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The effect of regard-focused visual exploration therapy for stroke pateints with visual field defect

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Introduction
Although the field-of-view(FoV) is a fundamental concept of human vision used to diagnose symptoms of visual field defect(VFD), humans have mobile sensory systems by moving their heads and bodies when viewing their surroundings. Thus, we previously proposed the concept of a human field-of-regard(FoR), which refers to the total area that can be captured by mobile visual systems. In a recent study, we demonstrated the efficacy of regard-focused visual exploration therapy(FORVT) implemented using a head-mounted display(HMD) virtual reality system for hemispatial neglect(HSN) rehabilitation following stroke. To examine the potential applications of FORVT for stroke patients with VFD this time, we applied FORVT for patients with VFD.

Objective
The Purpose of this study was to examine the efficacy of FORVT using HMD for patients with post-stroke VFD.

Methods
Nine right-handed patients who had been diagnosed with VFD after stroke but not with HSN were included. Six patients had left VFD and three patients had right VFD. Patients completed 20 sessions of a FORVT program using a HMD (five daily sessions per week over a period of four weeks). Pre- and post-training conditions were quantified by HMD assessments ; FoV and FoR. The dependent variables for FoV measurement included response time(FoV-RT) and success rate(FoV-SR). The dependent variables for FoR assessments included response time(FoR-RT), success rate (FoR-SR), and head movement(FoR-HM). We used the Wilcoxon signed-ranks test to determine whether there were differences between pre- and post-training conditions.

Results
Results revealed a significant difference in FoR-RT($p = 0.005$) and FoR-SR($p = 0.005$) between the pre- and post-FORVT condition. There was no difference between the pre- and post-FORVT conditions in FoV-RT($p = 0.288$), FoV-SR($p = 0.185$) and FOR-HM($p = 0.240$). (see Table 1)

Conclusion

FORVT improved FOR not FoV. It indicates FORVT improved attention, motor component of VF, although sensory component of VF was not obtained. Further study that includes the functional improvement after FORVT could reveal efficacy of FORVT.

table1. Results of Wilcoxon singed-ranks test relative to comparison between pre- and post-FORVT conditions.

	Pre-training	Post-training	p-value
FoV Detection time	1.72±0.86	1.61±0.73	>0.288
FoV Success rate	80%	86%	>0.185
FoR Detection time	3.78±1.70	2.91±1.58	<0.005
FoR Success rate	82%	94%	<0.005
Head movement	133367.01±7366.15	9438.68±5591.38	>0.240