

Title: Response

Authors: Michael A. Johnson¹, Dean E. Mills¹, Peter I. Brown², Graham R. Sharpe¹

Affiliations

¹Sport, Health and Performance Enhancement (SHAPE) Research Group, School of Science and Technology, Nottingham Trent University, Clifton Lane, Clifton, Nottingham, NG11 8NS, UK

²School of Science, University of Derby, Derby, DE22 1GB, UK

Corresponding author

Dr Michael Johnson

Sport, Health and Performance Enhancement (SHAPE) Research Group, School of Science and Technology, Nottingham Trent University, Clifton Lane, Clifton, Nottingham, NG11 8NS, UK

Tel.: +44 (0)115 8483362

Fax: +44 (0)115 8486636

Email: Michael.johnson@ntu.ac.uk

We thank Chiappa et al. for commending our work (2,3,7), which we reciprocate in light of their thought-provoking research (4,5) that sparked the ensuing trans-Atlantic debate on the effects of inspiratory muscle loading on lactate clearance after exercise. Specifically, despite using similar methodologies, Chiappa et al. have twice shown accelerated lactate clearance with inspiratory loading (4,5), whereas we have twice shown no effect (2,7). We hypothesised that these discrepancies may be due to inter-study differences in participant endurance training status, as evidenced by higher $\dot{V}O_{2\text{peak}}$ and faster blood lactate recovery kinetics in our participants. We were thus intrigued by the authors' unpublished data showing, in sedentary individuals, no effect of inspiratory loading on lactate clearance. In their accompanying figure the authors also present novel data showing a significant correlation between maximal inspiratory pressure (MIP) and changes in the area under the blood $[\text{La}^-]$ curve with inspiratory loading. This observation informed their hypothesis that the efficacy of inspiratory loading is influenced by inspiratory muscle mass rather than training status.

We note three important observations from their data. Firstly, the authors report, for two similarly aged groups, MIP's of 166 cmH₂O (92% of predicted) and 106 cmH₂O (88% of predicted); these values seem discordant with commonly used predictive formulae and the similarity in % predicted values is curious given the large differences in MIP. Secondly, enhanced lactate clearance with inspiratory loading is evident in all participants irrespective of MIP; and thirdly, although their figure is, unfortunately, void of MIP measures within ~120-155 cmH₂O, substantial lactate clearance with inspiratory loading is evident when MIP exceeds ~155 cmH₂O. In light of these observations we also revisited our original data (2,7). Interestingly, and contrary to Chiappa et al., we did not observe a relationship between MIP and changes in the area under the blood $[\text{La}^-]$ curve with inspiratory loading ($r = 0.22$) (Fig. 1), nor was greater lactate clearance evident in participants with MIP above 155 cmH₂O. Therefore, our data do not support the notion that the efficacy of inspiratory loading is

influenced by inspiratory muscle mass. We also feel that MIP may not be a particularly strong indicator of inspiratory muscle mass: only 38% of the variance in MIP was explained by diaphragm cross-sectional area (8). It also seems unlikely that an increase in MIP from ~105 to 155 cmH₂O would correspond to an increase in inspiratory muscle mass sufficient to elicit an approximate four-fold increase in blood lactate clearance with inspiratory loading, as Chiappa et al.'s scattergram suggests. Thus after inspiratory muscle training greater lactate clearance with inspiratory loading is more likely explained by an increased inspiratory muscle oxidative capacity (1,2), rather than a modest increase in inspiratory muscle mass (6).

The lively debate on the efficacy of inspiratory muscle loading during recovery therefore continues. Whilst the role of inspiratory muscle mass remains uncertain, Chiappa et al.'s unpublished data in sedentary individuals have taken us a step closer to explaining the inter-study discrepancies. We envisage that further work will provide more definitive answers.

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Figure Caption

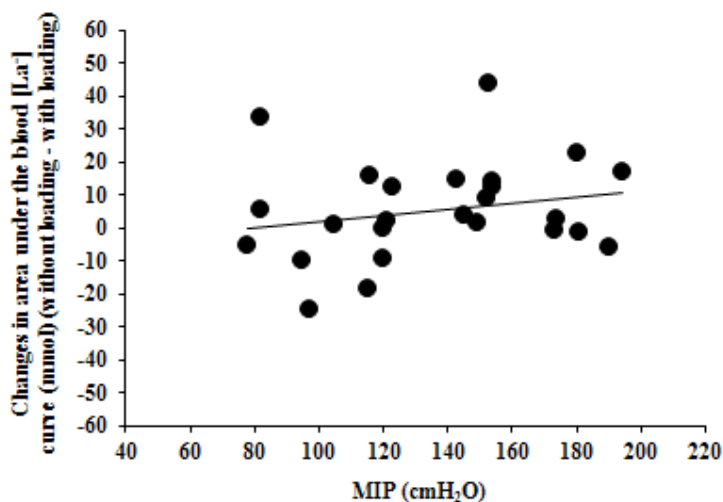


Figure 1. The association between maximal inspiratory pressure (MIP) and the change in the area under the blood [La⁻] curve after exercise with inspiratory muscle loading.