

## 9366

# Inspiratory muscle effort, perfusion and oxygenation responses to inspiratory muscle training (IMT) with Tapered Flow Resistive Loading (TFRL) and Normocapnic Hyperpnea (NH) in COPD.

COPD, Respiratory muscle, Exercise

Z. Louvaris<sup>1</sup>, S. Dacha<sup>1</sup>, L. Janssens<sup>2</sup>, R. Gosselink<sup>1</sup>, I. Vogiatzis<sup>3</sup>, D. Langer<sup>1</sup>

<sup>1</sup>Faculty of Kinesiology and Rehabilitation Sciences, Department of Rehabilitation Sciences, Research Group for Rehabilitation in Internal Disorders, KU Leuven. Respiratory Rehabilitation and Respiratory Division, University Hospital Leuven, Belgium. - LEUVEN (Belgium),

<sup>2</sup>Department of Rehabilitation Sciences, Musculoskeletal Research Group KU Leuven, Belgium. – LEUVEN (Belgium),

<sup>3</sup>Department of Sport, Exercise and Rehabilitation, Faculty of Health and Life Sciences, Northumbria University Newcastle, UK. - NEWCASTLE (United Kingdom)

**Background:** Inspiratory muscles of COPD patients undergo adaptations in response to stimuli of overload during IMT however little is known about specific characteristics of stimuli provided by different types of IMT.

**Aim:** To compare physiological responses of scalene [SCAL] and intercostal [INTER] muscles between two types of IMT.

**Methods:** In 7 COPD patients (FEV<sub>1</sub>:62±15%pred) we measured cardiac output [CO] (impedance cardiography), O<sub>2</sub> uptake, O<sub>2</sub> delivery (by pulse oximetry & CO), pressure time product [PTP<sub>insp</sub>] and total work of inspiration [W<sub>insp</sub>] (esophageal catheter), SCAL and INTER muscles blood flow index [BFI] (NIRSICG) and oxygenation [%StiO<sub>2</sub>] during a high intensity TFRL session of 30 breaths (50%P<sub>imax</sub>) and a NH (80%M<sub>VV</sub>) to exhaustion.

**Results:** Compared with TFRL, NH induced a greater increase in CO (6.4±0.5 vs 5.9±0.5L/min), O<sub>2</sub> uptake (588±55 vs 521±84ml/min), O<sub>2</sub> delivery (1.24±0.14 vs 1.11±0.11L/min) and PTP<sub>insp</sub> (-208±31 vs -61±11cmH<sub>2</sub>O/s/min, p<0.05). However, SCAL and INTER muscles perfusion was lower during TFRL (4.5±0.9 & 1.7±0.3nM/s) as compared to NH (7.8±2.0 & 2.6±0.4nM/s) that was accompanied by reduction in %StiO<sub>2</sub> (TFRL= SCAL:-4.7±1.1 & INTER:-2.1±0.9 vs NH= SCAL:0.8±1.5 & INTER:2.0±0.5, p<0.05). W<sub>insp</sub> was greater during TFRL (1280±148 vs 414±34 L/cmH<sub>2</sub>O, p<0.05) and was negatively correlated with SCAL (r=-0.65, p<0.05) and INTER muscles (r=-0.78, p<0.05) deoxygenation response.

**Conclusion:** This interim analysis reveals that in COPD patients, high-intensity TFRL induces greater mechanical and physiological stimulus to inspiratory muscles compared to NH.