



## Exercise Biochemistry Review

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### Effect of Trunk Resistance Vest on Running Economy at Different Speed in Male Collegiate Students

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**Objective** Wearable resistance training is a common method utilized by athletic and fitness population during running. This method is demonstrated to have multiple athletic and health benefits despite of its potential risk for running technique. Running economy is a measure for running technique, which is defined as the oxygen uptake ( $VO_2$ ) at a given sub-maximal speed. The purpose of this study is to evaluate the effect of wearable resistance on running economy at different running speed in male collegiate students.

**Methods** 18 male collegiate students from Shanghai University of Sports (age:  $22.4 \pm 2.4$  yrs, height:  $177.4 \pm 7.5$  cm, body mass:  $69.3 \pm 8.2$  kg, training experience:  $4.6 \pm 1.6$  yrs, body fat:  $13.3 \pm 4.7\%$ ) volunteered to perform one two four-stage incremental tests (8km/h, 10km/h, 12km/h, 14km/h) with and without a trunk resistance vest (10% of individual body mass). The duration of each stage was 5 min, and intermittent per stage was 1 min. A portable spirometric system (K4b<sup>2</sup>, Cosmed, Italy) was utilized to measure the ventilator and heart rate index during the test. The running economy was calculated as the averaged  $VO_2$  in the last minute of each stage. The capillary blood was collected from the earlobe after each stage IBM SPSS Statistics 19 (SPSS Statistics 19, IBM Corporation, USA) was used to carry out a one-way repeated measurement ANOVA analysis on the physiological results at different speeds, and Paired-T test was to statistical analysis the normal and trunk vest test at the same speed.  $P < 0.05$  was set as the significant level.

**Results** Along with the increase of speed,  $VO_2$ , heart rate, blood lactate concentration and RPE was increased significantly ( $P < 0.05$ , except 12km/h and 14km/h without vest, and 8km/h and 10km/h with vest). The running economy was slightly lower in running with vest at each running speed compared with without vest ( $P > 0.05$ ). However, the blood lactic concentration with vest was higher than that without vest at all speed, with the difference significant at 14km/h ( $9.3 \pm 2.9$  vs.  $7.6 \pm 2.2$  mM,  $P > 0.05$ ). The RPE was significant higher with vest than without vest at each speed ( $P < 0.05$ , except at 8km/h).

**Conclusions** Running with trunk resistance vest of 10% body mass is characterized with slightly better economy, although it induces a significant higher blood lactic concentration and RPE.