

## No Differences were Found Between Partial and Full Range of Motion Bench Press Resistance Exercises on Markers of Work, Blood Lactate, and Muscle Oxygen and Hemoglobin Concentrations: A Pilot Study

KATHERINE F.A. COLBURN, & DANIEL E. NEWMIRE

Exercise Physiology and Biochemistry Laboratory; Kinesiology; Texas A&M University-Corpus Christi; Corpus Christi, TX

---

*Category: Undergraduate*

*Advisor / Mentor: Newmire, Daniel (daniel.newmire@tamucc.edu)*

### ABSTRACT

During resistance training (RT) exercises, full range of motion (fROM) is traditionally promoted by exercise training professionals. Based on recent publications, it is reported that partial range of motion (pROM) during RT may have similar muscle growth responses as fROM. There are limited investigations examining the acute effects of ROM during a RT bout on blood lactate (BLa), muscle oxygen saturation (SmO<sub>2</sub>), and total hemoglobin content (tHb) that may help drive mechanistic investigations. **PURPOSE:** This study aims to investigate the effects of different ROMs during flat (FB) and incline (IB) barbell bench press exercises on BLa, SmO<sub>2</sub>, and tHb concentrations. **METHODS:** Eight subjects (4M/4F; Age: 23.8±2.3 y; Ht: 170.1±3.5 cm; Wt: 72.96±5.6 kg; Body Fat: 25.49±2.2 %; Lean Body Mass: 52±3.8 kg), completed the eight-week study which consisted of four bouts of strength testing (1RM) followed by four ROM bouts of ~75-80% 1RM testing, alternating each week with 4-7 days between 1RM and ROM bout sessions. Each subject was randomized in their schedule of fROM and pROM during FB and IB (45°) bench press exercises utilizing a Smith Machine (SM). The SM barbell was fitted with an EliteFTS™ shoulder saver pad during pROM bouts. Vertical distance (cm) was assessed with GymAware. Pre-bout and 3-minute post-bout BLa were collected from the subject's fingers using a lactate analyzer (Nova, Biomedical). A Moxy Muscle Oxygen monitor was placed on the subject's left side approximately mid-muscle belly of the pectoralis major at ~25% distal to the suprasternal notch to assess SmO<sub>2</sub> and tHb concentrations during RT sessions. **RESULTS:** Currently, our results show that the differing ROM (pROM; fROM) and bench press angles (FB; IB) had no effect on load volume (kg-sets-repetitions), volume (sets-repetitions), 1RM (%) intensity, Δ in BLa, and SmO<sub>2</sub> and tHb concentrations. However, we did find a difference between vertical distance displaced during ROM bouts (p = .003). **CONCLUSION:** Currently, with our small sample size, there is no effect of the selected ROM and bench press angles on measures of work (volume; volume load), BLa, SmO<sub>2</sub>, and tHb concentrations. This may be explained by the smaller sample size or the difference in ROM distance may not large enough to elicit an effect.