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Description of the sexhormonal variations on menstrual symptoms and wellness of elite athletes during their menstrual cycle.

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INTRODUCTION:

The different phases of the menstrual cycle can be characterized by sex hormonal variations. Each of these variations can impact the athletes' wellness (i.e. fitness, mood, sleep quality). During their menstrual cycle, some women will develop premenstrual symptoms [1]. Studies have shown that a consistently higher level of progesterone in the luteal phase is associated with low levels of premenstrual fatigue [2]. Objective : to determine the sex hormonal profile of elite athletes (i.e. estradiol, progesterone and testosterone) and the impact of its variations on their wellness and menstrual symptoms, comparing athletes with a natural menstrual cycles (MC) or IUDs* and athletes on combined oral contraception (OC).

*abbreviation for intra-uterine device

METHODS:

27 elite athletes (12 skiers, 11 rowers, 4 cyclists) volunteered to participate in the study. There were 14 athletes on OC and 13 with a MC. For MC eumenorrhic athletes were included. Salivary samples were taken on average every 3/4 days for x cycles on average. In order to identify abnormal data, while still considering the atypical hormonal profiles of some athletes, we used the Z-scores-based methods [3]. Wellness data and different menstrual symptoms (i.e. soreness, headaches, increased fatigue) were collected. In order to model hormonal profiles, a mixed model with random effect on athletes was used.

RESULTS:

In MC athletes, a significantly higher level of progesterone was observed in the luteal phase than in the follicular and menstrual phase (Wilcoxon test: p-value <0.001). There was also a significant difference in estradiol levels between natural cycle and pill athletes (Wilcoxon test: p-value <0.001). There is a greater variation in testosterone for MC athletes than for OC athletes. In addition, for the MC athletes, the menstrual symptoms were significantly different across the cycle's phases (Kruskall-Wallis test: p-value <0.001). The number of symptoms observed, on the whole of the MC athletes, in the menstrual phase is more important than in the follicular phase and the luteal phase (13.03% in fol., 41.96% in lut. and 45% in menst., n=591). Premenstrual symptoms (i.e. increased fatigue, headaches, breast pain) were reduced in athletes taking hormonal contraceptives.

CONCLUSION:

Through this study, we observed the variations of estradiol and progesterone according to the different phases of the cycle while testosterone seems to remain rather stable across the MC. The study of estradiol and testosterone through wellness and symptoms in high performance athletes is still very under researched. Understanding these variations will allow athletes and staff to optimize and adapt their training loads to improve performance.

[1] Lovick T.A. , Guapo V.G., Anselmo-Franci J.A., Loureiro C.M., Faleiros M.C.M., Del Ben C.M.(2017)

[2] Ziolkiewicz A., Pawlowski B., Ellison P.T. Lipson S.F., Thune I., Jasienska G.(2012)

[3] Saulière, G., Dedecker, J., Marquet, L.-A., Rochcongar, P., Toussaint, J.-F., and Berthelot G.(2017)

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