



Tinted Soft Contact Lens for controlling glare in patients with albinism and its comparison with tinted glasses.

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Purpose: To find out effects of tinted soft contact lens on patient's contrast sensitivity function in the presence and absence of glare source and to explore whether tinted contact lens is a better option for controlling glare as compared to tinted glasses.

Introduction: Photophobia/ glare sensitivity is the most common complaint of Albinism patients. Contrast sensitivity function test is used instead of visual acuity function test for assessment of glare sensitivity under glare source with and without tinted glasses and tinted contact lens.

Methodology: Eighteen subjects between the ages of 11 and 26 years were included in the study. Subjects were assessed for visual acuity on ETDRS chart and contrast sensitivity on PELLI ROBSON chart with and without introducing glare source. Results of visual acuity and contrast sensitivity were scored by recording the total number of letters read correctly. Same procedure was repeated with dark brown tinted glasses and then with soft iris painted contact lens. Binocular scores were recorded and compared with and without tinted glare source.

Results: Subjects showed better results with tinted contact lenses (p value 0.00), while visual acuity remained same.

Conclusion: Use of tinted contact lenses is an important and useful aid in oculocutaneous albinism for reducing glare and improving contrast. The contact lenses also provided a natural appearance and were readily accepted by the subjects.



Introduction:

Albinism affects approximately 1 in 20,000 individuals, resulting in pigment deficiency in the retina, abnormal crossings of the temporal fibers in the optic chiasma, photophobia, defective visual acuity, nystagmus and squint. There are two main variants namely ocular and oculocutaneous albinism. Ocular albinos have variable amounts of uveal pigmentation and usually have a better visual acuity (20/25 to 20/300) among all types of albinos. Oculocutaneous albinos have lesser pigmentation and also have poorer visual acuity (20/80 to 20/400).¹

The amount of light entering the eye in the normally pigmented people is regulated by the pupil size and the dark pigment in the iris. However, persons with albinism experience from a lack of pigmentation in iris. This often causes extra glare resulting in reduced visual function in bright light. Different options in the management of albinism and the resultant glare include, but are not limited to, using tinted glasses and lenses, coatings for protection against ultraviolet radiation, special contact lenses with aperture or colour, and use of visors/ hats to reduce photophobia.²

There are mainly two types of glare, disability glare and discomfort glare. The glare that results in a reduced visibility of an object owing to a source of light somewhere else in the field of vision is termed as disability glare and occurs due to scattering of light by ocular media. The rays of light from the light source are scattered within the eye that results in a curtain of brilliance reducing the contrast and in turn the visibility of the object. The other type of glare is discomfort glare, which occurs as a sensation experienced due to an over bright illumination e.g. reflection of sun rays from a mirror-like shiny surface such as the windscreen of a car.³

The persons with albinism are assumed to have disability glare resulting in photophobia and reduced ability to see in bright light. This has been demonstrated by observing responses to routine visual function tests e.g. contrast sensitivity and visual acuity with and without a light source in the visual field.⁴

In this study comparison of tinted spectacles with tinted contact lens was done in order to find out their comparative effectiveness in reducing the glare. A dark brown contact lens versus brown tinted glasses is used to reduce glare of all subjects. Comparison of contrast values with and without glare source revealed the true picture of patient's visual status.

It is rational to use contrast sensitivity as a test to quantify disability glare which can be demonstrated in a test target as a veiling luminance. This reduces the contrast markedly depending upon the amount of light scattered from a glare source and this reduction can be measured by testing

contrast sensitivity to determine how much disability glare is present and what amount can be reduced by controlling the scattered light.⁴

Aims and Objectives:

- To find out effects of tinted soft contact lens on patient's contrast sensitivity function in the presence and absence of glare source.
- To find either tinted contact lens is a better option for controlling glare or tinted glasses.

Materials and Methods:

Eighteen subjects between the ages of 11 and 26 years were randomly fitted with iris-tinted Plano soft contact lenses. All subjects were identified as having oculocutaneous albinism. All eighteen subjects of albinism were previously using tinted glasses, hats, visors for controlling glare. The subjects who were regular spectacle users were asked to continue wearing them during all testing procedures. Early Treatment Diabetic Retinopathy Study (ETDRS) high contrast acuity chart was used at standard illumination levels for checking the visual acuity. Contrast sensitivity was measured with the Pelli-Robson Contrast Sensitivity Chart at standard room illumination with and without a glare source.⁵⁻⁷ In order to maintain consistency and accuracy the same examiner administered and recorded each stage of assessment throughout the study. In the first stage visual acuity was recorded using the high contrast Lighthouse Distance Visual Acuity Test Chart with standard illumination placed at an appropriate distance. Distance visual acuity in right eye was recorded for each subject, followed by the same procedure in the left eye and then in both the eyes. The responses were scored by noting the total number of letters read correctly. Each letter was assigned one point while each line was assigned a value of five points. Same procedure was repeated with soft iris painted contact lens and patient's visual acuity was recorded. Binocular visual acuity was compared with and without tinted contact lenses.⁷

Pelli- Robson letter sensitivity chart was used to measure Contrast sensitivity first in the presence and then in the absence of a glare source. A 60 watt fluorescent bulb in a white plastic cone shaped mount and placed 15cm away from the eye served as the glare source.

Contrast sensitivity of right eye was measured, followed by left eye and then both eyes of all subjects with tinted glasses and with tinted soft contact lenses were noted and compared. Assessment with contact lens was started after minimum 15 minutes of contact lens insertion.

Inclusion criteria:

1. Patients with albinism



2. Patients with glare problems/ photophobia
3. Patients having visual acuity less than 6/18 but better than or upto 3/60 in better eye with best possible correction.

Exclusion criteria:

1. Patients with mild or no glare problems.
2. Patients with aniridia associated with albinism.
3. Mentally retarded patients.
4. Patients who showed difficulty in handling with contact lenses.
5. Dry eye patients.
6. Ocular allergies and infectious patients.
7. Study was conducted in eye department mayo hospital Lahore.

Results:

Thirty six eyes of 18 Subjects with and without tinted glasses and contact lens and glare source were checked monocularly first and then binocularly. Difference of both eyes of contrast sensitivity was minute and considered negligible. Binocular mean recordings (OU) were compared and analyzed.

Due to fewer numbers of subjects, study should not be considered authentic. A large sample size is required to improve authenticity.

Condition	Without tinted glasses/contact lenses	With tinted glasses	With contact lenses	p-value
Without glare	0.67	1.025	1.508	0.00
With glare	0.42	0.9000	1.233	0.00

Subject's visual acuity remained same with and without iris tinted contact lenses/ tinted glasses and with and without glare source but contrast sensitivity on Pelli Robson chart increased with iris tinted contact lenses. While comparing tinted glasses with tinted contact lens on Pelli Robson chart, subjects showed better results with tinted contact lenses (p value 0.00). This showed that iris painted contact lenses improved visual comfort and patient may get help from these lenses in order to improve contrast and reduce glare.

Without tinted glasses and tinted contact lens mean contrast sensitivity was 0.67 (without introducing glare) in front of patient, while when glare source was introduced it reduced to 0.42.

Meanwhile patient was introduced with tinted glasses (dark brown) and then contrast sensitivity (CS) was measured again with and without glare source. Mean CS score was 1.025 without glare and it was 0.9000 with glare

source.

Patient was asked to wear the contact lens in the end and CS was again measured with and without glare source. With tinted contact lens mean CS was 1.508 without glare and 1.233 with glare.

While comparing tinted glasses with tinted contact lens, tinted contact lens proved to be a better option for controlling glare than tinted glasses ($p < 0.05$).

Discussion:

Photophobia/ glare sensitivity is the most common complaint of Albinism patients. This study is designed in a context that how an optometrist can reduce glare sensitivity of albinism patients without being compromised on his/ her visual acuity. Problem with glare may reduce patient's visual acuity and contrast sensitivity. Visual acuity is usually tested with a standard eye chart that measures the ability to note fine detail on maximum contrast. While contrast sensitivity function test usually gives a more complex designation of vision loss than does visual acuity alone and helps clinicians in their low vision evaluation. In this study contrast sensitivity function test was used instead of visual acuity function test for assessment of glare sensitivity under glare source with and without tinted glasses and tinted contact lens.

The results of our study showed that using tinted contact lens improved the contrast sensitivity thereby reducing glare and increased the comfort levels of the patients suffering from albinism

A study done on three cases by Maria et al showed results similar to the current study. She successfully treated three patients having low vision due to acquired iris abnormalities using tinted hydrogel contact lenses.⁸

Another study however terms the use of tinted contact lenses in low vision as controversial as previous studies of tinted lenses and low vision have used variables like visual acuity, grating acuity, contrast sensitivity, visual fields, adaptation time, glare, photophobia and TV viewing etc. This evidence, the study concluded, is not convincing enough for the eye care practitioners to continue to rely on them while prescribing them.⁹

In another study Fernandes LC prescribed absorptive and tinted contact lenses to four subjects with retinal dystrophy, as an alternate when the use of filter in glasses was not possible or enough to reduce glare. These lenses were prescribed to two patients with rod monochromacy and two with cone dystrophy. All the subjects had complained of severe photophobia, both indoors as well as outdoors. They were given soft absorptive lens, dark brown in colour with amber pupil of 3 mm, in both eyes. Whereas the visual acuity remained unaffected, the subjects immediately experienced comfort in seeing, indoors and outdoors. Despite the limited number of cases, the study

recommended use of absorptive and tinted contact lenses as an important aid to reduce disability glare for patients with retinal dystrophy.¹⁰

Conclusion:

Visual discomfort in bright surroundings is a major complaint of a considerable number of patients with albinism. Eyecare practitioners are aware of this complaint and the responses from our study also confirm this clinical impression. Similarly, reduced contrast sensitivity due to glare induced by a glare source also point towards an abnormality in the visual system. In spite of limited number of cases, findings suggest that use of tinted contact lenses for reducing glare is an important and useful aid in addition to visual acuity enhancers. The contact lenses provided a natural appearance both indoors and outdoors and were readily accepted by the subjects. However, like many other studies, owing to the small number of subjects in the study it cannot be generalized yet that visual discomfort was improved by using iris tinted contact lenses.

References:

1. Sowka JW, Gurwood AS, Kabat AG. Hand book of ocular disease management. [online] [cited Dec 2012] Available from URL: cms.revoptom.com/handbook.
2. Brilliant RL. Essentials of low vision practice. Butterworth Heinemann. 1999. pp 83-84.
3. Schachat AP. Current practice in ophthalmology. Mosby. 1992. pp 153-162.
4. Stedall R, Sacharowitz H, Theotakanis R. Albinism controlling glare with iris tinted contact lenses. [online] [Cited Dec 2012]. Available from URL: <http://www.eyesite.co.za/Professional/EYESITEcozaMagazine/tabid/121/Default.aspx>
5. Pelli DG, Robson JG, Wilkins AJ. The design of a new letter chart for measuring contrast sensitivity. *Clin Vision Sci* 1988 2:187-99.
6. Pelli DG, Rubin GS, Legge GE. Predicting the contrast sensitivity of low vision observers. *J Opt Soc Amer* 1986 3 56.
7. Rosenthal BP, Cole RG. Functional assessment of low vision. Mosby. 1996. pp 41-88
8. Garcia-Kramer MY, Weissman BA. Use of tinted hydrogel contact lenses to reduce glare caused by iris abnormalities. *Int Contact Lens Clin*, 1992 Nov-Dec;19:264-268
9. Eperjesi F, Fowler CW, Evans BJ. Do tinted lenses or filters improve visual performance in low vision? A review of the literature. *Ophthalmic Physiol Opt*. 2002

Jan;22(1):68-77

10. Fernandes LC. Absorptive and tinted contact lens for reduction of glare International Congress Series. Vision 2005 — Proceedings of the International Congress 4 – 7 April 2005 London, UK;1282:534-538 Available from URL: www.sciencedirect.com.