

## Relationship Between One Repetition Maximum Strength and Peak Power Output for the Free-weight Bench Press Exercise

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*Category: Masters*

### ABSTRACT

Strength and conditioning coaches are often interested in improving power output in their athletes. As many coaches are aware that power is the product of force and velocity, an emphasis is often placed on training with loads that correspond to peak mechanical power output (e.g., 30-50% of the one repetition maximum [1RM]). The purpose of this study was to examine the relationship between 1RM strength and peak power output during the free-weight bench press exercise. Twenty-one healthy, recreationally resistance-trained men (mean  $\pm$  SD age =  $24 \pm 3$  years; body mass =  $90.5 \pm 14.6$  kg; 1RM bench press =  $125.4 \pm 18.4$  kg) volunteered for this investigation. A minimum of 48 hours following a maximal strength testing and familiarization session, the subjects performed a single repetition of the bench press using 50% of the 1RM. For each repetition, the subjects were instructed press the weight explosively throughout the concentric portion of the range of motion. A Tendo Weightlifting Analyzer was used to assess peak power output for each repetition. A linear regression analysis was used to examine the relationship between 1RM strength and peak power output. The results indicated that the coefficient of determination ( $R^2$ ) was 0.697, suggesting that 1RM strength explained roughly 70% of the variance in peak power output. The linear slope coefficient was 5.94 W/kg, and the y-intercept was 110.2 W. These findings demonstrated that 1RM strength and peak power output were highly correlated. Although explosive training with light loads is often stressed in strength and conditioning programs, for the free-weight bench press exercise, a relatively small degree of variance in peak power output can be explained by factors other than 1RM strength.

