

EFFECTS OF TRAINING OF RESPIRATORY MUSCLES ON FEV₁

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Introduction

Aerobic training is often aimed at stimulating the metabolism, while little attention is usually given to the stimulation of the respiratory muscles of athletes.

The purpose of exercises for opera singers is to stimulate respiratory dynamics in order to produce sounds of a high intensity without the use of a microphone. These exercises can be used to stimulate respiration, in a direct manner, for educational, preventive and training purposes, also for people who practise sport.

The aim of the study, therefore, is to assess the efficacy of exercises to learn and train the respiratory muscles (used by opera singers according to the Wilfart Method), on the maximum quantity of air exhaled in one second (FEV₁).

Materials and Methods

A study was made on 39 healthy men and women, aged between 19 and 60 yrs, divided on a random basis into three groups.

Group A (average age 21.0±1.4 yrs) was composed of 13 people who did sport, with no specific work on respiration.

Group B (average age 20.4±1.9 yrs) was comprised of 13 students from the Faculty of Exercise Sciences, who were submitted to a session to learn the respiratory exercises that would then be used for the training. Pictures of the exercises and a check list were also distributed during the session. Training was subsequently performed for a period of 6 weeks, during which 5 exercises, lasting a total of 15 minutes, were self-administered, 3 times a week.

Group C (average age 40.4±12.9yrs) was made up of 13 people who took part in a 3-day (Souffle-Voix) training period in which each person performed 2 work day sessions, each lasting approximately 15 minutes. During each session the same exercises as those in group B were presented, but this time with the help of the same operator who had to adapt the execution technique to the characteristics of each person. While performing the exercises, this group also used vocal emission techniques.

The spirometric evaluation (Pony Graphic, Cosmed Rome) of each group consisted of the measurement of FEV₁, performed in a sitting position, at ease, before starting the exercises, and 3 months (group A) and 6 weeks (group B) following the initial finding, and after the third day of the training period (group C). Each person performed the spirometric test three times and the best test was used for analysis. The significance of the differences between before and after treatment was tried out with the Student's paired *t*-test and a value of $P < 0.05$ was selected as being significant.

Results and discussion

The results of this study show that the people in Group A who do not perform respiratory exercises do not present significant FEV₁ improvements.

On the other hand, with the exercises presented, the people in Group B achieve a significant improvement in FEV₁ (+0.37 L/s; $P < 0.01$). This improvement is established with exercises on the respiratory muscles that are relatively undemanding, since each person only exercises for 15 minutes, three times a week for six weeks.

Table 1: results of the study. *** $P < 0.01$.

The Rehabilitation of Sports Muscle and Tendon Injuries

	FEV₁ pre (L/s)	FEV₁ post (L/s)	Difference
Group A (Control)	4.35+0.78	4.43+0.68	102%
Group B (Exercises)	4.26+0.66	4.63+0.74	109%***
Group C (Stage)	3.09+0.70	3.02+0.68	98%

Group C, made up of elderly people who merely do a short 3-day training period, learns new exercises, but does not manage to obtain significant FEV₁ improvements that can be seen following such short training.

Conclusions

The exercises for training the respiratory muscles used according to the protocol described, engage the person for about 15 minutes, three times a week, and have a significant effect on FEV₁ provided they are regularly performed for a period of at least six weeks. Indeed, the improvement of FEV₁ does not depend on the learning of respiration exercises (Group C), but on the training effect that these exercises have on the muscles, that becomes evident after a few weeks' practice (Group B).

References

1. Wilfart S. *Le chant de l'E'tre*, Albin Michel Eds, 2001.
2. Schünemann H. & coll. Pulmonary function is a long-term predictor of mortality in the general population: 29-year follow-up of the Buffalo Health Study. *Chest* 118(3): 656-64, 2000.