

**P38 THE IMPACT OF ETHNICITY ON SPECIFIC AIRWAYS RESISTANCE (sRAW) IN CHILDREN**

doi:10.1136/thoraxjnl-2012-202678.179

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**Introduction** Plethysmographic Specific Airways Resistance (sRaw), which can be measured during tidal breathing without need for airway occlusion.<sup>[1]</sup> has been shown to discriminate between young healthy children and those with lung disease. Recent recommendations and reference data were, however, based on data from White children.<sup>[2]</sup> This could potentially bias interpretation if applied to children of other ethnicities. Nevertheless, since ethnic differences in lung and airway function have been shown to be proportional,<sup>[3]</sup> and since sRaw is internally adjusted for differences in resting lung volume, we hypothesised that there would be no ethnic differences in sRaw.

**Aim** To compare sRaw between healthy Black and healthy White children of similar age.

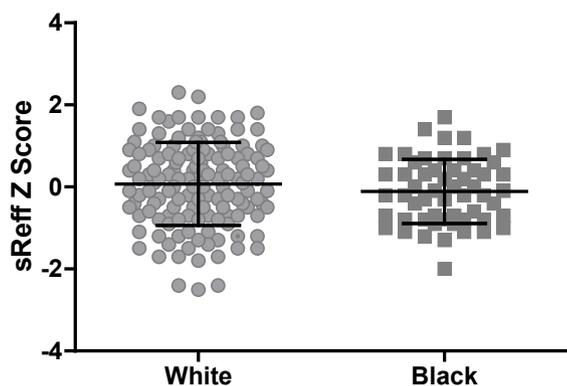
**Methods** Fifty-six healthy Black children (64% male, mean (SD) age: 8.3(1.1) years) and 148 healthy White children (50% male, mean (SD) age: 7.3(1.4) years) underwent sRaw measurements in accordance with recent recommendations.<sup>[2]</sup> Results were expressed as Z-Scores to adjust for height, sex and age.<sup>[2]</sup> Paired t-tests were used to determine the impact of ethnicity on sRaw.

**Results** There were no significant differences in sRaw between healthy Black children and healthy White children ( $p=0.22$ ). The mean (95% CI) difference (Black-White) for specific effective airways resistance (sReff)<sup>[2]</sup> was  $-0.2$  Z-Scores (0.5; 0.1) (figure 1).

**Conclusion** Since ethnic differences in sRaw do not occur, published sRaw reference equations derived from White children should be equally applicable when assessing Black children with lung disease.

**References**

1. Dab & Alexander, *Pediatr Res*, 1976.
2. Kirkby, *ERJ*, 2010.
3. Quanjer *ERJ* 2012.



Abstract P38 Figure 1 Comparison of sReff Z-Scores in healthy White and Black children (Black lines denotes mean  $\pm$  SD)

**P39 VENTILATORY RESPONSE AMONGST SCUBA DIVERS AND NON-DIVERS**

doi:10.1136/thoraxjnl-2012-202678.180

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**Purpose** To investigate the ventilatory response to CO<sub>2</sub> in hyperoxia, hypoxia, and during exercise amongst experienced scuba divers and matched controls.

**Methods** Three studies were performed comparing the ventilatory response to CO<sub>2</sub> of experienced scuba divers with non-diving matched controls. The first study measured the ventilatory recruitment threshold (VRT) during CO<sub>2</sub> rebreathing in hyperoxia of experienced divers (n=10) and controls (n=10); the second study investigated the CO<sub>2</sub> sensitivity in rest and exercise using CO<sub>2</sub> rebreathing in hyperoxia at a workload designed to mimic the load of diving with scuba divers (n=11) and controls (n=11). The third study examined the respiratory drive of scuba divers (n=10) and controls (n=10) whilst breathing four different gas mixtures balanced with N<sub>2</sub> (ambient air; 25% O<sub>2</sub>/6% CO<sub>2</sub>; 13% O<sub>2</sub>; 13% O<sub>2</sub>/6% CO<sub>2</sub>) aimed to assess the combined response to hypercapnia and moderate hypoxia.

**Results** Experienced divers possessed a higher VRT ( $P<0.05$ ) coinciding with the accumulation of 7%<sup>ins</sup>CO<sub>2</sub> (pCO<sub>2cap</sub> = 53.20  $\pm$  2.20 mm Hg) during CO<sub>2</sub> rebreathing compared to controls with VRT occurring at 6%<sup>ins</sup>CO<sub>2</sub> (pCO<sub>2cap</sub> = 44.72  $\pm$  1.74 mm Hg). Exercise at a load typical for diving was found to have no effect on the ventilatory sensitivity to CO<sub>2</sub> in divers (rest: 1.49  $\pm$  0.33; exercise: 1.22  $\pm$  0.55 [l/min x mmHg<sup>-1</sup>]) and controls (rest: 2.08  $\pm$  0.71; exercise: 2.05  $\pm$  0.98 [l/min x mmHg<sup>-1</sup>]) while differences in sensitivity remained between the groups ( $P<0.05$ ). Inspiration of the four test gas mixtures revealed there was no contribution of the tested oxygen pressures to the difference in ventilatory sensitivity to CO<sub>2</sub> between divers and controls.

**Conclusion** Divers possess a lower ventilatory response to CO<sub>2</sub> which was not affected by exercise or the tested oxygen pressures suggesting an adaptation of central CO<sub>2</sub> sensitivity.

**Key Words:** Diving, hypercapnia, hypoxia, chemo sensitivity, exercise

**P40 CHANGE IN RECTUS FEMORIS CROSS SECTIONAL AREA (RFCSA) FOLLOWING AN ACUTE EXACERBATION OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE (AECOPD)**

doi:10.1136/thoraxjnl-2012-202678.181

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**Introduction** Ultrasound (US) is a useful tool in measuring RFCSA. We have previously shown that a curvilinear ultrasound probe (CUP) is equally effective as a linear ultrasound probe in measuring RFCSA (Mandal et al 2011). We therefore used a CUP-US to characterise the trajectory of muscle loss in a cohort of patients with AECOPD.

**Methods** Subjects had RFCSA measured at 3/5 of the distance from the anterior superior iliac spine to the superior border of the patella during a hospital admission with AECOPD and at 4 weeks post hospital discharge. Image acquisition was made using real time B-mode ultrasonography using a 2–5MHz curvilinear probe (SonoSite Inc, Japan). RFCSA measurements were calculated offline using the Image J® programme. Subjects also wore an Actiwatch Spectrum device (Phillips Respironics, Murrysville, Pennsylvania) to monitor physical activity levels during exacerbation and recovery.

**Results** 10 patients were recruited. 40% were male with an age of 71  $\pm$  11 years and FEV<sub>1</sub> 0.6  $\pm$  0.12L (on admission). RFCSA at admission was 519  $\pm$  359mm<sup>2</sup>. Mean change in RFCSA between admission and follow up was -90  $\pm$  295mm<sup>2</sup> (19.5%). Subjects were divided in to 2 groups based on a 10% reduction in RFCSA (see table 1). Small numbers of patients prevented statistical analysis of the data. However, patients with  $\geq 10\%$  RFCSA loss tended to be older, had a lower BMI and longer length of hospital stay. At discharge this group of patients had lower daily physical activity count and