

Biomechanical analyses of paramedics simulating frequently performed strenuous work tasks

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Abstract

Firefighters performing emergency rescue functions are at an elevated risk of musculoskeletal injuries. The objective of the current study was to analyze the biomechanical stresses placed on the body based on simulations of the following strenuous *and* frequently performed emergency rescue tasks: (1) transferring a patient from a bed to a stretcher using bedsheets, (2) transferring a patient from the ambulance stretcher to a hospital gurney, (3) carrying a victim down a set of stairs and through a landing using a stairchair, (4) carrying a victim down a set of stairs and through a landing using a backboard, and (5) carrying a victim down a straight set of stairs using a stretcher. Postural data were analyzed using the University of Michigan's Three-Dimensional Static Strength Prediction ProgramTM and the relative risk of low back disorder (LBD) was quantified using the trunk motion model published by Marras et al. (1993, spine 18, 617–628). Peak compression values and the probabilities from the Marras et al. (1993) model indicated that the most hazardous tasks performed as part of this simulation included pulling a victim from a bed to a stretcher, the initial descent of a set of stairs when using the stretcher, and lifting a victim on a backboard from the floor. Overall, the two models were well correlated in their assessment of the task components modelled ($r = 0.78$). These data indicate where engineering changes to equipment regularly used by emergency rescue personnel would have the greatest impact in reducing the risk of musculoskeletal injury. © 2000 Elsevier Science Ltd. All rights reserved.

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