

DIFFERENCE BETWEEN THREE METHODS FOR PREDICTING BREATHING RESERVE RATIO DURING EXERCISE

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INTRODUCTION: Cardiopulmonary exercise testing can be used to identify ventilatory limitation during exercise. MVV or $FEV_{1 \times 40}$ are often used to estimate the maximum ventilatory capacity. Breathing reserve ratio (BRR) is calculated either by $\dot{V}_{E_{max}} / MVV$ or $\dot{V}_{E_{max}} / FEV_{1 \times 40}$. A high BRR ratio indicates a ventilatory limitation. The purpose of this study was to investigate the relationship between MVV, FEV_1 and $\dot{V}_{E_{max}}$. We also investigated the performance of $\dot{V}_{E_{max}} / FEV_{1 \times 40}$ respiratory rate (RR) as an alternative predictor of BRR.

METHODS: 100 consecutive exercise tests were analysed. Spirometry and MVV were performed before exercise. Patients were categorised as normal, restricted or obstructed based on spirometry. Normal range BRR was considered as $72 \pm 15\%$.

RESULTS: The table shows the correlation between MVV (E1), $FEV_{1 \times 40}$ (E2), $FEV_{1 \times RR}$ (E3) to $\dot{V}_{E_{max}}$; and the mean BRR (%) using E1, E2 and E3. There was a significant difference ($P < 0.05$) between BRR calculation in the normal group.

	E1 (correlation)	E2 (r)	E3	E1 Mean and SD BRR	E2	E3
Norm. (n = 64)	0.70	0.70	0.85	$79 \pm 22^*$	$70 \pm 18^*$	$72 \pm 16^*$
Restr. (n = 20)	0.53	0.54	0.70	75 ± 20	82 ± 26	87 ± 21
Obstr. (n = 16)	0.87	0.83	0.84	85 ± 16	88 ± 14	85 ± 15

* $P < 0.05$

CONCLUSION: The 3 maximum ventilatory capacity prediction methods have varying relationships to $\dot{V}_{E_{max}}$ in the 3 diagnostic groups. This has implications on the calculation of BRR and the identification of a ventilatory limitation using these parameters alone. E3 returned a good relationship between $\dot{V}_{E_{max}}$ in all groups. E3 may be a useful alternative to calculate BRR but requires further investigation.

KEY WORDS: MVV, FEV_1 , breathing reserve ratio, ventilatory limitation.