

## AUTHORS' REPLY

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We would like to thank Forgiarini Junior and Esquinas for their comments, precisely because they address highly relevant issues related to the chances of success of pulmonary rehabilitation in severe COPD. Our colleagues properly pointed out that patients with more advanced COPD may also have peripheral muscle weakness, which can be a limiting factor for maximal performance gain through cardiopulmonary rehabilitation. In our study, the COPD patients who showed no improvement following rehabilitation had higher leg fatigue values before the intervention than did those who showed improvement. In addition, the degree of fatigue was not reduced after training in the patients who did not respond to rehabilitation. It is in fact to be assumed that peripheral skeletal muscle involvement in those patients is not restricted to the legs but is also present in the arms.<sup>(1)</sup> For this reason, handgrip evaluation can identify patients with a potentially poorer response in terms of exercise capacity after cardiopulmonary rehabilitation.

In addition to the impact of various organs as limiting factors in COPD, no static or dynamic assessment of the respiratory muscles was performed in our study. Ventilatory weakness can certainly be an additional factor contributing to a greater sensation of dyspnea, as our colleagues pointed out. However, in such patients, one of the major problems is mechanical inefficiency secondary to dynamic air trapping during exercise. Because of this inefficiency, even with strength being generated by the ventilatory muscles, there is no proportional increase in ventilatory flow. As a result, fatigue occurs mainly in the inspiratory muscles in this state of inefficiency and high ventilatory demand.<sup>(2)</sup> Undoubtedly, complementary therapies that reduce air trapping and result in increased exercise tolerance during rehabilitation, such as the use of noninvasive ventilation, mentioned by our colleagues, should be considered for such groups of patients with severe COPD, especially for those with pulmonary hyperinflation.

We do agree that future studies addressing these multiple limiting factors in COPD are extremely important<sup>(3)</sup> so that our patients can achieve a decrease in their sensation of dyspnea and an improvement of endurance in their activities of daily living.

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## REFERENCES

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