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Gender Specific Strategies in Demanding Hopping Conditions

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ABSTRACT

Difference in leg stiffness between females and males is considered to be a cause of higher rates of Anterior Cruciate Ligament injury in female athletes. Females are believed to have lower stiffness and as a consequence different recruitment strategies to adapt functional tasks. The aim of the current study was to evaluate how leg stiffness is tuned to demanding conditions. 22 healthy subjects (11 Male-11 Female; age: 20-43 years) participated in this study. Subjects performed two-legged hopping tasks (at their preferred rate, as fast as possible and with added mass of 10% bodyweight) on a force platform. Leg stiffness was calculated for each condition as the ratio between peak ground reaction force and vertical displacement of center of mass. In the preferred and added mass conditions males showed substantially higher leg stiffness than females ($p = 0.006$ and $p = 0.002$, respectively). When hopping as fast as possible the gender bias in leg stiffness disappeared ($p = 0.880$). Added mass had no significant effect on change in leg stiffness. Results have shown that females increased their leg stiffness more than males indicating they have no gender limiting capacity to reach objectives of higher demanding tasks (i.e. fastest hopping). The relationship between observed gender differences in leg stiffness and increased Anterior Cruciate Ligament injury rate in females requires further study.

Key words: Leg stiffness, frequency, added mass, hopping test

Key Points

- Leg stiffness is an adaptable property of neuro musculoskeletal system to different functional loading conditions.
- Females can increase their leg stiffness more than males indicating they have no gender limiting capacity to reach objectives of higher demanding tasks as fastest hopping.

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