NO DIFFERENCES IN NUEROMUSUCLAR FUNCTION BETWEEN TRADIITONAL AND REST-REDISTRIBUTION SETS IN RESISTANCE TRAINED FEMALES

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Background

Traditionally, repetitions within a set are performed consecutively without rest between repetitions and these are called “traditional sets” (TS) (1). However, rest-redistribution (RR), which includes shorter and more frequent rest periods, is an alternative set structure that previous research has found to be more effective than TS for maintaining and mitigating fatigue while also saving time (1, 2). **The purpose of this study was to examine the time-course of changes in peak force and neuromuscular function of the quadriceps across rest-redistribution (RR) and traditional set (TS) during an isometric back squat exercise in females.**

Methods

Fourteen healthy resistance-trained females with no recent history of lower extremity injury completed a total of two experimental visits where they performed the isometric back squat (SQ) on a force plate. Participants were randomized to perform either the RR (10 sets of 2 repetitions) or TS (4 sets of 5 repetitions) condition on visit one, and then completed the opposite condition on visit two. Visits were separated by ≥48 hours, but no more than seven days and completed at the same time of day (±1 h). Prior to both visits participants were asked to abstain from caffeine intake and exercise for 8 and 24 hours, respectively. For each repetition of the RR or TS protocol, participants pushed into a fixed barbell and were instructed to get to their max “as fast as possible,” hold it for approximately 5 s., and rest for approximately 5 s., between reps. Thirty-six seconds of rest (RR) or two minutes of rest (TS) between sets to equate the time and number of repetitions between protocols. EMG amplitude (AMP) and mean power frequency (MPF) of the vastus lateralis (VL) and rectus femoris (RF), as well as peak force (PF), were collected for all repetitions. Separate repetition (1st/MID/LAST) × muscle (VL/RF) × condition (RR/TS) ANOVAs were run for EMG_{AMP} and EMG_{MPF}, while a repetition (1st/MID/LAST) × condition (RR/TS) ANOVA was run for PF.

Results

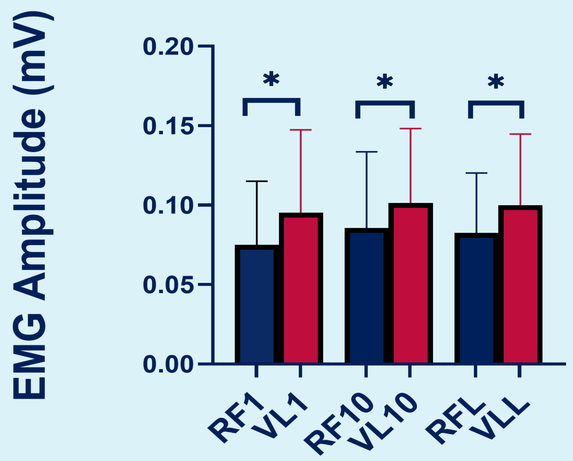

Figure 1. Mean ± SD EMG_{AMP} values for rectus femoris (RF) and vastus lateralis (VL) at the first (1), 10th (10), and last (L) repetition when collapsed across condition.

*Indicates significantly greater VL EMG_{AMP}

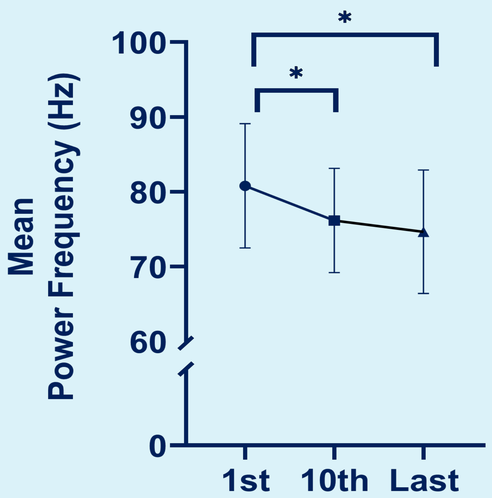

Figure 2. Mean (±SD) EMG_{MPF} values at the 1st,10th, and Last repetition when collapsed across condition and muscle.

*Indicates significant decrease in EMG_{MPF} across time points

There were no significant interaction effects for any dependent variables nor any main effects for PF ($p>0.05$ for all). For EMG_{AMP}, there was a significant main effect for muscle ($p = 0.047$), in which post-hoc analyses indicated that when collapsed across condition and repetition, VL_{AMP} (0.104 ± 0.046 mV) was significantly greater than RF_{AMP} (0.084 ± 0.040 mV; $p =0.047$). For EMG_{MPF}, there was a significant main effect for repetition, in which post-hoc analyses indicated that when collapsed across condition and muscle, EMG_{MPF} was significantly greater at rep 1 (82.1 ± 14.6 Hz) when compared to MID (74.9 ± 10.8 Hz, $p=0.011$) and LAST (73.9 ± 12.3 Hz, $p=0.004$). There was no significant difference between MID and LAST ($p=0.999$).

Conclusions

The primary finding of this investigation was a similar time-course of neuromuscular function across RR and TS isometric squat protocols in resistance-trained females. Surprisingly, there was no significant change in PF across time in either RR or TS. Participants displayed greater muscle excitation of the VL than the RF regardless of condition and repetition number, however, only EMG_{MPF} significantly decreased across exercise, while EMG_{AMP} did not change.

Practical Applications

The primary finding of this investigation was a similar time-course of neuromuscular function across RR and TS isometric squat protocols in resistance-trained females. Surprisingly, there was no significant change in PF across time in either RR or TS. Participants displayed greater muscle excitation of the VL than the RF regardless of condition and repetition number, however, only EMG_{MPF} significantly decreased across exercise, while EMG_{AMP} did not change.

References

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