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Binocular Visual Acuity in Intermittent Exotropia: Role of Accommodative Convergence

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Ahn and associates presented their findings regarding the level of accommodation, monocularly and binocularly, in patients with intermittent exotropia.¹ They noted that “binocular interaction of visual acuity is associated with accommodative response,” with which we agree. However, they assume that this is the result of accommodative convergence.

In the person trying to maintain binocular single vision during forced convergence, Semmlow and Heerema demonstrated that the blur was the result of convergence accommodation, not accommodative convergence, because on removal of the stimulus, the vergence after response was in the convergence direction.² This was the result of accommodation actively being brought back into play (otherwise divergence would be expected as accommodation relaxed).

Hasebe and associates found that in intermittent exotropes and decompensating exophorias, a larger lag of accommodation occurred in the monocular state compared with the binocular state, and patients with lower as well as higher accommodative convergence-to-accommodation (AC/A) ratios had been shown to respond to minus lens therapy³ (for review see Firth⁴). If the mechanism was accommodative convergence, only those with high AC/A would be expected to respond.

These findings led Firth to argue that the increase in accommodation in patients with intermittent exotropia, when binocular, was the result of convergence accommodation.⁴ In a closed-loop condition, convergence accommodation normally is inhibited; however, as the limit for this is reached, the patient either has to accept blur or has to become manifest. Minus lens therapy may be used to allow convergence accommodation to occur and give clear vision.

Indeed, this was demonstrated (Firth AY, Davis H. Convergence accommodation in a distance exotrope. Paper presented at the British Isles Paediatric Ophthalmology and Strabismus Association Conference. September 23–25, 2009; Glasgow, United Kingdom) in a patient with reduced CBA of 6/18 resulting from an increase of accommodation of approximately 2 diopters in the binocular state compared with the monocular state. The patient's AC/A ratio was low, and dissociated measurement of the deviation showed no observable difference when viewing through –3.00-diopter lenses.

Recently, Horwood and Riddell found that disparity driven accommodative response gain and accommodative response at 33 cm are higher in controlling intermittent exotropes than in matched non-strabismic controls.⁵ The participants showed higher convergence accommodation to convergence ratios and responded mainly to the disparity in visual targets to drive responses, as did controls. They suggest that the increased vergence necessary to control the exodeviation brings along over accommodation, which explains the blur and loss of stereopsis found by Ahn and associates.¹ Also, they found no evidence that any of the exotropes used blur cues to drive their responses any more than did the controls, and their response AC/A ratios were no higher. In simple terms, the need to converge drives accommodation, rather than accommodation being used to drive convergence. Considerable inter-individual variability in the strength of the association between convergence and accommodation account for this not being a universal finding.

Although various reports in the literature, as included by Ahn and associates, refer to the mechanism for controlling an intermittent exotropia as being accommodative convergence, our findings challenge this premise.¹ We contest that the mechanism behind the change in accommodation is driven by vergence.

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