

Virtual Reality Game Playing in Amblyopia Therapy: A Randomized Clinical Trial

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ABSTRACT

Purpose: To compare the visual outcome of occlusion therapy with virtual reality game playing as a new therapy for children with amblyopia.

Methods: This randomized clinical trial was performed on 50 children between 4 and 10 years old who had unilateral amblyopia. They were randomly divided into virtual reality and patching groups (n = 25 in each). The virtual reality group was trained binocularly using the virtual reality games through a head set for 1 hour per day 5 days a week for 4 weeks. Patients in the patching group occluded their non-amblyopic eyes 2, 4, and 6 hours for mild (best corrected visual acuity [BCVA] 0.2 to 0.3 logarithm of the minimum angle of resolution [logMAR]), moderate (0.3 to 0.6 logMAR), and severe (worse than 0.6 logMAR) amblyopia, respectively.

Results: The mean BCVA based on logMAR units improved significantly in both groups ($P < .0001$), but the difference between the two groups was not significant ($P = .59$). BCVA based on the responded letters improved in both groups (virtual reality: $P = .0001$, patching: $P = .001$), and change in BCVA in the virtual reality group was higher than in the patching group ($P = .002$).

Conclusions: Virtual reality game playing was equal or superior to patching in an analysis of linear and letter

BCVA, respectively. Therefore, applying this new amblyopia therapy is recommended.

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INTRODUCTION

Although the traditional definition of amblyopia is the unilateral or, rarely, bilateral decreasing of visual acuity with no structural abnormalities of the eye or visual pathways, a new definition states that “amblyopia is a neurodevelopmental disorder with deficit in both monocular and binocular functions and it extends even beyond the primary visual integration centers”; therefore, amblyopia is not a “lazy eye,” but it is a “lazy brain.”^{1,2} The standard methods of amblyopia therapy are optical correction, occlusion, and penalization.^{3,4} New modalities are needed because not all patients respond to the traditional methods and even the patients who respond often show residual amblyopia at 10 years old. Approximately 25% of successfully treated children will suffer from amblyopia recurrence. Thus, long-term efforts of the child and their family are needed and there are many challenges for treating amblyopia in adults.⁵

The current theory is that suppression plays a causal role in amblyopia and its reduction would in-

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