

## A Case of Microscopic Amblyopia Successfully Treated using Occlu-Pad

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**Received:** April 04, 2018; **Published:** May 22, 2018

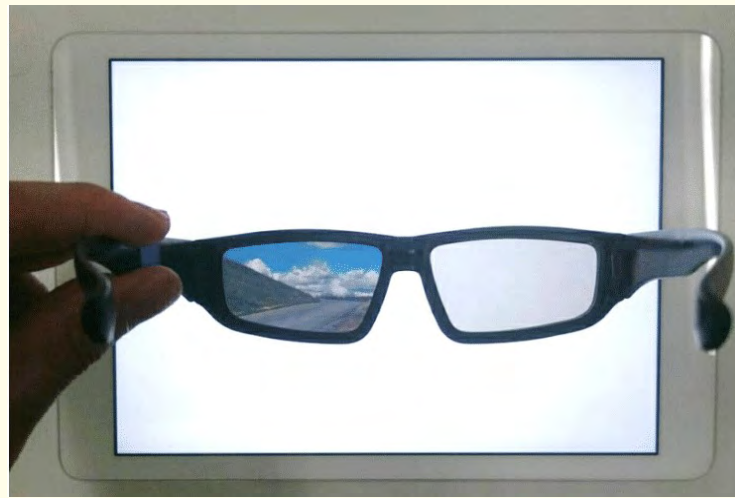
### Abstract

Use of the Occlu-pad, a binocular open-view treatment device, has only been reported for anisometropic amblyopia. In this article, the authors report a case of severe microscopic amblyopia with eccentric fixation successfully treated using Occlu-pad. Visual acuity (LogMAR) and refraction under cycloplegia at the first visit were RV =  $(-0.08 \times S + 3.50 D = C - 0.50 D A 175^\circ)$  LV =  $(0.82 \times S + 5.75 D = C - 0.75 D A 150^\circ)$ . The fixation state was unstable para-macular fixation. The patient was instructed to wear corrective glasses and undergo amblyopia treatment twice per week (30 min per session) using Occlu-pad. Treatment after 2, 3, 4, and 5 months resulted in visual acuity improvement to 0.52, 0.22, 0.15, and 0.10, respectively. Harmonious abnormal retinal correspondence and suppression scotoma were detected 4 months after treatment initiation. Eye position was  $5\Delta$  esodeviation, and stereo acuity was 480 sec of arc using TNO stereotest at 4 months after starting treatment. In addition to improvement in visual acuity, improvement of fixation position was also observed. Occlu-pad may be an effective treatment option for severe microscopic amblyopia.

**Keywords:** Microscopic Amblyopia; Occlu-Pad; Amblyopia Treatment; Binocular-Open Type Amblyopia Treatment Device

### Introduction

In recent years, many binocular open-view amblyopia treatment devices, which are different from occlusion therapies using eyepatch, have been reported [1-4]. Occlu-pad can selectively present target images on a tablet terminal to one eye under open binocular view using white screen technology (Figure 1) [4,5]. White screen technology involves peeling off the polarizing film layer from a liquid crystal panel and attaching this film to glasses; viewing videos is possible only when the subject is wearing the polarized glasses. To date, amblyopia treatment using Occlu-pad has not been reported other than for anisometropic amblyopia [4,5]. In this article, we report a case of severe microscopic amblyopia with eccentric fixation, in which amblyopia treatment performed during hospital visits using Occlu-pad was successful.



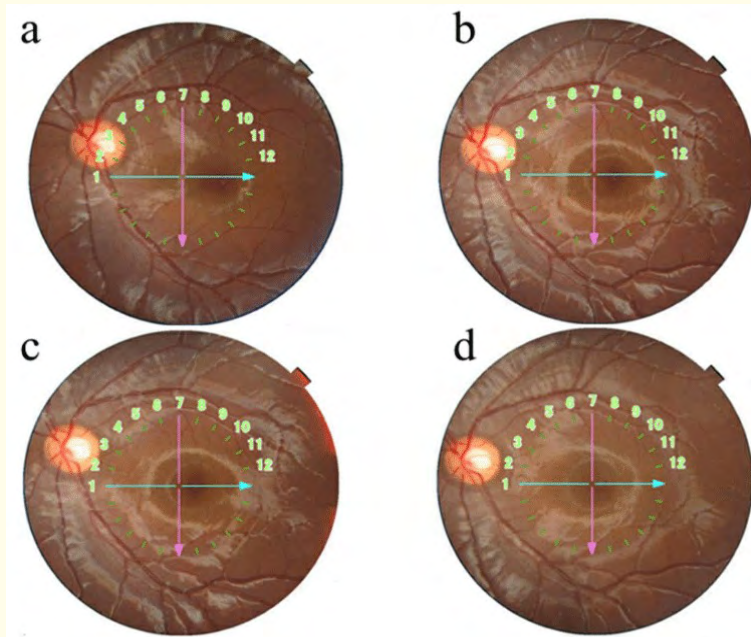
**Figure 1:** Appearance of the Occlu-pad screen. The left eye (amblyopic) can see the image on the tablet terminal, but the right eye (healthy) cannot.

## Materials and Methods

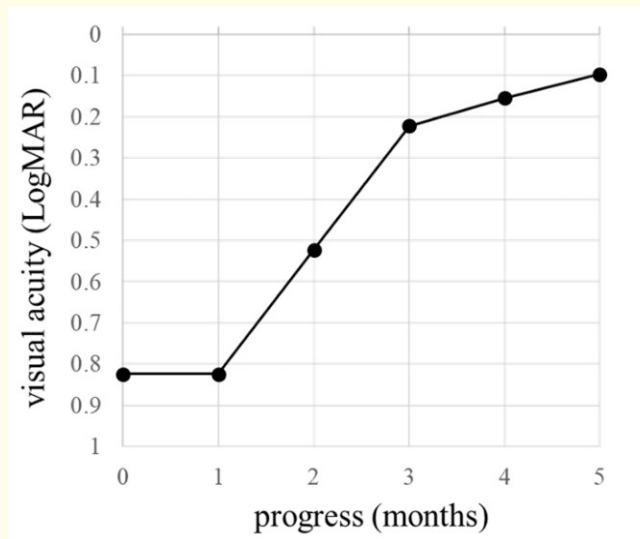
The patient was a 4-year-old boy who presented with suspected low visual acuity in the left eye at the time of a medical checkup. Visual acuity (Log MAR) and cycloplegic refraction at first visit was RV =  $(-0.08 \times S + 3.50 D = C-0.50 D A175^\circ)$  LV =  $(0.82 \times S + 5.75 D = C-0.50 D A150^\circ)$ . There was no stereoacuity using TNO stereotest. His eye position was unstable due to low visual acuity; however, slight esodeviation movement was observed. The fixation state was unstable paramacular fixation (Figure 2a). For treatment of amblyopia, the patient was instructed to wear complete corrective glasses and undergo in-hospital therapy with Occlu-pad two days per week (30 minutes per session).

## Results

The course of the amblyopia treatment is shown in figure 3. After wearing complete corrective glasses for 1 month, treatment with Occlu-pad was initiated. Treatment after 2, 3, 4 and 5 months resulted in best corrected visual acuity improvement to 0.52, 0.22, 0.15, and 0.10 respectively. Four months after treatment initiation, suppression scotoma was detected at  $4\Delta$  base-out prism test, and harmonious abnormal retinal correspondence was observed on Worth 4-dot test. Eye position exhibited  $5\Delta$  esodeviation in the alternate prism cover test. Stereoacuity was observed for 480 sec using the TNO stereotest. In addition to improvement in visual acuity, changes were also observed in fixation points. Fundus photographs demonstrating fixation positions before treatment, and at 2, 3, and 5 months after treatment initiation, are shown in figures 2b, 2c, and 2d. Five months after starting treatment, the fixation state was stable near the fovea ( $0.5^\circ$  to  $1^\circ$  nasal shift according to visuscope).



**Figure 2:** Progress of fixation position. *a* before treatment. *b* One month after starting treatment. *c* Two months after treatment initiation. *d* Three months after treatment initiation.



**Figure 3:** Course of amblyopia treatment.

### Discussion

The patient in this case was diagnosed with microscopic amblyopia due to suppression scotoma, abnormal retinal correspondence, eccentric fixation on the nose side, and an oblique angle  $< 10 \Delta$  [6,7]. In this case, visual acuity before treatment was very low (0.82); however, wearing glasses and twice weekly amblyopia treatment (30 minutes per session) using the Occlu-pad were successful. Although this was a short-duration amblyopia treatment, similar to occlusion therapy using an eye patch, it has been reported that there is no significant difference between full-time occlusion therapy and treatment 6 h per day [8]. Moreover, there is no significant difference between occlusion therapy for 6 h per day and 2 h per day [9], which suggests that effective amblyopia treatment can be achieved using short treatment durations. In addition, amblyopia treatment using a binocular open-view method, such as the Occlu-pad, has been reported to yield a satisfactory treatment effect compared with occlusion methods using an eye patch [1,2]. Although there was no comparison with eye patch therapy in this study, our results suggest that an amblyopia treatment method using a binocular open-view technique may be effective in cases of severe microscopic amblyopia. However, since this study is only one case, it is necessary to increase the sample size in the future.

### Conclusion

Occlu-pad may be an effective treatment option for severe microscopic amblyopia.

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Volume 9 Issue 6 June 2018

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