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Title: The effects of inspiratory muscle training on interleukin-6 concentration during cycling exercise and volitional hyperpnoea

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Body: The plasma concentration of interleukin-6 (IL-6) increases during cycling exercise (EX) (Starkie et al. J. Physiol 2001; 533:585-591) and inspiratory resistive breathing (IRB) (Vassilakopoulos et al. Am. J. Physiol 1999; 277:R1013-R1019). Whether inspiratory muscle training (IMT) can attenuate the magnitude of the IL-6 response to EX and volitional hyperpnoea (VH) rather than IRB is unknown. Therefore, we tested the hypothesis that IMT would reduce the IL-6 response to EX and/or VH. Twelve male participants performed either 6 weeks of pressure-threshold IMT (n=6) or placebo (PLA) training (n=6). Before and after training, participants undertook three 1 hour experimental trials on separate days: (i) passive rest; (ii) EX; and (iii) VH. EX was performed at maximum lactate steady state power. In VH, participants voluntarily mimicked at rest the breathing and respiratory muscle recruitment pattern attained during EX. IL-6 peaked immediately after EX for both the IMT and PLA groups (6.75 ± 1.6 and 5.64 ± 1.76 pg·mL⁻¹). Following training, this response was reduced (-33%; P=0.027) for the IMT but not the PLA group. Blood lactate concentration ($[Lac^-]_B$) during EX was also reduced (-35%; P=0.009) for the IMT group only. IL-6 and $[Lac^-]_B$ increased (P<0.05) during VH in both groups, but there was no effect of training on these responses. There were no increases in IL-6 or $[Lac^-]_B$ over time for either group during passive rest. In conclusion, 6 weeks of IMT reduces IL-6 during EX but not VH. The reduction in IL-6 concentration following IMT may be related to a decreased carbohydrate utilisation as indicated by the post-IMT reduction in $[Lac^-]_B$ during EX but not VH.