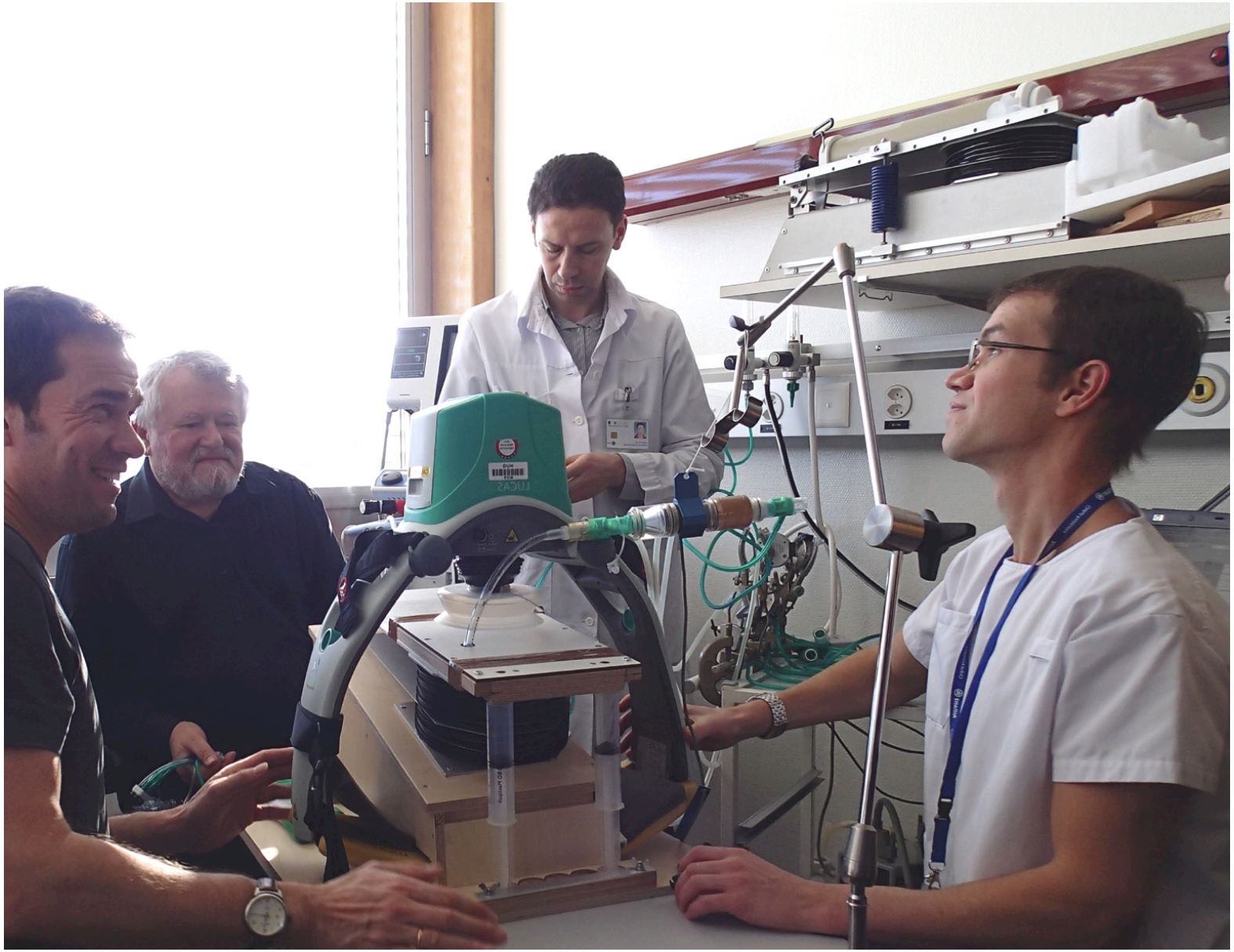
Change in lung volume: Vt and FRC



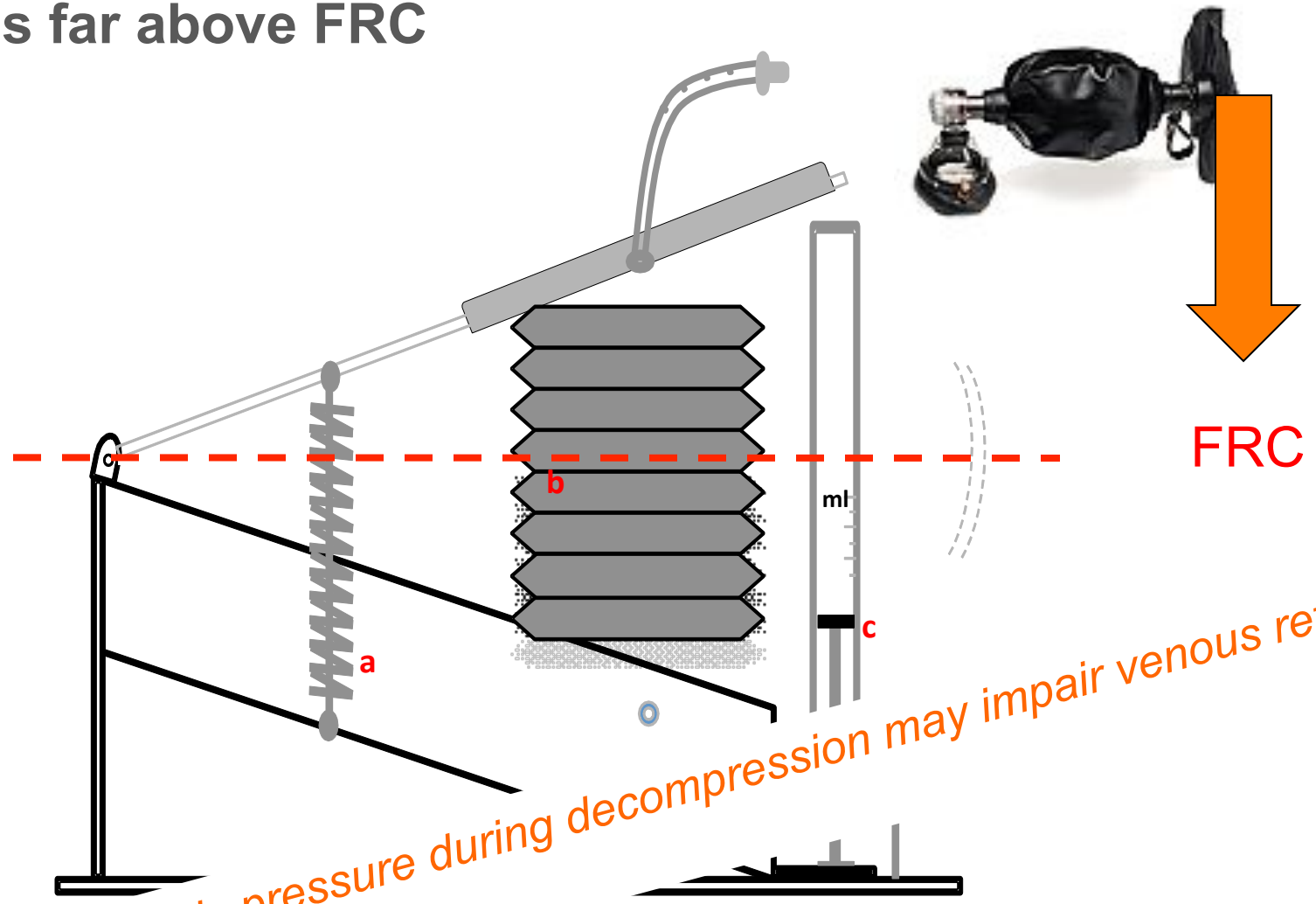
a. Ressort
b. Soufflet
c. Seringue
d. Prise de pression dans le soufflet
e. Entré d'air
f. Stylet et Papier millimétrique

Pressure transmitted into the thoracic compartment

aps American Physiological Society Journal of Applied Physiology

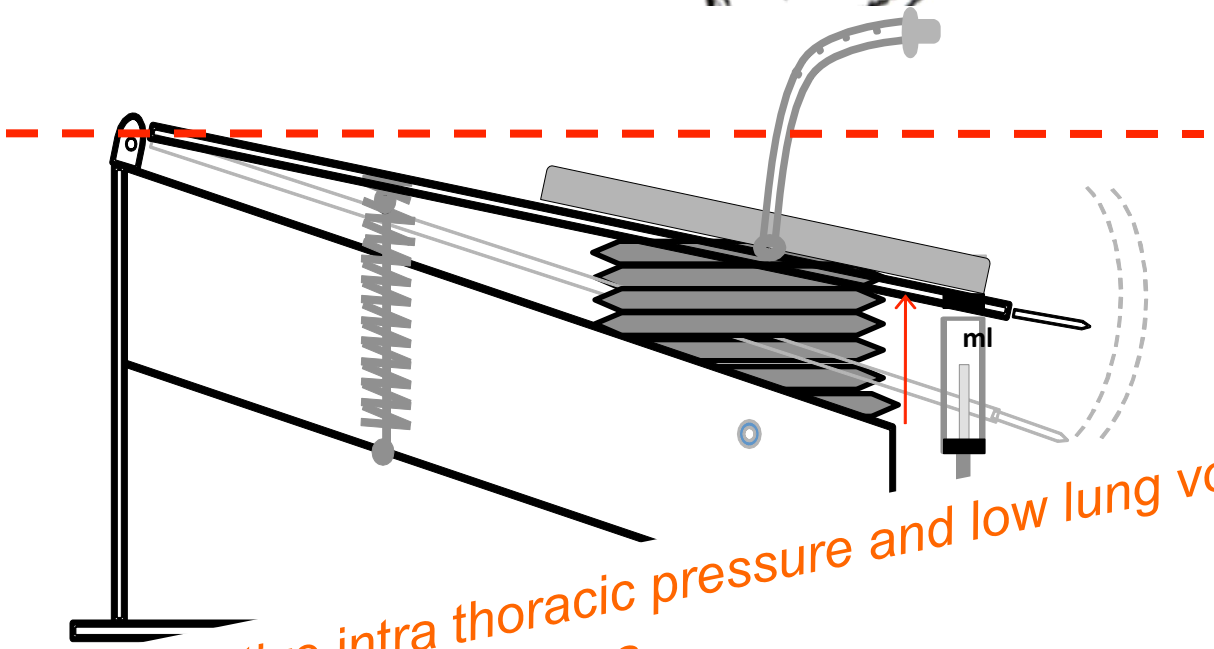


Adverse effects expected with increase in lung volumes far above FRC



Positive intra thoracic pressure during decompression may impair venous return

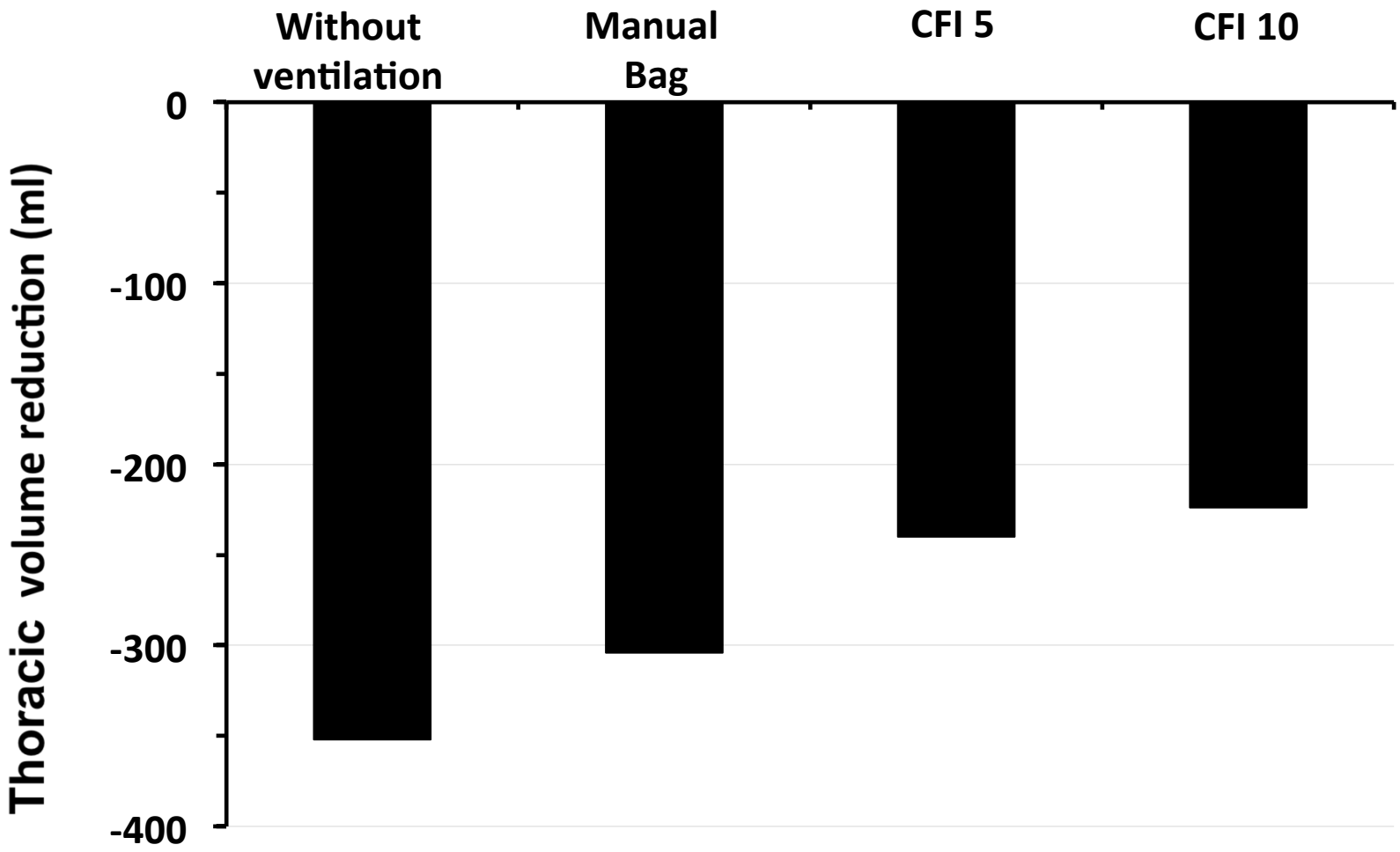
Adverse effects expected with reduction in lung volumes far below FRC



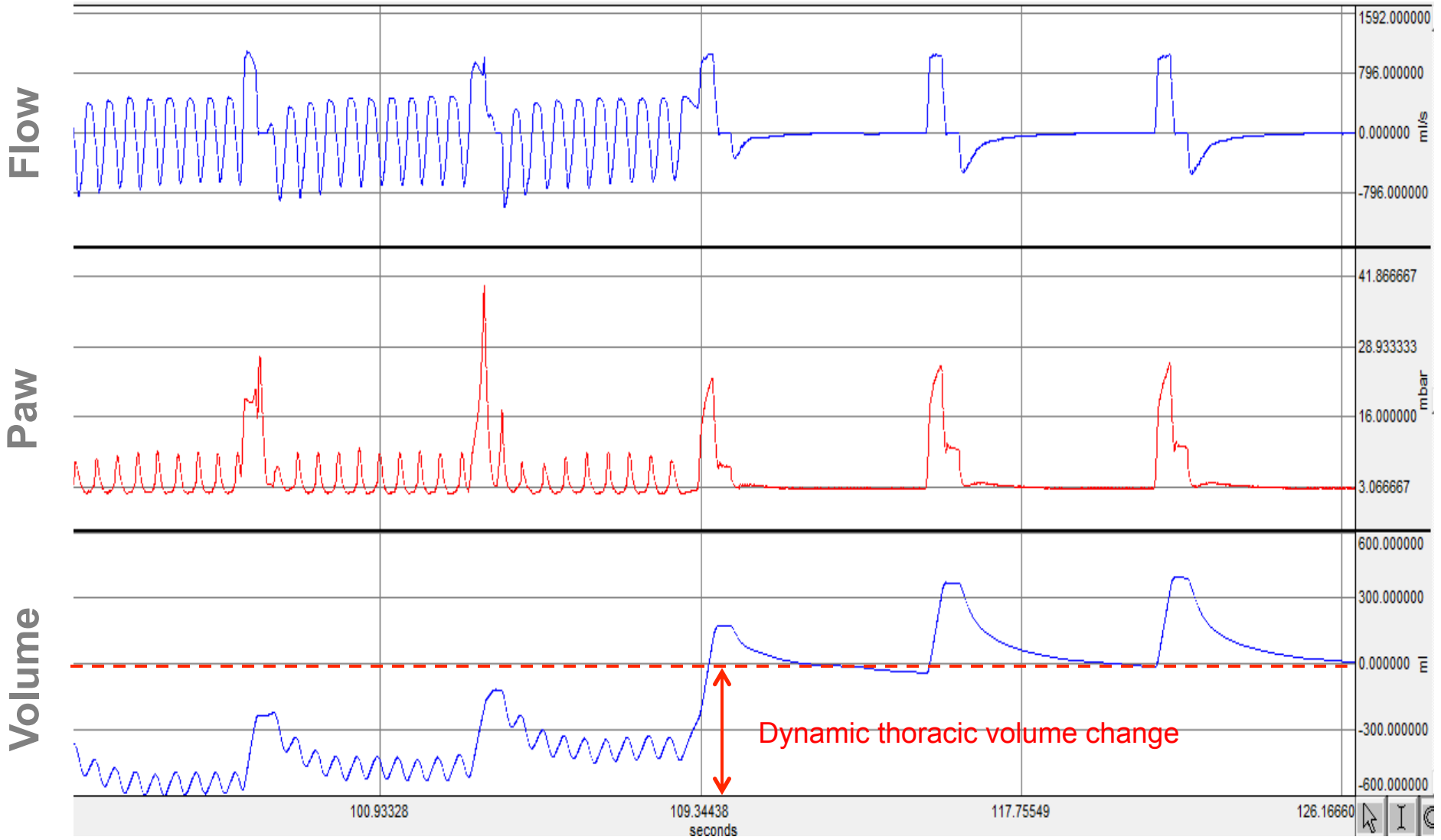
FRC

Negative intra thoracic pressure and low lung volume favor lung injury and edema

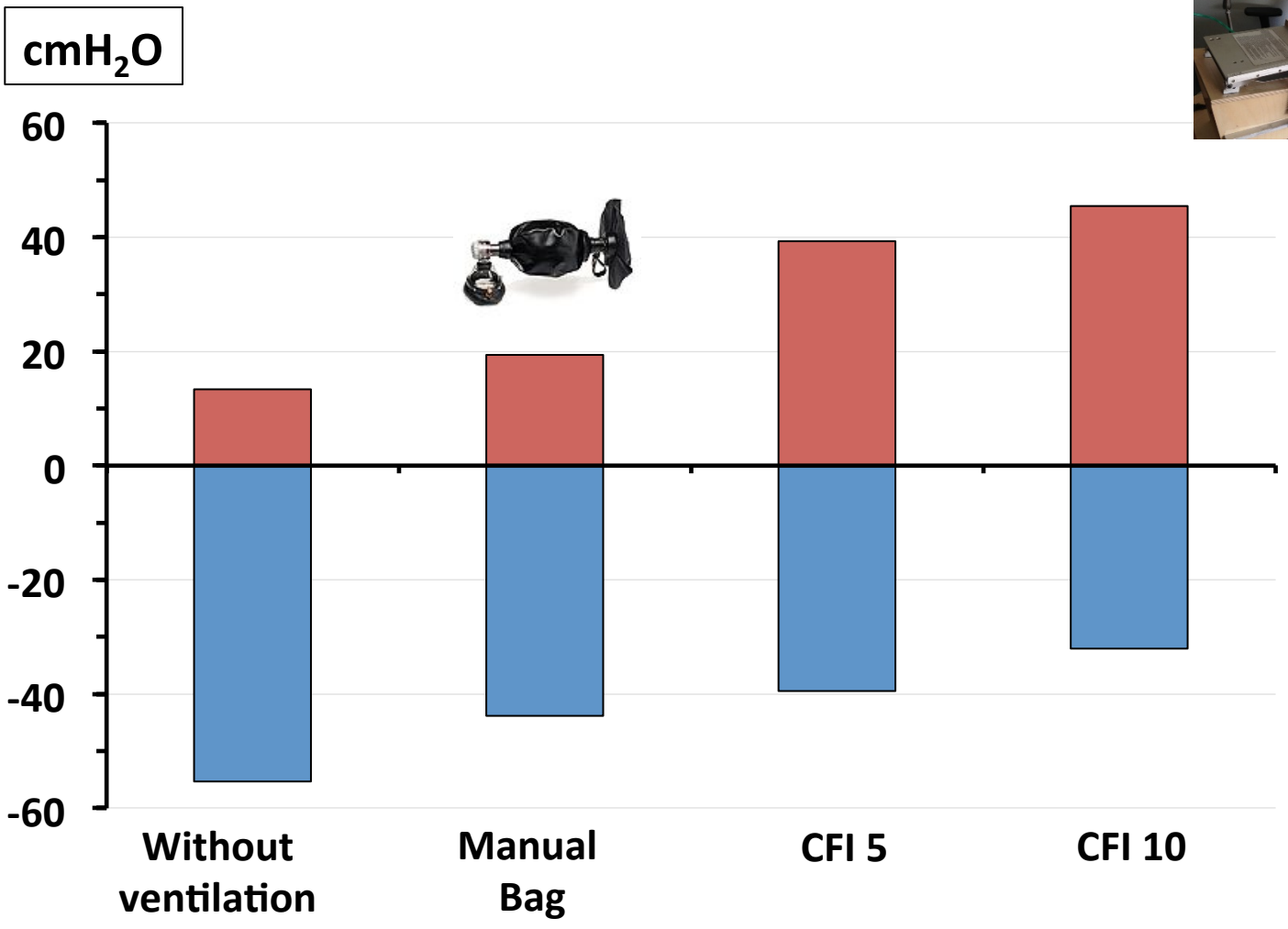
RESULTS WITH CFI 5



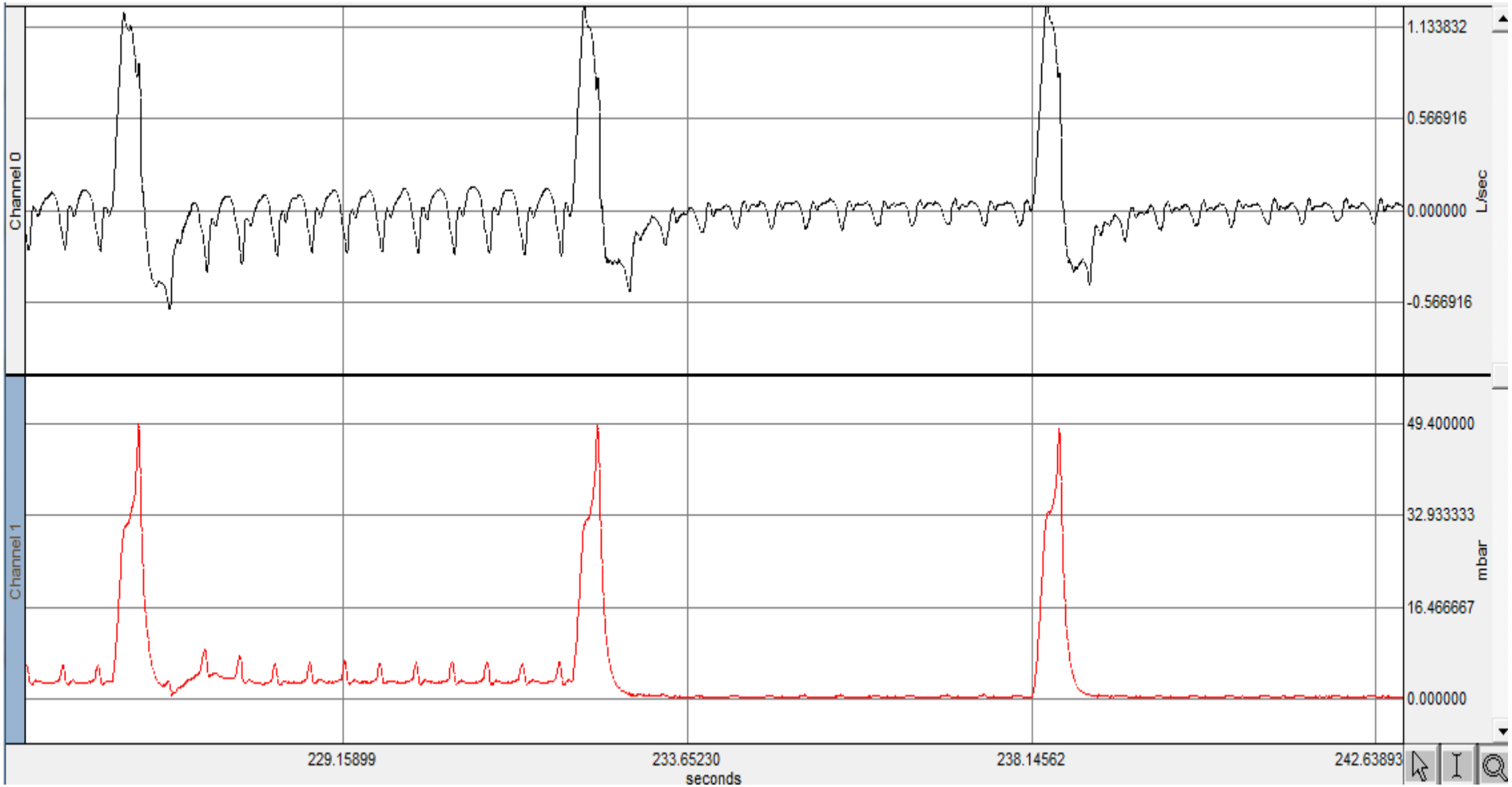
Clinical observation:
Reduction in lung volume below FRC during chest compressions



RESULTING PRESSURES WITH CFI 5

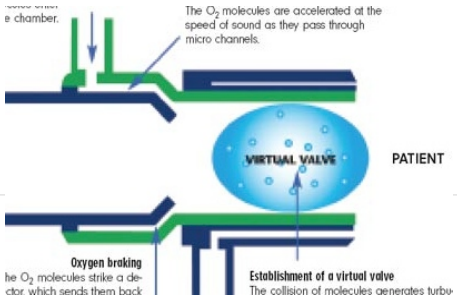


Clinical observation:
Airways collapse related to PEEP reduction



Change in intra thoracic pressure is no longer transmitted to Paw

Bench study



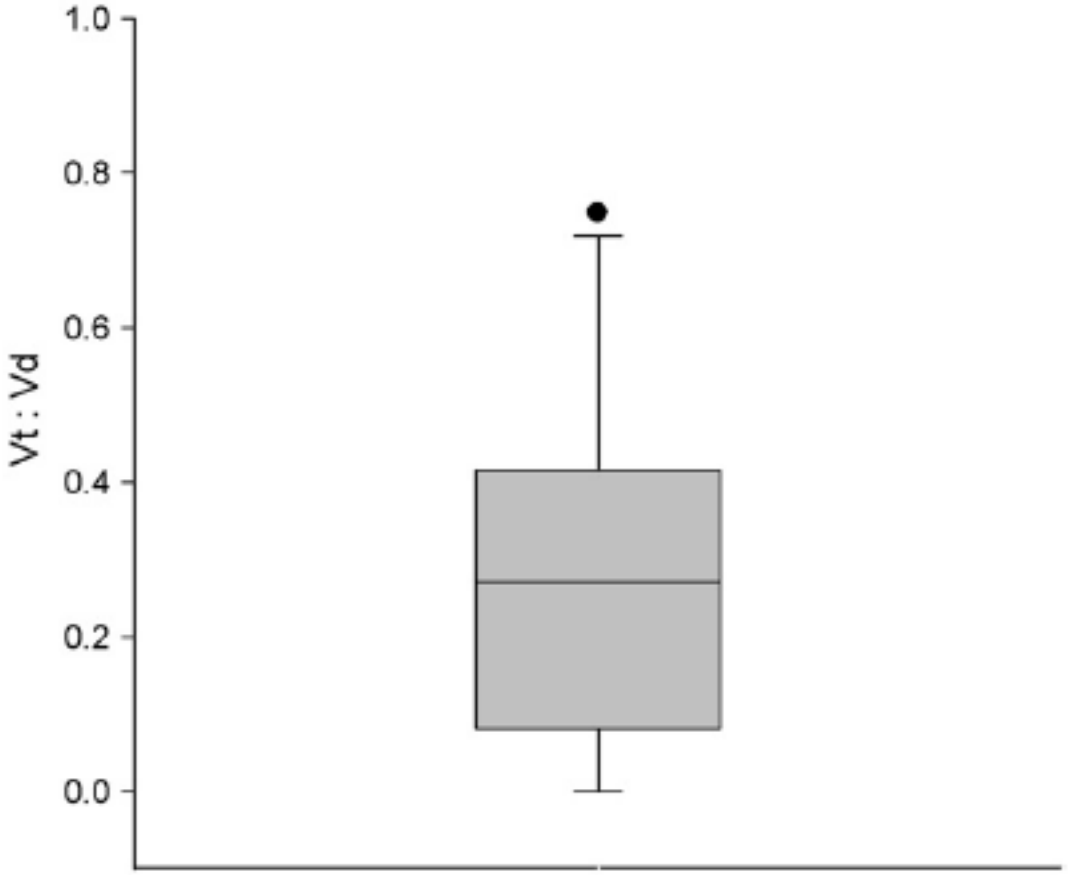
Dead space ventilation (Estimated physiological dead space = 200ml)

Calculated alveolar ventilation

Does compression-only cardiopulmonary resuscitation generate adequate passive ventilation during cardiac arrest?☆

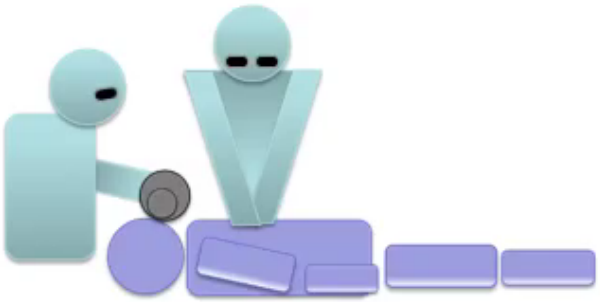
Charles D. Deakin[a,*], John F. O'Neill[b], Ted Tabor[c]

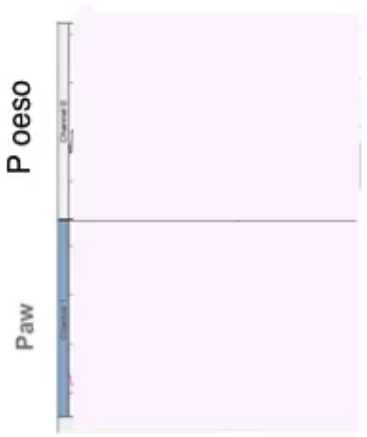
RESUSCITATION



CAVIAR
Cardiac Arrest and Ventilation
International Association for Research

Protocole THIEL

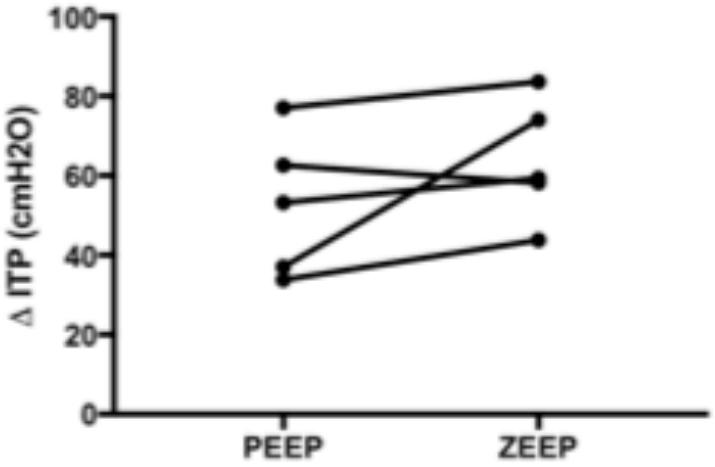


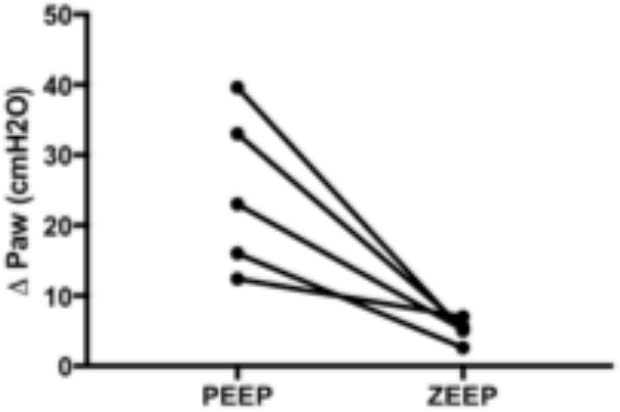


CAVIAR
Cardiac Arrest and Ventilation
International Association for Research

Intra-thoracic and airway pressure changes depend on PEEP application during Cardio Pulmonary Resuscitation: A Thiel cadaver model

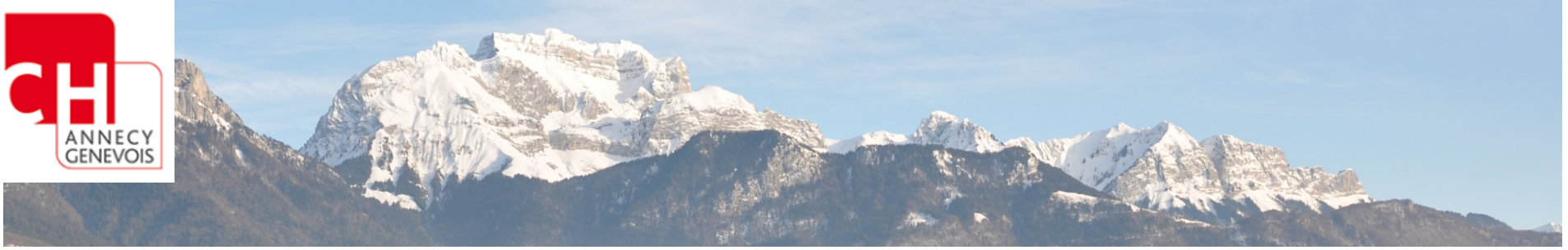
CAVIAR
Cardiac Arrest and Ventilation
International Association for Research





We confirmed the presence of airway closure in the absence of PEEP.

This suggest that in the absence of PEEP, oxygen may not reach the alveoli and the EtCO2 may not reflect alveolar CO2



EtCO2 during CPR : meaning and clinical application

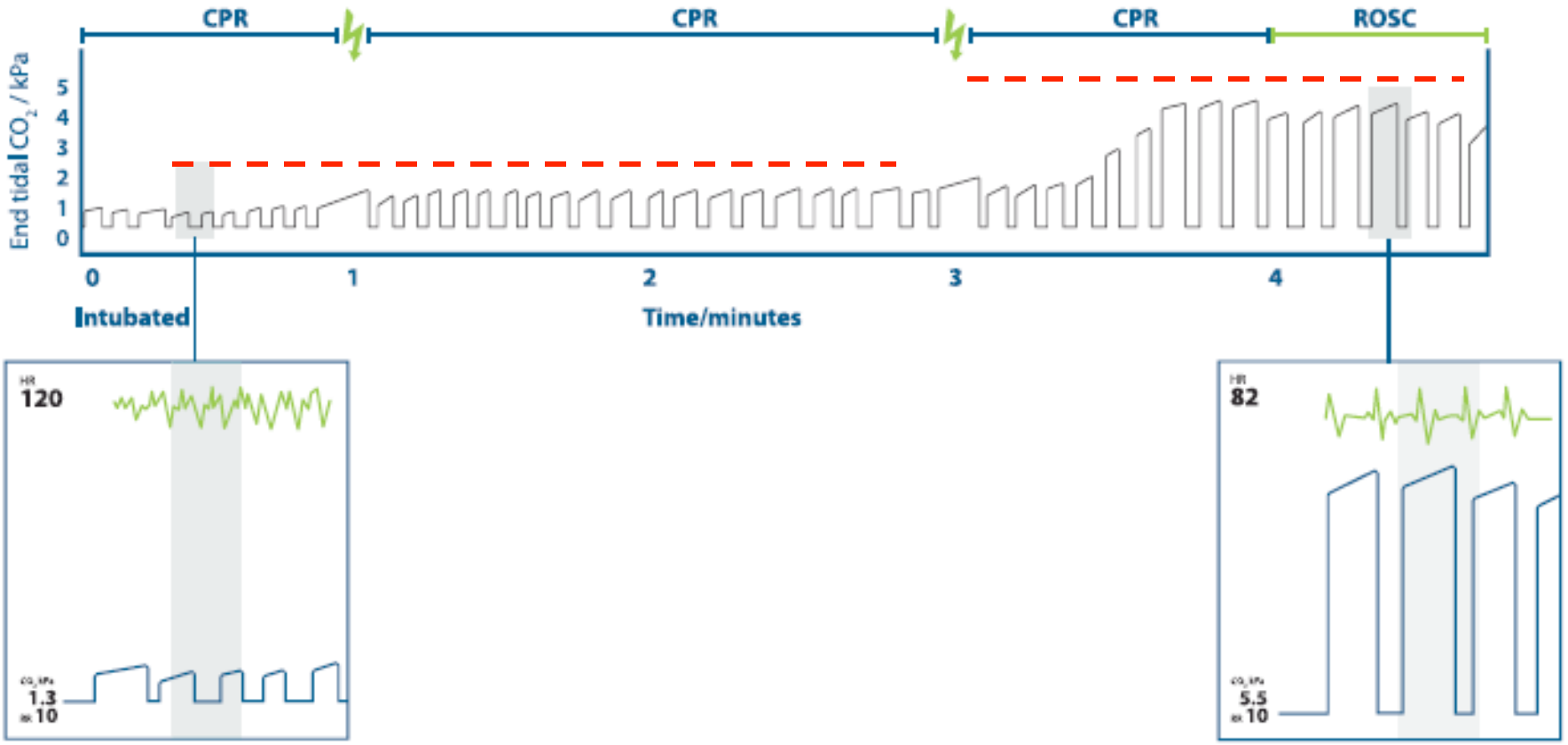
CPRS

CAVIAR
Cardiac Arrest and Ventilation
International Association for Research

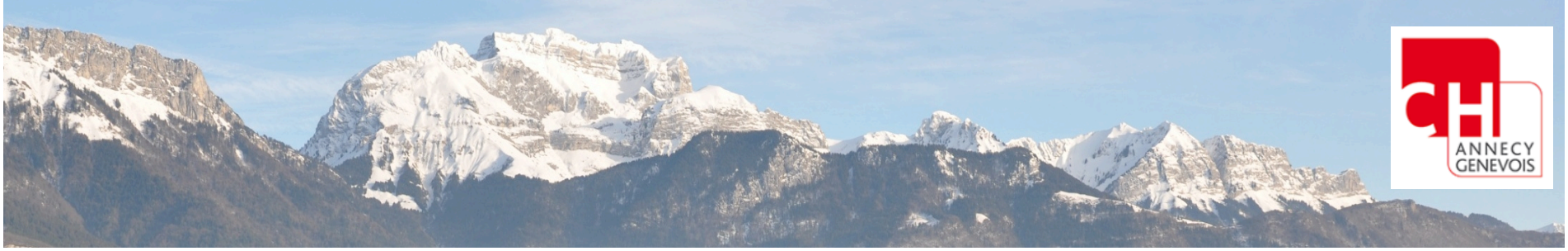
ENGAGE IGNITE IMPACT
Resuscitation in Motion
RiM 2016
May 2-3
Toronto, ON
www.resusinmotion.ca

25 March 2016

ERC Guidelines 2015 on $EtCO_2$ monitoring



"Our Lack of confidence in the accuracy of $EtCO_2$ measurement during CPR, and the need of advance airway to measure EtCO2 reliably, limits our confidence in its use for prognostication" ….



CARDIO PULMONARY VENTILATION: SPECIFICATIONS

① Compatible avec les recommandations internationales

② Eviter les effets délétères de la ventilation au BAVU

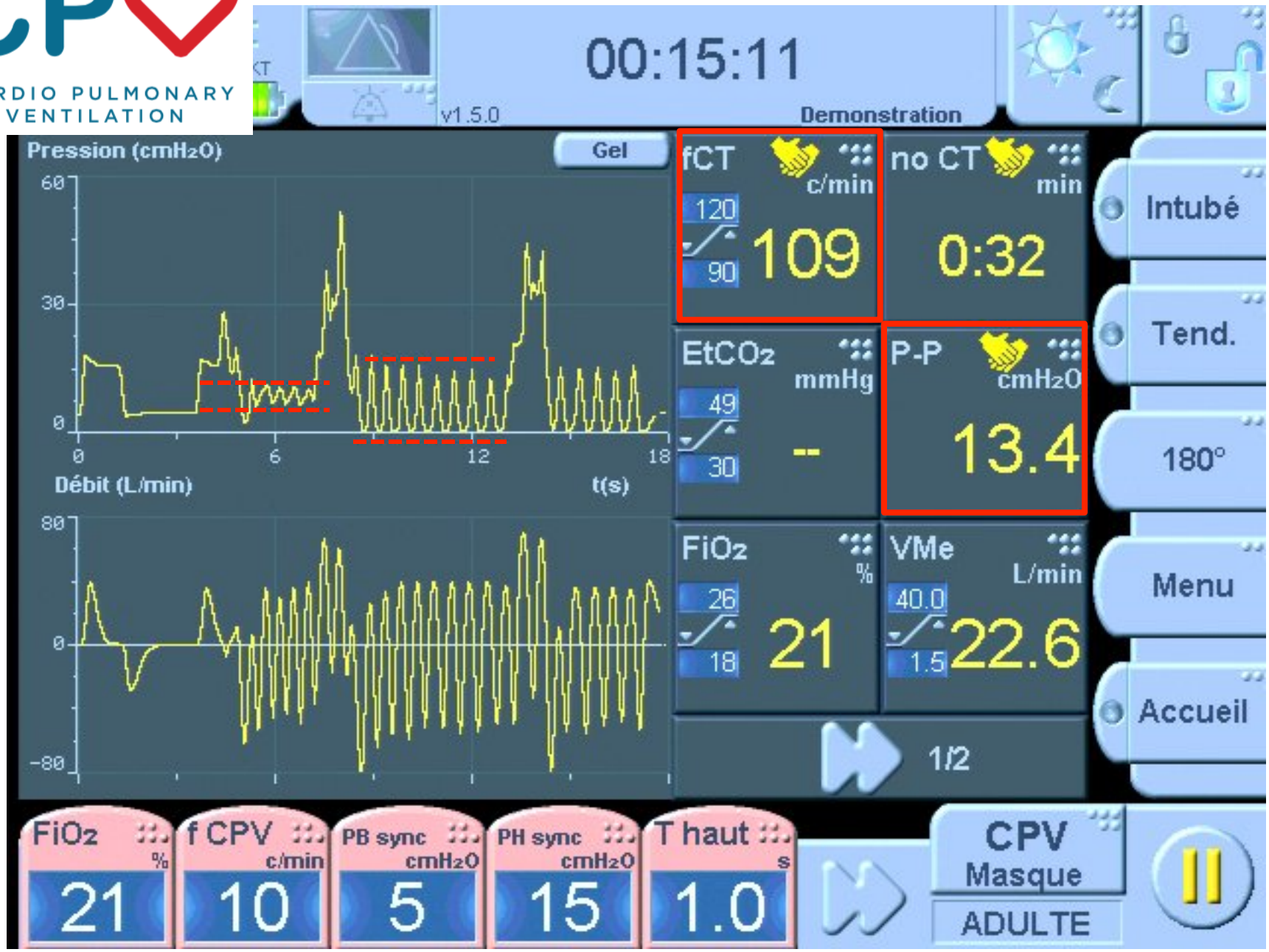
③ Optimiser la circulation en facilitant les CT continues

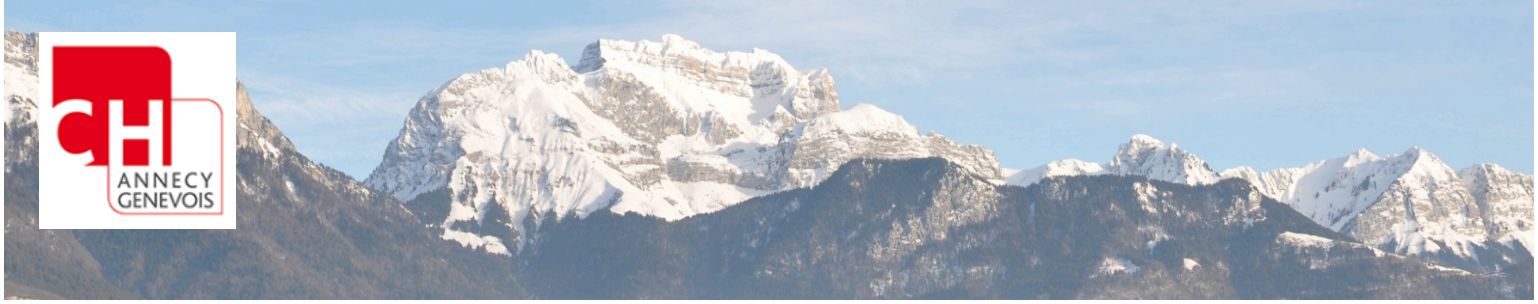
④ Couvrir automatiquement BLS et ALS (ACLS)

⑤ Permettre un monitoring simple et adapté

CPV
CARDIO PULMONARY VENTILATION

CARDIO PULMONARY VENTILATION





CONCLUSIONS

- La ventilation au BAVU est complexe dangereuse et peu efficace
- Pendant la RCP les volumes pulmonaires son réduits et les voies aériennes se ferment compromettant ainsi oxygénation et ventilation alvéolaire.
- Les chiffres instantanés d'EtCO2 sont difficilement interprétables et donc utilisables pour pour la pratique.
- La ventilation induite par les CT est insuffisante dès que la RCP se prolonge
- L'approche « BCARD-CPV » facilite l'application continue des CT et et permet un pourcentage de CT continues élevé (Fraction CPR) et permet d'optimiser la ventilation.