PRIMING: Influence of set-configuration on delayed neuromuscular and physical performance.

Priming protocols involving inter-repetition rest provide **no distinct advantage**, indicating priming effects may be influenced by ***task specificity***, ***exercise selection***, and the ***strength levels*** of participants.

BACKGROUND

Repeated structured exercise is essential for successful athletic performance across many sports. However, acute exercise can temporarily reduce performance due to fatigue from neural and muscular mechanisms and decreased motivation. Emerging evidence indicates that a well-structured exercise bout, with minimal fatigue, can improve neuromuscular performance (priming) after a delay of 1-33 hours. Despite these findings, optimal approaches and timing for priming remain unclear. Cluster set protocols may be beneficial due to fatigue minimisation and maintenance of force and power output.

The purpose of the study was to compare the effects of set configuration (traditional or cluster sets) or no exercise (control) on the time-course and magnitude of the priming effect on measures of maximal neuromuscular performance in resistance-trained individuals.

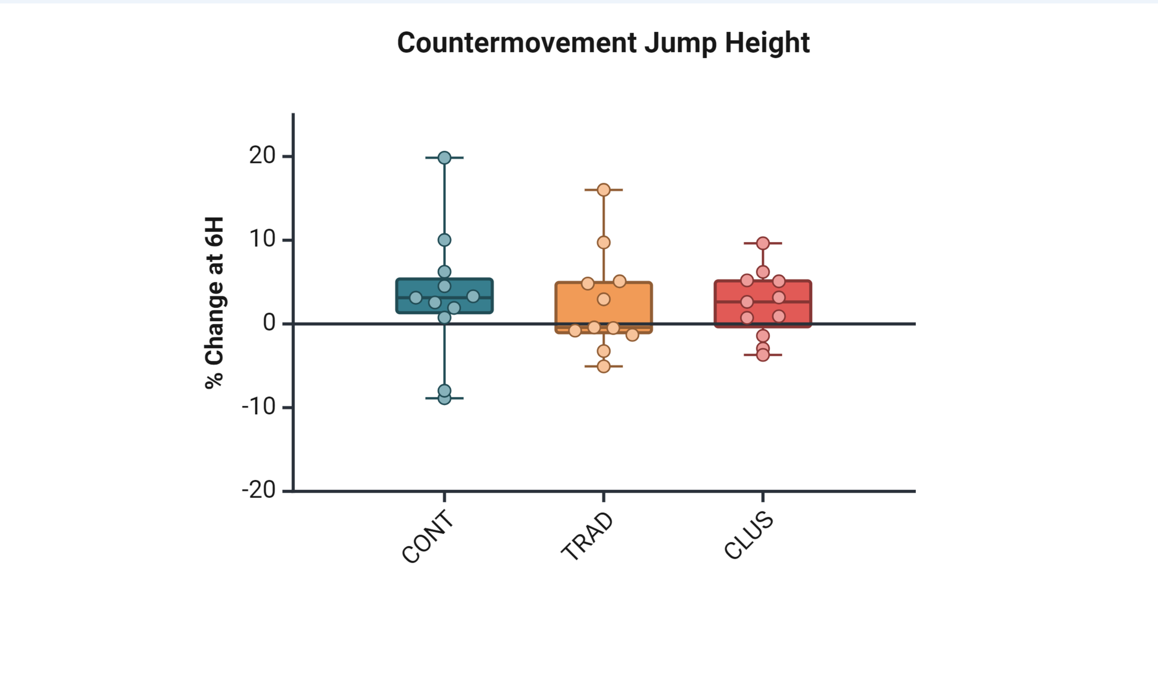
METHODS

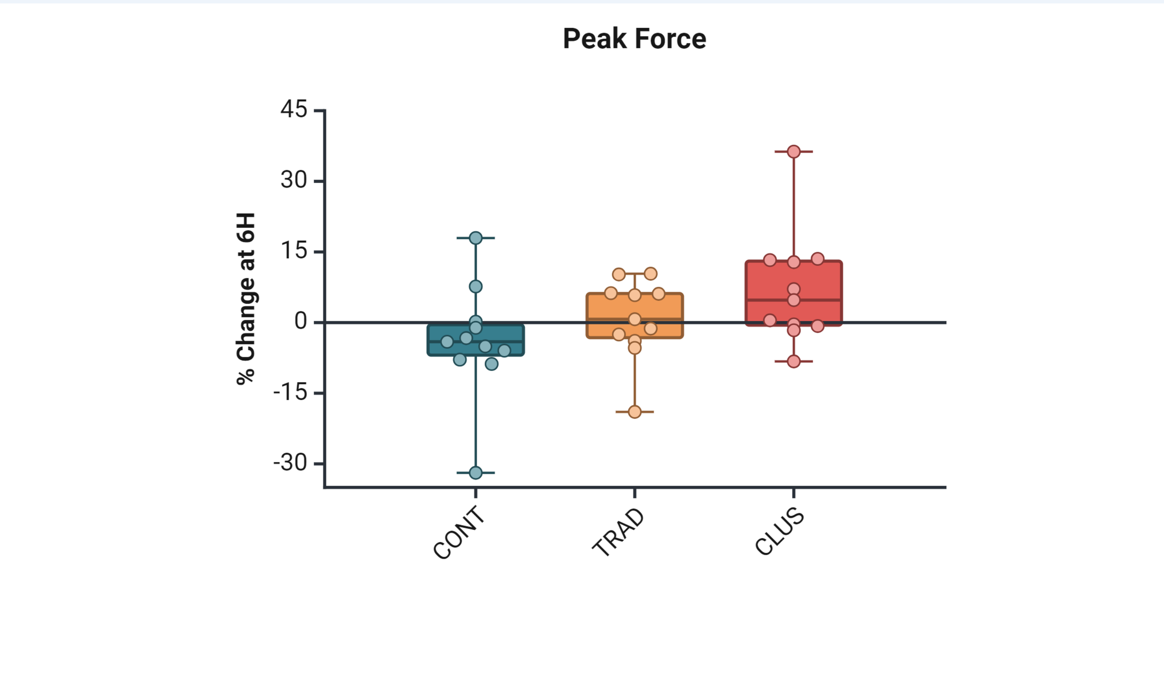
Eleven participants (n=11; age: 27.1±4.6 y, body mass: 81.9±19.7 kg, relative squat 1RM: 1.4±0.2 kg/bw; volunteered for this study. Participants completed 3x5 squats @ 80% 1RM in a traditional (TRAD: 180 s inter-set rest) and cluster set (CLUS: additional 15 s inter-repetition rest) format, or no exercise (CONT) on separate days. Changes in performance were assessed at 6 hours and 24 hours post-exercise.

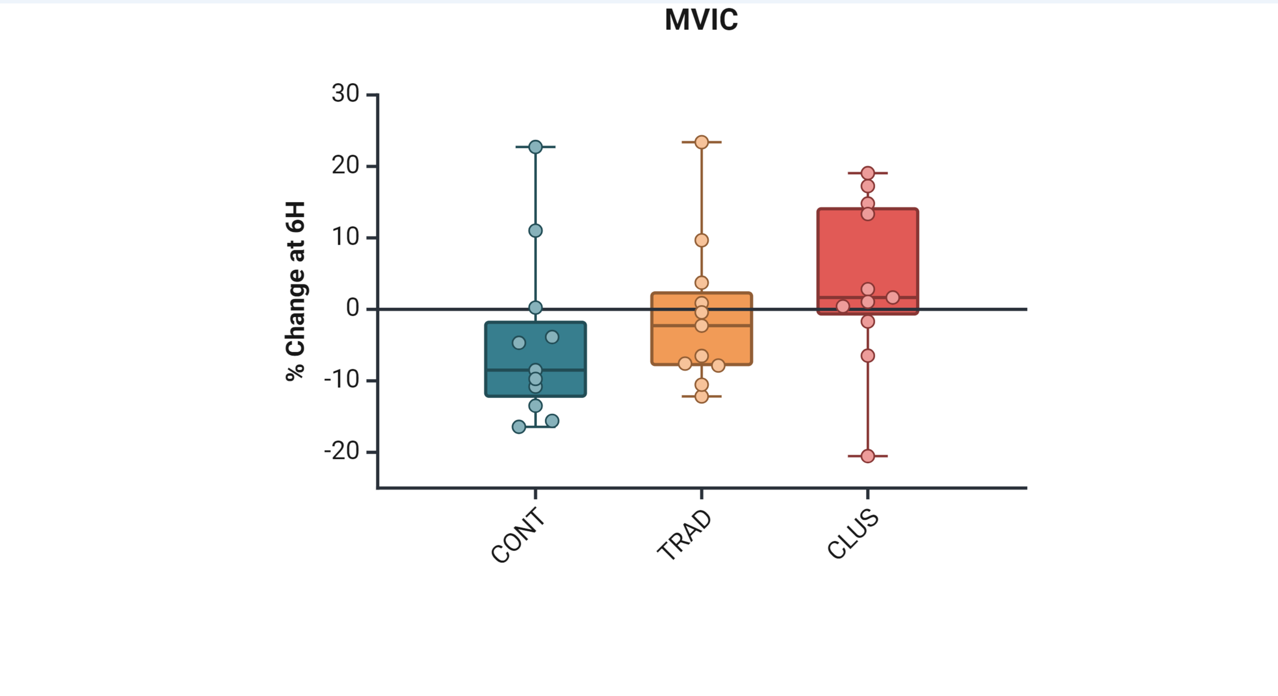
Repeated measures ANOVA were used to assess differences in performance variables across the three time points and between the different conditions. Hedge's g effect sizes assessed pre-to-post and between condition effects, and were classified as ≥0.2: small, ≥0.5: medium, ≥0.5: large.

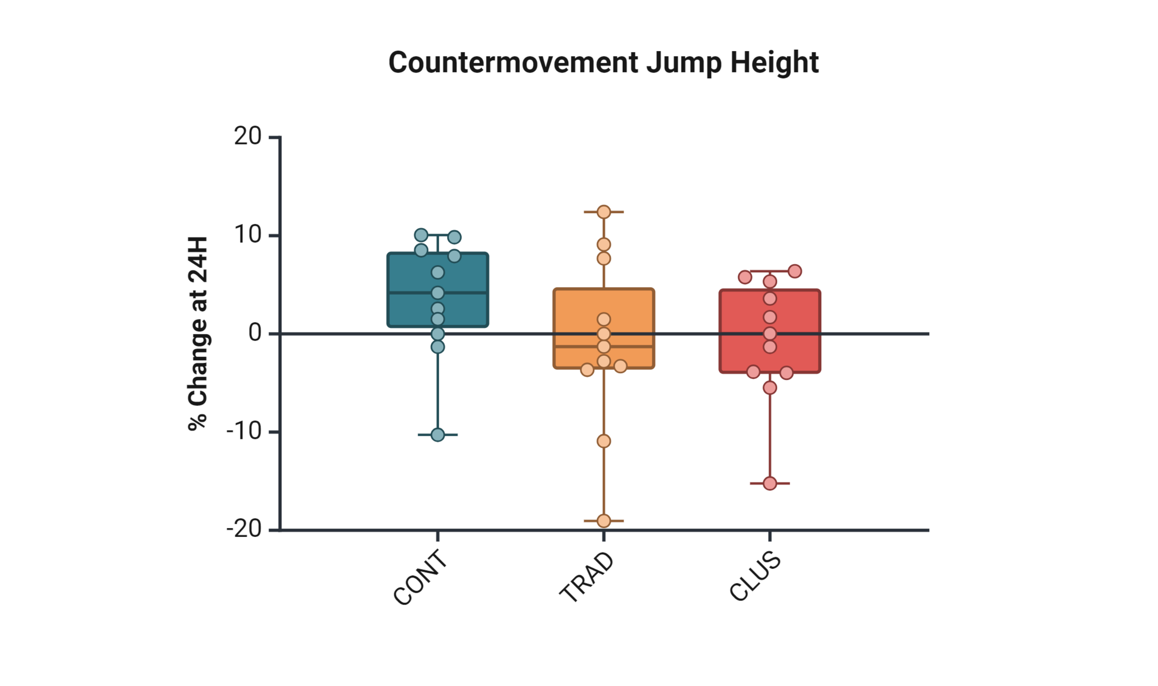
RESULTS

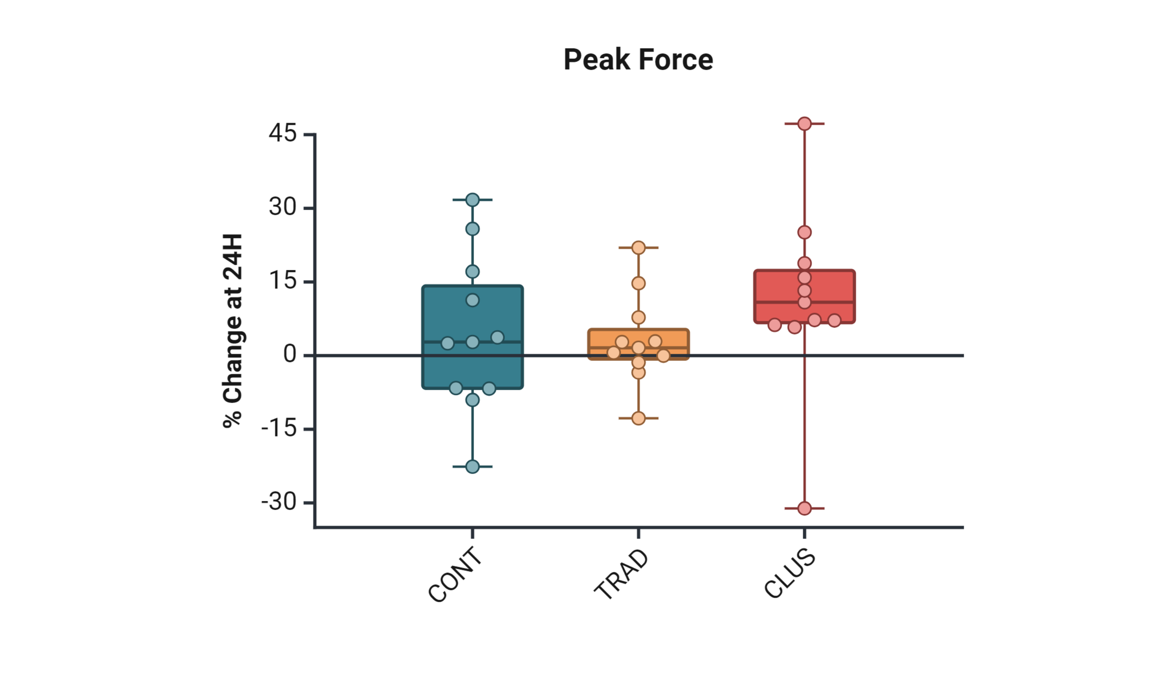
There were no statistically significant interactions for any of the variables of interest (p>0.05). Although not significant, PF showed an improvement at 6 hours (7.0±12.0%, g=0.54) and 24 hours (11.5±18.5%, g=0.57) in the CLUS condition compared to TRAD (0.7±8.5%, g=0.07 and 3.1±9.2%, g=0.32) and CONT (-3.8±12.1%, g=-0.29 and 4.5±16.0%, g=-0.30) at 6 and 24 hours, respectively. SJ height decreased at both 6 (1.3±4.7%, g=-0.25) and 24 hours (-2.9±5.7%, g=-0.48) in the CLUS condition; whereas it remained stable at 6 hours in both the TRAD and CONT conditions and decreased (-2.3% to -2.6%, g=-0.33 and -0.34) at the 24-hour mark. CMJ height increased ~2% to 3% across all conditions at the 6-hour time point but returned to baseline for the both the CLUS and TRAD conditions at 24 hours. CMJ height increased slightly at the 24-hour time point for the CONT condition (3.5±6.1%, g=0.54). MVIC showed an improvement at 6 hours (3.8±11.7%, g=0.30) for the CLUS condition; however, MVIC decreased by 3.1±9.5% (g=-0.30) compared to baseline at 24 hours. MVIC remained stable across all timepoints for the TRAD condition and decreased at both 6 hours (-4.5±12.0%, g=-0.34) and 24 hours (-2.2±11.6%, g=-0.18) in the CONT condition. A small improvement in TF was noted for the CLUS condition (4.1±9.2%, g=0.41) at 24-hours, whereas TF decreased in the CONT condition (-4.2±8.5%, g=-0.46). VA remained relatively stable across all time points for each condition.

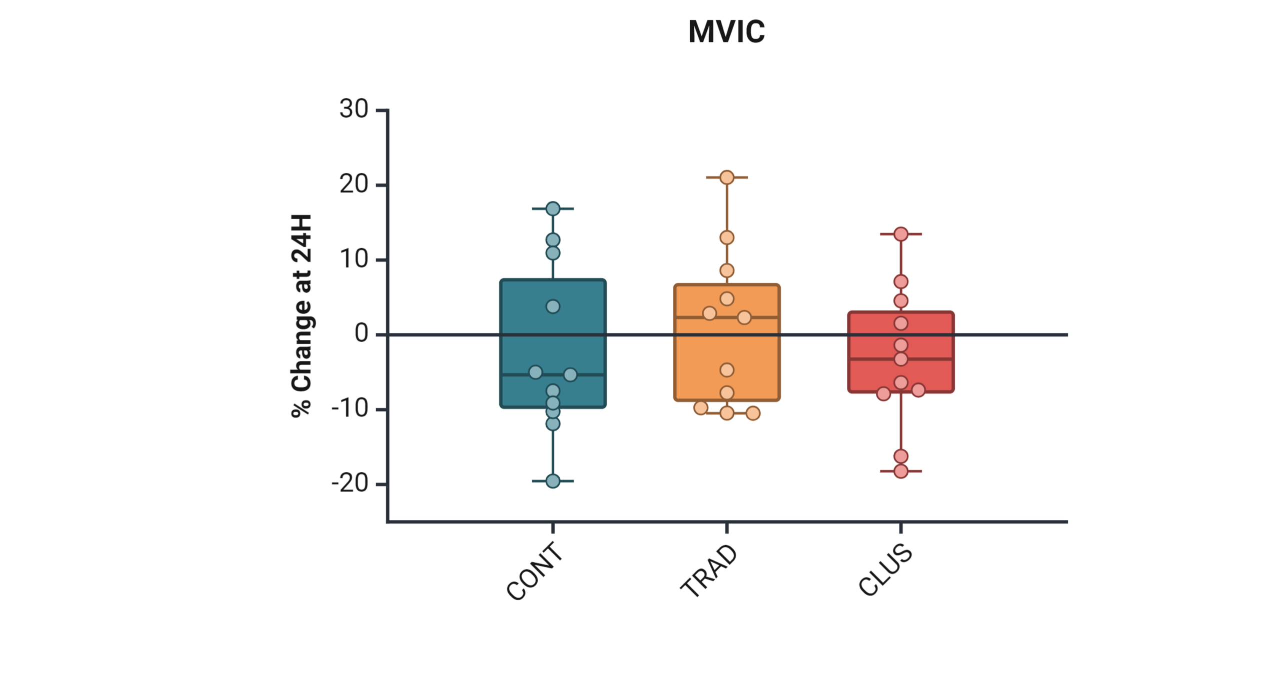












CONCLUSIONS: Our research indicates that maximal neuromuscular performance measures exhibit no significant differences between the application of traditional and inter-repetition cluster set protocols during a priming exercise. While subtle improvements in isometric maximal strength (IMTP PF, MVIC, and TF) were noted, a contrasting decrease in jump height following the cluster-set protocol suggests potential task specificity in delayed priming effects. Although reasons for these observations are unclear, participant strength level, the small sample size, and other factors not measured should be considered.

PRACTICAL APPLICATIONS: Inter-repetition rest priming protocols offer no clear benefit at this stage. Other cluster set protocols that avoid un-racking/re-racking every repetition may be more feasible.

Kristina Kendall[1], Mark Scanlan[1], Janet L Taylor[1], Guy G. Haff[1], Stuart N Guppy[1], and Christopher Latella[1]

Acknowledgement: This project is funded by an NSCA Foundation Senior Investigator grant