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Menstrual Cycle Phase Not Exercise Intensity Affects ACL Laxity in Women

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Female athletes experience an anterior cruciate ligament (ACL) tear incidence rate three times greater than male athletes, and due to the disruptive effects on athletic career and the cost to the healthcare system, research on cause and prevention is crucial. One risk factor for ACL tears found to be higher among females is ACL anterior-posterior laxity (AP_{LAX}). Separate studies have found AP_{LAX} to vary throughout the menstrual cycle and to be higher after exercise; however, these variables have never been investigated together. Additionally, few studies have examined the impact of exercise intensity on AP_{LAX} . **PURPOSE:** To determine the effects of exercise intensity on female ACL laxity throughout follicular and luteal menstrual cycle phases. **METHODS:** Eleven eumenorrheic aerobically trained college-aged females (20.82 ± 2.72 yrs; 164.16 ± 5.31 cm; 60.81 ± 9.89 kgs; 32.46 ± 5.32 %BF) reported to the lab on four separate days: two in the luteal phase and two in the follicular phase. During each phase, subjects completed both a high (HIE; 85%HRR) and moderate intensity exercise (MOD; 42.5%HRR) session using a randomized crossover design on a treadmill. The two sessions per phase were separated by 4 days. Before and after each session, AP_{LAX} was tested using KT-2000 arthrometer at 90N and 120N. **RESULTS:** ACL laxity measurements were significantly greater in the luteal phase pre-exercise (90N $p=0.018$; 120N $p=0.024$) and post-exercise (90N $p=0.004$; 120N $p=0.002$). However, the level of intensity had no significant impact on AP_{LAX} post-exercise (90N $p=0.698$; 120N $p=0.749$). **CONCLUSION:** The speed engendered during MOD or HIE treadmill running did not differentially affect AP_{LAX} in this study. Our results demonstrated that for a female athlete, ACL tear-risk will vary more throughout her cycle than it will vary based on her level of activity.