A Comparison of Adaptations via Either a Linear Periodization or an Undulating Periodization Model of Weight Training

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BACKGROUND: Resistance training has been proven to have a positive impact on parameters such as muscular strength, hypertrophy and endurance. Periodization is a progressive mode of training that has been shown to illicit greater results than programs that stay consistent throughout. The two prime modes of periodization are linear (LP), which progresses from high volume/low intensity to low volume/high intensity, and undulating (UP) which follows an oscillating volume/intensity design. The purpose of this study was to compare the effects of a 12 week linear program to those from an undulating program on strength and body composition when both programs reflect the entire NSCA repetition continuum. **METHODS**: 10 resistance trained men were matched according to weight-relative strength and randomly assigned to either a linear (N=4, 21 ± 2.5 yrs, 69.08 ± 0.69in, 1178.13 ± 19.5 lbs, 16.9 ± 5.2 %BF) or undulating (N=6, 20 ± 1.7 yrs, 70.27 ± 2.13 in, 180.17 ± 23.98 lbs, 13.67 ± 2.94 %BF) periodization program. Subjects participated in 3 days per week of supervised total body resistance training with repetitions and intensities reflecting the entire NSCA repetition continuum. At 0, 4, 8 and 12-weeks, subjects were tested on body composition via dual energy x-ray absorptiometry, 1RM strength, muscular endurance, vertical jump and anaerobic capacity. Statistical analyses utilized a two-way ANOVA with repeated measures for all criterion variables ($p \leq 0.05$). Data are presented as mean ± SD changes from baseline values. **RESULTS**: Significant main effects for time ($p < 0.05$) were observed on bench press (LP: 15.03 ± 8.02 lb; UP: 26.10 ± 5.05 lb), leg press (LP:161.07 ± 14.10 lb ; UP: 164.03 ± 55.20 lb), and Wingate peak power (LP: 148.21 ± 78.05 W; UP: 143.22 ± 137.04 W). However, no significant interactions were observed between groups on any of these parameters. Also, no significant group or time effects for time or differences between groups were observed in the measures of percent body fat, lean muscle mass, or vertical jump. **CONCLUSION**: Both undulating and linear periodization models of resistance training that reflect the entire repetition continuum can bring forth highly significant changes in strength and peak anaerobic power. However, despite the fact that the undulating method resulted in a 43% greater increase in upper body strength, there is no significant difference in the magnitude of the training adaptations that stem from the two methods over 12 weeks.