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澳門大學
UNIVERSIDADE DE MACAU
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教育學院

Faculty of Education

急性低氧暴露及高強度間歇運動對健康男性大學生血壓和

認知功能的影響

Influences of Acute Hypoxic Exposure and Hypoxic High-
Intensity Interval Exercise on Blood Pressure and Cognitive
Function in Male College Students

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Influences of Acute Hypoxic Exposure and Hypoxic High-Intensity Interval Exercise on Blood Pressure and Cognitive Function in Male College Students

Abstract

Objective: There is dispute whether hypoxic training has an effect on blood pressure and it is also unclear whether high-intensity interval exercise has an effect on blood pressure. Moreover, few studies have discussed the influence of high-intensity interval exercise in hypoxia on cognitive function. The aim of this study was to discuss the influences of acute hypoxic exposure and hypoxic high-intensity interval exercise on blood pressure and cognitive function in male college students.

Methodology: 8 male college students (23.1 ± 1.5 years, BMI 25.6 ± 4.3 kg/m²) without regular exercise were recruited and randomly assigned to conduct four different exercise interventions (HHIE, NHIE, HCON, NCON). In the HHIE or NHIE trial participants were required to complete all-out effort for 6s and rest for 30s for 10 cycles, respectively simulated to 2500m or normoxia. In NHIE or NCON, participants were required to rest for 6min, respectively simulated to 2500m or normoxia. During each intervention, ambulatory blood pressure was measured from pre-10m to post-30m and mean blood pressure was measured the next morning. Cognitive function was measured at pre-5min, post-0min and post-30m. SaO₂ and RPE were also monitored during each intervention.

Results: For SBP, the main effect of time was significant ($F=23.488$, $p<.001$) while the main effects of group ($F=1.967$, $p>.05$) and oxygen concentration ($F=0.435$, $p>.05$) were not significant. In the aspect of differences in SBP, the results showed that SBP

during exercise was significantly higher ($p<.05$) and the one the next morning ($p<.05$) was significantly lower than the value before exercise. For DBP, the main effect of time was significant ($F=8.928$, $p<.001$), while the effects of group ($F=0.573$, $p>.05$) and oxygen concentration ($F=0.268$, $p>.05$) were not significant. There were no significant changes in DBP among each time point. For MBP, the effect of time was significant ($F=12.835$, $p<.001$), while the effects of group ($F=1.239$, $p>.05$) and oxygen concentration ($F=0.256$, $p>.05$) were not significant. For the accuracy of GoNoGo, the main effects of time ($F=4.191$, $p>.05$), group ($F=0.023$, $p>.05$) and oxygen concentration ($F=0.606$, $p>.05$) were not significant. Additionally, the interaction effects among them were either not significant. For reaction time, the main effects of time ($F=0.221$, $p>.05$), group ($F=1.131$, $p>.05$) and oxygen concentration ($F=0.474$, $p>.05$) were not significant.

Conclusion: Acutely moderate hypoxia exposure with short period has no significant effects on blood pressure and cognitive function. Acute high intensity interval exercise has no significant effect on blood pressure and cognitive function. But it has a trend to decrease BP at least to the next morning. Acute high intensity/interval exercise in moderate hypoxia has no additional effects on blood pressure and cognitive function.

Keywords: High-intensity interval exercise, hypoxic training, blood pressure, cognitive function

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