

Visual Acuity and Irlen Syndrome

Some Findings

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1 Introduction

An Irlen diagnostician faces many different aspects of visual performance: visual acuity, binocular vision, visual field, span of recognition, low contrast sensitivity, dominance factor, collaboration of parvo-/magnocellular systems and sensory integration to name a few.

According to an inquiry by e-mail among Irlen Diagnosticians, I noticed that there were no formal studies specifically on this subject, "Visual Acuity and Irlen Syndrome", although in a couple of studies the VA was measured.

By using filters the chromatic aberration can be reduced and therefore an uncorrected ametropia may be reduced as well. This aspect has to be taken in consideration for further studies.

2 Visual Acuity

Visual acuity is just one important element of visual perception. It is part of every ophthalmic and orthoptic examination.

2.1 Definition

Visual acuity is the spatial resolving capacity of the visual system. This may be thought of as the ability of the eye to see fine detail. There are various ways to measure and specify visual acuity, depending on the type of acuity task used. Visual acuity is limited by diffraction, aberrations and photoreceptor density in the eye (Smith and Atchison, 1997). Apart from these limitations, a number of other factors also affect visual acuity such as refractive error, illumination, contrast and the location of the retina being stimulated.

2.2 Little research specifically on Visual Acuity and Irlen Syndrome

A preliminary inquiry by the way of the Irlen Diagnosticians e-mail list showed that there was not any formal study concerning the influence of Irlen Filters on visual acuity. Otherwise, Bruce Evens, Senior Lecturer at the Institute of Optometry, mentioned a couple of studies where they investigated the relationship between Irlen Syndrome and vision problems but without placing particular emphasis on the influence on visual acuity. So in the study "Coloured overlays in schools: orthoptic and optometric findings"¹ some findings in visual acuity are mentioned as "6/6 or better".

But if the assessment of visual acuity stops at 1.0 (6/6), the difference between wearing the filters or not can not be showed. The visual acuity of Irlen patients

¹ Lorna Scott, Hazel McWhinnie, Lynette Taylor, Nicola Stevenson, Peter Irons, Elizabeth Lewis, Marylyn Evans, Bruce Evans and Arnold Wilkins, "Coloured overlays in schools: orthoptic and optometric findings", 2001, in *Ophthal, Physiol. Opt.* 2002, 22, 160, Extract Table 1

without visual impairment is higher than 1.0, even without wearing Irlen Filters. Just in some very severe cases the visual acuity may be below 1.0.

3 Can colored filters improve Visual Acuity?

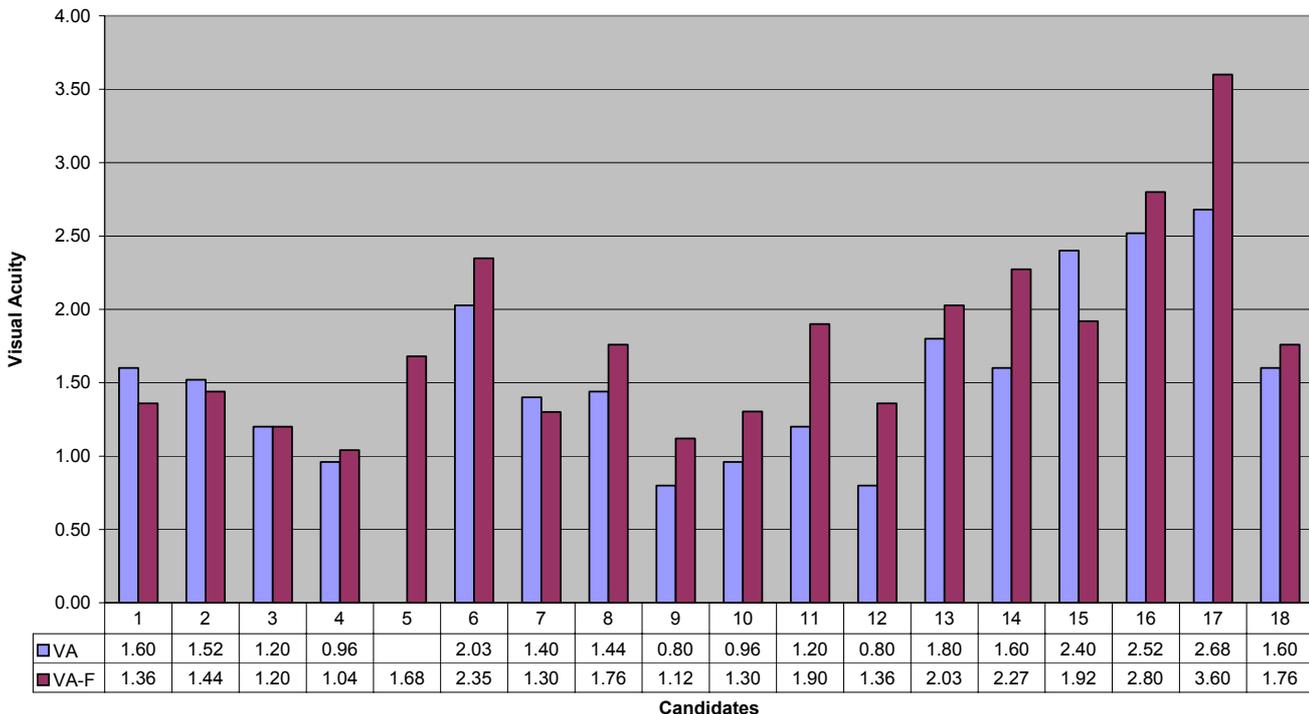
As low vision specialist I am sensitive to any change in visual performance in general and in visual acuity in particular.

Practice as an Irlen diagnostician has showed me, that there may be an important change in visual acuity as a result of wearing the correct Irlen Filters. Preliminary results of systematic observation made me interested in the question of whether wearing Irlen Filters can improve visual acuity.

This question and the analysis of the records of my patients (see Table 1) initiated the presentation of this topic at the 8th International Irlen Conference 2004 in Brugge: "Irlen Syndrome and Visual Acuity, Some Facts – A lot of Questions"

In addition to the presentation, attendees at the conference with Irlen Syndrome had the opportunity to have their visual acuity tested with and without Irlen Filters in order to compare the results.

Visual Acuity and Irlen Syndrome



VA = Visual Acuity without Irlen Filters; VA-F = Visual Acuity with Irlen Filters

Table 1 Visual Acuity and Irlen Syndrome, Findings 2003 – 2004, Switzerland

3.1 Concept of the assessment

3.1.1 Participants

Volunteers without prescription glasses were assessed both with and without Irlen Filters. Some participants with prescription glasses had a pair of correct prescription glasses without tint in addition to their regular Irlen Filters in order to test for the difference.

3.1.2 Test material

- 2 test cards with Landolt Ring (Single Sign) for Standard-Distance 2.5 m and 5 m.²
- Folding ruler
- Lux Meter

3.2 Landolt Ring (Landolt C)

To limit the "side effects" it was decided to use the Landolt Ring Optotype (single sign).

3.2.1 Detection Acuity, „minimum visibile“

Detection Acuity³ is measured using the Optotype Landolt Ring. It estimates the minimum size visible. Target detection requires only the perception of the presence or absence of a stimulus.

3.2.2 Illumination

Illumination is an important factor for visual perception and influences the visual performance for Irlen patients.

There were two "normal" illumination situations.

- in the meeting room with very little light (80 - 200 Lux)
- outside in the shadow but bright (1700 - 1800 Lux)

Some of the candidates were tested in different light conditions.

Remark: In further studies the measurement of luminance contrast of test charts may be more important and has to be taken into consideration.

² The Test cards are based on the SNAB Low Vision Test cards (5 cards), by F. Buser, Olten, Switzerland. The test used in our investigation was altered. We used 2 cards (standard distance 5 m, 2.5 m) and the low contrast sign on the back side is the same size.

³ Various ways to measure and specify visual acuity:

Detection Acuity, „minimum visibile“

Resolution Acuity

Localisation Acuity, „minimum discriminabile“

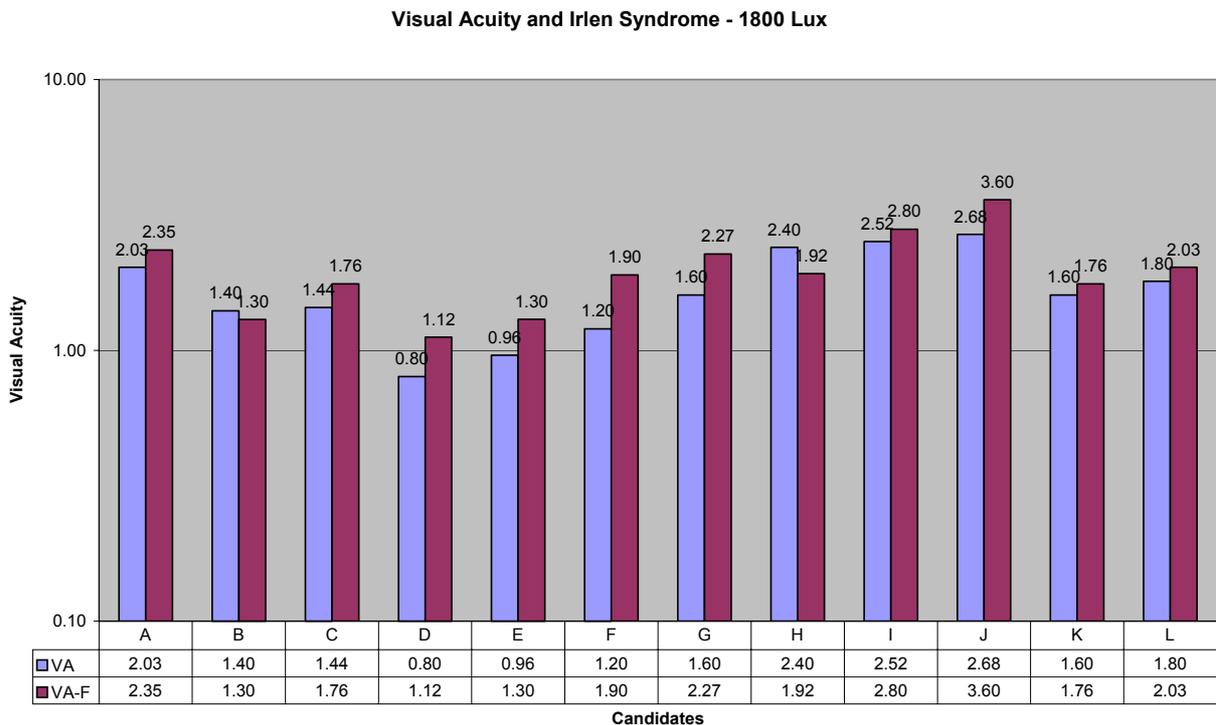
Recognition Acuity, „minimum distinguibile“

3.3 Questions

1. Irlen filter: Do they influence the visual acuity?
2. What's the influence of illumination?
3. How is the perception of low contrast targets?
4. Is there any difference in perception of group signs?

4 Results

4.1 Illumination 1700 - 1800 Lux



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Table 2 Visual Acuity and Irlen Syndrome, Findings, International Irlen Conference 2004, Brugge

Candidates	VA	VA-F	Lux	Candidates	VA	VA-F	Lux
A	2.03	2.35	1800 Lux	G	1.60	2.27	1750 Lux
B	1.40	1.30	1800 Lux	H	2.40	1.92	1750 Lux
C	1.44	1.76	1800 Lux	I	2.52	2.80	1750 Lux
D	0.80	1.12	1800 Lux	J	2.68	3.60	1750 Lux
E	0.96	1.30	1800 Lux	K	1.60	1.76	1750 Lux
F	1.20	1.90	1800 Lux	L	1.80	2.03	1800 Lux

4.1.1 Effect of more light 1

	VA	VA-F	Lux
M	1.20	1.20	80 Lux
M-b	0.80	1.36	110 Lux

4.1.2 Effect of more light 2

	VA	VA-F	Lux
L	0.96	1.04	200 Lux
L-b	1.80	2.03	1800 Lux

5 Conclusion

Although there was a limited number of test subjects, the study gave interesting results:

1. 10 of 12 could improve VA by wearing Irlen Filters (illumination 1800 Lux).
2. In a illumination of less than 200 Lux 3 of 6 had a better VA without filters. But all of them mentioned a disturbed visual perception without filters. Filters improved the visual perception although the visual acuity was reduced or the same.
3. The few cases tested in different light conditions indicate a tendency towards lower illumination less difference and more illumination increased difference between VA with and without filters.
4. A similar tendency could be observed using the low contrast sign. The visual performance of an Irlen person is less disturbed by low contrast sign. Therefore the low contrast sign can be recognized at the same distance or at a slightly reduced distance compared to the sign in high contrast.
5. The focus of the assessment was on visual acuity for a single sign target. In some cases the low contrast perception and the perception of group signs were assessed too. There may be an important difference between perception of a single sign target and group signs target.
6. As it is an easy, precise and short procedure, I hope that the experience and results can be confirmed by many of the Irlen diagnosticians.
7. Such results could give the motivation for further studies, including eye to eye assessment, low contrast sensitivity and perception of group signs.

6 Acknowledgements

I thank the attendees who took part in the study. The results prove that it was an important contribution not only to my presentation "Visual Acuity and Irlen Syndrome" but also to the conference itself.

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