Reviewer's report

Title: Metabolic load during strength training or NMES in individuals with COPD: results from the DICES trial

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Reviewer: Rodney Hughes

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The paper by Sillen et al explores the ventilatory impact of neuromuscular stimulators in patients deemed too dyspneic to undertake more traditional pulmonary rehabilitation. The premise is that patients may find this method of quadriceps strength training more acceptable and adherence may be improved if they do not experience limiting dyspnea.

The background and aims of the study are well stated and are scientifically valid. This is indeed a clinically relevant problem in many patients and limits their uptake of pulmonary rehabilitation. The population studied, although within a selected specialist centre, is representative of the severe COPD population as a whole. There are no obvious ethical concerns, and the study has been appropriately approved and consented.

The study compares the ventilatory effects of both high and low frequency NMES and assess the benefits of the interventions when compared to lower limb strength training. This is a single blinded study for NMES vs strengthening although the NMES subjects were blinded to intensity. Bias appears to have been minimised appropriately. However, there is no mention of sample size calculation and anticipated effect sizes.

The outcomes of the study are clearly presented and appropriately analysed. A significant proportion of subjects were withdrawn from the study due to the need for supplemental oxygen or refusal to undertake testing. Many of the patients desaturated during the course of their assessments, and it is unclear whether oxygen is administered during this time. If this is the case, would it have been possible to have included LTOT patients also, as these patients are also likely to have benefit from this intervention also. Further elaboration would be useful here. I acknowledge the supplemental oxygen can make VO2 interpretation difficult, but VE should be assessible and it would be interesting have known whether this affected the perception of breathlessness.

The small sample size is discussed and this, in conjunction with the above, does limit generalisability of the study to the wider population. However, in general the methodology and analysis is sound and contributes to the understanding of the utility of these interventions.

Level of interest: An article of importance in its field
Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests