Differences in loss of chromatic sensitivity in various diseases of the visual pathways

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Chromatic sensitivity was measured at the fovea and in each of the four quadrants (6 deg) in 59 patients with specific diseases of the visual pathways. The CAD test was used to measure yellow/blue (YB) and red/green (RG) colour detection thresholds. Results were analysed separately for each location tested and compared against age matched normal data.

Pregeniculate conditions cause symmetric loss in chromatic sensitivity in either one or both channels. Glaucoma and hypertension tend to cause symmetric YB loss for early glaucomatous damage and greater RG loss at later stages of the disease. Chromatic loss often precedes visual field loss and it may well be the case that measurement of peripheral chromatic discrimination may predict future glaucomatous damage. Optic nerve and chiasmal lesions exhibited symmetric loss to the RG channel with some additional loss of YB sensitivity in some patients.

Postgeniculate lesions can cause either symmetric or asymmetric loss depending on the location and extent of the lesion. In patients presenting with ‘occipital’ or ‘occipital and cortical damage’ (striate or extra-striate lesions) colour vision was either completely damaged or asymmetrically affected. On the other hand, patients with radiation damage, i.e. prestriate loss, presented with symmetric damage (mainly RG). Cortical cases show symmetrical loss if an earlier pathway is damaged at the same time; only localised cortical damage caused asymmetric loss. Colour specific losses were found to be location specific. Asymmetric colour loss affecting one single colour category differs from general knowledge in the literature where colour vision can be affected in certain conditions, but a symmetric overall loss is usually reported. These observations suggest that selective damage to V1 and early extrastriate visual areas that exhibit good topographic representation of the visual field can cause hue specific losses which implies independent coding of hue specific signals in these areas.