We report the results of a new amblyopia treatment device used in 7 children with anisometropic amblyopia. The Occlu-pad was created by removing the polarizing film layer from the liquid crystal display screen of an iPad Air (Apple Inc, Cupertino, CA). Patients were asked to wear special glasses that contained a polarizing filter for their ambyloptic eye and a light reduction filter for their normal eye and instructed to play an amblyopia training game displayed only to the ambyloptic eye. In 5 patients corrected distance visual acuities in the ambyloptic eyes improved after 2 months’ treatment on average by 0.38 (logarithm of the minimum angle of resolution).
FIG 1. The Occlu-pad, a binocular open-view amblyopia treatment device. A, Home-based treatment using the Occlu-pad. B, White screen displaying to the unaffected eye. C, “Ants” displaying to the amblyopic eye. D, Game play testing hand–eye coordination, with patients touching and dragging on-screen targets (ants) into the “insect cage.” E, The Occlu-pad was made by removing only the polarizing film layer from the liquid crystal display (LCD) screen of an iPad Air. The special glasses designed for viewing the device were made with a light reduction filter for the normal eye and a circular polarizing lens for the amblyopic eye that contained a $\lambda/4$ wave retarder and linear polarizing filter. The amblyopic eye can perceive the video information because the right polarizing filter matches the output of the LCD screen; however, the normal eye can only perceive the white backlight, because the light reduction filter does not match the screen output.

FIG 2. Progress during the 2-month amblyopia treatment period.
Discussion

Childhood amblyopia has a reported prevalence of 1% to 5%. When treating anisometropic amblyopia, improvement of the visual acuity of the amblyopic eye can often be attained through spectacle use only. In the present study, we used glasses with full refractive correction along with the Occlu-pad to treat children with anisometropic amblyopia. A clear improvement was noted in the visual acuity of the amblyopic eyes of children who performed treatment on the Occlu-pad for at least the minimum number of hours requested (3 patients using Occlu-pad training alone and 2 using the Occlu-pad with occlusion therapy for 3 hours daily). To play the game, use the Internet, or watch videos on the Occlu-pad, children had to wear the glasses with the polarizing filter and, therefore, we suggest that child used their amblyopic eyes positively while using the Occlu-pad. An additional benefit of the Occlu-pad is that treatment compliance can be easily monitored because the device automatically stores the dates and the times that the patient played the amblyopia training game.

References