INTRODUCTION

Decompression sickness (DCS) is a disabling, but hypothesized to be a relatively rare, condition. The risk to experience hypobaric DCS is higher as the person is less likely to experience hypobaric DCS than an "unfit" person given that fitness is exploited as part of the denitrogenation process prior to an altitude exposure. Aerobic fitness is peak oxygen consumption, both consume about 3.5 ml/kg/min. So why should aerobic fitness be of any value during denitrogenation (prebreathe, PB) prior to ascent in an altitude chamber, and is not associated with fitness unless fitness is exploited as part of the denitrogenation process (exercise PB, coef. = 0.014, p = 0.50). The VO₂pk for subjects who perform no PB or resting PB has no bearing on the DCS outcome as seen in Fig. 1, the slope is essentially zero. The expression of signs and symptoms of decompression sickness (DCS) are dictated by many factors, both subject-specific and environmental. Aerobic fitness, as VO₂pk (ml O₂/kg/min), may be linked to resistance to DCS and venous gas emboli (VGE) (1-3). It is not possible to distinguish a "fit" person from an "unfit" person based on resting oxygen (O₂) consumption, both consume about 3.5 ml/kg/min.

So why should aerobic fitness be of any value during denitrogenation (prebreathe, PB) prior to ascent in an altitude chamber? "Fit" and "unfit" subjects rest during the PB? Hypothesis: Exercise during the PB is a necessary condition to understand if aerobic fitness is associated with hypobaric DCS and VGE outcomes.

METHODS

Two general classes of experiments that include VO₂pk information are available from the NASA Hypobaric Decompression Sickness Database. 165 exposures with 25 cases of DCS where no PB or resting PB conditions was performed prior to ascent in an altitude chamber, and 172 exposures with 25 cases of DCS where exercise was performed during the PB prior to ascent to altitude. The similarity of the DCS (15.2% versus 14.5%) and VGE (45.5% versus 44.8%) incidence between the two classes indicates that decompression stress was similar in both cases.

VO₂pk is a measure of aerobic capacity and a form of aerobic fitness, and is most commonly estimated as the maximum work that can be performed. The VO₂pk for subjects who perform no PB or resting PB has no bearing on the DCS outcome as seen in Fig. 1, the slope is essentially zero. The expression of signs and symptoms of decompression sickness (DCS) are dictated by many factors, both subject-specific and environmental. Aerobic fitness, as VO₂pk (ml O₂/kg/min), may be linked to resistance to DCS and venous gas emboli (VGE) (1-3). It is not possible to distinguish a "fit" person from an "unfit" person based on resting oxygen (O₂) consumption, both consume about 3.5 ml/kg/min.

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