Abstract

Methodology: This study examined respiratory muscle strength in 25 runners using the POWERbreathe® K5 inspiratory muscle trainer before and after 100-m and 3000-m running. We watched the development of the resting values of SIndex and PIF and these values after the sprint (100 m) and running (3000 m, intensity of 70% of their HRmax). The probands were examined for resting spirometry and chest circuits (at maximum inspiration and expiration) in four levels. According to the respiratory amplitudes in the lower chest sector, the probands were divided into groups A (> 5.0 cm; n = 11) and B (<5.0 cm; n = 14).

Results: After the 100-m sprint, the SIndex and PIF values have been increased for all probands. We noticed the difference between group A and B.

A: SIndex increased by an average of 6,11%. PIF by 8,39 %, i.e. 0,35 $l \cdot s^{-1}$.

B: SIndex increased by an average of 9,33%. PIF by 11,82 %, i.e. 0,61 $l \cdot s^{-1}$.

After 3000-m running, the values of all probands have changed both in terms of increase (positive numbers) and decrease (negative numbers). The trend showed no regularity and the values ranged in positive and negative values independently of the respiratory amplitudes of the probands. The cause of these changes cannot be determined from the monitored parameters.

The mean SIndex and PIF values of group A, with lower values of respiratory amplitudes, of all three measurements were below the mean values of group B.

SIndex: A 70,58 (54,04 – 108,63) cm H_2O, B 106,09 (66,49 – 142,63) cm H_2O.

PIF: A 4,33 (3,51 - 5,51) $l \cdot s^{-1}$, B 5,57 (4,46 – 7,21) $l \cdot s^{-1}$.

Conclusion: Probands of group A with lower values of respiratory amplitudes have lower elasticity of the chest, which represents a higher mechanical resistance for the breathing muscles during inspiration. The average values of the inspiratory muscle strength of all measurements were lower for these probands than in probands of group B. The dynamic properties of the rib cage affect the strength of the breathing muscles.