



Luminance in Acuity and Reading Performance of Low Vision Patients

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Abstract:

Purpose: To assess the role of luminance in low vision patients for visual function tests.

Methods: 152 consecutive low vision patients had assessment of visual acuity (VA) with habitual correction and with a 4% transmission gray filter on the ETDRS chart at 1 meter. Reading acuity on the MN Read was performed in room light and then with 125 (low) and 2070 Lux (high) additional lighting. Contrast sensitivity (LH) and central visual field (CCVFT) were also performed. All tests were done binocularly.

Results: Patient age median (range) was 82 (13 – 101) years with 63% female. All patients were referred for low vision rehabilitation with 89% having the diagnosis of a maculopathy. Visual acuity with habitual correction median (range) was 20/100 (20/20 - 20/1000). Visual acuity with a 4% transmission gray filter over habitual correction median (range) was 20/220 (20/20 - 20/2000). Change in visual acuity with the decreased luminance was median (range) 2 lines decrease (plus 2 - minus 10 lines). On the MN Read test the low additional light gave no performance increase in 44% of patients, a one block increase in 50% and a 2 block increase in 6%; the high additional light gave no performance increase in 12% of patients, a one block increase in 29% and a 2 block increase in 32% and a greater than 2 block increase in 27% with up to an 8 block increase in one patient. Ring scotoma patients (25) improved 1 block (range 0 – 2) on the MN Read with low additional light and 4 blocks (range 1 – 8) with high additional light. Non ring-scotoma patients (107) improved 0 blocks (range 0 – 2) on the MN Read with low light and 2 blocks (range 0 – 5) with high light. There is a significant moderate correlation between the lines lost with the filters and improvement with additional lighting – 125 Lux ($r = 0.30$) and 2070 Lux ($r = .49$). Of particular interest, patients with ring scotomas had the largest improvements in reading with extra light.

Conclusions: There is a significant tendency for acuity to drop with decreased luminance and this had some tendency to predict response to extra light. There was a consistent positive improvement in reading acuity with extra light and especially with very bright light. All patients and particularly those with ring scotomas should have trials with very bright illumination in their rehabilitation program.