

## Nutrition Discussion Forum

### *Energy balance in patients with chronic obstructive pulmonary disease*

It was with great interest that we read the recent publication by Goris *et al.* (2003) on energy balance in patients with chronic obstructive pulmonary disease (COPD). The authors presented the results of a small sample of patients with COPD randomised to an intervention group ( $n$  11) and a control group ( $n$  9). The intervention consisted of a nutritional supplement three times per d during 3 months and the authors could not find any difference in body mass change between the two groups during the 3 months. Change in body mass was, however, not the main focus in the presented paper. The main focus was, as stated in the aim: ‘to gain insight in the energy balance’.

A carefully performed 7 d food record was used to capture the energy intake. This was converted into total energy intake. On the expenditure side of the energy-balance equation, a tri-axial accelerometer (Tracmor) was used during the same 7 d as the food record was completed. In the subjects and methods section the calculation procedure to calculate energy expenditure from the Tracmor is presented. Unfortunately, due to a typographical error in the cited reference (Goris *et al.* 2000 instead of Goris *et al.* 2001), the referred regression equation was hard to find. We have concluded that the regression equation can not be derived in the reference stated as Goris *et al.* (2001), since that study was performed on twenty-four healthy subjects, and the regression equation in the Goris *et al.* (2003) paper is not identical to the one stated in the Goris *et al.* (2001) article. It would have been of great value to refer to the study in which the presented regression equation was developed.

For us, as readers, this puts some uncertainty into the validity of the Tracmor’s ability to measure energy expenditure in COPD patients. As far as we understand, it has never been validated in this patient group. This also means that the conclusion of the study, the negative correlation between change in body mass and physical activity level, may be based on a method that has not been validated in this patient group. As the authors discuss, physical exercise is probably limited in COPD patients, and it surprises us that one of the patients in the intervention group had a physical activity level value at 2.44 at month 3. This indeed indicates a very high physical activity, and again the validity of the Tracmor is questioned.

Another major concern with the Goris *et al.* (2003) paper is the statistics used. The authors state that the difference between groups was tested with the Wilcoxon rank-sum test which is an impossible test to use for comparing unpaired groups. Probably the Mann–Whitney  $U$  test (which is the non-parametric test to be used for comparing two independent groups of observations) would not have detected any differences between the two groups anyway, but using a paired test for analysing unpaired data cannot pass without comment.

The authors conclude that ‘the individual physical activity level is necessary for estimation of the energy need of the patient’. This is in concordance with our conclusion in a recently published study using doubly labelled water (Slinde *et al.* 2003). However, our wish for the future is that a device measuring energy expenditure during activity is presented and validated on patients with COPD before it is used to estimate the energy need in the clinical setting.

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used to estimate total energy expenditure, this regression equation was derived, as described in our publication, from a group of elderly men and women of the same age as the COPD patients. In the publication (Goris *et al.* 2001) we refer to in our article (Goris *et al.* 2003) another regression equation was described, which was derived from a group of younger individuals. For the group of COPD patients we used a regression equation derived from the published data on total energy expenditure (measured with doubly labelled water), BMR and physical activity counts (measured with the Tracmor) of the elderly group described here (Goris *et al.* 2001). So we used an age-specific equation to estimate total energy expenditure derived from a study described in an earlier paper by us (Goris *et al.* 2001).

The ideal would be a specific equation for each patient population, but due to practical reasons and costs this is not possible. The Tracmor used in our study (Goris *et al.* 2003) is, however, in our opinion the first tri-axial activity monitor validated against doubly labelled water and as such is a good device to objectively estimate one's physical activity. Furthermore, we looked in our study at differences between subjects and we could also have used acceleration counts per BMR instead of total energy expenditure per BMR (i.e. physical activity level). This would not have changed the results and conclusions of our study.

Another comment in the letter of Frode Slinde and Lena Rossander-Hulthén was about the statistics used for comparing two independent groups. To our knowledge the Wilcoxon test is equivalent to the Mann–Whitney test, and additional statistical analysis gave similar results for comparing both groups using either the Wilcoxon or the Mann–Whitney test. In reply to the other comment on the statistics used, a paired *t* test was only used to test differences between the two periods studied within the total group (i.e. paired data), thus not to test between groups, as was also described in our publication. The results and conclusions stated in our publication remain valid.

Finally, as Frode Slinde and Lena Rossander-Hulthén also concluded from their study (Slinde *et al.* 2003), it is important to know the physical activity level of ambulatory

COPD patients to estimate their energy need. We think it is very useful to have a calibrated device for the estimation of free-living human energy expenditure, which can be easily applied. The doubly labelled water method is not applicable for large groups and especially not in daily practice. Questionnaires are not objective, as was also shown in the study of Slinde *et al.* (2003), and can therefore not be used to estimate daily energy expenditure. Activity monitors can directly estimate, objectively, one's physical activity, which is valuable for the estimation of the energy need of COPD patients at home.

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