

WOMEN'S FOOTBALL & THE MENSTRUAL CYCLE... HOW WE CAN FURTHER INDIVIDUALISE?

FEATURE/ANDREW WISEMAN & GEORGIE BRUINVELS

Female athletes are two to eight times more likely to rupture their anterior cruciate ligament (ACL) than men when using the same rules and equipment.¹

Crucially however, risk is enhanced further at certain times in the menstrual cycle in line with the changes in ovarian hormones². Specific injury prevention programmes incorporating individualised neuromuscular training are already being implemented to support female athletes, however it is now important to consider incorporating menstrual cycle tracking to enhance awareness and mitigate risk.

Statistically the general injury pattern is similar for male and female players, however the female player is likely to suffer greater knee and head injuries than male counterparts with the ankle sprain being the most common joint injury in female players (FIFA F-Marc).

The time just prior to ovulation in the menstrual cycle, when oestradiol levels reach a peak has been associated with increased knee joint laxity³. This is thought due to activation of specific receptors located to connective tissue. Evidently it is therefore possible that this is a causative factor in the post-pubertal increase in ACL injury rate in women^{3,4}.



While it may be difficult to modify joint laxity, a solid programme to increase muscular strength and heighten neuromuscular control should become an integral part of the female players individual training programme. Further, specific strategies can be implemented on a player-by-player basis depending on where they are in their cycle and based on their individual risk profile. For example, an enhanced warm up, that is steadily progressive and increasingly dynamic, could be used, and a greater focus can be placed on post-exercise recovery, enhancing tissue repair at certain times in the cycle. Evidently, we accept it can be challenging to individualise players programmes, especially when players are not full time.

While there is a paucity of research on the effect of the menstrual cycle on performance in female soccer, as practitioners we need to be aware of the potential performance decrements that may occur especially when fatigue may be a limiting factor, particularly just before and during menstruation. Simple modifications to nutrition should be considered, accounting for blood loss and the potential for changes in substrate utilisation as hormone levels change⁵. Research in other sports has demonstrated increases in strength within the follicular phase of the cycle⁶, and this may give us scope to more effectively plan training for performance gains within this period. One recent study by Julian et al., (2017)⁷ demonstrated a reduction in maximal endurance performance (Yo-Yo IET) in the mid-luteal phase of the menstrual cycle. However, this study was hampered by a small sample size (n=9). Further research is clearly required.

To conclude, by integrating individual menstrual cycle data there is a clear rationale for tailoring training methods to reflect this in a relatively simple way within a team environment. This could be considered alongside subjective data to optimise physical performance.

1. Boden BP, Sheehan FT, Torg JS, Hewett TE. Noncontact anterior cruciate ligament injuries: mechanisms and risk factors. *J Am Acad Orthop Surg.* 2010;18(9):520-527.
2. Balachandrar V, Marciniak J-L, Wall O, Balachandrar C. Effects of the menstrual cycle on lower-limb biomechanics, neuromuscular control, and anterior cruciate ligament injury risk: a systematic review. *Muscles Ligaments Tendons J.* 2017;7(1):136-146. doi:10.1138/mltj/2017.7.1.136.
3. Myer GD, Paterno MV, Ford KR, Quatman CE, Hewett TE. Rehabilitation After Anterior Cruciate Ligament Reconstruction: Criteria-Based Progression Through the Return-to-Sport Phase. *Journal of Orthopaedic & Sports Physical Therapy.* 2006;36(6):385-402. doi:10.2519/jospt.2006.2222.
4. Hewett TE, Ford KR, Myer GD. Anterior Cruciate Ligament Injuries in Female Athletes. *Am J Sports Med.* 2017;34(3):490-498. doi:10.1177/0363546505282619.
5. Oosthuysen T, Bosch AN. The effect of the menstrual cycle on exercise metabolism: implications for exercise performance in eumenorrhoeic women. *Sports Med.* 2010;40(3):207-227. doi:10.2165/11317090-000000000-00000.
6. Sung E, Han A, Hinrichs T, Vorgerd M, Manchado C, Platen P. Effects of follicular versus luteal phase-based strength training in young women. *SpringerPlus.* 2014;3(1):668. doi:10.1186/2193-1801-3-668.
7. Julian R, Hecksteden A, Fullagar HHK, Meyer T. The effects of menstrual cycle phase on physical performance in female soccer players. *Lucía A, ed. PLoS ONE.* 2017;12(3):e0173951. doi:10.1371/journal.pone.0173951.

Georgie Bruinvels

Exercise Physiologist and Research Scientist, Orreco Ltd.
Twitter: @gbruinvels,
Email: georgie.bruinvels@Orreco.com,
Co-founder of FitrWoman.
www.fitrwoman.com

Andrew Wiseman

Sports Scientist & Physical Preparation Coach, Celtic FC (Women)
Twitter: @mrwiseman
Email: celticcladiesconditioning@gmail.com