

Changes to Strength, Muscular Power, and Bar Velocity after 2-Weeks of Eccentric Overload Bench Press Training: A Case Study

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ABSTRACT

CASE HISTORY: Eccentric Overload Training (EOT) is a training method aimed to improving strength and power based on attenuated eccentric muscular contraction. EOT is defined as a lift where the eccentric load is set at a percentage higher than that of concentric 1RM. However, research pertaining to EOT has been primarily focused on lower-body strength. Currently, it is unclear what effects EOT can have for upper-body strength. The purpose of this case study is 1) to observe changes to power output after incorporating 2-weeks of EOT training for the bench press exercise; 2) to evaluate whether bar velocity at 1RM can be improved through EOT, and 3) to observe changes to 1RM after 2-weeks of EOT. **PHYSICAL EXAM:** One recreationally trained (male) subject (age = 22 years, weight = 102.1 kg, BMI = 39.9) was used for this case study. The subject participated in a two-week eccentric overload training regimen. Before the training program began, the subject attended a baseline testing (height, weight, 1RM, power output) and familiarization session to become comfortable using detachable eccentric hooks. These adjustable hooks are placed at the end of the barbell, ensuring full range of motion through the eccentric phase before they detach. This provides additional loading to the eccentric phase, and the concentric phase remains unchanged. Once the subject was familiar with the equipment, training sessions began. The subject attended a total of 5 training sessions (pre-test + 3 sessions per week + post-test), where eccentric overload was set at 105%, 110%, 115%, 120%, and 125% of concentric 1RM, and concentric weight remained at 90% of 1RM, respectively. The subject began each session with a 5-minute warm-up on a treadmill, followed by 5-minutes of dynamic stretches, and finally 3 sets of light-load bench press. **DIFFERENTIAL DIAGNOSES:** Eccentric Overload effect on Power output, bar velocity, strength through 1RM bench press. **TESTS & RESULTS:** Strength data was obtained from dynamic bench press testing, and velocity and power data were obtained from an inertial measuring unit system (PUSH Band 2.0) that was placed on the bar, in-between the subject's hands. For each training session, the subject performed seven single-repetition sets (7 sets of 1 rep) with 3-5 minutes of rest in-between sets. An increase of 6.15% in strength (148 to 157 kg) was observed. Mechanical power (w) during the 1RM test was improved by 4.06% (495 to 516 w). Bar velocity at pre-test 1RM (148 kg) increased by 6.45% (from 0.31 m/s to 0.33 m/s), while subject's new 1RM (157 kg) remained at 0.31 m/s. **FINAL DIAGNOSIS:** EOT led to increased 1RM bench press strength and power output. **DISCUSSION:** EOT increased the subject's 1RM bench press strength with only two weeks of training. Additionally, we observed an increase in bar velocity and power output on the subject's initial 1RM (147kg) during post-test and an increased power output for the new 1RM (157 kg). **OUTCOME OF THE CASE:** EOT training increased strength, bar velocity, and power output for the 1RM in just two weeks of training. **RETURN TO ACTIVITY AND FURTHER FOLLOW-UP:** The subject will return to his regular physical activities. No follow-up will be implemented.