

The Efficacy of Tinted Red Glasses in Retinal Dystrophies

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Abstract

- The efficacy of red transmittance 550 nm as compared to ordinary dark or non-tinted glasses was assessed in 24 diagnosed cases of these conditions (cone-rod dystrophy 14, rod-cone dystrophy 2, rod-monochromatism 5 and central areolar dystrophy 3). Independent observers evaluated improvements in (a) visual acuity on Sheridan Gardiner testing in normal day light illumination; (b) photophobia as assessed by reduction in blinking and orbicularis spasms and (c) subjective comfort. Twelve out of 14 (86%) cases of cone-rod dystrophy and 3 out of 5 (60%) of patients with rod monochromatism demonstrated marked improvement on all three parameters with red as compared to dark glasses. Only 2 cases (14%) of cone-rod dystrophy preferred dark tinted over red glasses. There was no change with any kind of glasses in all the three cases of central areolar choroidal dystrophy, as well as the 2 cases of rod-cone dystrophy. In spite of the small sample size, it seems that patients with cone-rod dystrophy especially in its early stages would benefit from red glasses by cutting down the short and middle wave length radiation, red glasses will attenuate the ambient illumination that would otherwise saturate the patient's rods, and thus prevent him from seeing in normal daylight illumination.
- Work carried out as during the Blind Schools Survey 1985-1987 by the author.
<http://jalili.co.uk/bss/covi.htm>

Introduction

Patients with retinal dystrophy may experience difficulties under conditions of high illumination. On the assumption that these problems are due to an abnormal recovery of the rods after bleaching, various workers^{1,2,3} have suggested the use of tinted glasses in this group of patients. However, there appears to be no agreement about the tint best suited for this purpose. While Everson and Schmidt (1976)¹ found the plastic NoIR 7% filter best, Silver and Lyness (1985)⁴ found no preference between red and brown-tinted glasses among their patients. This study was undertaken to assess the efficacy of red and brown tinted glasses in improving visual function in different subgroups of patients with congenital retinal dystrophy, and which tint was most effective.

Methods

- Twenty-four diagnosed cases of congenital retinal dystrophy between the ages of 6 and 22 years attending a school for the visually handicapped in the Gaza Strip participated in this study. The break-up of diagnoses was as follows:
 - cone-rod dystrophy 14,
 - rod-cone dystrophy 2,
 - rod monochromatism 5,
 - central areolar dystrophy 3.
- In each case, the diagnosis had been established previously by detailed ocular examination and ERG studies⁵.

Methods (Continued)

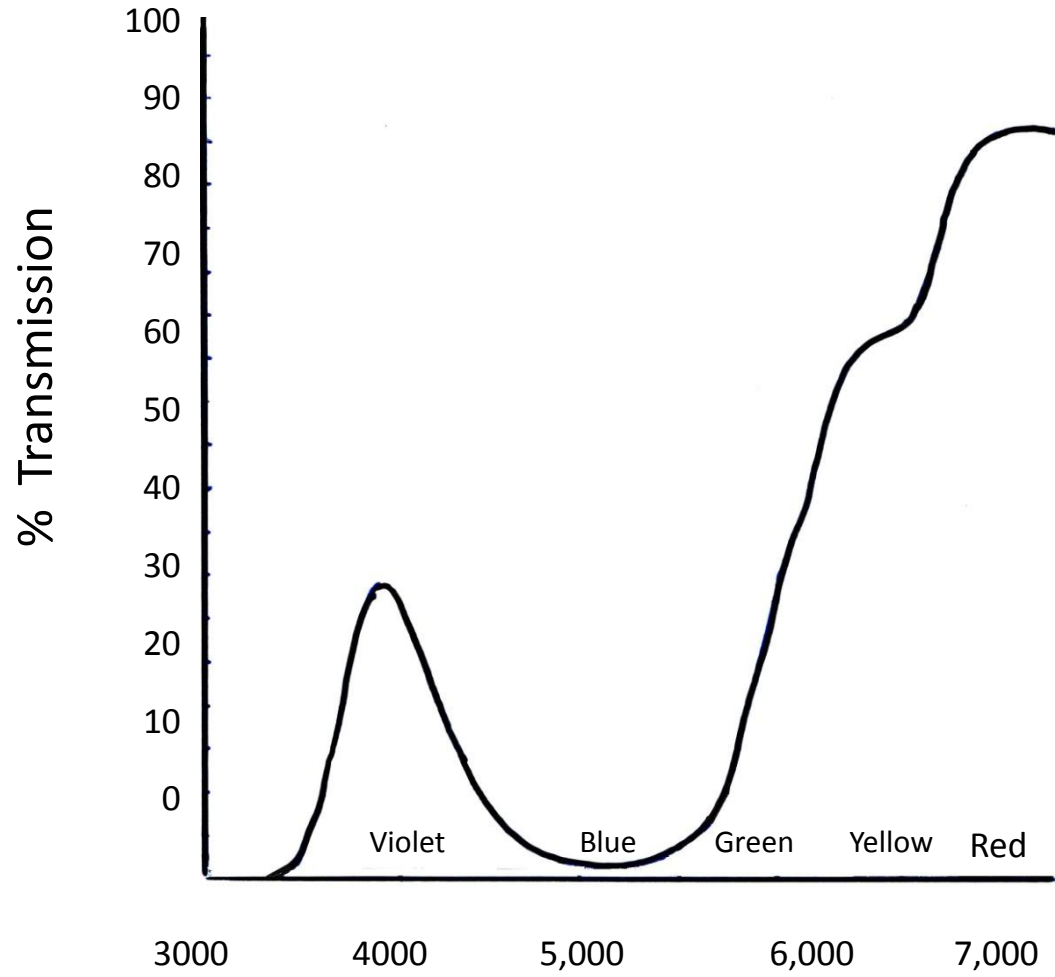
- All patients were evaluated by independent observers vis a vis:
 - (a) photophobia as assessed by blinking and orbicularis spasm;
 - (b) Subjective comfort; and
 - (c) Visual acuity on Sheridan-Gardiner testing in normal daylight illumination.

Methods (Continued)

Three kinds of glasses were used:

1. Non-tinted: (plain glass);
2. Red tinted (transmittance 550 nm; Younger Optics PLS550 CR39 plastic lenses (Fig 1)
3. Brown tinted (commercially available sunglasses with approx. transmittance 750 nm).

Transmission Curve^a



Methods (Continued)

- Each patient was offered these glasses in random order. The visual acuity was recorded with each filter and was graded as 6/18-6/36, 6/60-3/60, 2/60-1/60 and CF-HM.
- No improvement in vision was recorded as 0, improvement by one of the above grades as +, and improvement of two or more grades as ++.
- Photophobia was then graded as mild, moderate or severe with each of the three glasses by one observer.
- Finally, the patients were asked to grade each kind of glass according to subjective comfort.

a) Photophobia

- Of the cases with cone-rod dystrophy, 10 out of 14 (71%) had marked photophobia with untinted glasses.
- But when red glasses were used, the photophobia had disappeared completely or was markedly improved in 10 of these cases (71%).
- With brown glasses, though somewhat better than with untinted glasses, 9 cases (64%) still had considerable photophobia.
- Three of the cases with rod mono-chromatism, who had severe photophobia, improved markedly with red glasses, so that only one patient (20%) had moderate photophobia with red glasses.
- In contrast, 4 patients (80%) in this group still had considerable photophobia with brown glasses. The patients with rod-cone dystrophy as well as central areolar dystrophy demonstrated no change in their photophobia with either red or brown glasses.

Cone-Rod Dystrophy with Amelogenesis Impfecta



Photophobic patients were more comfortable under high sun illumination and could keep their eyes open with dark red tinted glasses in comparison to commercially available sun glasses.

Results

b) Subjective Comfort

- 10 out of 14 cases (71%) of cone-rod dystrophy found red glasses most comfortable.
- Only 2 cases (14%) preferred brown over red glasses.
- In the rod monochromatism group, all 5 cases preferred red over brown glasses.
- None of the cases with rod-cone dystrophy or central areolar dystrophy found any increase in subjective comfort with either red or brown filters.

c) Visual Acuities

- 12 out of 14 (86%) cases of cone-rod dystrophy showed improvement in visual acuity with red glasses, as opposed to 8 cases (57%) with brown glasses.
- The two cases who demonstrated no improvement with either glass had fairly advanced stages of the condition with widespread peripheral pigmentary clumping.
- Of the 5 cases with rod monochromatism, 3 (60%) showed improvement in vision with red filters, while only 1 (20%) showed mild improvement with brown glasses.
- The two cases with rod-cone dystrophy as well as the three cases with central areolar dystrophy failed to demonstrate any improvement in vision with either red or brown glasses.

Discussion

- It is widely accepted that patients with various types of retinal dystrophy, especially those with cone-rod dystrophy and rod monochromatism, would benefit from using coloured filters in conditions of bright illumination. Dark glasses attenuate the ambient illumination that would otherwise saturate the patient's rods, and thus prevent him from seeing in normal daylight illumination. On the basis of the theoretical criteria laid down by Adrian and Schmidt (1975)⁶, Everson and Schmidt (1976)¹ concluded that the ophthalmic filters best suited for this purpose are the Adrian and the NoIR 7% lenses. For our series, we used red glasses (transmittance 550nm; Younger Optics PLS550 CR39 plastic lenses) and commercially available dark brown sun glasses.

Discussion (Continued)

- Silver and Lyness (1985)⁴ found no difference between red and brown glasses in their series, even though most of their patients showed a marked preference for one or the other. However, these workers assessed their cases vis a vis subjective comfort only, and made no objective evaluation of their visual acuity or photophobia.

Discussion (Continued)

- Furthermore, all their cases belonged to a heterogenous group of "retinitis pigmentosa", with no differentiation into exact diagnostic subtypes being made.
- Among those patients in the present study who did improve with filters, the majority appeared to respond most to RED glasses as opposed to brown ones, both objectively as regards improvements in visual acuity and photophobia and subjectively as regards comfort. As would be expected from the clinical condition, all these cases had either cone rod dystrophy or rod monochromatism. Patients with rod cone dystrophy and central areolar dystrophy did not respond to any kind of filter at all.

Discussion (Continued)

- Some limitations of red glasses have been pointed out by various workers. The most important of these appears to be the marked decrease in visibility of objects reflecting short wavelength radiations, which could be of importance in certain situations such as recognition of traffic signals. However, most patients who would benefit most

Discussion (Continued)

- from these glasses already have such poor colour discrimination that further attenuation of colour vision would hardly matter. Secondly, red glasses elevate the effective absolute threshold of rods and therefore cannot be worn in dim (scotopic) illumination. A photochromic lens with a red appearance would appear to obviate this problem. Such a glass is indeed commercially available⁴, but is very expensive, and would require further appraisal before its widespread use could be justified. Finally, some patients may not accept red glasses because of aesthetic reasons. However, as the present study indicates, these limitations are minor in comparison with the benefits that red glasses would provide in daylight illumination.

Discussion (Continued)

- This study appears to indicate significant benefits with red glasses for patients with cone rod dystrophy and rod monochromatism.
- The use of red filters to symptomatic patients with the above condition would appear to be justified.
- It is suggested that local authorities, schools and charitable organisations to endure provision of these glasses to affected pupils and patients.

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[\(Link to the article\)](#)