

## A PILOT STUDY ON COMPARISON OF KINEMATICS CHANGE OF LOWER EXTREMITY WITH DIFFERENT TENNIS SHOES DURING LANDING

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**INTRODUCTION:** A study reported that the rate of getting ankle injury was 4.3 times higher among the basketball players who worn shoes with air cells in the heel than those worn shoes without air cells (McKay et al., 2001). It was hypothesized that the higher rate of ankle injury was due to the air cells located in the heel decreased the rearfoot stability. In tennis, air cells technology also have been applied on tennis shoe construction. However, the kinematics change of the foot has not been reviewed on the tennis shoes with air cells in the heel. The purpose of this paper was to compare the kinematics change of the foot, especially the inversion of the foot, with different tennis shoes during the landing of the lateral jump movement.

**METHODS:** One subject was participated in this pilot study. Retroreflective markers were attached on subject's left and right extremities. Eight camera motion analysis system (Motion Analysis System) was used to capture the three-dimensional coordinates of the retroreflective markers in 120Hz filming rate. The subject performed 10 trials of lateral jump movement (5 trials landing with left foot and 5 trials landing with right foot) in three shod conditions which are barefoot and two different models of tennis shoes (a model without air cells and the other model with air cells in the heel). The order of each condition was randomized. The subject stood a distance (height of iliac crest) away from a line, the weight equally distributed on both feet. The subject then jumped on the line landing with the left/right foot and immediately jumped back to the original position. The selected lateral jump movement was used in current study because it had been shown to be the most reliable lateral movement for tennis shoes test (Nigg et al., 1983). The angles of maximum inversion of the foot during landing were compared.

**RESULTS AND DISCUSSION:** The mean maximum inversion angles of the left foot during landing in barefoot, shoes without air cells and shoes with air cells in the heel are  $9.8^\circ \pm 1.9^\circ$ ,  $17.0^\circ \pm 0.6^\circ$  and  $21.8^\circ \pm 1.2^\circ$  respectively. Also, the mean maximum inversion angles of the right foot during landing in barefoot, shoes without air cells and shoes with air cells in the heel are  $7.9^\circ \pm 1.4^\circ$ ,  $14.0^\circ \pm 3.8^\circ$  and  $18.4^\circ \pm 1.0^\circ$  respectively. Shoes with air cells in the heel had highest maximum inversion angle than the other two shod conditions in both feet. This could be the reason for the shoes with air cells with higher rate of ankle injury in previous study (McKay et al., 2001). However, the sample size of the current study was too low. The sample size has to be increase in the current study in order to analysis the data with appropriate statistical analysis.

### REFERENCES:

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