Model of Contrast Sensitivity Function in Patients with Age-Related Macular Degeneration

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Abstract. Using the Stiles-Crawford function, we have calculated the relation between the contrast sensitivity of the human eye for a grating and the spatial frequency of the grating. Using the fact that at spatial frequency 50 cycles∕degree of the grating, the value of contrast sensitivity is 1, the value of contrast sensitivity at any other spatial frequency is calculated using the assumption that the minimum number of photons required to elicit the visual response in the retina is constant. Again, we assume that taking width of the grating unity when we increase the area, the length should increase. An increase in length means a decrease in spatial frequency, so the intensity or contrast decreases and the contrast sensitivity value increases. Again, using the same Stiles Crawford function but now with a different directionality constant for AMD, we have obtained the age-related macular degeneration curve. Here the value of the directionality constant for AMD is found to be0.041∕mm2. It is seen that for a particular spatial frequency, the contrast sensitivity of the healthy eye is greater than that of the AMD eye, and this difference increases with a decrease in the spatial frequency of the grating.