



Three planar symmetry of knee joints moments during running

Oral Presentation

1Ali Fatahi * ; 2Rozhin Molavian; 2Raziyeh Alizadeh; 2Mehrangiz Salehi

¹Assistant professor in Sports Biomechanics, Faculty of physical Education and sports Sciences, Islamic Azad university, Central Tehran Branch Tehran, Iran(fattahiali81@gmail.com)

²PhD candidate, Department of Sports Biomechanics, Faculty of Physical Education and Sports Sciences, Islamic Azad university, Central Tehran Branch, Tehran, Iran

Abstract

Introduction: Symmetry and asymmetry of the limbs' movement pattern during running are introduced as one of the main critical challenges of human locomotion. There is growing evidences that running provides many health benefits, such as preventing chronic diseases and reducing the rate of premature mortality (Lee et al., 2014; Major, 2001; Papaioannou & Portes, 2008; Sadeghi, Allard, Prince, & Labelle, 2000). The aim of this study was to investigate three planar symmetry of knee joints' moments during running at a fixed speed.

Methods: the present study was conducted as a quasi-experimental study. Elite runner (age: 34.75±6.63years) participated in this study. Running at constant speed was conducted by each subject at 2/5 m.s-1 on treadmill while kinematic (Raptor-4 motion analysis) and kinetic data (Force plate, Bertec) were captured at 150 Hz and 300 Hz, respectively. The internal joint moments in each plane were represented in the joint-coordinate system and were calculated using a standard inverse-dynamics approach and were normalized by the subject's body mass as well as running cycle over 101 time points. Independent t tests were conducted to examine the symmetry of knee and moments between dominant and non-dominant joints during stance phase of running (p<0.05).

Results: results of the present study showed no significant difference between two limb's peak moments of lower joints in every three planes. Highest values in knee joint of the dominant limb's peak moments in sagittal and transvers plane were derived.

Conclusion: Symmetry exists in lower joints three planar moments during running at the constant speed. According to the results dominant and non- dominant lower joints play propulsive and absorbent roles cooperatively.

Keywords

running; Symmetry; joint's moment; biomechanics

Reference:

1. Lee, D.-c., Pate, R. R., Lavie, C. J., Sui, X., Church, T. S., & Blair, S. N. (2014). Leisure-time running reduces all-cause and cardiovascular mortality risk. *Journal of the American College of Cardiology*, 64(5), 472-481.
2. Major, W. F. (2001). The benefits and costs of serious running. *World Leisure Journal*, 43(2), 12-25.
3. Papaioannou, E., & Portes, R. (2008). Costs and benefits of running an international currency. Retrieved from
3. Sadeghi, H., Allard, P., Prince, F., & Labelle, H. (2000). Symmetry and limb dominance in able-bodied gait: a review. *Gait & posture*, 12(1), 34-45.