TACSM Abstract

Evaluation of Repetitions-to-Failure Equations in the Presence of Male and Female Spotters

CLARISSA M. GUERRERO[1], KYUNG-SHIN PARK[1], BRETT S. NICKERSON[1]

[1] Exercise Physiology Laboratory; College of Nursing and Health Sciences; Texas A&M International University; Laredo, TX

Category: Undergraduate

Advisor / Mentor: Nickerson, Brett (brett.nickerson@tamiu.edu)

ABSTRACT

One-repetition maximum (1RM) is commonly evaluated in strength and conditioning programs in order to monitor the progress of exercise prescriptions. Although the benefits of muscular strength are well-known, conducting 1RM protocols can be time consuming and is not recommended for certain populations. Alternatively, the estimation of 1RM can be completed by utilizing a repetitions-to-failure (RTF) approach. However, one area that has yet to be systematically evaluated is whether the accuracy of RTF prediction equations is influenced by the sex of a spotter during a 1RM testing protocol. **Purpose:** The purpose of this study was two-fold: 1) to determine whether differences in RTF, measured 1RM, and 1RM prediction methods vary between lifter and spotter sex; and 2) determine the validity of the 1RM prediction methods in the presence of either a male or female spotter. **Methods:** 20 resistance-trained individuals (50% males) participated in this study. The first two visits determined 1RM (kg) bench press scores in the presence of a male or female spotter. Subjects bench-pressed loads at 30 (5-repetitions), 50 (5-repetitions) and 70% 1RM (RTF) in the presence of a male or female spotter for visits 3 and 4. Estimated 1RM was determined via the RTF at 70% 1RM using Wathan ($Wathan_{1RM}$), Mayhew ($Mayhew_{1RM}$), and Epley ($Epley_{1RM}$) equations. **Results:** There were significant interactions when assessing $Wathan_{1RM}$ and $Mayhew_{1RM}$ ($p<0.05$). *Post hoc* analysis revealed $Wathan_{1RM}$ and $Mayhew_{1RM}$ were significantly higher during the male spotter condition (58.13±11.05 and 54.07±10.32kg, respectively) than female spotter condition (54.30±10.61 and 50.53±9.91kg) when evaluated in female weight lifters ($p=0.032$ and 0.033, respectively). Evaluation of mean differences revealed that the constant error (CE) for male and female spotter conditions was lower for $Epley_{1RM}$ (CE = 4.98 and 4.75kg, respectively) than $Wathan_{1RM}$ (CE = 16.19 and 16.06kg, respectively) and $Mayhew_{1RM}$ (CE = 8.79 and 8.65kg, respectively). Moreover the 95% limits of agreement for male and female spotter conditions were smaller for $Epley_{1RM}$ (±13.79 and 13.62kg, respectively) than $Wathan_{1RM}$ (±26.49 and 22.95kg, respectively) and $Mayhew_{1RM}$ (±19.82 and 17.13kg, respectively). **Conclusions:** $Epley_{1RM}$ should be used over $Wathan_{1RM}$ and $Mayhew_{1RM}$ when loads up to 70% 1RM are implemented. Also, spotter sex only appears to impact female lifters when employing the prediction equations of $Wathan_{1RM}$ and $Mayhew_{1RM}$.