training loads without calculating a %1RM, the loads are too light to effectively stimulate strength gains (5,7,11). Some guidance in selecting a training load seems to be warranted. The use of the RPE could improve the selection of appropriate ERT loads while not relying upon a 1RM strength test. The purpose of this study was to assess the relationship between the Borg RPE scale and ERT loads relative to the %1RM in older adults during the chest press and to investi-

fast as safely possible"). The slow- and medium-speed repetitions were used to acclimate the participant to the feeling of lifting the concealed load before conducting the final repetition at maximum speed. The subjects then rated the load during only the high-velocity repetition using the Borg RPE scale (range, 6–20 points). The subjects were instructed to always perform the eccentric phase slowly, under control, and to include a pause before and after the concentric phase was performed. Subjects rested for 1-minute between each set.

The loads presented during session 1 were based on the goal of exposing the participant to loads that would elicit RPE ratings across the spectrum of "light" to "heavy". Some planned loads were not presented for some participants if the previous trials made it apparent that the load would either exceed the participants' capabilities or that the load would be below a "very, very light" rating already achieved.

The influence of previous experience with chest press loads on the subjects' RPE was prevented by concealing the weight stack from the subjects by a curtain at all times during the study. Because they could never see the load, the subject only became aware of the magnitude of the load upon lifting the first repetition of the set, and this was always conducted in a slow and controlled manner with subsequent repetitions increasing in velocity. Repeatability of the RPE ratings was assessed for 4 loads following the initial presentation of loads during session 1. The subjects were not informed that they would lift some loads twice, but rather were instructed that they would lift a variety of loads ranging from light to heavy.

The qualitative descriptors accompanying the original Borg 6–20 point RPE scale (4) were presented to the subjects alongside the numerical ratings (7: very, very light, 9: very light, 11: fairly light, 13: somewhat hard, 15: hard, 17: very hard, 19: very, very hard). In addition, the subjects were asked whether they felt that the handlebars would have projected from their hands when pushing as fast as they could. These answers were recorded after the experience of each load. Unlike

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## Statistical Analyses

Each load experienced and rated for RPE during session 1 was calculated as %1RM by dividing by the highest load lifted during session 2 and multiplying by 100. A regression analysis that would include all data points (up to 7 loads) for all subjects combined could not be conducted without violating the assumption of independence that each observation is from a different subject. Because of this, the RPE scores were averaged across subjects for each 5% range of 1RM from 35% 1RM to 110% 1RM. For each 5% 1RM range, a different number of subjects were included in the calculation of the mean %1RM and RPE, according to how many subjects had attempted a load that fell within that range (Table 2). Regression analysis was used to determine if the average RPE for each load predicts the average %1RM during chest press ERT. Previous research has revealed no difference in RPE between sexes for resistance training (9,11). Therefore, results from both men and women were included in the single regression analysis. All subject characteristics, RPE, and %1RM variables passed tests of normality (Kolmogorov-Smirnoff, Shapiro-Wilk) and the Levene's test for equality of variances between the sexes. Two-tailed, independent -tests were used to test for (a) sex differences on subject characteristics (age, height, and weight) and (b) sex differences on the RPE for 2 loads: a high-intensity (80–85% 1RM) load relevant to strength and power (4) and a low-intensity load (45–50% 1RM) relevant to balance function (15). Four loads were repeated during session 1 to evaluate the repeatability of the RPE using the Intraclass Correlation Coefficient (ICC) between the first and second experience with the load during session 1.

Descriptive statistics (mean and *SD*, and confidence intervals [CI]) were calculated for the 1RM (in %BW). Both absolute and relative 1RM, height, and weight, were compared between sexes using independent -tests. The alpha level of significance for all tests conducted was $\leq 0.05$.

## RESULTS

Rating of perceived exertion significantly predicted the %1RM corresponding with chest press ERT loads ($R^2 =$ 97.6%, SEE 3.6, $< 0.001$; Figure 1). The predicted %1RM at the maximal rating (RPE = 20) exceeded 100% 1RM (Tables 2 and 3 and Figure 1). This may reflect the difficulty in obtaining a true 1RM in some older adults; 3 participants lifted a higher load during session 1 than during the 1RM test on session 2. Rating of perceived exertion demonstrated moderate repeatability between the first and second expo-

Males had significantly greater body size and absolute

a lower-extremity (16) and an upper-extremity multijoint