

Does inspiratory muscle training (IMT) change aerobic capacity in young football players?

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Introduction and background –

Inspiratory muscle training (IMT) is used in several programs of pulmonary rehabilitation with good results. However for sports performance, results are yet scarce and in football no studies were found.

Aims and objectives -

The purpose of our study was to verify if an exercise training program for inspiratory muscles with eight weeks of duration will influence inspiratory muscle strength (IMS) and cardiorespiratory capacity (VO₂).

Table 1 – Descriptive characteristics of the participants

	RTTG (n=8)	RTG (n=7)	CG (n=7)
Age (yrs)	17,3±0,2	16,6±0,2	17,3±0,2
Weight-M1 (kg)	68,4±1,6	65,9±4,5	65,3±1,9
Height (m)	1,7±0,0	1,7±0,0	1,7±0,0
BMI-M1	22,5±0,6	21,9±0,7	21,9±0,7
SMM (kg)	32,1±0,5	31,5±1,4	31,2±0,5

Values are means±SD; RTTG – Respiratory and task training group; RTG – Respiratory Training Group; CG – Control Group; M1 – first moment of assessment at beginning of football training (pre-season); M2 – second moment of assessment at beginning of respiratory muscle training.

Methods – Twenty two healthy sports participants from a youth sub-19 football team were invited and after a first assessment (M1), allocated in a randomized way in three groups: RTTG (Respiratory and Task Training Group; n=8), RTG (Respiratory Training Group, n=7) and CG (Control Group, n=7). Assessment protocol included inspiratory muscle strength (IMS), anthropometric measures and estimated maximal oxygen consumption (VO₂) by yo-yo test. They were assessed at three moments: M1 – after vacations at the pre-season, at M2 – after one month of football training and at beginning of inspiratory muscle training (IMT) and M3 – after eight weeks of IMT with an IMT device (PowerBreath) and normal football training. IMT was performed at 60% of maximal strength, in 5 to 6 sets of twelve repetitions (one minute between sets). For RTTG a technical task from football training was added during the IMT

References: McConnell, A. (2011). *Breath Strong Perform Better*. Human Kinetics Eds; McConnell, A. (2013): *Respiratory Muscle Training*. Churchill Livingstone. Eds

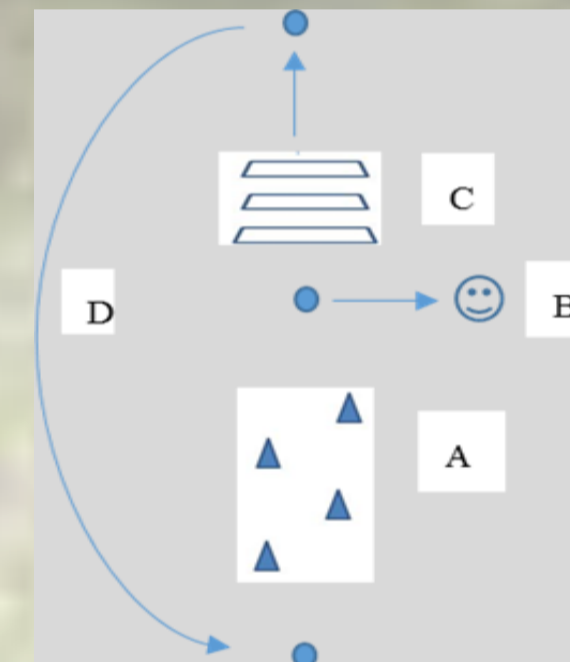


Figure 1 – Task for group RTTG included an activity over 20 meters and in each set the route was carried out twice. (A) Running with changing directions over 10 meters; (B) pass and returned the ball to the coach; (C) running over barriers with heels of 40 cm for 4 m followed by a sprint 5 meters; (D) return to the starting point in light jogging

Table 2 – Inspiratory Muscle Pressure and VO_{2peak} at three moments of assessment

GROUPS	MIP1	MIP2	MIP3	p
RTTG (n=8)	98,1±8,6	129,8±10,4	163,9±12,0	0,001
RTG (n=7)	120,4±11,6	135,4±10,0	180,3±3,9	0,010
CG (n=7)	120,6±5,4	142,4±12,6	147,0±12,0	
	VO _{2peak} -M1	VO _{2peak} -M2	VO _{2peak} -M3	
RTTG (n=8)	46,6±0,8	57,0±2,3	60,9±1,2	0,001
RTG (n=7)	48,3±1,3	56,2±1,6	62,6±1,5	0,001
CG (n=7)	48,8±1,7	55,1±2,6	58,4±2,0	0,006

Values are means±SD; MIP – Maximal Inspiratory Pressure; VO_{2peak} – maximal oxygen consumption in yo-yo test; M1 – first moment of assessment at beginning of football training (pre-season); M2 – second moment of assessment at beginning of respiratory muscle training; M3 – third moment of assessment at end of respiratory muscle training program.

Results – Statistical tests showed differences between M1, M2 and M3 for three groups, in IMS, showing an increment in muscle strength. Results for VO₂ showed that IMT seems to change VO₂ only for RTTG and RTG since VO₂ does not change significantly between M2 and M3 for CG.

Conclusions – An IMT program of 8 weeks and at 60% of maximal strength additionally to the normal sports training seems to change IMS and VO₂ and this could influence positively game performance of young football athletes.

