

Perception of Hand Force in Power Grip for Females

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Abstract

Borg's rating of perceived exertion (RPE) and category ratio (CR-10) scales are commonly used to quantify perceived muscular exertion for body segments. Twenty females participated in an experiment to study the power grip force at four perceived exertion levels using either dominant or nondominant hand under two posture conditions. It was found that the subjects tended to apply a higher power grip force (100% of perceived maximum voluntary contraction) than the levels they were requested to apply. The power grip forces between dominant and nondominant hands at low hand exertion levels were negligible. The grip forces between the two hands were significantly different when the exertion level was nearly maximal. Linear regression models were established for the subjects to link the relationship between the perceived hand exertion and measured grip force, hand used, and hand/arm posture. All the models were statistically significant ($p < 0.0001$) with R^2 values 0.97 or higher. These models provided better estimates in perceived hand exertion for dominant hand than for nondominant hand. A follow-up experiment was conducted to measure the subjective rating of both the CR-10 and RPE when a 98 N grip force was applied. It was found that the subjects reported higher exertion levels when they were using the CR-10 scale than when they were using the RPE scale.

Keyword : Grip force; Hand exertion; Subjective rating; CR-10; RPE