Difference in Standardized Repetitions-to-Intensity Ratios for Females during Resistance Training

Ruth Caddell, Andrew Wolfe, Matt Laurent, Michael Luera, Gillian Braden, Kenneth Bowen, Kayleigh Abbott
Tarleton State University , Stephenville, TX
Kinetic Performance Laboratory

Abstract

Introduction: In resistance training, a given training load is determined by two factors, volume (number of repetitions completed) and intensity (weight lifted). The current literature clearly recognizes an inverse relationship between the weight lifted and repetitions completed. The previous studies establishing intensity-to-repetition ratio predominantly utilized male participants (Mayhew et al., 2008). Research has yet to explore and determine appropriate resistance training intensity-repetition ratios for females. **PURPOSE:** Furthermore, the purpose of the study was to examine the difference between the current norm repetition-intensity recommendations and the performed repetitions of females at concurrent intensities. **Methods:** Subjects included 17 females with six month of consistent resistance training experience. Each participant completed five testing sessions. Session one consists of one-repetition maximum (1RM) testing for the squat (SQ), bench press (BP), and deadlift (DL), utilizing the National Strength and Conditioning Associations (NSCA) standardized 1RM testing procedures. Sessions 2-5 were experimental sessions involving a repetition-maximum testing at 65, 75, 85, and 95% of an individual's 1RM, in the order of SQ, BP, then DL. Following the SQ, participants received 10-15 minutes of rest before performing the same protocol for the BP, followed by 10-15 minutes rest before performing the DL. One-way ANOVA was performed to determine if there were any significant differences in repetitions performed between exercises at each intensity level. A series of one-sample t-tests were performed to indicate significant differences between established target repetitions for each exercise across all intensities (65% = 15, 75% = 10, 85% = 6, 95% = 2). **Results:** There was no significant main effect (p=0.14) in repetitions completed during SQ, BP, or DL at 65% (26.1 ± 6.8, 21.3 ± 6.8, 23.4 ± 6.3, respectively). Similarly, no significant main effect was found at 75% (p = 0.15) across SQ, BP, and DL (18.0 ± 6.2, 14.4 ± 4.2, 15.7 ± 4.7, respectively). At 85% there was no significant main effect (p = 0.7) found for repetitions completed during SQ, BP, and DL (10.3 ± 3.7, 9.0 ± 4.6, 9.6 ± 4.1, respectively). Finally, no significant main effect (p = 0.30) was present at 95% during SQ, BP, and DL (4.1 ± 2.4, 2.5 ± 2.0, and 3.4 ± 2.0, respectively). There was no significant difference recognized (p = 0.09) between current norms and female BP repetitions at 95%. However, a series of one-sample t-tests indicated significantly higher repetitions for all SQ, BP, and DL at 65%, 75 %, 85%, and 95%. **Discussion:** These results suggest the same intensity-repetitions ratios should be prescribed for upper and lower body exercises in females. However, the results suggest different resistance training intensity-repetition ratios should be prescribed for females; meriting future research aimed at establishing sex-specific intensity-repetition ratio norms.

Introduction

In resistance training, a given training load is determined by two factors, volume (number of repetitions completed) and intensity (weight lifted). The current literature clearly recognizes an inverse relationship between the weight lifted and repetitions completed. The previous studies establishing intensity-to-repetition ratio predominantly utilized male participants (Mayhew et al., 2008). Research has yet to explore and determine appropriate resistance training intensity-repetition ratios for females.

Purpose Statement

Furthermore, the purpose of the study was to examine the difference between the current norm repetition-intensity recommendations and the performed repetitions of females at concurrent intensities.

Methods

Participants:

- 17 Females with 6 months of consistent resistance training

Measures:

- 1RM SQ, BP, DL
- Reps completed of SQ, BP, DL:
  - 65, 75, 85, 95% 1RM

Procedures:

- Session 1: 1RM of SQ, BP, DL
- 10-15 minutes of rest between each exercise
- Sessions 2-5: maximum rep testing randomized at 65, 75, 85, 95% of 1RM in order of SQ, BP, DL
- 10-15 min rest between each exercise

One Sample T-Test Results:

- Current Norms: 65% = 15, 75% = 10, 85% = 6, 95% = 2

Results

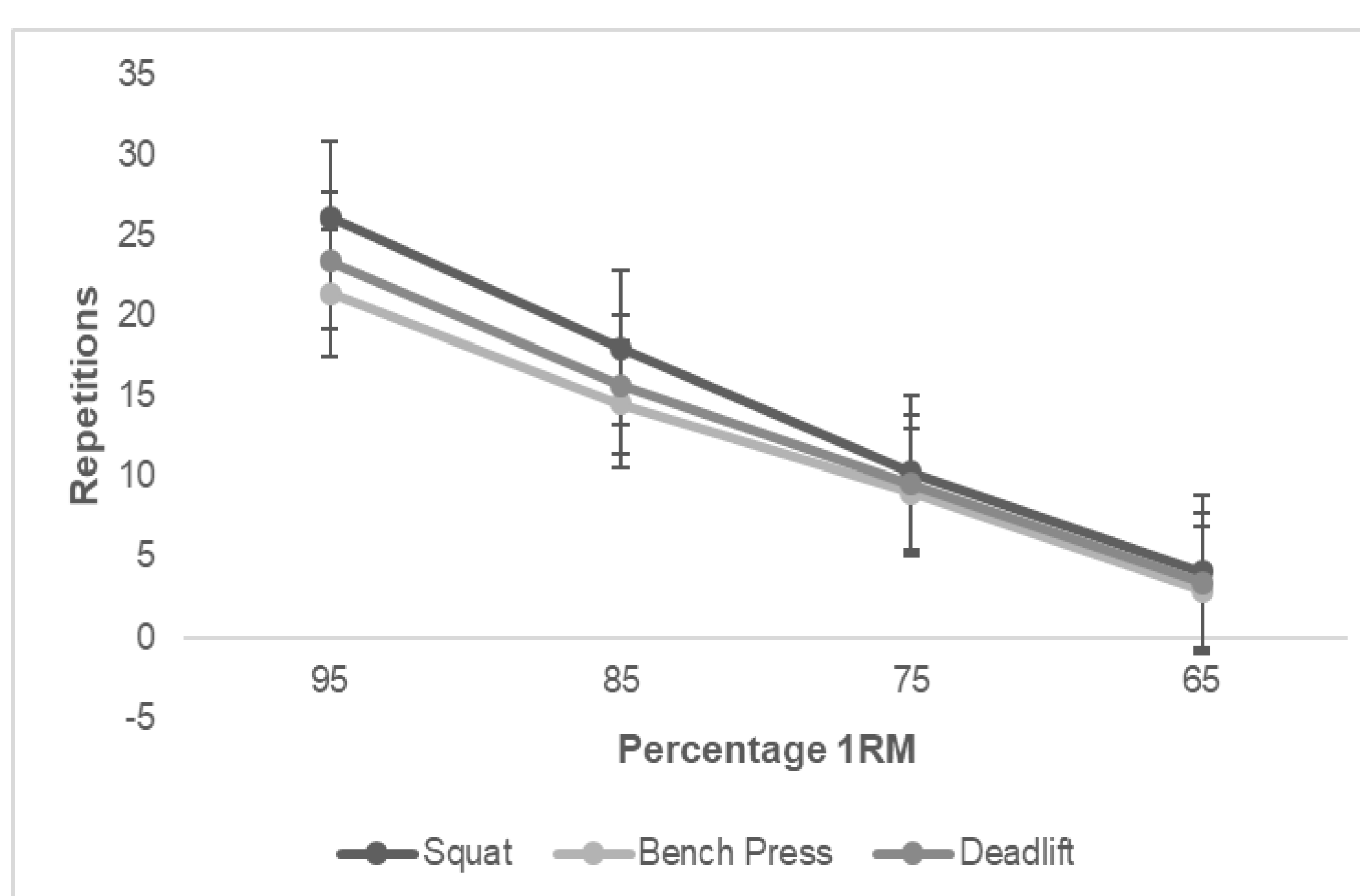There was no significant main effect (p > 0.05) in repetitions completed during SQ, BP, or DL at all levels of intensity. A series of one-sample t-tests indicated significantly higher repetitions for all SQ, BP, and DL at 65%, 75 %, 85%, and 95%.
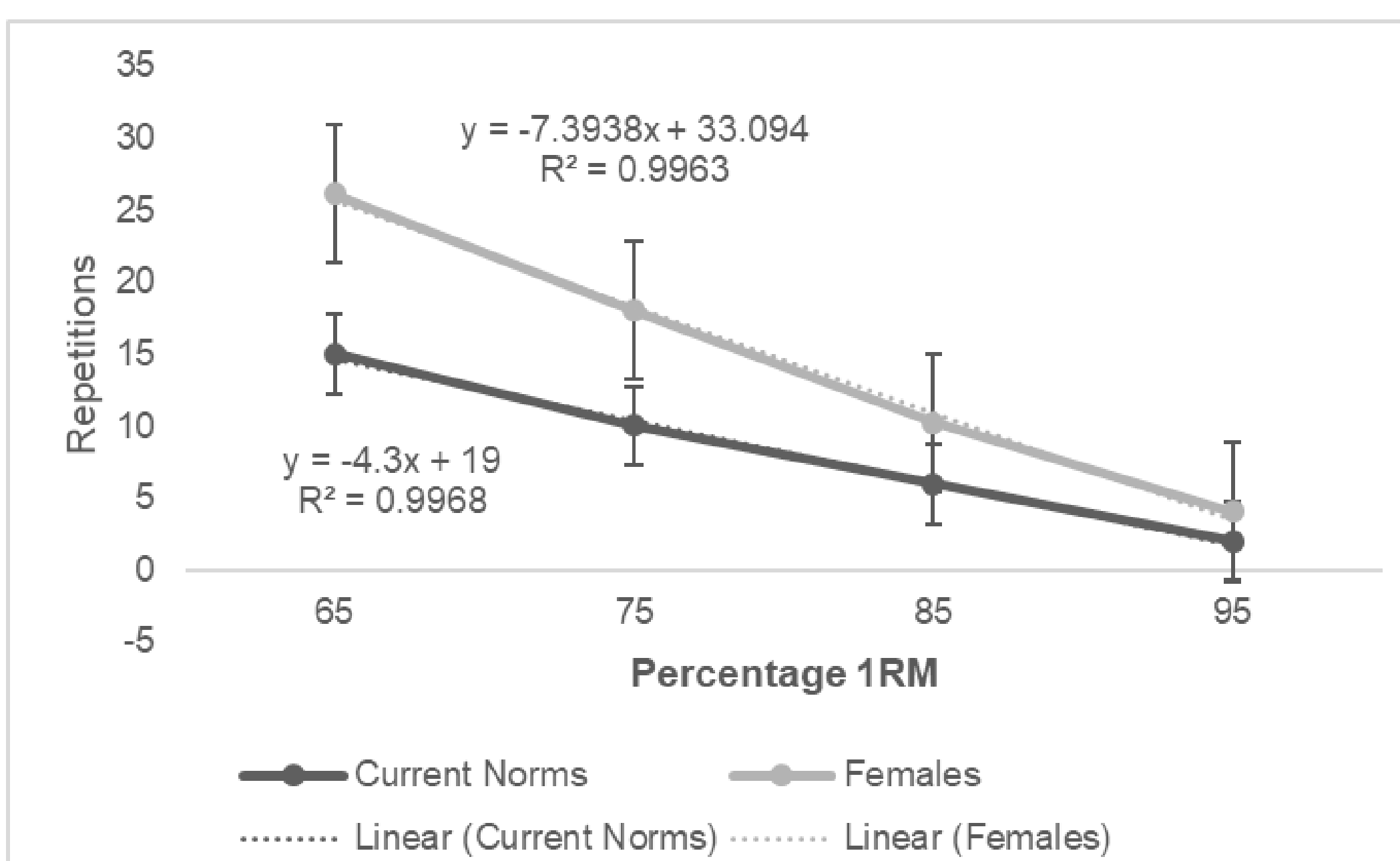
Table 3
Title (N = 658)

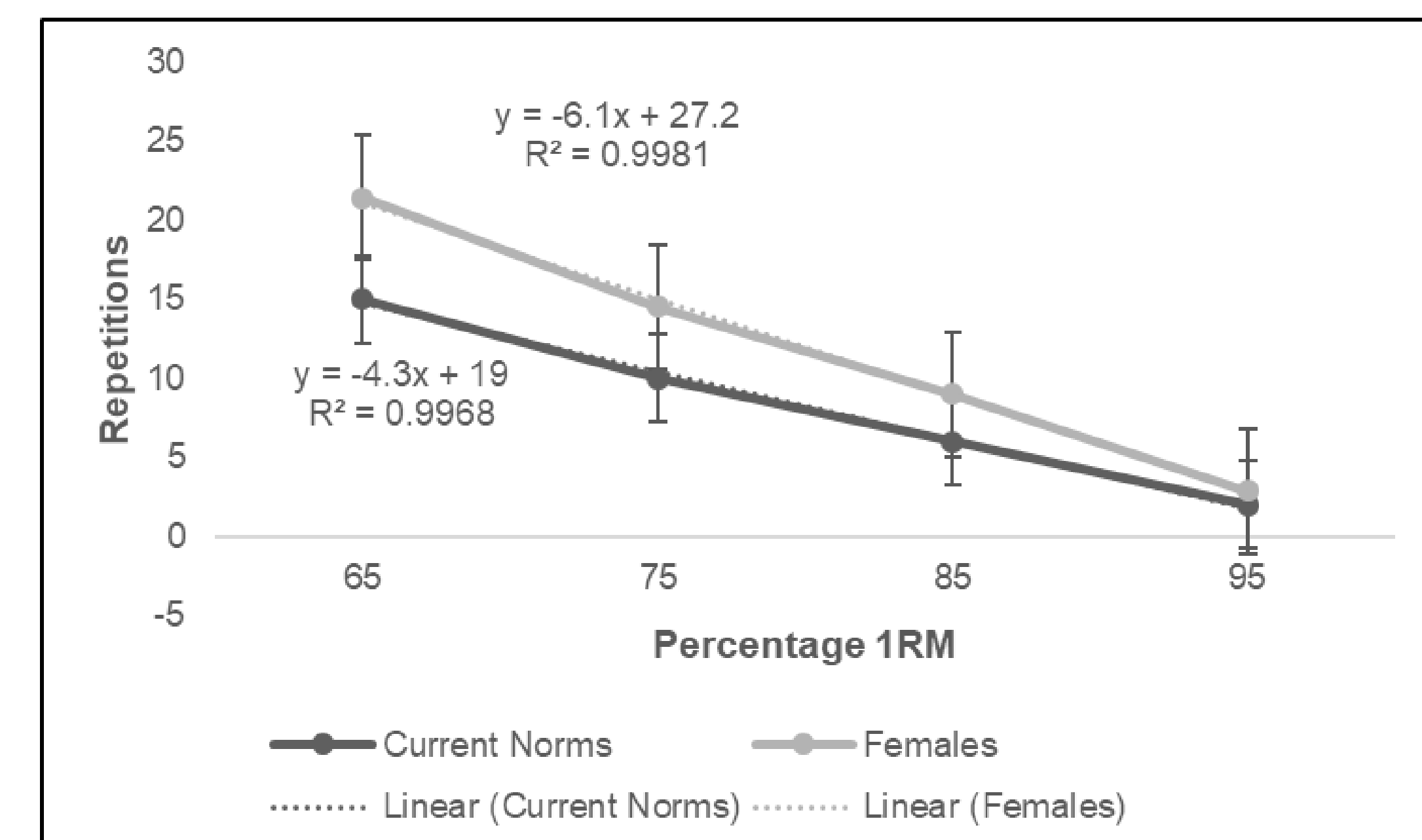| Variable	65% Intensity	75% Intensity	85% Intensity	95% Intensity
SQ	26.1 ± 6.8	18.0 ± 6.2	10.3 ± 3.7	4.1 ± 2.4
BP	21.3 ± 6.8	14.4 ± 4.2	9.0 ± 4.6	2.5 ± 2.0
DL	23.4 ± 6.3	15.7 ± 4.7	9.6 ± 4.1	3.4 ± 2.0

Note. SQ = Squat; BP = Bench Press; DL = Deadlift.
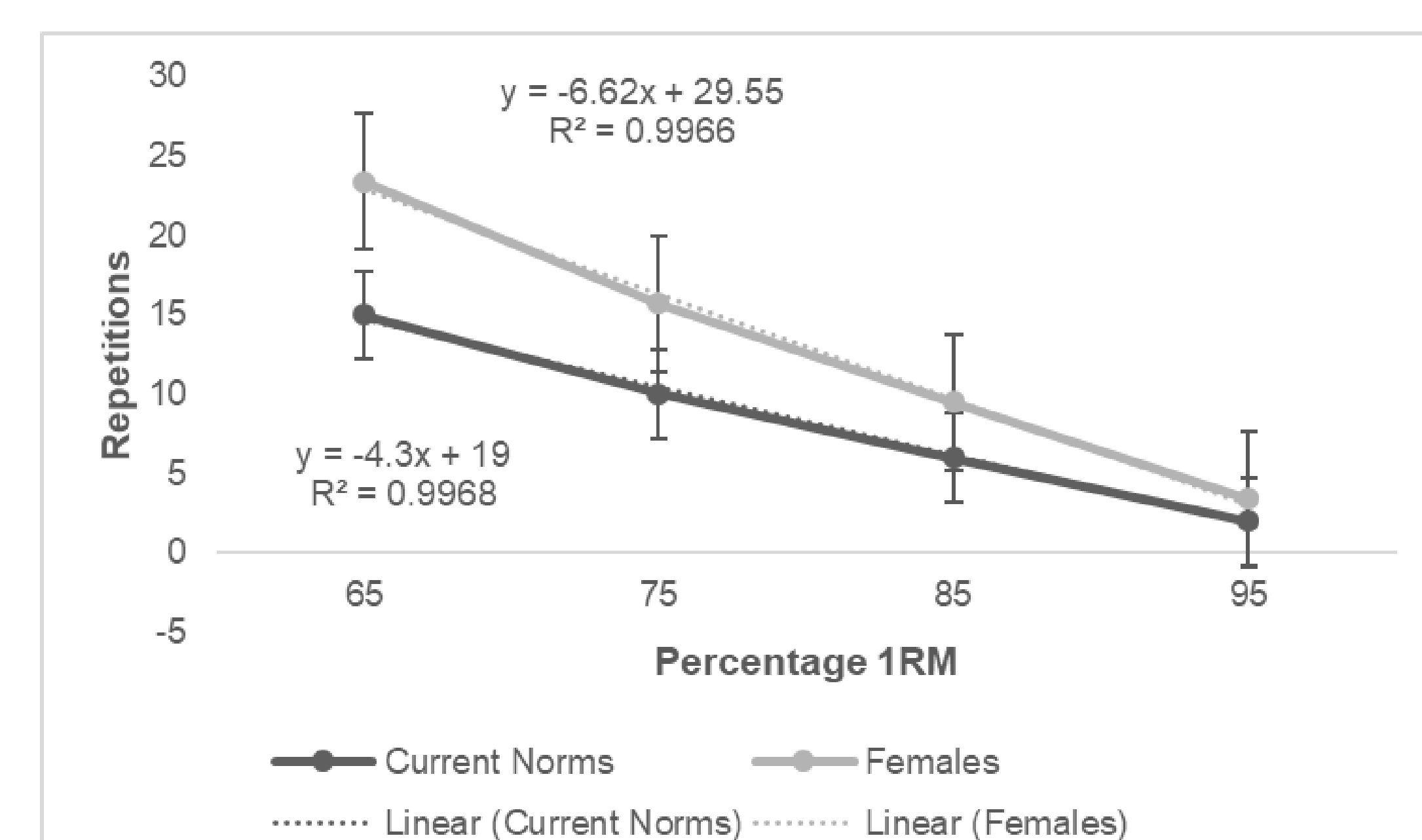
1RM- Repetition Relationship Between Exercises

Percent of 1RM- Repetition Relationship in SQ

$y = -7.3938x + 33.094$
$R^2 = 0.9963$

$y = -4.3x + 19$
$R^2 = 0.9968$

Percent of 1RM- Repetition Relationship in BP

$y = -6.1x + 27.2$
$R^2 = 0.9981$

$y = -4.3x + 19$
$R^2 = 0.9968$

Percent of 1RM- Repetition Relationship in DL

$y = -6.62x + 29.55$
$R^2 = 0.9966$

$y = -4.3x + 19$
$R^2 = 0.9968$

Discussion

These results suggest the same intensity-repetitions ratios should be prescribed for upper and lower body exercises in females. However, the results suggest different resistance training intensity-repetition ratios should be prescribed for females; meriting future research aimed at establishing sex-specific intensity-repetition ratio norms.

References

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TARLETON STATE UNIVERSITY
School of Kinesiology