# THE ROLE OF IMPULSE OSCILLOMETRY IN DETECTING AIRWAY DYSFUNCTION IN ATHLETES

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**CATEGORY: A**

# Background: Impulse oscillometry (IOS) has previously been suggested to provide greater sensitivity than conventional spirometry when employed in conjunction with indirect bronchoprovocation testing for the diagnosis of airway dysfunction in athletes 1-3. However, this recommendation has been based on a highly selected population of symptomatic patients with a high pre-test probability of airway dysfunction. The aim of this study was therefore to compare IOS, spirometry and respiratory symptoms following indirect bronchoprovocation in a screened cohort of athletes.

**Methods:** One hundred and one recreational athletes were recruited for the study. Athletes attended the laboratory on a single occasion. Respiratory symptoms were determined via the Dyspnoea-12 questionnaire. Spirometry and impulse oscillometry (IOS) were performed pre-and post- a eucapnic voluntary hyperpnoea (EVH) challenge. Pulmonary function variables for airway dysfunction positive and negative subjects were compared using a two-way unpaired *t*-test. The relationship between spirometry and IOS parameters were assessed using Pearson’s product-moment correlation coefficient (normally distributed data) (mean ± SD). *P*<0.05 was considered statistically significant. The study was approved by the local research ethics committee and all subjects provided written informed consent.

# Results: Ninety-four athletes completed the study. Sixteen athletes (17%) were positive for airway dysfunction based on spirometry (i.e. ≥10% fall in FEV1) and seventeen athletes (18%) based on IOS (i.e. ≥50% increase in R5) 3. However, only nine athletes (10%) met both diagnostic thresholds. A poor relationship was observed between respiratory symptoms (i.e. Dyspnoea-12 score) and all spirometry and IOS variables. A direct relationship was observed between percentage change in R5 (r = 0.65), Z5 (r = 0.68), RF (r = 0.65), AX (r = 0.69) and ∆FEV1max (P< 0.001). A weak relationship was observed between R20 (r = 0.27), X5 (r = 0.37) and ∆FEV1max (*P*<0.01).

# Conclusion: Although IOS and spirometry do not concur precisely; IOS detects additional cases of airway dysfunction in athletes. Impulse oscillometry should therefore be used as an adjunct to spirometry to confirm a diagnosis. Further work is required to establish diagnostic thresholds and fully determine the place of IOS in screening athletes for airway dysfunction.

**References:**

1. Evans TM, Rundell KW, Beck KC, Levine AM, Baumann JM. Airway narrowing measured by spirometry and impulse oscillometry following room temperature and cold temperature exercise. *CHEST Journal.* 2005;128(4):2412-2419.

2. Evans TM, Rundell KW, Beck KC, Levine AM, Baumann JM. Impulse oscillometry is sensitive to bronchoconstriction after eucapnic voluntary hyperventilation or exercise. *Journal of Asthma.* 2006;43(1):49-55.

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Is this a pilot study? **No.**

Does this study use human subjects, human biopsy specimens or genetic material? **Yes.**