

Multi-Segment Foot Joint Kinematics with Varying Midfoot Orthotic Postings

Hilary F. Feskanin

Advisor: Joaquin A. Barrios, PT, DPT, PhD

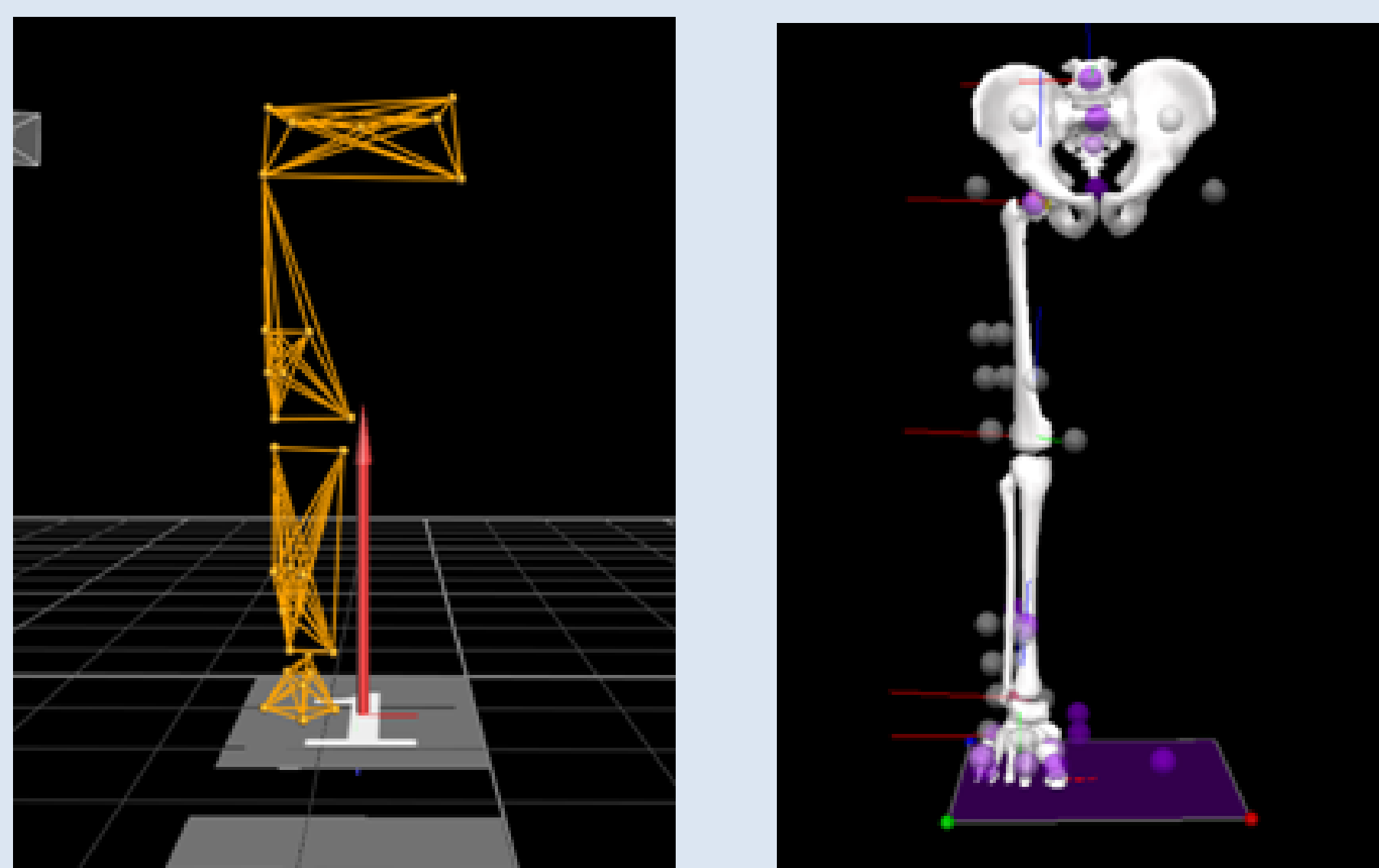
Co-Advisor: Kimberly Bigelow, PhD

Objective

Assess the effects of orthotic devices on midfoot and rearfoot kinematics.

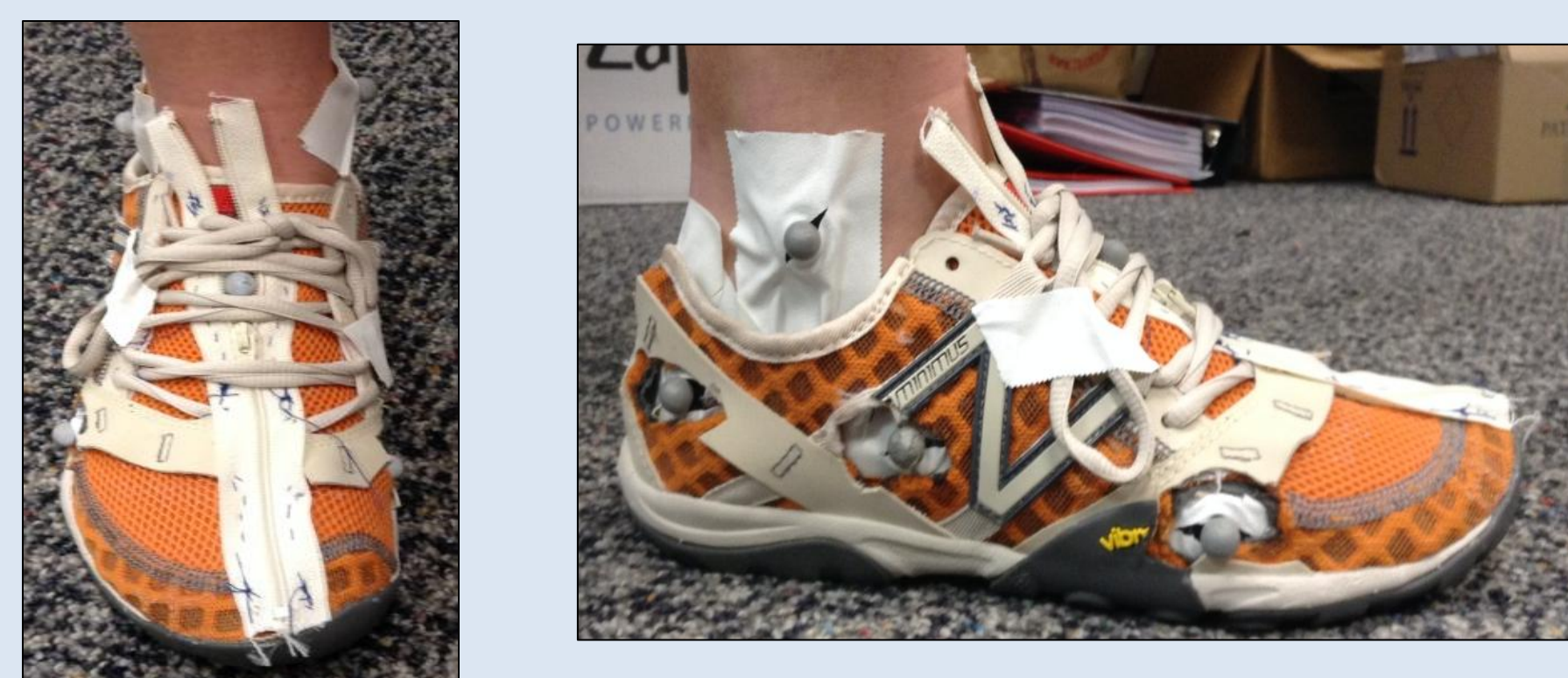
Methodology

Tested 19 healthy females by attaching reflective markers to the right lower limb and foot and recorded gait mechanics using an 8-camera Vicon motion analysis system.



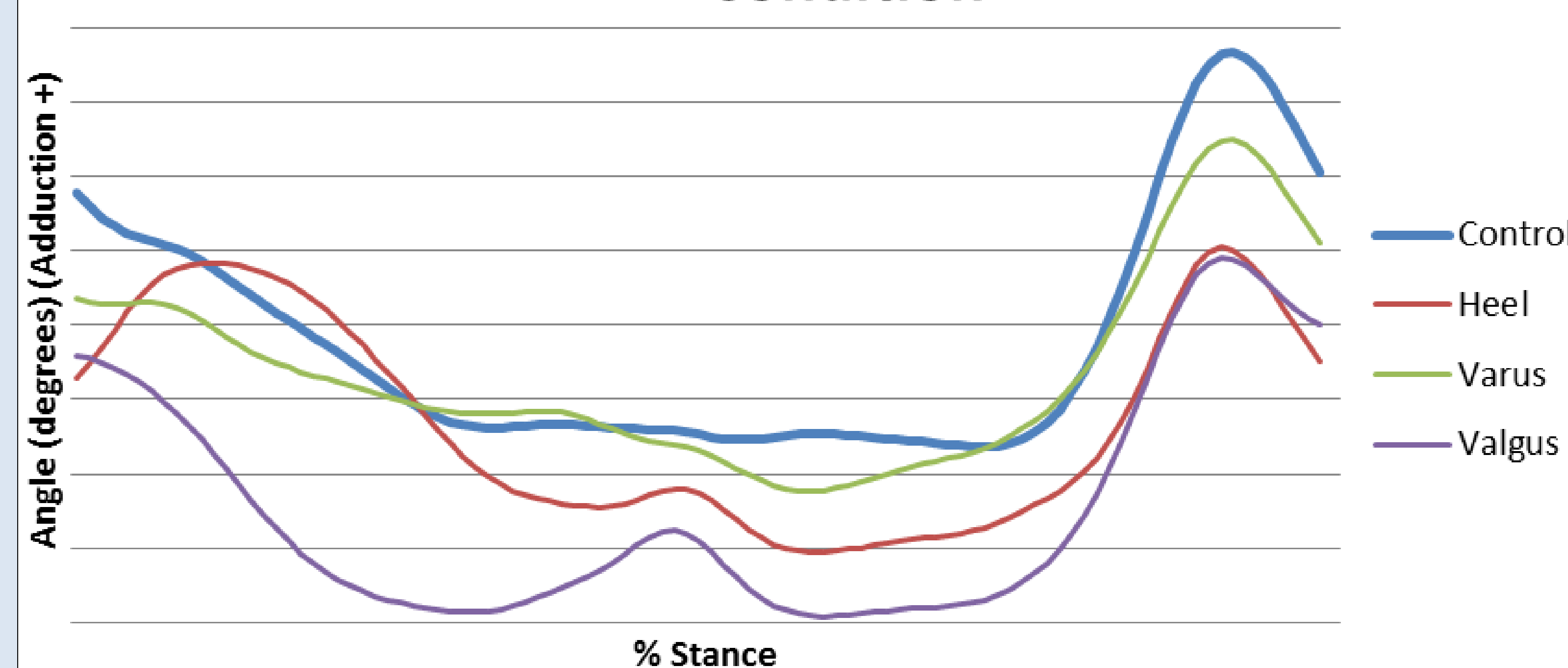
Materials

Subjects were testing wearing 4 different orthotic conditions: 1) 6 mm heel lift, 2) 6 degrees forefoot varus post, 3) 6 degrees forefoot valgus post, and 4) standard.



Results

Mean Midtarsal Transverse Angle Values by Condition



Ankle Joint

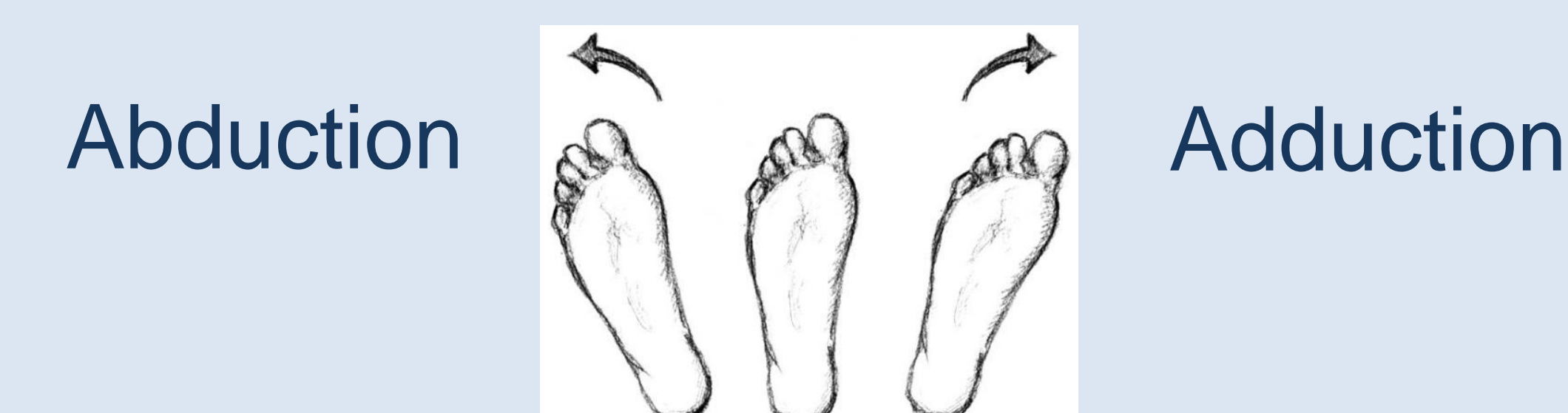
- Heel lift increased adduction on initial contact and the overall abduction excursion
- Varus post decreased peak abduction

Midtarsal Joint

- Heel lift led to more abduction at initial contact
- Varus post decreased the abduction excursion
- Valgus post decreased dorsiflexion excursion, increased eversion peak and excursion, and increased peak abduction

Discussion

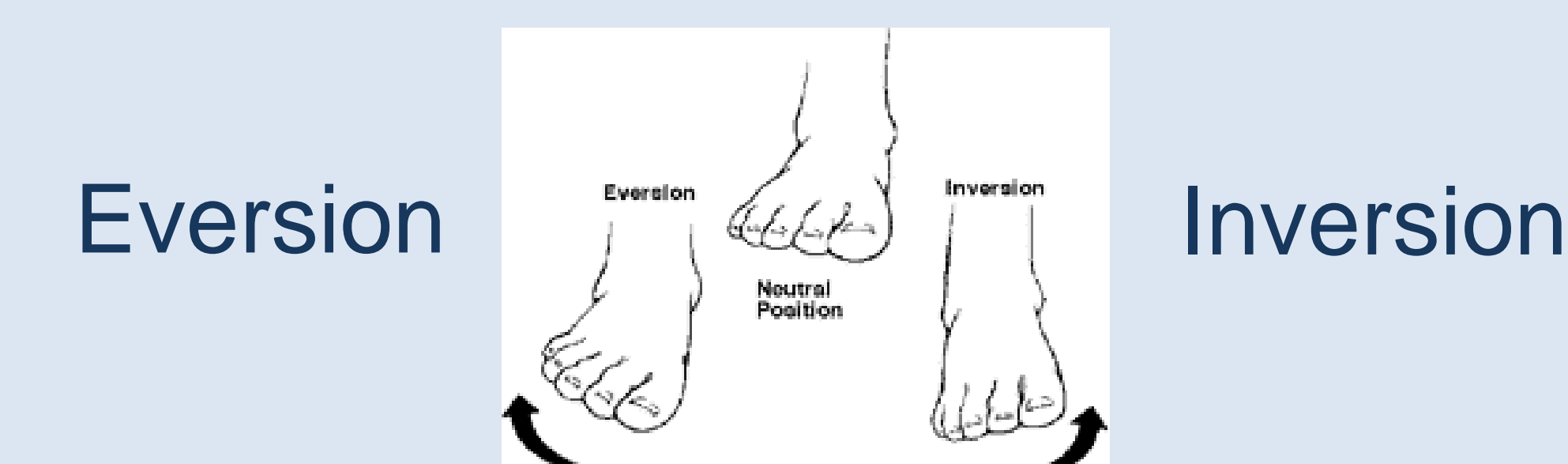
- The orthoses generally had limited effects on the ankle joint.



- The heel lift unexpectedly affected transverse plane
 - We would usually expect the heel lift to raise the back of the foot and increase pronation- affecting the sagittal plane



- The varus post limited pronation
- The valgus post affected all 3 planes but only 2 of the changes support our prediction of increased pronation



Future Work

- Study kinetic data to better explain our findings.
 - Study subjects while running