Eye-tracking technology in children with dyskinetic cerebral palsy: efficacy of a five-week intervention on eye-tracking performance, quality of life and participation


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Introduction

The era of technology!

Education

Recreation

Communication

The era of technology!

Dyskinetic Cerebral Palsy

Dystonia

Choreoathetosis

Abnormal postures or movements

Impaired muscle tone regulation

Impaired movement control

Impaired movement coordination

Children with DCP as young as 3yo gain skills to use an eye-tracking system

Goals identified by parents were accomplished
- GAS
- COPM

Six week training was perceived as the right duration

**Introduction**

Eye-tracking – a window to better opportunities!

Children with DCP as young as 3yo gain skills to use an eye-tracking system.

Goals identified by parents were accomplished:
- GAS
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Six week training was perceived as the right duration.

**AIM**

1. To explore the participants’ ability to acquire specific eye-tracking skills by quantifying their eye-tracking gaming performance.

2. To report the clinicians’ perception on the impact of the eye-tracking training period on quality of life domains.

**Methodology**

Five-week eye-tracking gaming intervention in dyskinetic CP

Pilot study

N = 10 participants
Age: 6-13 yo
GMFCS IV-V; MACS IV-V

Good seating position
Ability to shift eye-gaze fixations
Ability to understand and follow instructions

30 minutes a day of eye-tracking gaming
Dynamic gaze games (quick shift of eye-fixations on the screen)

Static gaze games (one second dwell eye-fixation)

Success rate (sum of reached targets in 90 second eye-tracking gaming performance)

Methodology
Data collection

Results
Success rate for the total targets and subscale targets – for the sample

<table>
<thead>
<tr>
<th></th>
<th>T0 Median (IQR)</th>
<th>T1 Median (IQR)</th>
<th>T2 Median (IQR)</th>
<th>T3 Median (IQR)</th>
<th>Friedman</th>
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<tbody>
<tr>
<td>Total targets</td>
<td>(n=6 games)</td>
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<tr>
<td>230.5 (99-586)</td>
<td>258 (121.8-606.8)</td>
<td>278 (139.5-627.3)</td>
<td>290 (147.3-623.3)</td>
<td>0.014*</td>
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<tr>
<td>Subscale targets</td>
<td>Static (n=3 games)</td>
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<tr>
<td>108 (72-171)</td>
<td>136 (79-203)</td>
<td>153 (99-194)</td>
<td>166 (91-214)</td>
<td>0.241</td>
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<tr>
<td>Dynamic (n=3 games)</td>
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<td>0.072</td>
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</table>

T0, baseline; T1, pre-intervention; T2, post-intervention; T3, follow-up; IQR, interquartile range; Friedman, Friedman test to track the evolution of the gaming performance from T0 to T3

Results
Success rate for the total targets – per participant

6 participants improved
9 participants improved
6 participants improved

T0, Baseline; T1, Pre-intervention; T2, Post-intervention; T3, Follow-up
Eye-tracking Likert-Scale questionnaire (ETL)

Conclusions

1. Eye-tracking gaming performance improved over time
2. Specific eye-tracking skills can be trained and therefore acquired
3. Self-confidence and self-esteem increased due to achievement in gaming performance
4. Eye-tracking is a promising computer interface for children with dyskinetic CP