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 crossover 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±5.7 vs 101.7±6.1, and the left leg 100.2±5.7 vs 101.6±5.8. CA also increased the sub-scale scores of the YBT for the PLR of both the right and left legs (102.9±9.0 cm vs 106.5±9.1 cm, p<0.01 and 102.9±9.4 vs 105.5±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±12.4 cm and with CA were 53.3±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.