COMPLEX TRAINING: AN EVALUATION OF POTENTIATION BETWEEN A 3RM BACK SQUAT AND A SQUAT JUMP

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INTRODUCTION: Complex training (CT) is increasingly popular among strength and conditioning coaches. CT hypothesises that a near maximal muscle contraction will enhance the explosive capabilities of the muscle given the exercises are biomechanically similar (Docherty et al., 2004). Previous CT research has focused on intra-complex potentiation between near maximum exercises and a similar stretch-shortening cycle exercise. The effect of CT on starting strength (SS) has yet to be explored. The optimal rest interval between the loaded exercise and the explosive exercise is somewhat unclear. Comyns et al. (2006) investigated potentiation between a 5RM back squat (BS) and a counter movement jump. Results varied between individuals. The purpose of this study was to determine if a heavy loaded exercise (3RM BS) results in a performance increase on a SS exercise (squat jump).

METHODS: Twenty male rugby players, proficient with the technique of the BS and squat jump (SJ) participated in this study. All subjects were part of a professional (n=13) or a semi-professional rugby academy (n=7). Testing protocol consisted of a pre-test, 3RM back squat and a post-test. Pre and post tests consisted of 1 SJ every minute for 10 minutes. A pilot study confirmed 1 minute sufficient time for recovery between SJ's. The SJ starting position and 3RM BS depth was 90^0 flexion of the knee. The first post test SJ was performed one minute after the 3RM BS. All SJ's were performed on a sledge apparatus inclined at 30^0 as described by Harrison et al. (2004). Each SJ was recorded on an AMTI OR6-5 force platform mounted at right angles to the sledge apparatus sampling at 1000 Hz. For all SJ's subjects were guided into position through feedback from the experimenter, and a marker on the sledge. Once in the correct position subjects jumped approximately 2's thereafter. For each jump; height jumped, peak ground reaction force, rate of force development and SS were calculated.

RESULTS & DISCUSSION: Data from pre and post tests were compared. In figure 1, post-test mean max and min scores significantly changed from pre-test averages. Further analysis investigated individual potentiation and time to max potentiation indicated optimal rest intervals. Criterion for potentiation was post-test scores that surpassed the pre-test plus the typical error. Using this criterion, all subjects potentiated. Results from this study will aid coaches in designing weight training programmes that contain complex pairs.
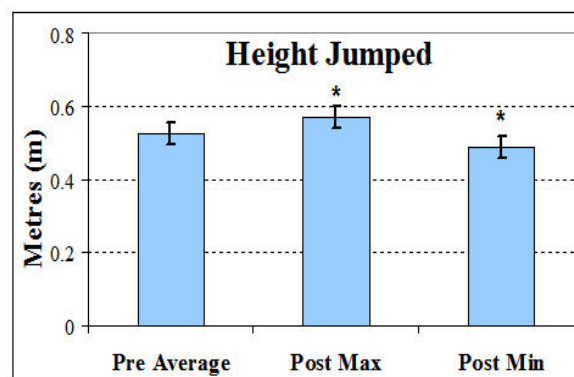
Figure 1: Group height jumped increases
(* = significant change from pre average, p<0.01)

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