Assessing Online Awareness Among Adolescents with Acquired Brain Injury During Performance of Motor, Cognitive and Functional Tasks

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Introduction

- Impaired awareness, manifesting as overestimation of cognitive and physical abilities, is often observed in adolescents with acquired brain injury (ABI).
- It can be associated with poor functional outcomes, poor motivation for rehabilitation and compromised safety.
- Online awareness is a dynamic, ongoing process which involves the ability to recognize and correct errors during performance of different tasks. It is critical for independent functioning.
- Research is lacking on online awareness among adolescents with ABI.

Purpose

To assess online awareness during performance in motor, cognitive and functional tasks, among adolescents with ABI.

Method

Study design: Cross-sectional study.

Participants: 9 adolescents (ages 11-18) with moderate to severe ABI, in chronic phase (≥ 6 months from injury), with impairments in executive functions. Recruited from the outpatient rehabilitation unit, or follow-up clinic at Safra Children’s Hospital.

Assessments:

<table>
<thead>
<tr>
<th>Task</th>
<th>Motor Task</th>
<th>Cognitive Task</th>
<th>Functional Task</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking on treadmill in variable speeds and slopes</td>
<td>Tower test, from D-KEFS assessment</td>
<td>Children’s Cooking Test (CCT)</td>
<td></td>
</tr>
</tbody>
</table>

Online Awareness Assessment

<table>
<thead>
<tr>
<th>Motor Task</th>
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<tr>
<td>Children’s OMNI Resistance Exercise Scale of Perceived Exertion</td>
<td>Awareness questionnaire</td>
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</tr>
</tbody>
</table>

Results

Graph 1. Correlations between OMNI and pulse, on each stage of task. [\* = significant correlation, p≤0.05]

Graph 2. Discrepancies between difficulty estimation, performance estimation and actual performance, across subjects. [\* = significant difference, p≤0.05]

Table 1. Discrepancies between difficulty estimation, performance estimation and actual performance, across tasks stages. [\* = significant difference, p≤0.05]

Table 2. Discrepancies between difficulty estimation, performance estimation and actual performance. [\* = significant difference, p≤0.05]

Conclusions

- Online awareness depends on task characteristics.
- While online awareness of performance decreases with a challenging cognitive task, it increases with a challenging motor task.
- Functional tasks can help raise online awareness of performance.
- It is more challenging to estimate difficulty pre-task than to estimate the performance post-task.

Clinical implications

- Online awareness needs to be assessed in different settings.
- Online awareness can rise when a task:
  - Has major physical input
  - Is mildly cognitive challenging
  - Has functional features