Figure 1. Medial-Lateral Pressure Index: Distances form each data point on the Center of Pressure Line (COP) to the Longitudinal Reference Line (LRL) were summed, with COP data points lateral to the LRL positive and those medial to the LRL line negative. In this example, the Normal Walk had roughly equal lateral and medial COP data points resulting in a MLPI near 0.0mm, while the Medial Thrust Walk resulted in most COP data points positioned medial to the LRL resulting in a MLPI near -40mm.

Figure 2a: The change in first peak knee adduction moment (KAM) versus the corresponding change in medial-lateral pressure index (MLPI) between normal and medical thrust gait. Figure 2b: The change in second peak KAM versus the corresponding change in MLPI.

**Table 1** Pearson Correlation Coefficients comparing Medial/Lateral Pressure Index in early stance with external moments at the knee joint and speed

<table>
<thead>
<tr>
<th>First peak KAM</th>
<th>Second peak KAM</th>
<th>Flexion moment</th>
<th>Extension moment</th>
<th>External rotation moment</th>
<th>Internal rotation moment</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early stance pressure index</td>
<td>0.827***</td>
<td>0.570*</td>
<td>-0.675***</td>
<td>-0.365</td>
<td>-0.473</td>
<td>-0.332</td>
</tr>
<tr>
<td>Late stance pressure index</td>
<td>0.119</td>
<td>0.538*</td>
<td>-0.296</td>
<td>-0.492</td>
<td>-0.119</td>
<td>-0.426</td>
</tr>
</tbody>
</table>

* = significant correlation (p<.05), ** = significant correlation (p<.01), *** = significant correlation (p<.001).

**Abstracts / Osteoarthritis and Cartilage 22 (2014) S57–S549**

**146 EFFECTS OF MEDIAL OPENING WEDGE HIGH TIBIAL OSTEOTOMY ON MOMENTS ABOUT THE KNEE DURING WALKING AND STAIR CLIMBING**

K.M. Leitch, T.B. Birmingham, C.E. Dunning, I.C. Jones, J.R. Giffin. Univ. of Western Ontario, London, ON, Canada

**Purpose:** To compare knee joint moments in frontal, sagittal and transverse planes during level walking and during stair ascent before, 6 and 12 months after medial opening wedge high tibial osteotomy (HTO) surgery.

**Methods:** Fourteen patients (Age: 46 ± 6.8 years, BMI: 28.7 ± 3.7 kg/m²) with varus alignment and osteoarthritis primarily affecting the medial compartment of the tibiofemoral joint participated. Three-dimensional motion analysis during level walking and stair ascent was evaluated before surgery, and 6 and 12 months after medial opening wedge HTO. For both level walking and stair ascent, the peak knee adduction, flexion, extension, internal and external rotation moments were calculated from the mean of five trials using inverse dynamics. Each measure was compared before and after surgery using a two-factor, ambulation condition (walking vs. stair ascent) by time (before HTO, 6, 12 months after HTO) analysis of variance with Scheffe post-hoc tests following any significant main effects or interactions.

**Results:** Ensemble averages for the moments about the knee during 100% of stance for walking and stair ascent before and after HTO are illustrated in Figure 1. Mean peak values with 95% confidence interval (CIs) are also shown in Figure 1. There were significant main effects for both the type of ambulation (p<.01) and for time (p<.05) for the peak knee adduction, flexion and internal rotation moments. For the peak extension moment, there was a significant main effect for ambulation (p = 0.03), but not for time (p = 0.31). There were no significant effects on the peak external rotation moment (p > 0.1). There were no significant interactions for all moments (p > 0.19). The peak knee adduction (p = 0.001) and extension moments (p = 0.028) were significantly lower during stair ascent than level walking, while the peak knee flexion (p<0.01) and internal rotation moments (p = 0.003) were higher (pre and postoperatively). The peak knee adduction, flexion and internal rotation moments were all significantly lower at 6 months after HTO during walking and stair ascent (p<.05), and did not change at 12 months postoperative (p > 0.3). The mean overall change (95% CI) was 1.71 %BW*Ht (1.35-2.06) and 1.35 %BW*Ht (0.80-1.90) for the peak knee adduction moment, 0.51 %BW*Ht (0.07-0.96) and 0.12 %BW*Ht(-0.72-0.97) for the peak knee flexion moment, and 0.55 %BW*Ht (0.68-0.43) and 0.50 %BW*Ht (0.64-0.36) for the peak knee internal rotation moment, during walking and stair ascent, respectively.

**Conclusions:** Medial opening wedge HTO results in substantial changes in the external moments about the knee in each of the frontal (46%), and transverse (43%) planes, during both level walking and stair ascent.

**147 CLINICAL IMPAIRMENTS UNDERLYING ABNORMAL FRONTAL PLANE BIOMECHANICS IN PERSONS WITH END-STAGE HIP OSTEOARTHRITIS**

J. Zeni, L. Miller, F. Pozzi, S. Abujabhar. Univ. of Delaware, Newark, DE, USA

**Purpose:** Changes in frontal plane trunk and pelvic mechanics are often described as consequences of hip pain and weakness in persons with hip OA. The purpose of this study was to identify interlimb differences in pelvic and trunk biomechanics in persons scheduled for unilateral