MEASUREMENT OF CENTRE OF PRESSURE IN THE STANDING SUBJECT: AN ALTERNATIVE TO FORCE PLATFORMS
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**Problem**
Centre of pressure (COP) measurement in the standing subject
- Force platforms
- Not portable
- Lab based
- In-field or on-site testing impossible

Specifically, measure COP at the golf course whilst subject is putting on the green

**Assess and filter data**
- 33 trials, various activities
- COP movement – small to large
- Data filtered at 5Hz
- Sigview 32 v1.9.1.0 signal analysis software

**Raw data example**

### AMTI

<table>
<thead>
<tr>
<th>COPx (mm)</th>
<th>COPy (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.48</td>
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### Pliance

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**Test of equality**
- non-central F test (Londoree et al., 1990)
- Calculate:
  - Practical difference (PD) in mean values (eg. 1%)
  - \( d = \frac{|PD|}{\sqrt{n_1 \cdot n_2}} \)

- Non centrality parameter (\( \delta \)) = \( d / \sqrt{2} \)
- One-way ANOVA output (F, df)
- R Statistical Computing v1.9.0

**Results**
Mean overall differences between pliance and AMTI
- COPx = 0.65mm, COPy = 0.38mm

<table>
<thead>
<tr>
<th>Parameters</th>
<th>M (mm)</th>
<th>SD (mm)</th>
<th>PD (mm)</th>
<th>d</th>
<th>( \phi )</th>
<th>F calc</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>COPx (ML)</td>
<td>48.2</td>
<td>71.9</td>
<td>0.48</td>
<td>0.03</td>
<td>0.02</td>
<td>0.00</td>
<td>0.03</td>
</tr>
<tr>
<td>COPy (AP)</td>
<td>16.8</td>
<td>13.6</td>
<td>0.17</td>
<td>0.05</td>
<td>0.04</td>
<td>0.00</td>
<td>0.01</td>
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**Collect validation data**
Validate COP measurements from pliance® mat against known COP measurement standard
- Mat on top of AMTI plate
- Biomechanics laboratory
- 38Hz pliance v 500Hz AMTI
- Peak-to-peak amplitude
  - COPx, y

**Discussion and conclusion**
- Accuracy of pliance® mat in measurement of COPx, y peak-to-peak amplitude acceptable to within 1%
- Portable, lightweight and accurate system available for assessment of COP in the field

**Alternate system**
Develop lightweight and portable COP measurement system that does not interfere with “performance” environment
- Pliance® mat
- 39.2cm x 39.2 cm
- 256 sensors
- Rubberised surface
- 5 mm thick

**Frequency content**
- Up to 5 Hz for Pliance vs 500 Hz for AMTI

**Smoothed data (5Hz)**

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**Signal content**
- Frequency content up to 5Hz Pliance v AMTI
- Peak-to-peak amplitude COPx 19.6 to 21.2 Hz, COPy 0 to 19.8 Hz