Resistance exercising where accentuated load is applied during the ECC phase of ECC-CON contractions is defined as dynamic accentuated external resistance (DAER) exercising (Brandenburg and Docherty 2002). Acute responses of various DAER loads have not been studied extensively. The purpose of this study was to monitor acute neuromuscular, growth hormone (GH) and blood lactate (La) concentrations and to find the most efficient ECC-CON loading strategy for muscle hypertrophy by employing various DAER resistances in the bench-press exercise. Male subjects (age=32.4±4.3 years, n=11) active in resistance training and fully familiar with DAER exercising were assigned as subjects for the study. The measurements consisted of 4 hypertrophic sessions separated by 5-6 days recovery. The subjects performed 4 sets of 10 repetitions with 2 min recovery between the sets. The resistances were 70%, 80%, 90% and 100% of 1 RM for the ECC phase and 70% RM was constantly used for the CON phase at each condition. Muscle EMG was measured at pre and post conditions in ISOM bench press measurements and in the 2nd (pre) and last (post) repetitions in dynamic measurements. Growth hormone (GH) and blood lactate (La) concentrations were measured before the first dynamic set (pre) and immediately after the last dynamic set (post). The DAER loading strategy was produced by the use of mechanical weight releasers that enabled higher loads in the ECC phase. ECC force was systematically smaller in the 70% condition than in other conditions (P<0.001). ISOM pre to post peak force reduced significantly in all conditions (P<0.01-0.001) but the decreases did not differ significantly between the conditions. CON force was reduced significantly from pre to post loading in all conditions (P<0.001). The change in La after the 90% condition (9.5±2.33mmol/l) was greater (P<0.05) compared to the 70% condition (7.7±1.15mmol/l). The individual highest change in La was (p<0.001) greater in the 90% condition compared to the control condition of 70%. No significant differences were observed in absolute mean post GH and in GH/repetition concentrations between the conditions. ECC EMG of the agonists increased with the increase in load but was significant only in deltoid anterior (P<0.01). A significant relationship (P<0.05) was observed between optimal ECC load and 1RM/BM-ratio (R=0.851). The major findings in the present study were the significantly higher change of La in the 90% condition compared to the 70% condition (P< 0.05) and the high correlation between the optimal ECC load and 1RM/BM-ratio. These findings can be applied into practice in designing optimal exercise protocols in training for muscle hypertrophy.

References

Keywords: Strength Training, Lactate, Strength