
THE EFFECTS OF VERBAL CUES ON QUADRICEPS EMG ACTIVITY DURING A QUADRICEPS SETTING EXERCISE

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Purpose: A quadriceps setting (quad set) exercise is commonly utilized following knee injury, but there is great variation in clinical prescription. The purpose of this study was to determine if internal, external, or visual cues results in the greatest quadriceps electromyographical (EMG) activity during a quadriceps setting exercise.

Methods: Thirty healthy individuals (15 males, 15 females; age = 25 ± 2.5 y, mass = 79.3 ± 14.2 kg, height = 176.9 ± 9.5 cm) volunteered for this study. Peak EMG amplitude of the vastus lateralis was determined during each exercise condition. Participants performed the quadriceps setting exercise and were given one of five cues in a randomized order: internal cue “tighten your thigh muscles,” internal cue “push your knee down,” external cue “push into the bolster,” external cue “push into the strap,” or visual biofeedback (mTrigger) using the cue “raise the value on the screen as high as you can.” A repeated measures ANOVA and associated post-hoc tests, with corrected alpha levels ($p < 0.005$), were used to determine differences in normalized EMG activity between conditions.

Results: There was a significant difference between conditions ($p < .001$). Post-hoc comparisons indicated both visual biofeedback ($83.2 \pm 24.9\%$) and “press into the strap” ($76.8 \pm 24.4\%$) produced significantly greater ($p < 0.001$) EMG activity than the push knee down ($53.2 \pm 27.0\%$), tighten thigh ($52.7 \pm 27.3\%$), or push into the bolster ($50.8 \pm 26.3\%$) conditions. There was no significant difference ($p = 0.10$) between the visual biofeedback and “press into the strap” conditions as well as no significant difference ($p > 0.38$) between the push knee down, tighten thigh, or push into the bolster conditions

Conclusion/Significance: Visual biofeedback and pressing into the strap produced the greatest EMG activity compared to the other internal and external cues. If the clinical aim during a quadriceps setting exercise is to obtain the greatest volitional muscle recruitment, the use of visual biofeedback or pressing into a strap is recommended.

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