Repetition Frequency Affects Accuracy of Repetitions in Reserve (RIR) in Resistance Trained College Females


Repetitions in reserve (RIR) simplifies measuring intensity during resistance training. However, previous studies suggest individuals underestimate RIR, with greater inaccuracy further from muscular failure. It is unclear if controlling for repetition (rep) frequency affects RIR accuracy.

PURPOSE: This study’s goal was to determine if a standardized rep frequency affects the prediction accuracy of reps to momentary failure through the means of RIR. It was hypothesized that participants with standardized rep durations would have improved RIR accuracy than participants with self-selected rep durations.

METHODS: Participants (n=29 resistance trained females) performed a dynamic warm-up before completing standard protocols for the determination of 1-repetition maximum (1RM) back squat. After a 10-minute rest, during which time 70% of 1RM was loaded on the bar and blinded to them using trash bags, participants performed back squats to momentary failure, calling out their RIR estimates of 5, 3, and 1. For 14 participants, rep frequency was standardized, with participants completing 1 rep every 3 seconds (tempo). For 15 participants, rep frequency was self-determined (standard). Paired t-tests were used to compare group characteristics. A one-way between-groups multivariate ANOVA with Bonferroni adjustment was used to compare RIRDIFF values (actual RIR – predicted RIR). A p<0.017 was considered significant.

RESULTS: There were no differences between the tempo and standard groups with regards to age (20±1 vs 20±1 yr), height (65.6±1.6 vs 65.6±1.6 in), weight (145.2±24.4 vs 143.3±11.8 lb), 1-RM (162.9±28.7 vs 177.7±24.8 lb), and reps completed (14.4±2.8 vs 16.3±5.2). There was a significant difference in RIR accuracy between the tempo and standard groups (Wilks’ Lambda=4.505, p=0.012). Evaluation of the dependent variables indicated that the tempo group was more accurate than the standard group at 1 RIR (RIRDIFF=0.3±0.7 vs 1.8±1.3 reps, p<0.001) and 3 RIR (RIRDIFF=1.4±2.0 vs 3.5±2.4 reps, p=0.013). CONCLUSION: As hypothesized, controlling for rep frequency was found to improve RIR accuracy. Further research is needed on variables like velocity loss and recovery to understand how these factors affect RIR.

SIGNIFICANCE/NOVELTY: To the best of the researcher’s knowledge, this is the first investigation to evaluate the impact of prescribed repetition tempo on RIR accuracy. Given these findings, prescribing a repetition frequency to individuals as they learn how to implement RIR may improve their ability to gauge proximity to failure with self-selected repetition pacing.

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