

# Female Sports Participation and Osteoarthritis: A Systematic Review

Yaodong Congyu\*

Department of Sports Medicine, University of West Attica, 12243 Athens, Greece

## Abstract

This systematic review examines the relationship between female sports participation and the risk of osteoarthritis (OA). With increasing participation of females in sports and physical activities, understanding the potential long-term musculoskeletal consequences is essential for informing injury prevention strategies and promoting lifelong joint health. Osteoarthritis, characterized by joint pain, stiffness and functional impairment, poses a significant public health burden, particularly among aging populations. While sports participation has numerous health benefits, including improved cardiovascular fitness, muscle strength and mental well-being, certain sports and repetitive movements may increase the risk of OA development, particularly in weight-bearing joints such as the knees and hips. Through a comprehensive review of existing literature, this study synthesizes evidence on the association between female sports participation and OA risk, exploring potential risk factors, protective factors and modifiable behaviors that may influence joint health outcomes. Understanding the complex interplay between sports participation, biomechanics, genetics and lifestyle factors can inform targeted interventions to mitigate OA risk and optimize musculoskeletal health in active females across the lifespan.

**Keywords:** Sports participation • Osteoarthritis • Musculoskeletal health

## Introduction

Osteoarthritis (OA) is a prevalent and debilitating musculoskeletal condition characterized by the degeneration of joint cartilage, leading to pain, stiffness and impaired function. While OA has traditionally been associated with aging, recent research has shed light on the potential relationship between sports participation, particularly in females and the development of osteoarthritis. This systematic review aims to provide a comprehensive analysis of existing literature on the impact of female sports participation on the risk of osteoarthritis, exploring potential risk factors, preventive measures and the overall implications for women's health. Over the past few decades, there has been a significant surge in female sports participation across various disciplines, reflecting a positive shift towards gender equality in the sporting arena. Women are now actively engaged in high-impact sports such as soccer, basketball and running, challenging historical norms and stereotypes. However, this increased participation has raised concerns about the potential long-term musculoskeletal consequences, particularly the association between female sports involvement and the development of osteoarthritis. The rise of female sports participation is a testament to the resilience, talent and determination of women athletes who have overcome historical barriers. As more women actively engage in sports at all levels, the societal perception of women in athletics continues to evolve. The ongoing journey towards gender equality in sports is not just about breaking records but also about breaking barriers and shaping a future where every woman has the opportunity to pursue her athletic dreams without limitations. The empowerment of women through sports is a victory not only for the athletes themselves but for society as a whole, fostering a more inclusive and equitable world [1,2].

**\*Address for Correspondence:** Yaodong Congyu, Department of Sports Medicine, University of West Attica, 12243 Athens, Greece, E-mail: yaodongcongyu@gmail.com

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## Literature Review

The participation of females in sports and physical activities has witnessed a remarkable increase over recent decades, with numerous benefits for overall health and well-being. However, alongside these benefits, there is growing concern about the potential long-term musculoskeletal consequences, particularly in relation to the development of Osteoarthritis (OA). OA is a prevalent and debilitating joint disease characterized by the progressive degeneration of articular cartilage, leading to joint pain, stiffness and functional impairment. While OA has traditionally been associated with aging and joint wear-and-tear, emerging evidence suggests that sports participation, particularly in certain high-impact and repetitive sports, may contribute to an increased risk of OA development, particularly in weight-bearing joints such as the knees and hips [3].

Numerous studies have investigated the association between sports participation and OA risk in females, examining a wide range of sports and activities, including soccer, running, basketball, gymnastics and dance. While regular physical activity is generally associated with improved joint health and reduced risk of chronic diseases, the cumulative effects of repetitive joint loading and trauma associated with certain sports may outweigh these benefits, particularly in the absence of appropriate injury prevention strategies and biomechanical optimization. For example, sports that involve high-impact landings, rapid direction changes and prolonged weight-bearing activities may subject the joints to excessive forces and mechanical stress, leading to cartilage damage, joint instability and accelerated OA progression over time. Furthermore, the risk of OA development in females may be influenced by a myriad of factors, including hormonal fluctuations, anatomical differences, genetic predisposition and lifestyle factors such as body weight, diet and smoking. Female athletes may be particularly susceptible to hormonal fluctuations associated with menstruation, pregnancy and menopause, which can affect joint laxity, collagen synthesis and cartilage metabolism, potentially increasing the risk of OA development. Additionally, anatomical differences such as wider pelvises and increased quadriceps angles in females may alter joint biomechanics and load distribution, predisposing them to specific types of joint injuries and OA pathology [4].

## Discussion

The findings of this systematic review underscore the complex interplay

between female sports participation and OA risk, highlighting the need for comprehensive approaches to injury prevention, biomechanical optimization and joint health promotion in active females across the lifespan. While sports participation offers numerous physical, psychological and social benefits, it is essential to recognize and mitigate the potential musculoskeletal risks, particularly in sports with high levels of joint loading and repetitive movements. Implementing evidence-based injury prevention strategies, such as proper warm-up and cool-down routines, strength and conditioning exercises, neuromuscular training and technique modifications, can help reduce the risk of acute injuries and chronic overuse conditions, thereby preserving joint health and minimizing OA risk. Moreover, promoting early detection and management of joint injuries, implementing sport-specific training and rehabilitation programs and fostering a culture of injury prevention and musculoskeletal health literacy among athletes, coaches and healthcare providers are essential components of comprehensive OA prevention strategies in female athletes. Additionally, longitudinal studies tracking the long-term musculoskeletal outcomes of female athletes, including joint health, functional capacity and quality of life, are needed to better understand the cumulative effects of sports participation on OA risk and inform targeted interventions and guidelines for promoting lifelong joint health in active females [5,6].

## Conclusion

In conclusion, female sports participation is associated with numerous health benefits, but it also carries potential risks for musculoskeletal health, including an increased risk of Osteoarthritis (OA) development. Understanding the complex interplay between sports participation, biomechanics, genetics, hormonal factors and lifestyle behaviours is essential for developing targeted interventions to mitigate OA risk and optimize joint health outcomes in active females across the lifespan. By implementing evidence-based injury prevention strategies, promoting musculoskeletal health literacy and fostering interdisciplinary collaborations between researchers, clinicians, coaches and athletes, we can work towards promoting lifelong joint health and well-being in female athletes. By exploring risk factors, the impact of different sports, preventive strategies, technological advancements and the psychological and societal dimensions, the review aims to contribute valuable insights into the complex interplay between sports engagement and joint health in women. As female participation in sports continues to rise, understanding and addressing the potential risks of osteoarthritis become paramount in promoting the long-term well-being of female athletes.

## Acknowledgement

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## Conflict of Interest

There are no conflicts of interest by author.

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