Vision Assessment in the Irlen Syndrome

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Irlen Diagnostician
Consultant in Low Vision Rehabilitation
Teacher for children with special needs

Introduction

- The following presentation will demonstrate the network of professionals working in the visual perception field. It is based on my experience in Switzerland.
- The presentation will also give an insight into the visual diagnostic network used to get indications for Irlen symptoms. It will demonstrate different assessment tools such as the Irlen Diagnostican and the Irlen Screener can use.
- The efficient interaction between the different parts is functioning seldom, is often insufficient and often inexistent.
- The unsatisfied situation is due to the absence of a common professional language and the lack of assessment instruments used “on both side”.
- In addition: Different others aspects out of the medical field will be mentioned and linked to our daily work.

Who can observe and judge visual performance?

- Person concerned (Questionnaires are the first step in the Irlen Methode)
- Professionals who are active directly in the field of visual performance. To mention: Ophthalmologist, optometrist, orthoptist, Low Vision Therapist.
- But there are others important questions: Which other professional group can observe and judge visual performance in school, at working places and in daily living? Who has time to observe and document the results?

Group A
„The professionals of seeing“ 1

- Ophthalmologist
- optometrist
- orthoptist
- Low Vision Trainer

- There is often a lack of competence and instruments to evaluate visual perception problems, Irlen Symptoms. An enlarged assessment in this field is not possible in the existant structure.
- Remark: Functional optometry include more techniques, but the selective photophoby is often forgotten or they have only a limited choice of colors in their equipment.

Group A
„The professionals of seeing“ 2

- This group of professionals has often not time, not the structure and competence nor the test instruments to recognize special needs in the field of visual perception problems. They just assess the standard functions such as visual acuity and need for refraction. For this group the important task is the assessment and treatment of eye diseases.

Group B:
The professionals near to visual activities 1

- teachers
- teachers for children with special needs
- psychologist
- ergotherapist
- specialists in rehabilitation
- …

They are working in a different frame, but very near to visual activities. They live and work with the persons concerned. They can observe different visual activities in different situation.

But:

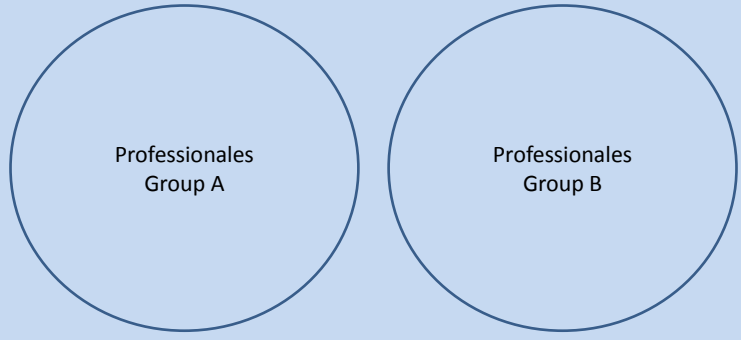
The professionals near to visual activities have:

- little or no knowledge and skills in observing and measurement the visual performance
- They often remain on the level of - "Something is not right" –
- A targeted assistance is hardly possible
- the communication to the group of eye experts is difficult

- Often are activities practiced and trained, which would need first a normalisation of the basic visual functions
- this is very frustrating for patients and for therapists

- Both groups, „vision specialists and professionals near to visual activities“ work in their "gardens". The obvious synergies are not exploited. Mourner is the person concerned.

Now

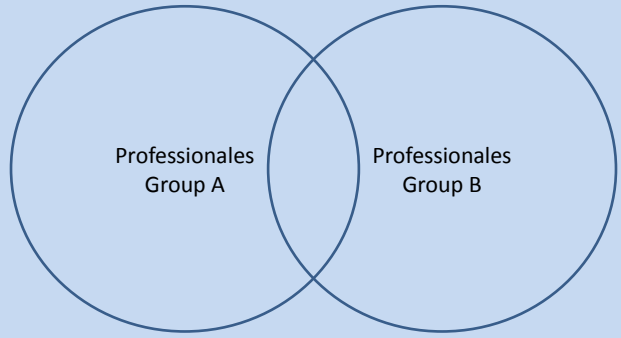


How can they work together better

Other ways?

- I am quite confident, that there may be other ways.
- We all have such experiences.
- The Irlen Method gives knowledges and interesting techniques for both groups.

The future: exchange results and solutions improve communication



Group A:
Ophthalmologist, optometrist, orthoptist, Low Vision Trainer

The standard assessment completed with few additional questions which give indications whether visual perception is impaired although the VA is “normal”. Some few examples:

Key Questions

- How is it for you to look to the vision chart? (Single sign, row sign, group sign)
- What happens when you hold fixation on one sign?
- What happens when you cover one eye?
- What happens at a reduced Illumination?
- What happens at a reduction of the luminance (difference black-white)?

Group B
Teachers, teachers for children with special needs, psychologist, ergotherapist, specialists in rehabilitation

Now I am come back to non-medical professionals: to teachers, teachers for children with special needs, psychologist etc.

- This professional group is not used to do vision tests. May be that they think not to be allowed to do such testing.
- But they should know more about visual tests and they should do some functional visual tests in their professional activities.
- It is important to have such additional instruments to understand important aspects of the visual performance.
- In order to understand the consequences for reading, learning and many other visual daily living skills.
- In order to have an improved communication to the eye professionals.

Different possibilities of functional testing

- Let's go in a systematic way through different possibilities of functional testing of different functions of the visual system.
- Using different standard assessments, it is possible to observe and document Irlen Symptoms. These are important tools to make different groups of professionals more conscious of the visual discomfort, visual perception problems and visual stress experienced by patients with Irlen Syndrome.
- On the other hand, all of the presented tests can be used by Irlen Screener and Diagnostician for functional measurements of the visual performance.
- The results are a base for discussion with other professionals and for reports. Although the measurements are not made under clinical condition they gave an important input for better understanding the symptoms.

Some visual functions

Visual function	Assessment Test
Visual Acuity Contrast Sensitivity	VA-LCS-Testcards by Buser/Steiner
Need for magnification	SZB Need for magnification
Accommodation-Convergence	A=C-Bar by Dr. med. D. Safra

Some visual functions

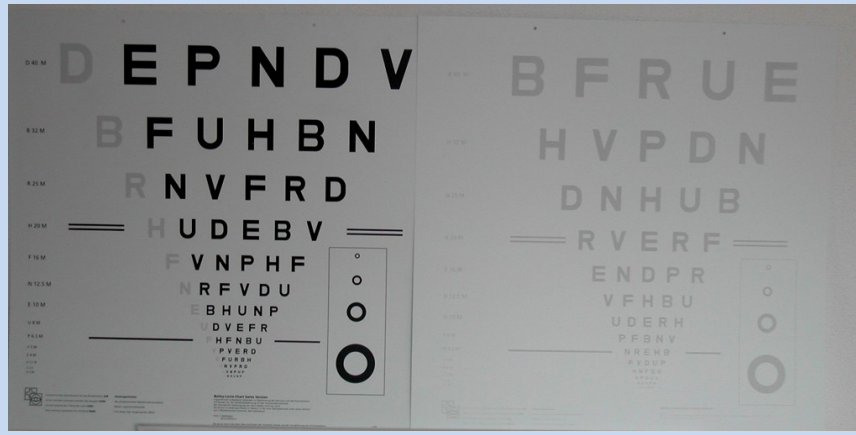
Visual function	Assessment Test
Binocularity	30-Prism-Test by Dr. med. D. Safra
Stereopsis	Lang Test
Color Vision, Color Discrimination	Ishihara Farnsworth Munsell-100 Farnsworth D15 Lanthony D15

Other visual functions

Not mentioned in the presentation are clinical test methods in field of :

- Glare Sensitivity
- Photophobia
- Dark Adaptation
- Visual Field

Visual Acuity and Low Contrast Sensitivity



UCBA-Vision Acuity chart, based on the Bailey Chart

VA-Test-Set by Buser/Steiner

Notation

CH: 1.0; 0.5; 1.6 (Decimal fraction, as result of the formula:

Test-Distance/Standard distance = VA

UK: 6/6; 6/18; 6/60 (relation to meters)

USA: 20/20; 40/20; 20/200 (relation to feet)

M-unit: Distance in meters, where an optotype can be recognised with a visual acuity of 1.0 or an angle of 5 '.

Visual acuity and IS

Print Resolution

Difficulty with Sustained Attention

Restricted Span of Recognition

- If we can improve print resolution, the Visual Acuity improves too.
- If we can improve sustained attention, it may be that the VA can improve.
- If we can enlarge the span of recognition it is possible that the VA will improve, particularly with group signs tests and with tests for need of magnification and reading tests

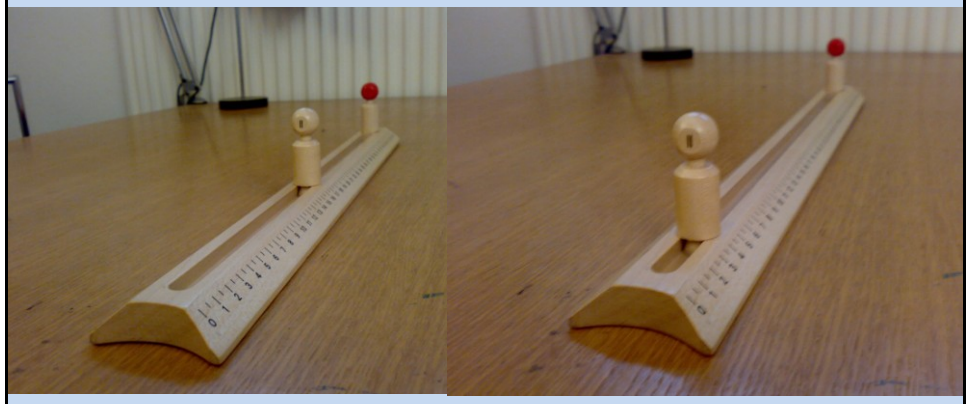
Very important: Improvement in comfort, fluency

Visual acuity
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 factors also affect visual acuity such as refractive error, illumination, contrast and the location of the retina being stimulated.

From the point of view of Irlen Syndrome:
The interaction of the receptors.
The selective sensitivity of the cones.
The ability to hold fixation.

Accomodation-Convergence Bar

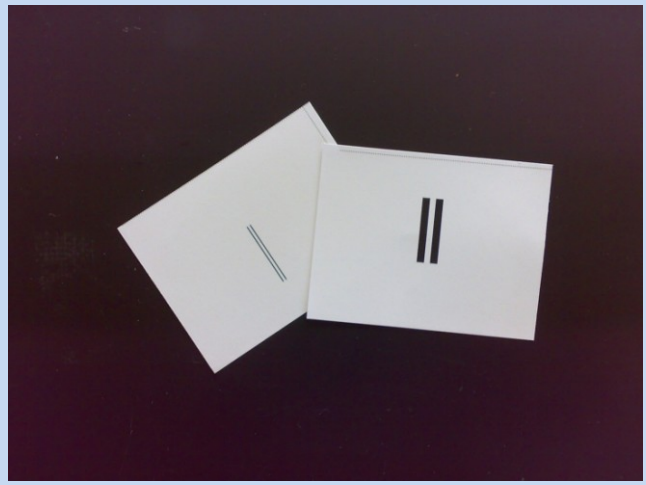


MEASURING THE CONVERGENCE NEAR POINT

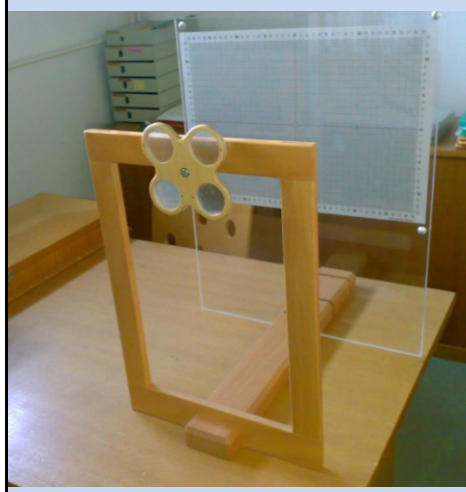
Place the curved end of the A=C-BAR above the upper lip of the patient. Move the white doll with the face side towards the patient's nose root and stop when the doll appears doubled. The convergence near point then can be read from the centimeter scale of the A=C-BAR. Normally the near point of convergence lies within 5cm near in front of the nose. While the white doll moves towards the nose the red doll should appear doubled. The more the white doll comes nearer the more the images of the red doll diverge.

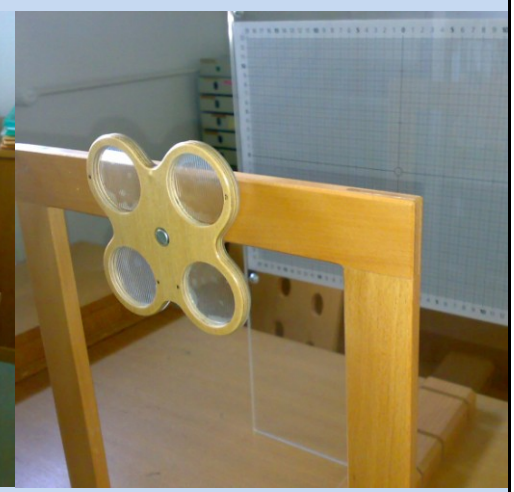
MEASURING THE ACCOMODATION - RANGE.

Place the curved end of the A=C-BAR above the lateral half of the upper lip beneath the eye to be examined. The other eye is kept covered. The patient looks at the two parallel lines of the white doll. Move the white doll towards the eye of the patient and stop when he sees three lines instead of two.



Binocularity





Binocularity

The person describe what the circles do. They can point the position of the circle.

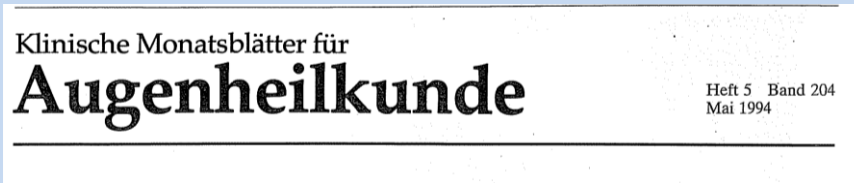
Binocularity – 30-prism-test

Video 30-Prism-Test 1

Video 30-Prism-Test 2

Binocularity

Dr. med. Doris Safra
30-Prismen-Test



Enke Verlag, Stuttgart

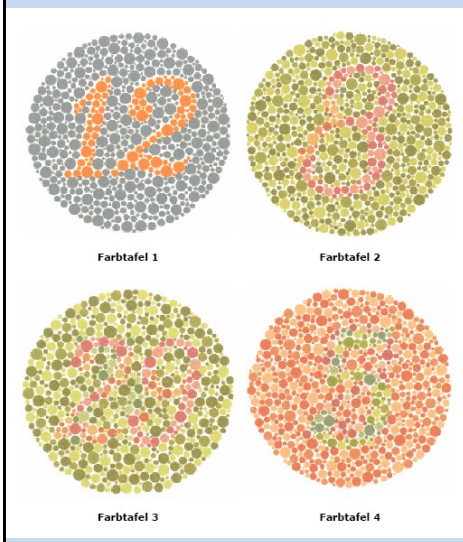
Accommodation, convergence

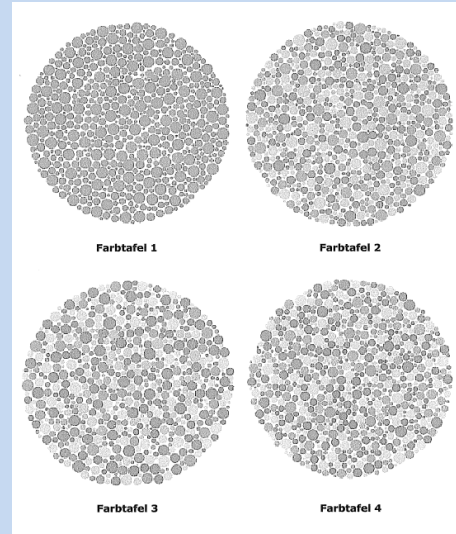
The findings are also consistent with those of Evans et al. (1995, 1996) in showing poorer amplitude of accommodation in children who benefit from the use of coloured Filters.

Lorno Scott et al., 2000, Colored overlays in School, Ortoptic and optometric findings.
In Ophthal. Physiol. Opt. 2002 22 156-165

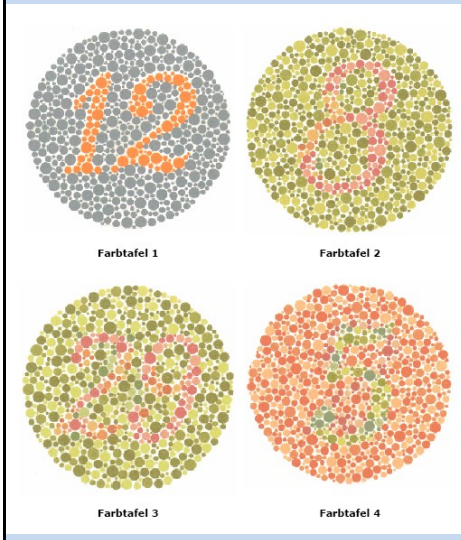
Color Vision, Color Discrimination

Ishihara Farbtafeln





Ishihara Farbtafeln



Different strategies to read the numbers:

The numbers can be read immediately

The gaze follow the form and the person try to construct the sign.

Again: Doing the task with and without the lenses.

Stereopsis

Possible Results using the Stereoscopique Tests

- Fluency in recognition of the images
- Recognition is only possible with the Irlen Spectral Filter (seldom)

Some News

- Cone activities and Colour discrimination
- Autisme and visual problems. Support in school activities. Extrait: Eye Movement, Tracking the gaze
- „Simple: It is so different“, Colored lenses change the world: Irlen Syndrom and Selfconcept

Cone activities and Colour discrimination (Barbolini 2009)

Giuseppe Barbolini, Andrea Lazzerini, Luigi Alberto Pini, Modena; Fritz Steiner, Dornach; Giancarlo Del Vecchio, Mario Migaldi, Gian Maria Cavallini, Modena, Malfunctioning cones and remedial tinted filters, in Ophta, Schweizerische Fachzeitschrift für augenärztliche Medizin und Technologie, 02/2009, 101-107

http://www.irlen.ch/ireports/Originalia_Malfunctioning_0415.pdf

Cone activities an Colour discrimination (Barbolini 2009)

Objective: To compare photophobic migraine patients (CM) with photophobic patients without headache in regard to the incidence of dysfunctional cones due to Irlen Syndrome.

Design: Prospective, observational case-control study.

Patients: Three study-groups (20 subjects each) were recruited as follows: (1) photophobic patients suffering from chronic migraine (CM); (2) photophobic patients without headaches; (3) healthy subjects.$

Cone activities an Colour discrimination (Barbolini 2009)

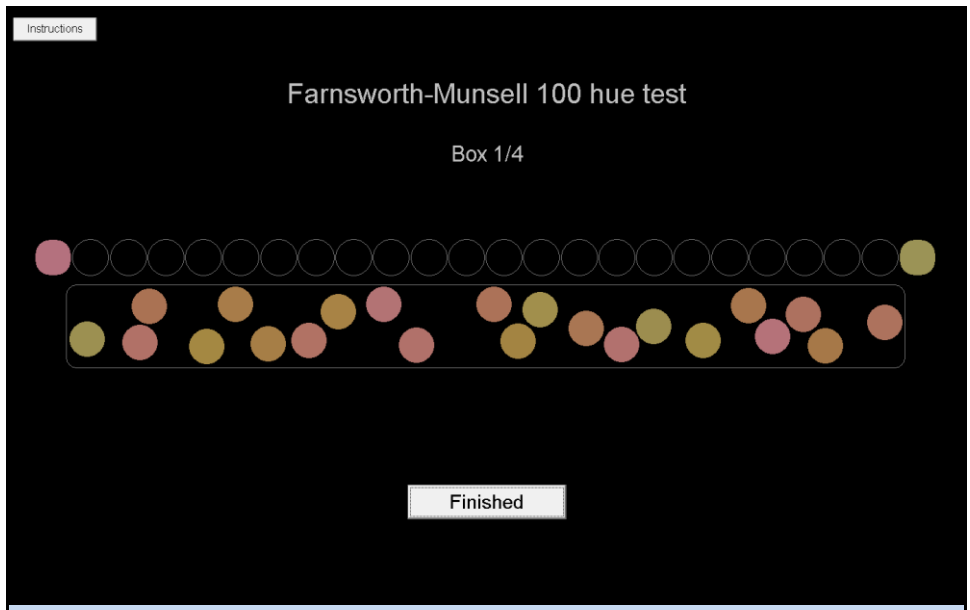
Methods: The photophobia was evaluated as total error score (TES) at Farnsworth-Munsell 100 hue test and by electroretinography.

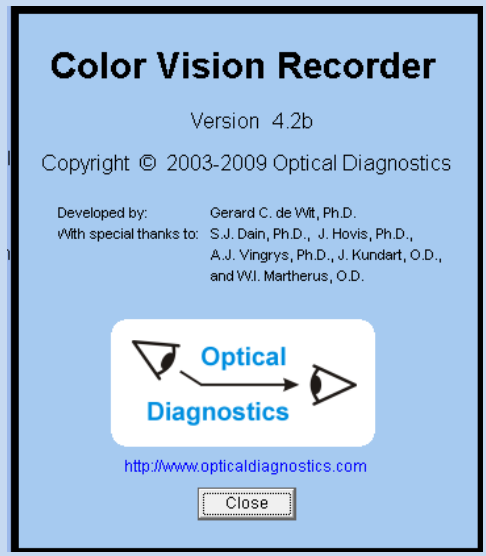
Results: About 85% of the photophobic tested patients were suffering from Irlen Syndrome (IS). Tinted filters, shifting daylight towards blue or towards green/red, markedly reduced the photophobic discomfort. The benefit was more evident in CM patients ($p<0.05$ ANOVA).

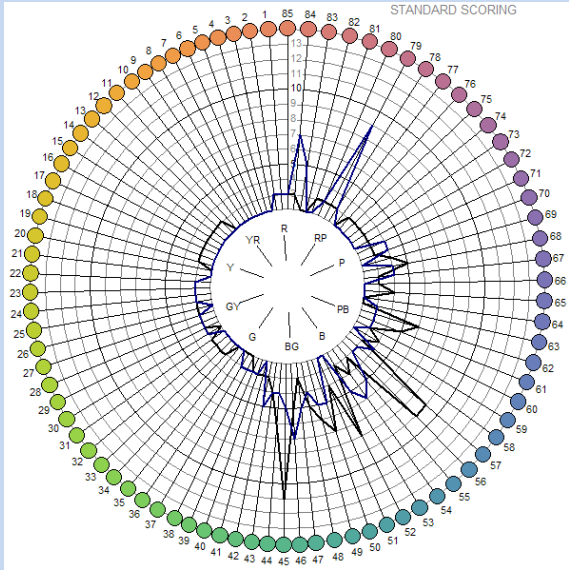
Conclusions: IS appears to be a hereditary disease related to a sectorial reduction in cones photopigment. There was a high incidence of IS in the CM patients, and these mainly responded well to tinted filters prompting further research.

Color discrimination (Barbolini 2009[4])

The use of tinted filters individually and hierarchically selected for hue, saturation and luminance was able to reduce total error score (TES) in the Farnsworth-Munsell 100 hue test.







ANALYSIS
Reference - MO15
Date of Birth - 02-17-1958
Date of test - 09-18-2006
Comments -
Total error score (TES) = 116
Square root (TES) = 10.77
Classification = Low discrimination
Percentile
'Unselected' = 10%
Vingrys analysis
Angle =-79.05
C Index = 1.7
S Index = 1.16
Suggested Diagnosis - ? Tritan defect

ANALYSIS
Reference - MO15
Date of Birth - 02-17-1958
Date of test - 09-18-2006
Comments - B66
Total error score (TES) = 84
Square root (TES) = 9.17
Classification = Average discrimination
Percentile
'Unselected' = 20%
Vingrys analysis
Angle =72.18
C Index = 1.59
S Index = 1.35
Suggested Diagnosis - Unresolved

Cone activities and Colour discrimination (Barbolini 2009)

The morphochromatic analysis of the foveomacular region revealed that IS patients had – in comparison with the control group – a reduction in red, green and blue, more pronounced for red and blue. Conversely, IS 6 patients presented higher values of saturation and lower values of intensity (luminance).

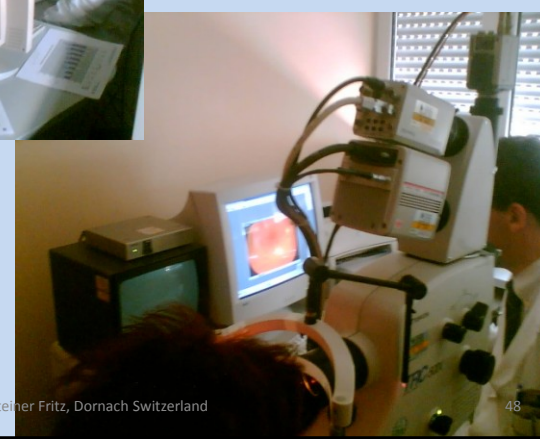
Finally the reduction of TES in photophobic-patients was 29±4.3%, whereas the improvement of CM patients was 41±5.9% . These parameters were significantly different from control group (differences from coloured lenses and white < 2%) by using ANOVA followed by Bonferroni post hoc test.

Electroretinogram ERG

Electroretinogram ERG

The benefit of using selected tinted filters was confirmed by ERG results showing a significant balanced decrease in photopic amplitude (µV) after wearing filters. Moreover more than 70% of IS-patients showed a significant balanced reduction in the difference in ms (peak time) between the left and right eye after wearing filters . This behaviour was observed in all IS-patients when the difference between the eyes exceeded 1.3 ms.

OCT Ocular Cohorence Tomography (OCT 3 Zeiss)



Fluoronangiograph TOP CON, Software for RGB and HIS

The high incidence of IS in the CM patients, who mainly responded well to the tinted filters, suggests continuing further research.

Giuseppe Barbolini, Andrea Lazzerini, Luigi Alberto Pini, Modena; Fritz Steiner, Dornach; Giancarlo Del Vecchio, Mario Migaldi, Gian Maria Cavallini, Modena, **Malfunctioning cones and remedial tinted filters**, in Ophta, Schweizerische Fachzeitschrift für augenärztliche Medizin und Technologie, 02/2009, 101-107

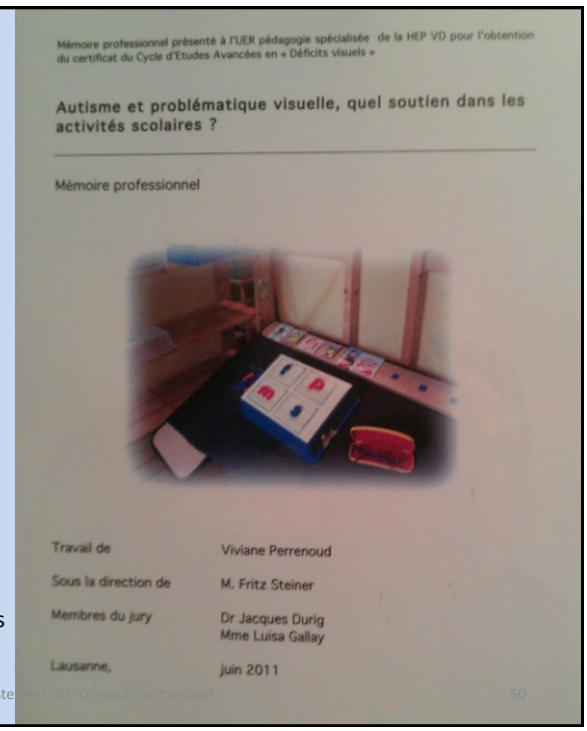
Download:
www.irlen.ch/ireports/Originalia_Malfunctioning_0415.pdf

Viviane Perrenoud, Autisme et problématique visuelle, quel soutien dans les activités scolaires?

Direction du mémoire:
Fritz Steiner

Membres du jury:
• Dr Jacques Durig, ophthalomologue
• Luisa Galley, enseignante spécialisée

Mémoire professionel:
Certificat du Cycle d'Études Avancées
Haute École Pédagogique du Canton Vaud, Lausanne

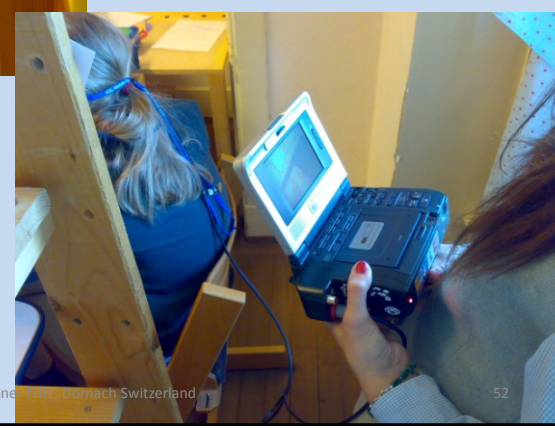

Mémoire professionnel présenté à l'UER pédagogie spécialisée de la HEP VD pour l'obtention du certificat du Cycle d'Etudes Avancées en « Déficits visuels »

Autisme et problématique visuelle, quel soutien dans les activités scolaires ?

Mémoire professionnel

Travail de Viviane Perrenoud
Sous la direction de M. Fritz Steiner
Membres du jury Dr Jacques Durig
Mme Luisa Gallay
Lausanne, juin 2011

Eye movements – eye gaze scanning



Lea
Dr Fabienne Giuliani
Therapiste

Apport des lunettes filtres 2011-2012

Balayage visuel avec les filtres Irlen

44% du temps passé à suivre la bougie

sans filtres

22%

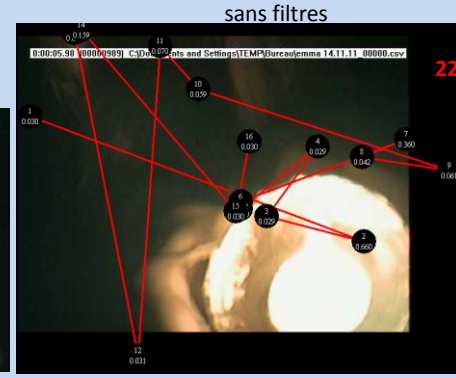


Figure 4 : **Balayage visuel durant 10 secondes**.
Les points noirs correspondent à la fixation du regard dans l'ordre chronologique d'apparition. On constate qu'avec le port des lunettes filtres, le balayage visuel est plus important tant en nombre de points de fixation, que sur le découpage de la scène observée par Lea. D'autre part, le pourcentage du temps passé à suivre la bougie par rapport à la durée de la tâche correspond à 44% avec les filtres contre 22 % sans les filtres.

Resource: le Foyer, Lausanne – CHUV, Lausanne 2012

Apport des lunettes filtres 2011-2012

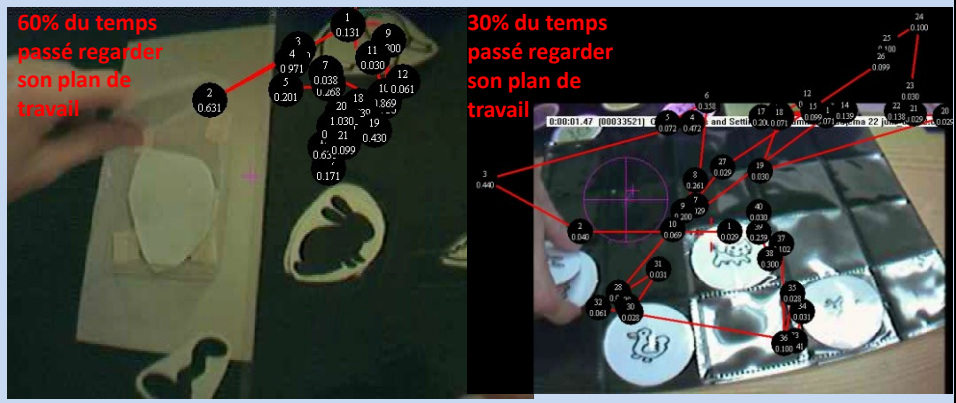
Balayage visuel avec les lunettes sans lunettes

Figure 4 : **Balayage visuel durant 10 secondes**.
Les points noirs correspondent à la fixation du regard dans l'ordre chronologique d'apparition. On constate qu'avec le port des lunettes filtres, le balayage visuel est plus important tant en nombre de points de fixation (ce qui rend compte du passage d'un balayage visuel dynamique), que sur le découpage de la scène observée par Lea.

Ressource: le Foyer, Lausanne – CHUV, Lausanne 2012

Apport des lunettes filtres 2011-2012

Balayage visuel avec les lunettes dans un exercice d'appariement sans lunettes



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Resource: le Foyer, Lausanne – CHUV, Lausanne 2012

Interkantonale Hochschule für Heilpädagogik Zürich

Susanne Hottiger-Müller

„Simple: It is so different“

Colored lenses change the world:
Irlen Syndrom and Selfconcept

2011

Director:
Prof. Dr. Ursula Hofer

Juni 2010

„Simple: It is so different“

The author of the Paper is personally affected by the Irlen Syndrom.

She is a certified in pedagogy for children with special needs and Irlen Screener.

Her experience led to the questions:

1. What is changed by the diagnosis of Irlen syndrome and its treatment through Irlen spectral filters?
2. Which impact have these changes in **self-concept** of those on the cognitive, emotional and pragmatic level?

„Simple: It is so different“

The Paper is a case study of qualitative social research. The data were problem centered and narrative interviews. They have been raised with two young women wearing Irlen filter glasses and their mothers.

The assumptions were confirmed by the study:

- Diagnosis and treatment influence the disorder awareness of the person concerned.
- The color filter treatment alters the visual perception of the Irlen patient
- These changes result in a reframing of the self-concept of the concerned person.

Conclusion

Functional visual assement is an important instrument for Irlen Screeners and Diagnostician

- For learning more about seeing
- For improving the communication to the „eye professionals“

A last question:
Irlen Syndrome – A Piece of the Puzzle or a Corner-Stone?
What do you think?

Thank you

Fritz Steiner, Dornach Switzerland

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