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## Respiratory Muscle Effort during Weaning: Reply

### In Reply:

We appreciate the interest of Özdemir *et al.* in our recent article.<sup>1</sup> They raise the interesting question of whether increased expiratory respiratory muscle recruitment in patients who fail a trial of spontaneous breathing is the result of increased respiratory loading and inspiratory muscle weakness or the reason of failure.

Undoubtedly, the inspiratory muscles of the patients in the failure group, including the diaphragm, were more weakened than in the success group and, among other factors, differences in duration of mechanical ventilation and underlying conditions may play a role in development of diaphragm weakness. In our study, we focused on the role of expiratory muscle physiology in weaning success and weaning failure patients. As pointed out in the discussion of our article, it has been reasoned that the goal of expiratory muscle recruitment is to assist the inspiratory muscles.<sup>2,3</sup> We demonstrated that in patients weaning from mechanical ventilation, a substantial amount of total energy expenditure is attributed to activation of the expiratory muscles. This is an important observation. Whether expiratory muscle recruitment is the reason or a result of failure cannot be derived from our study. However, we agree with Özdemir *et al.* that previous studies have demonstrated that increased respiratory loading, as occurs with exercise, low respiratory compliance, but also inspiratory muscle weakness results in the activation of expiratory muscles in fixed hierarchy.<sup>4</sup> Thus it is likely that expiratory muscles were recruited as a result of high loading. The interesting observation is the high energy expenditure by the expiratory muscles during weaning. We cannot directly derive from our data if expiratory muscle activation indeed improved diaphragm contractile efficiency. However, it is interesting to note that despite increasing activation of the expiratory muscles during the spontaneous breathing trial in weaning failure patients, diaphragm neuromuscular efficiency did not change and was still lower compared to weaning success patients.

We would like to stress that the arguments provided by Özdemir *et al.* concerning cardiac arrest or surgery in our

study may not be valid. First, only three patients (33%) underwent cardiac surgery in the failure group. The risk of iatrogenic phrenic nerve injury as a result of cardiac surgery when using ice slush<sup>5</sup> is uncommon with the use of more modern cardioplegia techniques as used in our center (Radboud University Medical Center, Nijmegen, The Netherlands). Second, we found no evidence of increased pulmonary edema in the failure group during the weaning trial (*i.e.*, no differences in dynamic lung compliance between groups).

### Competing Interests

The authors declare no competing interests.

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## Delirium after Cardiac Surgery and Cognitive Change: Comment

### To the Editor:

We read with great interest the article by Brown *et al.*<sup>1</sup> that reported an association between delirium diagnosis and cognitive dysfunction at 1 month in patients