

# Acute Strength Adaptations to Autoregulatory Progressive Resistance Exercise Using Relative Adjustments vs. Absolute Adjustments

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## Abstract

Autoregulatory progressive resistance exercise (APRE) is a training method that allows daily fluctuation in training load, therefore, aligning with current participant readiness. Previous literature indicates APRE as superior for strength adaptations compared to traditional linear periodization. However, traditional APRE utilizes absolute intra- and inter-session load adjustments, contradicting positive implications associated with percentage-based training. **PURPOSE:** Therefore, the purpose of this study is to investigate differences in acute strength adaptations using a novel relative APRE (r-APRE) training program as compared to absolute adjustments (a-APRE). **METHODS:** Eighteen resistance trained males were separated into groups a-APRE (n=8; age: 20.7 ± 2.5 yrs; height: 1.71 ± 0.08 m; weight: 86.64 ± 24.2 kg; mean ± SD) or r-APRE (n=10; age: 21.3 ± 2.0 yrs; height: 1.76 ± 0.06 m; weight: 78.59 ± 11.1 kg; mean ± SD). Each group underwent 1 repetition maximum (1RM) testing for back squat (BS), bench press (BP), deadlift (DL), and overhead press (OP). Following, a 4-week r-APRE or a-APRE program was employed, consisting of 4 days per week, emphasizing a different pre-test 1RM exercises each day, in conjunction with 2-3 accessory movements at a self-selected weight equivalent to an 8 on the OMNI Rate of Perceived Exertion scale. 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 r-APRE group. For the a-APRE group, individuals selected 0-15lb adjustments based on the number of repetitions completed during working sets. After the 4-week intervention, participants completed a post-test 1RM for BS, BP, DL, and OP. A mixed factorial analysis of variance (ANOVA) ( $p < 0.05$ ) (group [a-APRE x r-APRE] x exercise [SQ x DL x OHP x BP x TWL]), was used to compare strength adaptations between groups. **RESULTS:** There was no significant group × exercise interaction ( $p = 0.886$ ); however, a significant main effect was revealed for group (a-APRE: 0.058 ± 0.014; r-APRE 0.117 ± 0.013;  $p = 0.003$ ). Also, a significant main effect of exercise (BP: 0.035 ± 0.022; SQ: 0.085 ± 0.022; DL: 0.168 ± 0.022; OHP: 0.060 ± 0.022; TWL: 0.089 ± 0.022;  $p < 0.001$ ) revealed lower body exercises (SQ and DL) displayed higher PC than upper body (BP and OHP). **CONCLUSION:** The findings indicated r-APRE lends significantly greater strength adaptation when compared to a-APRE. Further, when groups are collapsed, autoregulation induces exceptional lower body strength. **PRACTICAL APPLICATION:** Implementing r-APRE allows for dynamic load adjustments based on individual performance, making it a practical strategy for athletes seeking consistent strength adaptations.

## 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 purpose of this study is to investigate differences in acute strength adaptations using a novel relative APRE (r-APRE) training program as compared to absolute adjustments (a-APRE).

## Methods

**Subjects:** a-APRE (n=8; age: 20.7 ± 2.5 yrs; height: 1.71 ± 0.08 m)  
r-APRE (n=10; age: 21.3 ± 2.0 yrs; height: 1.76 ± 0.06 m)

**Tests Performed:** Back Squat, Bench Press, Deadlift, Overhead Press

**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:** A mixed factorial analysis of variance (ANOVA) ( $p < 0.05$ ) (group [a-APRE x r-APRE] x exercise [SQ x DL x OHP x BP x TWL]), was used to compare strength adaptations between groups.

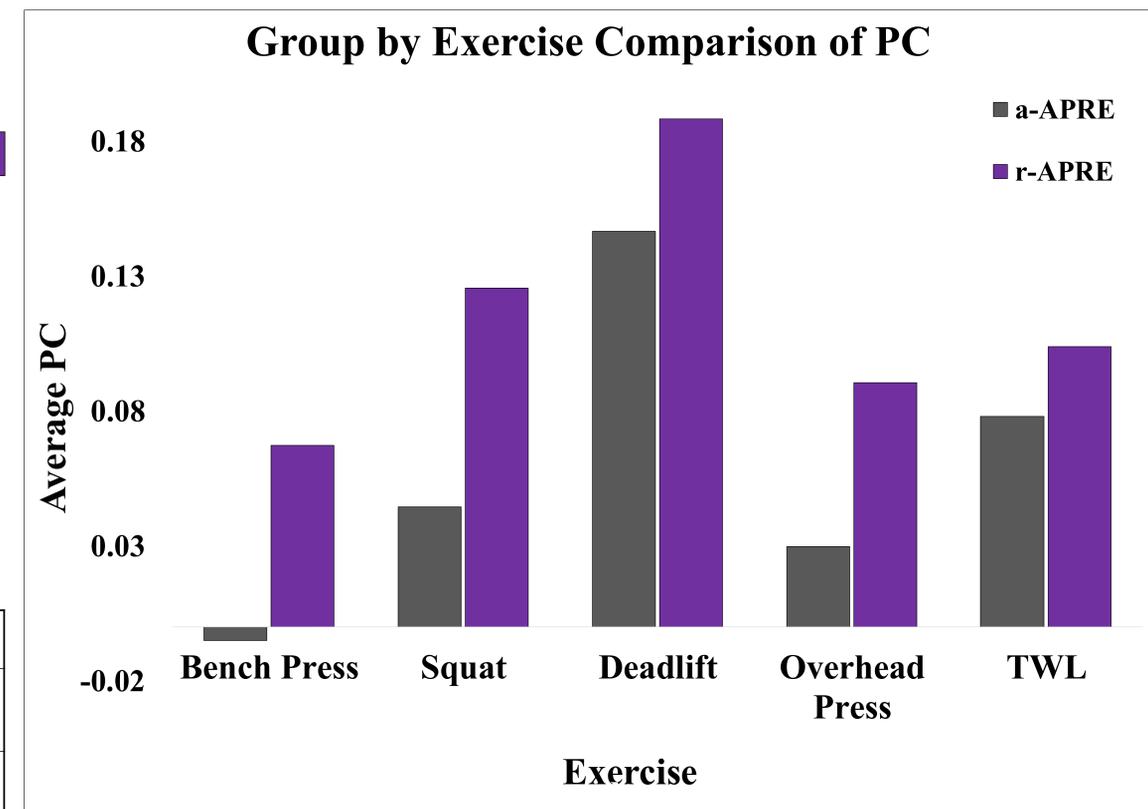
a-APRE Adjustments	
Repetitions	Intensity (% of 6RM)
10x	50%
6x	75%
AMRAP	6RM
AMRAP	Adjusted weight
Repetitions for set 3 adjustment	Set 4 adjustment (lb)
0-2	-5 to -10
3-4	0 to -5
5-7	No change
8-12	+5 to +10
>13	+10 to +15

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: (Previous Weight/(1.0278-(0.0278 * Previous Reps))) <sup>0.85</sup>	

## Exercises Training Routine

Day 1 (lower body)	Day 2 (upper body)	Day 3 (lower body)	Day 4 (upper body)
§ Squats BB RDL	§ Bench Press Pull Up	§ Deadlift BB Step Up	§ OH Press Inverted Row
BB Lunge	DB OH Triceps Extension Lateral Raise	Lateral Lunge	Front Raise BB Bicep Curl
§ - Core exercise performed with APRE percentage based or absolute adjustments; *DB = dumbbell; BB = barbell; OH = overhead			

## Results



There was no significant group × exercise interaction ( $p = 0.886$ ); however, a significant main effect was revealed for group (a-APRE: 0.058 ± 0.014; r-APRE 0.117 ± 0.013;  $p = 0.003$ ).

Also, a significant main effect of exercise (BP: 0.035 ± 0.022; SQ: 0.085 ± 0.022; DL: 0.168 ± 0.022; OHP: 0.060 ± 0.022; TWL: 0.089 ± 0.022;  $p < 0.001$ ) revealed lower body exercises (SQ and DL) displayed higher PC than upper body (BP and OHP).

## Conclusion & PA

The findings indicated r-APRE lends significantly greater strength adaptation when compared to a-APRE. These findings can likely be attributed to the better alignment of r-APRE with the principle of specificity.

Further research should investigate r-APRE over a longer period of time to examine chronic adaptations associated with r-APRE training methods. Implementing r-APRE allows for dynamic load adjustments based on individual performance making it an ideal strategy for athletes seeking optimal strength adaptations.

## References

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