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Effect of Ambient Oxygen Content and Lifting Frequency on the Participant's Lifting Capabilities, Muscle Activities, and Perceived Exertion

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Abstract : The aim of this study is to assesses the lifting capabilities of persons experiencing hypoxia. It also examines the behavior of the physiological response induced through the lifting process related to changing in the hypoxia and lifting frequency variables. For this purpose, the study performed two consecutive tests by using; (1) training and acclimatization; and (2) an actual collection of data. A total of 10 male students from King Saud University, Kingdom of Saudi Arabia, were recruited in the study. A two-way repeated measures design, with two independent variables (ambient oxygen (15%, 18% and 21%)) and lifting frequency (1 lift/min and 4 lifts/min) and four dependent variables i.e., maximum acceptable weight of lift (MAWL), Electromyography (EMG) of four muscle groups (anterior deltoid, trapezius, biceps brachii, and erector spinae), rating of perceived exertion (RPE), and rating of oxygen feeling (ROF) were used in this study. The results show that lifting frequency has significantly impacted the MAWL and muscles’ activities. The oxygen content had a significant effect on the RPE and ROE. The study has revealed that acclimatization and training sessions significantly reduce the effect of the hypoxia on the human physiological parameters during the manual materials handling tasks.

Keywords : lifting capabilities, muscle activities, oxygen content, perceived exertion
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