The Enigma of Luminance and Fixation in Dissociated Strabismus

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Dissociated strabismus complex (DSC), comprising dissociated vertical deviation (DVD), dissociated horizontal deviation (DHD), and dissociated torsional deviation (DTD), is an enigmatic ocular misalignment disorder, for which multiple causes have been hypothesized.1–3 Evidence-based studies evaluating the pathophysiology of this unusual ocular motility disorder is of value to existing knowledge.

Luminance disparity and fixation loss have been implicated in the pathogenesis of DVD and form the basis of classical clinical tests considered characteristic of this condition, like the Bielschowsky phenomenon.1 While occlusion with minimal luminance imbalance has been found to result in DVD,2 the effect of luminance disparity alone as a trigger for DVD has not been assessed.

This age- and sex-matched case-control study by Ghadban et al.4 evaluates the role of isolated binocular luminance disparity in the causation of DVD. The amplitude of vertical deviation in the same set of patients with DVD as a response to marked binocular luminance disparity, uniocular occlusion, and alternate occlusion maintaining similar background illumination (either light or dark) was systemically evaluated with video-oculography (VOG). The observations conclusively emphasized that luminance disparity alone has little effect on the genesis of DVD, suppression of fixational effort being the fundamental primary stimulus. It was postulated that this loss of effort, which may be due to uniocular occlusion or blurring or contralateral fixation, when superimposed with binocular luminance disparity at the cortical level, triggered DVD with demonstration of the characteristic Bielschowsky phenomena. This phenomenon is unique to DVD because the control group demonstrated no such deviation under any of the four test conditions.

Overall, the design and execution of the study has been meticulously focused towards delineating the hitherto unanalyzed independent roles of luminance disparity and fixation loss in the pathogenesis and behavior of the vertical deviation in DVD, amalgamated with an excellent scientific review and illustrative recording.

References