

latter paper, I noted that the authors never used a flanged mouthpiece nor did they make their  $P_{I,max}$  measurements from functional residual capacity but rather from residual volume. The type of mouthpiece and the way it is used result in large pressure differences obtained during the measurements of  $P_{I,max}$  and  $P_{E,max}$  [5]. Lung volumes also affect these measurements and appropriate reference values should be used [6].

**N.G. Koulouris**

**Correspondence:** N.G. Koulouris, Respiratory Function Laboratory, 1st Dept of Respiratory Medicine, University of Athens Medical School, "Sotiria" Hospital, 152, Mesogeion Ave, Athens GR-11527, Greece. E-mail: koulunik@med.uoa.gr

**Statement of Interest:** None declared.

## REFERENCES

- 1 Just N, Bautin N, Danel-Brunaud V, *et al.* The Borg dyspnoea score: a relevant clinical marker of inspiratory muscle weakness in amyotrophic lateral sclerosis. *Eur Respir J* 2010; 35: 353–360.
- 2 Koulouris N, Mulvey DA, Laroche CM, *et al.* The effect of posture and abdominal binding on respiratory pressures. *Eur Respir J* 1989; 2: 961–965.
- 3 American Thoracic Society, Standardization of spirometry – 1994 update. *Am J Respir Crit Care Med* 1995; 152: 1107–1136.
- 4 Black LF, Hyatt RE. Maximal static respiratory pressures in generalized neuromuscular disease. *Am Rev Respir Dis* 1971; 103: 641–650.
- 5 Koulouris N, Mulvey DA, Laroche CM, *et al.* Comparison of two different mouthpieces for the measurement of  $P_{I,max}$  and  $P_{E,max}$  in normal and weak subjects. *Eur Respir J* 1988; 1: 863–867.
- 6 Bruschi C, Cerveri I, Zoia MC, *et al.* Reference values of maximal respiratory mouth pressures: a population-based study. *Am Rev Respir Dis* 1992; 146: 790–793.

DOI: 10.1183/09031936.00048810

*From the authors:*

In response to the question raised by N.G. Koulouris, we confirm that vital capacity (VC) and the respiratory muscle strength were all performed in the seated posture. We agree with N.G. Koulouris that correlations between the supine Borg and the supine respiratory muscle strength values might be better and it would be relevant to verify this hypothesis. However, as a matter of routine, only the VC was performed in both the seated and supine positions.

Measurement of the maximal inspiratory pressure ( $P_{I,max}$ ) is conventionally easier to obtain from residual volume (RV) and greater inspiratory pressures are obtained at lower lung volumes. However, in the neuromuscular disorders, the recoil pressure of the respiratory system at RV may be a significant fraction of  $P_{I,max}$ . The recoil of the chest wall and lungs is equal at the functional residual capacity (FRC). The difference of values obtained from RV and FRC is not important in healthy subjects [1]. In patients with neuromuscular disorders, the advantage of measuring the voluntary inspiratory strength from FRC is that only the force of the inspiratory muscles is assessed and not the negative recoil pressure of the respiratory system. Changing the reference in the text, as demonstrated in a study by ULDREY *et al.* [2], is more suitable. Indeed, we used the predicted values of ULDREY *et al.* [2] which were measured at FRC.

N.G. Koulouris demonstrates that better values of inspiratory strength were obtained with a tube mouthpiece rather than a flanged mouthpiece in healthy subjects [3]. Patients find the flanged mouthpiece easier than the tube explaining its widespread use [1]. In our experience with neuromuscular disorders, especially in amyotrophic lateral sclerosis with bulbar involvement, air leaks were less important with a flanged mouthpiece [4].

**N. Just, N. Bautin and T. Perez**

Service des Explorations Fonctionnelles Respiratoires, Clinique des Maladies Respiratoires, CHRU, Lille, France.

**Correspondence:** N. Just, Service de Pneumologie, Hôpital Victor Provo, 11-17 Bd Lacordaire, F-59100 Roubaix Cedex, France. E-mail: nicolas.just@ch-roubaix.fr

**Statement of Interest:** None declared.

## REFERENCES

- 1 Polkey MI, Green M, Moxham J. Measurement of respiratory muscle strength. *Thorax* 1995; 50: 1131–1135.
- 2 Uldrey C, Fitting JW. Maximal values of sniff nasal inspiratory pressure in healthy subjects. *Thorax* 1995; 50: 371–375.
- 3 Koulouris N, Mulvey DA, Laroche CM, *et al.* Comparison of two different mouthpieces for the measurement of  $P_{I,max}$  and  $P_{E,max}$  in normal and weak subjects. *Eur Respir J* 1988; 1: 863–867.
- 4 American Thoracic Society/European Respiratory Society, ATS/ERS Statement on respiratory muscle testing. *Am J Respir Critical Care Med* 2002; 166: 518–624.

DOI: 10.1183/09031936.00068110

# Do $\beta_2$ -agonists inhibit capsaicin-induced cough?

*To the Editors:*

We read with great interest the paper by FREUND-MICHEL *et al.* [1] in a recent issue of the *European Respiratory Journal*, because the results are inconsistent with the medical common

sense that  $\beta_2$ -agonists do not have common antitussive property.

The authors showed that a  $\beta_2$ -agonist, terbutaline (0–3 mg·kg<sup>-1</sup>), dose-dependently inhibited 10<sup>-4</sup> M capsaicin-induced cough in