

Eight-week of high-intensity running interval-training induce an improvement in maximal expiratory flow-volume curves in healthy prepubertal children

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Several studies have shown that respiratory muscle strength may be improved by aquatic physical activities in adults. This fact seem to be involved in the alterations of airway resistance or maximal expiratory flow-volume in prepubertal girls following one year of swimming training [1]. However, swimming need specific breathing pattern during exercise. Therefore, we questioned if a short training period in running, as it used in school physical activities may induce an alteration in maximal expiratory flow volumes. The aim of this investigation was to study the effect of an eight-weeks period of running interval-training in prepubertal children.

Eighteen prepubertal children (age = 10.0 ± 0.8 years, Tanner's stade 1) have participated to this study. The subjects were divided into two groups: one Experimental group (n = 9; age = 9.7 ± 0.7 years; height = 135.3 ± 8.6 cm; weight = 34.6 ± 12.2 kg) who have followed an high-intensity interval-training associated with school physical education during eight weeks with three weekly physical education sessions; and one Control group with untrained children who followed their habitual activities (n = 9; age = 10.4 ± 0.5 yrs ; height = 141.9 ± 10.4 cm; weight = 40.9 ± 14.2 kg). All the children performed maximal flow-volume tests (Medisoft, Ergocard, Belgique) before and after an eight-week period. All the children were preliminary familiarised with the apparatus and the tests. At each investigation time, three maximal flow-volume tests was performed and the best values were retained as recommended by American Thoracic Society.

Following the eight-week period, none of the measured parameters were altered in Control group. However, Experimental group showed an increase ($P < 0.05$) in Forced Vital Capacity (+ 7 %), in Forced Expiratory Volume in 1-s (+11%), in Peak Expiratory Flow (+17 %) and in Maximal Expiratory Flow at 75% of FVC (+15%) and at 50% of FVC (+18%).

We concluded that a running high-intensity interval-training integrated in physical education sessions during eight weeks seem to be sufficient to observe alterations in pulmonary volume and maximal flow-volume parameters. In perspectives, the study of the respiratory muscle strength and contractility may be investigated.

[1] Courteix D, Obert P, Lecoq AM, Guenon P, Kock G (1997). Effect of intensive training on lung volumes, airway resistances and on the maximal expiratory flow-volume relationship in prepubertal. *Eur. J. Appl. Physiol.* 76: 264-269.