**Influence of difference in posture on lower limb oxygen kinetics during cycle bicycle ergometer driving**

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**Abstract:**

Introduction: Recently, ergometer-based exercise in the supine position has been used in the treatment of intensive care unit and dialysis patients. The purpose of this study was to clarify the effect of body position on lower limb muscle oxygen dynamics during cycle bicycle ergometer driving.

Methods: This study included 12 men. A cardiopulmonary exercise test was conducted in each of the sitting and supine positions. Exercise was performed for 20 minutes at a workload equivalent to 60% of each individual’s maximum oxygen uptake (sitting: 92 ± 16 W; supine: 81 ± 17 W). During exercise, muscle oxygen dynamics of the left, vastus lateralis were measured using near-infrared spectroscopy. Hemodynamics were also measured.

Results: In the supine position compared to the sitting position, oxyhemoglobin (O₂Hb) was significantly lower (sitting: 0.07 ± 0.17 AU; supine: -0.12 ± 0.16 AU; p < 0.01), whereas deoxyhemoglobin (HHb) (sitting: 0.17 ± 0.18 AU; supine: 0.62 ± 0.27 AU; p < 0.01) and total-hemoglobin (THb) were significantly higher (sitting: 0.25 ± 0.25 AU; supine: 0.48 ± 0.25 AU; p < 0.01). Similarly, cardiac output (CO) was significantly lower (sitting: 14.0 ± 3.5 L/min; supine: 12.7 ± 2.8 L/min; p < 0.01) and total peripheral vascular resistance (TPR) significantly higher (sitting: 630.9 ± 154.9 [dyne-sec]/cm⁵; supine: 685.2 ± 189.2 [dyne-sec]/cm⁵; p < 0.01). Mean blood pressure (MAP) was not significantly different between the two positions (sitting: 104.7 ± 13.6 mmHg; supine: 103.3 ± 13.7 mmHg; p = 0.07).

Conclusion: Since there was an increase in THb with a concurrent reduction in CO and increase in TPR, it can be suggested that vasodilatation increased during supine exercise. In addition, Increased THb and HHb in the supine position indicates that oxygen extraction and lower limb load is increased during this type of exercise.

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