Examining Aerobic Power and the Industrial Athlete.

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Maximal oxygen uptake (VO\textsubscript{2}max) was first described in the 1920’s as the oxygen uptake attained during maximal exercise intensity that could not be increased despite further increases in exercise workload, thereby defining the limits of the cardiorespiratory system. Today, VO\textsubscript{2}max is one of the most common measurements in all exercise science. A PubMed search for VO\textsubscript{2}max yields more than 9,000 citations and underscores the seminal importance of this concept for understanding physiological function and outcomes associated with both health and the performance of occupational, recreational and/or elite athletes. However, the precise measurement and importance of VO\textsubscript{2}max as it relates to physically demanding emergency occupations is surprisingly unclear. VO\textsubscript{2}max values are commonly used to determine occupational demands and represent the functional capacity needed for occupational fitness. As such, the measurement of VO\textsubscript{2}max is routinely used to ensure that applicants and incumbents in safety-related physically demanding occupations (i.e. structural fire fighters, wildland firefighters, police officers, correctional officers, etc.) have sufficient aerobic power to carry out the central occupational related tasks in a safe and effective manner. The goal of this research is to clarify the requirement for determining the attainment of VO\textsubscript{2}max and to further examine the role of aerobic power as it relates to the “industrial athlete”. The three proposed research studies will examine (a) supramaximal discontinuous verification workloads for the determination of a true VO\textsubscript{2}max, (b) the relationship between aerobic power and the pass/fail rates in the job-task related component of the physical fitness screening requirement for structural firefighter applicants, (c) the impact of training and detraining cycles on the physical and physiological fitness of wildland firefighters and their ability to safely and efficiently perform the critical emergency job-tasks.