

Effects of Breathing Exercise on Active Recovery after Wingate Anaerobic Test

Rena MIYAJIMA (Graduate School of Education, Shizuoka University)

1. Purpose

Active recovery promotes lactic acid removal more than passive recovery after increasing lactic acid in high intensity exercise. Exercise makes lactic acid remove as an energy source in slow twitch fibers. According to the previous study, 70% of trunk muscles involved in respiration are composed of the slow twitch fibers. The purpose of this study was to clarify the effect of breathing exercise on recovering after Wingate Anaerobic Test as an active recovery.

2. Methods

The subjects were 9 healthy female young adults with exercise habits (age 20.3 ± 0.7 years, height 162.7 ± 4.5 cm, weight 56.4 ± 6.1 kg). The experiment was performed under two conditions after Wingate Anaerobic Test (WAnT). One was passive condition (sitting rest), and the other one was active condition, 3 sets of the breathing exercises during recovery. Each breathing exercise was performed 4 times powerful and instantaneous continuous expiration within 3min in 2, 10 and 18min after WAnT.

Measurements were oxygen uptake ($\dot{V}O_2$), ventilation (\dot{V}_E), carbon dioxide production ($\dot{V}CO_2$), respiratory exchange ratio (RER), heart rate variability, blood lactate concentrations (BLa), EMG value (%RMS) of Transversus abdominis and Rectus muscle, rating of perceived exertion (RPE), total work and power output during WAnT and recovery.

3. Results and Discussion

Total work and power output were no significant differences between both conditions. $\dot{V}O_2$ (Figure1), \dot{V}_E , $\dot{V}CO_2$ and %RMS value of the transversus abdominis muscle of 2nd and 3rd sets in active condition had significantly higher than those in passive condition ($p < 0.01$, $p < 0.001$).

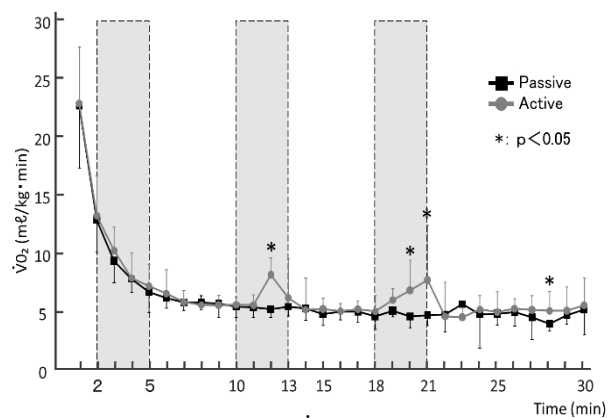


Figure1. Comparison of $\dot{V}O_2$ under both conditions.

BLa was no significant difference between both conditions. But $t_{1/2}$ of BLa for active condition was significantly faster than for passive condition ($p < 0.05$). RER showed significantly higher values in the 2nd and 3rd sets under active conditions ($p < 0.01$, $p < 0.001$). In contrast, RER of active condition was lower than that of passive condition after breathing exercise in the 2nd and 3rd set ($p < 0.05$, $p < 0.01$).

These results indicated that the breathing exercise during recovery was able to gain energy expenditure and was also involved in the elimination of BLa in WAnT. Therefore, it was suggested that utilizing respiratory exercise is effective as a method of active recovery in sitting after anaerobic exercise.