The Effects of Driving Simulator Training on Physiological Measures
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Introduction

- The general cardiovascular response to mental effort during task performance is an increase in blood pressure (BP) and heart rate (HR).
- There has been very little research on the effects that driving rehabilitation or evaluation has on physiological measures in individuals with Multiple Sclerosis (MS).

Purpose/Hypothesis

To determine the effect of a simulator-based driving rehabilitation program on hemodynamic responses in individuals with MS.

We hypothesized that BP of participants will be reduced after 5 hours of driving training.

Methods

Participants: 36 individuals with relapsing remitting MS
Design: Single Group Pre-test Post-test Pilot Study

Inclusion Criteria

- 25 – 75 years old
- Other neurological conditions
- Previous driver training
- ≥ 24 on MMSE
- From any in-vehicle aids or adaptations
- Biocular Visual Acuity ≥20/60
- Peripheral Vision ≥ 140 degrees

Exclusion Criteria

- Stable medications and dosage
- No exacerbation of symptoms one month prior to or during the study

Table 1. Changes in physiological variables in response to driving training

<table>
<thead>
<tr>
<th></th>
<th>Training 1 Post - Pre</th>
<th>Training 2 Post - Pre</th>
<th>Training 3 Post - Pre</th>
<th>Training 4 Post - Pre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systolic BP, mmHg</td>
<td>1.9 (12.9)</td>
<td>1.6 (11.7)</td>
<td>2.6 (14.0)</td>
<td>3.6 (14.6)</td>
</tr>
<tr>
<td>Diastolic BP, mmHg</td>
<td>0.1 (9.4)</td>
<td>0.2 (6.2)</td>
<td>-0.9 (6.6)</td>
<td>0.3 (6.9)</td>
</tr>
<tr>
<td>Heart Rate, bpm</td>
<td>-3.7 (6.6)</td>
<td>-3.1 (6.5)</td>
<td>-0.4 (7.0)</td>
<td>-2.1 (7.2)</td>
</tr>
<tr>
<td>Rate Pressure Product, au</td>
<td>-329 (1412)</td>
<td>-280 (1428)</td>
<td>149 (1357)</td>
<td>15 (1635)</td>
</tr>
</tbody>
</table>

Data are mean (S.D.)

Results

Discussion

- Mental stress associated with driving was not substantial enough to cause a large change in blood pressure or heart rate in patients with M.S.
- Because the hemodynamic response to driving training was small, task familiarization did not have a significant effect on HR or BP.
- BP and HR were taken immediately after, but not during driving; therefore, participants may have had enough time to recover before the second blood pressure reading.

Future Research

To investigate the hemodynamic responses to the stress of driving in individuals with myocardial infarction to determine safety in return to driving.

References