Modeling of Effort Perception in Lifting and Reaching Tasks

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Although biomechanics models can predict the stress on the musculoskeletal system, they cannot predict how the muscle load associated with exertion is perceived. The short-term goal of the present study was to model the perception of effort in lifting and reaching tasks. The long-term goal is to determine the correlation between objective and subjective measures of effort and use this information to predict fatigue or the risk of injury. Lifting and reaching tasks were performed in seated and standing situations. A cylindrical object and a box were moved with one hand and two hands, respectively, from a home location to shelves distributed in the space around the subject. The shoulder and torso effort required to perform these tasks were rated on a ten point visual analog scale. Statistical regression models were developed to determine the effects of target location, gender, age, strength, stature, hands used, and condition (seated or standing) on the perception of effort at the shoulder and low back, respectively.