CHANGES IN BODY COMPOSITIONS FOLLOWING RELATIVE VERSUS ABSOLUTE ADJUSTMENT AUTOREGULATORY PROGRESSIVE RESISTANCE EXERCISE

Cason D. Kelly[1], Dylan J. Harty[1], Annalee G. Krahn[1], Andrew J. West[1], Jenaya V. Brown[1], Micheal J. Luera[1], Andrew A. Wolfe[1]

[1]Tarleton State University

KINETIC PERFORMANCE LABORATORY

Abstract

Autoregulatory Progressive Resistance Exercise (APRE) is a training approach that incorporates individual adjustments to exercise intensity based on individual intra- and inter-session performance. However, traditional APRE titrates lifting load with absolute adjustments, disregarding the principle of individuality. **PURPOSE:** The aim of this study was to determine potential differences in body composition following relative adjustment APRE (r-APRE) versus absolute adjustment APRE (a-APRE). **METHODS:** Fifteen resistance trained males were separated into groups, r-APRE (n=9; $m \pm sd$; age: 21.3 ± 2.2yrs; height: 175.8 ± 6.7cm; weight: 65.6 ± 17.8kg) or a-APRE (n=6; age: 21.1 ± 2.6yrs; height: 171.9 ± 6.5cm; weight: 90.5 ± 28.6kg). An Air Displacement Plethysmography system using whole body densitometric principles was utilized to determine body composition measures. Body weight (Wt), body fat percentage (BFP), fat free mass (FFM), and fat mass (FM) measures were recorded both before and after 4-weeks of APRE training. The 4-week r-APRE or a-APRE program was employed, consisting of 4 days per week, in conjunction with 2-3 accessory movements at a self-selected weight equivalent to an 8 on the OMNI Rate of Perceived Exertion scale. For the r-APRE group intra- and inter-session adjustments were made by reestablishing predicted 1RM using the Brzycki's predicted 1RM equation, then, recalculating participants' 85% 1RM (6RM) for the load of the subsequent working set. For the a-APRE group, individuals selected ±0-15 adjustments based on the number of repetitions completed during working sets. Separate mixed factorial analyses of variance (group [a-APRE v r-APRE] x time [pre v post]) were used to compare mean differences between groups following the training intervention. **RESULTS**: There were no significant group x time interactions for FFM (p = 0.853), FM (p = 0.206), BFP (p = 0.245), or Wt (p = 0.264). Further, there were no main effects of time or group for FFM (p = 0.076, p = 0.647), FM (p = 0.404, p = 0.313), or BFP (p = 0.553, p = 0.279). However, there was a main effect of time on Wt (p = 0.004) with average weight increasing over time (85.880 ± 5.680 to 87.011 ± 5.706) when collapsed by group, but no main effect of group (p = 0.433). **CONCLUSION:** These findings suggest that neither r-APRE nor a-APRE resulted in significant changes in body composition over the 4-week training period. However, a significant increase in body weight over time, regardless of training method, indicates that short-term APRE interventions may influence overall mass but not specific body composition metrics. **PRACTICAL APPLICATION**: Future investigations should further explore these anthropometric outcomes for 3RM and 10RM r-APRE program designs. Nutritional strategies may also be utilized in conjunction to APRE to optimize body composition.

Introduction

Autoregulatory progressive resistance exercise (APRE) is a training method that allows daily fluctuation in training load, therefore, aligning with current participant readiness.

Traditional APRE utilizes absolute intra- and intersession load adjustments, contradicting positive implications associated with percentage-based training.

Purpose

The aim of this study was to determine potential differences in body composition following relative adjustment APRE (r-APRE) versus absolute adjustment APRE (a-APRE).

Methods

Subjects: r-APRE (n=9; m ± sd; age: 21.3 ± 2.2yrs; height: 175.8 ± 6.7cm; weight: 65.6 ± 17.8kg)

a-APRE (n=6; age: 21.1 ± 2.6yrs; height: 171.9 ± 6.5cm; weight: 90.5 ± 28.6kg)

Measurements: Body weight (Wt), body fat percentage (BFP), fat free mass (FFM), fat mass (FM)

Training: 4 sessions per week; 4 weeks

Main exercise using a-APRE or r-APRE adjustments

Accessory exercises done for 3 sets at RPE of 8 with 2 RIR

Statistical Analysis: Separate mixed factorial analyses of variance (group [a-APRE v r-APRE] x time [pre v post]) were used to compare mean differences between groups following the training intervention.

a-APRE Adjustments

Repetitions	Intensity (% of 6RM)
10x	50%
6x	75%
AMRAP	6RM
AMRAP	Adjusted weight

Repetitions for set 3 adjustment	Set 4 adjustment (lb)
0-2	-5 to -10
3-4	0 to -5
5-7	No change
8-12	+5 to +10
>13	+10 to +15

r-APRE Adjustments

Repetitions	Intensity (% of 6RM)
10x	50%
6x	75%
AMRAP	6RM/Adjusted
AMRAP	Adjusted weight

Set 3 & 4 Adjustment

Load Prescription – Brzycki Equation:

$$(\text{Previous Weight}/(1.0278-(0.0278 * \text{Previous Reps})))*0.85$$

Exercises Training Routine

Day 1 (lower body)	Day 2 (upper body)	Day 3 (lower body)	Day 4 (upper body)
§ Squats	§ Bench Press	§ Deadlift	§ OH Press
BB RDL	Pull Up	BB Step Up	Inverted Row
BB Lunge	DB OH Triceps Extension	Lateral Lunge	Front Raise
	Lateral Raise		BB Bicep Curl

§ - Core exercise performed with APRE percentage based or absolute adjustments; *DB = dumbbell; BB = barbell; OH = overhead

Results

Effect of APRE Training on Body Weight
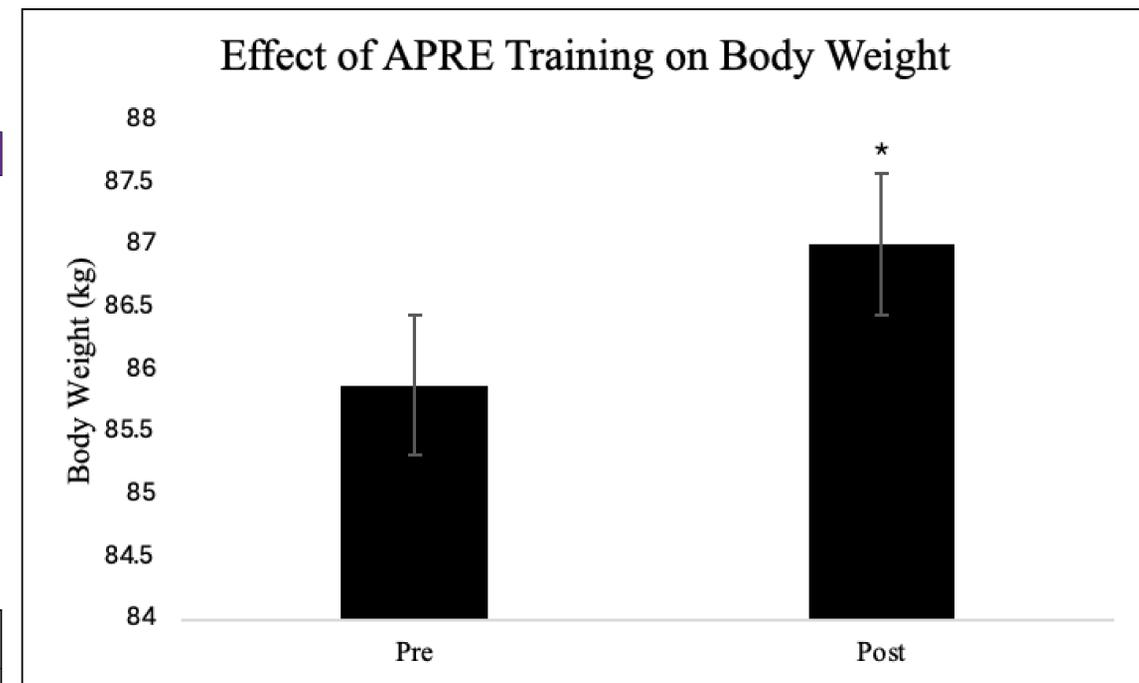
*Significantly (p < .05) greater than pre-test bodyweight

There were no significant group x time interactions for FFM (p = 0.853), FM (p = 0.206), BFP (p = 0.245), or Wt (p = 0.264). Further, there were no main effects of time or group for FFM (p = 0.076, p = 0.647), FM (p = 0.404, p = 0.313), or BFP (p = 0.553, p = 0.279).

However, there was a main effect of time on Wt (p = 0.004) with average weight increasing over time (85.880 ± 5.680 to 87.011 ± 5.706) when collapsed by group, but no main effect of group (p = 0.433).

Conclusion & PA

These findings suggest that neither r-APRE nor a-APRE resulted in significant changes in body composition over the 4-week training period. However, a significant increase in body weight over time, regardless of training method, indicates that short-term APRE interventions may influence overall mass but not specific body composition metrics.

Future investigations should further explore these anthropometric outcomes for 3RM and 10RM r-APRE program designs. Nutritional strategies may also be utilized in conjunction to APRE to optimize body composition.

References

- Mann, J. B., Thyfault, J. P., Ivey, P. A., & Sayers, S. P. (2010). The Effect of Autoregulatory Progressive Resistance Exercise vs. Linear Periodization on Strength Improvement in College Athletes. *Journal of Strength and Conditioning Research*, 24(7), 1718–1723.
- Brzycki, M. (1993). Strength Testing—Predicting a One-Rep Max from Reps-to-Fatigue. *Journal of Physical Education, Recreation & Dance*, 64(1), 88–90. https://doi.org/10.1080/07303084.1993.10606684