BALANCE METRICS IN SKATES AND POST-SKATING AMONGST PEOPLE LIVING WITH PARKINSON DISEASE

Brittany Bailey1, Patrick Bartoshyk1, Natalie de Bruin2, Harsha Bandaralage1, Claudia Steinke3, Jon Doan1
1Engineering and Human Performance Lab, Department of Kinesiology, University of Lethbridge, Lethbridge AB Canada
2Balance Research Lab, Department of Kinesiology, University of Lethbridge, Lethbridge AB Canada
3Faculty of Health Sciences, University of Lethbridge, Lethbridge AB Canada

Email: jon.doan@uleth.ca.

Web: https://www.facebook.com/#!/pages/U-of-L-Exercise-Therapy-for-People-with-Parkinsons/111770085632775

INTRODUCTION
Poor postural control and increased incidence of falls are common reports amongst people living with Parkinson disease (PD). Research examining exercise therapy from various traditional modalities for PD patients’ has returned equivocal results. Vigorous exercise has shown promise, but patient safety is a frequently-cited concern. The purpose of this study was to examine the fall risk of ice skating as exercise neurotherapy amongst people living with PD, and to quantitatively assess the balance of PD patients in ice skates, and following a single ice skating exercise session. The goal of this work was to add to the evidence supporting regular ice skating as a safe and specific exercise neurotherapy for some mild and moderate PD patients.

METHODS
12 people (56.8 +/- 9.6 years in age) previously diagnosed with Parkinson disease and self-identified as capable of ice skating attended a single testing session at their local arena. Participants performed 10 dynamic skating trials (starting, skating 12 metres, and stopping in each trial) plus 6 stationary trials (stickhandling drills while standing in skates). Participants also performed 3 quiet standing balance trials in their skates (60 seconds per trial, 200 Hz sampling rate, Bertec force platform, Texas Instruments a/d board), with a thin plastic sheet protecting the surface of the force plate. All participants performed these same balance trials pre- and post-skating, in their chosen footwear and minus the protective plastic. Conventional postural control measures, including elliptical sway area (ESA), peak CoP velocity in sagittal and frontal planes, and total path length in same dimensions were calculated for each trial, and averaged within condition (PRE, SKATE, POST). A within subjects repeated measures ANOVA was performed on the mean values, and significant differences were isolated with follow-up t-tests (PRE-POST, PRE-SKATE, SKATE-POST).

RESULTS AND DISCUSSION
There were zero falls amongst participants during skating and regular terrain trials, including balance trials while wearing skates. Furthermore, there were no decrements in any balance measures amongst PD participants wearing skates, when compared to PRE testing (Table 1). There were significant differences in the PRE-POST comparisons, specifically with decreased peak velocity of CoP in the sagittal plane and decreased total CoP displacement in the frontal plane for POST-skating balance trials.

CONCLUSIONS
Ice skating appears to be a safe and appropriate exercise modality for people living with mild to moderate Parkinson disease and with previous experience and enjoyment in ice skating. Short-term improvements identified here may reflect increased attention to postural control. Longer-term benefits would support skating exercise amongst PD patients.

REFERENCES

ACKNOWLEDGEMENTS
Thanks to Alberta Innovates-Health Solutions and Emmy Droog Research Fund for funding.

Table 1: Pre- and post-skating balance measures, plus in-skates measures, amongst PD participants.

<table>
<thead>
<tr>
<th>Condition (Mean (SEM))</th>
<th>Elliptical Sway Area (cm²)</th>
<th>Peak A/P velocity (cm/s)</th>
<th>Peak M/L velocity (cm/s)</th>
<th>A/P displacement range (cm)</th>
<th>M/L displacement range (cm)</th>
<th>Total A/P displacement path (cm)</th>
<th>Total M/L displacement path (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE-SKATE</td>
<td>65.3 (13.5)</td>
<td>61.8 (5.0)</td>
<td>54.0 (3.2)</td>
<td>9.2 (0.7)</td>
<td>8.8 (1.8)</td>
<td>803 (52)</td>
<td>776 (40)</td>
</tr>
<tr>
<td>POST-SKATE</td>
<td>68.0 (10.7)</td>
<td>51.0* (1.9)</td>
<td>51.7 (2.3)</td>
<td>9.5 (0.8)</td>
<td>7.4 (0.7)</td>
<td>779 (43)</td>
<td>744* (31)</td>
</tr>
<tr>
<td>IN-SKATES</td>
<td>68.5 (11.7)</td>
<td>54.6 (2.9)</td>
<td>53.5 (2.8)</td>
<td>9.0 (0.6)</td>
<td>8.6 (1.1)</td>
<td>823 (54)</td>
<td>789 (41)</td>
</tr>
</tbody>
</table>

* p < 0.1 vs. PRE-SKATE