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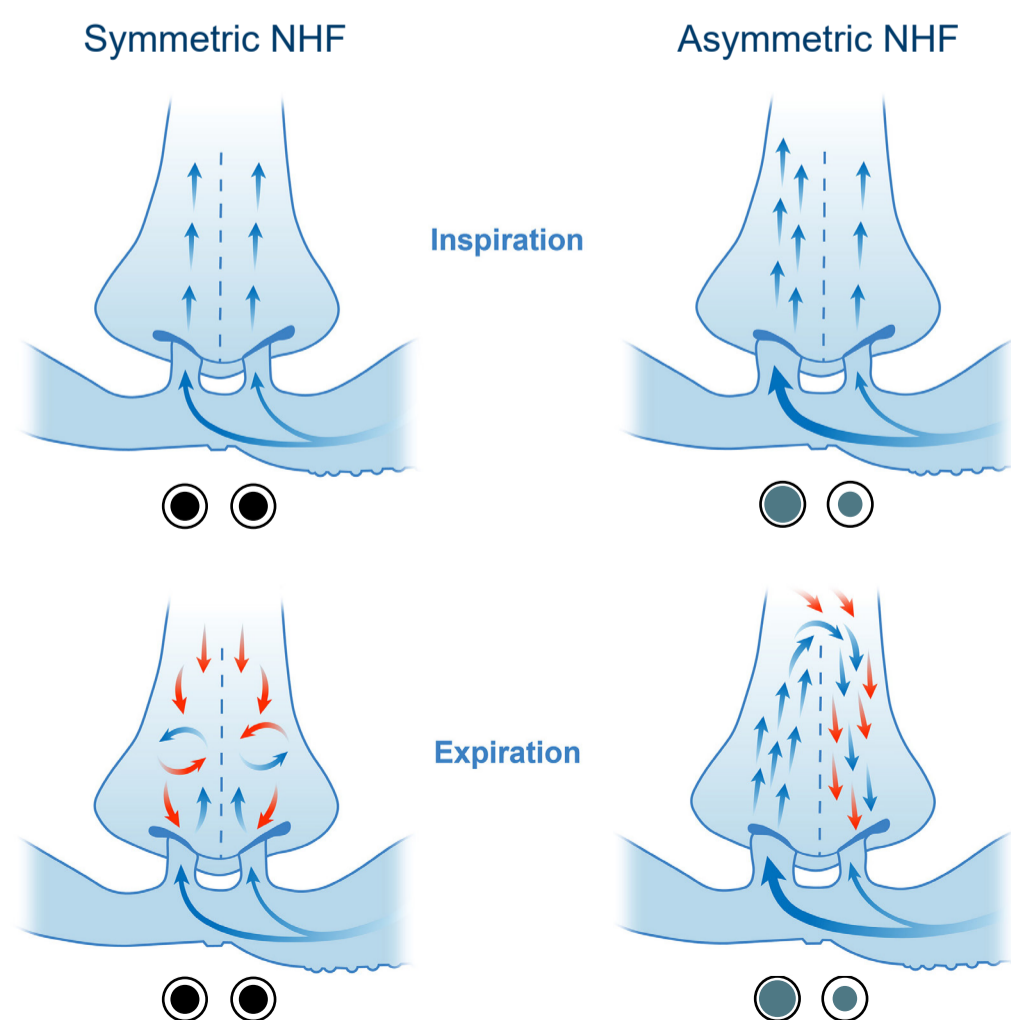
**Asymmetrical nasal high flow ventilation improves clearance of CO<sub>2</sub> from the anatomical dead space and increases positive airway pressure**

**Aim of the study**

To test if asymmetric nasal high flow (NHF) improves and accelerates dead space clearance, when time for clearance is reduced (increased respiratory rate and expiratory flow limitations) and to determine the effect of asymmetric occlusion on airway pressure.

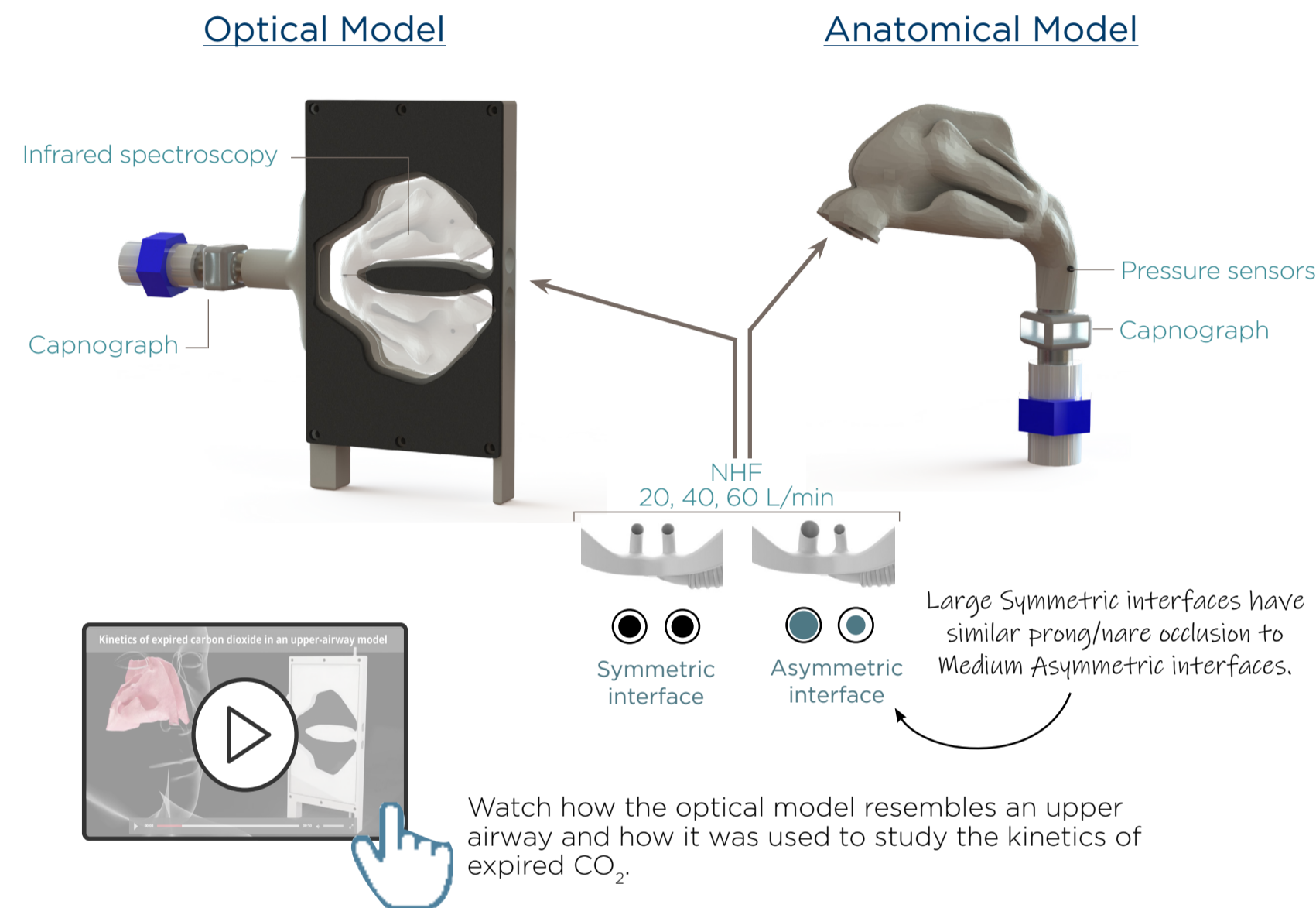
**Conclusion**

Asymmetric occlusion of the nares improved dead space clearance through asymmetric flow and increased airway pressure.



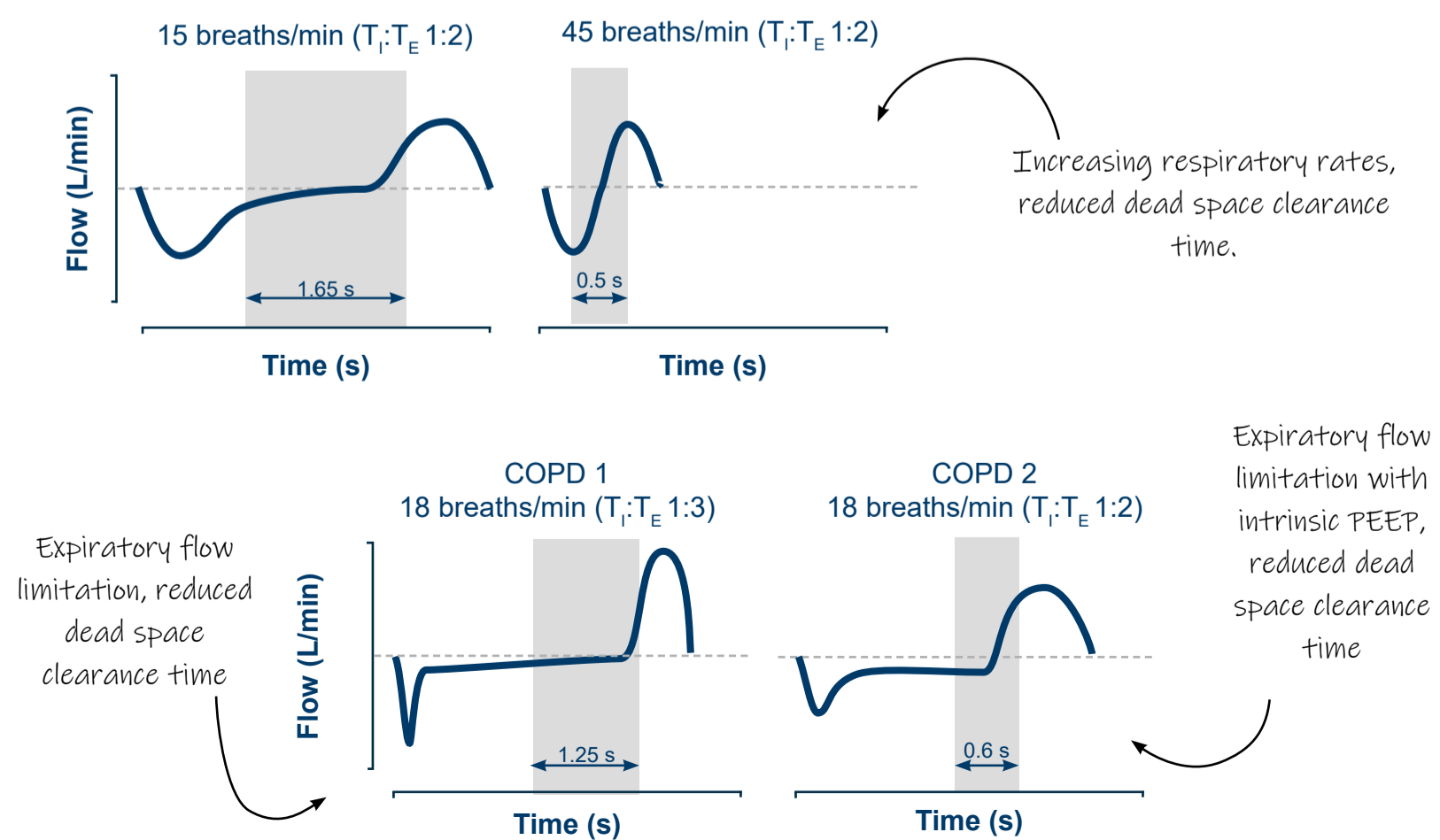
Two upper airway models were connected to a lung simulator and symmetric or asymmetric interfaces delivering NHF. The models were used to measure dead space clearance, using volumetric capnography and infrared spectroscopy, and airway pressure, using sensors.

**Upper Airway Models**

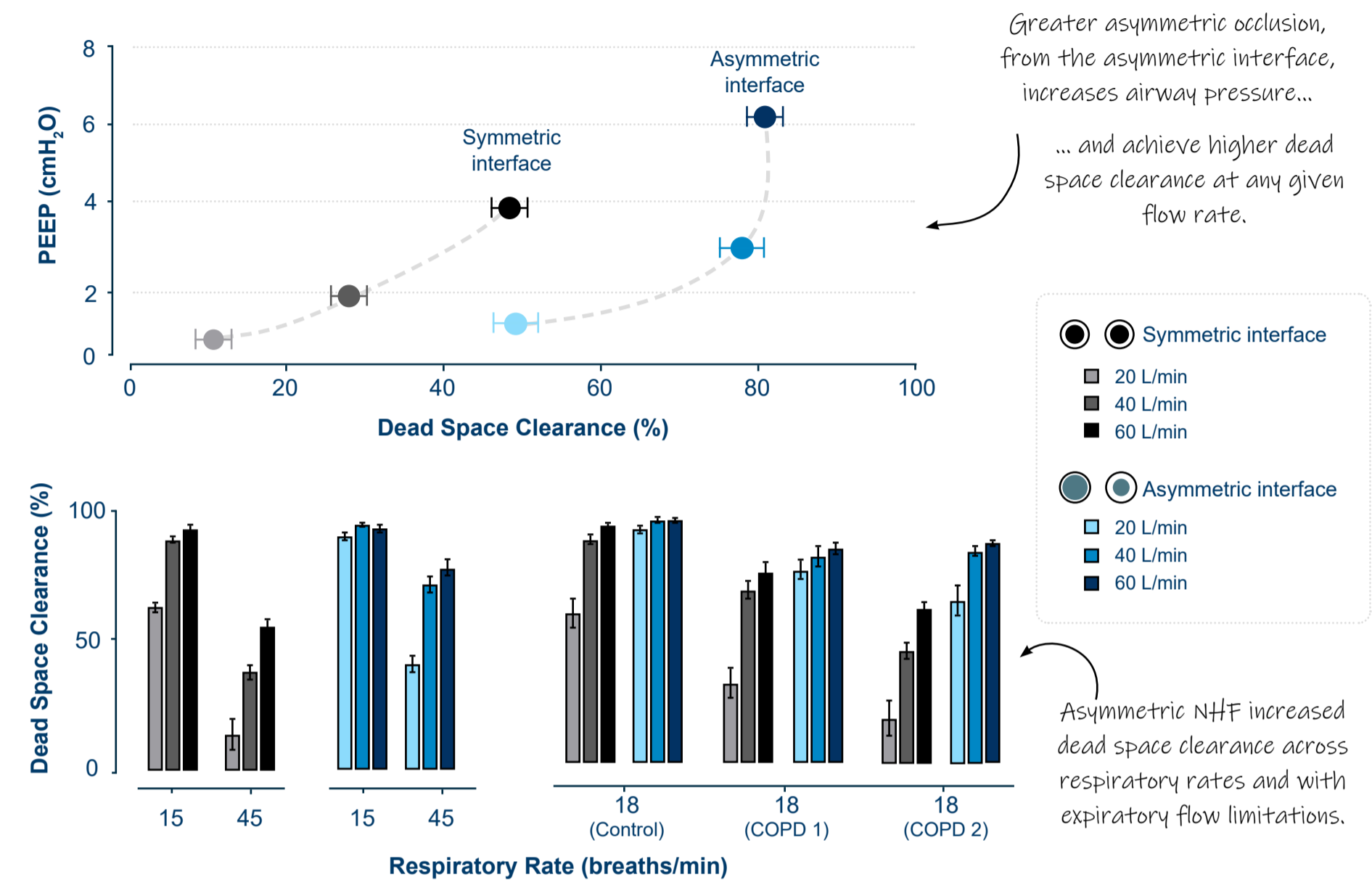


**Breathing Patterns from Lung Simulator**

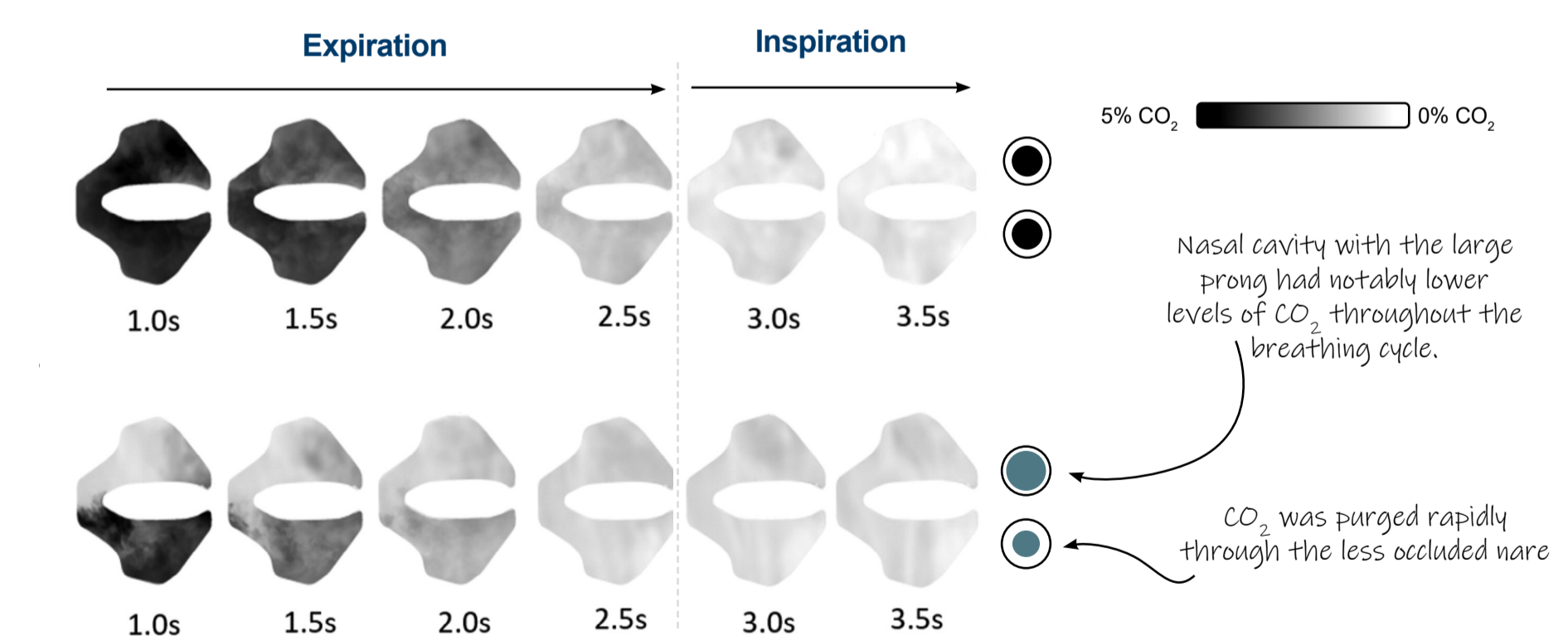
Dead space clearance time (grey shaded area) changed by respiratory rate and expiratory flow limitations.



**Increased dead space clearance and PEEP with asymmetric NHF compared to symmetric NHF**



**Accelerated dead space clearance with asymmetric NHF**



Watch how CO<sub>2</sub> is cleared from the optical upper airway model with asymmetric and symmetric NHF.

Video Abstract

Full paper