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## The Effects of Static and Dynamic Stretching on Postural Stability, Hip Flexibility, and Power

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**PURPOSE:** The purpose of this study was to investigate the effects of a dynamic (DS), static (SS) or no stretching (NS) warm-up on postural sway, hip power, hip range of motion (ROM), and vertical jump height. **METHODS:** In this crossover study, participants attended one familiarization and three testing sessions, each separated by at least 48 hours. At each testing session, the subject completed a 5-minute light aerobic activity (1Kp) on a cycle ergometer immediately followed a 7-minute DS video, 7-minute SS video or sitting (NS) to complete the warm-up. DS and SS protocols were designed to equally target (time/intensity) muscle groups of the lower limb. Following the warm-up, hip ROM (flexion, extension, abduction, adduction) was measured with a goniometer, 1-foot stance for sway on a force plate, countermovement vertical jump height and hip power was recorded using an isokinetic dynamometer at 60° and 180°·sec<sup>-1</sup>. A one-way ANOVA with repeated measures with a Fisher LSD post-hoc test was used to determine significance ( $p < 0.05$ ) for each variable. **RESULTS:** For ROM, measured in degrees, hip flexion and adduction showed no significant difference; however, compared to NS, DS and SS improved hip extension ( $19.7 \pm 6.2$ ;  $20.7 \pm 2.6$ ;  $25.2 \pm 6.3$ , respectively) and abduction ( $31.8 \pm 5.3$ ;  $37.1 \pm 7.8$ ;  $40.3 \pm 8.9$ , respectively). For isokinetic power (W) at 60°·sec<sup>-1</sup>, DS significantly generated more power than NS and SS (DS=during flexion but no difference in extension ( $p = 0.11$ )). Isokinetic power (W) at 180°·sec<sup>-1</sup> showed difference between all warm-ups (DS  $427.65 \pm 80.4 > SS 256.7 \pm 76.6 > NS 216.5 \pm 73.31$ ) for flexion and both DS and SS produced more force than NS during extension (DS  $102.3 \pm 55.4$  and SS  $105.2 \pm 54.0 > NS 88.5 \pm 45.1$ ). There were no differences detected between conditions for postural sway or vertical jump. **CONCLUSION:** The literature on the effects of stretching prior on performance varies and the results of this study substantiate the different results from previous studies. The variables of sway and vertical jump showed no differences between conditions. The acute benefits for improved ROM was only found in 2 of the 4 exercises. Finally, isokinetic power was generally increased following stretching; however, DS gave the greatest benefits.