Re: Hoyt C.: What is next in amblyopia treatment?
(Ophthalmology 2015;122:871–3)

TO THE EDITOR. Dr Hoyt raises important questions about the centuries old occlusion treatment for amblyopia. The scientific sequence for treating disorders is to determine their natural history and etiology and then to develop a treatment protocol. Animal experiments using occlusion did produce anatomic defects in the visual cortex. However, when Horton et al used cytochrome oxidase histochemistry to examine the ocular dominance columns in human amblyopia patients, defects in the lateral geniculate body were not found. In addition, a study using functional MRI found that the topographic organization in the visual cortex of blind participants who did not have a typical retinal development in utero (microphthalmics) was indistinguishable from normally sighted subjects. These findings suggest that current accounts of critical periods and experience dependent development should be revisited.

Contrary to Dr Hoyt’s belief that occlusion or penalization have proven to be effective, there is little objective proof that they have the desired effect. Indeed, a Pediatric Eye Disease Investigator Group (PEDIG) study found consistent improvement with increasing age in the distribution from poor to better acuity which applied to both the amblyopic and fellow eyes before any treatment (Table 3, Baseline Characteristics According to Age at Enrollment). The improvement may actually be owing to increasing literacy, familiarity with the test procedures, or, as in perceptual learning, practice.

There are other problems with basic understandings in amblyopia and deficiencies in treatment methodologies, including a lack of untreated controls, which were pointed out by Hoyt. The presence of significant congenital anomalies such as optic nerve hypoplasia and macular structural abnormalities must be identified before making a diagnosis of amblyopia.

Until amblyopia research includes scientific methods—use of untreated controls, rigorous examination of the eyes with modern techniques such as magnification controlled objective imaging of the fovea and optic nerve—we will continue to have a plethora of new and ultimately disappointing treatments.

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References