INFLUENCE OF INTER-REPETITION REST ON MAINTAINING MAXIMUM LOWER LIMB MUSCULAR POWER AGAINST DIFFERENT OVERLOADS

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INTRODUCTION
Fatigue must be minimized when attempting to maximize power output. One simple method to avoid fatigue is to perform low repetitions (reps) per set. Another method that is gaining popularity in the last years is inter-repetition rest (IRR) training. IRR periods minimize muscle fatigue, enabling the performance of more reps per set before there is a significant power output loss. Thus, the aim of this study is to determine the optimal range of reps to perform before it appears a significant power loss according to the pattern of movement (with or without rest between reps) and the load used (lower, optimal or higher than maximum power [Pmax]) in half squat.

METHOD
16 active duty military men performed a progressive loading test to determine the load linked to Pmax and 1-repetition maximum (1RM) in half squat exercise. The second day (48–72 hours rest), they performed 6 maximal power output sets until a maximum of 20 reps with 3 loads: optimal load (OL), 15% lower (LL) and 15% higher (HL) respect to the load where Pmax is attained. In a counter balanced order, each subject performed 1 set without rest between repetitions (CR) and another set with 6 seconds of rest between repetitions (IRR) with the 3 loads. Power output of each repetition was registered by a linear velocity transducer (T-Force, Murcia, Spain). Only the first 12, 9 and 6 reps of LL, OL and HL, were analyzed.

RESULTS
Subject's 1RM corresponded to 151.3 ± 19.5 kg and Pmax was set at $67.0 \pm 5.6\%$ 1RM. When Pmean was expressed as a percentage of the best of the 2 initials reps, significant declines in relative Pmean were observed in CR protocol at the repetition 7 ($p = 0.004$), 4 ($p = 0.002$) and 3 ($p = 0.012$) in LL, OL and HL, respectively. In contrast, for IRR significant declines were only observed in OL at rep 8 ($p < 0.001$). When considering Pmean losses of 15% regarding the best of the 2 initials reps, athletes increased the number of reps per set in a 318% (11 vs. 35 reps for LL), 186% (7 vs. 13 reps for OL) and 275% (4 vs. 11 reps for HL) in IRR.

DISCUSSION
Our results are similar to the ones found in previous studies, indicating that no more than 5 or 6 reps per set should be performed when considering Pmax. However, when resting 6 sec between successive reps, the volume of sets may increase more than twice, maintaining the capacity to repeat maximal magnitudes power output. From our results, we conclude that IRR training may be a useful variable to consider when coaches design training programs for the development of muscular power. However, practitioners need to take into account that longer IRR periods may reduce post-exercise metabolic stress, compromising the gains in strength and muscle mass.