

# A tablet Computer-based Cognitive Training for Visuomotor Function in the Children with Developmental Delay

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## Introduction

### ● Visuomotor skills

- The ability to perceive visual input, process the information, and coordinate a motor response
- Essential for meaningful everyday actions, including tasks such as handwriting, keyboard typing, and engaging in activities like playing ball
- Visuomotor function impairment: commonly observed in children with developmental delay

### ● Aim of this study

- To evaluate the effect of tablet computer-based cognitive training for visuomotor function in the children with developmental delay

## Methods

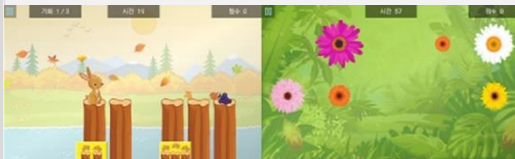
### ● Subjects

- Children aged 4 to under 18 years who were diagnosed with developmental delays
- Prospective study

### ● A tablet Computer-based Cognitive Training

- Administered the Mind Rx Kids Program (Brain Academy, Seoul)
- Consists of eight domains with 96 cognitive training games
- Designed to enhance visual-spatial and visuomotor functions were applied to the participants
- Underwent a 30-min tablet computer-based training daily for 8 weeks

**Figure 1. Mind Rx Kids Program (Brain Academy, Seoul)**



### ● Outcome measurements

- Primary outcome: Beery-Buktenica Developmental Test of Visual-Motor Integration, 6th Edition (VMI-6)
- Secondary outcomes: Quality of Upper Extremity Skills Test (QUEST), Functional Independence Measure for Children (WeeFIM), Childhood Autism Rating Scale (CARS), ADHD Rating Scale (ARS), and Child Smartphone Addiction Observer Scale

### ● Statistical analysis

- Wilcoxon signed-rank test: used to comparing pre- and post-treatment outcomes

## Results

### ● A total of 10 children with developmental delays

- The average age: 7.90±4.93 years
- 7 males and 3 females

**Table 1. Demographic data of the children with DD**

Total 10 children	Mean ± SD
Age (month)	The youngest: 4 years The oldest: 17 years
Sex	Male 7 Female 3
Diagnosis	Autistic spectrum disorder 2 Intellectual disability 2 Borderline cognitive impairment 3  Traumatic brain injury 1 Hereditary spastic paraplegia 1 Cerebral palsy 1

### ● The results of the 8-week tablet computer-based cognitive training

- Significant improvements in **VMI raw score**, **VMI standard score**, **VMI percentile score**, **VMI equivalent age QUEST** and **WeeFIM**
- cf>While there were improvements in CARS, ARS, and Smartphone Addiction Observer Scale, not reach statistical significance

**Table 2. Comparison of primary and secondary outcomes before and after 8 weeks of tablet computer based cognitive training**

	Pre-treatment	Post-treatment	P-value
VMI			
VMI raw score	10.60±5.32	13.20±5.65	0.005
VMI standard score	58.70±20.67	66.40±25.18	0.007
VMI percentile score (%)	2.87±4.27	11.18±21.44	0.028
VMI-age	46.30±17.77	55.80±23.56	0.005
QUEST	81.68±23.84	82.85±24.01	0.042
WeeFIM	81.40±23.80	84.60±24.60	0.007
CARS	19.85±3.46	19.50±4.14	0.838
ARS	15.80±9.97	11.90±7.44	0.065
Smartphone Addiction Observer Scale	54.20±14.60	50.50±13.67	0.236

\*: p<0.05

## Discussion

### ● Tablet computer-based cognitive training to children with developmental delay

- Not only improves visuomotor integration but also enhances fine motor skills and activities of daily living
- Not increase addiction to digital media

- Children with developmental delay could engage in the tablet computer-based cognitive training at home without concerns about digital media addiction