Multi-segment foot biomechanics with varying foot orthotic postings
Multi-Segment Foot Joint Kinematics with Varying Midfoot Orthotic Postings
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**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**

<table>
<thead>
<tr>
<th>Condition</th>
<th>Mean Midtarsal Transverse Angle Values by Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td><img src="image" alt="Graph of Mean Midtarsal Transverse Angle Values by Condition" /></td>
</tr>
<tr>
<td>Heel</td>
<td><img src="image" alt="Graph of Mean Midtarsal Transverse Angle Values by Condition" /></td>
</tr>
<tr>
<td>Varus</td>
<td><img src="image" alt="Graph of Mean Midtarsal Transverse Angle Values by Condition" /></td>
</tr>
<tr>
<td>Valgus</td>
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</tr>
</tbody>
</table>

**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