



Differences in Rate of Perceived Exertion During Relative or Absolute Autoregulatory Progressive Resistance Exercise Training

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Abstract

Autoregulatory progressive resistance exercise (APRE) is a training method that allows daily fluctuation in training load, eliciting greater performance outcomes than traditional periodization. However, absolute intra- and inter-session load adjustments (± 0 -15lbs), ignoring the principle of individuality, poses a potential downfall associated with traditional APRE. **PURPOSE:** The purpose of this study is to examine the effect of relative (r-APRE) and absolute (a-APRE) load adjustments on rate of perceived exertion (RPE) over a 4-week training period. **METHODS:** Fifteen resistance trained males were separated into an a-APRE (n=6; $m \pm sd$; age: 21.1 ± 2.6 yrs; height: 171.9 ± 6.5 cm; weight: 90.5 ± 28.6 kg) or r-APRE (n=9; age: 21.3 ± 2.2 yrs; height: 175.8 ± 6.7 cm; weight: 65.6 ± 17.8 kg) group. Each group underwent 1 repetition maximum (1RM) testing for back squat (BS), bench press (BP), deadlift (DL), and overhead press (OP). A 4-week a-APRE or r-APRE program was then employed. This protocol was administered 4 days per week, emphasizing a different pre-test 1RM exercise each day, in conjunction with 2-3 accessory movements at a self-selected weight equivalent to an 8 on the OMNI RPE scale. Intra- and inter-session adjustments were made by reestablishing a predicted 85% 1RM (6RM) using the Brzycki 1RM equation, 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. Immediately after each working set of BS, BP, DL, and OP, participants reported an RPE score using the OMNI RPE scale. A 3-way mixed factorial analysis of variance (group [a-APRE v r-APRE] x set [set 1 v set 2] x time [week 1 v week 2 v week 3 v week 4]) was used to compare the RPE values throughout the training study. **RESULTS:** There was a significant group x set interaction ($p = 0.27$) in which there was an increase from set 1 to set 2 for a-APRE (7.979 ± 0.239 to 8.323 ± 0.257 ; mean \pm SE) and r-APRE (7.65 ± 0.195 to 8.396 ± 0.210 ; mean \pm SE) when collapsed by time. Additionally, there was a significant main effect of set ($p < 0.001$) with set 2 increasing from set 1 (7.813 ± 0.154 to 8.359 ± 0.166) and time ($p = 0.011$) with week 4 RPE being significantly higher than week 1 ($p = 0.41$) (8.278 ± 0.154 ; 7.830 ± 0.174 ; mean \pm SE; respectively.) Lastly, there were no significant interactions or main effects for group x set x time ($p = 0.258$), group x time ($p = 0.925$), set x time ($p = 0.207$), or group ($p = 0.673$). **CONCLUSION:** These results suggest a- and r-APRE adjustment protocols do not differ in reported RPE, and therefore, produce similar internal workload measures. The significant increase from set 1 to 2 and week 1 to week 4 indicates that APRE simulates progressive overload while allowing for autoregulation. Further research is needed to compare external workload between APRE approaches. **PRACTICAL APPLICATION:** Because r-APRE produces similar internal workload measures, it is a comparable training strategy that allows lifters to relatively scale weight, providing more individualized training.

Introduction

Autoregulatory progressive resistance exercise (APRE) allows for daily fluctuation in training load. However, the traditional APRE training methods utilizes 5-15 lbs (absolute) load adjustments; therefore, overlooking the principle of individualization. While the traditional APRE methods appears superior to standard linear periodization models, the potential of under- or over-stimulating persists when relative load adjustments (percentage-based) are not prescribed.

Purpose

The purpose of this study was to verify the hypothesis difference in rate of perceived exertion (RPE) by examining between absolute APRE (a-APRE) and relative APRE (r-APRE).

Methods

Participants:

- n = 15 resistance trained males
- Two groups: a-APRE (n=8)
- r-APRE (n=10)

Testing & Training Protocol:

- 1RM testing for four exercises (BS, BP, DL, OP)
- 4-week r-APRE or a-APRE program, 4 days per week
- Participants recorded RPE scores immediately after working sets using OMNI RPE scale
 - r-APRE: Brzycki's predicted 1RM Intra/intersession adjustments
 - a-APRE: ± 0 -15lb adjustments based on number of repetitions completed.

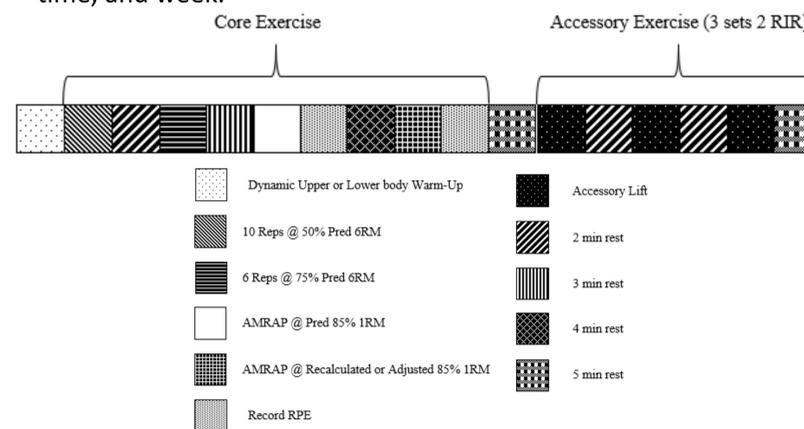
	a-APRE	r-APRE
Age	20.7 \pm 2.5	21.3 \pm 2.0
Height (m)	1.71 \pm 0.08	1.76 \pm 0.06
Body Weight (kg)	86.64 \pm 27.2	78.59 \pm 11.1
Body Fat (%)	12.6 \pm 5.9	13.4 \pm 7.5

Rating of Perceived Exertion (RPE Scale)

10	Maximal
9	Really, Really, Hard
8	Really Hard
7	
6	Hard
5	Challenging
4	Moderate
3	Easy
2	Really Easy
1	Rest

Statistical Analysis:

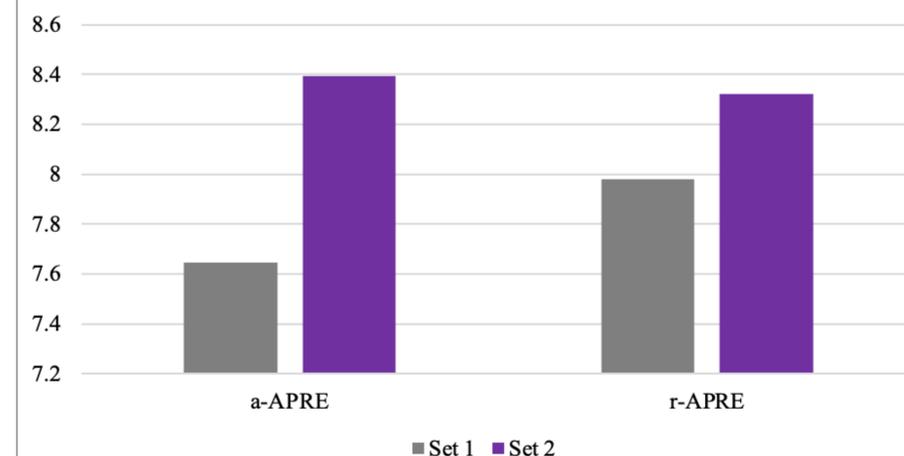
- A 3-way mixed factorial ANOVA was employed to compare group, set, time, and week.



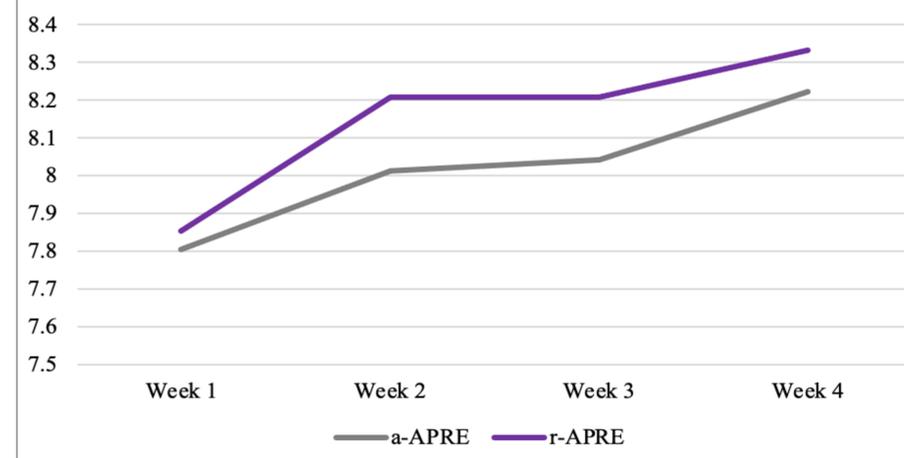
a-APRE Adjustments		r-APRE Adjustments	
Repetitions	Intensity (% of 6RM)	Repetitions	Intensity (% of 6RM)
10x	50%	10x	50%
6x	75%	6x	75%
AMRAP	6RM	AMRAP	6RM/Adjusted
AMRAP	Adjusted weight	AMRAP	Adjusted weight
Repetitions for set 3 adjustment	Set 4 adjustment (lb)	Set 3 & 4 Adjustment	
0-2	-5 to -10	Load Prescription – Brzycki Equation:	
3-4	0 to -5	(Previous Weight / (1.0278 - (0.0278 * Previous Reps))) * 0.85	
5-7	No change		
8-12	+5 to +10		
>13	+10 to +15		

Results

Root Comparisons of Set 1 vs Set 2 RPE



Weekly RPE Averages



There were no significant interactions or main effects for group x set x time ($p = 0.258$), group x time ($p = 0.925$), set x time ($p = 0.207$), or group ($p = 0.673$).

Conclusion & Practical Application

These results suggest a-APRE and r-APRE adjustment protocols do not differ in reported RPE and therefore produce similar internal workload measures. The significant increase from set 1 to 2 and week 1 to week 4 indicates that APRE stimulates progressive overload while allowing for autoregulation. Further research is needed to compare external workload and training effect between APRE approaches.

References

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