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Editorial

Beyond the Menstrual Cycle: Time for a Holistic Approach to Athlete Health and Performance

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INTRODUCTION

Gender differences in athlete performance and injury risk are often scrutinized through the narrow lens of the menstrual cycle. Basic research indicates that estrogen and progesterone levels may affect muscle function, energy metabolism, and thermoregulation[1,2]; however, results in vivo remain inconclusive.[3-5] While hormonal fluctuations may affect injury risk and performance for some women,[6,7] we argue that it should not overshadow other important issues, such as socio-environmental or psychological factors. This article aims to broaden the awareness of the challenges faced by female athletes through an examination of the complex interplay of these factors and advocating for a more holistic approach to evaluating and supporting athlete health and performance.

Recently, the quantity of research into the menstrual cycle has increased. A recent meta-analysis suggested that the menstrual cycle may have a trivial effect on performance.[5] However, the results of studies included in the meta-analysis were highly variable, and most of the included papers were of poor methodological quality, with menstrual cycle phases being estimated or assumed based on regular menstruations rather than accurately measured using validated methods for detecting ovulation and hormone levels.[8,9] Therefore, even though the meta-analysis was performed, true, reliable conclusions on the effect of menstrual cycle on performance cannot be drawn.

To be clear, monitoring the menstrual cycle is a useful tool to assess the health of individual female athletes not using hormonal contraception. A regular cycle between 21 to 35 days with an ovulation and a menstrual bleeding is an indicator of good physiological function.[10,11] Further, for some women menstrual cycle tracking can help them anticipate and mitigate symptoms associated with their menstrual cycle, which can improve their performance. Menstrual cycle tracking can also help identify the 50% of female athletes who experience menstrual disorders,[12] which are often linked to relative energy deficiency, poor recovery, overtraining or gynecological issues. Although the menstrual cycle itself is not conclusively associated with increased risk of injury, menstrual cycle disorders are associated with injury risk.[13]

It is clear that there is a lack of evidence to indicate the menstrual cycle has significant effects on the performance or injury risk of women athletes. Yet, the menstrual cycle remains a focal point in research and the media but is only one piece of the puzzle as injury risk and performance are driven by a multitude of other important factors.[14,15] Focusing primarily on the menstrual cycle can result in us ignoring other critical socio-environmental and psychological factors that adversely affect women athletes.[16]

GENDERED SOCIOCULTURAL FACTORS

Female athletes operate within complex socio-environmental contexts that can profoundly impact their performance and well-being.[16] For example, the lack of visibility and representation of female athletes in the media contributes to a cycle of inequality. When female athletes receive less media coverage, they have fewer sponsorship opportunities, which limits their financial support and access to high-quality training resources.[14,17] This disparity not only affects their current performance but also their long-term career prospects and post-retirement opportunities. It is essential to advocate for more equitable media coverage to highlight the achievements of female athletes and ensure they gain the tangible benefits from that exposure.

Less funding and fewer sponsorship opportunities for women compared to men, limits their access to high-quality medical, training, and competition experiences.[17,18] In football, women have less access to appropriate medical care, training and match facilities, as well as strength and conditioning support compared to their male peers.[16,19] Less access to resources means less access to effective programs, such as anterior cruciate ligament injury prevention. Access to such prevention programming could have a major impact on an athlete's entire career[19]; and if an injury does occur, treatment pathways can differ for women,

potentially affecting their recovery and long-term performance, independent of any physiological factors.[20]

Less funding and fewer resources in women's sport has also contributed to significantly less research in women's sport compared to men's.[21-23] While there has been an increase in menstrual cycle research, there has not been a similar growth in training research. We need more research to understand differences between men and women in their physiological response to and experiences with training.[24, 25] However, there is a drastic need for more strength and conditioning literature for female athletes.

Social support systems, including family, friends, and coaches, play a crucial role in an athlete's career. Female athletes often juggle multiple roles, balancing their sporting ambitions with family responsibilities and gendered societal expectations.[26] This juggling act can add significant stress and time constraints, which are rarely considered in performance evaluations or rehabilitation plans. Some organizations are beginning to build support systems such as on-site childcare or time for infant feeding or breast pumping, however these resources are still rare. The gendered attitudes and beliefs that remain pervasive in the sports world result in female athletes frequently facing sexism and unequal treatment[27] compared to male athletes.[28] These experiences not only limit the opportunities available to women but can undermine their confidence, motivation, and mental health, thereby impacting their injury risk and performance on the field.

Stakeholders, including coaches, organizations, and national governing bodies, need to be trained to recognize and address the unique challenges faced by female athletes, including the psychological and social pressures they encounter. Creating a positive and supportive team culture can help female athletes feel valued and respected, enhancing their overall well-being and performance.[29]

PSYCHOLOGICAL FACTORS

Psychological well-being is critical for athlete health and performance. Female athletes are often subject to unique psychological stressors shaped by the gendered environments of sport and society. For example, societal pressures regarding body image send strong messages about what women 'should' look like. The emphasis on physical appearance and the idealization of certain body types can lead to issues like eating disorders, which are more prevalent among female athletes.[30] Female athletes recognize the benefits of resistance training for injury prevention and optimal performance, but for some the fear of being seen as "too muscular" or "too bulky" can interfere with how athletes adhere to their training program.[31]

In addition to body image concerns, female athletes often face psychological stressors related to balancing societal expectations about femininity and athleticism. Female athletes may feel pressured to conform to traditional gender roles while also excelling in their sport, leading to a conflict of identity and increased mental strain.[32]

Gender discrimination, sexism, and harassment within sport present significant psychological stressors for female athletes. These stressors range from obvious forms, such as unequal pay and less media coverage, to more subtle forms, such as harassing comments/behavior or providing locker rooms with no toilets. Such experiences can diminish an athlete's motivation and performance, as well as negatively impact their mental health.[33]

Moreover, the lack of female representation in coaching and leadership positions within sports organizations and governing bodies can exacerbate feelings of isolation and lack of support among female athletes. When female athletes do not see themselves represented in leadership roles, it can affect their self-confidence and aspirations.[34] Mentorship from female coaches and role models can provide individual athletes with guidance, but a collective leadership effort is needed to change organizational and cultural attitudes as well as eliminate sexism and harassment.

To mitigate psychological stressors, it is important for sports organizations to implement comprehensive mental health support systems that are attuned to the gendered environments of sport. Access to sports psychologists can help athletes develop coping strategies and resilience.[35] Additionally, creating a supportive team environment where female athletes feel valued and respected can significantly enhance their psychological well-being. Providing education and training for coaches, staff, and other stakeholders on the unique challenges faced by female athletes can also promote a more inclusive and supportive culture within sports.[35]

CONCLUSION

Looking beyond the menstrual cycle and providing interdisciplinary teams, including access to medical, strength and conditioning, sports psychologists, nutritionists, and sports trainers, who understand the gendered environments of sport, is vital to creating an equal playing field for women.

The injury risk and performance of female athletes are shaped by a multifaceted array of factors, including gendered sociocultural influences and psychological stressors. To fully support female athletes and help them achieve their highest potential, it is crucial to address these barriers head-on. Society, but especially the sporting community, must move past the narrow lens of focusing on the menstrual cycle as the key determinant of performance and injury risk in women. Embracing a comprehensive approach that considers social and psychological factors along with biological dimensions will ensure that female athletes receive the recognition and value they deserve, leveling the playing field so they can achieve the highest levels of success.

REFERENCES

1. Collins BC, Arpke RW, Larson AA, et al. Estrogen Regulates the Satellite Cell Compartment in Females. *Cell Rep*. 2019;28(2):368-381.e6. doi:10.1016/j.celrep.2019.06.025

2. Oosthuyse T, Strauss JA, Hackney AC. Understanding the female athlete: molecular mechanisms underpinning menstrual phase differences in exercise metabolism. *Eur J Appl Physiol*. 2023;123(3):423-450. doi:10.1007/s00421-022-05090-3

3. Colenso-Semple LM, D'Souza AC, Elliott-Sale KJ, Phillips SM. Current evidence shows no influence of women's menstrual cycle phase on acute strength performance or adaptations to resistance exercise training. *Front Sports Act Living*. 2023;5:1054542. doi:10.3389/fspor.2023.1054542

4. D'Souza AC, Wageh M, Williams JS, et al. Menstrual cycle hormones and oral contraceptives: a multimethod systems physiology-based review of their impact on key aspects of female physiology. *J Appl Physiol Bethesda Md 1985*. 2023;135(6):1284-1299. doi:10.1152/japplphysiol.00346.2023

5. McNulty KL, Elliott-Sale KJ, Dolan E, et al. The Effects of Menstrual Cycle Phase on Exercise Performance in Eumenorrheic Women: A Systematic Review and Meta-Analysis. *Sports Med Auckl NZ*. 2020;50(10):1813-1827. doi:10.1007/s40279-020-01319-3

6. Hayward E, Akam L, Hunter D, Mastana S. Role of the Menstrual Cycle on Performance and Injury Risk: A Survey of Female Professional Rugby Players in the United Kingdom. *Int J Environ Res Public Health*. 2024;21(2):150. doi:10.3390/ijerph21020150

7. Legerlotz K, Nobis T. Insights in the Effect of Fluctuating Female Hormones on Injury Risk—Challenge and Chance. *Front Physiol*. 2022;13:827726. doi:10.3389/fphys.2022.827726

8. Burden RJ, Altini M, Ferrer E, et al. Measure do not guess: a call to action to end assumed and estimated menstrual cycle phases in research. *BMJ Open Sport Exerc Med*. 2024;10(2):e002095. doi:10.1136/bmjsem-2024-002095

9. Elliott-Sale KJ, Minahan CL, de Jonge XAKJ, et al. Methodological Considerations for Studies in Sport and Exercise Science with Women as Participants: A Working Guide for Standards of Practice for Research on Women. *Sports Med Auckl NZ*. 2021;51(5):843-861. doi:10.1007/s40279-021-01435-8

10. Itriyeva K. The normal menstrual cycle. *Curr Probl Pediatr Adolesc Health Care*. 2022;52(5):101183. doi:10.1016/j.cppeds.2022.101183

11. Popat VB, Prodanov T, Calis KA, Nelson LM. The Menstrual Cycle A Biological Marker of General Health in Adolescents. *Ann N Y Acad Sci*. 2008;1135:43-51. doi:10.1196/annals.1429.040

12. De Souza MJ, Toombs RJ, Scheid JL, O'Donnell E, West SL, Williams NI. High prevalence of subtle and severe menstrual disturbances in exercising women: confirmation using daily hormone measures. *Hum Reprod Oxf Engl*. 2010;25(2):491-503. doi:10.1093/humrep/dep411

13. Mountjoy M, Ackerman KE, Bailey DM, et al. 2023 International Olympic Committee's (IOC) consensus statement on Relative Energy Deficiency in Sport (REDs). *Br J Sports Med*. 2023;57(17):1073-1097. doi:10.1136/bjsports-2023-106994

14. Martin D, Timmins K, Cowie C, et al. Injury Incidence Across the Menstrual Cycle in International Footballers. *Front Sports Act Living*. 2021;3:616999. doi:10.3389/fspor.2021.616999

15. Martínez-Fortuny N, Alonso-Calvete A, Da Cuña-Carrera I, Abalo-Núñez R. Menstrual Cycle and Sport Injuries: A Systematic Review. *Int J Environ Res Public Health*. 2023;20(4):3264. doi:10.3390/ijerph20043264

16. Parsons JL, Coen SE, Bekker S. Anterior cruciate ligament injury: towards a gendered environmental approach. *Br J Sports Med*. 2021;55(17):984-990. doi:10.1136/bjsports-2020-103173

17. Fink JS. Female athletes, women's sport, and the sport media commercial complex: Have we really "come a long way, baby"? *Sport Manag Rev*. 2015;18(3):331-342. doi:10.1016/j.smr.2014.05.001

18. Meier HE, Konjer MV, Krieger J. Women in International Elite Athletics: Gender (in)equality and National Participation. *Front Sports Act Living*. 2021;3:709640. doi:10.3389/fspor.2021.709640

19. Horan D, Delahunt E, Roe M, Hägglund M, Blake C, Kelly S. 'More than likely the men come first. That's just very frustrating'. A qualitative exploration of contextual factors affecting the implementation of injury prevention initiatives and the provision of effective injury management in elite-level women's club football in Ireland. *Br J Sports Med*. 2024;58(2):89-96. doi:10.1136/bjsports-2022-106548

20. Collins JE, Katz JN, Donnell-Fink LA, Martin SD, Losina E. Cumulative Incidence of ACL Reconstruction After ACL Injury in Adults: Role of Age, Sex, and Race. *Am J Sports Med*. 2013;41(3):544-549. doi:10.1177/0363546512472042

21. Cowan SM, Kemp JL, Ardern CL, et al. Sport and exercise medicine/physiotherapy publishing has a gender/sex equity problem: we need action now! *Br J Sports Med*. 2023;57(7):401-407. doi:10.1136/bjsports-2022-106055

22. Cowley ES, Olenick AA, McNulty KL, Ross EZ. "Invisible Sportswomen": The Sex Data Gap in Sport and Exercise Science Research. *Women Sport Phys Act J*. 2021;29(2):146-151. doi:10.1123/wspaj.2021-0028

23. Smith ES, McKay AKA, Kuikman M, et al. Auditing the Representation of Female Versus Male Athletes in Sports Science and Sports Medicine Research: Evidence-Based Performance Supplements. *Nutrients*. 2022;14(5):953. doi:10.3390/nu14050953

24. Bartolomei S, Grillone G, Di Michele R, Cortesi M. A Comparison between Male and Female Athletes in Relative Strength and Power Performances. *J Funct Morphol Kinesiol*. 2021;6(1):17. doi:10.3390/jfmk6010017

25. Landen S, Hiam D, Voisin S, Jacques M, Lamon S, Eynon N. Physiological and molecular sex differences in human skeletal muscle in response to exercise training. *J Physiol*. 2023;601(3):419-434. doi:10.1113/JP279499

26. McGannon KR, McMahon J, Gonsalves CA. Juggling motherhood and sport: A qualitative study of the negotiation of competitive recreational athlete mother identities. *Psychol Sport Exerc*. 2018;36:41-49. doi:10.1016/j.psychsport.2018.01.008

27. Biram MD. Mermaids in the land of the king: an ethnography of Santos FC women. *Movimento*. 2021;27:e27005. doi:10.22456/1982-8918.109357

28. Cooky C, Messner MA, Musto M. "It's Dude Time!": A Quarter Century of Excluding Women's Sports in Televised News and Highlight Shows. *Commun Sport*. 2015;3(3):261-287. doi:10.1177/2167479515588761

29. Banwell J, Kerr G. Coaches' Perspectives on their Roles in Facilitating the Personal Development of Student-Athletes. *Can J High Educ*. 2016;46(1):1-18. doi:10.47678/cjhe.v46i1.185109

30. Sundgot-Borgen J, Torstveit MK. Prevalence of Eating Disorders in Elite Athletes Is Higher Than in the General Population. *Clin J Sport Med*. 2004;14(1):25-32. doi:10.1097/00042752-200401000-00005

31. Roth RI, Knapp BA. Gender Negotiations of Female Collegiate Athletes in the Strength and Conditioning Environment. *Women Sport Phys Act J*. 2017;25(1):50-59. doi:10.1123/wspaj.2015-0049

32. Krane V, Choi PYL, Baird SM, Aimar CM, Kauer KJ. Living the Paradox: Female Athletes Negotiate Femininity and Muscularity. *Sex Roles*. 2004;50(5/6):315-329. doi:10.1023/B:SERS.0000018888.48437.4f

33. Cooky C, Messner MA, Hextrum RH. Women Play Sport, But Not on TV: A Longitudinal Study of Televised News Media. *Commun Sport*. 2013;1(3):203-230. doi:10.1177/2167479513476947

34. Sartore-Baldwin M, Warner S. Perceptions of justice within intercollegiate athletics among current and former athletes. *Journal of Issues in Intercollegiate Athletics*. 2012;5:269-282.

35. Reardon CL, Factor RM. Sport Psychiatry: A Systematic Review of Diagnosis and Medical Treatment of Mental Illness in Athletes. *Sports Med*. 2010;40(11):961-980. doi:10.2165/11536580-000000000-00000