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## **Intermittent hypoxia increases exercise tolerance in elderly men with and without coronary artery disease**

### **Background:**

Intermittent hypoxia has been suggested to increase exercise tolerance by enhancing stress resistance and improving oxygen delivery. Because the improvement of exercise tolerance reduces mortality in the elderly with and without coronary artery disease intermittent hypoxia might be a valuable preventive and therapeutic tool. However, controlled studies are lacking.

### **Methods:**

Sixteen males (50-70 years, 8 with and 8 without prior myocardial infarction) were randomly assigned in a double-blind fashion to receive 15 sessions of passive intermittent hypoxia (hypoxia group) or normoxia (control group) within 3 weeks. For the hypoxia group each session consisted of three to five hypoxic (14-10% oxygen) periods (3-5 min) with 3-min normoxic intervals. Controls inhaled only normoxic air in the same way. Exercise tests were performed before and after the 3-week breathing program. After 3 weeks of intermittent hypoxia peak oxygen consumption had increased compared to normoxic conditions (+ 6.2% vs. -3%,  $p < 0.001$ ). This improvement was closely related to the enhanced arterial oxygen content after hypoxia ( $r = 0.9$ ,  $p < 0.001$ ). Both higher haemoglobin concentration and less arterial oxygen desaturation during exercise contributed to the increase in arterial oxygen content. During sub-maximal exercise (cycling at 1 W/kg) heart rate, systolic blood pressure, blood lactate concentration, and the rating of perceived exertion were diminished after intermittent hypoxia compared to control conditions (all  $p < 0.05$ ). Changes in responses to exercise after intermittent hypoxia were similar in subjects with and without prior myocardial infarction.

### **Conclusions:**

Three weeks of passive short-term intermittent hypoxic exposures increased aerobic capacity and exercise tolerance in elderly men with and without coronary artery disease.