Strength and regional lean body mass association to mineral bone health

Dalton Muller Pessoa Filho

Abstract

Citation: Dalton Muller Pessoa Filho Strength and regional lean body mass association to mineral bone health. **protocols.io**
dx.doi.org/10.17504/protocols.io.kxacxie
Published: 22 Nov 2017

Protocol

Strength measure

Step 1.

The 1RM tests were performed on: (a) flat bench-press (BP), (b) lat pull-down (LPD), (c) knee-extension (KE), (d) leg-curl (LC), and (e) leg press 45º (LP45). All tests were performed after a 15 min warm-up (static stretching, and aerobic exercise on a bike or running with low workload/velocity intensity). The 1RM test protocol followed: (1) a specific warm-up preceded the test, and included repetitions performed with light intensity loads avoiding concentric failure; (2) initial attempt for one maximum repetition was performed with load related rating scores for UL and LL strength, according to age, gender and body-weight; (3) the participants performed at least three attempts with 3 min resting between each, increasing or decreasing the initial lifted load from 1.1 to 4.5 kg, according to the level of difficulty of the first attempt. The highest weight (in kg) successfully lifted was the reference value of 1RM. The 1RM load was submitted to a confirmatory test, consisting of two additional attempts performed 24 h apart. For the confirmatory test, the load at 1RM was fractioned into percentages of 90, 95, 100, 105 and 110 %, which were randomly chosen and lifted with a 3 min rest between them. It was mandatory to try one lift with a load above 1RM if the first load chosen was 100 % 1RM or less.

Body Composition

Step 2.

DXA (modelo HologicÒ, QDR Descoberta WiÒ) was used to obtain the regional and whole-body composition. The software (Hologic APEXÒ) yields absolute (in grams) values of FM, FFM (which includes measures of BMC, in grams), BMD (in grams/cm^2), LM (which does not include BMC), and total mass for whole-body and regional references (head, trunk, left arm, right arm, left leg and right leg). The UL and LL composition were further considered, which were obtained from a simple algebraic sum of corresponding regional reference. The equipment was calibrated according to the manufacturer's recommendations and all analyses were performed by an experienced technician. The participants should wear light clothing, no shoes or have any metallic objects attached to the body and clothes. The participants were positioned in the supine position on a flat table until the end of the checking. Their feet remained close together and their arms were placed parallel to the trunk. Lines were adjusted and aligned by the same technician through specific anatomic points determined by

the software.

Statistics

Step 3.

Normality was verified by the Kolmogorov-Smirnov's test. The linear correlation coefficient (Pearson's "r") was applied to the analysis of the relationships from values of BMD and BMC (as dependent factors) to the regional and whole-body composition and 1RM for BP, LPD, KE, LC and LP45 (as independent factors). The dispersion and variability for the deterministic relationship between dependent and independent variables were measured by the coefficient of variance adjusted to the sample (R^2_{Adj}), and the standard error of estimate (SEE). The stepwise method was applied to regression analysis, and the significance level was set at $p \leq 0.05$. The sample power for the correlations between dependent and independent variables was determined considering the sample size (Men = 36). The entry parameters were: (a) the Pearson "r" coefficient; (b) Za = 1.96 to a security index of a = 0.05; and (c) Z_1-b = 1.282 for an expected sample power of 80 % (b = 0.20). Magnitude-based inference analysis was applied to test the chances of the true magnitude of an effect to be substantially positive and negative, and negligible or trivial (with odds ratio of 66 to ensure that >25 % chance of benefit and <0.5 % chance of harm means a decisively useful effect). The chances were given qualitatively from threshold values, according to the scale: <1 % = most unlikely; 1 %–5 % = very unlikely; 5 %–25 % = unlikely; 25 %–75 % = possibly; 75 %–95 % = likely; 95 %–99.5 % = very likely; and >100 % = most likely. This procedure ensures that the study with the sampling distribution of z [= 0.5 × ln × ((1+r)/(1-r))] would be reproduced normally with variance [=1/(n-3)].