INTRODUCTION
Individuals with acquired brain injuries (ABI) commonly experience gait impairments that restrict their mobility [1]. To compensate for their functional limitations, they often use rollators (i.e. four-wheeled walkers). However, as with other neurologic populations, ABI patients exhibit an increased falls risk [2], despite assistive device, which negatively impacts their safety and quality of life. Previous work using an instrumented rollator, developed by our team (i.e. iWalker), has demonstrated that the variability of foot placement patterns can change between different walking environments [3]. In this case study, we aim to determine if there is also an environmental effect on the upper trunk accelerations of a rollator user with an ABI, specifically looking for differences between a laboratory and a typical urban setting.

METHODS
One ABI patient (i.e. subarachnoid hemorrhage with hydrocephalus; age: 61; sex: female), who used a rollator regularly, participated in this study. She was asked to use the iWalker (Figure 1) while walking along: (i.) a typical, straight path in a laboratory (i.e. a 7-m walkway); and (ii.) a pre-determined course in the vicinity of the Toronto Rehabilitation Institute, located in downtown Toronto. Accelerations of the upper trunk were acquired in both settings using a tri-axial accelerometer attached to C7 (GLink-mXRS, Microstrain).

RESULTS
There were significant differences in the mean acceleration root-mean-square (RMS) of the course walk compared to the laboratory setting, in the vertical (VT) and anterior-posterior (AP) directions (Table 1). In fact, during the course walk, 12, 86 and 88% of the RMS accelerations observed were above or below the laboratory-based confidence interval (mean ± standard deviation) for the medio-lateral, AP and VT directions, respectively (Figure 2).

DISCUSSION & CONCLUSIONS
This case study demonstrated that the upper trunk accelerations of a rollator user with an ABI differ between a controlled, laboratory setting and walking outdoors. Thus, in order to better understand the challenges to stability that rollator users face, it would be helpful to observe how the characteristics of everyday environments affect their upper trunk accelerations. Future work will expand on the sample size of this case study, correlate the changes observed in upper trunk accelerations with clinical measures and other iWalker-based parameters (e.g. walker loading patterns, gait speed, etc.), and generate new knowledge about the determinants of stability of rollator users during walking in the community.

REFERENCES

Table 1: Mean (SD) for Accelerometer RMS

<table>
<thead>
<tr>
<th>Environment</th>
<th>Vertical (g)</th>
<th>Medio-Lateral (g)</th>
<th>Anterior-Posterior (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Laboratory</td>
<td>0.48 (0.04)</td>
<td>0.11 (0.02)</td>
<td>0.63 (0.02)</td>
</tr>
<tr>
<td>Course Walk</td>
<td>0.61 (0.07)*</td>
<td>0.11 (0.03)</td>
<td>0.55 (0.05)*</td>
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</tbody>
</table>