

Researchers compare joint loading and muscle forces between novice and experienced runners

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The relationship between running experience, running mechanics and the risk of injury, particularly to the knees, is discussed in the *International*

Journal of Biomedical Engineering and Technology. The [research](#) looks at the differences in joint loading and muscle forces between novice and experienced runners.

Zhihui Kang of Ningbo University of Finance and Economics in Ningbo, China, and Xinyan Jiang of Obuda University in Budapest, Hungary, carried out a 3D running analysis of 15 novice and 15 experienced [runners](#) and used OpenSim software to model the behavior of the musculoskeletal system, estimating lower limb muscle forces and knee joint loading.

The team found that there were notable differences in running mechanics between each group. Novice runners exhibited significantly higher knee loading and muscle forces during most of the stance phase of running compared to their experienced counterparts.

This increased loading would coincide with a higher susceptibility to lower extremity injuries, such as sprains, strains and ruptures of the knee joint, among novice runners.

Understanding the biomechanics and neuromuscular control of running movements is crucial for developing coaching and training strategies to prevent such injuries and enhance running performance. However, the research did not record direct evidence linking novice status to an increased risk of knee injury when running. The current work will be useful to those working in [sports medicine](#), rehabilitation, and [athletic training](#).

By identifying biomechanical differences between novice and experienced runners, targeted interventions might be developed to reduce injury risk and improve running techniques. This could involve tailored [training programs](#) that gradually increase the tolerance of novice runners to running loads, thereby enhancing their musculoskeletal

adaptations over time.

Future research could focus on [longitudinal studies](#) to determine whether specific knee joint variables can reliably predict running-related injuries. Such studies would help refine [injury](#) prevention strategies and contribute to safer and more effective running practices for athletes at all levels.

More information: Zhihui Kang et al, The effect of running experience on muscle forces and knee joint reaction forces during running, *International Journal of Biomedical Engineering and Technology* (2024). [DOI: 10.1504/IJBET.2024.138969](https://doi.org/10.1504/IJBET.2024.138969)

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