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ARTIFICIAL INTELLIGENCE AND WEARABLE TECHNOLOGIES IN WOMEN'S SPORTS PERFORMANCE OPTIMIZATION

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ABSTRACT

Artificial intelligence (AI) and wearable technologies are transforming contemporary sports science by providing new opportunities to monitor athletic performance, assess physical workload, and support individualized training programmes. In women's sports, these technologies offer considerable potential for improving performance evaluation, monitoring fatigue, supporting recovery, and identifying patterns associated with injury risk. Wearable devices, including smartwatches, heart-rate monitors, GPS trackers, and motion sensors, can collect physiological and biomechanical information during training and competition. Artificial intelligence can analyse these data to identify performance trends and provide evidence-based recommendations to athletes, coaches, and sports scientists. Recent research has demonstrated the potential of AI-based systems to monitor workload and fatigue in elite women's handball, illustrating the relevance of these approaches to women's professional sports (Felice, 2026). However, technological applications must account for differences in individual physiology, training requirements, sporting disciplines, and available resources. Challenges involving data accuracy, privacy, algorithmic bias, and the limited representation of female athletes in some research datasets also require attention. This study examines the role of artificial intelligence and wearable technologies in optimizing women's sports performance through a qualitative review of recent academic literature and relevant research publications. It explores their applications in performance monitoring, training personalization, fatigue management, and injury-risk assessment while considering ethical and practical limitations. The study argues that these technologies can strengthen sports performance management when their outputs are interpreted alongside professional coaching expertise and athlete-specific information. Responsible implementation, inclusive research, and appropriate data protection are essential for ensuring that technological innovation contributes to safer, more effective, and equitable opportunities for women athletes.

KEYWORDS: *Artificial Intelligence, Wearable Technologies, Women's Sports, Athletic Performance, Athlete Monitoring, Injury Prevention, Training Optimization, Sports Innovation.*

INTRODUCTION

Artificial intelligence and wearable technologies have become increasingly important in contemporary sports science because they enable the collection and analysis of information that can support athletic training and performance evaluation. Traditional performance assessment often depends on coaches' observations, physical tests, competition results, and athletes' reported experiences. Although these methods remain valuable, they may not capture every change in workload, fatigue, movement patterns, or recovery throughout a training programme. Wearable devices provide opportunities to monitor selected physiological and biomechanical indicators continuously, while AI-based systems can analyse large datasets to identify patterns that may be difficult to recognize through observation alone. Recent research highlights the potential of combining AI and wearable technologies for individualized training, workload

management, injury-risk assessment, and athlete wellbeing (Alkasasbeh et al., 2026). This technological development is particularly relevant to women's sports, where evidence-based performance management can support more individualized approaches to training and competition.Women athletes participate in a wide range of professional and amateur sports, including football, cricket, basketball, athletics, swimming, tennis, and handball. Their performance depends on numerous interacting factors, such as physical conditioning, technical skills, recovery, psychological readiness, and environmental conditions. Wearable technologies can help coaches monitor indicators such as heart rate, movement intensity, running distance, acceleration, and training duration. When combined with AI-based analysis, these measurements may support the identification of workload patterns and changes in athletic performance. Felice (2026), for example, examined an AI-based tool for monitoring intensity and fatigue in elite women's handball, demonstrating the relevance of wearable-derived performance indicators to professional women athletes. Nevertheless, such systems should support rather than replace direct observation, athlete feedback, and qualified professional judgment.One important application of these technologies is the personalization of training programmes. Women athletes differ in their fitness levels, sporting roles, training histories, physical characteristics, and recovery requirements. Consequently, a training approach that benefits one athlete may not produce identical results for another. AI systems can process information from wearable devices to help coaches evaluate individual workloads and identify patterns that may justify adjustments to training intensity or recovery schedules. Recent research on AI-integrated wearable systems emphasizes the potential of combining multiple data sources to develop individualized performance-management strategies (Alkasasbeh et al., 2026). Similarly, broader research on deep learning and sensor-based sports monitoring demonstrates how physiological, movement, and other sensor information can be analysed to assess athletic performance and health (Deep Learning for Sensor-Based Sport Performance and Health Monitoring, 2026). These developments suggest that data-informed training can complement conventional coaching methods when recommendations are appropriately validated.

Fatigue management and injury prevention represent additional areas in which wearable technologies may contribute to women's sports performance. Excessive training loads, insufficient recovery, and repeated high-intensity activity can affect athletes' readiness and may contribute to undesirable health and performance outcomes. Wearable devices can help track selected indicators of physical exertion and recovery, while AI models can identify patterns associated with changes in workload or movement. However, these measurements do not independently establish that an athlete will experience an injury. Their usefulness depends on the accuracy of the devices, the quality of the data, and the validity of the analytical models. Research on AI-supported wearable monitoring identifies injury-risk estimation and return-to-play support as promising applications while emphasizing the importance of contextual interpretation and professional oversight (Alkasasbeh et al., 2026). For women athletes, these tools should be evaluated using relevant female-athlete data rather than assuming that models developed primarily from other populations will perform equally well.

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Despite their potential benefits, AI and wearable technologies also introduce practical and ethical challenges. High-quality devices and advanced analytical systems may be expensive, limiting access for athletes and teams with fewer financial resources. Inaccurate measurements, incomplete datasets, and poorly validated algorithms can produce misleading conclusions. Privacy is another major concern because wearable devices may collect sensitive information about an athlete's health, movement, sleep, and training habits. The collection and use of such information require clear consent, appropriate data security, and transparent decisions about who can access the records. Recent literature on AI and wearables in sports emphasizes that reliable performance monitoring depends on data quality, model validation, responsible governance, and human involvement in decision-making (Alkasasbeh et al., 2026). Addressing these issues is essential for ensuring that technological innovation improves athlete support without creating unnecessary risks.

The development of AI-based performance monitoring also raises questions about how effectively existing technologies represent the needs of women athletes. Athletic performance is influenced by individual characteristics and circumstances, and models trained on limited or unrepresentative datasets may produce less reliable recommendations for some groups. Women athletes should therefore be appropriately represented in research, technology development, and validation studies. Researchers should also investigate whether different sports, competition levels, and training environments require distinct monitoring approaches. Work on wearable technologies and sports medicine identifies methodological variation and the need for careful validation as important considerations when applying these systems to injury prevention and rehabilitation (Silva et al., 2026). Greater attention to women-specific evidence can help ensure that performance recommendations are relevant, fair, and scientifically defensible.

The integration of AI and wearable technologies can also influence coaching practices and the wider management of women's sports. Coaches can use relevant performance information to evaluate training responses, compare progress over time, and communicate more clearly with athletes about workload and recovery. Sports organizations may use aggregated and appropriately protected data to evaluate training programmes and allocate performance-support resources. Nevertheless, technological recommendations should remain understandable to athletes and coaches, and individual decisions should account for factors that numerical measurements cannot fully capture. Research on wearable technologies for athletic performance and safety emphasizes the value of monitoring, real-time feedback, and communication between athletes and support personnel (VanBibber et al., 2026). These applications are most effective when integrated into established sports-science practices rather than introduced as isolated technological solutions.

In this context, examining AI and wearable technologies in women's sports performance optimization is important for understanding both the opportunities and limitations of contemporary sports innovation. Existing research demonstrates promising applications in

performance monitoring, fatigue assessment, workload management, and injury-risk analysis, but the benefits depend on scientific validity, appropriate implementation, and consideration of women athletes' specific needs. This study therefore examines how AI and wearable technologies can support women's athletic performance, identifies the practical and ethical challenges associated with their use, and explores strategies for more inclusive implementation. By synthesizing recent research published in 2025 and 2026, the study aims to contribute to a more informed understanding of how technological innovation can support individualized training, athlete wellbeing, and equitable development in women's sports.

RESEARCH OBJECTIVES

1. To examine the role of artificial intelligence and wearable technologies in optimizing women's sports performance.
2. To identify the benefits and challenges of using AI-based monitoring systems for training, fatigue management, and injury-risk assessment among women athletes.
3. To explore strategies for improving the accuracy, accessibility, ethical use, and effectiveness of wearable technologies in women's sports.

RESEARCH QUESTIONS

1. How can artificial intelligence and wearable technologies contribute to optimizing women's athletic performance?
2. What benefits and challenges are associated with AI-based wearable systems for training, fatigue management, and injury-risk assessment?
3. What strategies can improve the accuracy, accessibility, and responsible implementation of these technologies in women's sports?

LITERATURE REVIEW

Recent research has highlighted the growing importance of artificial intelligence and wearable technologies in contemporary sports performance management. Alkasasbeh et al. (2026) examined the integration of AI and wearable systems for athlete monitoring, performance optimization, injury-risk estimation, and wellbeing. Their review explains that wearable devices can collect physiological, biomechanical, and behavioural information, while AI models can help interpret complex datasets and identify patterns relevant to training decisions. The authors emphasize that the effectiveness of these systems depends on data quality, model validation, contextual interpretation, and professional expertise. This research provides a foundation for understanding how technological innovation can support individualized athletic performance while highlighting the importance of responsible implementation.The application of wearable technology to training intensity and fatigue management is particularly relevant to women's professional sports. Felice (2026) investigated an AI-based tool for monitoring intensity and

fatigue in elite women's handball. The study used wearable-derived performance indicators, including running distance and speed, to estimate workload and physiological stress. Its findings demonstrate the potential of AI-assisted analysis to provide coaches with information that can support training decisions and player management. However, the results from one professional handball team should not automatically be generalized to all women athletes or sporting disciplines. Further research involving different sports, competition levels, and athlete populations is needed to determine how widely these approaches can be applied.

Wearable technologies are also increasingly used in sports medicine, particularly for injury prevention, rehabilitation, and recovery monitoring. Silva et al. (2026) reviewed the use of wearable sensors and AI-based analytical methods for injury prevention and rehabilitation. Their review discusses the use of movement sensors, physiological measurements, and machine-learning approaches to identify patterns associated with injury risk and recovery. The authors identify methodological differences, limited validation, and ethical considerations as important challenges affecting wider implementation. These findings are relevant to women's sports because injury-monitoring systems should be evaluated using appropriate athlete populations and sport-specific evidence. Wearable measurements may support professional assessment, but they should not be treated as definitive predictions of future injuries.VanBibber et al. (2026) examined the role of wearable technology in optimizing athletic performance and safety. Their research describes how wearable devices can monitor internal and external workloads, provide real-time feedback, and assist with recovery assessment. Such information can help coaches understand how athletes respond to training and make more informed decisions about exercise intensity and workload progression. The study also emphasizes the need for further validation of wearable devices and improved data security. These considerations are important when applying technology to women's sports because unreliable measurements or inappropriate interpretations may lead to unsuitable training recommendations. The literature therefore supports the integration of wearable monitoring with established sports-science practices rather than relying exclusively on device-generated results.

Recent research has further expanded the use of machine learning and multimodal data analysis in athletic performance assessment. Kanthavel et al. (2026) presented Athlete-AI, a framework integrating wearable sensor information, human movement data, and machine-learning methods for athlete monitoring and injury-risk forecasting. Their research illustrates how different data sources can be combined to develop computational models for examining workload, fatigue, and injury-related patterns. Similarly, Deep Learning for Sensor-Based Sport Performance and Health Monitoring (2026) reviews the application of deep-learning approaches to wearable, movement-based, physiological, and multimodal sensing. Together, these publications demonstrate the potential of advanced analytical techniques to support more comprehensive performance evaluation. Nevertheless, computational performance does not automatically establish clinical accuracy or improved competitive outcomes, making independent validation essential.Overall, the reviewed literature indicates that AI and wearable technologies offer

promising opportunities for improving training personalization, fatigue management, performance monitoring, and injury prevention. However, important research gaps remain concerning the representation of women athletes, the validation of predictive models, access to affordable technologies, and the protection of sensitive athlete information. Existing findings support the use of these systems as decision-support tools rather than substitutes for coaching expertise or medical assessment. Further research should examine their effectiveness across different women's sports, evaluate outcomes over longer periods, and determine whether AI-generated recommendations lead to measurable improvements in performance and wellbeing. The present study builds on these research directions by examining both the potential benefits and the limitations of AI-integrated wearable technologies in women's sports.

METHODOLOGY

This study adopts a qualitative research methodology based on a review of existing academic literature concerning artificial intelligence, wearable technologies, and women's sports performance. The methodology is designed to examine how digital monitoring systems can support training optimization, workload assessment, fatigue management, recovery, and injury-risk evaluation. Secondary information is drawn from relevant scholarly publications and research reports, with particular attention to studies published in 2025 and 2026. The review considers research involving AI-based performance analysis, wearable sensors, physiological monitoring, and sports-science applications. A qualitative approach is appropriate because the study seeks to interpret existing findings, identify recurring themes, and understand the practical implications of technological innovation rather than collect new experimental measurements.The literature review focuses on academic sources identified through Google Scholar and relevant scholarly publication databases. Search concepts include artificial intelligence in sports, wearable technology, women athletes, performance optimization, machine learning, training load, fatigue monitoring, injury prevention, and athlete recovery. Publications are considered for inclusion when they directly address at least one of the research objectives and provide relevant information about the use or evaluation of AI-based systems or wearable devices in sport. Studies with insufficient relevance to athletic performance or without a meaningful contribution to the research questions are excluded from the main analysis. Priority is given to recent publications, although relevant contextual information may be considered where necessary to interpret the findings.The data collection process involves reviewing the selected publications and recording their central objectives, methods, findings, and limitations. Information is organized into thematic categories covering performance monitoring, individualized training, fatigue management, injury-risk assessment, athlete wellbeing, and technological challenges. The review also records whether studies specifically investigate women athletes or examine broader athletic populations. This distinction is important because findings obtained from a particular sport or population may not apply equally to other groups. Published statistics and study findings are treated as secondary evidence and are not presented as original observations generated by the present research.

The study uses thematic analysis to interpret the collected literature. Relevant findings are grouped according to recurring concepts and compared to identify areas of agreement, differences, and research gaps. For example, several studies discuss the benefits of continuous monitoring, while also emphasizing that device accuracy, model validation, and professional interpretation affect the reliability of recommendations (Alkasasbeh et al., 2026; Silva et al., 2026). This process allows the researcher to examine not only the potential benefits of technological innovation but also the conditions required for effective implementation. The analysis distinguishes between demonstrated findings in individual studies and broader possibilities that require further investigation.Ethical considerations are addressed through appropriate acknowledgment of the original authors, accurate reporting of published evidence, and cautious interpretation of research findings. Because the study relies on secondary sources, it does not involve direct recruitment of athletes or the collection of new personal health information. Particular attention is given to the ethical issues associated with wearable technologies, including privacy, informed consent, data ownership, and the potential misuse of performance information. The study also recognizes that unequal access to technology may limit its benefits for athletes and teams with fewer resources. These considerations form an important part of evaluating the suitability of AI-based systems for women's sports.The methodology has several limitations. The study does not conduct new field experiments, measure athletes' performance directly, or independently validate AI models. Its conclusions therefore depend on the quality, scope, and relevance of the available literature. Differences in sporting disciplines, wearable devices, research methods, and participant characteristics may also limit direct comparisons between studies. Furthermore, the inclusion of recent publications does not guarantee that every application discussed has been tested extensively among women athletes. These limitations are considered when interpreting the evidence and developing recommendations for future research.

RESEARCH DESIGN

The study employs a descriptive and analytical research design to investigate the role of artificial intelligence and wearable technologies in women's sports performance optimization. The descriptive component identifies the main technologies used in athlete monitoring and explains their applications in training, workload management, recovery, and performance assessment. The analytical component examines the benefits, limitations, and conditions affecting their practical effectiveness. This design is suitable for a literature-based investigation because it allows the researcher to synthesize existing knowledge without manipulating variables or claiming results from an original experiment.The conceptual framework connects wearable technologies, AI-based analysis, and athletic performance through several interrelated dimensions. Wearable devices provide information about movement, heart rate, training intensity, and other measurable indicators. AI systems process these data to identify patterns that may support individualized training and recovery decisions. Coaches and sports scientists then interpret the resulting information in relation to the athlete's sporting discipline, training history, and current condition.

The framework recognizes that technology is only one component of performance optimization and that its effectiveness also depends on professional expertise, athlete feedback, and appropriate implementation.

The scope of the research focuses on women athletes participating in professional and competitive sports, while also considering relevant findings from broader sports-science research. The principal areas of investigation include performance tracking, training personalization, fatigue monitoring, injury-risk assessment, and recovery support. Attention is also given to the accessibility, reliability, and ethical implications of wearable technologies. This approach allows the study to consider both the opportunities available to women athletes and the practical barriers that may prevent teams and individuals from benefiting equally from technological advances.The analytical design organizes the literature into thematic categories corresponding to the research objectives. Evidence concerning performance monitoring is examined separately from research on fatigue, injury prevention, and recovery, while cross-cutting issues such as privacy, data accuracy, and algorithmic bias are considered across all categories. Findings are compared according to their relevance, methodological limitations, and applicability to women's sports. The study avoids assuming that a result demonstrated in one sport will necessarily produce the same outcome in another. Instead, the analysis emphasizes the need for context-specific evaluation and evidence-based application.

The quality of the research design is supported by transparent source selection, careful comparison of published findings, and clear distinctions between established evidence and recommendations requiring further validation. Recent publications are prioritized to reflect current technological developments, while their research methods and limitations are considered during interpretation. The design does not claim to establish causal relationships or prove that AI-based wearable systems improve competitive outcomes in every setting. Rather, it provides a structured assessment of the available evidence and identifies areas in which future empirical research could strengthen understanding of technology-supported performance optimization among women athletes.

DATA ANALYSIS

The analysis of performance-monitoring applications indicates that wearable technologies can provide coaches and athletes with continuous information about selected aspects of training and physical activity. Devices such as GPS trackers, heart-rate monitors, and movement sensors can help quantify training duration, running distance, speed, and physiological responses. AI-based analysis can then be used to identify patterns in these measurements and support the evaluation of individual training progress. Felice (2026) provides a relevant example through research on AI-assisted intensity and fatigue monitoring in elite women's handball. The evidence suggests that these systems may improve the availability of performance information, although their practical value depends on measurement accuracy and appropriate interpretation.The analysis of

training personalization indicates that AI-based systems can support more individualized approaches to workload management. By examining information collected over repeated training sessions, analytical models may help coaches recognize changes in performance indicators and consider whether training intensity or recovery arrangements require adjustment. Alkasasbeh et al. (2026) highlight the potential of integrating wearable data and AI for individualized training prescription and workload regulation. However, individualized recommendations should account for differences in sporting roles, training histories, health conditions, and personal circumstances. A numerical prediction should not be treated as an automatic instruction because coaches and athletes must consider the wider context before modifying a training programme.

The analysis of fatigue management and injury prevention shows that wearable technologies can help identify changes in workload and selected physiological or biomechanical indicators. These measurements may assist sports professionals in evaluating training responses and identifying circumstances that warrant further assessment. Silva et al. (2026) describe the potential of AI-integrated wearable systems for injury-risk monitoring and rehabilitation, while also emphasizing the importance of validation and consistent research methods. The findings indicate that such technologies can contribute to monitoring and decision support, but they cannot guarantee that injuries will be prevented. Reliable injury-related decisions require multiple sources of evidence, including clinical evaluation, athlete-reported symptoms, movement assessment, and professional judgment.The analysis also identifies important technological and ethical limitations. Wearable devices may produce inaccurate readings, and AI models may generate unreliable recommendations when trained on incomplete or unrepresentative datasets. Women athletes require appropriate representation in the development and evaluation of performance-monitoring systems to ensure that analytical methods are relevant to their needs. Privacy and data security are equally important because wearable information can reveal sensitive details about physical condition, recovery, and daily activity. VanBibber et al. (2026) emphasize the need for further device validation and improved data security. Consequently, the benefits of AI-based monitoring must be evaluated alongside the risks associated with inaccurate measurements, limited accessibility, and inappropriate use of personal information.

The overall analysis suggests that AI and wearable technologies are most useful when integrated into established sports-science practices. Their potential benefits include more consistent monitoring, better-informed training decisions, individualized workload assessment, and improved communication between athletes and coaches. Nevertheless, the literature does not establish that every AI-based system produces measurable performance improvements in every sport. Differences in research methods, devices, athlete populations, and evaluation periods make direct comparisons difficult. The analysis therefore supports a balanced approach that combines technological monitoring with professional expertise, careful validation, and continuing evaluation of outcomes in women’s sports.

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FINDINGS

The study finds that artificial intelligence and wearable technologies offer promising opportunities for optimizing women's sports performance by improving access to information about training activity, physiological responses, and movement patterns. Wearable devices can collect relevant data during training and competition, while AI-based systems can help interpret these measurements and identify changes over time. These capabilities may support more informed performance assessment and provide coaches with additional information for planning training programmes. However, the extent of the benefits depends on device reliability, data quality, and the suitability of the analytical methods for the sport and athlete population being examined.The findings indicate that individualized training is a major potential benefit of AI-integrated wearable systems. Athletes differ in their physical characteristics, competitive responsibilities, training histories, and recovery needs. AI-based analysis may help identify individual patterns and support adjustments to training intensity or workload. Research involving elite women's handball illustrates how wearable-derived indicators can be used to examine workload and fatigue (Felice, 2026). Nevertheless, these findings should not be generalized to every women's sport without additional evidence. The effectiveness of individualized recommendations must be evaluated in relation to actual training outcomes, athlete feedback, and professional coaching assessment.

The study also finds that wearable technologies may contribute to fatigue monitoring, injury-risk assessment, and recovery management. Continuous monitoring can provide information that complements periodic assessments and subjective reports. AI models may identify patterns that deserve further investigation, potentially helping sports professionals evaluate workload and recovery more systematically. However, the reviewed literature emphasizes that predictions are affected by data quality, validation procedures, and the complexity of athletic performance (Alkasasbeh et al., 2026; Silva et al., 2026). Wearable systems should therefore be regarded as supportive tools rather than independent authorities for medical decisions or injury prevention.Another finding concerns the importance of reliable and inclusive technology development. AI systems may produce less appropriate recommendations when the datasets used to train or evaluate them do not adequately represent women athletes, different sporting disciplines, or diverse competitive environments. Research specifically involving women athletes is therefore important for determining whether existing technologies are suitable for their intended applications. The study also identifies cost, technical knowledge, data privacy, and security as practical barriers to adoption. These challenges suggest that sports organizations should assess both the technical performance and the accessibility of wearable systems before introducing them into routine training.

The findings further indicate that the successful implementation of AI and wearable technologies requires cooperation among athletes, coaches, sports scientists, healthcare professionals, and technology developers. Wearable measurements become more useful when interpreted alongside

training observations, athlete feedback, and relevant professional assessments. Coaches should understand the limitations of AI-generated recommendations, while athletes should receive clear information about what is being measured and how their data will be used. Secure data-management procedures and informed consent are essential for maintaining trust and preventing inappropriate use of sensitive information. Technological adoption should therefore be accompanied by professional training, ethical safeguards, and clear institutional responsibilities.Finally, the study finds that further empirical research is required to establish the long-term effectiveness of AI-integrated wearable technologies in women's sports. Existing publications demonstrate promising applications, but differences in methods, populations, and outcomes limit the extent to which their findings can be compared. Future studies should examine multiple sporting disciplines, include diverse groups of women athletes, validate wearable measurements against appropriate reference methods, and evaluate whether AI-supported interventions produce measurable improvements in performance and wellbeing. Research should also investigate affordability and practical implementation in teams with different levels of resources. Such evidence would help distinguish promising technological possibilities from benefits that have been consistently demonstrated in real-world sporting environments.

CONCLUSION

Artificial intelligence and wearable technologies represent important developments in contemporary sports science, offering new methods for monitoring athletic performance and supporting evidence-based training decisions. This study examined their potential applications in women's sports, particularly in performance assessment, individualized training, fatigue management, injury-risk monitoring, and recovery. The reviewed literature indicates that combining wearable-derived information with AI-based analysis can provide useful insights into training responses and performance patterns. These technologies can complement conventional coaching practices by making selected measurements more accessible and supporting more systematic evaluation of athletic progress. Their contribution, however, depends on scientific validity and appropriate interpretation rather than on technological sophistication alone.Individualized training emerges as an important potential benefit of these systems. Women athletes have different training requirements, sporting responsibilities, physical characteristics, and recovery needs. AI-assisted analysis may help coaches examine these differences and develop more informed approaches to workload management. Research on elite women's handball demonstrates the relevance of wearable-derived performance indicators to fatigue and intensity monitoring (Felice, 2026). Nevertheless, further research is needed to determine whether similar methods produce consistent benefits across other sports and competitive environments. Training decisions should continue to incorporate professional expertise, athlete feedback, and the wider circumstances affecting performance.

The study also concludes that wearable technologies may support fatigue monitoring, recovery assessment, and injury-risk evaluation, but their outputs must be interpreted cautiously. Device errors, incomplete datasets, and insufficiently validated algorithms can limit reliability. Furthermore, an observed change in a performance indicator does not necessarily establish that an athlete is injured or will sustain an injury. As emphasized by Alkasasbeh et al. (2026) and Silva et al. (2026), effective implementation requires reliable measurements, validated analytical methods, and appropriate professional oversight. These requirements are essential for ensuring that technological recommendations contribute to informed decisions rather than unnecessary restrictions or misleading assessments.Ethical responsibility and equitable access are also central to the future development of AI in women's sports. Athletes should understand how their information is collected, analyzed, stored, and shared. Sports organizations must protect sensitive data and establish clear procedures for informed consent, confidentiality, and responsible use. Technology developers should also ensure that women athletes are appropriately represented in research and that systems are evaluated across different sports and performance levels. Affordable devices, accessible training, and appropriate technical support can help reduce inequalities in the availability of sports innovation. Without these measures, technological progress may benefit well-resourced teams disproportionately while leaving other athletes with fewer opportunities.The study recommends that sports organizations introduce AI-based wearable monitoring through carefully evaluated programmes that combine technological tools with established coaching and sports-science practices. Before adoption, devices and analytical systems should be assessed for accuracy, relevance, affordability, and data protection. Coaches and athletes should receive appropriate training, and the recommendations generated by AI systems should remain subject to professional review. Researchers should prioritize studies involving women athletes, use appropriate validation procedures, and examine long-term outcomes rather than relying solely on computational performance measures. Such measures can help establish whether technological innovations provide meaningful and sustainable benefits in practice.

In conclusion, artificial intelligence and wearable technologies have considerable potential to contribute to women's sports performance optimization, but their value depends on responsible and evidence-based implementation. They can improve access to performance information, support individualized training, and assist the assessment of fatigue and recovery when used appropriately. However, they cannot replace professional expertise, eliminate all injury risks, or guarantee improved competitive outcomes. A balanced approach that combines technological innovation, inclusive research, reliable validation, ethical data management, and athlete-centred decision-making offers the strongest foundation for future development. By addressing these priorities, sports organizations can work toward safer, more effective, and more equitable opportunities for women athletes.

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