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### The Effects of Core Pre-Conditioning Exercises on Vertical Jump and Dynamic Balance

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Muscular pre-conditioning exercises have been shown to evoke a post-activation performance enhancement (PAPE); however, few studies have assessed PAPE following a warm-up using muscle activation of the anatomical core. **PURPOSE:** The purpose of this study was to examine the immediate effects of implementing core activation (CA) exercises as part of a warm-up on vertical jump (VJ) and single-leg dynamic balance. **METHODS:** Nineteen NCAA or competitive club athletes (9 males and 10 females) aged 18-22, without core or lower extremity injuries limiting participation, volunteered for the study. A familiarization session designed to teach participants the exercises and testing protocols preceded the study. The study utilized a cross-over design for the warm-up treatments. The control warm-up was a light, 4-minute jog on a treadmill at a self-selected pace followed by the testing procedures. The CA program sequence consisted of a matched 4-minute warm-up and 5 exercises designed to systematically progress from the isolated deep, inner core muscles to integrated global/outer core muscles with increasingly complex motor control demands. The CA was comprised of abdominal bracing (1 min), Bird dog (30 s/side), side planks (30 s/side), prone plank (1 min), and curl-up (1 min), followed by the testing procedures. Testing included the VJ for lower quarter power and the Y Balance Test (YBT) to assess single-leg dynamic balance with a composite score and sub-scales of anterior reach (AR), posterior medial reach (PMR), and posterior lateral reach (PLR). The differences between treatments for each test and sub-scales were analyzed using a paired t-test ( $p < 0.05$ ). **RESULTS:** CA demonstrated significant improvement in scores over non-treatment in the YBT for the composite score of the right leg,  $100.3 \pm 5.7$  vs  $101.7 \pm 6.1$ , and the left leg  $100.2 \pm 5.7$  vs  $101.6 \pm 5.8$ . CA also increased the sub-scale scores of the YBT for the PLR of both the right and left legs ( $102.9 \pm 9.0$  cm vs  $106.5 \pm 9.1$  cm,  $p < 0.01$  and  $102.9 \pm 9.4$  vs  $105.5 \pm 9.5$ ,  $p < 0.01$ , respectively). However, no differences were found in the AR and PMR for the right or left leg. CA did not significantly improve VJ. Jump scores for control were  $52.6 \pm 12.4$  cm and with CA were  $53.3 \pm 13.2$  cm. **CONCLUSION:** Results demonstrated that a short CA program did not improve lower quarter power; but may produce a PAPE for tasks and movements that require rotational dynamic stabilization. **SIGNIFICANCE/NOVELTY:** Core exercises have been investigated for years; however, their potential immediate impact on lower extremity power and single-leg balance performance has not. The results of this study appear to move the discussion forward by suggesting that the PAPE principle using the described exercise protocol may be task-dependent. Specifically, tasks such as single-leg asymmetrical and rotational movements may benefit more from this strategy than bilateral leg and non-rotational movements.