



# cerebral oxygenation in chronic obstructive pulmonary patients

Cardiorespiratory fitness effect on

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### **1** Introduction:

Chronic obstructive pulmonary disease (COPD) is often associated with brain functioning deregulation and lower cerebral oxygenation than healthy during exercise (1). Low cerebral oxygenation is associated with cognitive decline and may lead to higher risk of neurodegenerative disease. However, positive impact of physical activity on brain health is recognized (2).

The aim of this study was to assess the influence of cardiorespiratory fitness on cerebral oxygenation



## during exercise in COPD patients.



**A** <sup>6</sup>





**During exercise**: (Fig 1 A and B) Changes in tHb, O<sub>2</sub>Hb and HHb increased from baseline during exercise.

Changes in tHb and O<sub>2</sub>Hb were more important in the higher fit group.

**During recovery**: (Fig 1 A and B) Changes in tHb and O<sub>2</sub>Hb stay higher in the most fit group. Changes in HHb decreased all along recovery.

**Fig 1**: Kinetics of  $O_2$ Hb (Panel A) and  $\Delta$ tHb (Panel B) during exercise and recovery . \* different from baseline ; # different from lower fit (p<0.05).



Significant correlations between  $\dot{v}O_{2peak}$  vs  $\Delta tHb_{VO2peak}$  and  $\dot{v}O_{2peak}$  vs  $\Delta O_{2}Hb_{VO2peak}$ 



#### **4 Conclusion:**

The patients who presented a higher  $VO_{2peak}$  also had a higher cerebral oxygenation and better compliance during exercise and recovery. This results could be explained by a better transport of  $O_2$  to brain probably due to by a better cerebral blow flow (3). Our results are in accordance with the hypothesis by Davenport et al (4) in healthy subjects that better cardiorespiratory fitness is accompanied by a higher cerebrovascular reserve during exercise.

As cerebral oxygenation is a major feature of brain functioning and health, it is one more reason to encourage COPD patients to be active.

<sup>V</sup>O<sub>2peak</sub> (ml.min<sup>-1</sup>.kg<sup>-1</sup>)

**Fig 2**: Correlation between  $VO_{2peak}$  versus  $\Delta O_2Hb$  at  $VO_{2peak}$  (Panel A) between  $\dot{V}O_{2peak}$  versus  $\Delta tHb$  at  $VO_{2pea}k$  (Panel B).

### Réferences:

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