Comparison of aerobic fitness with motion sickness susceptibility in linear and Coriolis acceleration

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Abstract: Objective To explore the relationship between aerobic fitness and motion sickness susceptibility in linear and Coriolis acceleration and to provide experimental evidences in guiding the vestibular function screen and adaptation training program.

Methods 22 male subjects (age: 30±4yr; height: 172±2cm; weight: 68.5±5.3kg) participated in this study. They were exposed to maximal 15min 4.95m/s² linear acceleration and maximal 4min Coriolis stimuli. The interval between these two kinds of stimuli was at least one week. Their aerobic fitness was measured at different day. Correlations between exposure time, motion sickness symptom scores, heart rate, blood pressure and VO2max or myocardial consumption of oxygen (MCO2) were analyzed. Results Subject who had large variations of MCO2 in the linear acceleration was inclined to have shorter exposure time and higher motion sickness symptom scores. All subjects had relatively better tolerance in linear acceleration than Coriolis stimuli. MCO2 variations in Coriolis stimuli linearly related to their individual VO2max. Conclusion Aerobic fitness was not related to the motion sickness susceptibility in linear and Coriolis acceleration. The larger variations in myocardial consumption of oxygen were related to higher motion sickness susceptibility in the linear acceleration. The correlation between symptoms after vestibular stimuli with individual aerobic fitness still need further study.

Keywords: linear acceleration; Coriolis acceleration; motion sickness susceptibility; maximal uptake of oxygen; myocardial consumption of oxygen.