



## A comparison of kinematic symmetry of knee joint during running at different speeds

### Poster Presentation

1Ali Fatahi \* ; 2Rozhin Molavian; 2Maryam Alizadeh; 2Mehrangiz Salehi

<sup>1</sup>Assistant professor in Sports Biomechanics, Faculty of Physical Education and Sports Sciences, Islamic Azad university, Central Tehran Branch, Tehran, Iran(fattahiali81@gmail.com)

<sup>2</sup>PhD candidate in Sports Biomechanics, Faculty of Physical Education and Sports Sciences, Islamic Azad university, Central Tehran Branch, Tehran, Iran

### Abstract

**Introduction:** Research on the various aspects of running would lead to performance optimization as well as injury prevention. In this field, biomechanics plays a significant role with respect to kinetics and kinematics. Associations of leg kinematics and maximal speed sprinting performance have broadly been investigated previously (Bushnell & Hunter, 2007; Haugen et al., 2018; Toyoshima & Sakurai, 2016; Yada et al., 2011). Symmetry and asymmetry are introduced as main critical challenges of human movement. The aim of this study was to compare kinematic symmetry of knee joint during running at different speeds.

**Methods:** The study was conducted as a quasi-experimental design. 28 professional runner (aged:  $34.75 \pm 6.63$  year) participated in this study voluntarily. Running at three progressive speeds (2.5, 3.5 and 4.5 m.s<sup>-1</sup>) was conducted by each subject on treadmill while kinematic data were captured at 150 Hz. Peak angle of dominant and non dominant knee joint during flexion were derived in stance phase of running. Independent t tests were conducted to examine the symmetry of knee joint peak flexion angle during running at different speeds using SPSS ver. 22 ( $p < 0.05$ ).

**Result:** Results of study showed no significant differences were observed between peak flexion angle of dominant and non-dominant knee joints during running in three progressive different speed.

**Conclusions:** Symmetry exists in knee joint flexion angle in stance phase during running at the different progressive speeds. Coaches, trainers and Biomechanists would achieve benefits of kinematic symmetry of knee joint in order to prevent injuries and optimize athletes running performance.

### Keywords

Symmetry; Knee joint; Kinematic; running

### Reference:

1. Bushnell, T., & Hunter, I. (2007). Differences in technique between sprinters and distance runners at equal and maximal speeds. *Sports biomechanics*, 6(3), 261-268.
2. Haugen, T., Danielsen, J., Alnes, L. O., McGhie, D., Sandbakk, Ø., & Ettema, G. (2018). On the importance of "front-side mechanics" in athletics sprinting. *International journal of sports physiology and performance*, 13(4), 420-427.
3. Toyoshima, R., & Sakurai, S. (2016). Kinematic characteristics of high step frequency sprinters and long step length sprinters at top speed phase. *International Journal of Sport and Health Science*, 201515.
4. Yada, K., Ae, M., Tanigawa, S., Ito, A., Fukuda, K., & Kijima, K. (2011). Standard motion of sprint running for male elite and student sprinters. Paper presented at the ISBS-Conference Proceedings Archive.