

Article

Biomechanical principles in the prevention of sports injuries**Yang Zhou**

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Abstract: Biomechanics, as an interdisciplinary field involving multiple fields, can help analyze individual differences, develop personalized training plans, and effectively prevent injuries to vulnerable areas of athletes. This article used a high-precision 3D motion capture system and various physiological monitoring devices to collect athletes' motion and physiological data. Combined with biomechanical modeling and risk assessment methods, the impact of five key parameters, step frequency, stride, joint angle, muscle strength, and speed, on injury risk was analyzed. The experimental results showed that implementing the personalized biomechanical prevention strategy applied in this article reduced the incidence of sports injuries by 20%, and optimizing step frequency, stride length, and enhancing muscle strength can significantly reduce the risk of injury. This article provided a scientific basis for developing personalized prevention strategies, which can help improve athletes' athletic performance and safety.

Keywords: prevention of sports injury; biomechanical principle; risk factor assessment; prevention strategy development; data collection

1. Introduction

With the continuous development and progress of various disciplines in competitive sports, the incidence and prevalence of sports related injuries have become increasingly serious problems, posing significant challenges and ultimately having adverse effects on the career trajectory and overall quality of life of athletes participating in these physically demanding activities. Traditional training methods often lack specificity and are not tailored to the individual needs of athletes. It is extremely difficult to effectively reduce the unique and personalized risks associated with injuries that each athlete may face based on their specific physiological and biomechanical characteristics. Therefore, it is necessary to conduct a comprehensive analysis and investigation of the application of biomechanical principles related to the prevention of sports injuries, and to develop and implement personalized training programs, both of which have significant practical significance and significant scientific value in the fields of sports science and athlete welfare.

The principles of biomechanics cover a wide range of potential implementation schemes and have broad and profound applicability in the field of sports science, significantly enhancing people's understanding and optimization of athletic performance. By using complex biomechanical analysis techniques, researchers and practitioners have a unique opportunity to carefully evaluate the stress conditions experienced by athletes during physical exertion, making it easier to identify specific areas where injury or risk of injury may exist. At the same time, when this analysis is combined with high-precision cutting-edge data acquisition technology and advanced multimodal data fusion algorithms, it becomes feasible to achieve

Prevention Of Sports Injuries A Biomechanical Approach

Daniela Niemeyer

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