Reduced Eccentric Loading of the Knee with the Pose Running Method

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Purpose: The aim of this study was to compare the biomechanical changes during natural heel-toe running with learned midfoot and Pose running.

METHODS: Twenty heel-toe runners were instructed in midfoot running and a novel running style in which the acromium, greater trochanter, and lateral malleolus are aligned in stance (Pose running). Clinical gait analysis was performed for each running style and the biomechanical variables compared.

RESULTS: In comparison with midfoot and heel-toe running Pose running was characterized by shorter stride lengths and smaller vertical oscillations of the sacrum and left heel marker. Compared with midfoot and Pose running heel-toe running was characterized by greater magnitudes and loading rates of the vertical impact force. In preparation for initial contact, the knee flexed more in Pose than in heel-toe and midfoot running. The ankle at initial contact was neutral in Pose compared with a dorsiflexed and plantarflexed position in heel-toe and midfoot running, respectively. The knee power absorption and eccentric work were significant lower ($P < 0.05$) in Pose than in either heel-toe or midfoot running. In contrast, there was a higher power absorption and eccentric work at the ankle in Pose compared with heel-toe and midfoot running.

Conclusions: Pose running was associated with shorter stride lengths, smaller vertical oscillations of the sacrum and left heel markers, a neutral ankle joint at initial contact, and lower eccentric work and power absorption at the knee than occurred in either midfoot or heel-toe running. The possibility that such gait differences could be associated with different types and frequencies of running injuries should be evaluated in controlled clinical trials.

Running in the forward direction with similar flexed knee geometry and midfoot contact to that of backward running may be hypothesized to offer equivalent treatment benefits. Midfoot running is, however, not associated with a lower risk of injury (3). Although the stance phase knee geometry of midfoot running is not described, it appears that foot contact is unlikely to be the exclusive determinant of the risk of injury.

A novel running style with a midfoot strike pattern and a flexed knee in stance has been developed and is called Pose running. The Pose running lower-limb geometry instance is achieved by forward lean of the trunk and vertical alignment of the ipsilateral shoulder, hip, and heel of the supporting limb. Pose running therefore appears to have a similar lower-limb geometry to backward running. It is intuitive that Pose running may have a role in the treatment of running injuries equivalent to backward running.

Accordingly, the aims of this study were to determine whether clinical gait analysis can distinguish between midfoot and Pose running in natural heel-toe recreational runners and whether the Pose method produces biomechanical changes that might be of value in the treatment or prevention of running injuries.