BIOMECHANICAL EVALUATION OF THE PERFORMANCE-ORIENTED MOBILITY ASSESSMENT (POMA)

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INTRODUCTION
The Performance-Oriented Mobility Assessment (POMA) is a tool used widely for assessing the mobility and risk of falls in the elderly [1]. Testing takes less than 15 minutes and requires only a chair, stopwatch, and a small area to walk in. The test involves a number of different components including assessment of sitting, rising to stand, standing, and walking. Assessment is made by a trained rater who simply assesses the different activities on a three point scale. It has been demonstrated that the POMA has good inter-rater reliability and that years of experience has no effect on rater agreement [2, 3].

The gait related portion of the POMA focuses on the assessment of asymmetries in the subject’s gait. The purpose of this study was to compare the POMA assessment of gait with biomechanical measures of gait asymmetry.

METHODS
A group of eight subjects were recruited for this study (age – 21.4 ± 1.3 years; height - 1.762 ± 0.086 m; mass – 59.55 ± 17.68 kg). All subjects provided informed consent, and all procedures had been approved by the Institutional Review Board. All subjects were able to walk unaided, but some had injuries which precluded symmetrical gait. The subjects were instructed to walk on an instrumented treadmill (Kistler Gaitway) which has two force plates under the belt. After a 10 minute period to habituate to the treadmill the subjects selected their preferred walking speed (1.91 ± 0.32 m.s\(^{-1}\)) and minute period to habituate to the treadmill the subjects

RESULTS
The SI for the gait descriptors ranged from -62% to 49% (positive scores indicate asymmetry to the right side, 0% no asymmetry). There were a range of correlations between POMA scores and the biomechanical measures of asymmetry (Table 1). The regression equation that best predicted the POMA scores was,

\[ POMA = c_1 + c_2 (SI \text{ 2nd Peak VGRF}) + c_3 (SI \text{ Time of Trough}) \]

All regression coefficients were statistically significant (p < 0.0001). The adjusted r-squared value of the final model was 96%.

DISCUSSION
The elderly are the most rapidly increasing proportion of society [5]. A major problem confronting this cohort is their susceptibility to falls [6], as a consequence the POMA is a popular means of assessing the mobility status of older adults. Sophisticated biomechanical measures have identified a demonstrated a link between postural stability and the ability to avoid falls [7].

The regression equation predicting the POMA score accounted for more than 90% of the variance yet the regression equation contained variables that are not directly observable. The time of the trough in the vertical ground reaction force curve does approximately correspond with mid-stance and it is possible the raters were observing asymmetries in this variable. The high r-squared indicates that the POMA is capturing the asymmetry in two aspects of gait, the functional significance of these variables in elderly gait remains to be established.

REFERENCES

Table 1: The correlation coefficients between the symmetry indices for the gait parameters and POMA scores.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Minimum Correlation</th>
<th>Maximum Correlation</th>
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</thead>
<tbody>
<tr>
<td>Step Interval</td>
<td>-0.191</td>
<td>0.477</td>
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<tr>
<td>Step Length</td>
<td>-0.599</td>
<td>0.280</td>
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<tr>
<td>Contact Time</td>
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<td>0.670</td>
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<tr>
<td>1st Peak VGRF</td>
<td>-0.406</td>
<td>0.404</td>
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<td>Time 1st Peak</td>
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<td>2nd Peak VGRF</td>
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<td>Time 2nd Peak</td>
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<td>Trough in VGRF</td>
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<tr>
<td>Time Trough</td>
<td>0.371</td>
<td>0.790</td>
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