



MALAGA2013

Four events, one vision: a global forum for eye care

18-21 April, Spain

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No.

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12.	Manuel Álvarez-Prada
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47.	Professor Antonio Calossi
48.	Dr Genís Cardona
15.	Dr Juan de la Cruz Cardona
01.	Virginia Carrillo Ramos
65.	Dr Lily Chan
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No.
 95. Priya Dabasia
 66. Raúl Martín Herranz
 67. Ana del Río San Cristóbal
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 69. Professor J. Peter Gierow
 42. Amparo Gil-Casas
 60. Dr Subodh Gnyawali
 96. Lena Gronde
 43. Dr Raquel Herrero
 97. Dr Simone Imbesi
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 99. Dr Keziah Latham
 51. Dr Janet Leasher
 28. Dr Dimitra Makrynioti
 06. Yolanda Martin
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 07. Claire McDonnell
 70. Jennifer McMahan
 29. Professor Juan Carlos Montalt
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 30. Judith Morris
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 100. Dr Shehzad Naroo
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 37. Ignacio Serrano Peláez
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 10. Nilpa Shah
 77. Irene Sisó Fuertes
 63. Karen Sparrow
 54. Dr Niall Strang
 88. Dr Ahalya Subramanian
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 04. Dr Baskar Theagarayan
 05. Louise van Doorn
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 89. Dr Elena Tomás Verduras
 90. Dr Wolfgang Wesemann
 44. Dr Timothy Wingert
 91. Professor Abbas Ali Yekta

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All information correct at time of printing.

About Malaga 2013

Malaga 2013 has brought professionals from around the world to Spain to attend several important optometric and optics events in one city over the same weekend.

This exciting event will allow you to network, share, inspire and learn from each other.

Malaga 2013 will host the European Academy of Optometry and Optics' Annual Conference, the European Council of Optometry and Optics' General Assembly, and the World Council of Optometry's General Delegates' Meeting, alongside the Spanish General Council of Optometry's National Conference.

European Academy of Optometry and Optics' Annual Conference

This conference offers delegates the opportunity to discuss and debate key issues, to interact with colleagues from around the world, and to learn from each other.



The conference brings together practitioners, educators, researchers and administrators from across Europe. It offers many different ways to learn, share ideas, and it also provides a forum for networking and discussion in an environment which facilitates collaborations and partnerships.

Conference aims

- To enhance communication and cooperation among educational institutions.
- To strengthen the harmonisation of optometry and optics in Europe.
- To promote education, research and scientific knowledge in optometry and optics.
- To promote collaborative working.
- To facilitate the building of European networks that cross borders and languages.

Conference sessions

Clinical workshops. Eight workshops will be held at the conference and will support the development of practical skills.

Poster presentations. Over 100 posters will explore a range of topics, giving delegates the opportunity to gain valuable insights and develop their personal networks.

Posters 1-54 will be displayed on Saturday, and those numbered 55-106 will be displayed on Sunday. There will be time during coffee and lunch breaks to view the posters.

Lectures and academic & research. Leading researchers and academics will focus on the latest developments in eye health care. The conference also features two keynote lectures.

Discussion forums. These forums will explore the major issues facing the practice and development of optometry and optics across Europe. These sessions are designed to be interactive and all delegates are encouraged to participate.

Case studies. These sessions will bring together brief case studies for discussion, allowing delegates to share and compare practice.

Facilitated by a Chair, the sessions will allow delegates to discuss how they work, and to explore how they can learn from each other.

Members' Special Interest Groups. These sessions offer members the opportunity to develop their professional networks in the areas of: cornea, contact lenses and refractive technology; optometric low vision rehabilitation; binocular vision; primary eye care; and optometric education.

These sessions are only open to Academy members.

European Council of Optometry and Optics' General Assembly

The ECOO spring meeting will bring delegates and interested parties together for the organisation's



General Assembly and a series of meetings that will offer a range of presentations, updates on ongoing activities and discussion forums.

World Council of Optometry's General Delegates' Meeting

The WCO General Delegates' Meeting will unite professionals to discuss eye care issues in WCO's six world regions.

WCO will use the meeting to update delegates on the work of the organisation's various committees and scope of practice around the world.

Spanish General Council of Optometry's National Conference

This conference will address one of the important issues in visual health sciences: the relationship between vision and ageing. The event will focus on the evolution of visual status over time, with particular emphasis on age-related macular degeneration (AMD) and glaucoma.



Welcome from the Academy's President

It is my great pleasure to welcome you to Malaga for the Academy's fifth annual conference.

This year, the Academy and the European Council of Optometry and Optics (ECOO) are welcoming colleagues from the World Council of Optometry to their biennial General Delegates' Meeting. These events are also taking place alongside the National Conference of our hosts, the Spanish General Council of Optometry.

We are now five years old, and I am very proud that the Academy's conference has become a valuable part of the international optometric calendar. We have once again received far more abstracts than ever before, 241 in total, from all over the world, addressing issues of importance to European professionals and our colleagues from further afield. This year's conference will provide the opportunity to discuss specific solutions to common international challenges in each of the education, research and clinical practice themes of the conference. It is very much a global forum for eye care.

This year we welcome Professor Brien Holden (University of New South Wales, Australia), and Dr Eef van der Worp (University of Maastricht, Netherlands) as our keynote speakers. Professor Holden will talk about the role of technology in eye care, while Dr van der Worp will cover some key issues around contact lenses. As usual, though, there is much more to the conference, with oral presentations on a wide range of topics, clinical workshops, discussion forums, case study sessions, members' only special interest groups and a different set of posters on display each day. Poster presenters will be available to discuss their work with you during the coffee and lunch breaks, so do remember to visit them on both Saturday and Sunday.

The size of the programme booklet you are holding shows how far we have come in the five years since we began our mission to bring together professionals from different backgrounds to help each other learn and develop. But the more people we are able to reach, the more we can help everyone to meet their own specific needs. It is what we can exchange with each other that is so valuable and the bigger the forum the more likely it is that we will all find what we are looking for. So, I urge you to spread the word about the work the Academy is doing.

Finally, I would like to thank our headline sponsor, Essilor, for their much valued support, our gold sponsor, Bausch + Lomb, silver sponsor, Topcon, our supporter, Optometry Giving Sight and the Spanish General Council of Optometry for being our hosts this year.

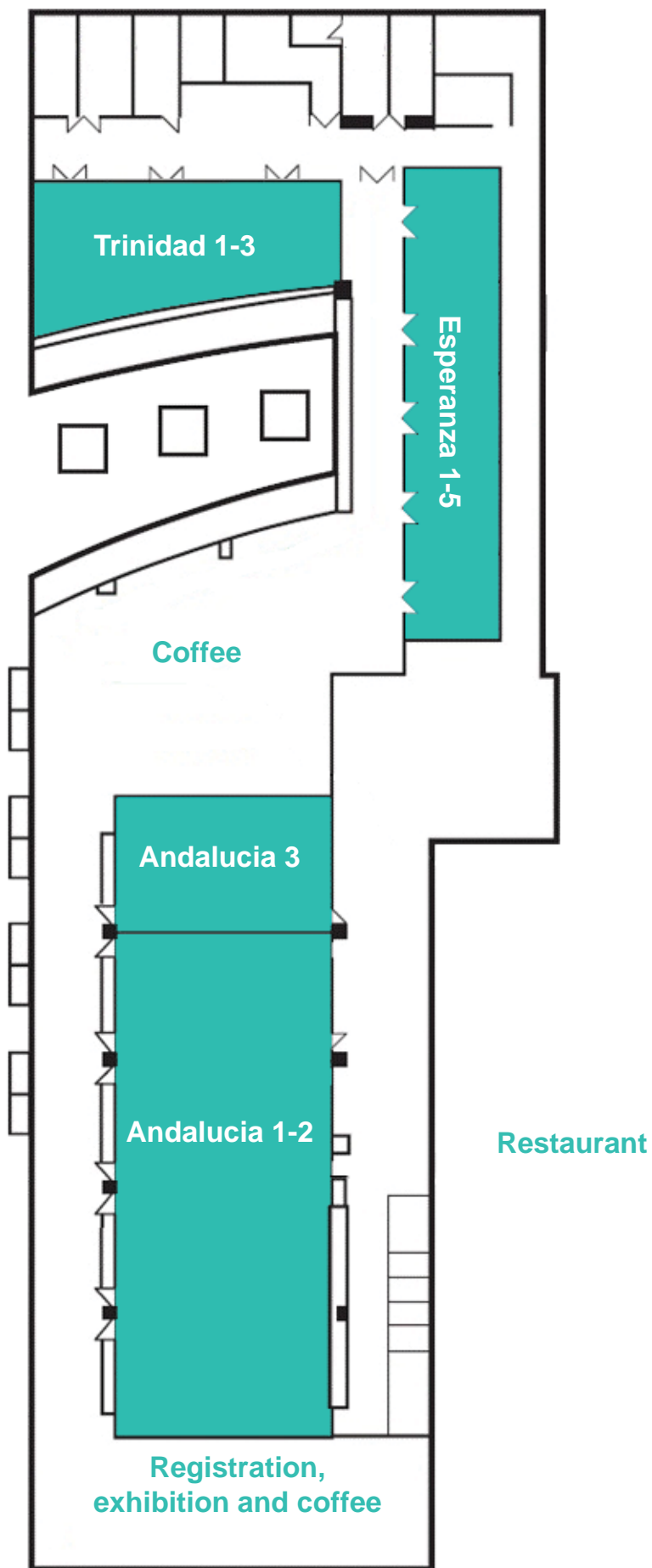
I hope you enjoy the conference and the many presentations available throughout the weekend. I look forward to meeting many of you for the first time, and do remember to complete your feedback form so we can continue to improve over the course of the next five years and beyond.

A handwritten signature in blue ink, appearing to read 'R. Crelier', with a stylized flourish at the end.

Professor Roger Crelier

President, European Academy of Optometry and Optics

Barceló Hotel floor plan



Dinners and coach transport

Many of you will have evening meals included in your event ticket, which also includes transport to the dinner venue.

ECOO get together dinner

Date: Friday 19 April
Time: 19.00
Venue: El Realengo
Carretera de Coín km 88
Churriana

This dinner is included in the price of the all event and ECOO only tickets.

Academy and WCO dinner

Date: Saturday 20 April
Time: 19.00
Venue: Hacienda del Alamo
Ctra. De Casabermeja
A-45 km 166
29014 Malaga

This dinner is included in the price of the all event and WCO only tickets.

Coach transport

We will be providing coach transport to and from these venues. If you are attending either of these dinners, please make a note of the following coach times.

Friday 19 April

19.00: Pick-up outside Barceló and Silken hotels
23.00 Return transport to Barceló Hotel

Saturday 20 April

19.00: Pick-up outside Barceló Hotel
23.00 Return transport to Barceló Hotel

Malaga 2013 venues

Barceló Hotel

Estacion Vialia Maria Zambrano
Heroe de Sostoa, 2
Malaga 29002
barcelo.com

Silken Puerta Hotel

Héroe de Sostoa, 17
Malaga 29002
hoteles-silken.com

Directions

To get to the Silken Puerta Hotel from the Barceló, head southwest on Calle Héroe de Sostoa toward Calle Juana Jugan.

The Silken Puerta Hotel will be on your left. Distance between the hotels is less than 200m.

Malaga 2013 sponsors

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European Academy of Optometry and Optics conference programme

Friday 19 April				Room	
Time	Session	Presenter	Title		
08.00	Registration				
13.30 - 17.30	Clinical workshops	Marie Bodack	Treatment of basic visual skills deficits with vision therapy	Esperanza 1-4*	
		Caroline Christie	Gadgets and gizmos - latest advances in clinical dry eye diagnosis and management		
		Philip Fine	The contact lens fitting technique in cases of medium to advanced cases of keratoconus with large diameter GP lenses and scleral GP lenses		
		Claire McDonnell & Declan Hovenden	Advanced slit lamp techniques		
		Jennifer McMahon	Fitting 'principles' and 'practicals' of non-fenestrated scleral lenses		
		Vanessa Moodley	Demystifying the diagnosis of the strabismus		
		Katerin Ortiz	Vision beyond 20/20 - the binocular vision exam		
		Brian Tompkins & Nicholas Rumney	Hi-tech photography		
18.00 - 19.00	Academy, ECOO and WCO welcome reception This is open to all delegates and their guest(s)				Silken Hotel
19.00 - 23.00	Coach departs the Barceló and Silken hotels for the ECOO get together dinner This dinner is included in the combined event ticket, and the ECOO only ticket				El Realengo

Saturday 20 April				Room
Time	Session	Presenter	Title	
07.30	Registration			
08.00 - 09.00	Discussion Forum 1	Petr Vesely	Reliability of the visual acuity testing on logMAR ETDRS and Snellen Chart	Trinidad 2*
		Zahra Jessa	Computerised screening for correctable visual impairment in older people	
08.30 - 12.00	ECOO General Assembly			Andalucia 1-2*
09.00 - 10.00	Discussion Forum 2	Miguel Zapata	Screening of retinal diseases from optical center by non-mydriatic cameras: the optician on the basis of visual health	Trinidad 2*
		Natividad Alcón	Fundus eye evaluation: fundus camera vs scanning laser ophthalmoscopes	
	Discussion Forum 3	Shehzad Naroo	Introducing specialist services into routine practice	Trinidad 1*
		Ellen Svarverud	Implementing the use of diagnostic drugs in Norwegian optometric practices: educating practising optometrists	
10.00 - 11.00	Discussion Forum 4	Roger Kamen	Achieving optometric coverage in a National Public Health Insurance Scheme: a journey of 22 years with Medicare in the USA	Trinidad 2*
		Vinod Daniel	All India strategic plan for the development of vision care in India – Aksauhini	
	Case Study 1	Jennifer Brower	An introduction to low vision assessment	Trinidad 1*
		Silvia Tablada Garcia	Sudden loss of vision in a young patient	

Saturday 20 April cont...				
Time	Session	Presenter	Title	Room
11.00 - 12.00	Discussion Forum 5	Priya Morjaria	The other side of the coin: provider perceptions on delivery of refractive services in a low income setting	Trinidad 2*
	Case Study 2	Kovin Naidoo	The potential of social enterprise to increase access to eye care	
		Marie Bodack	Vision therapy as an alternative to surgery for the correction of acquired paediatric esotropia	Trinidad 1*
		Juan de la Cruz Cardona	Visual training as treatment of diplopia in patients with oculomotor palsy due to intracranial hypertension	
12.00 - 13.00	Lunch	<i>Sponsored by Topcon</i>		Restaurant*
12.15 - 13.00	Poster presentations			Andalucia corridor*
12.00 - 12.30	Presentation by Essilor, Malaga 2013 headline sponsor			Trinidad 1*
13.00 - 13.45	Academy AGM Open to Academy members only			Andalucia 1-2*
14.00 - 14.20	Academy conference opening address and presentation of Fellows			
14.20 - 15.20	Keynote Lecture 1	Brien Holden	The role of technology in future optometric eye care	
15.20 - 15.45	Coffee break and poster session <i>Coffee break sponsored by Topcon</i>			Andalucia corridor*

Saturday 20 April cont...				Room
Time	Session	Presenter	Title	Room
15.45 - 16.45	Academic & Research 1	Priya Dabasia	An evaluation of non-contact screening methods for measuring anterior chamber depth using Pentacam imaging, and the IOLMaster	Andalucia 1-2*
		Langis Michaud	Controversies in contact lens care: a clinical perspective to define the best system	
		Sotiris Plainis	Anisocoria induced by small-aperture contact lenses and the Pulfrich experience: absence of neural adaptation effects	
		Jorge Rodriguez	Revolutionary ophthalmic lenses with liquid crystal layer inside	
15.45 - 16.45	Case Study 3	George Woo	Determining refractive error with the use of an Instant Vision Assessment Device (IVAD)	Trinidad 1*
15.45 - 17.15	Special Interest Group 1	Leader: Per Michael Larson Supporter: Roger Crelier	Binocular vision <i>SIG sessions are only open to European Academy members</i>	Trinidad 2*
16.45 - 17.45	Academic & Research 2	David Piñero	Ocular residual astigmatism and topographic disparity vector indexes in normal healthy eyes	Andalucia 1-2*
		John Siderov	Foveal contour interaction of low-luminance acuity targets	
		Pádraig Mulholland	Temporal summation with perimetric stimuli as a function of visual field eccentricity	
		Sofia C Peixoto-de-Matos	Night myopia as a function of the stimulus contrast	

Saturday 20 April cont...			
Time	Session	Presenter	Title
16.45 - 17.45	Special Interest Group 2	Leader: Michael Crossland Supporter: Roger Anderson	Optometric low vision rehabilitation <i>S/G sessions are only open to European Academy members</i>
19.00 - 23.00	Coach departs the Barceló Hotel for the Academy and WCO dinner This dinner is included in the combined event ticket, and the WCO only ticket		Hacienda del Alamo
Sunday 21 April			
08.00 - 09.00	Special Interest Group 3	Leader: Christian Stebler Supporter: Eduardo Teixeira	Primary eye care (refraction, dispensing and visual optics) <i>S/G sessions are only open to European Academy members</i>
09.00 - 10.00	Academic & Research 3	Vanessa Moodley	Institutional accreditation: a tool for quality assurance and capacity development in optometric education
		Natalie Briggs	Volunteers: a fantastic resource or a time-wasting liability?
		John Siderov	Development of robust methods of assessment of clinical competency in ophthalmic dispensing – results of a pilot trial
		Natalie Colomé de Man	Development of optometry in El Salvador
	Case Study 4	Langis Michaud	Clinical comparison of large diameter rigid gas permeable lenses to silicone hydrogel toric contact lenses for the correction of refractive astigmatism
		David Piñero	New-generation hybrid contact lens for the management of extreme irregularity in a thin cornea after unsuccessful excimer laser refractive surgery
			Trinidad 1*
			Trinidad 2*
			Andalucia 1-2*
			Trinidad 1*

Sunday 21 April cont...			Room	
Time	Session	Presenter	Title	
09.00 - 10.00	Special Interest Group 4	Leader: Gerhard Gschweidl Supporter: Rossella Fonte	Cornea, contact lenses and refractive technology Contributors include: <ul style="list-style-type: none"> • Keratometer readings and contact lens fitting characteristics (Helmer Schweizer, Alcon) • Contact lens fitting in a case with Keratocone and Keratoplasty (Gustav Pöltner, contact lens specialist from Austria) <i>SIG sessions are only open to European Academy members</i>	Trinidad 2*
09.30 - 13.30	Special Olympics			Esperanza 1-5*
10.00 - 10.30	Coffee break and poster session <i>Coffee break sponsored by Topcon</i>			Andalucia corridor*
10.30 - 11.30	Academic & Research 4	Michael Crossland Carmen Gonzalez-Alvarez John Lawrenson Chris Hull	Dark-adapted visual function in dry age-related macular disease Impact of education level and computer experience on repeatability of the Moorfields Motion Displacement Test (MMDT) Targeting modifiable risk factors in people with or at risk of age-related macular degeneration: a cross-sectional survey of eye care professionals in the UK Binocular contrast summation with unequal monocular light scatter	Andalucia 1-2*

Sunday 21 April cont...				Room
Time	Session	Presenter	Title	Room
10.30 - 11.30	Case Study 5	Nicholas Rumney	Making good referrals	Trinidad 1*
	Special Interest Group 5	Leader: Paul Murphy Supporter: Holger Dietze	Optometric education <i>SIG sessions are only open to European Academy members</i>	Trinidad 2*
11.30 - 12.30	Academic & Research 5	Nikki Rai	Beyond VA: Evidence-based recommendations for enhanced vision screening of children	Andalucia 1-2*
		Aoife Phelan	Successes of the Mozambique Eyecare Project: an international collaboration developing Mozambique's capacity to deliver eye care	
		Stephen Thompson	The development of a public optometry system in Mozambique: a cost benefit analysis	
		Janet Leasher	Estimated temporal trends in global blindness and visual impairment age-standardised prevalence (1990-2010)	
12.30 - 13.30	Keynote Lecture 2	Eef van der Worp	Beyond the corneal borders – the future of fitting irregular corneas?	Andalucia 1-2*
13.30 - 13.45	Closing address			Andalucia 1-2*
13.45 - 14.15	Poster presentations			Andalucia corridor*
13.45 - 14.30	Lunch <i>Sponsored by Topcon</i>			Restaurant*
14.30 - 16.30	WCO General Delegates' Meeting			Andalucia 1-2*

European Council of Optometry and Optics programme

Thursday 18 April			
Time	Session	Meeting type	Room
08.00	Registration		
08.30 - 11.30	ECOO Diploma Board of Management meeting	Closed	Trinidad 1*
11.30 - 13.00	ECOO Board of Examiners meeting	Closed	
13.00 - 14.00	Lunch		
14.00 - 15.30	ECOO Board of Examiners meeting	Closed	Trinidad 1*
15.30 - 18.30	ECOO Executive Committee meeting	Closed	
Friday 19 April			
08.30	Registration		
09.00 - 10.00	ECOO Professional Services Committee meeting (part I)	Closed	Trinidad 1*
10.00 - 12.00	ECOO Professional Services Committee meeting (part II)	Open	
12.00 - 13.00	Lunch		
13.00 - 14.00	ECOO Public Affairs and Economic Committee (part I)	Closed	Trinidad 1*
14.00 - 16.00	ECOO Public Affairs and Economic Committee (part II)	Open	
18.00 - 19.00	Academy, ECOO and WCO welcome reception. This is open to all delegates and their guest(s)		Silken Hotel
19.00 - 23.00	Coach departs Barceló and Silken hotels for the ECOO dinner This dinner is included in the combined event ticket, and the ECOO only ticket		El Realengo
Saturday 20 April			
08.30 - 12.00	ECOO General Assembly	Open	Andalucia 1-2*
12.00 - 13.00	Lunch		Restaurant*

Delegates with a Malaga 2013 all event or ECOO General Assembly only ticket are welcome to attend meetings marked 'open'.
Spaces are limited and will be allocated on a first come, first served basis.

*Barceló Hotel

World Council of Optometry programme

Thursday 18 April			
Time	Session	Meeting type	Room
08.00	Registration		
08.30 - 10.00	WCO Education Committee meeting	Open	Trinidad 2-3*
11.00 - 13.00	WCO World Optometry Foundation (WOF) Committee meeting	Closed	
13.00 - 14.00	Lunch		
14.00 - 16.00	WCO Public Health Committee	Open	Trinidad 2-3*
Friday 19 April			
08.30	Registration		
08.30 - 10.00	WCO Membership Committee meeting	Closed	Silken Hotel
10.00 - 13.30	WCO Executive Committee meeting (includes working lunch)	Closed	
13.30 - 15.30	WCO Legislation, Registration and Standards Committee meeting	Open	Silken Hotel
18.00 - 19.00	Academy, ECOO and WCO welcome reception This is open to all delegates and their guest(s)		Silken Hotel
19.00 - 23.00	Coach departs the Barceló and Silken hotels for the ECOO get together dinner This dinner is included in the combined event ticket, and the ECOO only ticket		El Realengo

Saturday 20 April			Meeting type	Room
Time	Session			
19.00 - 23.00	Coach departs the Barceló Hotel for the Academy and WCO dinner This dinner is included in the combined event ticket, and the WCO only ticket			Hacienda del Alamo
Sunday 21 April				
09.00 - 14.00	WCO Governing Board meeting (includes working lunch)		Closed	Andalucia 3*
09.30 - 13.30	Special Olympics			Esperanza 1-5*
13.45 - 14.30	Lunch			Restaurant*
14.30 - 16.30	WCO General Delegates' Meeting (GDM)		Open	Andalucia 1-2*
16.30 - 17.30	WCO New Governing Board meeting		Closed	Andalucia 1-2*
17.30 - 18.00	WCO Executive Committee meeting		Closed	

Delegates with a Malaga 2013 all event or WCO General Delegates' Meeting only ticket are welcome to attend meetings marked 'open'. Spaces are limited and will be allocated on a first come, first served basis.

European Academy of Optometry and Optics poster presentations

Number	Poster presenter	Title
Posters 1 - 54 will be on display on Saturday 20 April		
1	Virginia Carrillo Ramos	The importance of the optometrist in diplopia by neurological problems
2	Trisevgeni Giannakopoulou	Patients with severe impairment in one eye show improved performance to defocus induced-blur
3	Sofia Mateus	Letter discrimination and reading performance under spherical and astigmatic blur, using 'Roman' alphabet
4	Baskar Theagarayan	Relationship between associated and dissociated phoria in Swedish adults
5	Louise van Doorn	Comparison of two editions of the TNO stereotest
6	Yolanda Martin	Vision care and optometry in a university programme for adults
7	Claire McDonnell	Evaluation of the assessment of distance learning in optometry
8	Lewis Reich	Incorporation of a formal service learning curriculum within an optometric programme
9	Francisco Segura	Interdisciplinary relationships between optometrists and occupational therapists
10	Nilpa Shah	Test-retest variability for vanishing optotype letter charts
11	Mirjam van Tilborg	Development of Hogeschool Utrecht from Higher Professional Education towards University of Applied Science
12	Manuel Álvarez-Prada	Keratoconus classification by location, topography and comatic aberration
13	Ana Hervás Ontiveros	Accuracy intrarings in the corneal topography
14	Inmaculada Bueno Gimeno	Corneal biomechanics, retinal nerve fibre layer and optic disc morphology, in Caucasian Spanish myopic children
15	Juan de la Cruz Cardona	New alternatives to corneal transplant based on tissular engineering and stem cells

Number	Poster presenter	Title
16	Cheryl Donnelly	Eye care professional and consumer experiences with presbyopia
17	Cheryl Donnelly	Use of power maps to evaluate aspheric multifocal contact lenses
18	Sara Fernandez Cuenca	Comparative study of corneal thickness measures by ultrasound pachymetry
19	Alessandro Fossetti	Comparison between an open field autorefractor and an internal fixation target autorefractor
20	M ^a Carmen García-Domene	Asphericity of the lens versus power lens
21	M ^a Carmen García-Domene	Study of the misalignment and aberrations in patients implanted with toric monofocal intraocular lens
22	Claudia García López	Change in axial length pre and post cataract surgery measured with IOLMaster
23	Verónica García López	Analysis of cataract surgery induced astigmatism
24	Marta García Manjarrés	Optical coherence tomography and visual outcomes in episcapsular lenses
25	Rosa García-Monlleó	Contact lens fitting after penetrating keratoplasty
26	Larissa Käser	Comparison of the effect of lubricant eye drops for contact lenses with a placebo
27	Douk Hoon Kim	A study of the thickness and anterior chamber depth of the keratoconus using Pentacam system
28	Dimitra Makrynioti	Corneal confocal microscopy repeatability
29	Juan Carlos Montalt Rodrigo	Corneo-scleral contact lenses after intrastromal corneal rings in keratoconus
30	Judith Morris	The teaching and fitting of RGP lenses in educational institutions across the European community
31	Daniela Nosch	Mechanical corneal sensitivity measurement with air gas aesthesiometry (belmonte ocular pain meter)
32	Juan Carlos Ondategui-Parra	Multifocal corneal refractive surgery in presbyopic patients: results of new algorithm SUPRACOR™

Number	Poster presenter	Title
33	Sara Ortiz Toquero	Number of visits and diagnostic lenses in keratoconus, RGP and soft contact lenses
34	Noelia Pérez Ortiz	Deep anterior lamellar keratoplasty (DALK) technique for treatment of corneal scarring in a pseudomonas aeruginosa infection
35	Leticia Santamaría García	VISANTE optical coherence tomography in the diagnosis of forme fruste keratoconus
36	María Satué	Detection of retinal nerve fibre layer degeneration in Parkinson's disease patients using Fourier domain OCT
37	Ignacio Serrano Peláez	Intrastromal corneal ring segment implantation in paracentral keratoconus with coincident topographic and coma axis
38	Irene Altemir	Influence of prenatal factors in retinal development
39	Maria Bambo	Ability of retinal nerve fibre layer measurements as biomarker of axonal damage in Alzheimer's patients
40	Sandra Block	Matching the visual needs of an urban school district and the needs of an optometric educational programme
41	Elena Garcia-Martin	Diagnosis of Parkinson's disease using only retinal thickness measurements provided by optical coherence tomography
42	Amparo Gil-Casas	Measurement of the variation in the ganglion cell layer and nerve fibre layer of the retina in the aging process
43	Raquel Herrero	Can optical coherence tomography be a marker of efficacy of multiple sclerosis treatments in reduction of axonal degeneration?
44	Timothy Wingert	Vision screenings versus comprehensive eye examinations for children
45	Per Kristian (Pelle) Knudsen	WCO Scope of Practice questionnaire: understanding where and how optometry is developing in the world
46	Natividad Alcón	ESPI technique for corneal biomechanical properties

Number	Poster presenter	Title
47	Antonio Calossi	The Radner reading charts for assessing near vision function
48	Genis Cardona	The evaluation colour vision anomalies: a (s)light discrepancy
49	Maria Teresa Diez Cuenca	Evaluation of anatomical changes and functional results after surgery of circular scleral indentation
50	María Fuertes Álvarez	Accuracy of time domain and spectral domain OCT in preperimetric and early open angle glaucoma detection
51	Janet Leasher	Estimated temporal trends in global blindness and visual impairment age standardised prevalence (1990-2010)
52	Sheila Rae	Comparing distance word acuity in the font and colour of UK road signs to the Landolt C optotype
53	Enrique Sánchez García	Photo-oxidative stress and macular degeneration, mechanism and prevention
54	Niall Strang	Training optometrists as primary eye care practitioners and their role in enhanced eye care services in Scotland
Posters 55 - 106 will be on display on Sunday 21 April		
55	Rosa Borrás	Optometric correlates of visual discomfort in university students
56	Andrés Gené-Sampedro	The Ibero-American Programme for Science, Technology and Development: thematic network REISVO
57	Andrés Gené-Sampedro	Visual search and speed of processing in elderly drivers
58	Ane Murueta-Goyena Larrañaga	Comparison of different phoria-measuring methods: reliability and repeatability
59	Mireia Pacheco-Cutillas	Agreement between the pattern glare test and Conlon questionnaire for visual discomfort. Are they measuring the same?
60	Subodh Gnyawali	Optical shops in Nepal: range and quality of services provided
61	Ejitu Isong	Growing the optometric profession in Nigeria: what new strategies?

Number	Poster presenter	Title
62	Kajal Shah	Evaluations of clinical exit competencies of optometry students in Mozambique
63	Karen Sparrow	Evaluation of practical refraction teaching interventions to supplement a new optometry diploma programme in Zambia
64	Pavel Beneš	Keratometric values in population
65	Lily Chan	The effect of bilberry extract on dry eyes: a pilot study
66	Raúl Martín Herranz	A new non-invasive method to assess corneal integrity based on bioimpedance measurements
67	Ana del Río San Cristóbal	Short-term corneal response between two hydrogel contact lenses of different Dk
68	Rosa García-Monlleó	Hybrid contact lens fitting
69	J. Peter Gierow	Comparison of two dry eye questionnaires in non-contact lens wearers
70	Jennifer McMahon	Where are they now? Scleral contact lens indications and long-term outcome for 1000 referrals
71	Carolina Ortiz	Influence of opaque-tinted contact lens wear on optical quality and visual performance
72	Sofia Otin	Influence of cataract on optical coherence tomography measurements
73	Luciano Parenti	Repeatability and reproducibility of the measurement of ocular aberrations with a Shack-Hartmann aberrometer
74	Francisco Luis Prieto Garrido	Acanthoablation (acanthamoeba keratitis case report)
75	Ken Pullum	A modern method of visual rehabilitation
76	Ana Sánchez-Cano	Volume and anterior chamber depth characteristics in normal human eyes
77	Irene Sisó Fuertes	Visual quality by using Optical Quality Analysis System (OQAS) in patients implanted with multifocal intraocular lenses: a pilot study
78	António Baptista	Optometry in Portugal: in the route of success

Number	Poster presenter	Title
79	Margarita Barrera-Lozano	Economic impact of ophthalmic optics and optometry
80	Dipesh Bhattarai	To evaluate the efficacy of use of contact lenses for therapeutic purposes in various ocular surface disorders in the Nepalese population
81	Dipesh Bhattarai	'Vision Volunteers': A model to tackle the burden of uncorrected refractive error in a developing country like Nepal
82	María Coco	Is it possible to improve reading performance and quality of life in non-AMD central vision loss patients with a specially designed reading rehabilitation programme?
83	António Filipe Macedo	Reading speed in the international reading speed texts by native Portuguese readers
84	Howard McAlister	An international humanitarian mission to Nepal
85	Elvira Peris	Design, application and evaluation of a programme of oculomotor visual therapy for children with special needs
86	Aoife Phelan	Considerations in the design of a child eye health programme for Nampula, Mozambique
87	Eulalia Sánchez	Design and testing of a protocol aimed at improving the care of patients with visual deficits, from the collaboration between different professionals and regardless of patients' economic resources
88	Ahalya Subramanian	The economic costs associated with providing emotional and other relevant support in eye clinics - findings from the United Kingdom
89	Elena Tomás Verduras	Prevalence of refractive error in children in Mazamari, central Amazonian forest, Peru
90	Wolfgang Wesemann	Refractive errors in Germany - a statistical analysis
91	Abbas Ali Yekta	Epidemiology of eye diseases in the elderly of Sari, Iran
92	Sandra Block	Comparison of visual findings of athletes participating in the Special Olympics Lions Clubs International Opening Eyes by regions in 2010

Number	Poster presenter	Title
93	Cristina Bonnin-Arias	Optical quality of the ready-made reading spectacles marketed in non-sanitary shops
94	Jennifer Brower	Low vision aids visual recognition and use
95	Priya Dabasia	A cross-sectional survey of current and anticipated future use of standard and specialist equipment by UK optometrists
96	Lena Gronde	Survey on management of refractive errors in children aged up to eight years by ophthalmologists, orthoptists, opticians and optometrists in Germany, Austria and Switzerland
97	Simone Imbesi	Evaluation of the anterior chamber angle closure: comparison of the Van Herick technique with Scheimpflug camera
98	Zahra Jessa	A rapid flip-chart screening tool for reduced vision in older people
99	Keziah Latham	Is a reading addition necessary for clinical contrast sensitivity measurements?
100	Shehzad Naroo	The quiet eye is not a true fixation
101	Juan José Navarro-Valls	Diffuse illumination device to improve mesopic contrast sensitivity in drivers
102	Paula Ortega	Eye disease prevention campaign in elderly people
103	Esteban Porcar	Prevalence of symptoms associated with the use of laptops for leisure
104	Yogita Laxmikant Rajgandhi	The wider role of the Indian Optometric Association in shaping the development of the optometry profession in India
105	Jean-Paul Roosen	Innovation to improve access and equity
106	Silvia Tablada García	The look of Calcutta



The role of technology in future optometric eye care

Professor Brien Holden
University of New South Wales,
Sydney, Australia

Half of the girls and 40% of the boys born today in many developed countries will live to 100 years of age. 100% of these centurions will have been presbyopic for 55 years.

25% percent of Americans were myopic in 1972, now 42% are, as are 93% of Taiwanese girls aged 18 years. 20% of the myopes in Taiwan are above -6.00D of myopia and myopic retinal damage is the most common cause of blindness in Shanghai. By 2113, unless we do something about it, the overwhelming majority of the world's population will be myopic and at least 10% of them will be blind from myopia alone.

This lecture will cover three top priorities to tackle this problem. Firstly, how to stem the tide of myopia, secondly to detect and prevent blinding eye disease and finally to provide optimal vision to every person on the planet. This is vital to enable children to learn, adults to work effectively and older people to enjoy the best quality of life possible.

This can be done through education, both of the public and of the professionals needed, and through advanced, affordable technological solutions for everything from the most common conditions to the most difficult threats to vision. It is also important, though, for government, social society and an industry that really cares to play a responsible part in delivering the best people, ideas, technology and services to all people, everywhere.

Learning objectives

- To understand the prevalence of myopia, high myopia and blinding eye disease and the associated burden.
- To review and compare the known and recent attempts at myopia control.
- To understand the strategies available in addressing and delivering solutions to refractive error and blinding eye disease.

Biography

Professor Brien Holden is a world leader in eye health and vision correction research, education and public health. He is a Professor at the School of Optometry and Vision Science at the University of New South Wales, Australia, a founder and CEO of the Brien Holden Vision Institute, International Centre for Eyecare Education, Vision CRC and Adventus Technology Inc, and Executive Chair of Optometry Giving Sight.

Professor Holden has six honorary doctorates from universities in the UK, US, Canada and South Africa, as well as over 30 other national and international awards, including the Medal of the Order of Australia for contributions to eye care research and education. He has helped obtain grants and funding for eye research, education and public health totalling over AU\$700 million, is the author of over 230 refereed research papers and more than 400 refereed scientific abstracts. In 2010, Professor Holden was jointly awarded with Professor Kovin Naidoo, the Schwab Social Entrepreneur Award for Africa, at the regional World Economic Forum in Tanzania.



Beyond the corneal borders – the future of fitting the irregular corneas?

Dr Eef van der Worp
University of Maastricht, the Netherlands

Scleral contact lenses that have their resting point beyond the corneal borders are believed to be among the best vision correction options for irregular corneas; they can postpone or even prevent surgical intervention as well as decrease the risk of corneal scarring.

A few years ago, only a handful of very specialised lens fitters around the world were capable of fitting scleral lenses successfully, and only a few manufacturers were making scleral lenses. Now many contact lens manufacturers have scleral lens designs in their arsenal. Improved manufacturing processes allow for better design, make lenses more reproducible and decrease costs, which combined with better lens materials has contributed to better ocular health, longer wearing time and ease of lens fit.

But what do we know about fitting scleral lenses? And what do we know about oxygen supply to the cornea underneath scleral lenses? What is the preferred tear clearance? And how thick can a scleral lens be, in relation to the material used, to meet the minimal oxygen criteria? This lecture will look at these issues and so provide a guide to the fitting of scleral lenses.

Learning objectives

- To understand what the shape of the limbus and anterior ocular sclera is.
- To evaluate how toric and/or nonrotationally symmetric the limbus and anterior ocular sclera is.
- To understand what the clinical consequences of this when fitting scleral lenses.
- To determine what the minimal oxygen requirements of the cornea are.
- To evaluate what the minimal Dk of a material should be (given a certain lens thickness and clearance).
- To evaluate what the minimal lens thickness and clearance of a lens should be (given a certain material).

Biography

Dr van der Worp is an educator and researcher. He received his optometry degree from the Hogeschool Utrecht in the Netherlands and his PhD from the University of Maastricht in 2008.

He is a fellow of the American Academy of Optometry, the International Association of Contact Lens Educators, the British Contact Lens Association and the Scleral Lens Education Society.

He is currently affiliated with the University of Maastricht as an associate researcher, is a visiting scientist at Manchester University (Manchester, UK), Adjunct Professor at the University of Montreal University College of Optometry (Canada) and adjunct Assistant Professor at Pacific University College of Optometry (Oregon, USA).

An introduction to low vision assessment

Lead author: Jennifer Brower
Association of British Dispensing Opticians, London, UK

Purpose

The purpose of the presentation is to introduce delegates to a basic but comprehensive assessment routine for low vision patients. Many opticians do not undertake low vision work in any depth but with the steadily increasing numbers of low vision patients, it is important that opticians both understand and feel competent to undertake this rewarding work. Low vision services in many European countries are patchy and under resourced and this routine should give practitioners the confidence to become involved. The clear step by step approach of the presentation is intended as a template for carrying out low vision assessment in practice.

Method

This presentation has been formulated following the author's many years of practical experience in the field of low vision in private and hospital practice, and as a low vision tutor and examiner, and the assessment routine is the procedure the author uses in her daily work. The assessment is conducted in private surroundings with the patient's family and/or carer present as preferred by the patient. The face to face approach with the patient and the priority given to the patient's needs and wishes have proved to be invaluable in achieving a successful outcome and the supply of the best possible solutions. The presentation will be mainly text based but will have images and/or photographs of the effects of ocular pathologies on vision, the problems these cause and examples of low vision aids.

Results

By the end of the presentation delegates should understand the basic principles of low vision assessment, appreciate the relationship between the pathology causing the low vision and the subsequent suitability of different types of low vision aids including magnifiers and non-optical low vision aids, and understand the need for multi-disciplinary care involvement and an appropriate aftercare regime.

Conclusion

The time allowed for the presentation (20 minutes including time for questions) is not sufficient to allow an in depth look at the very large range of low vision aids available but the information on the visual effects of ocular pathologies and the principles of magnification, plus examples of optical and non-optical low vision aids, and the important aspects of demonstration to the patient and the patient's full participation, will provide a good foundation for practitioners to build on what has been learned through this presentation and give them the confidence to develop their own low vision service.

Sudden loss of vision in a young patient

Lead author: Silvia Tablada García
Hospital Rey Juan Carlos de Móstoles, Madrid, Spain

Introduction

Sudden loss of vision can occur with multiple presentations, as a sudden blur, a falling curtain, complete loss of vision, which may be unilateral or bilateral, may be temporary or permanent, can go with or without pain and can present in a wide range of ages.

Description

A Caucasian male patient of 35 years who presented with the chief complaint of sudden loss of vision in his left eye and metamorphopsia. His medical history was negative; no known allergies, no drugs. Three years ago he suffered an episode of central serous chorioretinopathy (CSCR). VA without correction was 20/20 for the Right Eye and 20/50 for the Left Eye. The subjective refraction was RE neutral and the LE+0.75D, reaching a VA of 20/20 and 20/33 respectively.

As additional tests, we used the Amsler grid, and in the left eye were altered, referring metamorphopsia, scotoma positive and micropsia. There wasn't relative afferent pupil defect.

Posterior pole examination with +90D lens showed an alteration in the macular area, with clinical signs consistent with a serous detachment of the neurosensory retina. Optical coherence tomography was performed, along with fluorescein angiography, which confirmed the diagnosis CSCR. The Helicobacter Pylori test was positive.

Reviewing all possible causes of sudden monocular vision loss in young male subjects with metamorphopsia and discarding them through additional tests, we got the diagnosis of CSCR.

CSCR is one of the most common retinal causes of vision loss, more commonly in men. It resolves spontaneously in most patients, VA recovered to 20/25 in 80-90% of cases.

A small percentage of patients (10.5%) do not recover good VA levels. In these cases there is a high risk of recurrence or chronic serous, resulting in a progressive atrophy of the RPE and permanent vision loss of 20/200 or worse. The treatment involved argon laser photocoagulation and photodynamic therapy for extrafoveal and subfoveal leaks respectively.

The treatment for the Helicobacter pylori infection may have a favourable effect on the outcome of CSCR.

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Sudden loss of vision in a young patient

Prognosis is highly dependent on presenting visual acuity. A prompt and appropriate treatment can in many cases restore the patient's vision and/or prevent the involvement of the contralateral eye, so it's important to know all the changes that may present with sudden loss of vision and know how to perform the appropriate assessment to reach the correct diagnosis.

Vision therapy as an alternative to surgery for the correction of acquired paediatric esotropia

Lead author: Marie Bodack
Cincinnati Children's Hospital Medical Center, Cincinnati, USA

Introduction

Strabismus surgery is frequently recommended for a non-accommodative esotropia, although prisms and/or vision therapy can be an option to help develop fusion.

Method

A two-year-old male developed a V pattern esotropia after having three brain surgeries. He was diagnosed with a cerebellar astrocytoma which was surgically resected at five months. After the surgery, he developed a fungal infection, haemorrhage and hydrocephalus. At 19 months, he underwent surgery to remove the remaining tumour, and at age 20 months he had a shunt placement. After the final surgery, he developed a left esotropia and head down posture. At 25 months, he was examined by a paediatric ophthalmologist. Visual acuity was central, steady and maintained in each eye. Near cover test revealed orthophoria in up gaze, esotropia of 20 prism diopters in primary gaze, and 35 prism diopters in down gaze. In right gaze the patient had a left hypertropia and in left gaze he had a right hypertropia. A bilateral inferior oblique over action was present. Cycloplegic retinoscopy found +2.00+0.50x180 OD, +1.50+0.75x180 OS. Pupils and optic nerves were normal. The patient was diagnosed with acquired esotropia and a bilateral fourth cranial nerve palsy.

Three months later, the following measurements for the esotropia were obtained: 14 prism dioptres in up gaze, 20 prism dioptres in primary gaze and 35 prism diopters in down gaze. Surgical correction of the esotropia and inferior oblique over action were recommended. The patient's mother sought a second opinion from an optometrist with specialisation in vision therapy. Home exercises to improve divergence were prescribed.

Results

Three months after beginning therapy, the patient returned to the ophthalmology practice and was examined by an optometrist. The patient's mother felt that his head posture improved and that the eye turn was present only 20% of the day. At this examination, visual acuity was 20/40 OD and OS. Cover test revealed a 14 prism diopter alternating esotropia in up and primary gaze and 20 prism dioptres in down gaze. One year later, the measurements were 4 prism diopters intermittent left esotropia at distance and near. With a slight head down posture, alignment was orthophoria at distance and near. The patient also identified 2/3 animals and 2/9 circles in the Randot stereopsis test.

Conclusion

Non-surgical treatment of esotropia, even in young children, can help improve alignment, stereopsis, and head posture and should be considered a treatment option.

Visual training as treatment of diplopia in patients with oculomotor palsy due to intracranial hypertension

Lead author: Juan de la Cruz Cardona
Co-authors: Ana Maria Ionescu, Razvan Ghinea, Yaiza Arcilla, Maria del Mar Pérez
Department of Optics, University of Granada, Granada, Spain

Purpose

Intracranial hypertension (ICH) is a syndrome caused by the increased volume of some of the intracranial contents. This disease can cause significant injury to the patient, such as traumatic oedema, bleeding or idiopathic pressure. The most significant symptoms are headache, vomiting, loss of consciousness or double vision, due to the palsy or paresis of the III, IV and VI cranial nerves, causing strabismus. Usually the first options of treatment of this double vision problem are the strabismus surgery, botulinum toxin injection or occlusion, choosing visual therapy as the last option. The aim of this study is to assess the results of visual training in three patients with ICH.

Method

Three similar case reports are presented in this study (seven-year-old boy with exotropia at near vision due to excess of cerebrospinal fluid; 64-year-old man with right eye VI Par palsy due to rhomboencephalitis listeria; and 40-year-old man with a endotropia at far distance due to an idiopathic ICH). Before the appearance of their diseases, all of them had a full development of binocular vision, and after least three months of the ICH episode, they were occluded to avoid double vision. Personalised visual training plans were designed. If there was any simultaneous perception or light fusion, the subjects started by working the fusion in the distance or sight position. Spatial location, accommodation and ocular motility were also trained. Daily visual training at home was recommended too.

Results

Two of three cases showed a good progression and recovered their binocular vision in three months for all distances and sight positions. However, the child had a great angle of deviation, and his near point of convergence could not be closer than 80cm after six months of training, so surgery was necessary. Afterwards, the visual training continued and his motility and binocular vision were recovered.

Conclusion

Visual training is necessary to restore binocular vision in a short period of time and helps obtaining better results after strabismus surgery. Management of diplopia in ICH diseases during hospital recovery stage may be revised, avoiding occlusion treatment and try to promote and preserve the fusion (e.g. with a prism).

Determining refractive error with the use of an instant vision assessment device (IVAD)

Lead author: George Woo
The Hong Kong Polytechnic University, Hong Kong SAR, China

A simple subjective telescopic refraction system will be introduced in this session. The optical principles will be described briefly. The accuracy and precision of this Instant Vision Assessment Device (IVAD) have been published in three different clinical trials in Canada, USA and Hong Kong in the past few years. This data will be presented.

The purpose of this session, however, is to demonstrate the use of this portable optometer in determining refractive errors subjectively. IVAD accommodates a range of refractive errors. Although the calibration of IVAD is skewed towards myopia, the hyperopic range can easily be extended by adding a reading cap in front of the eyepiece of the device or by changing the viewing distance. In employing the IVAD for subjective refraction findings, the length of the telescope and the position of the stenopaic slit can be adjusted by the examiner while the patient focuses a target on a custom-designed visual acuity chart at 3m with his or her right and left eyes respectively. The same device can also be used to determine refractive errors of some low vision patients. The protocol to use this device consisted of eight steps and these steps can be carried out sequentially by the examiner in obtaining the subjective refraction.

WHO has identified uncorrected refractive error and low vision as two of the major causes of blindness. This simple instrument (IVAD) can indeed help eliminate avoidable blindness by providing accurate subjective refraction for those in need in the developing countries around the world.

Clinical comparison of large diameter rigid gas permeable lenses to silicone hydrogel toric contact lenses for the correction of refractive astigmatism

Lead author: Langis Michaud¹

Co-authors: Woo, Stephanie, Dinardo-Lotoczky, Amy, Harthan, Jennifer S. Bennett, Edward S., Morgan, Bruce W., Reeder, Renee E.

¹University of Montreal, Montreal, Canada

Purpose

This study aims to validate the clinical performance of a new large diameter rigid gas permeable lens in a group of subjects with low to moderate (0.75D to 2.75 D) refractive astigmatism. It aims also to demonstrate whether soft toric or large diameter rigid gas-permeable (LRGP) contact lenses offer the best option for the correction of ametropia and to determine which modality is preferred by subjects.

Method

Forty subjects, soft contact lens wearers, non symptomatic for dryness or visual acuity problems are selected and randomly assigned to Group A or Group B. Group A is fitted first with the soft lens (Biofinity toric, Cooper Vision) and then switches to the LRGP lenses (Blanchard, OneFit P&A Lens). Group B starts with LRGP lenses and ends the study being fitted with soft lenses. For each type of lens worn, low- and high-contrast visual acuity (VA) are evaluated at both near and far and a questionnaire is answered on visual performance during day-to-day activities (computer, driving, etc.). At the end of the study, each subject is asked to indicate their preference for one type of lens.

Results

Forty patients (10/sites) were enrolled and completed the study. All subjects were successfully fitted with both soft and rigid lenses. There is no difference in the visual acuity measured at distance but subjectively, 75% of subjects preferred LRGP for vision. Comfort was rated equivalent for both lenses. At the end of the study, 56% of the subjects preferred to remain in RGP lenses instead of soft lenses and have selected them as their lens of choice. Handling was the most common reason to do not select LRGP as the lens of choice.

Conclusion

Large diameter RGP lenses out perform soft toric disposable lenses on a group of healthy young soft contact lens wearers, based on the better visual acuity provided. RGP lenses were rated as comfortable as the soft ones. Consequently, large diameter RGP lenses can be considered as a valuable option for the correction of current refractive errors.

New-generation hybrid contact lens for the management of extreme irregularity in a thin cornea after unsuccessful excimer laser refractive surgery

Lead author: David P. Piñero^{1,2}

Co-authors: Rafael J. Pérez-Cambrodí¹, Pedro Ruiz-Fortes²

¹Department of Ophthalmology (Oftalmar), Medimar International Hospital, Alicante, Spain

²Department of Optics, Pharmacology and Anatomy, University of Alicante, Alicante, Spain

Purpose

To evaluate the visual and ocular aberrometric changes after contact lens fitting with a new hybrid lens in an eye with extreme irregularity after unsuccessful excimer laser refractive surgery for the correction of myopia.

Method

A man of 25 years old attended our clinic with very poor vision in his right eye after undergoing bilateral LASIK for myopia correction and some retreatments in his right eye. After a comprehensive optometric analysis, contact lens fitting with a reverse geometry hybrid contact lens (SynergEyes PS, SynergEyes Carlsbad) was proposed as a solution for this case of corneal irregularity with the presence of a central island. Contact lens fitting was performed following the guidelines defined for this specific lens, without any type of adverse event. Visual, refractive, and ocular aberrometric outcomes (iTrace system, Tracey Technologies Inc.) were evaluated after 15 days of contact lens wearing.

Results

LogMAR uncorrected distance visual acuity improved from a pre-fitting value of 1 to a post-fitting value of -0.1. Pre-fitting manifest refraction was +6.00 sphere and -3.00 cylinder at 70°, with a LogMAR corrected distance visual acuity of 0.3. After 15 days of contact lens wearing, manifest overrefraction was plano. Higher order root mean square (RMS) for a 5-mm pupil changed from a pre-fitting value of 1.56 µm to a post-fitting value of 0.34 µm. Likewise, primary coma RMS decreased from a pre-fitting value of 0.85 µm to a post-fitting value of 0.38 µm. A change of 0.07 µm was observed in the level of primary spherical aberration after fitting. The contact lens wearing was referred to as comfortable and the patient was very satisfied with the solution.

Conclusion

The SynergEyes PS contact lens seems to be an excellent option for the visual rehabilitation of corneas with extreme irregularity after myopic excimer laser surgery, minimising the level of higher order aberrations and providing an excellent visual outcome.

Making good referrals

Lead author: Nicholas Rumney
BBR Optometry, Hereford, UK

Referral is a fundamental part of primary care, although it is only one component of diagnosis, monitor, refer, treat or discharge. Before approaching referral it is important to appreciate that referral does not absolve the responsibilities of the other components and most importantly referral is not an excuse to absolve the clinician from their own decision-making responsibility and simply move the patient outside the consulting room/business model.

Optometrists, CLO's and Dispensing Opticians should bear in mind that in comparison to under referral (missed disease) over referral also results in a significant number of Fitness to Practice Allegations quite apart from reflecting badly on you as an individual, the group as a whole and optometrists, CLO's and Dispensing Opticians in general.

Few conditions are sufficiently serious that they merit same day referral for immediate treatment. If you can create the time to be able to make a decision at leisure when you have time to think, the decision will be better and the outcome better for the patient.

If you practice entirely on your own then the extra time is your own, time to read up overnight, time to repeat tests personally (if CA derived) and time to examine further often under dilation. If you practice with others then you can make use of them in helping you form an opinion (or even educating them if the condition or scenario is rare or unusual).

Think about the biggest complaint patients make about their hospital visits (after having to wait) – it is lack of continuity, and this impairs decision-making. So far as is humanly possible try and be the person to review the patient you saw and flag up the need for further investigation. If this is not possible, do not just leave a record of a number of test results, make records that ensure who reads your notes understands your thinking. Even if you do not know exactly what you are seeing you will be able to come up with three or four hypotheses or differential diagnoses.

FTP cases on referral always have similar aspects or patterns that stick out. Chief amongst these is poor communication, the patient did not know what you were doing, often because the optometrist is unsure. There is no shame in letting the patient know that you do not have all the answers, that you are going to look something up or that you are going to ask someone. Second is a truncated examination with corners cut, e.g. no unaided visions, near acuities always written as R&L, phrases such as poor fundal view. Finally above all, a lack of regimentation in logical decision making starting with observations, through hypotheses and differential to probable diagnosis. This is often because optometrists have frequently grown up thinking or even been taught that we cannot diagnose! If this was untrue before referral rules changed in 2000, it is very untrue now.

The aim of this presentation is try and eliminate the element of variability and quality so that the receiving nurses and doctors see us all in a much better light because overwhelmingly we want to make their job easier. Then when you do need a favour they jump at the chance to help.

Treatment of basic visual skills deficits with vision therapy

Lead author: Marie Bodack
Cincinnati Children's Hospital Medical Centre, Ohio, USA

Purpose

Patients with visual skills problems (disorders of accommodation, convergence and ocular motility) may have symptoms of diplopia, eye strain, blur, fatigue or headaches when reading. These conditions can be easily treated with vision therapy. This workshop will present treatment options for these conditions.

Method

The workshop will use the following equipment:

- *For accommodation:* Hart Chart (distance and near), loose lenses (+2.50 to -6.00 dioptres), accommodative flippers (up to +/-2.50 dioptres), polarised or anaglyph filters with corresponding glasses, eye patches.
- *For convergence:* Brock String, Barrel Card, Vectograms (Clown, Quoits, Spirangle), Aperture Rule, loose prisms (varying powers), eccentric circle cards, computerised orthoptics
- *For oculomotor work:* Hart Chart, letter tracking, visual tracings, computer programs for saccades.

Results

Participants will learn to treat visual skills disorders, specifically accommodative insufficiency/infacility, convergence excess/insufficiency, and oculomotor dysfunctions. For each condition, treatment will progress from simple to complex and include end points for therapy.

For accommodation, techniques will begin monocularly until the skills are equalised between the eyes. Techniques include Near/Far Hart Chart, Monocular Accommodative Rock using loose lenses and printed material at near. Therapy will progress to Bi-ocular Accommodative Rock dissociating the eyes using polarised or red-green filters and corresponding glasses. The final stage of therapy will be Binocular Accommodative Rock using flipper lenses.

For convergence, techniques can be divided into voluntary convergence, non-computer targets and computer orthoptics. Therapy will begin with the Brock string first with one bead, then three beads at varying distances, and then progress to the Barrel Card. Loose prisms will be incorporated with the Brock String to increase difficulty with divergence and convergence. Vectograms, and the aperture rule for convergence and divergence will be presented. The final stage of therapy in this area is eccentric circles (base in and base out). Computerised programs will be discussed (and may be illustrated). The incorporation of accommodative training into convergence work as a final stage (base out plus, or BOP, and base in minus, or BIM) will be included.

Therapy for oculomotor work will include work on both saccades and pursuits. Saccadic therapy will begin with 4-corner and flashlight saccades. More advanced techniques including distance Hart Chart and letter tracking at near will be presented. Computerised programs training saccades will be demonstrated. Therapy for pursuits will include Chalkboard Circles, flashlight tag, mazes and visual tracing.

Participants will become able to treat basic near binocular, accommodative and oculomotor dysfunctions in symptomatic patients.

Gadgets and gizmos: latest advances in clinical dry eye diagnosis and management

Lead presenter: Caroline Christie¹

Co-presenters: Elena Garcia Rubio, Giancarlo Montani
¹City University, London, UK

Dry eye is amongst the most commonly reported condition in optometric/contact lens practice. Despite this, management remains difficult, often because traditional tear film and ocular surface tests fail to determine the most likely cause of the dry eye, which subsequently leads to an inappropriate choice of management strategy. With this realisation has emerged an exciting new range of devices to aid in clinical dry eye diagnosis and management.

Now, clinicians have tests available to them, which, until recently, have been restricted to the laboratory. Tear osmolarity, can now be performed within seconds in the clinical setting, providing confirmation of the presence or absence of dry eye. Detailed yet simple investigation and classification of the lipid layer, precise measurement of NIBUT and Tear Meniscus Height, digital measurement and classification of conjunctival hyperaemia and meibomian gland visualisation are now possible with the latest topographical instruments whilst IR camera attachments in association with digital slit-lamp imaging can aid investigation of the actual structure of the meibomian glands. Patients suspected of underlying inflammation, can have elevated MMP-9 levels confirmed in minutes with an in-office immunoassay, enabling the appropriate anti-inflammatory therapy to be instigated.

This workshop will demonstrate some of the latest developments in the field of dry eye detection and management. It will provide discussion opportunities and the chance for delegates to hands-on experience with many of the newest developments.

The benefits and limitations of which will be alluded to by the workshop presenters, who between them have many years experience in both research and clinical investigation of dry eye patients, and no financial interest in any of the products.

Learning objectives

- to review the latest diagnostic instruments for the detection and classification of ocular surface disease
- to understand the ways in which these latest tear film and ocular surface tests function in order to provide information about tear quantity or tear quality
- to look at ways in which new equipment, stains and grading schemes can be incorporated into clinical practice to assist in the classification and diagnosis of ocular surface disease.

The contact lens fitting technique in cases of medium to advanced cases of keratoconus with large diameter GP lenses and scleral GP lenses

Lead author: Philip Fine
Department of Optometry and Vision Science, Hadassah
Academic College, Jerusalem, Israel

Rigid gas permeable mini scleral and full scleral contact lenses offer improved quality of life and excellent visual acuity in cases of moderate to severe corneal distortions and particularly in cases of Keratoconus. This workshop will analyse the differences between the two lens types, and will provide a hands-on tutorial in the contrasting techniques in fitting these lenses along with the limitations of each type of lens. The workshop participants will learn initial lens selection, fit assessment, lens modification and determination of final parameters of each type of lens along with the relevance of each type to the severity of the keratoconus.

As such the lens parameters will be modified until an acceptable fit is obtained in each case.

Participants will have the opportunity to practice lens insertion and removal and to evaluate the contact lens fit throughout the fitting process.

Advanced slit lamp techniques

Lead author: Claire McDonnell

Co-author: Declan Hovenden

National Optometry Centre, Dublin Institute of Technology,
Dublin, Ireland

Purpose

In this workshop delegates will be shown how to use a slit lamp bio-microscope to measure the anterior chamber angle and depth, to examine the anterior chamber, the crystalline lens, the retrolental space and the anterior vitreous face. They will also be shown how to decouple the illumination and observation systems of the slit lamp to allow visualisation of the cornea using sclerotic scatter illumination at a high magnification.

Method

The two workshop presenters will demonstrate the techniques on delegates and will then supervise delegates as they carry out these techniques themselves.

Learning objectives

At the end of this workshop delegates will be able to:

- measure the anterior chamber angle using Van Herick's technique
- estimate the anterior chamber angle using the split limbal technique
- measure the anterior chamber depth using Smith's technique
- examine the anterior chamber using a conical beam
- decouple the illumination and observation systems for corneal examination
- examine the crystalline lens, retrolental space and anterior vitreous face.

Fitting 'principles' and 'practicals' of non-fenestrated scleral lenses

Lead author: Jennifer McMahon^{1,4}

Co-author: Ken Pullum^{2,3,4}

¹Great Western Hospitals NHS Foundation Trust, Swindon, UK

²Moorfields Eye Hospital, London, UK

³Oxford Eye Hospital, Oxford, UK

⁴Innovative Sclerals Ltd, Hertford, UK

Introduction

Preformed non-fenestrated scleral lenses are now considered the mainstream clinical option as the fitting process is straightforward and an endpoint is reached quickly.

The lenses bear solely on the sclera vaulting both the limbus and the cornea such that almost any corneal topography may be fitted.

Scleral lenses are most often indicated in the management of keratoconus, other primary corneal ectasias, post transplant and other irregular corneal surfaces, but can also be successfully applied for a range of therapeutic purposes.

This presentation illustrates the basic fitting principles and tackles the most frequently asked questions of scleral lens fitting.

Method

A fully illustrated didactic lecture covering the basic fitting principles of modern scleral lens designs will be followed by a hands-on practical session giving delegates the opportunity to practise insertion and removal, to assess the fit and to ascertain which potential modifications may improve the lens fit.

Learning objectives

- to provide an outline of modern scleral lens designs and manufacturing techniques
- to show examples of potential scleral lens indications
- to illustrate fitting principles of non ventilated, preformed scleral lenses
- to allow insertion and removal techniques to be practiced
- to allow assessment of fitting characteristics with lenses in situ.

Conclusion

Delegates will be in a position to recognise when scleral lenses may provide the best clinical option for the patient and then make an informed fitting choice.

Demystifying the diagnosing of the strabismus

Lead author: Vanessa Moodley
University of Kwa Zulu-Natal, Durban, South Africa and
Dublin Institute of Technology, Dublin, Ireland

The evaluation of binocular vision, achieved by the co-ordinated use of both eyes to form a single precept, is an integral part of the optometric assessment of a patient. However, when the binocular vision system breaks down and a strabismus results the practitioner is called upon to conduct a series of additional tests to ultimately derive a full diagnosis of the strabismus.

Many practitioners often refer these patients to an ophthalmologist or optometric colleague on merely observing the strabismus. There is no attempt to conduct tests that will provide necessary clinical information to the practitioner receiving the patient. Anecdotal reports indicate that this is because practitioners feel incompetent, lack the 'expensive' equipment needed for a diagnosis or feel inadequately trained to deal with the strabismic patient.

This workshop is designed to demystify the diagnosis of the strabismus patient. Participants will be guided to conduct all the relevant motor and sensory assessments with inexpensive equipment that can easily fit into a hand held bag. Assessments will cover the direction, magnitude, frequency, laterality, associated accommodative status, comitancy and sensory adaptations (ARC, Suppression, Eccentric Fixation, Amblyopia).

The tests that will be demonstrated include Bruckner, Hirschberg and Krimsky Tests, Cover Test, Worth 4 Dot, Diplopia Field/Red Lens Test, Maddox Rod, Bagolini Striated Glass Lens Test, Pola Mirror, Vis-a-Vis, Visuoscopy and Amblyopia Tests.

Delegates will be given appropriate clinical information and demonstrations on the tests and will be allowed to conduct each test during the session.

Vision beyond 20/20 – the binocular vision exam

Lead author: Katerin A. Ortiz
Inter American University School of Optometry, Bayamon,
Puerto Rico

Purpose

The purpose of the workshop will be:

- to review the binocular vision exam methods and its components
- to review diagnosis of pertinent findings and diagnosis of accommodative and binocular vision disorders
- to discuss when a bifocal is necessary.

Method

The optometry exam is more than a refraction. New research such as that conducted in the convergence insufficiency treatment trial (CITT) has provided proof that patient's symptoms are attributable to more than just a refraction. The proper binocular vision exam should include a careful case history that includes a developmental history, headache history and questions specific to the classroom such as: trouble copying from the board, blurry vision after reading, double vision, etc. Many children today suffer from binocular vision problems that intervene in school performance. Therefore, in addition to refraction, a binocular vision exam can uncover a problem previously undetected by any other health professional. Other studies suggest that attention deficit disorder is often associated with accommodative disorders and some findings suggest that they may be related to ADHD medication. This workshop will cover all these topics and treatment options for patients with binocular vision disorders

Results

The following procedures will be covered:

I. Accommodative testing:

- Amplitude of Accommodation - Donders (push up/pull away), Sheards (minus lens)
- Accommodative Facility - NRA/ PRA, Flippers +/-2.00
- Posture of accommodation – BCC, MEM (Objective)

II. Binocular testing:

- Phoria - Cover test, Von Graffe
- Near Point of Convergence (NPC) – Penlight, Fixation stick, Red Lens
- Vergences – Smooth (Von Graffe), Jump Vergences (Prism bar)
- AC/A - Add +1.00 if EXO, Add -1.00 if ESO

III. Pursuits & Saccades

- Using fixation stick
- Repeat 5 x

Conclusion

A child with reading problems may be suffering from a binocular vision problem that is not uncovered during refraction. Therefore, vision of 20/20 does not mean that a child has clear, comfortable vision. It is therefore important for all optometrists to know about binocular vision procedures, analysis and treatment.

Hi-tech photography

Lead author: Brian Tompkins¹

Co-author: Nicholas Rumney²

¹Independent practitioner, Northampton, UK

²BBR Optometry, Hereford, UK

It is impossible to remember each and every aspect of every patient, so modern practice must have some method of 'remembering' each patient, their conditions and their clinical changes.

A variety of simple and more technologically complex methods of investigation will be discussed, using observation and photography in slit lamps, topographers, retinal cameras and OCT instruments to examine and measure the eye in general, tears, anterior chamber, lens and retina in a variety of ways to enable a better understanding of the problems faced by patients.

A variety of CL types will be examined in situ from a new dimension, to help understand the principles of fitting.

There will also be a discussion on the ways that the images can be used, from referral processes, to educating the patient and marketing the practice for increased loyalty and business.

Learning objectives

- to understand how new imaging technology can be used to look at a variety of conditions in the eye and demonstrate to patients for a better understanding
- to look at the various options available to investigate and record images
- to describe methods used in practice to understand contact lens fitting from a new dimension.

Reliability of the visual acuity testing on logMAR ETDRS and Snellen Chart

Lead author: Petr Vesely^{1,2}

Co-author: Svatopluk Synek^{1,2}

¹Department of Optometry and Orthoptics, Faculty of Medicine, Masaryk University, Brno, Czech Republic

²Department of Ophthalmology and Optometry, St. Anne's University Hospital, Brno, Czech Republic

Purpose

The main goal of the study was to prove the statistically significant correlation between repeated measurements and test-retest variability TRV expressed with confidence interval CI according to Bland-Altman's method on 95% level of statistical confidence. The methods are threshold interpolation log MAR method on ETDRS chart, whole-line method on Snellen chart and modified threshold interpolation method on Snellen chart with Sloan letters.

Method

We had 468 measurements measured with threshold interpolation log MAR method on ETDRS chart, whole-line method on Snellen chart and modified threshold interpolation method on Snellen chart with Sloan letters. The average value of the first sequence of measurements measured with whole-line method on Snellen chart was -0.043 logMAR (min. 1, max. -0.30, SD 0.25) and of the second sequence of measurements was -0.045 logMAR (min. 1, max. -0.30, SD 0.23). The average value of the first sequence of measurements measured with interpolation method on Snellen chart was -0.018 logMAR (min. 0.98, max. -0.30, SD 0.29) and of the second sequence of measurements was -0.024 logMAR (min. 1, max. -0.80, SD 0.29). The average value of the first sequence of measurements measured with interpolation method on ETDRS chart was -0.0612 logMAR (min. 0.72, max. -0.30, SD 0.21) and of the second sequence of measurements was -0.0610 log MAR (min. 0.8, max. -0.28, SD 0.21).

Results

All the methods did not produce a statistically significant difference between repeated measurements (Wilcoxon paired test, whole-line method on Snellen chart $p = 0.74$, interpolation method on Snellen chart $p = 0.33$ and interpolation method on ETDRS $p = 0.95$). They also had statistically significant correlations (Spearman correlation coefficient, whole-line method on Snellen chart $r = 0.91$, $p < 0.0001$, interpolation method on Snellen chart $r = 0.89$, $p < 0.0001$ and interpolation method on ETDRS chart $r = 0.89$, $p < 0.0001$). TRV expressed with CI on 95% statistical significance level according to method of Bland-Altman was with whole-line method on Snellen chart ± 0.11 (i.e. 5 letters), with interpolation method on Snellen chart ± 0.20 (i.e. 10 letters) and with interpolation method on ETDRS ± 0.08 (i.e. four letters).

Conclusion

The biggest conclusion of clinical importance was the determination and confirmation of the CI value of TRV. The recommendation based on the results of this study is that it is not clinically appropriate to convert measured values from Snellen optotype to logMAR and perform interpolation method on the Snellen chart.

Computerised screening for correctable visual impairment in older people

Lead author: Zahra Jessa^{1,2}

Co-authors: Bruce Evans^{1,2}, David Thomson²

¹The Neville Chappell Research Clinic, The Institute of Optometry, London, UK

²The Department of Optometry and Visual Science, City University, London, UK

Objectives

In the UK, 20-50% of older people have undetected reduced vision and in most cases this results from correctable problems (refractive error and cataract). Many older people are not availing themselves of state-funded community optometric care. We sought to investigate whether vision screening in the community might (a) educate the public about the need for routine eyecare and (b) provide personalised advice to persuade people with poor vision to seek optometric care.

Method

We used a computerised vision screening test which was refined after a preliminary study of 180 older people to include tests of: monocular presenting distance high contrast and low contrast visual acuities (VAs), binocular near acuities, and monocular visual fields. We report here the results from this computerised vision screener (CVS) on 200 people aged 65+ (mean age 77 years). 31.5% were seen in community settings including a community day centre; the rest were seen in a primary care optometric practice. All participants were given a full optometric eye examination.

Results

Initially, we defined eye disease as significant gain in monocular distance VA or binocular near VA with new refractive correction, significant cataract, or at risk of rapid progression macular degeneration. The best sensitivity was obtained for a screener test combination of a fail on high contrast VA OR low contrast VA OR near VA (sensitivity 80.3%, 95% CI 72.4 to 86.4; specificity 66.7%, 95% CI 55.6 to 76.1). Alternatively, a screener test combination of high contrast VA OR near VA gave sensitivity of 79.5% (71.5 to 85.7) and specificity 67.9% (57 to 77.3). If glaucoma or glaucoma suspects are included in the target diseases, then with a test combination of high contrast VA OR visual field defect sensitivity of 80.3% can be achieved (72.7 to 86.2), but specificity drops to 51.5% (39.8 to 62.9).

Conclusion

Our computerised vision screening does not replace the need for routine eyecare, but may help to educate older people about the need for eyecare and may be useful in detecting people whose are not aware of a drop in their VA.

Fundus eye evaluation: fundus camera vs scanning laser ophthalmoscopes

Lead author: Natividad Alcón
Co-authors: Consuelo Moreno, Angel Tolosa
Technological Institute of Optics (AIDO), Spain

Purpose

Retinal alterations are a heterogeneous group of disorders affecting the morphological components of the fundus eye. Their classification, clinical presentations and differential diagnosis are complex and sometimes difficult. Due to this, it is essential to have useful tools to help in their diagnosis.

This was a comparative study between two optometric instruments: a fundus camera (FC) and a scanning laser ophthalmoscope (SLO) in order to evaluate their use for fundus eye evaluation.

Method

This comparative study mainly focused on the following aspects: field of view, magnification, stereoscopic character of the images and feasibility of use.

Results

FC takes a photograph of the fundus without mydriatic drugs. It has a field of view of 30° —nowadays 45°— with a magnification about 2.5x. Using lenses it is possible to magnify the fundus image, but reducing the field of view until 20° or less. For field of view greater than 100°, special lenses must be introduced into the system to flatten the image and to avoid problems linked with the curvature of the ocular globe. With FC it is possible to take stereoscopic images and using appropriate coloured filters to obtain images at different depths of the fundus layers.

Topographic and tomographic digital images can be obtained with SLO (currently confocal scanning laser ophthalmoscope (cSLO)). Transversal resolution may be about 5 to 10 µm, and about 200 to 300 µm for axial resolution.

Typically, a slow 'vertical' scanner has a frequency of 10-30 frames/ second, while a fast 'horizontal' scanner has a frequency of 10,000 Hz or higher. It produces lower resolution images than common FC (Typically 500x500 pixels vs 1000x1000 pixels for digital FC).

Their images are monochromatic. To obtain colour images it is necessary to use three lasers (RGB). This way, three different colour images recorded sequentially and carefully aligned could be integrated into a single image.

Conclusion

Both instruments can be used for fundus eye evaluation. If new devices are developed they need to avoid some of the problems of these instruments, mainly image noise for SLO and contrast for FC.

Screening of retinal diseases from optical center by non mydriatic cameras: the optician on the basis of visual health

Lead author: Miguel A. Zapata¹

Co-authors: Lluís Bielsa²

¹Retinal specialist, Diagsum, Barcelona, Spain

²Optometrist, Barcelona, Spain

Purpose

To describe the first three months of operation of a telemedicine system for the screening of retinopathy by non-mydriatic cameras in OPT retina network centres.

Method

The mean age and underlying disease of the patients was established. Effectiveness of the system, study of pathological cases, referral and recommendations were made. All patients who came to the centres of the network and agreed to have the fundus photographs taken were included. Images were evaluated by a retina expert ophthalmologist, who performed diagnostic impressions and made recommendations.

Results

The study included a total of 804 patients with a mean age of 45.3 years. 4% were known diabetics. Of all patients 79.1% were normal, 16.6% were considered pathological and 4.3% of cases could not be evaluated because of the poor quality of the fundus photographs. Age-related maculopathy represented the most frequent pathology (37.3%) and diabetic retinopathy accounted for 7.5% of total pathological cases. From a total of 134 patients who were referred to an ophthalmologist, 6.8% were referred urgently, 23.8% preferentially (within two-three weeks) and 69.4% were referred in the ordinary way. Not only was eye pathology observed but retinal lesions were described with systemic implications, which involved a referral to other specialists.

Conclusion

Telemedicine applied to retinopathy screening is an effective and simple method for the detection of pathology. The network centers of OPT retina have retina specialists. This system benefits patients by the easy access to examinations, is an advantage for ophthalmologists as they receive filtered and earlier stage pathology and benefits opticians who can add value to their work.

Introducing specialist services into routine practice

Lead author: Shehzad Naroo¹

Co-authors: Nicholas Rumney², Peter Frampton³, Neelam Patel²

¹Ophthalmic Research Group, School of Life & Health Sciences, Aston University, Birmingham, UK

²BBR Optometry, Hereford, UK

³Aaron Optometrists, Ashington, UK

The discussion forum will consist of four talks and then a Q&A interactive session.

1. Shehzad: The importance of specialist services (including details on waiting list initiatives, training, equipment etc)
2. Nick: The need for independent prescribing in private practice and specialist services
3. Peter: How to set up independent prescribing services
4. Neelam: How to balance the books with specialist services and share care schemes

The demand for eye care is ever on the increase with an aging population and a reduction of funding for public services. Often local fund holders are looking for more efficient methods of delivering good quality eye care. As a result it is not uncommon for local Trusts to enter into agreements with local ophthalmic service providers and formulate shared care schemes.

Are these schemes necessary and are they financially viable? Independent prescribing of therapeutic drugs in primary eye care practice is one specialised service that has come about to try and reduce the burden on the hospital eye service. How would a practice start on the road to independent prescribing? How are these services costed? Some practices may decide on implementing independent prescribing as a way of differentiating their practice to rival practices, but the question needs to be asked regarding how successful are these services to a practice? Is it better for a practice to concentrate on the retail aspects of the business or try and introduce new clinical services? Do these services generate adequate revenue that substitute for possible losses of retail sales? This clinical spotlight aims to try and answer some of these questions with evidence-based practice.

Implementing the use of diagnostic drugs in Norwegian optometric practices: educating practising optometrists

Lead author: Ellen Svarverud

Co-authors: Magne Helland, Bente Monica Aakre
Department of Optometry and Visual Science, Faculty of Health,
Buskerud University College, Kongsberg, Norway

Introduction

When Norwegian optometrists achieved the right to use diagnostic drugs in 2004, there were already a number of optometrists qualified through bachelor- and master- studies abroad. Further, diagnostic drugs were by this time implemented in the curriculum in the Norwegian optometric education. However, with the extended scope of practice the optometric profession was instructed by the national health authorities to provide educational courses to bring the remainder of practising optometrists to the necessary level of knowledge and skills. This presentation will discuss how this was achieved in Norway.

Method

In collaboration with the Norwegian Optometric Association, the Department of Optometry and Visual Science at Buskerud University College developed two continuing education courses which were approved by the health authorities. The first course was aimed at optometrists who had graduated before 1990, where the curriculum included a limited amount of basic and ocular anatomy, physiology, immunology, pharmacology and microbiology. The second course was mandatory for all graduates and included topics on ocular disease, systemic disease with ocular implications, ocular pharmacology, considerations concerning the use of diagnostic drugs and possible adverse reactions, and investigative techniques relevant to the use of diagnostic drugs.

Results

During the period between 2005 and 2011, almost 300 optometrists completed the necessary courses, and achieved the right to use diagnostic drugs in optometric practice. This means that 35% of all optometrists who had the right to use diagnostic drugs by the end of 2011 had completed these continuing education courses.

Conclusion

Many countries in Europe face the challenge of expanding the scope of optometric practice to include the use of diagnostic drugs. Our experience is that to obtain such a major goal, the professional bodies and educational institutions must collaborate to achieve legislation, and further, collaborate to implement relevant knowledge and skills in the optometric profession. By offering easily accessible continuing education courses for practising optometrists, a considerable proportion of practitioners were enabled to fulfil the extended scope of practice.

Achieving optometric coverage in a National Public Health Insurance Scheme: a journey of 22 years with Medicare in the USA

Lead author: Roger D. Kamen
Michigan College of Optometry, Ferris State University,
Big Rapids, Michigan, USA

Introduction

In 1965 the United States Congress passed historic legislation creating the first national public health insurance programme in the US, Medicare. Medicare originally provided hospital and medical benefits to individuals who were aged 65 and over but not routine care. Medicare did not cover routine vision care or eyeglasses/contact lenses except as prosthetic lenses for the aphakic patient (post cataract surgery). In essence, optometrists were excluded, only able to provide lenses for the aphakic patient on orders (RXs) from ophthalmologists. Unlike optometrists, ophthalmologists were reimbursed for medical eye examinations. Optometry in 1965 was a drugless profession in the United States, not able to use pharmaceutical agents for diagnostic (DPA) or treatment (TPA) purposes and could not diagnose eye disease (only ascertain deviation from normal), thus only screening for eye disease. How did optometry succeed in gaining privileges in this all important national health insurance programme?

Method

Optometry's answer was the realisation that optometry needed to transform from solely a vision care profession to an eye health care profession; i.e., become primary eye care providers. Organised optometry at the federal level and the states level developed grassroots campaigns to push through necessary changes to states' practice acts to allow diagnostic drugs as a first step, then seeking therapeutic drug privileges and most importantly adding the word 'diagnose' to the laws. Expanding the optometric education curriculum as well as distribution issues of ophthalmologists (concentrated in large cities) provided important argument points for supporting optometry's scope's expansion with states' legislatures. Optometric education evolved from a five year programme (post high school) in 1950 to a six year programme (two year pre-optometry and four year optometry school) by the end of the 1960s, with all optometry schools offering the OD degree. Over the next two decades the length of the pre-optometry requirement increased to three-four years, increasing the total programme to the current length of seven-eight years.

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Achieving optometric coverage in a National Public Health Insurance Scheme: a journey of 22 years with Medicare in the USA

Results

In 1971 the first state passed DPA legislation and by the end of 1970s, 22 states had DPA laws and two states had passed TPA legislation. The campaign had success as the US Congress in 1981 amended the Medicare Act permitting optometrists to be classified as a physician for medical related services provided to patients related to the condition of aphakia. Continuing the hard fought campaign, by the end of the 1980s all states had DPAs, 25 states had TPAs and most could diagnose rather than detect disease. In 1987, 22 years after the initial enactment of Medicare, optometrists were classified as physicians for all covered Medicare services, reaching parity with ophthalmology. Many private insurance carriers follow Medicare's lead and thus recognise optometrists as providers of medical eye care.

Conclusion

With an organised effort and following the mantra of educate first, then legislate, and finally implement, success was achieved. Today, US optometry is accepted by medical insurances, public and private and is recognised as a primary eye care profession. A discussion of European countries' current optometric scope of practice and status of participation in health insurance schemes along with possible strategies for future enhancements could be beneficial.

All India strategic plan for the development of vision care in India – Aksauhini

Lead author: Vinod Daniel
Co-authors: Abhishek Kalbarga¹, Neilsen Desouza², Andrew Grant³, Puneet Sahai⁴
¹India Vision Institute, Hyderabad, India
²Brien Holden Vision Institute, Australia
³Consultant, Australia
⁴Consultant, Australia

Introduction

The All India strategic plan for the development of vision care in India is a strategic framework to significantly improve vision care in India. India has one of the largest populations of unnecessarily blind and vision impaired individuals in the world, totalling about 133 million people. A significant number of these people are based in the rural parts of the country.

The profession of optometry in India is not regulated, integrated into the health care system or recognised by the majority of people in India as provider of comprehensive eye care services. India requires 115,000 optometry professionals to meet the eyecare needs of 1.22 billion people. However, currently there are only 49,000 trained optometrists. This contributes to extensive shortage of practitioners, particularly in the rural parts of India. Though the global vision industry is worth about \$200 billion, the Indian vision care industry is valued around \$2 billion.

Purpose

To develop the resources required to enable excellent vision care and position India as a world leader in vision care within 20 years.

Method

Survey conducted in early 2012 involved gathering fresh insights by conducting more than 300 interviews across the vision care sector including: clinicians, allied health workers, professional bodies, vision care educators, industry players and the general public.

Results

Given the magnitude of the change management effort required to achieve our long-term objective, we have identified 16 strategic projects for implementation:

- all India awareness campaign
- campaign to increase existing school intake
- optometry professional regulatory framework
- faculty development
- higher education scholarships
- optometry school infrastructure
- Vision Care Educators Academy
- advocacy within the profession of optometry

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All India strategic plan for the development of vision care in India – Aksauhini

- high quality education materials and technology
- blended learning and online platform
- continuing professional development
- new optometry schools
- representative body for innovation in vision care technology
- standard educational resources for retail and para-technical
- low cost spectacles localisation
- technology development and local commercialisation.

Conclusion

Based on primary research involving more than 300 interviews, the plan sets out a comprehensive improvement programme comprising 16 strategic projects to develop the resources required to enable excellent vision care in India, and to position India as a world leader in vision care within 20 years.

The other side of the coin: provider perceptions on delivery of refractive services in a low income setting

Lead author: Priya Morjaria¹

Co-authors: Hasan Minto², Prasad Ramson², Michael Gichangi³,
Kovin Naidoo^{2,4}, Clare Gilbert¹

¹International Centre for Eye Health, Department of Clinical Research, London School of Hygiene and Tropical Medicine, London, UK

²International Center for Eye care Education (ICEE), Durban, South Africa

³Division of Preventive Ophthalmic Services, Ministry of Public Health and Sanitation, Nairobi, Kenya

⁴African Vision Research Institute, University of Kwa-Zulu Natal, Durban, South Africa

Purpose

To obtain key information perspectives on the current level of refractive service provision against the targets in the 'National Strategic Plan for Eye Care (NSPEC) in Kenya 2005-2010' by the Ministry of Health, Division of Ophthalmic Services.

When investigating barriers to delivery of health care services, frequently only patient perceptions are discussed. This study (as part of a wider situational analysis) explores the other side of the coin, provider perceptions in order to give a complete picture. Evidence of provider challenges to the delivery of refractive error services is crucial for future planning purposes at a national and regional level.

The findings will provide information on progress in relation to Kenya's strategic plan for eye care.

Method

In depth interviews were conducted with some of the main stakeholders that provide eye care services in Kenya, such as the National Coordinator for Prevention of Blindness Committee, representatives of international non-governmental organisations e.g. Sightsavers International and key ophthalmologists.

Semi structured interviews were held with the individuals in order to obtain a provider perspective on the key barriers to providing the services, the quality, progress towards targets that have been set in the NSPEC and future plans. These interviews were recorded and transcribed and analysed for themes.

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The other side of the coin: provider perceptions on delivery of refractive services in a low income setting

Results

The following themes were emphasised in the interviews - creating awareness amongst the community about refractive errors and the simple management of it, the need for standardisation of services in terms of quality, quantity and cost and the willingness of eye care professionals to make progress and be open to additional training to provide quality care. A very important message from stakeholders was to build on the public-private partnership in Kenya and to take into account the services provided by the private sector.

Conclusion

Over 15 key informants were interviewed in this study, across a wide range of stakeholders. Their perceptions on the delivery of refractive services not only confirm the challenges faced but also give a platform for other concerns to be raised. There are also similarities between provider and patient challenges and in order to improve the delivery of refractive services both need to be addressed.

The evidence gathered and the challenges faced in the Kenyan setting are present not just in eye care but also in other aspects of health care. These lessons can be translated to other low resource settings and are very useful for planning and measuring progress towards national and regional goals.

The potential of social enterprise to increase access to eye care

Lead author: Kovin Naidoo^{1,2}

Co-authors: Sebastian Fellhauer¹, Pirindhavellie Govender¹, Vivasan Pillay¹
¹Brien Holden Vision Institute, Durban, South Africa
²African Vision Research Institute (AVRI), University of KwaZulu Natal (UKZN), Durban, South Africa

Introduction

The current global economic burden of uncorrected refractive error is among the most significant of the preventable vision disorders and is therefore a public health priority. Social enterprise (SE) models have been developed to increase access, affordability and quality of eye health services, especially in resource limited countries. Social enterprise uses market mechanisms but instead of profit maximisation it addresses a social need. Its objectives are to achieve effectiveness and efficiency so as to create an impact in communities. The end product is an enterprise that is sustainable, scalable and replicable.

Method

An analysis of current SE initiatives was conducted. A case-study approach was adopted whereby a cross-section of global SE initiatives were reviewed. The different approaches were evaluated in terms of their reach and impact as well as the barriers to the expansion of a social enterprise strategy.

Results

The population served by the private sector in the developing world can be as low as 10% or as high as 90% in some communities. Social enterprise initiatives have created the opportunity to expand services outside the public sector and have generated income for numerous eye care service delivery programmes around the world. Barriers such as government legislation, funding mechanisms and poor infrastructure have been identified. A major stumbling block to the successful expansion of social enterprise initiatives is the lack of optometrists in the developing world.

Conclusion

Struggling with competing health priorities and a lack of access to services, social enterprise offers an innovative approach in not only providing affordable and accessible refractive services but at the same time empowering the local community through successful entrepreneurship. Overcoming the current barriers will create the potential for an expansion of current initiatives.

An evaluation of non-contact screening methods for measuring anterior chamber depth using Pentacam imaging, and the IOL-Master

Lead author: Priya Dabasia¹

Co-authors: John Lawrenson¹, David Edgar¹, Ian Murdoch²

¹City University, London, UK

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Purpose

Detection of eyes at risk of developing angle closure glaucoma (ACG) is based on morphological evaluation of the anterior chamber angle configuration. Gonioscopy is the current reference standard method of examination. However, most community optometrists lack the training to perform gonioscopy, and only an estimated 12% have access to a gonio lens. Surrogate methods to evaluate anterior chamber depth (ACD) have been adopted, including slit-lamp biomicroscope-based techniques, and recently imaging-based technologies. This study aims to determine whether the IOL Master (Zeiss), a biometric device, and the Pentacam (Oculus), an automatically rotating Scheimpflug camera, provide comparable results for ACD measurement.

Method

In this prospective study, ACDs from 118 phakic eyes of 59 subjects with mean age 47 years (range 21 to 85) were measured using both instruments. Refractive error was determined by autorefractor. Subjects with anterior and posterior ocular disease, history of ocular surgery, and corneal disorders or abnormalities that precluded anterior imaging were excluded. Data from both eyes were captured in the same order, by a single experienced examiner. The IOL-Master defined the ACD as the distance between the corneal front surface and the anterior lens surface. To obtain a comparison with these data, the Pentacam ACD measurements were added to the respective central corneal thickness measurements. A Bland-Altman difference plot evaluated the agreement between the two devices for ACD. Statistical analysis was performed by SPSS 19.0 Software.

Results

Right eye measurements from 59 subjects were analysed. Mean ACD was 3.45 ± 0.39 mm (SD) for the IOL Master, and 3.51 ± 0.40 mm for the Pentacam. The bias was -0.065 ± 0.105 mm, with the largest deviation from the average ACD measurement being 0.32mm. The difference plot showed a systematic deviation with no proportional or magnitude-dependent error. The 95% limits of agreement of -0.27 to 0.14 mm represent approximately 12% of mean ACD, which implies fair agreement. A statistically significant, medium negative Pearson correlation was found between the spherical equivalent refractive error and ACD as measured with the IOL Master ($r = -0.662$, $P < 0.01$) and the Pentacam ($r = -0.641$, $P < 0.01$).

Conclusion

Agreement between ACD measurements by the IOL-Master and Pentacam is fair but the modalities are not interchangeable. This study provides validation for use of non-contact methods to screen for shallow ACDs, with potential for use in community optometric practice and population screening. Further research is required to determine how measurements by imaging-based technologies can be used alone, or in combination, to improve case detection.

Controversies in contact lens care: a clinical perspective to define the best system

Lead author: Langis Michaud
University of Montreal, Montreal, Canada

This presentation will cover the following areas:

- contact lens and solutions market in 2012 - what are the new products and how do they differ
- contact lens materials and care systems defined – their composition and properties, the key elements that can influence interactions and uptake and release mechanisms and understanding physiological and immune responses to chronic exposure to chemicals
- the staining debate – existing and new approaches
- infiltrative events outbreak (CLAIK) – incidence, nature of the infiltrates (LPS), relation to specific contact lens/solution combinations and options for treatment and refit
- defining the optimal contact lens care system - disinfection properties vs other issues, biguanides revisited, the importance of chelating agents and interactions with modern materials
- other factors to consider - contact lens fit, compliance, hygiene, smoking, tap water, case and other risk factors
- hydrogen peroxide - performance and limits vs newest products and new applications for RGP lenses
- daily disposable lenses.

Conclusion

Even with the launch of new products, contact lens care remains controversial. New knowledge indicates that we should revisit our understanding of fluorescein staining (nature, clinical relevance) and of physiological response to chronic exposure to chemicals. Infiltrative events are increased in number and lens/solution interaction is in play but we have to consider other risk factors. The best care system could be to not use chemicals at all.

Anisocoria induced by small-aperture contact lenses and the Pulfrich experience: absence of neural adaptation effects

Lead author: Sotiris Plainis^{1,2}

Co-authors: Dionysia Petratou¹, Trisevgeni Giannakopoulou¹,
Hema Radhakrisnan², Ioannis G Pallikaris¹, W Neil Charman²
¹Institute of Vision & Optics (IVO), University of Crete, Heraklion
Greece
²Faculty of Life Sciences, The University of Manchester,
Manchester UK

Background

Although monocular use of small aperture optics in the form of a corneal inlay or contact lens (CL) may improve the near binocular acuity of presbyopes, the associated interocular differences in retinal illuminance result in differences in visual latency and the Pulfrich effect. This study explores whether adaptation effects may reduce these differences.

Method

The effects of anisocoria were simulated in two normal, young adults by wearing in the non-dominant eye a hand-painted opaque soft CL (Cantor&Nissel Ltd, Brackley, UK) with a central circular aperture diameter of 1.5 or 2.5 mm. Subjects wore each of the CLs continuously for seven consecutive days while awake (about 17-18 hours a day). Each day monocular and binocular pattern reversal visual evoked potentials (VEPs) were elicited using reversing 10 arcmin checks with 100% contrast at a distance of 1m. Additionally, the Pulfrich effect was measured: the two-alternative forced choice (2AFC) task of the subject was to state whether a 2 deg circular spot appeared in front or behind the plane of a central cross when the spot moved left-to-right or right-to-left on a display screen at a distance of 0.4m. The retinal illuminance of the dominant eye, having a natural pupil, was varied using neutral density (ND) filters to establish the ND value which eliminated the Pulfrich effect for each lens. Experiments were performed with best-corrected vision for distance at two luminance levels, of 5 and 30 cd/m².

Results

Induced anisocoria increased the latency of the P100 component of the VEP compared to normal binocular viewing (Figure 1). The effect was more pronounced at the lower luminance and with the smaller artificial pupil. Interocular differences in VEP latency (at 30 cd/m²) rose to about 12-15 ms and 20-25 ms when the pupil of the non-dominant eye was 2.5 and 1.5 mm, respectively. A strong Pulfrich effect was observed with both lenses at all conditions. The ND value required to null the effect decreased as the diameter of the aperture of the CLs increased (Figure 2). No neural adaptation appeared to occur: neither the interocular differences in VEP latency nor the ND value required to null the Pulfrich effect reduced over the seven days of anisocoric vision. Following CL removal, VEP latencies returned to pre-adaptation values.

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Anisocoria induced by small-aperture contact lenses and the Pulfrich experience: absence of neural adaptation effects

Conclusion

The anisocoria induced by small-aperture CLs produced marked interocular differences in visual latency and a Pulfrich experience. These differences were not reduced by adaptation, perhaps because the natural pupil diameter of the dominant eye was continually changing throughout the day due to varying illumination and other factors, making adaptation difficult. The interocular latency differences may lead to distortions in the perception of relative movement and, in some cases, to possible hazard in practical situations such as driving.

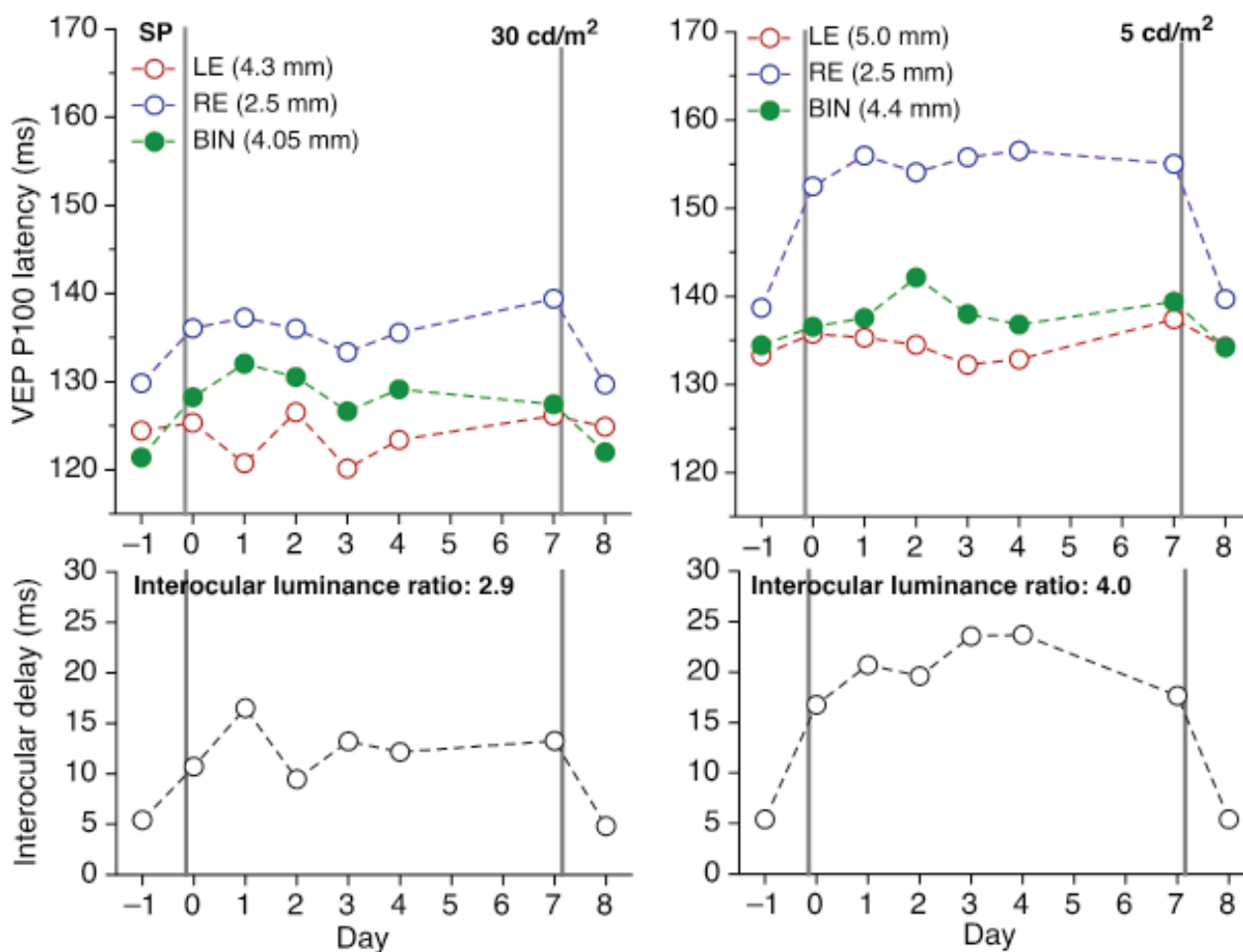


Figure 1: (Upper) Plots of monocular (red, dominant (left) eye; blue, non-dominant (right) eye) and binocular (blue circles) mean latency of the VEP P100 component as a function of time at high (left) and low (right) photopic levels for one subject. The non-dominant eye was wearing a reduced-aperture contact lens with a pupil 2.5mm in diameter. The dominant eye had its full, unobstructed natural pupil (mean diameter about 5.0mm at low and 4.3mm at high photopic levels).

(Lower) Plot of the interocular latency difference as a function time. The ratio of the retinal illuminance in the dominant eye to that of the non-dominant eye is indicated.

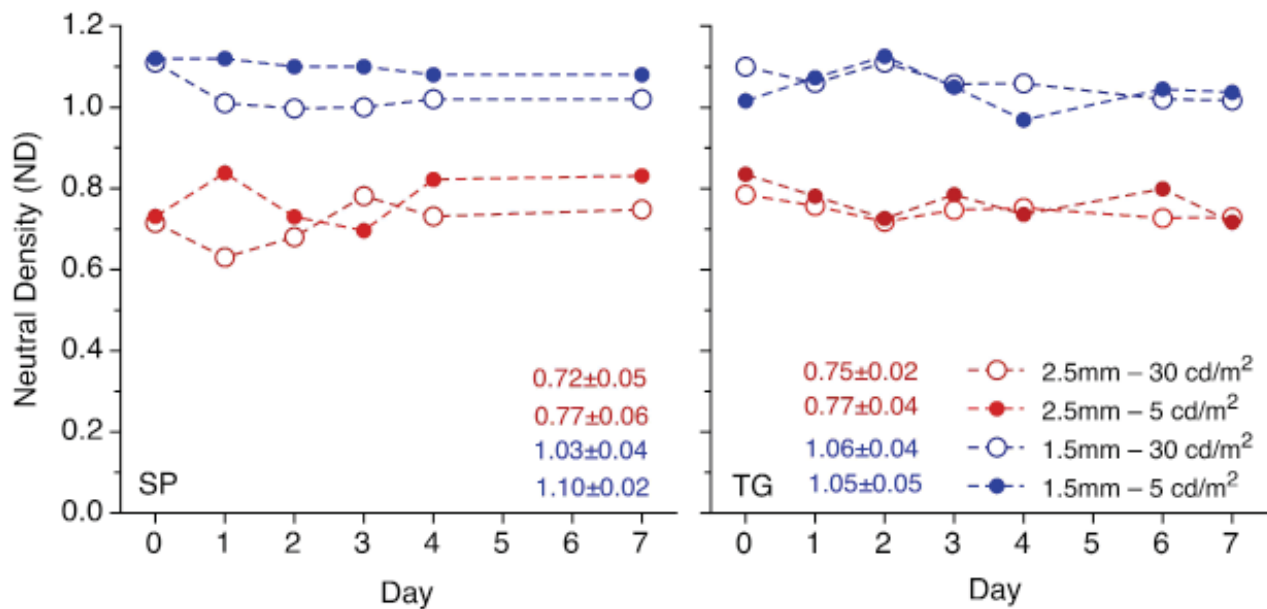


Figure 2: Values of ND filter required to null the Pulfrich effect, when placed in front of the dominant eye, as a function of time for two subjects. The non-dominant eye was wearing a 2.5mm (red circles) or a 1.5mm lens (blue circles). Data for recordings at high (open circles) and low (filled circles) photopic levels are presented. The average values of ND filter required to null the Pulfrich effect for all conditions are also shown.

Revolutionary ophthalmic lenses with liquid crystal layer inside

Lead author: Jorge Rodriguez
Technical Director, Gran Optica, Madrid, Spain

Purpose

This presentation will show how the new technology of liquid crystal works inside ophthalmic lenses. Twelve years ago, researchers from Japan and the USA started working on lenses that change power thanks to the liquid crystals. A first application for these lenses is the first electronic PAL that changes the add value with no moving parts.

Method

The molecular arrangement means that the same lens has the ability to change the refraction index, and therefore its power. The research and development of this material has been able to create a composite lens from two different lenses which includes a liquid crystal layer inside and has the ability to appear and disappear according to the user's needs.

The main advantages that these lenses provide are:

- the user can select the vision mode of the glasses (far distance, short distance or automatic mode)
- they radically decrease the unwanted lateral astigmatism.

In the PAL lenses the unwanted astigmatism grows 2:1 as the add grows. If with a lens the lateral astigmatism can be reduced with a very low add, with wide fields for far distance and comfortable vision, the add power will only appear when it is needed. These lenses provide two targets:

- wide vision fields
- dynamic focusing as our eyes before the presbyopia.

The role of the liquid crystal in the dynamic PALs is essential.

There are different kinds of liquid crystal, and the main feature is that they can be orientated according to a magnetic field. The molecules are thin and elongated and when a small electrical field is applied they orientate in one direction, and when the electric field stops, they are orientated in the initial direction.

Thanks to this effect, when a layer of liquid crystal is introduced to an ophthalmic lens, and a light beam is shone on it, the light is refracted in a direction, but when an electric current is forced through the liquid crystal, the refractive index changes, and this deflects the light beam which means that the effect can take place.

Conclusion

Thus we get an addition (Phantom) and a much lower lateral astigmatism.

Cylinder

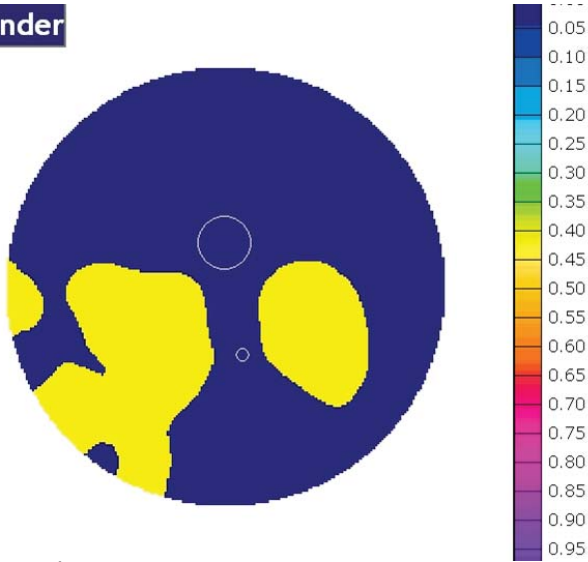


Image 1

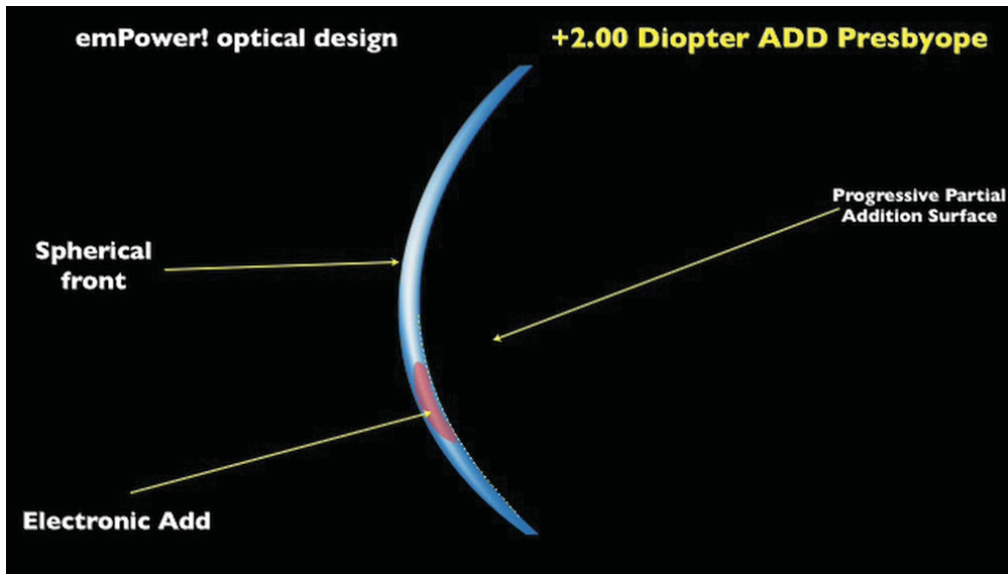


Image 2

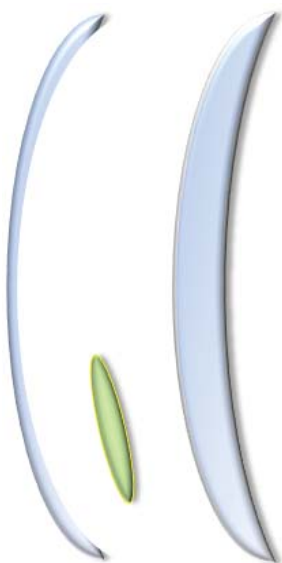


Image 3

Ocular residual astigmatism and topographic disparity vector indexes in normal healthy eyes

Lead author: David P. Piñero^{1,2}

Co-authors: Pedro Ruiz-Fortes¹, Rafael J. Pérez-Cambrodí¹, Verónica Mateo², Alberto Artola¹

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Purpose

To define a range of normality for the vectorial parameters ocular residual astigmatism (ORA) and topography disparity (TD) and to evaluate their relationship with visual, refractive, anterior and posterior corneal curvature, pachymetric and corneal volume data in normal healthy eyes.

Method

This study comprised a total of 101 consecutive normal healthy eyes of 101 patients ranging in age from 15 to 64 years old. In all cases, a complete corneal analysis was performed using a Scheimpflug photography-based topography system (Pentacam system Oculus Optikgeräte GmbH). Anterior corneal topographic data was imported from the Pentacam system to the iASSORT software (ASSORT Pty. Ltd), which allowed the calculation of the ocular residual astigmatism (ORA) and topography disparity (TD). Linear regression analysis was used for obtaining a linear expression relating ORA and posterior corneal astigmatism (PCA).

Results

Mean magnitude of ORA was 0.79 D (SD: 0.43), with a normality range from 0 to 1.63 D. Ninety eyes (89.1%) showed against-the-rule ORA. A weak although statistically significant correlation was found between the magnitudes of posterior corneal astigmatism and ORA ($r=0.34$, $p<0.01$). Regression analysis showed the presence of a linear relationship between these two variables, although with a very limited predictability ($R^2: 0.08$). Mean magnitude of TD was 0.89 D (SD: 0.50), with a normality range from 0 to 1.87 D.

Conclusion

Values below 1.9 D for the vector parameters ORA and TD are present in the healthy human eye. The potential diagnostic value of these parameters for the detection of some ocular pathological conditions should be evaluated in future studies.

Foveal contour interaction of low-luminance acuity targets

Lead author: John Siderov¹

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Purpose

Single-letter visual acuity is impaired by nearby flanking stimuli, a phenomenon known as contour interaction. We showed previously that the magnitude and angular extent of foveal contour interaction remain unchanged when target contrast is reduced, thereby producing a reduction of visual acuity. Here we asked whether contour interaction also remains unchanged when foveal visual acuity is degraded by a reduction of target luminance.

Method

The percentage of correct letter identification was measured in 10 normal observers (five in Cambridge, UK and five in Olomouc, Czech Republic) for isolated near-threshold black Sloan letters and for letters surrounded by four flanking bars. In different blocks of trials, the luminance of the targets ranged from 100 to 0.1 cd/sq.m (Cambridge) or from 195 to 0.195 cd/sq.m (Olomouc), with corresponding letter sizes that increased from approximately -0.05 to 0.5 logMAR (Cambridge) or -0.20 to 0.40 logMAR (Olomouc). All targets were viewed with the fovea, using the natural pupil (Cambridge) or through a 2.5mm pinhole (Olomouc). At each luminance, black flanking bars with a width equal to 1 letter stroke were presented at separations ranging from approximately 0.45 to 4.5 min arc (Cambridge) or 0.317 to 3.17 min arc (Olomouc).

Results

The extent of contour interaction was equal to approximately three - five min arc at all target luminances for both labs. On the other hand, the magnitude of contour interaction decreased systematically, from approximately a 50% reduction to approximately a 15% reduction in percent correct, as the target luminance was reduced.

Conclusion

Our results are difficult to reconcile with current theories that attribute crowding to either an integration of nearby features or to lateral masking. Rather, the decreasing magnitude of contour interaction as target luminance is reduced suggests that foveal contour interaction may be mediated by luminance-dependent lateral inhibition that occurs within a fixed angular region.

Supported, in part, by a grant from the Evelyn Trust, Cambridge, UK, a Leverhulme Visiting Professorship and grant No. PrF_2012_014 from the Faculty of Science of Palacky University, Olomouc, Czech Republic.

Temporal summation with perimetric stimuli as a function of visual field eccentricity

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²NIHR Biomedical Research Centre at Moorfields Eye Hospital NHS Foundation Trust and UCL Institute of Ophthalmology, London, UK

³School of Optometry & Vision Science, Cardiff University, Cardiff, UK

Purpose

Current standard automated perimetry (SAP) assumes that the limit of complete temporal summation (critical duration) remains constant across the visual field, and thus a stimulus of fixed duration (200ms) is most commonly used. However, previous studies have failed to account for changes in spatial summation with visual field eccentricity and the effect such changes may have on the critical duration.

Method

Achromatic temporal and spatial summation functions were determined for four psychophysically experienced and one naïve observer (median age 29 years, range 24, 47), at four diagonal visual field locations at 5°, 10° and 15° eccentricity. A Goldmann III stimulus (0.43° diameter) was initially used for the temporal summation experiments and a 200ms stimulus for spatial summation experiments. Ricco's area and the critical duration (t_c) were determined by two-phase regression analysis.

Temporal summation experiments were repeated with a stimulus equal in size to Ricco's area for each observer. All stimuli were presented on a gamma-corrected achromatic CRT monitor running at 121 Hz with an adapting field of luminance 10 cdm-2.

Results

Critical duration values (median, IQR) with a Goldmann III stimulus were 42.3 msec (29.4, 52.5), 42.8 msec (34.5, 60) and 36.6 msec (31.4, 45.8) at 5°, 10° and 15° respectively. There was no statistically significant difference between these measurements at the 5% level ($\chi^2(2) = 3.32$, $p = 0.19$). Median (IQR) critical duration values for 5°, 10° and 15° visual field eccentricity as measured using the Ricco's area-sized stimulus were 35.4 msec (26.2, 44.3), 45.2 msec (34.6, 67.6) and 64 msec (42.8, 90) respectively. This increase was statistically significant ($\chi^2(2) = 9.03$, $p = 0.011$). Post-hoc Wilcoxon signed rank analysis with Bonferroni correction reported a significant increase in critical duration estimates between 5° and 15° ($z = -2.80$, $p = 0.005$).

Conclusion

Critical duration increases significantly with increasing visual field eccentricity when measured using an achromatic stimulus scaled to equal Ricco's area. No such change is observed with a Goldmann III stimulus. This may have implications for the optimal design of achromatic perimetric stimuli used to examine the visual field.

Night myopia as a function of the stimulus contrast

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Co-authors: Larry N. Thibos², José Manuel González-Méijome¹, Norberto López-Gil³

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²Indiana University School of Optometry, Bloomington, Indiana, USA

³Facultad de Óptica y Optometría, Universidad de Murcia, Murcia, Spain

Purpose

A large number of patients suffer from a myopic refractive change at night, known as night myopia. Classically attributed to accommodation errors under scotopic light conditions, we have recently shown that night myopia is also present under mesopic conditions and might be related to the characteristics of the stimulus. Thus, the purpose of this study was to evaluate the role of luminance and contrast of a punctual stimulus against a variable illuminance background on night myopia values measured in an experimental setting.

Method

Refractive state was measured objectively and subjectively in 10 right eyes under 15 different combinations of contrast for a tunable punctual source of light against a tunable background (Weber contrast ranging from 101 to 106). In each condition, the subjective refractive state was measured using an automated Badal. To know how much of that value was due to accommodation its objective value was also obtained by means of an open field autorefractometer.

Results

Night myopia was found when the stimulus Weber contrast was about 300, and beyond that value night myopia increases with the contrast of the stimulus ($r=-0.846$; $p<0.001$). The main reason of the presence of night myopia was due to the decreases of the background luminance ($r=0.736$; $p=0.002$). About half of night myopia measured with the Badal system was not a real myopia since it was originated by accommodation of the eye as measured objectively which also increased with the stimulus contrast.

Conclusion

A myopic shift (identified as night myopia) was found when the contrast of the stimulus, formed by a point source on a uniform background, increases. About half of that shift is not due to accommodation. These results support the hypothesis that the aberration of the eye plays a larger influence in the refractive state when the contrast of the stimulus is very high as usually happens under night vision conditions.

Institutional accreditation: a tool for quality assurance and capacity development in optometric education

Lead author: Vanessa Moodley
University of Kwa Zulu-Natal, Durban, South Africa, and
Dublin Institute of Technology, Dublin, Ireland

Purpose

Developing nations whom throughout the years were plagued by grossly under-resourced education institutions and poor health service infrastructures and systems, focussed mainly on producing the best health worker possible within the context. Occasional initiatives such as the use of external examiners at exit levels served as the only means of assuring quality standards. Quality assurance in the higher education sector was introduced formally in South Africa in 1997 with the introduction of the Council for Higher Education. The statutory professional bodies, that are mandated to protect the public, saw quality assurance as a means for institutions to improve accountability and effectiveness in the use of public resources allocated to them annually. Institutional accreditation is one of the critical components of the quality assurance system. Noting the dearth of experts in the field, capacity development was integrated into the system in line with the broader transformational and developmental agenda of the country.

The quality of eye care services delivered in a country is fundamentally underpinned by the quality of the education that the eye care workers have received in their undergraduate training. This paper outlines the development, implementation and various processes, spanning over a decade, that were undertaken as part of institutional accreditation of optometry and optical dispensing programmes in the country and the concurrent capacity development in quality assurance that occurred.

Method

Five institutions offering optometry and optical dispensing programmes were accredited twice in five yearly cycles by the professional board. A mixed regulation system which involved both self-regulation and external evaluations was utilised. The institutions were assessed in accordance with the 19 criteria for institutional audits as defined by both the CHE and the professional board. The first cycle of audits (2004-2009) focused on the mission of the institution, links between planning, resource allocation and quality management, teaching and learning, research and community engagement.

The criteria were amended for the second cycle and institutions here had to additionally demonstrate integrated quality assurance systems with self-evaluation mechanisms in each area.

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Institutional accreditation: a tool for quality assurance and capacity development in optometric education

Results

The institutions were graded and granted either full or conditional accreditation status in both cycles. Lessons learned, strengths, weaknesses and challenges experienced by the regulatory body as well as the institutions will be highlighted.

Conclusion

This presentation serves to provide a quality assurance perspective of a developing country where health and social contexts differ vastly from that of developed nations.

Volunteers: a fantastic resource or a time-wasting liability?

Lead author: Natalie Briggs
Vision Aid Overseas, Crawley, UK

Introduction

The aim of the education intervention undertaken with Vision Aid Overseas' volunteers was to promote the development of professional roles and the scope of practice of optical and other professionals. The oral presentation will focus on the changing nature of professional volunteering in developing countries from service delivery to skills sharing, thereby enabling sustainable and capacity building approaches with our in-country partners and improving the quality of the patient experience. This reflects an important transition based on a peer to peer relationship through which shared learning can be achieved.

Method

An analysis was undertaken of Vision Aid Overseas' project reports in the period 2010-2012; volunteer data, patient impact statistics and conference evaluations were all reviewed alongside a literature review of UK volunteering. An intervention was developed to support volunteer transition from aid based direct service approaches to a skills sharing agenda and a two day Volunteer Engagement course was piloted involving 36 participants.

Results

Participants had a greater understanding of Vision 2020: Right to Sight, the global challenge to eradicate preventable blindness and their roles in relation to skills sharing to support the development of community eye services. At the pilot two day Volunteer Engagement course 36 professionals attended and 30 have confirmed their intention to volunteer (83%); indicating a willingness to broaden their professional roles and scope of practice.

The volunteers who participate in programmes during 2013-2014 will be surveyed in order to ascertain the impact of the experience on their professional roles and to further develop the volunteer education programme. The volunteers will be expected to review the patient experience and to make recommendations for the future development of community eyes services.

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Volunteers: a fantastic resource or a time-wasting liability?

Conclusion

Volunteer engagement in skills sharing is the way forward to ensure that this fantastic resource is utilised to give the strongest support for our in-country partners. The World Health Organisations Health Systems Strengthening Framework (WHO, May 2010) provides the building blocks through which volunteers can engage in order to share their skills comprehensively. If volunteering focuses on solely delivering eye services to patients the accusations of self fulfilment being the prime motivation becomes more difficult to challenge and open to the charge of being a time-wasting liability for in-country partners. Vision Aid Overseas remains dedicated to enhancing the scope of professional roles to lead this endeavour.

Development of robust methods of assessment of clinical competency in ophthalmic dispensing – results of a pilot trial

Lead author: John Siderov

Co-author: Julie Hughes

Vision & Hearing Sciences, Anglia Ruskin University, Cambridge, UK

Purpose

The introduction by the General Optical Council (GOC), UK, of new clinical competencies in ophthalmic dispensing is an important step to promote the achievement of a high level of skill in the student dispensing optician and for instilling confidence in the public that appropriate standards are being met. Thus, it is important that robust and defensible methods exist for the assessment of these new competencies. In this study we evaluated whether the use of Objective Structured Clinical Examinations (OSCEs) combined with established standard setting procedures, could be used to define standards for the achievement of clinical competencies in ophthalmic dispensing.

Method

Ten new OSCE stations were created for use in our Foundation Degree in Ophthalmic Dispensing course to assess a range of tasks that covered specific GOC competencies for dispensing opticians. A checklist and marking scheme for each station was distributed to a group of experienced examiners for review and comment. We also introduced performance-based standard setting using a linear regression method. For each station, examiners made a global judgement about student performance using a rating scale, (bad fail, fail, borderline, pass, good pass). Examiners were instructed not to base their rating on the checklist marks. The rating of the student was plotted against marks obtained for the station. A line of best fit was derived from the data for each station. The pass mark for the station was set at the mark for the borderline rating.

Results

The average pass mark across stations was 57%. Students with higher marks also tended to be rated more highly by examiners; however, this was not universal. The slopes of the regression lines were significantly greater than zero across stations suggesting that the checklists were appropriate. Feedback from students and examiners was overwhelming positive.

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Development of robust methods of assessment of clinical competency in ophthalmic dispensing – results of a pilot trial

Conclusion

OSCEs and performance-based standard setting provide a novel approach to the assessment of clinical competency of student dispensing opticians that minimises the influence of individual examiners on student results and provides an objective method of setting clinical standards. Our study has demonstrated that the OSCE format and use of standard setting procedures is a viable approach to assess clinical competencies in ophthalmic dispensing. More data are required to confirm the reliability of the stations over repeated use.

Supported, in part, by a Teaching Development Grant from the Higher Education Academy, UK.

Development of optometry in El Salvador

Lead author: Natalia Colomé de Man, OD
Private Optometry Centre, Barcelona, Spain

Purpose

To create a method for the development of optometry worldwide, by integrating optometry education, accreditation through public health policy and international cooperation.

The cornerstones for developing optometry in a country are:

- *education*: to implement an optometry programme at higher public education institutions
- *accreditation*: to establish guidelines for practice and opening optometric establishments under the existing Public Health Law by organising the optometry guild and passing the necessary amendments
- *international cooperation*: to lead, follow and fund these efforts through the various resources of developed countries and institutions (international cooperation for development policies, universities, optometry councils, NGOs).

Method

- education and international cooperation: researching the legal guidelines for the development of optometry: higher studies and Public Health Laws (DECRETO N° 2699 21/10/79)
- implementing an optometry programme at the public university of El Salvador, approved by the Ministry of Education by their own means, joined with funding and consulting of Spanish institutions: UPC; UV, Cátedra UNESCO SVD, OxO, AECID and others (Lions club, VOSH, ALDOO, WCO)
- accreditation: inclusion of optometry practice as a public health career ruled by the public health law, presenting a proposal ruling the practice of optometry to the El Salvador Legislative Assembly (congress) working hearings, reaching an agreement between the national representatives from government (ministry of public health, public health council, (congress), visual health guilds (optometry, opticians, ophthalmology, non formal practitioners) and citizens.

Results

Since 2008 a five year optometry programme has been part of the academic curriculum of the public university of El Salvador. Optometry practice and the opening of optometry centres is now included through amendments made on the Rulebook of Public Health of El Salvador as agreed on the discussion hearings DECRETO N° 2699 21/10/79 Am.

Optometry is part of the public health offer at their social security health plan. Since 2005, optometry programmes have been created in Costa Rica, El Salvador and Panama. Nicaragua is working on opening their programme and Guatemala improved their technical degree to a higher education degree (bachelors). At this stage, the only country in the Central American and Panama region lacking a higher education optometry programme and accreditation is Honduras.

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Development of optometry in El Salvador

Conclusion

When you join together local resources (such as public education, public health and an optometry guild) with international cooperation, the result is the development of optometry in that country which always positively affects the surrounding region, improving visual health and decreasing statistics of preventable blindness in the world.

Dark-adapted visual function in dry age-related macular disease

Lead author: Michael Crossland^{1,2,3}

Co-authors: Gary Rubin^{1,3}, Adnan Tufail^{2,3}

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³NIHR Moorfields Biomedical Research Centre for Ophthalmology, London, UK

Purpose

Histological, functional and subjective reports suggest that rod photoreceptors are affected prior to cones in early age-related macular disease. In this study we measured low luminance visual performance using the low luminance questionnaire (LLQ) for a group of people with geographic atrophy ('dry' age-related macular disease). We compared LLQ scores to measurements on functional vision tests.

Method

Twenty people with dry AMD (VA <0.7 logMAR (6/30 or better)) were recruited. Visual acuity and contrast sensitivity were measured under conventional lighting conditions. Retinal perimetry was performed under conventional and dark-adapted conditions (modified MP-1 microperimeter, Nidek Technologies, Italy). The LLQ was administered orally.

Results

Low luminance questionnaire score was reduced in this population (mean \pm sd score: 2159 \pm 676; control subject score: 3200). In decreasing order of significance, LLQ score was linearly related to visual acuity ($r^2 = 0.39$), to dark-adapted retinal perimetry score ($r^2 = 0.37$) and to contrast sensitivity ($r^2 = 0.24$). LLQ was not related to conventional microperimetry score ($r^2 = 0.10$). Analysis of individual domains of the LLQ showed strong relationships between the 'general dim lighting' domain and dark-adapted retinal perimetry score ($r^2 = 0.65$) and between the 'extreme lighting' domain and dark-adapted retinal perimetry score ($r^2 = 0.39$).

Conclusion

People with early to moderate geographic atrophy report greater difficulty with low luminance tasks than control subjects. This reduction in performance is strongly correlated to performance on a dark-adapted retinal perimetry task. Future rehabilitation programmes for people with geographic atrophy should include the provision of additional task lighting.

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Impact of education level and computer experience on repeatability of the Moorfields Motion Displacement Test (MMDT)

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Purpose

One of the major global causes of visual impairment is glaucoma, which presents an even greater public health challenge than cataract, because the blindness it causes is irreversible. The Moorfields Motion Displacement Test (MMDT) is a novel glaucoma screening device, designed specifically for community based screening in developing countries. The motion displacement task is presented using a laptop computer, which offers an affordable and portable community glaucoma case-finding technology. The current study was designed to determine the effect of computer experience on MMDT applicability and repeatability.

Method

The MMDT employs vertical white line stimuli, presented continuously at 31 test locations on a background screen luminance of 10 cd/m², achieving 85% Michelson contrast. Inclusion criteria were visual acuity better than logMAR 0.3, normal ocular health by self report and ophthalmoscopy examination, and negative history for ocular disease or treatment. Participants were stratified according to experience of computer use [computer naive (n = 77) or computer familiar (n = 67)]. The subject's task was to indicate the presence of horizontal displacement of the white line stimuli using the handheld computer mouse. The device and method was explained, and each participant undertook a maximum of three MMDT demonstration sessions (12 stimulus presentations) to actively demonstrate understanding of the task. The MMDT enhanced suprathreshold test algorithm (ESTA) 99.5 screening strategy was employed with Pandora response algorithm (software version 1.7.0). Variables measured included the ESTA global probability of true damage (GPTD), testing time (TT) and false positive (FP) response rate. The visual field test was conducted twice on the same eye, and results compared to determine intra-session device repeatability.

Results

The mean age of the study group was 31 ± 11 (range = 15 – 56) years, with 60% of participants of male gender. Twenty of the 164 recruited participants were excluded from the study on the basis of a FP rate greater than 15% during the test proper (of these 95% had no prior computer experience). Independent samples t tests revealed no difference in GPTD ($P = 0.84$ and 0.97 respectively) or TT ($P = 0.45$ and 0.14 respectively) between computer subgroups for either the initial or repeat test, although the FP response rate was statistically significantly higher among computer naive subjects for both baseline and repeat tests ($P = 0.00$ for both). Paired T test analysis revealed no difference between GPTD1 and the repeat GPTD2 measure ($P = 0.06$ to 0.79), baseline and repeat TT ($P = 0.13$ to 0.28) and baseline and repeat FP response rate ($P = 0.05$ to 0.80) for any subgroup. A statistically significant positive correlation was found between repeat GPTD, TT and FP measures for all subgroups ($r = 0.30$ to 0.71 ; $P < 0.01$ for all), except for the computer naive FP rate which did not correlate significantly ($r = 0.20$; $P = 0.11$). Bland Altman analysis revealed good repeatability for all subgroups. The coefficient of repeatability (CoR) was marginally better, however, for computer familiar participants (CoR = 0.96) compared to computer naive participants (CoR = 1.20).

Conclusion

This is the first study to evaluate the MMDT device in an African setting, which is important given the glaucoma screening challenges which are unique to developing countries. The MMDT is a repeatable visual field device that could be implemented in community glaucoma screening programmes. The device has many advantages including its portability, affordability, and short testing time (108 to 116 seconds on average in the current study). It is easy to understand and to perform, robust to optical blur and to cataract, and designed to be performed without near correction ($+4.5$ to -6.0 DS). The current results validate its general repeatability for certain sectors of society likely to be encountered in developing communities, including those without high level education or prior experience of computers. The technology may, however, require enhanced explanation, an alternate patient response button, and prolonged training in order to achieve acceptable FP rates among some inexperienced computer users. Further evaluation among an older computer naive population is also warranted.

Targeting modifiable risk factors in people with or at risk of age-related macular degeneration: a cross-sectional survey of eye care professionals in the UK

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Introduction

In the absence of a cure, there has been considerable interest in attempts to prevent or reduce the progression of age-related macular degeneration (AMD) by targeting particular modifiable risk factors. The aim of this study was to conduct a cross-sectional survey of the current practice of UK eye care professionals in relation to advice given on diet and other lifestyle modifications for patients with or at risk of AMD.

Method

Optometrists and ophthalmologists on the membership databases of professional organisations for the two professions were invited to participate in an online survey. The survey was open for 12 weeks between July and September 2012

Results

A total of 1,468 responses were received (1,414 (96.3%) from optometrists and 54 (3.7%) from ophthalmologists). The response rate of those receiving the invitation was 16.2% for optometrists and 6% for ophthalmologists. A majority of respondents reported that they frequently provide dietary advice to patients with established AMD (67.9%) and those at risk of AMD (53.6%). Typical advice consisted of a recommendation to eat plenty of leafy green vegetables and eat more oily fish. The decision to recommend nutritional supplements was based on the risk of progression to advanced AMD, with approximately 93% of respondents recommending supplementation in a patient with advanced AMD in one eye. However for the majority, the type of supplement recommended did not comply with current best research evidence. Only one in three optometrists regularly assessed smoking status and advised on smoking cessation.

Conclusion

The results of this cross-sectional survey of a large sample of UK eye care professionals demonstrates active engagement in providing nutritional advice to patients with or at risk of AMD. However, there is a need for greater awareness of the evidence underpinning the use of nutritional supplements together with an increased involvement in targeted smoking cessation.

Binocular contrast summation with unequal monocular light scatter

Lead author: Chris Hull
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Purpose

It is well-established that differences in monocular illuminance and defocus can cause a loss of binocular summation. Light scatter causes changes in the distribution of light in the image as well as a reduction in retinal illuminance. A difference in light scatter between both eyes, for example in unilateral cataract, causes unequal monocular light scatter and unequal monocular illuminance. The aim of this study was to examine the loss of binocular contrast sensitivity with unequal monocular light scatter alone by first equating the monocular illuminances.

Method

Five subjects were recruited from a student population (mean age 22.2 years, range 21 to 27). All subjects underwent an eye examination and careful refraction. Light scatter was simulated in one eye with the aid of 0.54micron latex particles in suspension. The study was a repeated measures cross-over trial with each subject tested under the two conditions. The concentration of the latex particles was adjusted to give a transmission of 70%. Contrast sensitivity was measured at 8.1 and 24.3cpd with the scatter cell in front of the dominant eye and a 0.15 ND filter (70% transmission) in front of the other eye to balance the monocular illuminances. Contrast sensitivity was also measured with 0.15 ND filters in front of both eyes so that pupil sizes were comparable between the two conditions. Measurements on each subject were repeated five times under both conditions and binocular contrast sensitivity values compared using non-parametric statistics.

Results

Median reduction in binocular contrast sensitivity levels was 14.5 (4.2%) at 8.1cpd and 15.6 (15.5%) at 24.3cpd. This reduction was statistically significant at 8.1cpd ($P = 0.041$) but not at 24.3cpd ($P = 0.69$; both Kruskal-Wallis with repeat readings as factors). The within subject standard deviation, which represents the repeatability of the measurements of difference in binocular contrast sensitivity on the same subject, was 74.6 and 24.9 at 8.1cpd and 24.3cpd respectively.

Conclusion

Results show the loss in binocular contrast sensitivity at two spatial frequencies with monocular light scatter after the retinal illuminances have been matched. It may be possible to improve binocular visual function in patients with unequal light scatter by balancing illuminance between the eyes. Further investigation of cataract patients and those with any form of unilateral light scatter are warranted.

Beyond VA: evidence-based recommendations for enhanced vision screening of children

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Purpose

The US Texas School Board requires a vision screening for all children entering school and every other year thereafter in elementary school. However, there is growing concern that vision screenings may be inadequate to detect vision threatening conditions which require treatment in early childhood. At what point do we, as professionals, intervene to convey evidence-based recommendations for appropriate vision screening and comprehensive eye care? Our purpose was to evaluate results from multiple vision screenings conducted over a period of one year to determine their efficacy for detection of visual conditions in school-age children.

Method

More than 2,000 children underwent vision screenings conducted by UIWRSO at various schools over a one-year period. The Texas Health and Safety Education Board requires referral of children <5 years old with visual acuity (VA) <20/40 in either eye or more than two lines difference between better and worse eyes; and referral of children ≥5 years old with VA <20/30 in either eye. UIWRSO conducted VA testing in accordance with these requirements as well as refractive error, binocular vision and ocular health assessment in multiple school screenings.

Results

A total of 31% of children failed vision screening tests including VA, binocular vision, refractive error, and ocular health screening of the anterior and posterior segments. The relatively high failure rate reflects inclusion of additional sensitive tests to disclose refractive error, strabismus and ocular disease, and inclusion of eye care professionals in the screening process.

Conclusion

Current Texas passing requirements for school-age children are visual acuity-based with no specific requirement for refractive error, binocular vision or ocular health. This and similar state and government testing standards may be inadequate for accurate diagnosis of amblyopia and its contributing factors (strabismus, anisometropia), or for detection of congenital and/or early onset ocular disease. Given our current levels of technology for rapid capture of refractive and ocular disease anomalies, it is essential that more rigorous standards are imposed, including the possibility of a mandatory comprehensive eye examination completed by a specified age. This approach will enhance detection/correction of visual anomalies, quality of life, and will likely decrease cost for supportive care administered too late for effective amelioration of vision threatening conditions. A concerted, global effort to establish age dependent standards for vision evaluation is needed.

Successes of the Mozambique Eyecare Project: an international collaboration developing Mozambique's capacity to deliver eye care

Lead author: Aoife Phelan¹

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Purpose

Dublin Institute of Technology, UniLúrio, Mozambique and University of Ulster are collaborating with the Brien Holden Vision Institute, in the implementation of the Irish Aid Funded 'Mozambique Eyecare Project' (MEP). Supported by these institutions UniLúrio has established the first optometry degree programme in Mozambique.

The MEP aims, through optometric education, to develop Mozambique's capacity to deliver eye care, shape the development of optometry in Mozambique and disseminate the research findings of the project with all stakeholders in eye health internationally. This presentation will outline the effective methods and resulting accomplishments of this multi-national collaboration.

Method

The development of the optometry programme in UniLúrio has come about as a result of a successful and strong management, effective communication and a mutually beneficial collaboration between the partners.

Results

The following successes of collaborative efforts within the project will be discussed:

- 75 undergraduate students enrolled in the UniLúrio Optometry Programme
- nine optometrists graduating in March 2013, their career path will be academic or public health
- five post graduate research students, co-supervised by project partners, disseminating lessons learned internationally
- development of a university optometric training clinic
- curricular model adapted in line with the Higher Education Reform in Mozambique
- recognition by the Mozambican Ministry for Health (MISAU) that the model will address the immediate need for optometric human resources
- involvement of the National Eye Care Coordinator in curriculum approval process as an initial stage in cadre recognition by MISAU
- development of vision centres to deliver eye health services
- inclusion of optometry in the Mozambique national eye care plan.

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Successes of the Mozambique Eyecare Project: an international collaboration developing Mozambique's capacity to deliver eye care

In addition the partners have been successfully awarded further funding from Irish Aid to develop a 'Human Resources for Eye Health' project aimed at providing further education to generate local optometry faculty in ten optometry schools in Africa.

Conclusion

The MEP is a cross institutional collaboration, which works effectively and efficiently to achieve its aim of increasing capacity in Mozambique and potentially Lusophone Africa to deliver eye care through optometric education. The many lessons learned from this collaboration should be disseminated to other institutions seeking to establish, or indeed those that have already established, international collaborations to further shape optometry in developing and developed countries.

The development of a public optometry system in Mozambique: a cost benefit analysis

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Purpose

To estimate the net social benefit of a School of Optometry developed by the Mozambique Eyecare Project by calculating the benefits of addressing refractive error in terms of productivity gained as a result of the intervention.

Method

A standard cost benefit analysis methodology was applied. The costs were calculated using several sources of information including Mozambique Eyecare Project reports and budgetary documents, current market price information and national human resources data. They included all costs associated with the establishment of a school of optometry, the development of a curriculum, the cost of establishing vision centres within public hospitals for the optometrists to work in and also human resources costs of both employing teachers for the course and employing the optometrists once they have graduated. Benefits were calculated by making a series of assumptions about how many patients each optometrist could provide a service to and how this would impact on the patient's ability to contribute to the economy. After making assumptions about the number of patients whose refractive error could be addressed and adjusting the figure to account for the fact not everyone one in a society is economically productive, disability weighting for visual impairment was applied to their Gross National Product to provide a proxy measure of the benefit of the intervention to address refractive error. Costs were subtracted from benefits to provide the societal net benefit.

Results

For the first four years since the programme's inception, the benefits are zero and costs are high due to the school of optometry being established. In 2013 costs the first optometrists graduate, begin to work in the public health sector and deliver a benefit. From 2013 onwards, the benefits outweigh the costs, creating a positive net annual benefit. This is the continuing trend until 2049 at the end of the time period analysed. By 2049 a total net social benefit of \$24,033 million will have been realised.

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The development of a public optometry system in Mozambique: a cost benefit analysis

Conclusion

This study demonstrates that a programme designed to address the burden of refractive error in Mozambique through the training and employment of optometrists has the potential to achieve a societal net benefit of \$24,033 million by 2049.

Estimated temporal trends in global blindness and visual impairment age standardised prevalence (1990-2010)

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Purpose

As an element of the Global Burden of Disease, Injuries and Risk Factors Study 2010, the Vision Loss Expert Group undertook a novel calculation of the temporal trends in the global estimated prevalence of blindness, moderate and severe vision impairment (MSVI) from 1990-2010. Significant for achieving VISION 2020 goals, the presentation shall describe a brief overview of the methods and discuss the results by global region.

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Estimated temporal trends in global blindness and visual impairment age standardised prevalence (1990-2010)

Method

A literature review was conducted of published and unpublished population-based cross-sectional studies for 1990-2010. Using the same hierarchical statistical model for each time period, trends in prevalence of moderate and severe vision impairment (MSVI) and blindness were estimated by age, country, region and year.

Results

Global total estimates suggest 33.5 million (95% confidence interval 29.6-38.1 million) people (60.6% female) were blind in 2010 and 199 (177-231) million people (56.8% female) had MSVI, with the largest numbers in South Asia (10.8, 8.4-13.2 million; and 74, 59-93 million, respectively), East Asia (5.5, 4.6-6.6 million and 34, 26-44 million, respectively) and Southeast Asia (3.4, 2.7-4.3 million and 19, 15-26 million, respectively).

Age-standardised blindness prevalence in older adults (≥ 50 years) was $\leq 0.6\%$ in High-Income regions and $> 4\%$ in Western Sub-Saharan Africa (5.8%, 4.6%-7.4%), Eastern Sub-Saharan Africa (5.6%, 4.4%-7.1%), South Asia (4.5%, 3.6%-5.4%), and North Africa/Middle East (4.4%, 3.4%-5.5%). Age-standardised MSVI prevalence in older adults was $< 5\%$ in all four High-Income regions and highest in South Asia (24.1%, 20.0%-29.2%), Oceania (18.0%, 11.8%-23.4%), Eastern and Western Sub-Saharan Africa and North Africa/Middle East (16.3%-16.8%). Age-standardised prevalence of blindness was 30-40% greater in women, with the lowest relative gender disparity in sub-Saharan African regions and highest in high-income regions. The global age-standardised prevalence of blindness and MSVI for older adults (≥ 50 years) decreased from 3.1% (2.7%-3.6%) in 1990 to 2.0% (1.8%-2.3%) in 2010, and from 14.2% (11.2%-16.1%) to 10.8% (9.7%-12.4%), respectively. The decreases in prevalence of blindness and MSVI were largest in North Africa/Middle East and South Asia.

Conclusion

The age-standardised prevalence of blindness/MSVI is decreasing. The prevalence of blindness and MSVI was highest in South Asia, East Asia and Southeast Asia. Women demonstrated more vision impairment and blindness, with the relative gender disparity being larger in high-income regions than in Sub-Saharan African regions.

The importance of the optometrist in diplopia by neurological problems

Lead author: Virgina Carrillo Ramos
Optometrist, Rementeria Clinic, Toledo, Spain

Purpose

A 45-year-old woman refers a variable horizontal binocular diplopia with oscillopsia due to a traffic crash two years ago.

Method

Medical history was taken and a clinical examination was undertaken. She had seven diopters myopia and had previously had refractive surgery. She was treated for paroxysmal positional vertigo. She also had an aponeurotic ptosis.

Results

After a complete ocular examination with ocular motility evaluation, she was diagnosed with a with angle esophoria, skew deviation, torsional torticollis and nystagmus on lateral gaze. Additional diagnostic ophthalmologic and neurological tests were performed with normal results.

After a follow-up of two years, we can summarise the outcomes of different treatment techniques and their involvement in these difficult neurological cases: prescription, prisms, medical therapy, visual therapy, botulinum toxin injection and strabismus surgery.

Conclusion

The knowledge of the results of some optical techniques may help patients with complex neurological pathology as in the case of this patient. It can avoid surgical treatment in these patients.

Patients with severe impairment in one eye show improved performance to defocus induced-blur

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Background

It is widely accepted that monocular deprivation results in improved spatial visual performance in the non-pathological eye. The current study investigates whether one-eyed patients show any advantages over binocular normals under blur conditions.

Method

Sixteen patients (age: 33 ± 8 years) with severe visual impairment in one eye (VA equal or worse than FC at 1m), for a period longer than two years (10 ± 8 years), participated in the study. Only patients with an age < 50 years and monocular deprivation onset > 9 years were included. Fifteen more participants (age: 28 ± 5) with normal binocular vision served as the control group. The effect of defocus, induced by positive lenses up to 2.50D, on the pattern reversal Visual Evoked Potential (VEP) and on visual acuity (VA) was measured. VEPs were elicited using reversing 10 arcmin checks (four reversals/sec). The stimulus subtended a circular field of 7° with 100% contrast and mean luminance 30 cd/m^2 . VA was measured under the same conditions using ETDRS charts. Pupil diameter was measured with an infrared camera. All measurements were performed at 1m viewing distance with best spectacle spherocylindrical correction and natural pupils. Performance of the control group was tested both monocularly (dominant eye) and binocularly.

Results

In normal subjects VA was always better with binocular than with monocular vision, with the difference being greater for higher levels of retinal blur. In subjects with one eye average VA when in-focus was equal to the monocular values of normal controls, being less affected by defocus, similar to the binocular vision of normal controls (Figure 1). As for the VA, average implicit times of the P100 component of the VEPs were shorter in all cases with binocular than monocular stimulation in normals. The effect of defocus on VEP P100 latency in one-eyed patients was similar to the one exhibited in normal under binocular viewing conditions (Figure 2). Note that pupil diameter was on average larger in patients with one eye (5.5 ± 0.4) compared to normal under monocular (5.1 ± 0.5) and binocular (4.5 ± 0.5) vision.

Conclusion

Both subjective and electrophysiological results show that one-eyed patients exhibit better performance under conditions of retinal blur compared to the monocular vision of control normals. These findings are consistent with growing evidence supporting functional changes as a result of altered experience or injury in the adult vision system.

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Patients with severe impairment in one eye show improved performance to defocus induced-blur

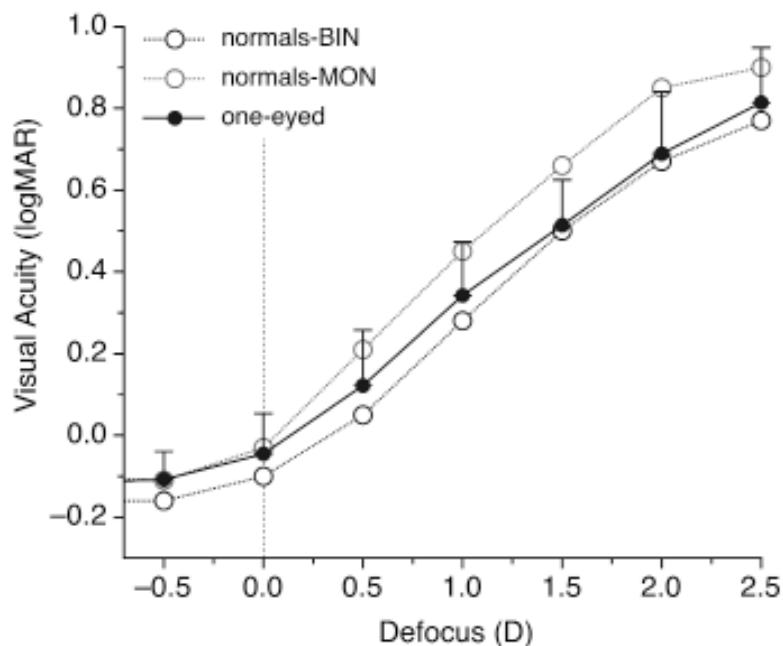


Figure 1: Mean logMAR acuities at 1.0 m as a function of defocus under binocular (black open circles) and monocular (grey open circles) vision for the control group and for the one-eyed group (filled circles). The bars indicate characteristic ± 1 SD.

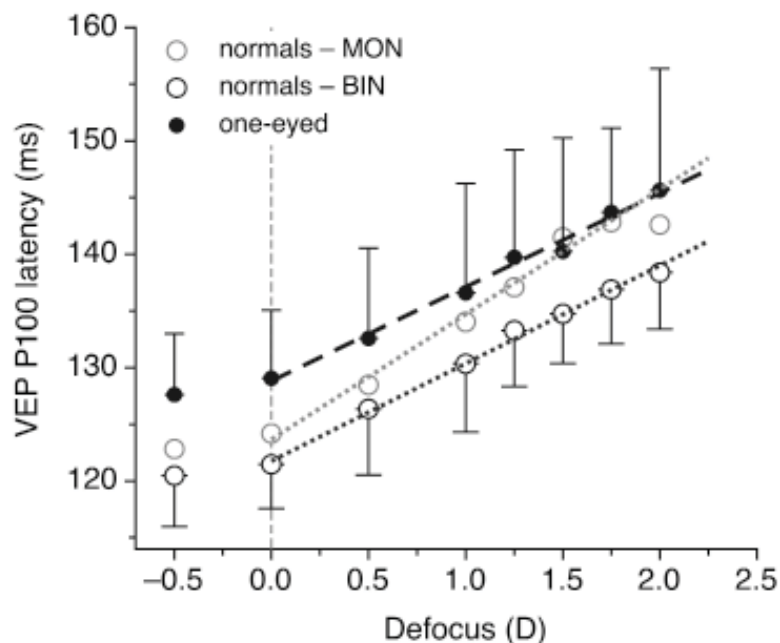


Figure 2: Mean latency of the VEP P100 component as a function of defocus under binocular (black open circles) and monocular (grey open circles) vision for the control group and for the one-eyed group (filled circles). The slopes are corresponding linear regression lines. The bars indicate characteristic ± 1 SD.

Letter discrimination and reading performance under spherical and astigmatic blur, using 'Roman' alphabet

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Purpose

Clinical practice indicates that in the presence of astigmatic refractive error, visual performance is dependent on the cylinder axis orientation, however, astigmatic axis influence is not totally clear. The purpose of this work was to evaluate the effect of astigmatic axis orientation and the combined effect of blur and letter contrast, on visual performance using a standard clinical technique, visual acuity (VA) and a common visual task (reading).

Method

VA and reading performance were measured in a group of 16 participants (median= 22, [20; 39] y/o), using ETDRS and MNREAD type of charts with unrelated words, respectively. Individual letters and words' letter size ranged from 1.1 to -0.2 logMAR, these were generated using Psychtoolbox and projected on a screen distancing 5.0 m from the observer. Participants wore their best distance refraction (OD or OS) and a 3.0 mm artificial pupil. Four refractive conditions were used, in-focus (± 0.00 D), spherical (+1.50 D) and astigmatic (+3.00x180 and +3.00x90 DC) defocus. For each condition two types of contrast were used: black letters on white background and the reversal. The parameters analysed were: VA and reading performance (area under the curve; threshold print size; reading acuity and maximum reading speed).

Results

The main results showed no differences between the type of contrast used either for VA or reading parameters. The four refractive conditions were statistically different, spherical and astigmatic defocus degraded visual performance differently. In general, visual performance with +3.00x180 was similar to +1.50, however both were less penalizing than +3.00x90.

Conclusion

The results indicate that visual performance is affected by astigmatic axis orientation. Furthermore, visual performance based on the theoretical prediction of power vector magnitude does not account for differences due to axis orientation.

Relationship between associated and dissociated phoria in Swedish adults

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Purpose

The purpose of this study was to investigate the relationship between associated and dissociated phoria at near in Swedish adults. We also investigated correlation between both associated and dissociated phoria with symptoms using a convergence insufficiency symptom survey (CISS) questionnaire.

Method

Subjects living in the southern part of Sweden aged between 18 to 39 years old were recruited for this study. A total of 99 subjects (mean age = 22.8 ± 3.0) participated in the study. All the subjects had best corrected visual acuity of 1.0 decimal acuity (Snellen 6/6) or better and good Stereopsis. The dissociated phoria was measured with Modified Thorington method and the associated phoria was measured with Mallet near unit and a handheld risley prism. Both the measurements were done at a distance of 40 cm. A symptom questionnaire with 15 questions (CISS) was used to determine which of the subjects were symptomatic and correlated the symptom score with both phoria. Each question had five options ranging from 0 (never) to 4 (always).

Results

Out of 99 subjects, 42 subjects had an associated phoria and 92 subjects had a dissociated phoria. The regression analysis showed a significant correlation between associated and dissociated phoria at near ($y = 0.19x + 0.32$, $r = 0.57$, $p < 0.001$). There was no significant correlation between associated phoria and symptom score and also between dissociated phoria and symptom score ($p > 0.05$ for both). The mean symptom score with CISS questionnaire was 16.7 ± 8.1 . Subjects were divided in to two groups based on their associated phoria, Group 1 was $\leq 0.5\Delta$ and Group 2 was $\geq 1.0\Delta$. Subjects with $\geq 1.0\Delta$ associated phoria, Group 2, had a significantly higher mean symptom score (19.8 ± 8.3) than the Group 1 (15.8 ± 7.9) ($p < 0.05$).

Conclusion

There was a positive correlation between associated and dissociated phoria at near in this sample of Swedish adults. Subjects with associated phoria of $\geq 1.0\Delta$ were more symptomatic than the subjects with $\leq 0.5\Delta$. This study adds new data in the field of Binocular vision.

Comparison of two different editions of the TNO stereotest

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Introduction

Stereopsis is important in daily life and the clinical measurement of stereopsis, stereoacuity (SA), is a key factor in the diagnosis and monitoring of various binocular vision anomalies. The measurement of stereoacuity is widespread, and it is crucial that a stereoacuity test used in clinical practice should be reliable and repeatable. However, it has been observed in a clinical setting that new editions of the TNO stereotest appear to give different values than those obtained using previous versions, especially in the higher degrees of stereoacuity. The aim of this study was to test the agreement between two different editions of the TNO stereoacuity test.

Method

A total of 121 subjects (aged 18 to 55 years) attending a community optometric practice had their stereoacuity (SA) measured using two different versions (referred to as TNO 13 and TNO 15) of the TNO stereoacuity test (Laméris Ootech BV Nieuwegein, The Netherlands) presented using an ABBA counterbalanced design. Subjects aged under 18 years or over 55 years were excluded, as were those with a VA worse than 0.5 decimal (0.3 LogMAR). A Bland-Altman difference plot was performed to determine whether the results obtained by the two tests agreed sufficiently well for them to be used interchangeably.

Results

The median value for stereopsis obtained using the TNO 13 was 30 seconds of arc and for TNO 15 was 60 seconds of arc. There was a statistically significant difference between the median values for SA using the two TNO tests ($p < 0.001$). The bias between the two tests was -0.23 Log arcseconds. The 95% limits of the differences were between 0.15 and -0.60 Log arcseconds, equivalent to more than two steps on the Log arcsecond scale.

Conclusion

Results obtained with two different editions of a commonplace stereoacuity test are not comparable. New editions are produced at regular intervals and the assumption that they will give the same results as previous editions may not be valid. Besides the statistically significant difference between SA measured by TNO 13 and TNO 15, the Bland-Altman plot also showed considerable bias and the 95% limits of the differences between the TNO 13 and TNO 15 were more than two steps on the Log arcsecond scale. These differences between two editions of the TNO stereotest are not clinically acceptable and therefore it is inappropriate to use these two versions of the test interchangeably.

Vision care and optometry in a university programme for adults

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Spain

Purpose

Complutense University has a programme for adults in which they can study different subjects to get a University degree. It is not necessary to have previous studies, but there is an examination to be passed. Some of the courses are taught at the Optic and Optometry Faculty and a subject related to vision was designed. It was planned to teach different aspects about vision and the function of optometrists in Spain.

Method

Fifty-three people over the age of 55 were enrolled in a 25 hours subject at the Optic and Optometric Faculty, Complutense University, Madrid. The programme includes general information about anatomy, the development of vision, refractive errors and how they can be compensated. A workshop in which each participant evaluated their vision in a visual screening session was also held. In a classroom different stations were placed with the instructions and the equipment to evaluate the visual acuity, central vision, stereopsis, ocular motility and visual memory. Moreover, a visit to the Clinic of Optometry at the faculty was completed to view the instruments used for visual diagnosis. We went on a tour of an ophthalmic lenses factory to comprehend how lenses are manufactured.

Results

This experience has given this group the opportunity to understand and learn more about vision. They have studied the importance of the prevention and care of vision. They have acquired a better knowledge of the function of the optometrist as an expert in health.

Conclusion

We believe it is very important people have better and more complete information about vision and the different treatments. This sort of activity contributes to prevent ocular and visual disorders. It is essential that people consider optometrists as prestigious professionals in vision care.

Evaluation of the assessment of distance learning in optometry

Lead author: Claire McDonnell
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Introduction

Many countries now require optometrists to maintain and improve on their education/knowledge post-graduation as a pre-requisite to retain registration. Some of this continuing education is in the form of distance learning whereby optometrists read an article or watch a video and then answer multiple choice questions (MCQs) in order to gain education points. This study looks at the quality of the assessment of distance learning material.

Method

234 MCQs from five different sources were analysed to determine if they are phrased according to best practice and to determine what educational taxonomy level they are assessing.

Results

Seventy-four MCQs (32%) were not phrased according to best practice. The most common error was that the MCQs were negatively worded. 130 MCQs (56%) were at the lowest taxonomy level which only tests the learner's recall.

Conclusion

The General Optical Council (UK) state that "CET is taken to mean the maintenance of the up-to-date knowledge and skills required for the safe exercise of professional activities". Given this stated aim it is probably insufficient for learners' recall alone to be tested (level one). At the very least their comprehension (level two) should be tested but ideally 50% of MCQs should be from taxonomy levels two and above.

Further recommendations from this study would be that authors should adhere to universally available guidelines when designing MCQs and that the correct answers with an explanation as to why they are correct should be made available to learners to maximise the potential for learning from these articles and quizzes.

Incorporation of a formal service learning curriculum within an optometric programme

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Introduction

Southern College of Optometry (SCO) recently developed a service learning curriculum that was incorporated into the existing professional optometry programme. This service learning curriculum blends multiple learning formats and assessment strategies, and addresses a key component of our mission which is fostering a personal commitment to service.

Method

The development of our service learning curriculum was a unique process with nearly universal participation from students, staff, faculty, and administration. The final product was called 'Facilitating Optometric Curriculum Using Service' (or simply 'FOCUS') and spans the entire four year professional programme. Student experience in focus begins early with a course on public health needs and eye care, followed by direct involvement in vision-related community outreach activities, and culminating in providing full-scope optometric services to individuals that have established need for these services, but have no other access to eye care within the health care system.

Results

Although still in its initial stages, FOCUS was received enthusiastically by our regional accreditation body, the Southern Association of Colleges and Schools – Commission on Colleges as a ground-breaking initiative in service learning for the optometric profession. To ensure its efficacy, students will be assessed throughout FOCUS. Specific outcome assessments will include their ability to identify community visual health needs, understanding and appreciation for cultural sensitivity in healthcare, and expression of their role in service to the community throughout their professional career.

Conclusion

To our knowledge, FOCUS establishes SCO as the first optometric programme with a formal service learning curriculum and will likely serve as a model for this component of optometric education in the United States. Studies on the impact of service learning will result from the data collected as part of the assessment plan for FOCUS.

Interdisciplinary relationships between optometrists and occupational therapists

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Purpose

The multidisciplinary management of the patient is considered a powerful tool in the field of rehabilitation, but it is necessary to know the functions and competencies of other related professionals and cooperation possibilities. The aim of this project is to facilitate the communication and collaboration between different disciplines, focusing on Vision Therapy.

Occupational Therapists and Optometrists are professionals engaged in rehabilitation of pathologies such as cerebral palsy, learning disabilities, brain damage and low vision. These patients have a relatively high incidence of visual problems. The main problem of the interdisciplinary work is the lack of human and material resources and the unknown roles of other professionals. It is important that all members of a rehabilitation team are able to recognise when to refer a patient to the appropriate professional. The main purpose of this project is to teach the students about the components of the evaluation and management of patients with certain vision dysfunctions and when they can benefit from a programme of visual therapy.

Method

This project has been framed within the practices of the subjects 'visual therapy and rehabilitation' of the degree in optics and optometry, and 'theory and techniques of occupational therapy 3' of the degree in occupational therapy. Several activities were carried out:

- conferences taught by professionals in both areas
- practical sessions with tests of visual perception shared by both disciplines
- creation of a forum for communication, evaluation and access to information.

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Interdisciplinary relationships between optometrists and occupational therapists

Results

Students in both degrees have actively participated in this project and developed knowledge of the work of the other professionals. This experience has been highly valued by teachers and students.

Conclusion

Communication with the interdisciplinary rehabilitation team members is beneficial to optimise the rehabilitative progress. Understanding the role of each discipline in vision rehabilitation when working together will help the patients to achieve their goals.

Test-retest variability for vanishing optotype letter charts

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Purpose

Vanishing Optotype (VO) letters have a pseudo high-pass design so that the mean luminance of the target is the same as the background. These letters thus 'vanish' soon after the resolution threshold is reached in the fovea. Previous studies have shown smaller inter-letter legibility differences and greater resistance to blur using these optotypes compared to conventional letters. We wished to determine if test-retest variability (TRV) is lower using visual acuity charts with these letters compared to conventional letter design, in normal subjects with a range of uncorrected refractive errors.

Method

Thirty subjects with no ocular abnormalities and a range of refractive errors (mean sphere range -5.50DS to +0.75DS) were recruited. Each subject underwent monocular single letter scoring test-retest visual acuity measurements using ETDRS charts 1 and 2 and the same chart layout with letters constructed using a VO design VO1 and VO2 i.e. four tests in total. All tests were performed in a random sequence. The methods of Bland and Altman were employed with TRV expressed as 95% confidence intervals for agreement.

Results

Visual acuity measurements attained with the ETDRS chart were on average 1.5 logMAR lines 'better' than those attained with VO design. TRV's of +/- 0.16 logMAR were found for the ETDRS charts and +/- 0.10 logMAR for the VO charts. This difference was statistically significant (F-Test, 2 tailed $p=0.10$, $F_{29,29}=1.88$).

Conclusion

Visual acuity measurements taken with VO design charts appear to be more repeatable than those attained with the ETDRS chart in normal subjects with uncorrected refractive error.

Supported by a Fight for Sight studentship, by Moorfields Special Trustees and by an award from the NIHR Biomedical Research Centre for Ophthalmology, Moorfields Eye Hospital and UCL Institute of Ophthalmology, London.

Development of Hogeschool Utrecht from higher professional education towards University of Applied Science

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Introduction

The higher education system in the Netherlands is based on a three-cycle degree system, consisting of a bachelor, master and PhD degree. The three-cycle system was officially introduced in the Netherlands at the beginning of the academic year 2002-3.

Higher education in the Netherlands is offered at two types of institutions: research universities (Universiteiten) and universities of applied sciences (Hogescholen). Hogeschool Utrecht is a university of applied sciences.

Universities of applied sciences are primarily responsible for offering programmes of higher professional education, which prepare students for particular professions. These tend to be more practically-oriented than programmes offered by research universities. Changes were made to develop towards University of Applied Science status.

The mission of the Research Centre, "innovation of care provision", fits in seamlessly with the research mission of the Hogeschool Utrecht University of Applied Sciences: *"The objective of research at our university is to develop and disseminate knowledge. This knowledge is practical, derived from social needs, aimed at the professionalisation of the industry and meets methodical requirements. Within the Research Centres professors, researchers, PhD students, students and professionals collaborate in research and design in order to contribute towards good professional practice and education."*

To achieve this ambition is to have at least all lecturers at masters level by the year 2017 and at least 20% of the lecturers with a PhD.

Method

This poster shows the two-way approach from the basic level of education and from above the research development by the Research centre at the Hogeschool Utrecht.

Results

The connection towards the research centre is building. The amount of research-related European credit points for the students is increased. By using the research-related topics directly combined with the given theoretical and practical optometric or orthoptic education, complete integration is provided.

The educational level of lectures is raised towards masters level, and others are now working towards a PhD.

Keratoconus classification by location, topography and comatic aberration

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³Ophthalmological Department, School of Medicine, Oviedo University, Asturias, Spain

Purpose

This study aimed to rate the different types of keratoconus, stages I and II of the Amsler-Krumeich scale, depending on the location of the point of minimum corneal thickness, topographic and comatic axes.

Method

This is a retrospective study of cases diagnosed as keratoconus in the Fernández-Vega Ophthalmological Institute.

In total, 219 eyes were examined using the Sirius® (CSO Italy®). We used the pachymetric map to locate the minimum thickness point and the distance from the pupil centre to that point. The anterior and posterior elevation maps and the anterior tangential map were used to evaluate the magnitude and axes of corneal astigmatism. Finally, we used the aberrometric map, with reference to comatic map aberration, to evaluate magnitude and axis of the comatic aberration.

Results

Analysing the cases, five morphologically different types of keratoconus could be defined as a combination of three parameters: first, distance from the thinnest corneal point to the pupillary centre, second, difference between topographic and comatic axes and third, magnitude of corneal astigmatism.

Based on the first parameter, central keratoconus was defined as the distance from pupil centre to the thinnest point being less than 0.8 mm, paracentral keratoconus as between 0.8 and 1.6mm, and pericentral keratoconus if the distance was 1.6mm or above.

The second parameter allowed the cases to be divided into three groups: coincident if the difference was less than 30°, not coincident if the difference was between 30° and 75° or perpendicular, when the difference was above 75°.

The third parameter was the magnitude of corneal astigmatism. Cases were divided according to whether its value was above or below three diopters.

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Keratoconus classification by location, topography and comatic aberration

The five morphologies found in our sample were:

- nipple morphology, defined as central keratoconus with corneal astigmatism lower than three diopters
- bow-tie, defined as central keratoconus with corneal astigmatism above three diopters
- croissant morphology, defined as paracentral or pericentral keratoconus with coincident topographic and comatic axes
- duck morphology, defined as paracentral keratoconus where topographic and comatic axes were not coincident
- snowman morphology, defined as paracentral keratoconus where topographic and comatic axes were perpendicular.

Conclusion

The classification of the different types of keratoconus will make easier to catalogue and evaluate differences in vision, progression and surgical prognosis of every type.

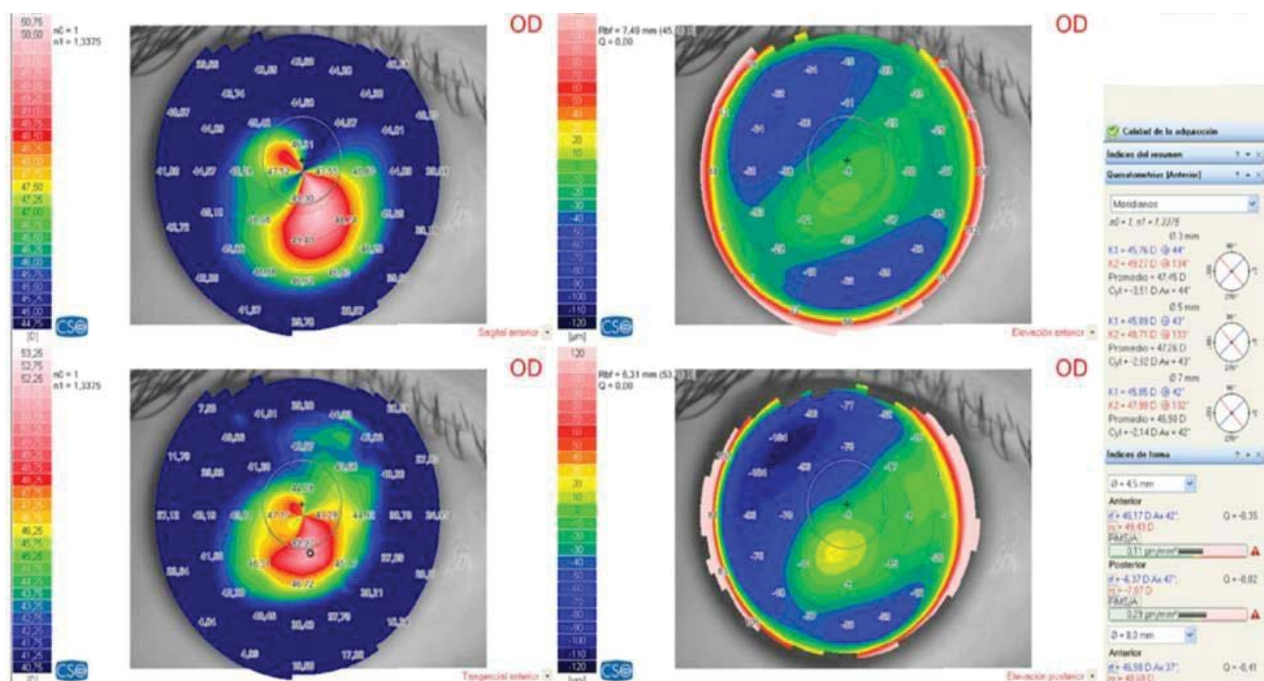


Figure 1: Sirius 1

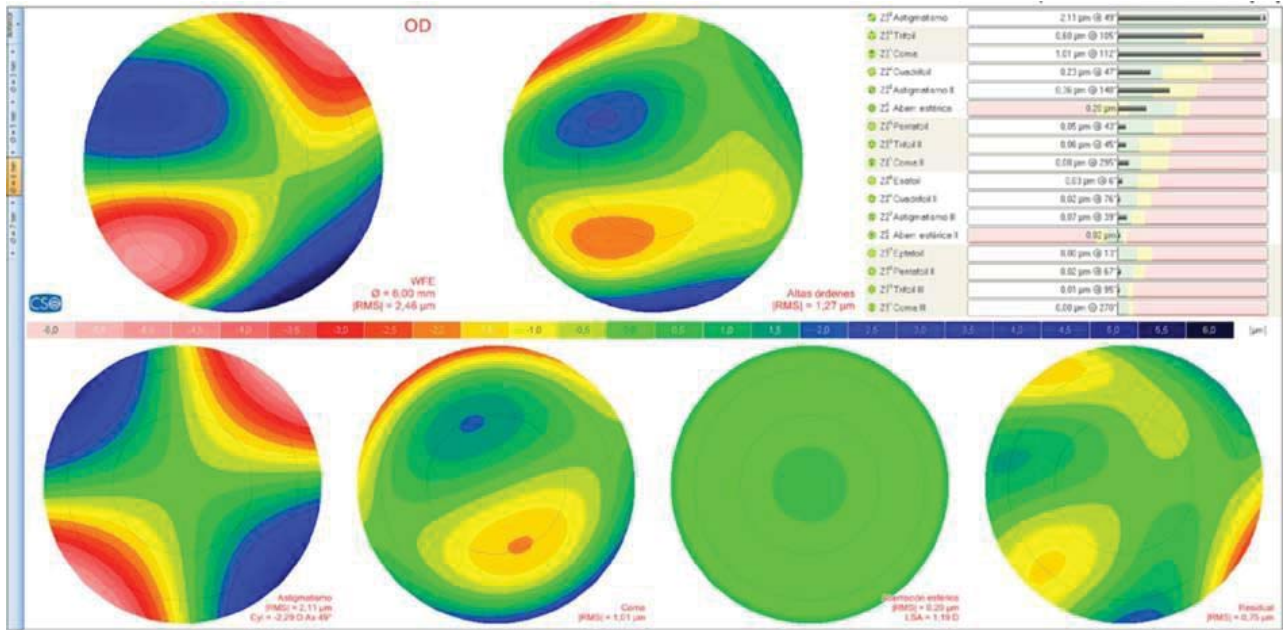


Figure 2: Sirius 2

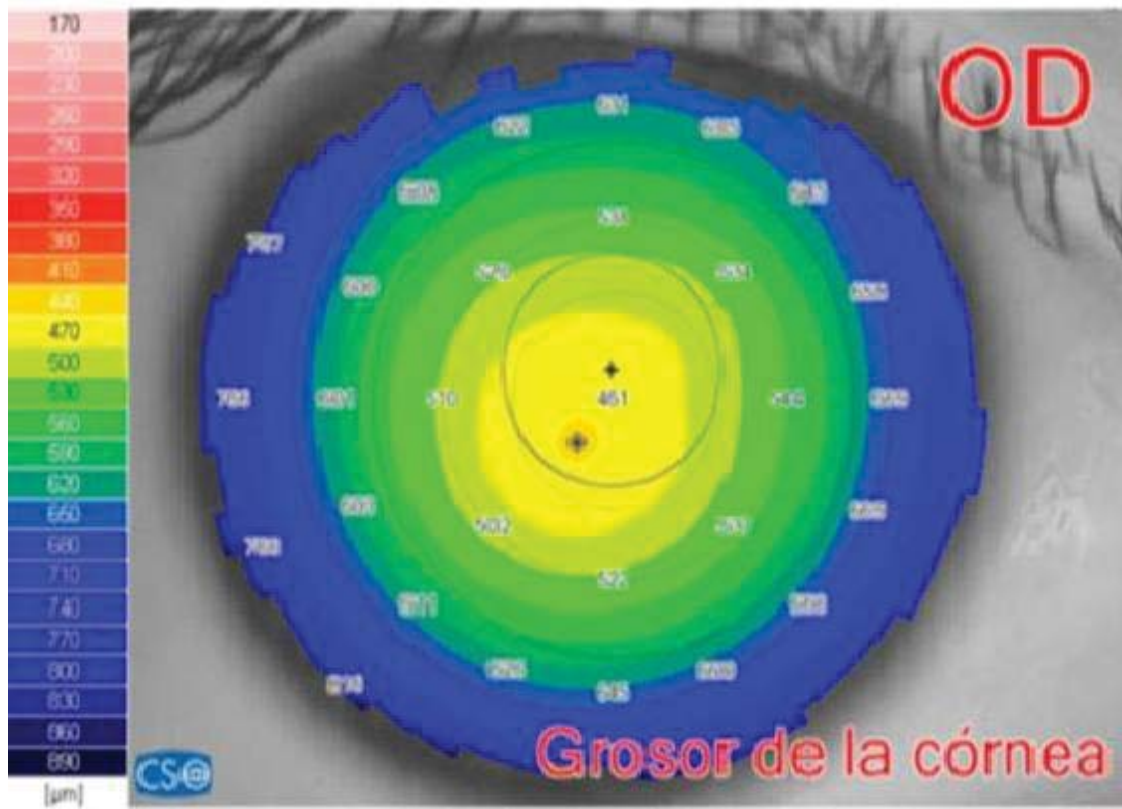


Figure 3: Sirius 3

Accuracy intrarings in the corneal topography

Presenter: Ana Hervás Ontiveros
Lead author: Josefa Benlloch Fornés
Co-author: Walter Furlan
 Diffractive Optics Group, University of Valencia, Valencia, Spain

Purpose

This study aimed to determine the accuracy of surface asymmetry index, SAI, and dioptric powers of 3, 5 and 7 mm, in a young population.

Method

Objective measurements were carried out with a corneal topographer (TOPCON KR-8100P AC-100) in a cabinet that met optometric test environment conditions in 220 healthy eyes. The pupil diameter and the accommodation were not artificially controlled. Three measurements were acquired for each eye, automatically. All subjects were examined by the same examiner. All participants gave informed consent to the tests and all tests were conducted according to the Declaration of Helsinki. The values were converted to vector notation $[M, J_0, J_{45}]$. Descriptive statistics were calculated with the programme SSPS 19.0.

Results

Of the 110 subjects, a 42.27% of the young adult population of this study, in astigmatic correction needed glasses. The average astigmatic error measured was -0.45 ± 0.77 D (range, 0 to -3.50 D). Visual acuity, AV, of all subjects was 20/20 or better, after correction. The average SAI was $+0,185 \pm 0.245$ (range, 0.06 to 1.94). First we checked the degree of association of J_0 and J_{45} at 3, 5 and 7 mm and SAI to 4.5 mm, given by the surveyor. Second, it was found, the ratio in absolute value, between pairs of rings for J_0 and J_{45} components, with expressions described in the attachment¹. Finally, the new parameter correlated Intra Rings Accuracy, S, (S_{53}, S_{57}, S_{37}), with the SAI, described in Table 1.

Conclusion

Statistically significant differences were found between S_{53} and S_{57} parameter. And, between the SAI and S_{53}, S_{57} SAI. So despite the absence of a high value of R^2 with SAI, according to the attached tabal where $R^2_{37} > R^2_{35} > R^2_{257}$, the parameter 'S' is a good parameter of the degree of irregularity of the astigmatism. Concluding that the more extensive the range of measures, the more obvious is its variation.

SAI vs S ₅₃	$y = 0,4536x + 0,0234$	$R^2 = 0,2936$
SAI vs S ₅₇	$y = 0,8411x + 0,2832$	$R^2 = 0,149$
SAI vs S ₃₇	$y = 0,777x + 0,0505$	$R^2 = 0,355$

Table 1: Correlation Factor and regression lines for each pair of diameters to SAI

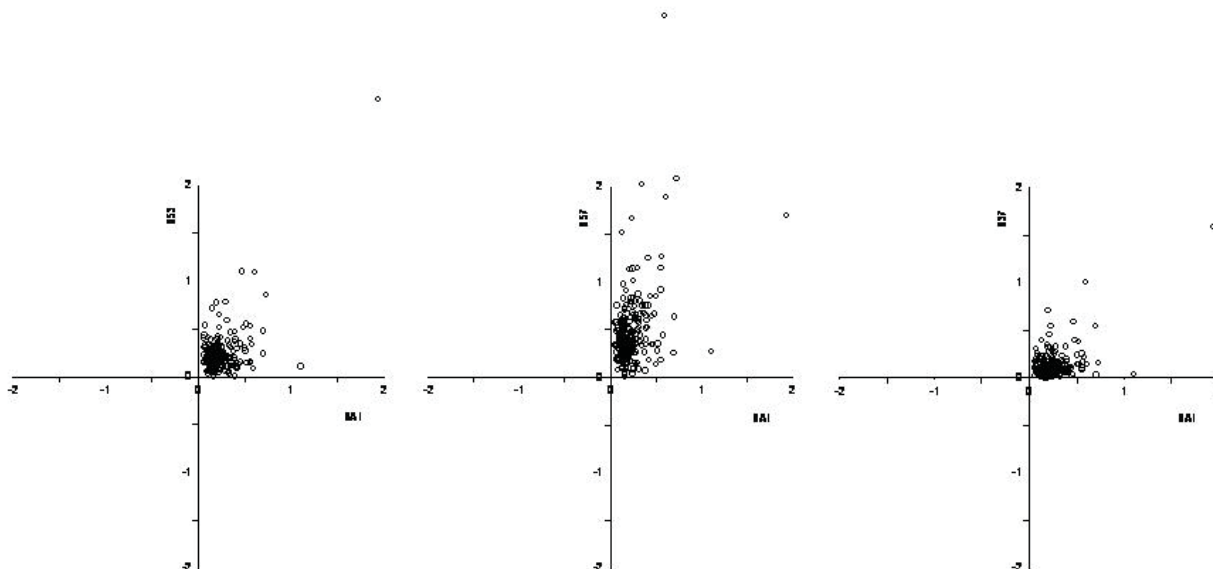


Figure 1:
Relation SAI vs S53

Figure 2:
Relation SAI vs S57

Figure 3:
Relation SAI vs S37

Purpose of metric

$$\left\{ \begin{array}{l} \Delta 53H = |J_{03} - J_{05}| \\ \Delta 75H = |J_{05} - J_{07}| \\ \Delta 73H = |J_{03} - J_{07}| \text{ (*1)} \\ \Delta 53V = |J_{45\ 3} - J_{45\ 5}| \\ \Delta 75V = |J_{45\ 5} - J_{45\ 7}| \\ \Delta 73V = |J_{45\ 3} - J_{45\ 7}| \end{array} \right. \quad \left\{ \begin{array}{l} S53 = \Delta 53H + \Delta 53V \\ S57 = \Delta 75H + \Delta 75V \text{ (*2)} \\ S37 = \Delta 73H + \Delta 73V \end{array} \right.$$

Corneal biomechanics, retinal nerve fibre layer and optic disc morphology, in Caucasian Spanish myopic children

Lead author: Inmaculada Bueno Gimeno¹

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⁴Facultat d'Optica i Optometria, Universitat Politècnica de Catalunya, Spain
⁵Fundación Oftalmológica del Mediterráneo, Valencia, Spain

Purpose

To evaluate the possible associations between corneal biomechanical parameters, retinal nerve fibre layer thickness and optic disc morphology in Caucasian Spanish myopic children and to assess the association between axial length and RNFL thickness in myopia.

Method

This cross-sectional study included a hundred myopic children (36 boys and 64 girls) ranging in age from six to 17 years. Corneal hysteresis (CH) and corneal resistance factor (CRF) were recorded with the ORA. Optic disc morphology and RNFL thickness were assessed by the Cirrus™ HD-OCT. Axial length (AL) measured using an IOLMaster, whereas central corneal thickness (CCT) was measured by Anterior-Segment Optical Coherence tomography (Visante™ OCT). One randomly chosen eye per children was included in the study for analysis. Statistical analysis was performed with SPSS (version 19.0, SPSS, Chicago), and $p < 0.05$ was considered statistically significant.

Results

The mean (\pm SD) age was 12.11 ± 2.76 years, with mean (\pm SD) spherical equivalent -3.32 ± 2.32 D. The mean (\pm SD) CH and CRF were 11.55 ± 1.45 and 11.93 ± 1.85 mmHg. The mean CCT was 543.02 ± 45.37 μ m and the mean (\pm SD) RFNL thickness was 95.20 ± 10.04 μ m. In multivariable mixed model analysis, average RFNL thickness and rim area correlated significantly positively with CH ($p = 0.009$ and $p = 0.001$ respectively) whereas average cup to disc area ratio (C/D ratio) correlated negatively with CH ($p = 0.008$). Average RFNL thickness decrease with increasing axial length ($p = 0.028$). CRF only correlated positively with rim area ($p = 0.001$). CCT did not correlate with optic nerve parameters or RFNL thickness.

Conclusion

Lower corneal hysteresis was associated with thinner RNFL thickness, less rim area and higher average C/D ratio in Caucasian Spanish myopic children. Average RFNL thickness was significantly thinner in longer and more myopic eyes.

New alternatives to corneal transplant based on tissular engineering and stem cells

Lead author: Juan de la Cruz Cardona¹

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Purpose

The decrease in the number of corneal donors and the side effects of transplanting an organ like the cornea (immunosuppressed patient, transplant rejection, etc.) have increased the clinical interest in the development of a suitable corneal replacement as an alternative to the corneal transplant. Tissue engineering represents the answer to this problem. The bioengineered corneal substitutes generated either for allotransplant or xenotransplant can be a suitable solution to restore partially or completely the functionality of the cornea. This poster will show some alternatives to the ordinary corneal transplant, such as human corneal substitutes generated by tissue engineering, and describe their optical and rheological properties.

Methods

Two types of bioengineered corneal replacement were developed in the laboratory: (1) human corneal substitutes of fibrin and fibrin with different agarose concentrations for allotransplant and (2) decellularised porcine corneas for xenotransplant, both with human keratocytes immersed within. Samples of the different fibrin stromal substitutes were studied weekly during eight weeks of development in culture. After each week, optical (scattering, absorption and transparency) and rheological parameters were measured. For the porcine corneas, different decellularisation protocols were performed. The scaffolds obtained were then recellularised with human keratocytes and the optical quality of the final corneal replacement was determined.

Results

Both types of corneal substitutes inserts (possibly used for allo and xenotransplantation) were found to have potential use as human corneal substitutes. Their optical and rheological properties are similar to the ones of a native cornea. Successful preliminary studies were obtained when autologous replacements were transplanted in animals, using lamellar and penetrating transplantation techniques.

Conclusion

The partial bioengineered human corneas proposed in this work displayed physical properties that make them appropriate for transplanting and could contribute to provide useful solutions for the generation of artificial tissues in regenerative medicine.

Eye care professional and consumer experiences with presbyopia

Lead author: Cheryl Donnelly¹

Co-authors: Alexis Vogt², Siva Raj

¹Medical Affairs Director for Bausch + Lomb Vision Care Division in the Europe, Middle East and Africa (EMEA)

²Optical Physicist, Bausch + Lomb

Purpose

There is increased dropout from contact lenses after 45 years of age despite a growing vision-corrected population and increasing interest in contact lenses. As the presbyopic population increases, so too does the need for eye care professionals (ECPs) to understand their patients' ever-changing vision needs. The purpose of this study was to examine ECP and patient experiences with presbyopia in order to better understand patients' vision needs.

Method

An online survey was administered to 301 French patients. The survey captured patient demographics and asked about lens use satisfaction, the frequency and impact of symptoms experienced with contact lens use, and an assessment of the patient's daily vision needs. A separate web survey was administered to 75 French ECPs that asked each ECP to discuss the challenges and success rates of fitting presbyopic patients.

Results

The primary area of dissatisfaction for multifocal and monovision wearers was near vision. Although all vision categories (near, intermediate, and distance vision) were listed as visual priorities while working, near vision caused the most visual issues for all lens wearers at work. 40% of French contact lens wearers reported it was hardest to obtain satisfactory near and intermediate vision. 61% of French ECPs reported that correcting mid-range vision was the greatest challenge when fitting presbyopic patients. When ECPs were asked about the number of visits it takes to successfully fit a presbyopic patient, survey responses indicated an average of 2.6 visits to successfully fit a patient with presbyopia. It was estimated that for 45% of French ECPs, it took three or more visits to successfully fit presbyopic patients with contact lenses. This means that on average, four in 10 patients are not fitted successfully in the first or second visit. French ECPs estimated that approximately three in 10 presbyopes are never successfully fitted with lenses.

Conclusion

The presbyopic population is challenging to fit due to the differing distance, intermediate, and near vision needs of this patient population. Mid-range vision is the greatest fitting challenge for ECPs while near and mid-range vision are the greatest areas of disappointment for patients.

Use of power maps to evaluate aspheric multifocal contact lenses

Presenter: Cheryl Donnelly²

Lead authors: Alexis K. S. Vogt¹

Co-author: Cheryl Donnelly²

¹Optical Physicist, Bausch + Lomb

²Medical Affairs Director for Bausch + Lomb Vision Care Division in the Europe, Middle East and Africa (EMEA)

Purpose

The demand for multifocal contact lenses continues to increase with an aging population. Although aspheric optics are commonly used to provide simultaneous vision correction for presbyopes, limited optical design information is available to assist practitioners in lens selection. Hartmann-Shack wavefront sensing instruments which apply high lateral resolution are now available for evaluation of mapping lens power across a contact lens. These instruments can record more than 2800 unique measurements over the central 6mm of the lens. The purpose of this study was to examine similarities and differences between multifocal contact lens designs/wavefront measurements using a new generation Hartmann-Shack instrument.

Method

The following lenses were compared: PureVision[®] MF Low and High Add lenses, and the Air Optix Aqua MF Lo, Med, and Hi add lenses. Measurements were also taken on PureVision and Air Optix Aqua single vision sphere lenses. Three separate -3.00D lenses were measured for each of the multifocal and single vision sphere lens designs from the center out to a 3mm radial distance. The median power of the three measurements was then plotted to create power profiles that could help explain on-eye performance of these lenses.

Results

The PureVision MF Low Add lens demonstrated more than twice the add power provided by the Air Optix Aqua Lo add MF lens: an estimated add of +0.59D for the PureVision MF lenses compared to an estimated add of only +0.25D for the Air Optix Aqua MF lenses. The PureVision MF High Add lens demonstrated a greater amount of add than either the Air Optix Aqua Med or Hi Add lenses: an estimated add of +1.84D compared to +1.31D and +1.41D for the Air Optix Aqua MF Med and Hi Add lenses, respectively.

Conclusion

Power profile mapping can help provide insight into fitting aspheric multifocal contact lenses. Because of the similar power profile between the Air Optix Aqua Med and Hi Add lenses, ECPs may find it difficult to discriminate between the add powers clinically, and may struggle to find an adequate solution when the patient's need for greater add power develops throughout the stages of presbyopia. PureVision Multi-Focal provides more add power to help address the needs of the presbyopic wearer. Knowledge of the lens power profile can guide the ECP toward selecting the best lens design for the patient.

Comparative study of corneal thickness measures by ultrasound pachymetry

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Co-author: Vanesa Blazquez Sanchez
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Purpose

This study was based on the assessment of precision, predictability and reliability of the main equipment used in daily clinical practice, due to the importance of preoperative studies for assessing and training in the detection of corneal disorders.

Method

Corneal thickness measurements were taken during a session during the day to prevent corneal thickness variations in a population of healthy women without previous eye pathology and without being subject to prior corneal surgery.

Results

Considering the ultrasonic pachymeter as gold standard in the assessment of corneal thickness, the deviation of the measures with the other teams were analysed. The non parametric linear correlation between OCT and Oculyzer is the largest (0,985), between OCT and ultrasonic pachymeter 0.675 and between this and Oculyzer of 0.698.

Conclusion

The corneal thickness measurement is reliable and accurate with any of these three teams and there is a good or very good correlation between the measures of the three teams. Each has advantages and disadvantages that need to be evaluated for the benefit of daily clinical practice.

Comparison between an open field autorefractor and an internal fixation target autorefractor

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³CNR-Istituto Nazionale di Ottica, Firenze, Italy

Purpose

Subjective refraction remains the gold standard for measuring refractive status of human eyes. Yet autorefractors are widely used to obtain the objective refractive status in vision screening, clinical practice, and research settings. The purpose of this work is to evaluate the refractive results between an open-field autorefractor (OFA) and an internal fixation target (IFT) autorefractor, comparing the agreement with subjective refraction.

Method

Measurements of refractive error were performed on 68 eyes of 34 subjects subjectively by an optometrist and objectively with the two autorefractors. The results were converted from the traditional representation (sphere, cylinder, axes) to the power series representation [Thibos 1997]. The results were statistically analysed using an univariate analysis (t-test) and using a multivariate analysis (Hotelling T²) in order to obtain the agreement between the different methods. Data were also converted in the Schmitz e Wesemann representation, in order to calculate the total cylindrical difference.

Results

From the point of view of the Spherical Equivalent the agreement between OFA and subjective refraction was good ($p=0.27$) while the agreement between IFT and subjective refraction was poor ($p<0.001$). Comparison of astigmatic component shows a few more problems for OFA than for the IFT. The multivariate analysis confirmed that the OFA was in good agreement with subjective refraction.

Conclusion

The results confirm that the OFA gives good results in the evaluation of Spherical Equivalent; it could be assumed that this could be due to the relaxation of accommodative effort, that may not be completely neutralised when using IFT instruments. About the astigmatic component it is necessary to perform a new study among subjects with higher cylindrical component in their refraction.

Asphericity of the lens versus power lens

Lead authors: M^a Carmen García-Domene

Co-authors: M^a Amparo Díez-Ajenjo, Cristina Peris-Martínez,
Jose Luis Menezo

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Purpose

To compare visual acuity of patients implanted with an aspheric or a spherical intraocular lens depending on the power lens.

Method

We evaluated 808 patients operated on for cataracts. 79 were implanted with a SN60WF (Alcon, USA) (mean age of 74+9 years old), and 729 with a SN60AT (Alcon, USA) (mean age 73+7). The lens power was between 18 and 25.5D.

We measured best corrected visual acuity (BCVA) at three months after surgery with EDTRS chart.

Results

In order to analyse the results the patients were organised into four different groups, depending on the IOL power. We compared the BCVA among these groups with the same IOL implanted and the same group but between the two lenses.

We used a Kolmogorov-Smirnoff test in order to check the normality of the sample. Any group had normal distribution, so for the comparison of the groups we used a Kruscal-Wallis test.

	8-19.5 D	20-21.5 D	22-23.5 D	24-25.5 D
SN60AT	0.92±0.12	0.9±0.12	0.89±0.13	0.87±0.15
SN60WF	1.05±0.23	1.13±0.15	0.96±0.16	0.98±0.17

Table 1: Mean of BCVA in decimal scale and deviation for the different groups

In Table 1 we can see BCVA. There aren't differences for SN60AT IOL ($p=0.08$) and for SN60WF. There are differences between 20-21.5 D and 22-24.5 ($p=0.00$), and between 20-21.5D and 24-25.5D ($p=0.04$). If we observe the results between the two lenses, the groups 20-21.5 and 22-23.5 have statistically significant differences ($p=0.0$, $p=0.02$)

Conclusion

After analysing the results we observed that VA depends on the lens power in the case of the aspheric lens. The SN60WF is statistically better than the SN60AT in the range of 20-23.5 D. So SN60WF was optimal for the range of 20-21.5, where we got the best results.

Study of the misalignment and aberrations in patients implanted with toric monofocal intraocular lens

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Method

Measurements were determined in 74 eyes of 51 patients; their age range was 75 ± 9 years. The patients in this study had senile cataract, and they were implanted with an Acrysof toric SN60T3, SN60T4 and SN60T5 IOL according to their pre-surgery corneal astigmatism. After three months of the cataract surgery, we measured the aberrations with the Ladarwave system (Alcon) and the lens' rotation with a slit lamp with a camera incorporated, in order to evaluate the aberrations' impact on visual quality.

Results

To compare lens rotation with aberrations, we conducted an experiment on a pupil with 5 mm of diameter. Taking as a reference the patients with a correct position of the IOL, we see how the astigmatism increases with the misalignment except with a rotation of 21-25°. Coma and spherical aberrations are maximum with rotation of 11-15° and minimum with a rotation of 21-25°. For the other toric IOL rotations, coma and spherical aberration are variable when the lens has more than 5° of rotation. High order aberrations value is variable when the lens rotation increases.

Conclusion

An accurate position of the IOL (0° of rotation) determines a decrease of 65.12% of the refractive astigmatism. The rotation of a toric monofocal IOL introduces aberrations that affect visual quality despite the compensation for the refractive error with glasses, since we can compensate low-order aberrations but not the highest orders. This effect increases for a rotation of 11-15° and decreases when approaching to a 30°, which could be due to the neutralisation of the astigmatism power.

Change in axial length pre and post cataract surgery measured with IOLMaster

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Purpose

Cataract surgery with intraocular lens (IOL) implantation tries to get a refractive result nearby to the optic emmetropia. So an accurate IOL power calculation is mandatory, and axial length (AL) measurement is one of the most influential parameters in this calculation.

IOLMaster is one of the most popular devices to measure AL, which uses the same group refractive index of the lens for all patients, independently of the cataract grade. But lens refractive index is higher as cataract grade increases. Nowadays cataract tends to be operated earlier, so moderate cataract are the most extracted in clinical practice. Therefore, it is important to study the influence of moderate lens opacity in AL measurements.

The objective of this study was to compare the AL value measures with IOLMaster, before and after uncomplicated cataract surgery in patients with moderate cataracts.

Method

This study included 153 eyes of 105 patients undergoing uncomplicated cataract surgery. Lens opacity was determined with the LOCSIII scale and AL was measured using optical biometry (IOLMaster; Carl Zeiss Meditec) before and one month after intervention. Intraoperative measurements (ultrasound time and fluid volume) were also registered.

Results

The average age was 67.51 ± 13.56 years (range 24 to 91) with a mean preoperative AL of 25.10 ± 3.19 mm (range 20.54 to 36.06; IC95% 24.59 to 25.60 mm) and postoperative of 24.88 ± 3.16 mm (IC95% 24.37 to 25.39; range 20.43 to 35.79 mm). The mean AL difference before and after surgery was 0.19 ± 0.05 mm ($p=0.549$ ANOVA) with agreement limits from 0.09 to 0.29 mm. It was observed that there was more difference in eyes with larger AL ($r^2=0.14$ $p<0.01$) (Figure 1).

The average cataract grade in each category was: nuclear opacity 2.25 ± 1.00 (range 1 to 5) ($p=0.564$ ANCOVA), cortical opacity 2.04 ± 0.73 (range 0 to 4) ($p=0.543$ ANCOVA), posterior subcapsular opacity 0.44 ± 0.90 (range 0 to 4) ($p=0.563$ ANCOVA), and nuclear colour 2.40 ± 1.05 (range 0 to 5) ($p=0.558$ ANCOVA), without a statistically significant effect in the AL difference pre and after cataract surgery.

The ultrasound time used during the surgery was 43 ± 29 seconds ($p=0.525$ ANCOVA) and the fluid volume was 4.73 ± 1.31 ($p=0.560$ ANCOVA) cubic centimeters without a statistically significant relationship between these parameters and the difference in the AL measurement.

Conclusion

The difference in AL measurement with IOLMaster before and after cataract surgery in eyes with low grade of cataract should be related with IOLMaster reproducibility especially in extreme-long eyes. Moderate cataract showed no statistical effect on AL measurement with IOLMaster.

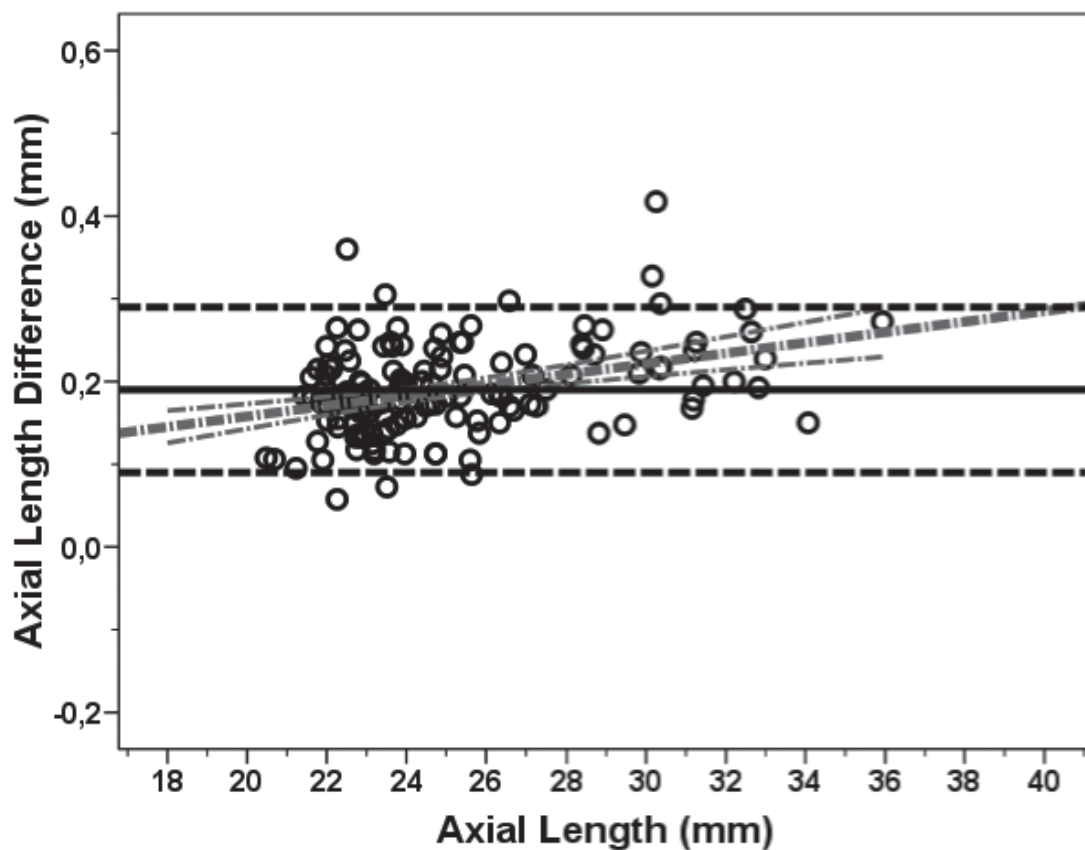


Figure 1

Analysis of cataract surgery induced astigmatism

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Purpose

Cataract surgery with implantation of an intraocular lens (IOL) is the most common ophthalmic surgical procedure. Hence, new types of IOLs have been developed to improve the refractive outcome, such as toric IOLs. To calculate toric lenses is necessary to evaluate the preoperative astigmatism and the surgically induced astigmatism (SIA) caused by the incision.

SIA could be determined as the difference between preoperative and postoperative refraction measured with a autorefractometer or keratometry. Nevertheless, the preoperative autorefractometer measurement may be altered due to the lens opacity.

The classical spherocylinder format written as sphere, cylinder and axis is useful for a single analysis but is not appropriate for mathematical and statistical analysis of aggregate data. Thus, polar value analysis is the recommended method to manage this type of data.

The objective of this study is to compare the SIA as the change in the refraction (autorefractometer) and keratometry (IOLMaster) pre and post cataract surgery, with two different polar value analysis methods [Method #1: KP (90)/KP (135) and Method #2: AKP/AKP(+45)].

Method

210 cataractous eyes of 131 patients undergoing uncomplicated cataract surgery were included. Preoperative and one month postoperative examination, including autorefraction (ARK-30; Nidek Co. LTD, Aichi, Japan) and keratometry (IOLMaster Carl Zeiss Meditec, Dublin, Ireland), were assessed. The same experimented surgeon, making a 2.75 mm clear corneal incision at 11 o'clock position, performed all cataract surgeries.

Results

The average age was 66.25±12.33 years (range 22 to 89). The polar value data and the SIA are summarised in Table 1. Statistically significant difference was found (paired T test <0.05) for polar value KP(135) measured with IOLMaster and KP(90) and KP(135) measured with autorefractometer. In Table 2 statistically significant difference was found (paired T test <0.05) for polar value AKP measured with IOLMaster and autorefractometer. Using method one, the SIA (diopeters@axis in degrees) calculated with IOLMaster was 0.11@137.60 and with autorefractometer was 0.46@165.04. The difference between the SIA calculated with IOLMaster and autorefractometer was 0.41@171.45. With Method #2, the SIA calculated with IOLMaster was 0.37@179.23 and with autorefractometer was 0.90@179.68. The difference between both devices was 0.53@180.

Conclusion

It is necessary to develop personalised equations taking into account the surgery incision location to calculate the exact SIA, for power and position of toric IOLs calculation, which could improve refractive outcome of patients.

	IOLMaster			Autorefractometer		
	KP(90)	KP(135)	\bar{M}	KP(90)	KP(135)	\bar{M}
Postop	-0.28±1.05	0.06±0.90	0.29@173.96	0.04±0.87	-0.06±0.55	0.07@61.85
Preop	-0.26±1.16	-0.05±0.68	0.26@5.44	0.43±1.35	-0.30±1.04	0.52@72.55
SIA	-0.01±0.82	0.11±0.86	0.11@137.60	-0.40±1.00	0.23±0.98	0.46@165.04
Paired P*	0.822	0.060	-	<0.001	0.001	-

Table 1: Summary of keratometer and autorefractometer polar value readings calculated with method one. All values except P and \bar{M} are mean±SD (D).

\bar{M} : conventional astigmatic format (diopers@axis in degrees). SIA: surgical induced astigmatism. Surgery induced a statistically significant flattening in the autorefractometer data. P: Paired T Test

	IOLMaster			Autorefractometer		
	AKP	AKP(+45)	\bar{M}	AKP	AKP(+45)	\bar{M}
Postop	0.68±1.12	0.01±0.51	0.68@90.42	0.52±0.77	0.01±0.51	0.52@90.55
Preop	1.05±0.88	0.00±0.00	1.05@180	1.40±1.07	0.00±0.00	1.40@180
SIA	-0.37±1.00	0.01±0.51	0.37@179.23	-0.90±1.04	0.01±0.51	0.90@179.68
Paired P*	<0.001	0.789	-	<0.001	0.822	-

Table 2: Summary of keratometer and autorefractometer polar value readings calculated with method two. All values except P and \bar{M} are mean±SD (D).

\bar{M} : conventional astigmatic format (diopers@axis in degrees). SIA: surgical induced astigmatism. Surgery induced a statistically significant flattening with both devices, but not a significant torque. P: Paired T Test

Optical coherence tomography and visual outcomes in epicapsular lenses

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Introduction

Measures and visual outcomes were measured in patients with implanted epicapsular lenses, a posterior chamber collagen copolymer phakic intraocular lens: ICL V4C (Staar Surgical, CA). In this study we analysed with special attention to vault values and intraocular pressure. Measurements were taken using optical coherence tomography, OCT-Visante[®], which were essential for the size calculation and the outcomes in this study.

Method

The preoperative data and the refractive and visual outcomes of 138 eyes of 70 patients who were implanted with a ICL V4C were measured. Uncorrected distance visual acuity (UDVA), corrected distance visual acuity (CDVA), refraction, tonometry, measures ACD and ACD and angle-to-angle by OCT and ACD and WTW with Orbscan, safety and predictability were evaluated six months postoperatively.

The mean age was 30. Data related to the anterior chamber morphology was also analysed. The ACD and angle-to-angle, measured by OCT, was essential for the size calculation. The horizontal and vertical angle-to-angle, obtained by OCT and ACD, was used to select the diameter and power of the lens.

Results

At six months postoperatively, the mean sphera was -0.01 ± 0.10 diopters (D) and the cylinder -0.2 ± 0.40 diopters (D) and the axis 0.54 ± 0.46 . The mean Snellen UDVA was 0.9 ± 0.1 and CDVA 0.99 ± 0.05 . Predictability was excellent with more than 98% of cases with less than half diopter. No eye had lost lines of CDVA and 8.75% had an improvement of one line of vision and 2.50% had two lines. In terms of safety the intraocular pressure remains stable after surgery. The central hole in V4C is very effective in this sense. Relation to the size of the lens, 13.2 was the lens implanted more frequently. The result of the vault medio postoperatory was 488.9 ± 211.47 (0 a 980 μ).

Conclusion

This study shows that implantation of V4C lenses for myopia was safe and effective and provided predictable refractive results at six months follow-up.

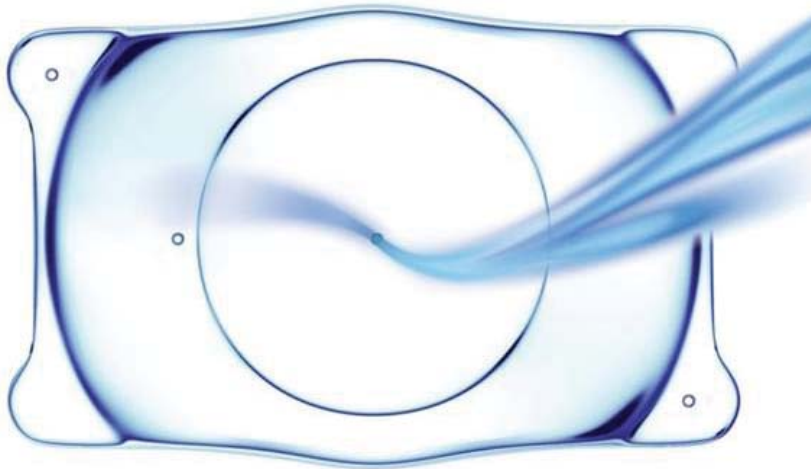


Figure 1

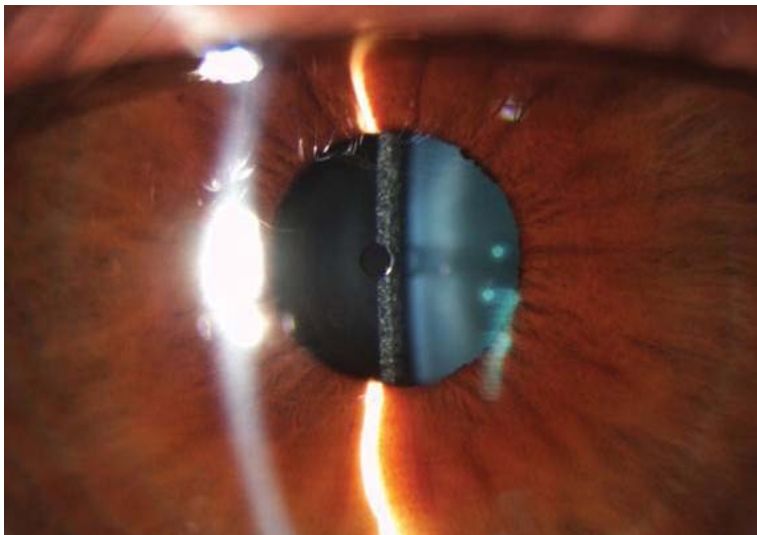


Figure 2

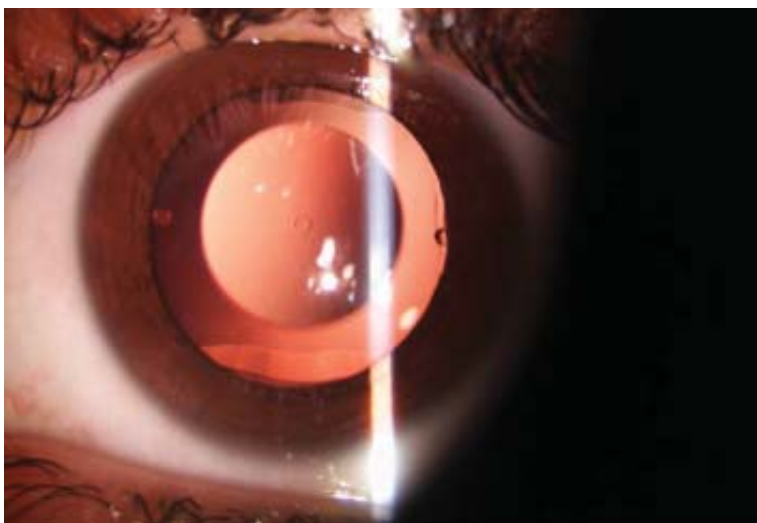


Figure 3

Contact lens fitting after penetrating keratoplasty

Lead author: Rosa García-Monlleó
Co-author: Miriam Medina Gonzalo
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Purpose

After penetrating keratoplasty (PK), may be an irregular corneal surface with high aberrations, high astigmatism or anisometropia. Therefore may be required contact lenses (CL) in order to achieve correct visual quality of the patient, not possible with glasses. The aim of this study was to adapt CL to patients previously with keratoconus subjected to PK.

Method

We have adapted four CL with refractive purposes to four patients, three men and a woman, post-PK. All the patients presented deficient visual acuity (VA). The material used was: Easygraph corneal topography, refraction column CSI, slit lamp CSI SL 990, Fscope and optical coherence tomography (OCT) TOPCON 3D OCT-1000. All the patients were informed and gave their consent, according to establishes the Declaration of Helsinki. Examination and follow-up post after adaptation are essential. It should get an adaptation with good VA, tolerance to CL all the time required by the patient and correct corneal integrity.

Results

In each case we have adapted a different CL, customising each adaptation depending on the characteristics of the corneal surface after PK. We have adapted a soft toric CL, a corneal CL RGP (diameter 10.40 mm) with special design post graft, a larger-diameter CL RGP (diameter 12.60 mm) and one hybrid CL. Ocular complications have not appeared after the adaptation of the CL in any case. We have obtained a significant increase of the VA in all the cases, respect to its previous compensation, a good tolerance, a good centration and stabilisation of CL, which allows a high number of hours of bearing in these patients, who absolutely depend on their CL.

Conclusion

- A precise knowledge is needed for the different adaptive techniques and new geometries of CL for the optical treatment of irregular corneas.
- The continuous monitoring post adaptation is essential in corneas subjected to PK.
- We have obtained a significant increase in VA in all the cases after the fitting with the different CL.

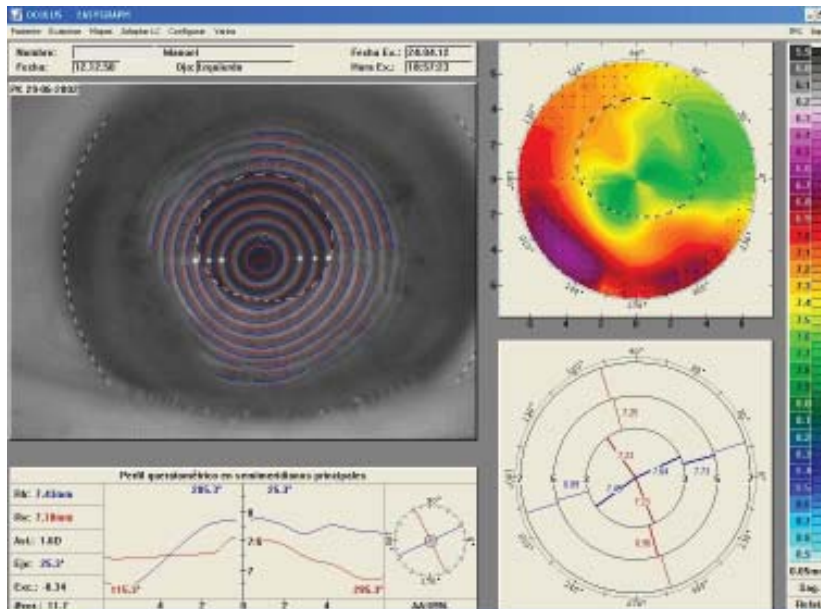


Figure 1: Topo OI Manuel

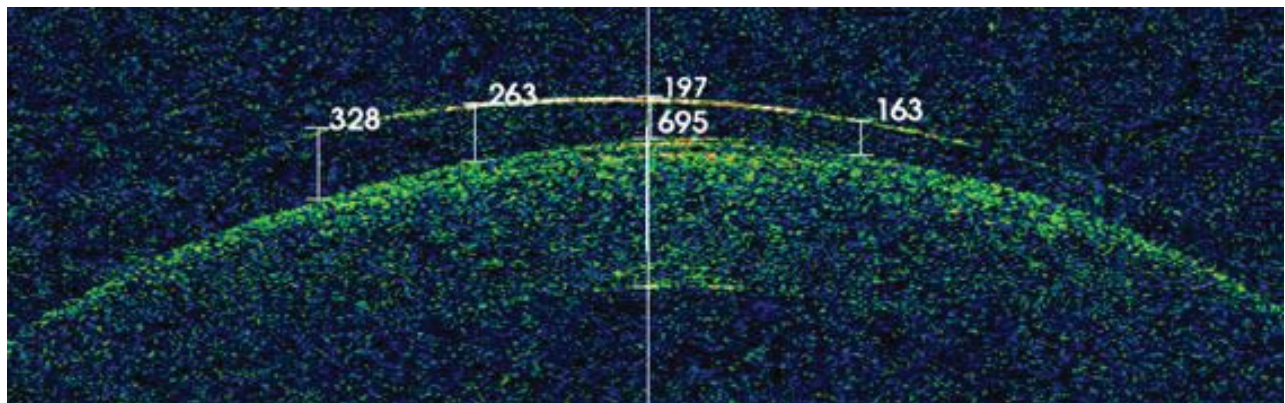


Figure 2: OCT OI Manuel with CL

PATIENTS/EYE	GLASSES/ VA	CONTACT LENS FIT	CL/VA
JRG (Man)/ Left	+1,50 -6,00x0° / 0.5	Soft toric CL TR 48G R ₀ 8.70 mm +1.5 -5.50 x 170° Ø _T 14.00 mm	0.8
MGC (Man)/ Left	Without glasses/ Hand movement	RGP Rose K® PS R ₀ 6.90 mm -18.25 D Ø _T 10.40 mm	0.8
APH (Man)/ Riath	-7.00 -4.00 x 90° / 0.3	RGP Large-diameter Scleracon® R ₀ 6,20 mm Rp 5,50 mm -14,50 D Ø _T 12,60 mm	0.8
RGQ (Woman)/ Left	-4.50 -3 x 120° / 0.8	Hybrid Contact Lens Clear Kone® 600 µ Skirt Medium -15,00 D Ø _T 14,50 mm	1.0

Figure 3: Contact lens fitting after penetrating keratoplasty

Comparison of the effect of lubricant eye drops for contact lenses with a placebo

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Co-author: Jasmin Beutler
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Institute of Optometry, Olten, Switzerland

Purpose

The study investigated whether there was a significant difference between lubricant eye drops and a placebo while participants were wearing 1-Day contact lenses. This was tested by two groups, one without (OSDI < 20) and the other with (OSDI > 20) dry eye symptoms.

Method

The subjective evaluation was done using a questionnaire about the comfort three minutes after application of the drop, the duration of the drop effect and the comfort of the contact lenses after eight hours. The objective comparison was based on the measurement of the LNIBUT with the Tearscope of Keeler. All of these methods were conducted at different drop rhythms.

Result

The comfort three minutes after the drop instillation was significantly better with lubricant eye drops than with the placebo only within group one and only for women. The duration of the drop effect showed the same result also only in group one, but for male and female participants. There was no significant difference between the products in comfort and measurement of LNIBUT after eight hours. However, there are trends towards an improvement with the use of the products, especially with lubricant eye drops.

Conclusion

The lubricant eye drops compared with placebo showed an increase in comfort after the application of the drop for women without symptoms of dry eyes. The duration of the drop effect with lubricant eye drops was longer for participants without symptoms of dry eyes no matter what sex. The comfort and LNIBUT after eight hours showed trends towards an improvement.

A study of the thickness and anterior chamber depth of the keratoconus using Pentacam system

Lead author: Douk Hoon Kim
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Purpose

This study was to investigate the thickness and anterior chamber depth values of keratoconus in the Korean population with the Pentacam system.

Method

The subjects consisted of 84 eyes from keratoconic adults aged seven to 59 years during 2010. The thinnest area, apex zone, and pupil centre of the corneal thickness were measured using the Pentacam pachymetry. Also the ACD value was measured with Pentacam.

Results

There was a statistically significant relationship between the thickness of the cornea at the thinnest area and the pupil centre (t-test, $p=0.0001$). However, there was no statistical difference ($p>0.5$) in the mean thickness of thinnest area, apex zone, pupil centre of cornea between right eye and left eye. Also, correlation between ACD and corneal thickness in all subjects had no statistical differences ($p>0.05$) in all subjects.

Conclusion

These results suggested that the regional thickness of cornea and ACD with Pentacam can provide correct and useful diagnostic information of the morphology of Keratoconus for the RGP contact lens and diagnosis of abnormal corneal refraction surgery.

Corneal confocal microscopy repeatability

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Purpose

To assess confocal microscopy repeatability (ConfoScan3, Nidek, Italy) when quantitatively analysing the morphological aspects of the limbus, mid-peripheral and central cornea.

Method

Eight subjects had their central, mid-peripheral and limbal cornea (temporal and nasal) of their right eye examined with a ConfoScan3 in two different visits – the second visit was scheduled at least six months later than the first. Bland-Altman repeatability was measured for 29 parameters, in the five different corneal areas examined: basal cell density and size, anterior and posterior keratocyte densities (AKD/PKD), endothelial cell density, polymegethism, pleomorphism, mean area and sides of endothelial cells.

Results

As a percentage of the mean absolute values, repeatability of 0-10% was classified as 'excellent', between 10-30% as 'acceptable' and over 30% as 'poor'. Repeatability was good (excellent and acceptable) for 67% of parameters: excellent for 14% of parameters and acceptable for 52% of parameters. The number of endothelial cell sides in the central cornea demonstrated the best repeatability (2.0%) whilst mid-temporal PKD showed the poorest repeatability (53.7%).

Conclusion

Confocal microscopy technique proves to be an adequately repeatable method of evaluating the various corneal layers. The dataset supports the ongoing use of the technique in research and clinical practice.

Corneo-scleral contact lenses after intrastromal corneal rings in keratoconus

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Purpose

To describe a series of cases of intrastromal corneal rings in keratoconic patients who had a residual ametropia and were fitted with corneo-scleral gas-permeable lenses.

Method

Five eyes of three young patients were fitted with a new corneo-scleral contact lens (designed: multiaspherical; material: fluorosilicone acrylate, oxicon extreme; Dk: 150 (Iso/Fatt method); diameter: 12.60 to 13.50mm; base curve: 5.80 mm (58.20 D) to 8.60mm (39.25 D), in 0.05mm steps; scleral curve: 6.80 mm (49.63 D) to 11.40mm (29.60 D), in 0.10 steps; powers: + 20.00 D to -25.00 D, in 0.25 D steps).

The preliminary study included Pentacam, biomicroscopy, ocular response analyzer (ORA), endothelial cell count and refraction. Visual acuity, comfort with the contact lenses, and the state of the cornea were evaluated.

Results

The values of spherical equivalent, average keratometry and corneal astigmatism were -4.15 D (range: -0.87, -9.0), 47.62 D (range: 40.90, 56.10) and 5.46 D (range: 3.70, 10.0), respectively. Mean best corrected visual acuity (BCVA) with glasses and contact lenses was 20/32 (r: 20/40, 20/25) and 20/20 (r: 20/25, 20/16), respectively. All cases improved the BCVA with corneo-scleral lenses: two eyes gained four lines; two eyes improved three lines; and one eye improved two lines. Pentacam, ORA and endothelial cell count did not show any significant change. After six months there were not any adverse effects on the cornea. The average daily use time was 11.20 h (range: 7, 12).

Conclusion

Patients implanted with intrastromal corneal rings for keratoconus that do not have good vision with glasses may require the use of gas-permeable contact lenses. In the cases presented the corneo-scleral lens has been a good treatment option for myopia and irregular astigmatism. The results with the lens indicate a significant improvement in vision for glasses in the intrastromal corneal rings.

The teaching and fitting of RGP lenses in educational institutions across the European community

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Purpose

Following a discussion forum at EAOO Dublin 2012, the status of RGP fitting as a subject taught at undergraduate level was seen to be downgraded in some institutions. With wider coverage of the actual situation in Europe this poster will present how teaching of RGPs differs in regions and countries. The usual argument for less RGP education is that teaching should reflect what is being fitted in the market place; but is that in the patients' interest?

Method

Skill levels data on RGP teaching was collected for 15 countries and 50 institutions mostly via the membership of IACLE. The data included both basic and advance level information depending on the 'undergraduate' course. The institutions were grouped into Northern, Central and Southern Europe as these areas had common experiences.

Topics particularly asked were hours of lectures and practical fitting, real patients seen and the use of assessments in RGPs. The impact of industry support was also explored.

Results

- Northern Europe: the Dutch had the most hours of lectures and practical fitting, closely followed by Ireland and Scandinavia with a similar split. The UK had the greatest variation in hours of lectures vs practicals.
- Central Europe: Austria and Croatia had the most lectures and practical fittings, but that was inevitable as they were taught by the same person. Germany, however, had more practical fitting than lectures.
- Southern Europe: Italy had the most lectures and practical fitting hours but it varied widely between institutions. France had the least hours, especially of the hands-on elements, and one person was teaching in four institutions.

The impact of industry support was greater for those who had less teaching hours, so used industry more than those with higher student contact time.

Conclusion

Students still get basic RGP teaching but in some institutions this is only just adequate. The differences around Europe depend on knowledge and the legal or political marketplace. Industry gives adequate support for this subject, but in some countries it looks as if new graduates will not have the skill set to deal with long-term RGP wearers.

Mechanical corneal sensitivity measurement with air gas aesthesiometry (belmonte ocular pain meter)

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Introduction

For true mechanical corneal sensitivity measurement using the Belmonte aesthesiometer (BOPM), airflow stimulus temperature must equal corneal temperature at the corneal surface, to avoid additional response from the temperature-sensitive nerves. The aim of this study was to record corneal surface temperature changes during the presentation of the airflow stimulus with varying temperatures and pressures.

Method

(a) Corneal surface temperature was recorded with the aid of an infrared camera (FLIR A310) on a total of 14 subjects (mean age 25.14 ± 2.18 (sd) years; seven females) during the presentation of heated airflow stimuli at three temperatures: room temperature +10°, +15° and +20°C (duration 3s; 4mm distance of exit-nozzle to cornea; airflow 60ml/min; room temperature 23-24°C).

(b) Subsequently, corneal temperature measurements were repeated on the same subjects, varying the airflow rates and restricting the stimulus temperature to that which matched corneal temperature in part (a). Inclusion criteria were age <40, no contact lens wear, absence of ocular disease including dry eye, and no use of artificial tears. For statistical analysis, repeated measures (ANOVA) and appropriate post hoc t-tests were applied.

Results

Mean corneal temperature changes were $-0.36 \pm 0.14^\circ\text{C}$ with stimulus temperature +10°C, $+0.18 \pm 0.17^\circ\text{C}$ with +15°C and $+0.77 \pm 0.43^\circ\text{C}$ with +20°C. Consequently, corneal temperature changes were recorded applying a stimulus temperature of +15°C, and following airflow rates of 30, 80 and 100ml/min. Mean corneal temperature change was found to be: $0.00 \pm 0.07^\circ\text{C}$ with 30ml/min ($p=1.000$), $+0.18 \pm 0.17^\circ\text{C}$ with 60ml/min ($p=0.002$), $+0.32 \pm 0.13^\circ\text{C}$ with 80ml/min ($p=0.000$), and $+0.43 \pm 0.10^\circ\text{C}$ with 100ml/min ($p=0.000$).

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Mechanical corneal sensitivity measurement with air gas aesthesiometry (belmonte ocular pain meter)

Conclusion

Although stimulus temperature was set to produce no temperature stimulus, the need to vary stimulus-airflow to change stimulus intensity, produced a small, but statistically significant effect on corneal surface temperature. Consequently, this air stimulus may not be exclusively 'mechanical', exciting only A- δ fibres during corneal sensitivity measurement, but may also have an additional response from the temperature-sensitive C fibres.

Multifocal corneal refractive surgery in presbyopic patients: results of new algorithm SUPRACOR™

Presenter: Juan Carlos Ondategui-Parra²

Lead author: Ahmad Zaher Makhmalji¹

Co-authors: Jorge Castanera¹, Juan Carlos Ondategui-Parra²

¹Instituto Oftalmologico Castanera IOC, Barcelona, Spain

²Clinical University Center (CUV), Optics and Optometry Faculty from Terrassa (FOOT), Politechnical University of Catalonia (UPC), Terrassa, Spain

Introduction

Presbyopia is a reduction in the amplitude of accommodation due to natural degenerative changes. The loss of accommodation progresses from early life and reaches its highest expression after 50 years, the age at which 100% of the population is affected. The surgical alternatives for presbyopia correction may be made in the sclera, cornea or lens. The objective of this work is to study the efficacy index (EI), that compares uncorrected vision postoperatively (AVSC POST) with corrected vision preoperatively (BCVA PRE) ($EI = AVSC\ POST / BCVA\ PRE$) and safety index (SI) that compares corrected vision postoperatively (BCVA POST) with corrected vision preoperatively (BCVA PRE) ($SI = BCVA\ POST / BCVA\ PRE$) of the corneal treatment (PresbyLASIK) called SUPRACOR™.

Method

The design chosen for this study is a cross-sectional study of consecutive cases. A total of 46 eyes of 25 patients with a mean age of 53.28 years (minimum: 44, maximum 63) were included in the study, of which 72% (18 cases) were women. Patients underwent treatment with PresbyLASIK SUPRACOR™ ablation algorithm. All had maximum distance corrected visual acuity (BSCVA) of 0.1 LogMAR or better, and maximum close-corrected visual acuity (BCVA) of 0.2 LogMAR or better.

Results

The mean distance of uncorrected vision (AVSCL) was 0.14 and 0.04 LogMAR monocular binocular LogMAR. Near vision uncorrected (AVSCC) was 0.25 and 0.17 LogMAR monocular binocular LogMAR. For far vision, the EI were higher for binocular vision (0,80 – 1 month; 0,87 – 3 months; 0,88 – 6 months) than in monocular vision (0,65 – 1 month; 0,73 – 3 months; 0,71 – 6 months). For near vision, EI were higher for binocular vision (0,75 – 1 month; 0,71 – 3 months; 0,77 – 6 months) than in monocular vision (0,67 – 1 month; 0,62 – 3 months; 0,63 – 6 months). For far vision, the SI were similar for binocular vision (0,96 – 1 month; 0,99 – 3 months; 0,99 – 6 months) than in monocular vision (0,93 – 1 month; 0,95 – 3 months; 0,95 – 6 months).

Conclusion

PresbyLASIK technique with the algorithm SUPRACOR™ is a technique with good efficiency and high security that reduces dependence on glasses for presbyopic patients in everyday life.

Number of visits and diagnostic lenses in keratoconus, RGP and soft contact lenses

Lead author: Sara Ortiz Toquero¹

Co-authors: Victoria de Juan¹, Guadalupe Rodriguez¹, Elena Alonso², Raul Martin^{1,3}

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²Instituto Oftalmológico Fernández-Vega, Oviedo, Spain

³Department of Physics TAO, School of Optometry, University of Valladolid, Valladolid, Spain

Purpose

Rigid gas permeable (RGP) contact lens (CL) fitting in keratoconic patients is the primary visual correction for these patients. Various fitting philosophies and different lens designs are available in contact lens practice. However, the variations in the severity of the disease (mainly the degree of irregular astigmatism, the steep corneal curvature, etc.) make the process of RGP fitting lengthy, difficult, and sometimes inaccurate for both the patient and the fitter. However, there is a lack of studies comparing keratoconus RGP CL fitting, versus refractive RGP and soft CL fitting. The purpose of this study is to compare the number of visits and the number of diagnostic lenses (DL) necessary to fit RGP in keratoconic patients, versus standard RGP, and soft CL fittings.

Method

247 refractive CL fittings conducted in the Optometry Research Group, IOBA-Eye Institute were retrospectively analysed. Patients were divided into three groups; soft CL wearers; RGP wearers and keratoconus patients. In the soft and RGP wearer groups patients with any ocular pathology, orthokeratology, any corneal surgery (LASIK, etc.) or special CL wear (scleral lenses, hybrid lenses, continuous wear, etc.) were excluded. In the keratoconic group only patients fitted with RGP lenses (KAKC Conoptica, Spain) were included (non-hybrid, piggy-back and scleral lenses were included).

Results

Of all CL fitted, 62% were soft CL, 17% were RGP and 21% were keratoconus RGP fitting. The number of visits in the keratoconus group was 3.31 ± 0.58 (IC 95% from 3.15 to 3.48, median 3, with a range of 3-5 visits); the standard RGP required 3.93 ± 0.93 visits (IC 95% from 3.63 to 4.22, median 4, with a range of 2-6 visits) and soft CL needed 3.04 ± 0.81 visits (IC 95% from 2.91 to 3.17, median 3, with a range of 2-5 visits). The number of visits was statistically significant ($p < 0.001$ Mann-Whitney). DL in keratoconus group was 3.10 ± 1.10 (IC 95% from 2.79 to 2.72, median 3, with a range of 2-6 lenses), in standard RGP was 3.34 ± 0.97 DL (IC 95% from 3.04 to 3.65, median 3, with a range of 1-5 lenses) and in soft CL 2.23 ± 0.72 DL was required (IC 95% from 2.12 to 2.35, median 2, with a range of 1-4 DL). Statistical significance ($p < 0.001$ Mann-Whitney) was only found between the number of DL used in the soft CL group versus RGP and keratoconic groups.

Conclusion

The results of this study suggested that fitting RGP in keratoconic patients is similar to standard RGP. So, these fitting procedures could not be that complicated as previous reports in the literature suggest. More studies are necessary to evaluate the effect of the clinician experience in keratoconus RGP CL fitting.

Deep anterior lamellar keratoplasty (DALK) technique for treatment of corneal scarring in a *Pseudomonas aeruginosa* infection

Lead author: Noelia Pérez Ortiz

Co-authors: Leticia Santamaría García, Ana Belén Blázquez Fernández, Iván Gonzalo Guijarro, David Antolín García, Paz Rodríguez Ausín, Sara Llorente-González
Ophthalmology Service, Hospital Universitario de Torrejón de Ardoz, Madrid, Spain

Purpose

This poster reports a case of a 37-year-old male, a soft lenses wearer, who had a severe corneal abscess with hypopion, a corneal central ulcer and mucopurulent secretion in his right eye (Figure 1) caused by *Pseudomonas aeruginosa* as an inappropriate use of caring for his contact lenses.

Method

Initially the patient received appropriate antibiotic drugs and fortified intraocular injection treatment for the corneal abscess. After that, there was severe central corneal scarring and top vascularisation which was solved with a lengthy treatment of topic steroid eye drops. Although the patient improved, after a few months he required Deep Anterior Lamellar Keratoplasty due to the persistence of the central corneal scarring (Figure 2). DALK is a new method of corneal surgical procedure that selectively removes the diseased anterior layers of the cornea and retains the healthy innermost layer (endothelium). As the inner layer is retained, the body does not recognise it as donor tissue, hence there is no risk of rejection. We followed up corneal sutures by topography in order to reduce corneal astigmatism (Figure 3). A year after the infection, the long time use of steroids led to a posterior subcapsular cataract that had to be removed by surgery.

Results

A patient with a *Pseudomonas aeruginosa* infection recovered corneal transparency and his vision was restored to 20/20 with a successful treatment based on antibiotics, steroids and surgical procedures explained above.

Conclusion

Extended and incorrect use of soft contact lenses increases the risk of *Pseudomonas aeruginosa* infection of the cornea. *Pseudomonas* corneal infection is an important disease that can be solved with an exhaustive topic treatment. Steroid drugs to prevent rejection of the corneal graft can cause complications such as cataract, glaucoma and Herpes infection. New corneal surgery procedures such as DALK are recommended in keratoconus and corneal scars. Corneal topography allows us to follow up the results.

Figure 1



Figure 2

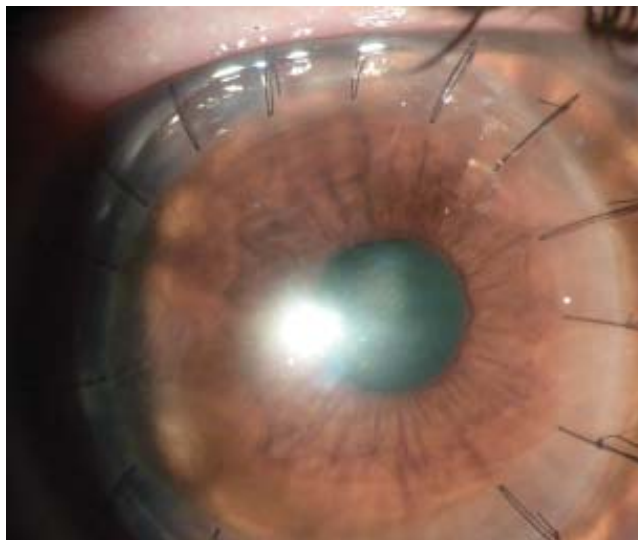
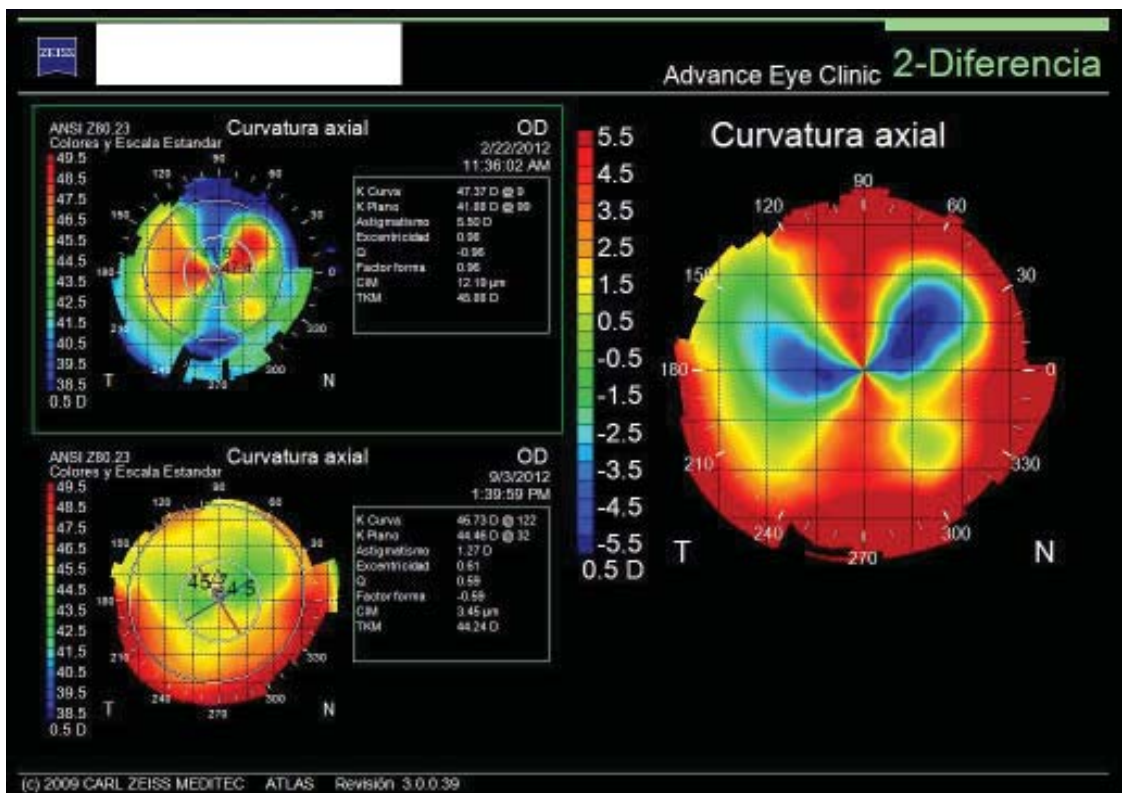


Figure 3



VISANTE optical coherence tomography in the diagnosis of forme fruste keratoconus

Lead author: Leticia Santamaría García
Co-authors: Paz Rodríguez Ausín, Cesar Hita Antón, Noelia Perez Ortiz, Ana Belén Blázquez Fernández, Iván Gonzalo Guijarro, David Antolín García
Ophthalmology Service, Hospital Universitario de Torrejón, Madrid, Spain

Purpose

To test the utility of the relative pachymetry map in Visante–Omni (Carl Zeiss Meditec, Inc, Dublin, CA) to detect forme fruste of two different corneal ectasias, keratoconus and marginal pelucid degeneration. Early detection of forme fruste corneal ectasias is of paramount importance in refractive surgery. Thus, many strategies such as the systematic evaluation of the posterior surface of the cornea, corneal biomechanics and aberrometry have been used. Corneal pachymetric distribution is currently one of the latest issues in corneal evaluation.

Method

The project studied 25 patients who underwent a complete analysis including Placido disk-based corneal topography (Pathfinder II Corneal Analysis Software) and anterior segment OCT (Visante), focusing on the posterior corneal surface and the relative pachymetry map, measuring the percentage of thickness in the thinnest point of the cornea compared with the Visante database (which considers >3% as normal). Three groups were included: seven patients with seven eyes with normal Placido disk-based corneal topography, with a known ectasia in the other eye (group A), nine patients with bilateral ectatic corneas (group B) and nine patients with unknown ocular pathology with normal Placido disk-based topography (group C).

Statistical analysis was performed using Centurion XVI (Staphgraphics). Normality of data was confirmed using the Kolmogorov-Smirnov test. A p value of less than 0.05 was considered an indication of statistical significance.

Results

The relative corneal pachymetry decrease was 9.2% (+/- 2.22%) in group A, 16.6% (+/- 8.8 %) in group B and 1.44% (+/- 3.0 %) in group C. These differences were statistically significant.

Conclusion

If unilateral corneal ectasia is present, relative pachymetry mapping could be a good screening test to detect forme fruste ectasia in a presumed normal eye without pathologic findings in the anterior and posterior surface elevation maps.



COMPREHENSIVE TOPOGRAPHY REPORT

Name: ID:

OS CZM

Visante OCT Exam: ATLAS Exam:

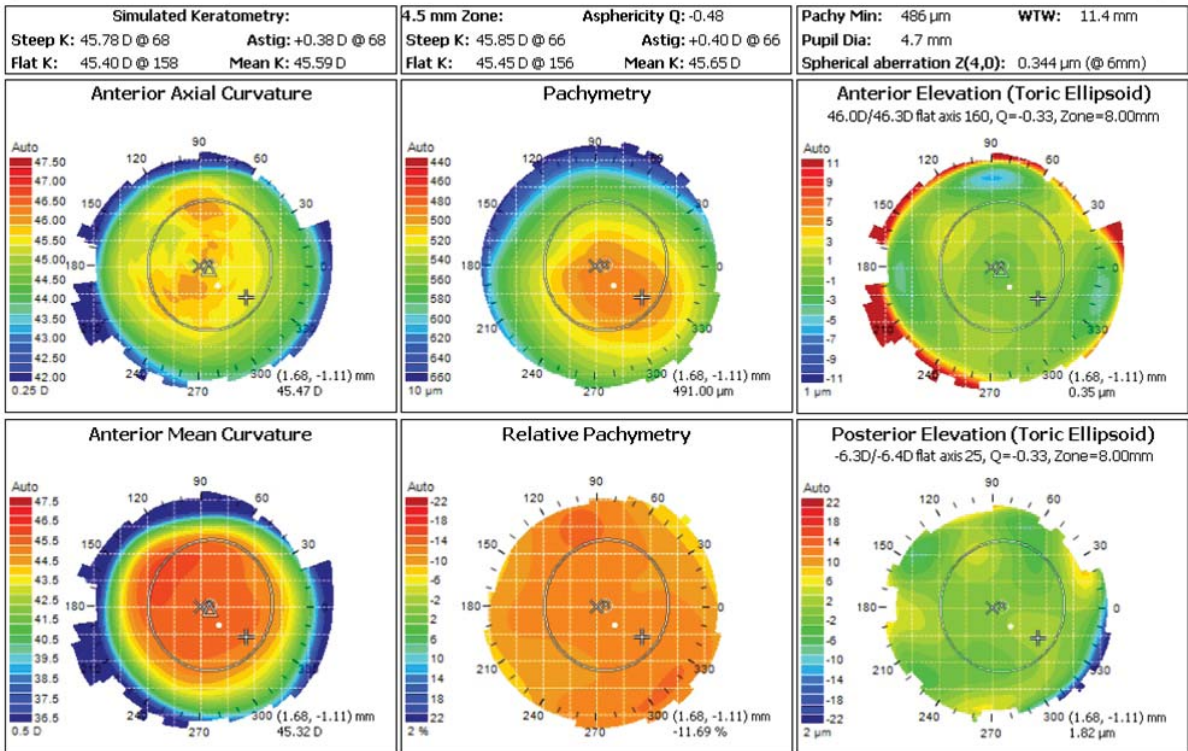


Figure 1: Group A



COMPREHENSIVE TOPOGRAPHY REPORT

Name: ID:

OD CZM

Visante OCT Exam: ATLAS Exam:

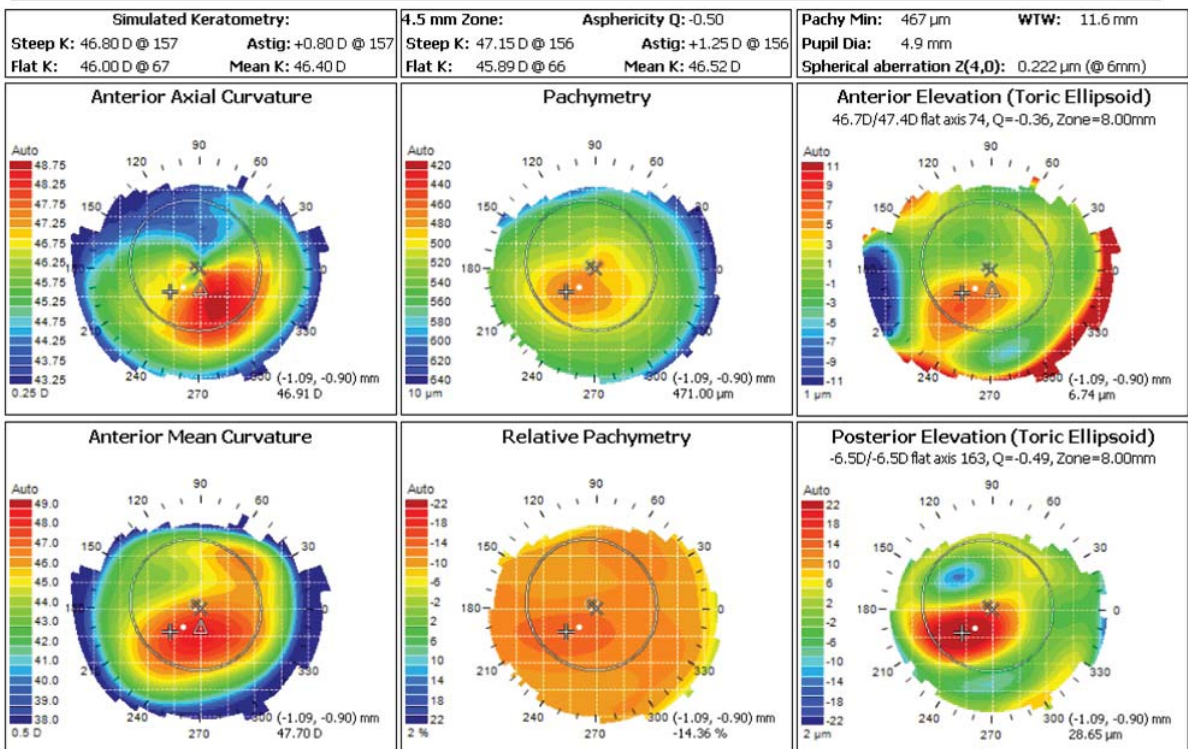


Figure 2: Group B

Detection of retinal nerve fibre layer degeneration in Parkinson's disease patients using Fourier domain OCT

Lead author: María Satué
Department of Ophthalmology, Hospital Universitario Miguel Servet, Zaragoza, Spain

Purpose

To evaluate the ability of Fourier domain optical coherence tomography (OCT) to detect RNFL degeneration and retinal thinning in Parkinson's disease patients.

Material and methods: PD patients (n=92) and healthy subjects (n=92) were included and underwent visual acuity and colour vision testing, and OCT using two last generation Fourier domain devices (Spectralis and Cirrus). Differences of retinal nerve fibre layer (RNFL) thicknesses were compared between patients and controls.

Results

RNFL parameters showed significant reduction in patients compared with healthy subjects, especially using Spectralis OCT, in the superior (122.81 μm in healthy eyes vs 117.18 in patients, $p=0.026$), in the inferior (133.38 μm vs 124.14 μm , $p=0.001$), the superonasal (109.07 μm vs 102.68 μm , $p=0.039$), inferonasal (116.27 μm vs 107.90 μm , $p=0.027$) and in the inferotemporal quadrant (150.76 μm in healthy eyes vs 140.69 μm in PD patients, $p=0.02$). Average thickness also showed significant differences (101,91 μm vs 96.97 μm , $p=0.07$). Macular thickness showed significant differences between controls and patients, in foveal thickness ($p=0.028$ measured with Cirrus OCT), superior inner thickness ($p=0.049$ and $p=0.023$ measured with Cirrus and Spectralis OCT respectively), nasal inner thickness ($p=0.043$), temporal inner thickness ($p=0.012$), superior outer thickness ($p=0.049$), nasal outer thickness ($p=0.036$ and $p=0.038$), inferior outer thickness ($p=0.050$) and temporal outer thickness ($p=0.031$).

Conclusion

Parkinson's disease causes RNFL and retinal thinning detectable by Fourier domain OCT measures.

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Detection of retinal nerve fibre layer degeneration in Parkinson's disease patients using Fourier domain OCT

Figure 1:
Cirrus

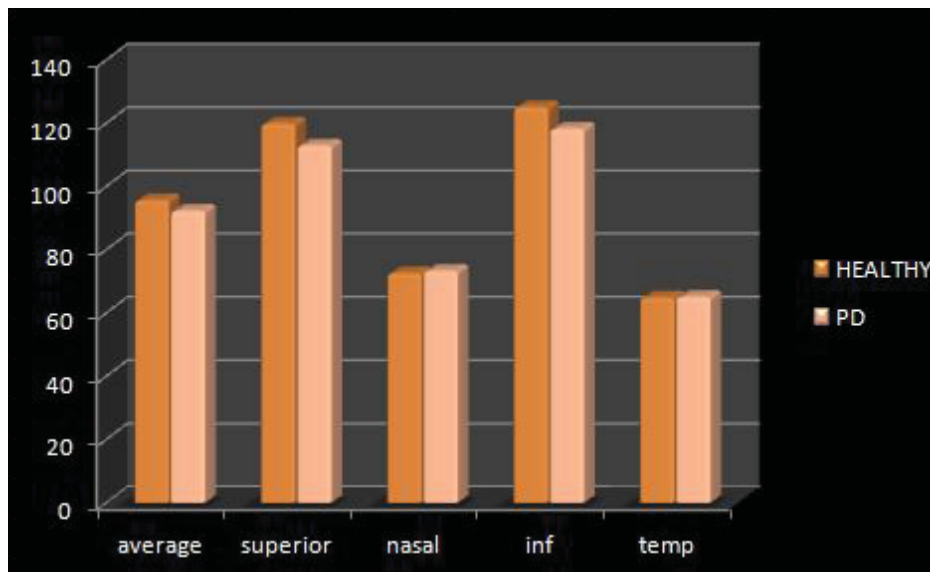


Figure 2:
Cirrus macular

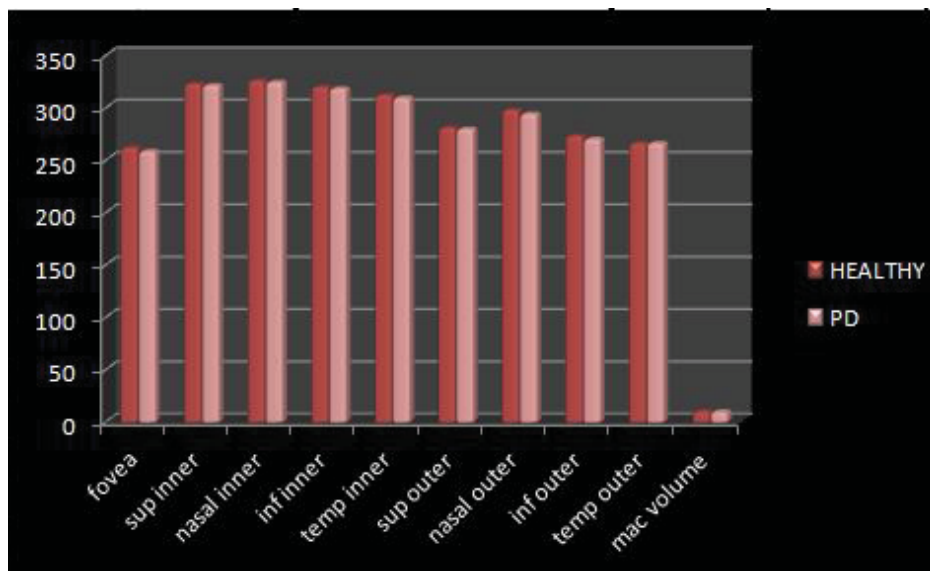
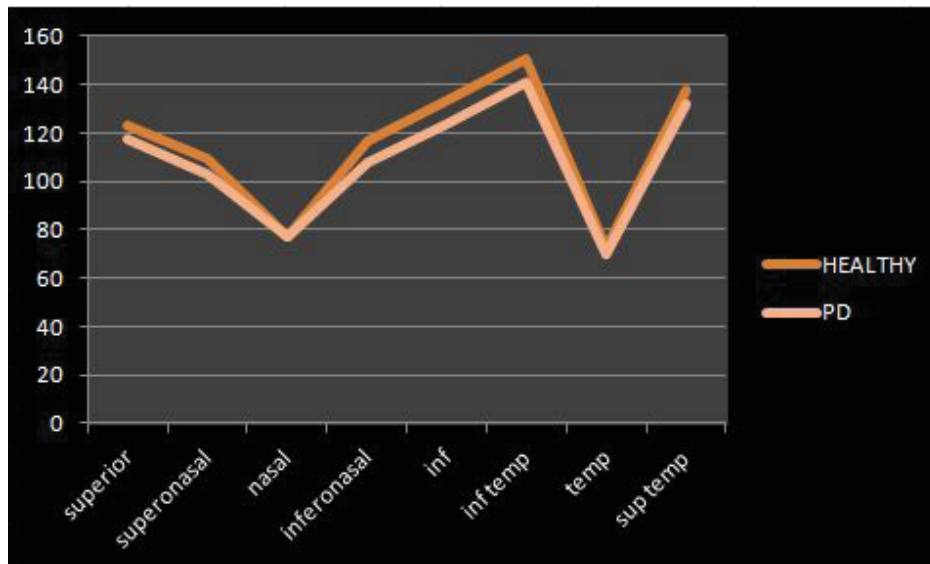


Figure 3:
Spectralis NO



Intrastromal corneal ring segment implantation in paracentral keratoconus with coincident topographic and coma axis

Lead author: Ignacio Serrano Peláez¹

Co-authors: José F. Alfonso^{2,3}, Aranzazu Poo-López¹

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²Cornea, Crystalline and Refractive Surgery Department, Fernández-Vega Ophthalmological Institute, Oviedo, Spain

³Ophthalmological Department, School of Medicine, Oviedo University, Spain

Purpose

To evaluate the efficacy, predictability and safety of the implantation of Ferrara type intrastromal corneal ring segments (ICRS) for refractive correction of paracentral keratoconus. We will present the explorations and suitable measures to facilitate the scheduling of surgery.

Method

This was a prospective study. The inclusion criteria was that the Keratoconus had to be stage I or II according to the Amsler-Krumeich Keratoconus classification. The lowest thickness point of the cornea was 1.0 to 2.0mm from the pupil centre. Snellen uncorrected (UDVA) and corrected (CDVA) distance visual acuities and residual refractive errors were recorded before and six months after ICRS implantation for keratoconus. With higher-order corneal aberrations, and topographic maps, we obtained the flattest axis of the cornea, and the axis of the coma, both with the lowest thickness corneal point facilitated by the anterior segment optical coherence tomography (OCT), which allowed us to phenotype keratoconus. The thickness and the arc of the segment were based on the amount of corneal astigmatism and the relationship between the corneal axis and coma axis. The implantation axis of the ICRS was coincident with the flat topographic axis. The lowest thickness point of the cornea remains between pupil and ICRS. The surgical technique is performed with one or two asymmetric ICRS. The power vector and the Alpíns method were used to analyse postoperative refractive outcomes.

Results

The study evaluated 56 eyes of 49 patients. No intraoperative or postoperative complications occurred. The mean UDVA was 0.17 ± 0.14 (SD) preoperatively and 0.41 ± 0.28 post operatively, the mean CDVA, 0.70 ± 0.18 before, and 0.80 ± 0.17 after surgery (both $<.0001$). The spherical equivalent and astigmatism were significantly lower postoperatively than preoperatively ($p<0.01$).

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Intrastromal corneal ring segment implantation in paracentral keratoconus with coincident topographic and coma axis

Conclusion

The findings of flatter topographic axis, the axis of coma, and thinnest corneal point allowed the surgical treatment for paracentral keratoconus to be scheduled and standardised where coma axis and flattest corneal meridian coincided in patients with moderate to severe keratoconus. In these cases, treatment with this type of ICRS provides good visual and refractive outcomes, indicating that it is a predictable and safe procedure.

Influence of prenatal factors in retinal development

Lead author: Irene Altemir
Miguel Servet Hospital, Zaragoza, Spain

Purpose

To establish normal reference ranges of optical coherence tomography measurements in children for retinal values and to evaluate the effects of late onset growth restriction and late prematurity on neuronal and cognitive development at school age.

Material

A total of 354 children were included in the study (ages ranging from six to 12). All of them underwent a complete visual examination that included: visual acuity (logMAR), stereopsis (TNO), ocular motility evaluation and optical coherence tomography (OCT Cirrus, Zeiss Meditec) centred on the optic nerve and macula. In a subgroup of 112 children neurocognitive assessment was also performed by Bender test. Perinatal data were obtained through a survey of 29-items. Children born over 34 weeks of gestation were analysed. Late preterm infants were defined as birth gestational age between 34 and 36 weeks and small for gestational age (SGA) as children with a birth weight below the 10th percentile for gestational age and sex. The sample was divided into three groups: late preterm, SGA and controls. The study compared the values of retinal nerve fibre layer (RNFL) and macular thickness and Bender test results between the groups.

Results

The mean age was (SD) 9.17 years (0.17). The mean (SD) average RNFL thickness and macular thickness was respectively 98.50 (10.73) μm and 238 (10) μm . The mean visual acuity and stereopsis was -0.02 ± 0.01 and 75.71 ± 67.30 respectively. We found 41 (11.7%) children born SGA and 25 (7.1%) preterm infants. Five children had a history of SGA and late preterm. Children born SGA compared with controls had lower average RNFL thickness (94.1 vs 98.7 μm , $p = 0.007$), decreased macular thickness (277.9 vs 283.3 μm , $p = 0.006$) and higher prevalence of pathological Test Bender (30% vs 6.4%, $p = 0.010$). No differences were found for RNFL thickness, macular thickness and cognitive abilities between late preterm and controls.

Conclusion

This study reports normative values of RNFL thickness and macular thickness in a community population of children. RNFL and macular thickness are significantly decreased in late SGA infants. Axonal loss in the optic nerve of these children shows a neurological damage, which is a surrogate marker of subclinical injury of the central nervous system.

The rate of abnormal Bender test scores is much higher in late SGA children. Axonal loss and impaired development of the cognitive executive functions seem to be associated with late growth restriction but not with late prematurity.

Ability of retinal nerve fibre layer measurements as biomarker of axonal damage in Alzheimer's patients

Lead author: Maria P Bambo

Co-authors: Sofia Otin, Elena Garcia-Martin, Raquel Herrero, Maria Satue Miguel Servet University Hospital, Zaragoza, Spain

Purpose

To evaluate the ability of retinal nerve fibre layer (RNFL) measurements as biomarker of axonal damage in patients with Alzheimer's disease compared with healthy subjects using Fourier domain optical coherence tomography (OCT).

Method

The study included prospectively and randomly 35 patients with Alzheimer's disease at different levels of severity (Mini-Mental State Examination of 15.45 ± 3.53) and 35 healthy subjects matched for age and sex. All patients with ophthalmic or systemic disease that could affect the parameters were excluded. All participants underwent a complete neuro-ophthalmological examination, including best corrected visual acuity, intraocular pressure and funduscopy. We acquired a scan of the optic nerve in both eyes with de Optic Disc Cube 200×200 application of Cirrus HD-OCT (Carl Zeiss Meditec, Inc., Dublin, CA). The study randomly selected one eye of each patient and excluded acquisitions that did not meet quality criteria provided by the device. The results between healthy and patient groups were compared using T-Student test.

Results

The mean age of the Alzheimer's patients was 73.08 ± 4.69 years and 74.88 ± 8.33 years for controls. We observed RNFL thinning in the group of Alzheimer's patients (mean value of $87.06 \pm 9.51 \mu\text{m}$) compared with the control group ($97.09 \pm 11.06 \mu\text{m}$) and the differences were statistically significant in the RNFL average thickness and in the superior, inferior and temporal quadrants ($p < 0.005$ respectively).

Conclusion

We found a thinning of the optic nerve RNFL in patients with Alzheimer's disease compared with healthy subjects with a similar age using Cirrus HD-OCT. RNFL measurements may be a useful biomarker to detect axonal damage in Alzheimer's disease.

Matching the visual needs of an urban school district and the needs of an optometric educational programme

Lead author: Sandra S. Block

Co-authors: Valarie Conrad, Melissa Suckow, Kathleen O'Leary
Illinois College of Optometry, Chicago, IL, USA

Purpose

The Illinois College of Optometry in partnership with the Chicago Public Schools opened a school-based vision programme to address the unmet need of vision care for their children. Each year, over 100,000 children in the Chicago Public Schools (CPS) fail vision screenings, have broken/lost glasses, or fail to complete a required exam for entry to school. Lack of follow up and limited access to providers accepting state insurance contribute to poor access to eye care. In addition, the Illinois College of Optometry was interested in optometric clinicians working in community based settings.

Method

The Illinois Eye Institute at Princeton School opened in January 2011 as a year round vision clinic staffed by faculty, students, staff and opticians from Illinois College of Optometry. The building is an empty elementary school which has wheelchair access. Financial support comes from state insurance along with grant support. More than 10,000 children have received eye care from January 2011 through to November 2012. A majority of the patients are brought to the clinic with their schools. The schools that are targeted identified their students as 90% or higher falling below the federal poverty level. The eye clinic is also open to children brought by their parents as walk ins. Every third year optometry students rotate through the clinic for one session per week for 11 weeks and a number of fourth year students return for a second session.

Results

A review of the data for care delivered shows that 74% of children seen need new eyeglasses. The clinic has also diagnosed amblyopia, convergence insufficiency and strabismus in numbers that exceed that expected for the general population. The recommendations for follow up of these problems show less than 20% of the children access appropriate services. Recently, appointments for vision therapy have been offered in the afternoons, with limited numbers of patients accessing this service. A Chicago Health Corp member (AmeriCorp) was appointed to address the need for follow up services. Challenges to success have included students moving between schools and parents not receiving the recommendation for follow up or understanding the recommendations previously received.

Conclusion

This presentation will describe lessons learned in the first two years including the strengths of the programme along with the challenges that have been encountered and what our next steps will be to address the eye care needs of children in Chicago.

Diagnosis of Parkinson's disease using only retinal thickness measurements provided by optical coherence tomography

Lead author: Elena Garcia-Martin

Co-authors: Satue M, Fuertes I, Otin S, Bambo MP, Herrero R, Alarcia R, Roche JC, Seral M, Pablo L. Miguel Servet University Hospital, Zaragoza, Spain

Purpose

To test the diagnostic ability of spectral domain optical coherence tomography (OCT) measurements for the detection of Parkinson's disease (PD) using retinal nerve fibre layer (RNFL) and retinal thickness parameters. Retinal thickness depends in part on the retinal pigment epithelium, one of the principal tissues producing levodopa.

Method

PD patients (n = 111) and healthy subjects (n = 200) were enrolled in this observational cross-sectional study. The Axonal application of the Spectralis OCT system (Heidelberg Engineering) was used to obtain the circumpapillary RNFL thickness and retinal measurements in both eyes of each participant. Two linear discriminant functions (LDF) were developed, one using RNFL parameters and another LDF using retinal thickness. A validating set (120 eyes from healthy individuals and 66 eyes from PD patients) was used to test the performance of both LDFs in an independent population. Receiver operating characteristic (ROC) curves were plotted and compared between both LDFs and with the standard parameters provided by OCT. Sensitivity and specificity were used to evaluate diagnostic performance.

Results

The Retinal LDF combines only retinal parameters and provided the best performance: $31.173 + 0.026 \times \text{Temporal Outer thickness} - 0.267 \times \text{Superior Outer thickness} + 0.159 \times \text{Nasal Outer thickness} - 0.197 \times \text{Inferior Outer thickness} - 0.060 \times \text{Superior Inner thickness} + 0.049 \times \text{Foveal thickness}$. The largest areas under the ROC curve were 0.902 for Retinal LDF and 0.845 for RNFL LDF. At 95% fixed specificity, the Retinal LDF yielded the highest sensitivity values.

Conclusion

Measurements of retinal thickness obtained with Spectralis OCT had a very good ability to differentiate between healthy and PD individuals. Based on the area under the ROC curve, the Retinal LDF performed better than any single parameter or diagnostic test used for PD.

Figure 1

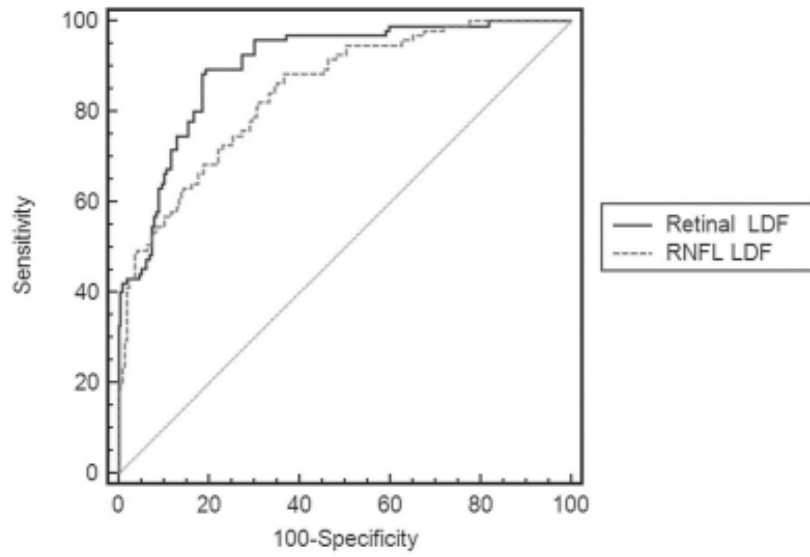


Figure 2

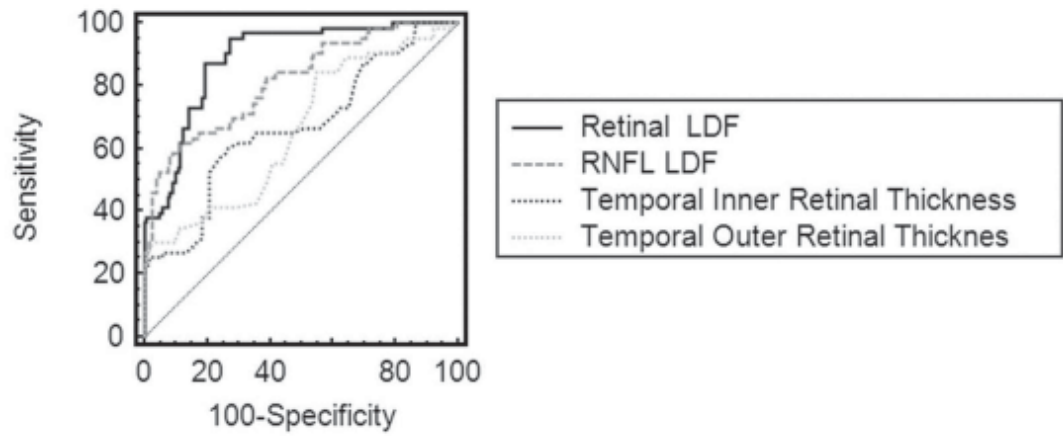
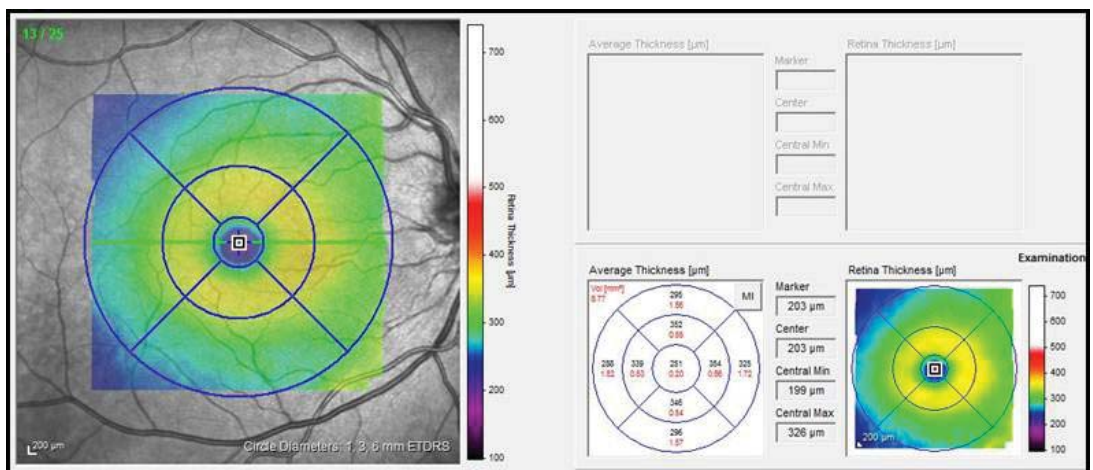


Figure 3



Measurement of the variation in the ganglion cell layer and nerve fibre layer of the retina in the aging process

Lead author: Amparo Gil-Casas¹

Co-authors: Francisco Sañudo-Buitrago^{1,2}, Ainhoa Molina-Martín¹, José M^a Gómez-Sánchez^{1,2}, Esteban Porcar Izquierdo²
¹Unitat d'Optometria- Fundació Lluís Alcanyís, Universitat de València, Valencia, Spain
²Departamento de Óptica, Universitat de València, Valencia, Spain

Purpose

To quantify the effect of aging in the ganglion cell layer with the plexiform layer (IPL + CGR), the nerve fibre layer of the retina (RNFL) and the total density of these (RGC + IPL + RNFL), and to establish a relationship in age-related losses.

Method

Data on the density of the different layers to be analysed (RGC + IPL, RNFL) were obtained by Topcon OCT 2000, using Glaucoma Test Analysis (macula). The data was classified according to age, so that the variation which occurs in non-pathological aging can be established. It was further classified based on the position according to four quadrants: superior-nasal, superior-temporal, inferior nasal and temporal lower.

Results

The results show a variability of the ganglion cell layer + IPL with age. This does not happen in the RNFL, which over the decades remains with no significant changes in all quadrants studied.

The lower-nasal quadrant shows the greatest changes over the GCC presents + IPL, and the least in the RNFL. The superior-temporal quadrant shows less variability in the CG + IPL, showing the highest variation in the CFNR.

Conclusion

In the process of aging a loss of ganglion cells takes place, which is measurable and can thus make a distinction between physiological loss caused by aging or by some pathology.

Obviously, if the somas of ganglion cells decrease with age, this also affects their axons (representative in RNFL). But the data shows that these losses are not quantifiable with OCT, because differentiation using this instrument includes neurological material. This has been demonstrated in several studies: this material increases when decreasing the axons of the ganglion cells, the density remained a constant RNFL with the passing of years.

Therefore, the IPL + GC analysis will provide information on whether the loss of neurological material (ganglion cells) is physiological or pathological, but not in the macula RNFL analysis.

Can optical coherence tomography be a marker of efficacy of multiple sclerosis treatments in reduction of axonal degeneration?

Lead author: Raquel Herrero
Miguel Servet Hospital, Zaragoza, Spain

Purpose

To compare changes in the retinal nerve fibre layer (RNFL) of patients with multiple sclerosis (MS) between patients who have been treated and untreated for a period of years years follow-up.

Method

116 eyes of 116 MS patients were followed-up over five years. All patients underwent a complete ophthalmic examination that included assessment of visual acuity (Snellen chart), colour vision (Ishihara pseudoisochromatic plates), visual field examination, optical coherence tomography (OCT) and visual evoked potentials (VEP). Patients were divided into two groups: subjects who received pathogenic treatment and subjects without treatment. Changes in RNFL between both groups after five years were analysed.

Results

There was a reduction of RNFL thickness in both patient groups. We found statistically significant differences (t test, $p \leq 0.05$) between the two groups in the change in inferior quadrant thickness of RNFL with a greater loss in the treated group (-14.1 microns) compared to the untreated group (-3.11 microns).

Conclusion

The analysis of RNFL in OCT can be useful to evaluate efficacy of treatments in reduction of axonal degeneration. The greatest loss of RNFL in the treatment group was in the more severe patients, with more outbreaks or worse evolution. More studies are needed with comparable groups between treated and untreated to verify these results.

Vision screenings versus comprehensive eye examinations for children

Lead author: Timothy A. Wingert¹

Co-author: W. Howard McAlister²

¹Rosenberg School of Optometry, University of the Incarnate Word, San Antonio, Texas, USA

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Introduction

Approximately 15-20% of children entering school have a vision problem. Only 14% of children have had a comprehensive eye examination before entering school. Vision screenings are designed to detect vision problems but in attempting to be efficient often miss vision problems that exist. It is difficult for parents of children entering school to understand the difference between a simple vision screening, performed in a few minutes by a nurse or lay assistant, and a comprehensive eye examination. To address this issue and ensure that children entering school in Missouri were visually ready to learn, Senate Bill 16 was enacted four years ago. This law formed the Missouri Children's Vision Commission and required children entering public school in Missouri to have a comprehensive eye examination prior to December 31 of their first year in school and a school administered vision screening in first and third grade.

For the past four years, Missouri children entering school were required to have an eye examination performed by an optometrist or physician by December 31 of their first year in school unless the parents sign a waiver asking to 'opt out' of this requirement. The goal of this policy is to ensure that no child has a visual condition that will interfere with classroom performance. By making sure that all children are ready to learn, resources allocated for education will be better spent and should improve the educational outcomes.

Method

Data was analysed for three full years comparing the reported results of vision screenings performed by school nurses with the results of eye examinations performed by an optometrist or ophthalmologist. The referral rate from the vision screenings was compared to the treatment rate of the comprehensive eye examinations.

Results

Approximately 60,000 children enter school each year in Missouri. Approximately 37% of these children had the comprehensive eye examination. Of those children obtaining a comprehensive eye examination, slightly more than 20% received treatment. Vision screenings were performed on every child in first and third grade during this same time period. The vision screenings had a referral rate of approximately 8%.

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Vision screenings versus comprehensive eye examinations for children

Conclusion

The difference in the prevalence of children needing treatment and those failing a vision screening is a cause of concern. While numerous studies indicate the prevalence of vision problems to be in agreement with the percentage receiving treatment after comprehensive eye examinations, vision screenings detected a prevalence of problems of approximately 40% of that. This implies that many children with vision problems are being missed by vision screenings and may have their school performance affected.

The Scope of Practice questionnaire: understanding how optometry and optics are developing in the world

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Purpose

The World Council of Optometry (WCO) and the Norwegian Association of Optometry have collaborated since 2008 in the implementation of the global online Scope of Practice (SoP) questionnaire. The SoP aims to help illustrate the evolving field of activities of optometry and optics, its growing importance in the delivery of public health and its role in the improvement of eye health and vision care across the world. It highlights the varied scope of practice of optometrists and opticians resulting from the extent of available training, the law, the organisation of the profession, and the dynamics between ophthalmology and optometry specific to each country. The survey is also an important tool to identify gaps considered when preparing national and/or regional strategies to develop optometry. At the global level the SoP enables WCO to influence decisions.

Method

The SoP developed as an interactive and online tool to enable WCO members, its partners and other interested organisations to update information on the development of optometry and optics in their countries. The SoP is regularly updated with relevant questions that result from the developments of and/or challenges faced by the sector. To ensure continuity there is one contact person in each country who is responsible for completing and submitting the questionnaire, in consultation with any other members in this country.

Results

The poster will highlight the following results to date:

- number and diversity of countries that filled in the SoP
- general trends identified from the information gathered
- key challenges identified in the scope of practice around what is permitted, what is prohibited and what is practised
- important developments in the evolution of the training and education of the profession.

Conclusion

The completion of the SoP in as many countries of the world as possible will support the recognition of the role of optometry within the public health sector and strengthen the understanding of the role of the profession in the delivery of basic eye health and vision care.

Electronic speckle pattern interferometry (ESPI) technique for corneal biomechanical properties

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Purpose

Biomechanical properties of the cornea can affect visual capabilities, hence the importance of developing adequate techniques for their characterisation.

Over the past two decades a multitude of techniques have been developed in corneal refractive surgery. In these the corneal structure is considered stable and moldable. However, the cornea has viscoelastic properties, and therefore simple estimations about the response mechanism to any invasive technique cannot be performed. In this way, measuring the biomechanical properties of the cornea in vivo could be very useful, in order to predict the possible consequences of a surgery.

Method

This work studies the possibility of the use of electronic speckle pattern interferometry (ESPI) technique to measure the biomechanical behavior of the cornea, in vivo.

Many authors have tried to measure the elastic properties of the cornea using the speckle interferometry. However, most of the scientific studies have been carried out using in vitro modeling. This work has been developed taking as reference the scientific studies developed.

In the study different factors were considered in order to analyse the use of the ESPI technique: medium stability, test environment, characteristics of the test specimen. Different tests were carried out in the laboratory in order to assess the validation of the method.

Results

The most relevant results obtained were:

- speckle interferometry is extremely sensitive to any disturbance or vibrations. This necessarily has a relatively long path separation. A phase decorrelation can occur in this process and as a consequence it is difficult to apply the test
- speckle pattern interferometry requires surfaces, to reflect light, and cornea surface is highly transparent. As a consequence, there may be signal intensity problems.
- in addition, speckle pattern is generated by rough surfaces, whereas cornea surfaces are smooth. So it would be necessary to apply a technique to obtain an adequate specimen surface. Therefore this method could not be classified as noncontact or noninvasive.

Conclusion

As a result, and given that speckle interferometry could be useful to evaluating the biomechanical properties of the cornea and monitoring the potential changes in them, the research team is now working on the possibility of implementing different alternatives in the technique, starting with two research lines: the evaluation of the use of a signal amplifier in order to obtain a reflected beam from the cornea with suitable intensity and the use of indirect interference patron.

The Radner reading charts for assessing near vision function

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Purpose

As visual acuity tests are poor predictors of real-world function, performance-based tests, e.g., reading speed measurements, can be used for the determination of near visual function. The characteristics of a good reading chart are: logarithmically diminishing print size, simultaneous measurement of reading acuity and reading speed, and the calculation of one score for reading acuity corrected for the number of reading errors. The original German-language Radner reading chart meets all these requirements, and above all emphasizes the principle of 'sentence optotypes' i.e. highly standardised sentences, because sentence complexity also influences reading performance. The aim of this work was to create the Italian version of the Radner reading chart according to Radner's strict principles.

Method

To develop 28 short Italian optotype sentences for the construction of a test based on the Radner reading test, 41 sentences were constructed in Italian, following the procedure defined by Radner, to obtain sentence optotypes with comparable structure and the same lexical and grammatical difficulty. Sentences were statistically selected and standardised in 211 normal non-presbyopic subjects. The most equally matched sentence optotypes in terms of reading speed and number of reading errors were selected for the introduction and printing of the first Italian version of the Radner reading chart.

Results

The overall mean reading speed of the tested persons was 189 +/- 26 w/min. The 28 sentences most similar in reading time were selected, achieving a coefficient of variation (the relative SD) of 2.2%. The reliability analyses yielded an overall Cronbach's alpha coefficient of 0.98. The reading speed results obtained with the 28 selected short sentences were also compared with the average of two long 4th-grade paragraphs (97 and 90 words) under the same conditions. The correlation between the short sentences and the long paragraph was high ($r= 0.85$, $P<0.0001$).

Conclusion

The Radner reading chart is a highly standardised multilingual reading test system that was recently developed for clinical practice and research. During the past few years it has become an international project; together with several universities we have developed an international and interdisciplinary cooperation with psychologists, linguists, statisticians, optometrists and ophthalmologists.

The result of the collaboration is a standardised, valid and reliable reading test system, available in numerous languages, which we hope will act as an internationally comparable reading chart standard. There is now a German, English, Dutch, Swedish, Spanish, Hungarian and Italian version available. French, Turkish and Portuguese versions are under development. The Radner reading charts are precise (high consistency) and practical (short sentences) and therefore useful for research and clinical practice to simultaneously measure near reading acuity and reading speed. They could be particularly useful, when evaluating the performance of a near vision correction, because reading acuity as well as reading speed are good predictors of everyday visual function.

The evaluation of colour vision anomalies: a (s)light discrepancy

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Purpose

The main purpose of the present study was to determine the influence of the type of illumination on the outcome of two commonly employed colour vision diagnostic tests (Ishihara Plates and the Farnsworth Munsell Dichotomous D-15 test).

Method

A total of 109 subjects (57 men and 52 women, with ages ranging from 28 to 87 years) participated in the study. Four tests were used to evaluate colour vision under illuminant D65 (daylight) and illuminant A (incandescent bulb): Ishihara Plates, the Farnsworth Munsell Dichotomous D-15 test, Nagel's Anomaloscope and the Lanthony's Tritan Album. In addition, a PR-715 SpectraScan SpectraRadiometer (Photo Research Inc., Chatsworth, CA, USA) was employed to conduct colourimetric analysis of several Ishihara plates and Farnsworth Munsell colour caps. All colourimetric analyses were performed in a VeriVide Colour Assessment Cabinet (VeriVide Ltd., Enderby, UK) and under light sources D65 and A.

Results

Colour vision testing identified 10 subjects (11%, all male) with colour vision deficiencies (nine deuteranomalous and one tritanomalous). Changing the characteristics of the illuminant under which colour vision was evaluated resulted in significant differences in the classification of colour anomalies, particularly with the Farnsworth Munsell D-15 test. Indeed, six out of nine deuteranomalous subjects were incorrectly classified as protanomalous when this test was conducted under illuminant D65, whereas the tritanomaly was not found to be sensitive to the type of illuminant. These findings were in agreement with the results of the colourimetric analysis.

Conclusion

Published recommendations exist regarding the need to conduct all colour vision tests under particular illumination conditions. These findings give support to the dependence of colour vision testing on the type of illuminant under which it is evaluated.

Evaluation of anatomical changes and functional results after circular scleral indentation surgery

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Aim

Assess anatomical and functional changes after scleral indentation surgery in patients with rhegmatogenous retinal detachment.

Method

Retrospective study of 53 patients undergoing scleral indentation surgery after being diagnosed of primary rhegmatogenous retinal detachment and unilateral. After surgery the visual acuity with best correction, axial length and corneal curvature were evaluated. The evolution of the detachment and the macular affection were taken into account.

Results

There were significant differences ($p < 0.05$) between the preoperative axial length (24.30 ± 1.10 mm) and postoperative (25.07 ± 1.21 mm) and a myopic refractive change trend ($-1, 53 \pm 0.87$ D). In contrast, no significant changes were seen in the cylindrical component (-0.13 ± 0.56 D). There were significant differences ($p < 0.05$) in the improvement in visual acuity between the group of patients with macula respected (0.14 ± 0.12) and the group of patients with macula detached (0.39 ± 0.26). Patients with an evolution of the detachment ≤ 7 days had better visual results (0.27 ± 0.23) than those with a higher evolution time (0.44 ± 0.28) but no significant differences were found between the two groups ($p > 0.05$).

Conclusion

The scleral indentation surgery induces anatomical changes of the eyeball and refractive changes. Understanding these modifications can allow for the quantification of the elongation of the globe and the induced refractive change. The improvement of visual acuity is unpredictable with the factors studied since it does not only depend on the anatomic success of the surgery; it also depends on the evolution time and whether the macular was affected, among other factors.

Accuracy of time domain and spectral domain OCT in preperimetric and early open angle glaucoma detection

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³Glaucoma Unit IOBA-Eye Institute, University of Valladolid, Valladolid, Spain

Purpose

To evaluate the accuracy of time domain and spectral domain optical coherence tomography (OCT) technologies detecting preperimetric and early open angle glaucoma, and to determine the agreement between structural and functional damage in earlier stages of the disease.

Patients and Method

100 eyes of 54 subjects were included in the study. All subjects underwent an ophthalmological examination including the evaluation of retinal nerve fibre layer (RNFL) with Stratus OCT ('Fast RNFL thickness 3.4' programme), with 3D OCT ('3D disc' programme) and visual field with frequency doubling technology (FDT) perimetry ('N-30-F' programme). Differences and correlation between measurements of both OCT were calculated. Results of both OCT were also correlated with FDT perimetry results.

Results

Significant differences in RNFL thickness measurements among all groups were found only in superior quadrant: between healthy and early glaucoma group ($p < 0.01$ in Stratus OCT and $p = 0.01$ in 3D OCT), between preperimetric and early glaucoma ($p = 0.01$ in Stratus OCT and $p = 0.04$ in 3D OCT), and between healthy and preperimetric glaucoma group ($p = 0.02$ in Stratus OCT). Significant differences between measurements of both OCT ($p = 0.00$ in temporal and nasal quadrants) and poor correlation (Pearson's correlation: 0.61, 0.52, 0.65 and 0.73 in temporal, superior, nasal and inferior quadrants) were found. Correlation with results of FDT perimetry was higher with Stratus OCT (Pearson's correlation=0.24) than with 3D OCT (Pearson's correlation=0.13).

Conclusion

Stratus OCT and 3D OCT are not interchangeable tools in detecting preperimetric and early glaucoma. Moreover, Stratus OCT has better agreement with FDT perimetry than 3D OCT. The results of this study suggest that OCT is not enough in the early detection of glaucoma.

Estimated temporal trends in global blindness and visual impairment age standardised prevalence (1990-2010)

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(While this author is a staff member of the World Health
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expressed in this publication and they do not necessarily represent
the decisions, policy, or views of the World Health Organization.)

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⁵A list of all members of the Vision Loss Expert Group may be
found at: www.anglia.ac.uk/ruskin/en/home/microsites/veru/other_research_areas/global_burden_of_diseases.html

Purpose

To describe the estimated trends in magnitude and gender disparities in the prevalence of blindness and severe/moderate visual impairment (SMVI) in Latin America as part of the Global Burden of Disease, Injury and Risk Factors Study 2010.

Method

A systematic review of the published literature from 1980-2012 on the incidence and prevalence of blindness and visual impairment from nationally representative studies and rapid assessment studies informed a database of crude, age-standardised and gender-specific estimates on the global prevalence of vision loss by region and country.

Results

Results to be presented shall include the age-standardised prevalence of all ages and those over age 50 for the Caribbean, North American and Latin American regions as they have changed over time.

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Estimates of temporal trends in the magnitude of blindness and visual impairment in the Americas from the Global Burden of Disease, Risk Factors and Injuries Study 2010 from 1990 to 2010

Conclusion

While trends show a decrease in prevalence in both visual impairment and blindness in the region, many country-years remain without data and therefore are only estimates. Gender disparities exist. The demographic transition of increasing absolute population numbers of the older generation, coupled with the increase in vision loss associated with age will require further intervention to continue a decline in prevalence.

Comparing distance word acuity in the font and colour of UK road signs to the Landolt C optotype

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Co-authors: Keziah Latham, Thomas Sharp, Maria Katsou
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Purpose

Good visual acuity for driving is necessary for hazard avoidance and for decision making based on the resolution of text and figures on directional signs. A European Union Directive 2006/126/EC on driving licences specifies a binocular visual acuity of 0.5 decimal (0.3 logMAR or 6/12 Snellen) as a requirement to hold a group 1 driving licence in Europe. This standard would typically be tested with Landolt C or letter optotypes. In the UK, directional road signs are destination-oriented, meaning that a place name or other instruction appears first before any symbols indicating the route name. Place names are written in lower-case in a font designed for the UK Highways Agency in the 1960s. Word recognition is a different visual task from identifying isolated upper-case letters as word shape plays a role in legibility. The equivalence of word and letter acuity for far vision is unknown, although logMAR scaled word charts such as MNRead exist for near vision.

Method

A word based chart was designed for use at six metres to allow comparison to standard optotype acuity measurements. Short sentences in lower case were taken from the MNRead chart 1 in the range 0.50 to -0.30 logMAR. These phrases were reproduced on slides in 'Transport Medium' font which is used on UK road signs. The words were in white with a background of 'Middle Blue' (BS 381C-109) and produced in reverse for display at six metres via a mirror. This colour combination is used on motorway signs and local signs for pedestrians and cyclists (Figure 1). Participants read each phrase out loud and time to read and errors were noted. Word acuity was scored to the nearest 0.01 logMAR with each word correctly read scored at 0.01 and critical print size and reading speed were also determined. Optotype acuity was also measured using Landolt C optotypes presented in logMAR format with five optotypes per line scored on a letter by letter basis. Participants read each chart binocularly, first uncorrected then with habitual correction if worn for driving. Systematic bias and limits of agreement were determined between the word and Landolt C acuity.

Results and conclusion

The relationship between distance word and optotype recognition will be discussed and compared to the EU vision standard for driving.

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Comparing distance word acuity in the font and colour of UK road signs to the Landolt C optotype

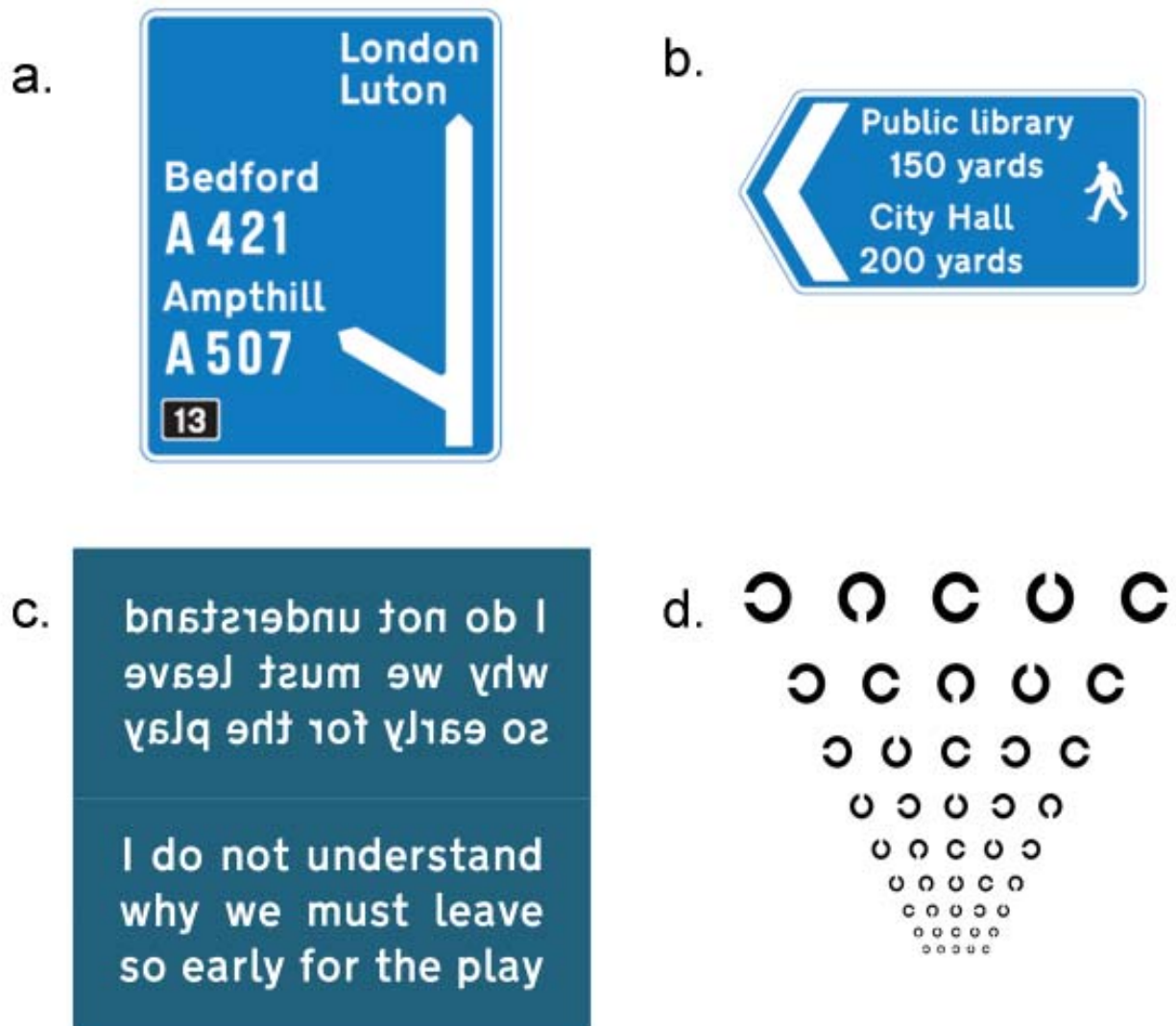


Figure 1

- a. Typical UK motorway sign in 'transport medium' font on middle blue background
- b. This colour combination is also used on local signs for pedestrians and cyclists
- c. Word based acuity task at 0.3 logMAR size reversed for mirror presentation
- d. Four position Landolt C chart in logMAR layout.

Photo-oxidative stress and macular degeneration, mechanism and prevention

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The Low Vision Institute, Madrid, Spain

Purpose

The eye is an organ particularly exposed to risks caused by free radicals. The purpose of this study is to understand the mechanisms of this process, their relationship with retinal diseases such as macular degeneration (AMD) and its prevention from the optometric viewpoint.

Method

Review of recent studies and publications on the prevention of AMD.

Results

Free radicals are highly reactive and unstable products that interact with proteins, lipids and carbohydrates, which are involved in cellular injury caused by different chemical and biological mechanisms. Formation of free radicals in the body can be induced by various causes:

- absorption of radiant energy (visible, UV and X-ray)
- oxidative metabolic reactions
- environmental contaminants.

Conclusion

The prevention of optometric retinal aging can be achieved by: prescribing absorptive filters (wavelength blocking), nutrition and healthy habits.

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Photo-oxidative stress and macular degeneration, mechanism and prevention

Figure 1:
Curve 2

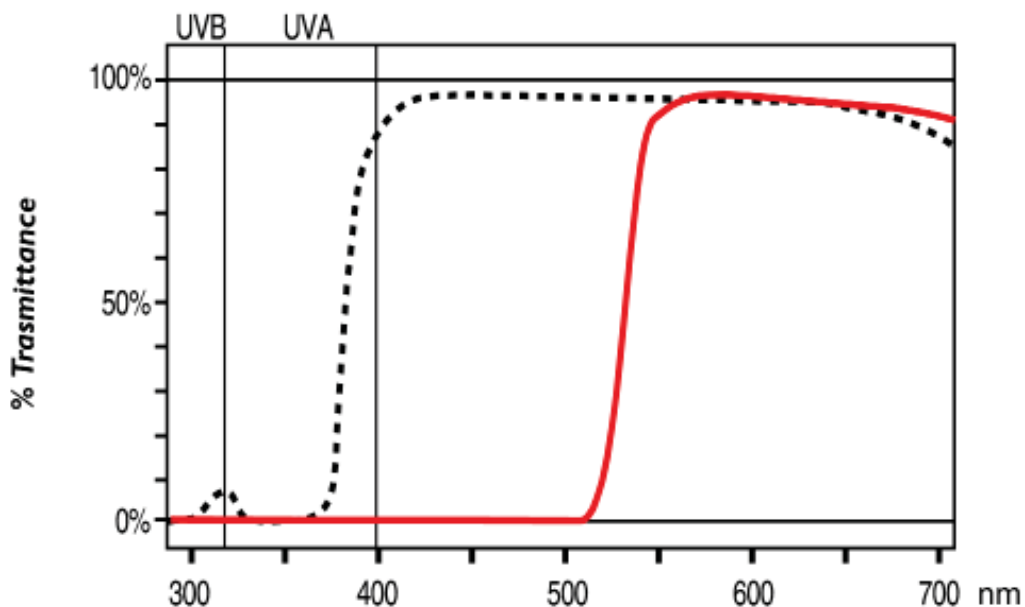


Figure 2:
Transmittance

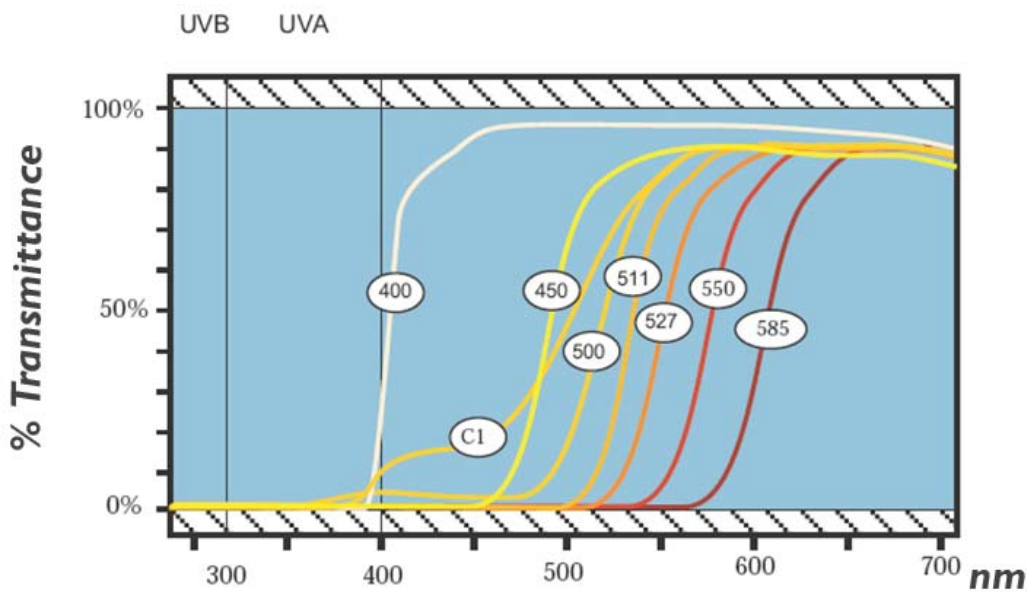


Figure 3:
Example filter



Training optometrists as primary eye care practitioners and their role in enhanced eye care services in Scotland

Lead author: Niall Strang

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Since 2006 a new model of eye care delivery within the National Health Service (NHS) has been developed in Scotland. The revised service involves optometrists in an enhanced role in communities with the aim of providing detection of eye disorders, early intervention and referral refinements.

As part of this, optometrists can recall patients and carry out supplementary eye examinations. The system has led to a 4.5% reduction of referrals to hospital ophthalmology departments across Scotland compared to an increase in England of approximately 23% over the same period. Registered optometrists have extended responsibilities as compared to the rest of the UK and are now the primary point of contact for any eye problems. Stringent protocols are adhered to before a patient can be referred to secondary care settings for ophthalmological examination. A recent study has suggested that the new model has led to significant indirect cost savings to the NHS and other visual related agencies of around £440 million per annum (4-Consulting).

This presentation will describe the current optometry model in Scotland from both an educational and primary care perspective. The continued development of optometry within Scotland and the cost implications for the NHS will also be discussed.

Optometric correlates of visual discomfort in university students

Lead author: Rosa Borrás

Co-authors: Alfonso Sánchez-Magan, Mireia Pacheco-Cutillas
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Purpose

Visual discomfort has a varied aetiology and may be associated with the symptoms of blurring, diplopia, eye irritation or headaches, among others. Several authors have suggested that these symptoms can be caused by a binocular and/or accommodative dysfunction. The aim of this study was to determine whether visual skills are significantly different in groups of high or low visual discomfort, using a visual discomfort questionnaire.

Method

In order to determine whether binocular and/or accommodative visual skills have a significant effect on visual comfort, 41 participants, from a sample of 181 university students, were classified into high (N = 20) or low (N=21) visual discomfort groups, based on their score on the Conlon Visual Discomfort questionnaire. The 85th and the 15th centile of the sample's total score were used as the criteria for higher and lower limits. There were no significant differences in age or gender between the two groups. Subjects in both groups underwent a thorough examination, which included extensive binocular and accommodative testing in near vision following a rigorous methodology protocol.

Results

Analysis of the optometric measurements in the high and low visual discomfort groups was undertaken for the total and partial scores of the questionnaire, in the latter case, according to three factors or groups of related questions, previously proposed by Borsting et al.

The analysis for the total score indicated statistically significantly higher results for:

- (1) lag of accommodation in the high discomfort group, though the clinical significance of this value was considered low (0.17D; $p=0.03$).
- (2) vergence facility in the low discomfort group, the difference being also clinically significant (4 cpm; $p=0.01$);
- (3) prevalence of the associated phoria in the group of high discomfort (9.5% vs 50% Chi square <0.01).

In the analysis for factors, questions related to symptoms of blurring and diplopia (factor 3) also showed significantly higher results for positive relative convergence (7 Δ ; $p=0.02$) and amplitude of accommodation (1.41DE; $p<0.01$) in the low visual discomfort group.

Conclusion

The high visual discomfort group showed larger lag of accommodation and reduced vergence facility, as well as a higher prevalence of associated phoria. Furthermore, subjects with greater symptoms of diplopia and / or blurring (questionnaire's factor 3), also showed significantly lower values of the amplitude of accommodation and positive relative convergence. These results show an association between visual discomfort symptoms and the quality of some binocular and accommodative skills in a sample of young adults with high visual demands.

The Ibero-American programme for science, technology and development: thematic network REISVO

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Purpose

The Ibero-American Programme for Science, Technology and Development (CYTED) is an intergovernmental multilateral Science and Technology cooperation programme, which aims to combine different perspectives and visions to promote cooperation in research and innovation for the development of the Latin American region.

One objective of the CYTED Programme is to contribute to harmonious development in the Latin American region by setting up mechanisms for cooperation among research groups at universities. In the field of visual health the thematic network is called 'Red Epidemiológica Iberoamericana en Salud Visual y Ocular' (REISVO). This presentation covers the principal features and objectives of REISVO.

Method

Scientific and technological visual health activities are brought together to improve the general ocular and visual conditions of the Ibero-American population, from the diverse environments and development levels found in the different countries. REISVO involves more than 40 researchers, from Colombia, Chile, Argentina, Panamá, Costa Rica, Ecuador, México and Spain. Maintenance and consolidation of REISVO requires the active participation of all the affiliated groups. For this reason, the identification of themes, and the viability of the activities are all key factors for success and sustainability.

Results

The principal features are:

- to publish and disseminate, prior to completion, at least one monograph on the 'state of the art' of the general ocular and visual conditions of the Ibero-American population
- to establish a database of visual disorders for each country
- to generate standardised and validated protocols to homogenise the collection of reliable data
- develop strategies and epidemiological research for control of visual health.

Conclusion

The principal objective of REISVO is to enable the exchange of knowledge between research groups and to maximise cooperation as a means of work. Its mission is to create a framework for collaboration in the workplace that will make new collective activity possible with results dissemination by means of publications and the organisation of specialised workshops and thematic courses. In the near future REISVO aims to promote international development involving other interest areas and other international organisations for collaboration.

Visual search and speed of processing in elderly drivers

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³Department of Surgery, University of Valencia, Valencia, Spain
⁴Hospital Universitario La Fe, Valencia, Spain

Purpose

Driving is a complex task, involving perceptual functions and motor skills. Vision is the most important source of perceptual information for the driver. Aging affects several visual abilities presumed to be important for safe and efficient driving. The oculomotor system can make adaptations in response to changes induced by aging and driving. These changes may affect saccades. We studied the effect of age on saccadic functioning in drivers with a new visual verbal test, the Adult Development Eye Movement test (ADEM).

Method

This study compares a group of older drivers (20 patients, ranging in age from 65 to 80 years) with a control group of younger drivers (20 patients ranging in age from 20 to 35 years). The development of eye movement was analysed using a modified version of the ADEM.

Results

A statistically significant increase was obtained for both vertical and horizontal performance versus age for subjects older than 65 years old ($p < 0.05$). No relation between modified ADEM ratio and age was found.

Conclusion

A decrease in ocular motility was found in elderly patients in both horizontal and vertical ADEM performance. It might be caused by age-related changes such as sensory degradation and cognitive decline. Nevertheless, no saccadic alterations were found in old subjects according to this test, as revealed by normal ADEM ratios for all age groups.

ADEM provides a method through which binocular eye movement development can be incorporated into patient management and allows, for example, a prediction of future driver's visual affectation. However, a more extensive study will be necessary to obtain a global standard value for older drivers, and to establish any relationship between ADEM loss and driving accidents.

Comparison of dissociated phoria-measuring methods: reliability and repeatability

Lead author: Ane Murueta-Goyena Larrañaga
Optometrist, Bilbao, Spain

Purpose

Many methods of heterophoria measurement are available clinically. This non-masked descriptive and correlational study was performed to compare different methods of measuring dissociated phoria and to determine the reliability and repeatability of each one: slow and fast Cover Test, modified Thorington and Von Graefe.

Method

A protocol was designed to put into practice in 31 non-presbyopic subjects (11 optometrists), with main age 23.2 ± 3.9 (SD). Preliminary tests were undertaken to confirm non-altered binocular vision. The tests were performed in the following order (from less to more dissociating): modified Thorington, Von Graefe, fast CT (five occlusions of one second) and slow CT (five occlusions of three seconds). The subjects were asked to appreciate phi phenomenon in both CT measures and subjective movement was neutralised with prisms. Each test was performed three times with enough time between measures to recover binocular vision.

Results

Both types of Cover Test and modified Thorington obtained a high correlation coefficient (>0.95) between measures, but Von Graefe did not. The highest standard deviation was for slow CT (8.56). Correlation coefficient was 0.845 for fast CT vs. Modified Thorington and 0.825 between slow CT vs. Modified Thorington, while Von Graefe obtained less than 0.6.

Conclusion

Cover Test and modified Thorington are two valid and reliable methods of measuring phoria in subjects with normal binocular vision. The differences between fast CT and modified Thorington are clinically non-significant. The slow CT uncovers higher amounts of phoria, due to its high dissociating nature. It is recommended to avoid using Von Graefe for its high variability between measures.

Agreement between the Pattern Glare Test and Conlon questionnaire for visual discomfort. Are they measuring the same?

Lead author: Mireia Pacheco-Cutillas
Co-authors: Rosa Borrás, Alfonso Sánchez-Magan
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Purpose

Visual discomfort includes a wide range of unpleasant symptoms that may occur when reading, in subjects who may have no significant refractive error and with good vision. Visual stress is also an uncomfortable experience, which causes perceptual distortions and glare, when susceptible individuals are exposed to certain visual stimuli. It has been suggested that a text can be compared to a pattern of stripes which may trigger the characteristic symptoms of visual discomfort. The purpose of this research is to determine the prevalence of visual discomfort in a sample of university students and to investigate the agreement between the Pattern Glare Test, which evaluates visual stress, and the Conlon questionnaire for assessing visual discomfort.

Method

181 university students were assessed on visual discomfort by means of the Conlon Visual Discomfort questionnaire, which consists of 23 questions, on a scale of zero to three. Also, the Pattern Glare Test (PGT) (Wilkins and Evans, 2001) was used to identify subjects with visual stress. Subjects were tested for three different spatial frequency patterns (0.5 cpd, 3cpd, 12cpd) and the number and severity of visual distortions recorded.

Results

Analysis of results for the total score of the Conlon questionnaire indicated a 12% prevalence of visual discomfort, which significantly affected more female students. The analysis of results was also undertaken for three factors or groups of related questions, as previously proposed by Borsting et al. There were no significant gender differences for factor 3 (symptoms of blurring and diplopia). Instead, female students scored significantly higher on factor 1 (symptoms of text movement and fading) and factor 2 (questions related to symptoms of headache and soreness) than men. Statistically significant agreement was found between Conlon questionnaire score and the severity, but not the number of visual distortions on the PGT, while viewing the 3 cpd pattern. Additionally, female students showed a significantly higher severity of symptoms with the 12 cpd pattern.

Conclusion

The severity of symptoms, a new parameter used in the analysis of visual distortions on the PGT, has proven useful to identify visual discomfort. A significant agreement was found between this parameter for the 3 cpg pattern and the total score of the Conlon questionnaire. The two methods studied have proven useful for the identification of individuals susceptible to visual discomfort; however, the agreement of results is low. This could be due to a multifactorial aetiology of the condition.

Optical shops in Nepal: range and quality of services provided

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Purpose

Dispensing of quality ophthalmic products is important for establishing the desired outcome and ensuring the good compliance of patients. This study aimed to analyse the range and quality of services provided by optical shops in Nepal. The study also aimed to provide baseline information regarding the distribution of resources which is expected to contribute to the planning of eye health services and human resources in the country.

Method

This was a cross sectional descriptive study. Trained enumerators were mobilised to collect data on service provisions at 1,045 optical shops distributed throughout Nepal using different data collection tools. Policy documents of the government were analysed by the researchers to collect data on the regulation of the optical shops.

Results

Among 1,045 optical shops analysed, 940 (90%) were run by private enterprises, 63 (6%) by primary eye care centres or eye hospitals and 42 (4%) by social organisations. More than 85% of the optical shops were located in major cities while only about 15% served the rural communities. More than 72% of the optical shops provided services for prescription eye glasses and sunglasses only. About 8% of the optical shops gave contact lens services as well while only 2% of the optical shops gave low vision services in addition to eye glasses and sunglasses. Almost 66% of the optical shops were devoid of qualified manpower to prescribe eyeglasses while more than 90% of them did not have trained personnel to dispense eye glasses. However, about 58% of the optical shops had the name plate of a qualified eye health worker but did not really have one. More than 85% of the optical shops with a clinic were not equipped with basic equipment to provide primary eye care services. Virtually none of the optical shops run by the private sector had a database cataloguing their services, those kept by social organisations and eye centres were also incomplete. Nepal has never had a clear policy document made to regulate the optical sector, though three separate members of the workforce are named (ophthalmologist, optometrist and ophthalmic assistant) as qualified to provide refraction and dispensing services.

Conclusion

Optical shops in Nepal are mostly based in city centres. Most of them do not have the required range of services, because of which patients do not often get the best option. With no proper regulating mechanism, the number of shops is increasing and 'quack practice' is flourishing. This may not serve the purpose of optical treatment prescribed and reduce patient compliance to care.

Growing the optometric profession in Nigeria: what new strategies?

Lead author: Ejitu Mfon Isong
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Optometry, a 'challenging' and satisfying career with excellent opportunities for professional growth has evolved from its crudest forms of 'reading stones' in Rome and China since 460BC and 1000AD to become the modern science it is today.

Optometry is a dynamic profession. From being recognised as a profession in the 19th century, it has grown to become rated 39th out of 250 jobs in the USA. Its scope and spread has grown across continents thanks to the efforts of the then IOOL, now transformed into the World Council of Optometry (WCO). In Nigeria, optometry has come of age having existed for close to 44 years. Many transformations have taken place including legislation, programme development, scheme of service and specialisation. The more sophisticated a society becomes, the greater the need for vision care.

Does the growth of the Optometric Profession in Nigeria match the evolving sophistication of the new Nigeria? What new strategies are in place or need to be put in place to meet the eye care needs of the populace? What plans are in place to meet the changing health paradigms, government policies etc? What needs to be done about the curriculum, licence issues, job opportunities etc? To maintain the three 'R's of growth (Recognition, Relevance and Reputation), definite steps need to be taken about research, inter-professional relations, chapter and section developments, among other strategies. This presentation looks into the future to discuss what the stakeholders in optometry must take on board for the future of the optometric profession in Nigeria.

Evaluations of clinical exit competencies of optometry students in Mozambique

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Purpose

There are many composite elements to the development of sustainable eye care structures, and appropriate education for eye health workers remains a key determinant of successful eye care development. The Mozambique Eye care Project (MEP) is a multi-institutional collaboration, which is training the country's first optometrists at the University of Lurio in Nampula, Mozambique. This is a four year programme, with the first students graduating as optometrists in November 2012. The development of competency-based education for optometrists has been identified as an important component in the solution to avoidable blindness and vision impairment. This research evaluates the exit competencies of the new optometrists and aims to establish entry-level competency standards for the profession of optometry in Mozambique. The situation in Mozambique is unique due to the fact that the students had no concept of optometry when they began the course and they are being taught by lecturers from Colombia, Spain and Portugal with differing backgrounds in optometry.

Method

Clinical evaluations were carried out on optometry students, aiming to get an overall picture of their exit competencies. WCO competencies were used which describe the skills and knowledge a person needs to be regarded as sufficiently qualified to be registered to practice optometry. The exams consisted of patient exams, practical and oral exams and a case records session.

Semi-structured interviews were carried out with the course lecturers to identify other factors relating to student performance.

Results

Eight of the nine students in their final year were deemed competent in the six units of the WCO Competency model. There were certain elements of all the units that needed more training for all the students as they deal with a lot of complex patients with pathology and low vision compared to the average European student. This involved adapting their subjective testing on patients with poor responses and/or low vision.

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Evaluations of clinical exit competencies of optometry students in Mozambique

Conclusion

A five-day intensive subjective testing workshop in patients with low vision relating to eye conditions specific to Mozambique, e.g. glaucoma, pterygium and macula dystrophies, is recommended and would form part of the basic curriculum for the preceding students. The students would be evaluated again post-course.

Every student is recommended to have a personal continuing education and development plan as they go into practice. This plan would be overseen by one of the Unilurio lecturers.

As all the lecturers have different clinical backgrounds, protocols need to be set for different sections of the eye test to ensure that the differing backgrounds of the lecturers do not affect student performance.

Evaluation of practical refraction teaching interventions to supplement a new optometry diploma programme in Zambia

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Background

Vision Aid Overseas has been teaching refraction and optometry to nurses and ophthalmic clinical officers in Zambia since 2006. The Chainama College of Health Sciences, Lusaka, set up the Optometry Technology Diploma programme in 2010 with support and funding from Vision Aid Overseas and Specsavers. This three-year full-time programme is open to High School graduates and accredited by the University of Zambia.

Purpose

The optometry teaching programme is delivered by the ophthalmology faculty and practical clinical sessions are overseen by an ophthalmic clinical officer. The didactic teaching programme is delivered by local faculty and occasional visiting lecturers but practical refraction expertise was limited. The aim of the refraction teaching interventions was to provide intensive blocks of refraction and clinical skills training across the teaching programme to enhance and increase the students' refraction and clinical competencies. The training was provided as two 10-day teaching periods over a 16-week period. A final practical teaching period is planned six months later.

Method

A small team of optometrists, including two UK university faculties, provided optometry clinic supervision, practicals and tutorials to support and improve the students' refraction skills. Additional lectures were given in topics that the Chainama faculty did not have expertise in. Teaching occurred over a two-week period and also included an off-site vision-screening programme and outreach services to provide additional experience for the students. Objective (10 point scale) and subjective (5 point scale) assessments were made before and after each teaching intervention (Kirkpatrick Level 1) and post-course feedback assessed (Kirkpatrick Level 2).

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Evaluation of practical refraction teaching interventions to supplement a new optometry diploma programme in Zambia

Results

In six key clinical skills student competency improved over the 16-week period. On objective assessment there was a two point and 20% improvement by the end of each two-week teaching intervention. Students' subjective improvement, a reflection of their confidence level, rose one point by the end of each two-week teaching intervention (16% and 19% respectively). There was a noticeable dip in scores between courses however subjective competency improvement across the 16-week period was 1 point (23%) with a 25% objective improvement in competency across the whole 16-week period. Student feedback on the training delivery improved during the programme.

Discussion

It is to be expected that practical skills competency drops in a new student cohort between teaching interventions. Students exhibited reduced confidence particularly in two key skills, ophthalmoscopy and refraction. Such a reduction in skill level is understandable and recoverable and with continued practical exposure and practice will become less evident as the students become more experienced and competent.

Recommendations

The third planned intervention is predicted to show continued improvement. Sustained and incremental improvements support the value of such interventions where there is a lack of local expertise. Such interventions help to support new and emerging optometry programmes in the initial stages until such a time as local lecturers have been developed or recruited to fulfil these teaching roles.

Keratometric values in population

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Introduction

Keratometry and corneal topography are part of basic diagnostic methods, providing numerical parameters for optometric and ophthalmological investigative techniques as for example the fitting of soft and hard contact lenses, pre-operative assessment in corneal surgery or degenerative diseases screening (i.e. keratoconus, pellucid marginal degeneration).

Method

The aim of this study was to assess some metric values of the cornea in emmetropic and ametropic eyes, measuring of corneal astigmatism and its possibility by compensation astigmatism of crystalline lens and total astigmatism, ratio of physiologic and inverse astigmatism. Consequently corneal topographic maps and their eccentricity were provided. The results of the most frequent values distribution were statistically analysed.

Results

In the group 1 there were 680 myopic eyes, 39, 2±18,9 years. Mean objective sphere power is -2,5±2,6 D, cylinder power -1,1±1,0 D; subjective refraction: sphere power: -2,3±2,4 D, cylinder power: -0,6±0,8 D. Keratometry in this group: the steepest meridián 7,6±0,3 mm, the flattest meridián 7,8±0,3 mm. Corneal power: 44,0±1,5 D, corneal eccentricity was 0,4±0,1.

The group 2 consisted from 400 hyperopic eyes. 57,9±16,8 years. Objective sphere power is +2,8±2,2 D, cylinder power -1,1±0,9 D; subjective refraction: sphere power: +2,2±2,0 D, cylinder power: -0,5±1,0 D. Keratometry in this group: the steepest meridián 7,7±0,3 mm, the flattest meridián 7,8±0,3 mm. Corneal power: 43,7±1,6 D, corneal eccentricity was 0,4±0,1.

Conclusion

In discussion is influence of corneal astigmatism in confrontation with the most frequent method of spectacle and contact lenses correction.

To evaluate and diagnose following instruments were used: Placido based corneal topographer, slit lamp, optotype, autorefractometer and trial spectacle lenses case. The aim of this paper is to verify theoretical data presented in literature.

The effect of bilberry extract on dry eyes: a pilot study

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Co-author: George C Woo
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Purpose

The dry eye condition remains difficult to treat despite our current knowledge of newer diagnostic strategies and treatment options. The role that essential fatty acids play in mediating symptomatic relief of dry eyes is the focus of this pilot study.

Method

Three female subjects of ages 49-51yrs reporting symptoms of dry eyes were recruited. The effectiveness of initiating a daily intake of combined bilberry extract and fish oil oral pill supplement over a three month period was assessed. The averaged tear break-up times (TBUT) and ocular surface disease index (OSDI) values were calculated at start-up and three-month post-initiation of therapy.

Results

The baseline TBUT ranged from 4-5 seconds (mean 4.67 ± 0.5774 seconds) and from 7-15 seconds (mean 12.33 ± 4.619 seconds) three months after intake of the dietary supplement. Two out of the three participants attained normal TBUT values and improved OSDI scores after a three-month daily intake of oral supplements.

Conclusion

The dietary supplement of a combined formulation of bilberry and fish oil extract showed an improvement in the TBUT values and dry eye symptomatology. Such data need to be confirmed by a larger cohort of patients from a larger, randomised clinical trial in order to validate the efficacy of a dietary recommended dosage of fish oil intake in dry eye treatment.

A new non-invasive method to assess corneal integrity based on bioimpedance measurements

Presenter: Raúl Martín Herranz¹

Lead author: Ana del Río San Cristóbal¹

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Purpose

The integrity of the cornea is key to maintaining its transparency. Any ion flow disorder through the corneal layers can compromise the barrier function and, therefore the corneal homeostasis. To assess changes in corneal permeability, measurement techniques are based on the passive electrical properties of living tissues. Among them, use of the translayer electrical resistance (TER) has been frequently employed both in vitro and in vivo. Although its sensitivity to detect alterations in corneal permeability has been probed, its use can not be translated to the clinical setting due to its invasiveness. We have developed a new non-invasive method based on bioimpedance that allows the assessment of changes in corneal barrier function.

Method

The permeability of the rabbit corneal epithelium was monitored before and after performing different types of epithelial lesions in the animals. The new equipment as well as other classical techniques commonly used was employed.

Results

The results validated the capability of the sensor to evaluate the corneal epithelial permeability in vivo since changes in bioimpedance were found.

Conclusion

This study validated the in vivo use of a new non-invasive method to assess the corneal integrity based on bioimpedance that can be translated to clinical settings.

Short-term corneal response between two hydrogel contact lenses of different Dk

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Purpose

The impact of contact lens (CL) on the cornea can be evaluated with a wide range of possibilities, allowing the detection and evaluation of the morphological changes suffered by the cornea as a result of the CL wear. The consequences due to the lack of oxygen due to CL wear are well documented in the literature. With the use of the silicone hydrogel (SiH) CL, hypoxic complications have significantly decreased. The purpose of this study was to analyse the short-term endothelial corneal response between high and low Dk hydrogel CL, comparing the relation between CL-induced corneal swelling and endothelial changes (bleb formation and endothelial cell count) among both CL.

Method

Low oxygen permeability (Etafilcon A) and high oxygen permeability (Lotrafilcon B) CL were eye-randomly fitted in 20 subjects with normal ocular health. Corneal swelling, endothelial bleb formation and endothelial cell count were monitored at six points: before the CL fitting; five, 20 and 40 minutes after the fitting (without CL removal); and five and 20 minutes after removing the CL. Corneal swelling was monitored with 3D OCT pachymetry. SP-3000P was used to determine endothelial blebs and endothelial cells.

Results

Lotrafilcon B CL induced significantly ($p=0.03$ Re-ANOVA) less corneal swelling ($1.72\pm 2.44\%$) compared with Etafilcon A CL ($2.43\pm 2.60\%$). However, endothelial bleb formation ($p=0.39$ Re-ANOVA) and endothelial cell count ($p=0.29$ Re-ANOVA) did not show differences between CL. Along the study time, the percentage of induced swelling and the endothelial bleb formation changed significantly ($p<0.05$ Re-ANOVA) for both CL, reaching its maximum peak 40 minutes after the insertion of the CL, and recovering quickly after CL removal.

Conclusion

No relevant differences have been found in the short-term physiological endothelial response between CL of different Dk. These results suggest that short term corneal swelling (as an immediate response to CL wear) does not seem to be attributed only to endothelial morphological changes.

Hybrid contact lenses fitting

Presenter: Rosa García-Monlleó²
Lead author: Cristina Ibáñez Madrid¹
Co-author: Rosa García-Monlleó²
¹Soloptical, Fuengirola (Málaga), Spain
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Purpose

In ectasic corneas, or after penetrating keratoplasty (PK), the corneal surface is very irregular, resulting in irregular astigmatism and high coefficients of aberration. Hybrid contact lenses (HCL), made from two materials, provide comfort, good centring with the peripheral portion and good visual quality with the central zone, maintaining corneal integrity. The aim of this study was to analyse the adaptation to these lenses in patients with keratoconus (KC), pellucid marginal degeneration (PMD) and patients with previous PK who had previous problems with rigid gas-permeable (RGP) contact lenses. It analysed each adaptation through the corneal topographies, the optical coherence tomographies (OCT) and the fluorescein images of the adapted HCL. It demonstrated the possibilities offered by these lenses as to how they can provide special adaptations in irregular corneas, which are not solved by other types of contact lens.

Method

Six SynergEyes® ClearKone® contact lenses with refractive purposes were adapted to three patients, two women and one man, three eyes with PMD, one with KC and two eyes with PK. All the patients presented problems in response to the use of RGP, indicated by instability or deficient visual acuity (VA). All the patients were informed and they gave their consent, according to the Declaration of Helsinki. The material used was: Easygraph corneal topography, refraction column CSI, CSI slit lamp SL 990, Fscope and OCT TOPCON 3D OCT-1000.

Results

The HCL has been adapted in each case, customising each adaptation depending on the characteristic of the cornea. This allowed for the resolution of previous problems with RGP contact lenses. Ocular complications did not appear after the adaptation of the HCL in any case. The VA was higher than the one obtained with the previous RGP contact lenses. OCT allowed for the verification that there was no contact between the cornea and HCL.

Conclusion

The HCL are a good alternative when other conventional contact lenses do not correct the vision problem or tolerance in patients with irregular corneas. The tears film assures that the HCL does not lean on the corneal surface, which ensures a correct integrity and ocular health in the long-term. A precise knowledge is needed for the adaptive techniques. The continuous monitoring of the adaptation and the state of the corneas of these patients is essential.

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Hybrid contact lenses fitting

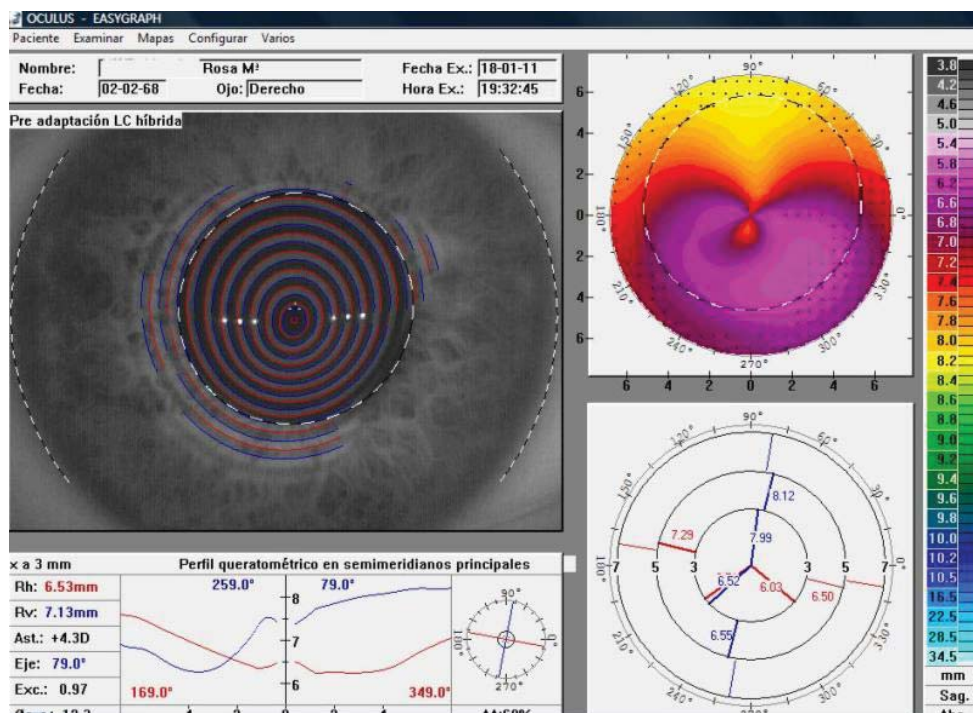


Figure 1: Topo OD Rosa

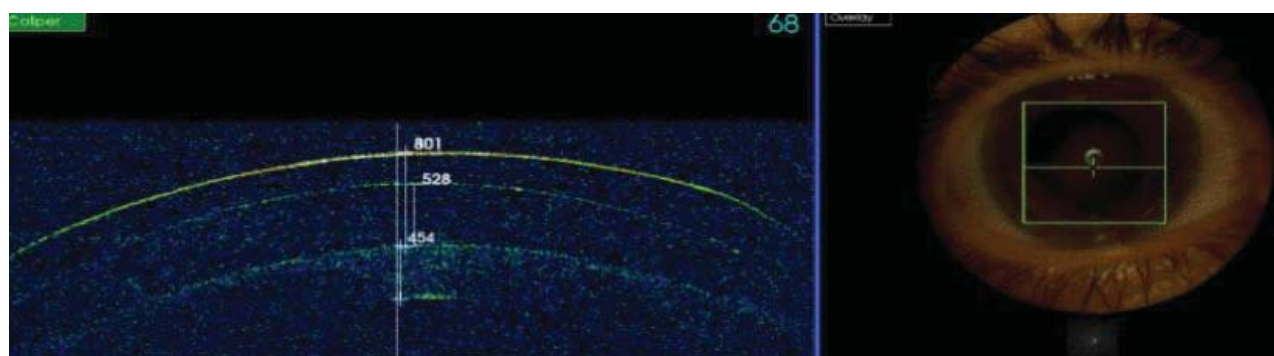


Figure 2: OCT OD Rosa with CL

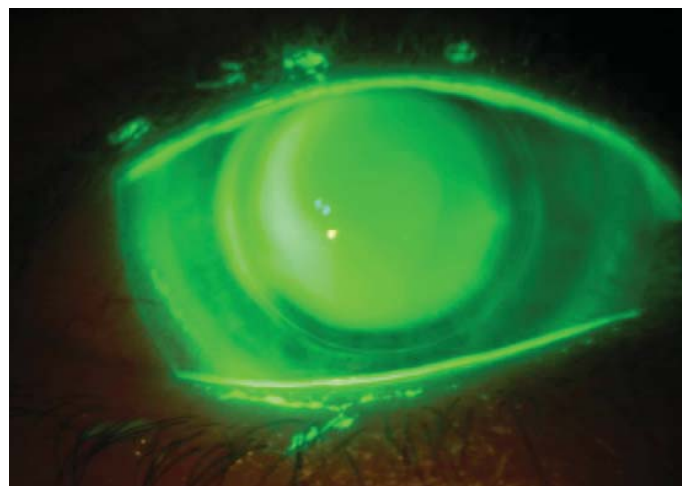


Figure 3: Fluor OD Rosa

Comparison of two dry eye questionnaires in non-contact lens wearers

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Introduction

More than 20 different dry eye questionnaires have been developed for detection, in combination with diagnostic tests, of patients with dry eye conditions and for classification of the severity of the condition. This study focused on patients with mild to moderate dry eyes. Therefore, two different questionnaires were compared, the commonly used Ocular Surface Disease Index (OSDI) and the Texas Eye Research Technology Center Dry Eye Questionnaire (TERTC-DEQ), the latter designed to identify the moderate dry eye. TERTC-DEQ identifies three categories: normal, moderate symptoms and patients with dry eyes, whereas OSDI has four categories: normal, mild, moderate and severe symptoms. The results were also compared with clinical signs obtained with a Tearscope.

Method

30 patients (15 males, 15 females; 52 +/- 8 yrs), all non-contact lens wearers, were enrolled in the study. Each patient filled out both questionnaires with two weeks in-between, half of them received TERTC-DEQ first and the other half OSDI first. The clinical signs obtained, using the Tearscope-plus attached to a bio-microscope, were non-invasive tear break-up time (NIBUT), lipid layer type, and tear meniscus height.

Results

Nine patients were identified according to the OSDI (four mild; four moderate; one severe) and nine (five moderate; four dry eyes) with TERTC-DEQ, representing a total of 11 patients with dry eyes. A significant correlation between the scores from the two questionnaires was obtained ($r=0.84$; $p<0.001$). Of the clinical signs, NIBUT indicated that 15 patients had dry eyes (< 10 s), of which only six were identified by the questionnaires. Of the 11 identified by the questionnaires five also had dry eyes according to their NIBUT-values. But no significant correlation was observed between break-up time and either one of the questionnaires or between the questionnaires and lipid layer type or meniscus height.

Conclusion

A significant correlation was observed between the two questionnaires, but a higher number of patients with at least moderate symptoms was observed with TERTC-DEQ compared with OSDI (nine and five, respectively), indicating that the former is better at recognising moderate forms of dry eye. However, further studies on a larger patient group are needed to verify this. The study also underscores the difficulty in comparing subjective symptoms and clinical signs.

Where are they now? Scleral contact lens indications and long-term outcome for 1000 referrals

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Aim

To evaluate the long-term outcome of patients referred for scleral contact lens (ScCL) management.

Method

A database was set up for a dedicated ScCL clinic at Moorfields Eye Hospital to illustrate the current indications and from which long-term outcome could be established.

Results

1000 patients fitted with ScCLs between the years 2000 and 2004 were identified. 561 were for one eye only, 439 were for both eyes, 1439 eyes in all. High refractive error constituted 54 eyes (3.8%), primary corneal ectasia (PCE) 857 (59.6%), corneal transplant 262 (18.2%), ocular surface disease 180 (12.5%) and other indications 86 (6.0%). There was reliable outcome data for 875 eyes. 63.0% continued with ScCL wear, 18.2% discontinued wear, 14.7% failed at trial and 4.1% suspended wear. The PCE and the corneal transplant group had the greatest proportions of continuing wearers. The discontinued and suspended wearer distributions were similar throughout the groups. The greatest proportion of failed at trial was in the high refractive error group. Visual acuity was 6/9 or better in 775 eyes (53.9%), between 6/12 and 6/18 in 368 (25.6%), 6/24 to 6/36 in 149 (10.4%), 6/60 or less in 42 (2.9%), unrecorded in 68 (4.7%) and there were 37 (2.6%) unsighted eyes where lenses were fitted for therapeutic purposes only.

Conclusion

63% of those attending for follow up were continuing with ScCL wear at their most recent appointment. 53.9% of eyes achieved visual acuity of 6/9 or better. Primary corneal ectasia is the main indication comprising 59.6% of the total cohort.

Influence of opaque-tinted contact lens wear on optical quality and visual performance

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Purpose

Soft opaque tinted contact lenses have been widely used for cosmetic purposes in the last few years. The purpose of this study is to investigate the influence of these contact lenses on optical quality and visual performance under low-illumination conditions.

Method

Eighty eyes of 40 subjects (non-contact lens wearers) were included in the study with ages from 18 to 30 years (21.9 ± 2.4 years). All participants were classified as emmetropic ($Rx \geq 0.00$ y $\leq +0.50$ D sph; ± 0.50 D cyl), with monocular best-corrected visual acuity (BCVA) of 20/20 or better. The opaque tinted contact lens used were monthly wear soft contact lenses with no refractive power (HEMA and Ocufileon D respectively, 55% water content) supplied by Servilens Fit & Cover™. These lenses have a central clear zone and a total diameter of 5.4 mm and 14.2 mm, respectively. The base curve is 8.6 mm. Data of optical quality were taken using an aberrometer based on the Hartmann-Shack sensor (ocular higher order, spherical, and coma aberrations). We also took data from a visual quality device (OQAS, Visiometrics SL) based on the double-pass technique, that included information on diffraction, ocular aberrations and scattering (OSI, Objective Scatter Index). For the visual performance we examined the contrast sensitivity function, and we quantified the discrimination capacity by the disturbance index under low illumination (Halo v1.0 software, Laboratory of Vision Sciences and Applications). All measurements were realised before and after the wearing of tinted contact lenses.

Results

The contact lens wear significantly increased coma-like and total higher-order aberrations ($P < 0.05$). We also obtained that the Strehl ratio decreased from 0.247 ± 0.069 to 0.222 ± 0.063 when wearing tinted contact lenses, a deterioration that was statistically significant ($P = 0.005$), and a significant increase in OSI from 0.42 ± 0.28 to 0.57 ± 0.37 ($P < 0.001$), reflecting a higher amount of aberrations and intraocular scattering with the contact lenses wear. Regarding visual performance, contrast sensitivity was significantly decreased at least three spatial frequencies: 6.1; 12.1; and 18.2 cpd after wearing the lenses. Finally, there was no difference between no lenses and wearing tinted lenses for visual discrimination capacity.

Conclusion

Opaque tinted contact lenses cause deterioration in optical quality and worsen contrast-sensitivity function. Therefore, according to the results, tinted contact lens wearers should be informed about the effects in visual quality, especially for tasks at low-illumination conditions such as night driving.

Influence of cataract on optical coherence tomography measurements

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Co-authors: Elena Garcia-Martin, Maria Satue, Raquel Herrero, Maria P. Bambó
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Purpose

To evaluate the changes that cataract causes in the macular and optic nerve measurements provided by two optical coherence tomography (OCT) devices: Cirrus High Definition (HD) OCT and Spectralis OCT.

Method

Sixty healthy subjects with cataract were consecutively and prospectively included. All subjects underwent full ophthalmological exam including three OCT exams using macular cube 512x128 and optic disc 200x200 protocols by Cirrus HD OCT and fast macular and retinal nerve fibre layer (RNFL) (glaucoma application) protocols by Spectralis OCT. The OCT measurements were performed before surgery and one month after the surgery. The results between both visits were compared using Student t-test for paired variables.

Results

Significant differences between the measures obtained before and after the surgery were found in average (80.49 vs 87.43 μ m, respectively), superior (103.07 vs 110.38 μ m), temporal (68.50 vs 60.99 μ m) RNFL thicknesses, and macular thickness (235.12 vs 276.15 μ m) provided by Cirrus HD OCT. With Spectralis OCT, significant differences were found in superior (107.48 vs 116.38 μ m) and temporal (72.00 vs 78.15 μ m) RNFL thickness. Macular thickness did not show significant differences between both visits using Spectralis OCT.

Conclusion

Cataracts affect macular and retinal nerve fibre layer measurements provided by Cirrus OCT and retinal nerve fibre layer measurements provided by Spectralis OCT.

Repeatability and reproducibility of the measurement of ocular aberrations with a Shack-Hartmann aberrometer

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Purpose

Considering the importance that the careful analysis of ocular aberrations has taken in modern clinical investigation of visual performance, this study evaluated the repeatability and reproducibility of the measurement of ocular aberrations with a Shack-Hartmann aberrometer.

Method

Sixty-eight healthy eyes with VA equal to 0 LogMAR or higher were selected. Four consecutive measurements were performed for each of the two operators in a random order. The following aberrations for a 5mm pupil diameter were analysed: defocus, astigmatism RMS, coma RMS, spherical aberration, high total orders RMS (from 3° to 7°) and residual higher orders RSM (without coma and spherical aberration). Statistical analysis was performed using two different pieces of software: MedCalc and Microsoft Excel 2007.

Normal distribution of the data for the various aberrations was assessed by the Kolmogorov-Smirnov test. To compare the activities of the operators a parametric analysis was used, using the Student's t-test in case of normality of the data, and the Wilcoxon rank sum non-parametric test where normality was not accepted. The repeatability of the operator was evaluated using the following statistical parameters: accuracy, repeatability, coefficient of variation and intraclass correlation coefficient (ICC). Starting from the analysis of variance (ANOVA for a single factor) of four consecutive measurements, the within subject standard deviation (Sw) was found through the square root of the variance. The data of the two operators was subsequently plotted with a scatter graph and the Bland-Altman plot.

Results

Both operators showed a high repeatability (ICC > 0.90) with respect to all parameters considered, except for higher orders for one operator and residual higher orders for both operators. Regarding the reproducibility, the p value was greater than 0.05 (therefore the error was not significant) for all aberrations excluding the coma RMS.

Conclusion

Analysis of the data shows, in agreement with similar studies in the literature, good intrapersonal repeatability and good reproducibility between different operators. The instrument has proven to meet the modern needs of clinical accuracy in the evaluation of aberrometric status of normal eyes.

Acanthoablation (acanthamoeba keratitis case report)

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Purpose

This presentation presents a case of Acanthamoeba keratitis in a 21-year-old healthy male fitted with orthokeratology (OK) overnight lenses. Protozoan infections from Acanthamoeba are severe but rare in the conventional use of rigid contact lenses and have been linked to contamination from water sources. Published reports of acanthamebic keratitis in OK patients indicate that corneal scarring caused by these infections may necessitate corneal transplantation in affected patients. Early diagnosis is essential to secure a good prognosis. If effective therapy is delayed for three weeks or more the prognosis deteriorates. Current methods of identifying the organism include corneal smears, culture, Polymerase Chain Reaction (PCR) and in vivo confocal microscopy (IVCM).

Method

A 21 year old man presented in September 2010 with a week's history of redness and severe pain. He had worn orthokeratology lenses overnight for six months. Epithelial irregularity with a diffuse punctate defect and perineural infiltrate were found. Acanthamoeba keratitis was diagnosed by corneal culture and in vivo confocal microscopy. The patient was treated hourly with chlorhexidine 0.02% and with topical Brolene (diamidine). Eye drops were tapered gradually.

Results

Fifteen months after the diagnosis the cornea had healed, and there was no impairment of visual acuity. The patient got a perfect visual acuity without his initial myopic prescription.

Conclusion

Acanthamoeba keratitis is closely related to wearing contact lenses and washing the lens storage case with tap water. Although final visual acuity improved after treatment in our patient and the result was positive, Acanthamoeba is a very severe condition that may lead to devastating results.

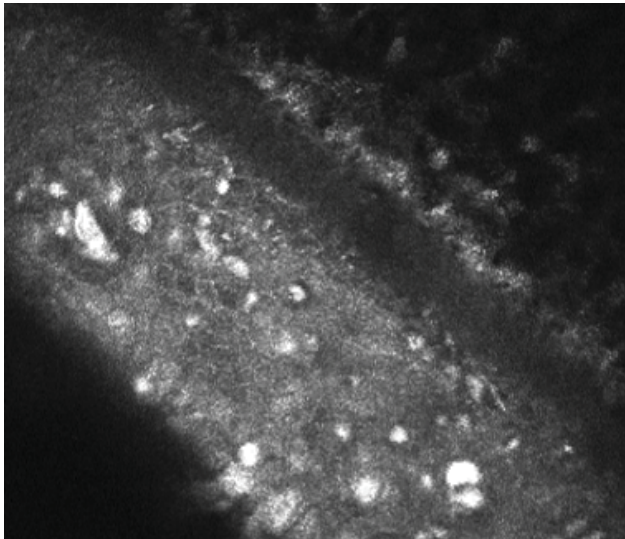


Figure 1: Confocal quistes

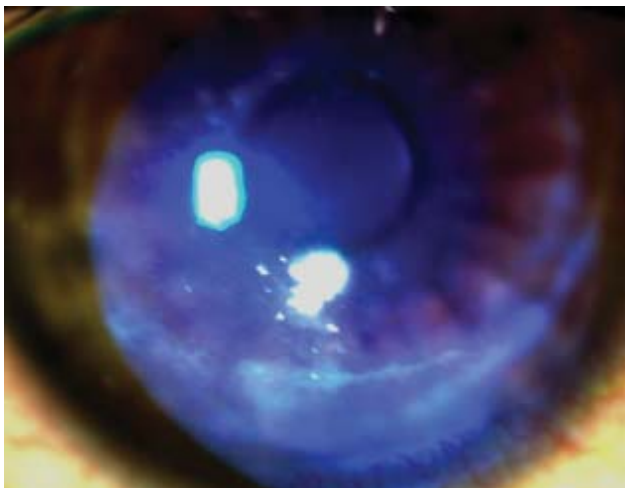


Figure 2: Pseudodendrira 2

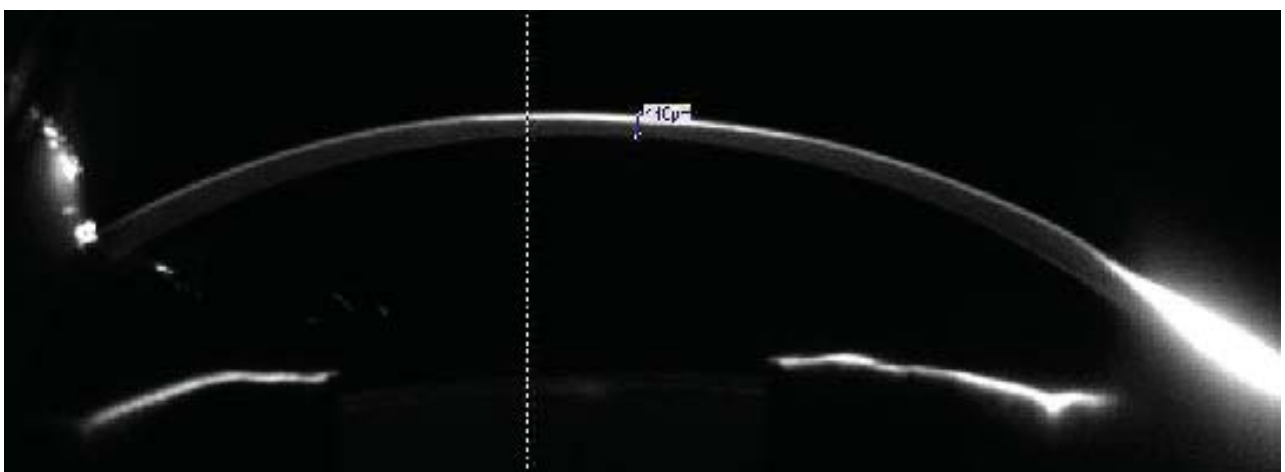


Figure 3: Pentacam

Scleral lenses: a modern method of visual rehabilitation

Lead author: Ken Pullum

Co-author: Jennifer McMahon

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Purpose

Scleral lens practice appears to have attracted more interest in the contact lens literature over the last five years than in total over the last five decades. Gas permeable materials were introduced in the mid 1980s, and since then both clinical practice and manufacture have undergone revolutionary changes. This presentation describes the current position of scleral lenses, including the fitting principles, what constitutes clinically significant parameter changes in terms of the curvature and diameter, and satisfactory end points in the clinical process.

Method

The indications are enumerated describing the clinical experience of a dedicated scleral lens clinic at Moorfields Eye Hospital, London. This information was recorded using a database onto which an entry was made for each patient referred.

Results

2074 patients, 3034 eyes in total, were referred for a scleral lens trial between the year 2000 and 2012. All patients had a clinical indication for contact lenses, but had had limited success with RGP corneal lenses or hydrogel lenses. Of these, 960 were bilateral, and 1114 were for a unilateral scleral lens fitting. The number of eyes where keratoconus or other primary corneal ectasia was the indication for contact lenses totalled 1834 (60.4%), corneal transplant 594 eyes (19.6%), of which 63% were indicated for a primary corneal ectasia. The total for aphakia was 52 eyes (1.6%) and myopia was exactly the same, also 52 eyes (1.6%). Abnormal ocular surface conditions including the aftermath of acute Stevens Johnson syndrome, or for serious or symptomatic dry eyes with a variety of different underlying pathologies totalled 353 eyes (11.6%), for management of ptosis 97 eyes (3.2%), with corneal scarring 30 eyes (1%), and other pathologies 22 eyes (1%). A visual acuity between 6/5 and 6/9 was recorded in 1753 eyes (57.8%), between 6/18 and 6/24, 821 eyes (27%), between 6/36 and 6/60, 346 eyes (11.4%) and less than 6/60, 76 eyes (2.5%). VA was not recorded in 38 eyes (1.3%).

Conclusion

The application of scleral lenses has retained a uniquely valuable role when contact lens management is necessary for a variety of different indications. For keratoconus or other primary corneal ectasias they can be applied to augment or replace other types of contact lenses, but also have major applications post transplant or in cases of ocular surface disease. Since the introduction of RGP materials, the fitting processes have become straightforward and predictable.

Volume and anterior chamber depth characteristics in normal human eyes

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Purpose

To evaluate anterior chamber volume, the four angles and anterior chamber depth (ACD) in normal human eyes.

Method

Anterior chamber parameters were recorded prospectively in a consecutive case series of 52 normal eyes. All the studied subjects had no ocular abnormalities rather than mild refractive error. Measurements were performed using the Galilei Dual Scheimpflug Analyzer that combines Placido and Scheimpflug imaging. This device achieves 15 images of anterior segment in less than two seconds.

Results

In the studied group, the mean values for the studied parameters were: ACD $3.29\text{mm} \pm 0.27\text{mm}$ (SD); Anterior Chamber Volume $123\text{mm}^3 \pm 49.05\text{mm}^3$; Temporal Angle ACD $37.58^\circ \pm 2.83^\circ$; Superior Angle ACD $36.71^\circ \pm 4.05^\circ$; Nasal Angle ACD $37.17^\circ \pm 3.19^\circ$ and Inferior Angle ACD $38.55^\circ \pm 3.71^\circ$.

Conclusion

The present method allows a noninvasive measurement of different parameters of the anterior chamber. This data provides benchmark information that can be used to monitor and assess clinical practice.

Visual quality by using Optical Quality Analysis System (OQASTM) in patients implanted with multifocal intraocular lenses: a pilot study

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Purpose

To confirm the usefulness of OQASTM in measuring post cataract surgery results in patients implanted with multifocal intraocular lenses (IOLs).

Method

This study comprised of 12 eyes from pseudophakic healthy patients, implanted with multifocal IOLs. Every patient went under examination before the surgery and at least one month after the surgery was performed. As subjective measurements, monocular uncorrected (UCVA) and best-corrected (BCVA) visual acuity using the ETDRS chart, refractive error and keratometry were evaluated. In order to assess the visual quality objectively, the Optical Quality Analysis System (OQASTM) was used. Differences were statistically analysed with the SPSS program.

Results

Refractive and keratometric results confirmed patients postoperative visual stability. Preoperatively BCVA and UCVA were statistically worse than postoperatively. The higher the contrast was, the better the OQAS values were. The OQAS values measured at 100% contrast, before and after the surgery were higher or similar than the subjective visual acuity, but differences were statistically significant in none of the cases. Statistically significant differences were found in MTF cut off values ($p=0.022$), which showed that the optical system improved after the surgery.

Conclusion

All patients improved their visual acuity and their MTF cut off after surgery ($p>0.05$), so every intraocular surgery was correctly indicated in all cases.

The OQASTM 1.0 version accurately reproduced the experimental results as there were not significant differences between postoperative BCVA measured subjectively and the OQASTM estimates. Therefore, it could be used to estimate visual acuity in patients from whom it is difficult to obtain.

Other studies have shown that, subjectively, patients implanted with multifocal IOLs have a worse visual quality. To make sure that analysed parameters with OQASTM are enough to illustrate patients' visual quality, and in order to try to know how these visual effects could be predicted, more patients and additional parameter measures (such as contrast sensitivity, pupil size effect and objective scatter index factor) would be needed.

Optometry in Portugal: in the route of success

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Introduction

In 1986, the article World Optometry by David Pickweel identified 35 optometrists in Portugal. 25 years later, more than 1000 people have obtained an academic degree in the field of optometry. These degrees are administered by two public universities (University of Minho and University of Beira Interior) since 1988. It is the aim of this study to evaluate the importance of optometrists in the prescriptions of glasses/contact lens in Portugal.

Method

An electronic questionnaire was sent to whole optical establishments affiliated in the National Opticians Association (Associação Nacional dos Óticos). It asked for information about the last three sales of glasses/contact lens for far vision. One of the questions was a four option forced question about who had been the professional responsible for the prescription. The options were ophthalmologist, optometrist, orthotic or other.

Results

235 optical establishments answered the questionnaire corresponding to a total of 705 prescriptions. Optometrists were responsible for 59.0% of the prescriptions followed by ophthalmologists, orthotics and others respectively with 39.4%, 0.9% and 0.7%. In addition, optometrists were consistently the major prescribers throughout all of the continental Portuguese territory.

Conclusion

In the last 25 years, optometrists have become the most important eye care providers in the prescription of glasses/contact lens in Portugal.

Economic impact of ophthalmic optics and optometry

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Purpose

As a relatively new branch of science, optometry must lay the foundations for an adequate development, enabling the possibility of suitable evaluation of public, economic and harmonisation policies. Such a political frame would only be possible by the delimitation of the sector where optometry must be included, that is optometry and ophthalmic optics, for which we will determine a new concept: the Visual Optical Sector (VOS).

Method

The core of this research is the determination of a new methodological system in order to tackle the problems related to the execution of policies in the field of ophthalmic optics, focusing on the Spanish economy. Two points were considered when determining the scope of the research: (i) the structural delimitation by delimiting what does and what does not belong to VOS; (ii) the determination and assessment of the elements of VOS.

The innovative method that is used in this research is the analysis of every product that belongs to the VOS in relation to the sub-division of the sector, and how the optometric practice is divided.

Results

Firstly, the research has shown the general lack of: (i) an economical frame; (ii) knowledge of optometry by society; (iii) and more seriously, a lack of knowledge even by the agents that belong to the VOS. Therefore it is not possible to carry out suitable promotional policies regarding optometry. Secondly, the traditional economic analysis of VOS has been made using the terms 'optics sector' or 'optical sector', which are not accurate in the scope of the analysis: (i) because ophthalmic optics is not the whole of optics; (ii) because, in general, these economic analyses only cover five known products, that do not represent the whole sector; (iii) these five products are important due to the turnover that they produce, but not when considering the importance of the optometric practice, and the inclusion of society within the economic analysis.

Conclusion

In cases in which the topic that is being regulated is not well defined it is neither possible to provide solutions for potential problems, nor to even recognise that a problem exists. Therefore, it is crucial to involve optometry within the ophthalmic optical sector as well as to carry out an assessment of the ophthalmic optical sector according to optometry.

To evaluate the efficacy of use of contact lenses for therapeutic purposes in various ocular surface disorders in the Nepalese population

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Purpose

Therapeutic contact lens is used to relieve pain, promote corneal wound healing, provide mechanical protection and support, maintain corneal hydration, improve vision and seal or splint the cornea in various ocular surface disorders. To date, no study has been conducted in the use of contact lenses for these purposes and its cost effectiveness in the Nepalese population.

Method

A prospective analysis of 57 eyes of 55 patients who had various ocular surface disorders was performed at B.P. Koirala Lions centre for Ophthalmic Studies, including 30 males and 25 females. 94.7% subjects were fitted with Poly-2-hydroxy ethyl methacrylate (70% water content) and 5.3% subjects with Balafilcon A (36% water content) with mean duration of 11.5 ± 47.9 days. Both the clinical condition and subject's assessment of lens comfort was evaluated at the initial treatment visit and the final visit at the close of data collection.

Result

Corneal laceration (22.8%) caused by mechanical injury and vernal keratoconjunctivitis (21.1%) were the most common ocular surface disorders that required contact lens fitting. The common indications for applying BCLs were alleviation of pain and discomfort in 31.5% and corneal thinning impending to perforation in 26.3%. Subjects' clinical conditions and symptoms were resolved partially to completely in 89.4%. About 83% of the patients were able to conduct their regular activities as they had significant reduction in pain and could open their eyes normally. Despite the high cost of the contact lens, 81.81% of the patients considered it to be a cost effective treatment considering the fact of significant pain and reduced visual efficiency before the use of lenses. Dry eye was found the common cause of contact lens associated therapeutic failure.

Conclusion

With a close follow up and patient education, bandage contact lenses are safe and cost effective in alleviating symptoms and healing ocular surface disorders despite the poor economic status of this Nepalese population.

'Vision Volunteers': a model to tackle the burden of uncorrected refractive error in a developing country like Nepal

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¹Maharajgunj Medical Campus, IOM, Kathmandu, Nepal

²B.P. Eye Foundation, Kathmandu, Nepal

Purpose

It is estimated that 1.01 million children under 16 years of age have uncorrected refractive error and only 15% of Nepalese children have access to eye care services in Nepal. Uncorrected refractive error has emerged as the commonest cause of ocular morbidity and an important cause of visual impairment in Nepal with a population of around 30 million and less than 500 eye care service providers. So, there is a need to develop an alternative model of human resource to screen the vision of these children with uncorrected refractive error and visual impairment and refer them to the eye care professionals.

Method

A team of teachers (three from each school) from 300 secondary level schools were trained for vision screening and recording it using the Snellen Fraction system. They were awarded the title of "Vision Volunteers" after the completion of their training. The children with presenting visual acuity of $\leq 6/12$ in better eye were categorised as abnormal and that of better ones as normal. Trainings were conducted at 12 randomly selected sites by researchers which included two optometrists and one ophthalmologist. Visual acuity taken by these volunteer teachers was reassessed in a randomly selected 30% of the children by the researcher team and the findings were compared.

Result

Out of 74,641 children screened by the vision volunteers, 71,436 (95.7%) were recorded to have normal vision ($VA \geq 6/9$ in the better eye) while 3,205 (4.3%) were recorded to have abnormal vision ($VA \leq 6/12$ in the better eye). Of the 30% of children reassessed by the researchers, 95.05% of the children had normal vision while 4.95% had abnormal vision. The findings of both volunteer teachers and researchers were in close agreement.

Conclusion

As Vision Volunteers can screen the vision of children as effectively as trained eye health professionals, they can be utilised to screen more children for their vision impairment. Trained professionals, of whom there are fewer in number available, can then give more time in managing the condition of these referred children. This in turn would help in reducing the burden of uncorrected refractive error and vision impairment in the country.

Is it possible to improve reading performance and quality of life in non-AMD central vision loss patients with a specially designed reading rehabilitation programme?

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Purpose

To study the improvement of reading performance in non-AMD central vision loss patients after performing an especially designed reading rehabilitation programme (RRP).

Method

36 low vision (9 pathologic myopia, 11 Bests' disease and 16 Stargardt's disease) patients underwent four in-office training sessions combined with in-home training during two months. Reading performance, including reading speed (RS), reading duration (Rd) and font size (F), were evaluated during each in-office training visit, while assessment of the individual's perception of quality of life (QoL) using the WHOQoL-Bref was carried out before and after the RRP.

Results

Mean VA and magnification values at baseline were 0.52 ± 0.35 LogMAR and 3.76 ± 0.79 x. Mean RS, Rd and F prior to training were 55.88 ± 14.7 words per minute, 8.32 ± 3.34 minutes and 15.24 ± 1.39 points, respectively. Patients obtained significant improvement in mean RS (107.35 ± 26.81 wpm, $p < 0.0001$), Rd (40.88 ± 8.57 minutes, $p < 0.0001$) and F (10.97 ± 2.49 points $p < 0.0001$) VA (0.06, M scale, $p < 0.0001$). Significant differences ($p < 0.0001$) in the physical, psychological and environmental domains of the WHOQoL-Bref questionnaire were obtained after the RRP.

Conclusion

A combined, well-structured RRP can improve reading performance as well as some QoL areas. Therefore, customised RRP where individually supervised in-home training is included may render high functional results for non-AMD central vision loss patients.

Reading speed in the international reading speed texts by native Portuguese readers

Lead author: António Filipe Macedo

Co-authors: Carla Silva, Ana Maria Cardoso, António MG Baptista

University of Minho, Department of Physics and Optometry, Braga, Portugal

Purpose

To measure reading speed in the International Reading Speed Texts (IReST), adapted to Portuguese-Brazilian, of native Portuguese readers.

Method

13 normally sighted subjects in the age range 18-42 years were selected amongst lecturers, undergraduate and postgraduate students at the University of Minho. All participants had no known reading disturbances, including dyslexia. Participants read the 10 texts of the IReST in random order at 40cm, reading time was measured by stop watch and reading speed calculated in words-per-minute (wpm) and characters-per-minute (cpm).

Results

Reading speed was 191wpm (SD±9) and 1166cpm (SD±57). The effect of text in reading speed, in number of errors measured in words and characters was not statistically significant. Reading speed for each text was compared with previous reported data for Brazilian readers that were 180wpm (SD±8) and 1100cpm (SD±40). The difference in reading speed (wpm) between Brazilian and Portuguese readers was statistically significant, $F(1,18)=7.0$ and $p=0.016$.

Conclusion

The main results of this exploratory study showed that reading speed in the Portuguese-Brazilian version of the IReST was higher amongst Portuguese readers. The difference might be due to differences in the population studied, which was more highly educated in Portugal. Contrary to the Brazilian study we found no differences in reading speed amongst texts. These results require further investigation including more subjects and different levels of education.

An international humanitarian mission to Nepal

Lead author: W. Howard McAlister¹

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²Rosenberg School of Optometry – University of Incarnate Word, San Antonio, Texas, USA

Purpose

Project HOPE, since 1958, has worked to make health care available for people around the globe. It is committed to long-term sustainable health care, including educating professionals and community workers, strengthening facilities, fighting diseases, and providing humanitarian assistance through donated medicines, supplies and volunteer help.

Project HOPE often partners with the U.S. Air Force and U.S. Navy to provide interdisciplinary patient care on humanitarian missions. One such mission, Operation Pacific Angel, was carried out in conjunction with the Nepalese Army, U.S. Air Force, Australian Air Force, and a small Army delegation from Mongolia. Patient care was provided near Pokhara, Nepal from 10 to 15 September 2012. Services provided included optometry, pediatrics, family medicine, physical therapy, and obstetrics/gynaecology. Results of the vision care provided were tabulated and analysed.

Method

Two US Air Force optometrists, two Project HOPE volunteers and one local optometrist provided eye and vision care to 995 patients. Visual acuity, auto-refraction, retinoscopy, and ophthalmoscopy were performed on the majority of patients. Other testing was provided on an as-needed basis. Additional equipment and supplies available included hand-held slitlamp biomicroscopes, phoropters, tonopens, diagnostic and therapeutic drugs, and prefabricated spherical spectacles. Because of the eyewear limitation, arrangements were made to refer those with high anisometropia or astigmatism to the optometrist at the Himalayan Eye Hospital for more accurate correction. In addition, it was agreed to refer those requiring surgery, primarily for cataracts and pterygia, to the ophthalmologists at the same facility. Consultation could be sought from the primary medical care professionals participating in the mission when warranted. Translation services were provided by students from the Gandaki Medical College who were taught basic eye care techniques.

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An international humanitarian mission to Nepal

Results

Following refraction of the 995 patients, 926 spherical prescription spectacles were dispensed. For those with astigmatism, equivalent sphere corrections were provided. The few with high cylindrical prescriptions or considerable anisometropia were referred to the Himalayan Eye Hospital for their spectacles. Patients were diagnosed with all types of ametropia, with presbyopia being the most common and myopia being the least encountered. Plano sun glasses were dispensed to all patients. Several non-refractive conditions were diagnosed; the most common were cataracts, dry eye, pterygium, and allergic conjunctivitis. Medical conditions were treated, but those requiring surgery were referred to the Himalayan Eye Hospital. Unfortunately, cataract surgery was not available to patients with better than 20/200 visual acuity.

Conclusion

Eye and vision care is lacking in Nepal, due to only 62 optometrists for 27 million residents, and only one optometry school producing six optometrists annually. Sporadic episodes of care have a considerable impact on those patients receiving treatment. However, there is no continual or follow up care available. One means to address this limitation is to combine on-site training with the care provided. However, training provided to the medical students who served as interpreters on this mission was minimal. In order to address the needs of the Nepalese people, more schools of optometry need to be developed.

Design, application and evaluation of a programme of oculomotor visual therapy for children with special needs

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Purpose

A literature review revealed a lack of specific oculomotor therapy exercises for children with special needs. The main purpose of this study was to design and implement a specific visual therapy programme for these patients, and to evaluate its outcome with the Development Eye Movement (DEM) test.

Method

A group of 12 children (10-11 years old) from a state school devoted to children with special needs participated in the study. Exercises were classified according to a progressive difficulty level. Aiming at the full involvement of educators in the implementation of the therapy programme, a training workshop was designed to describe the temporal scheduling of sessions, the activities corresponding to each session, with detailed and accurate instructions of each exercise, and the material required to conduct the therapy. The training was scheduled for 12 weeks, with a 45 minute session once a week.

As a preliminary step before designing the therapy programme, all children were administered a complete ocular and visual examination, including oculomotor skills with the DEM test. These skills were reevaluated after six months, and again six months later.

Results

The evaluation of the outcome of the therapy programme supported the need for further modifications in its design. Thus, a stronger action is considered necessary for this particular population, oriented at large and small amplitude saccades. Similarly, some of the figures included in the exercises were not totally appropriate for the intellectual level and thus not suitable for this population group.

Results from the DEM test revealed that, whereas 10 years old children reached the expected values for their age, both in horizontal and vertical times, the 11 years old group failed to reach normal values under the two concepts. In addition, the subjective perception of educators indicated a progress in the reading ability of the children participating in the study.

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Design, application and evaluation of a programme of oculomotor visual therapy for children with special needs

Conclusion

Although a larger study sample is required to draw definite conclusions, the present findings suggest a strong dependency of the outcome of the therapy on the age of the participants. As the design of the exercises may have influenced the effectiveness of the performed therapy, further modifications in the therapy design are required, both in number and duration of the sessions.

Acknowledgment: La Gavina, special needs school, Barcelona

Considerations in the design of a child eye health programme for Nampula, Mozambique

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Purpose

There are almost 12 million children (<18 years) in Mozambique with minimal access to eye care. Annual screening of school children by teachers for uncorrected refractive error is one of the most cost effective health interventions in Sub Saharan Africa. The International Agency for the Prevention of Blindness (IAPB) has recommended that child eye health interventions be incorporated into National School Health Initiatives.

In view of the IAPB position this presentation sets out to identify and discuss the main considerations in the design of a child eye health strategy, for the province of Nampula, Mozambique, which aligns itself with broader child health and education strategies.

Method

The Mozambique national, provincial and district educational and health systems were examined through the 2007 census and other published statistics. Interviews were conducted with representatives of the provincial health and education systems and an external bilateral aid representative. Local potential stakeholders in the child eye health programme were identified and interviewed; these included primary school principals, teachers and representatives from NGOs working locally and nationally.

Results

Considerations will be discussed under the following headings: social; educational; community; health. A School Health policy exists in Mozambique but the implementation of the policy is not consistent in each province. The main considerations in Nampula are the lack of resources in education and health and the extreme poverty in which most children live. Potential areas for positive integration of child eye health were identified in several government run school and community health and education schemes.

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Considerations in the design of a child eye health programme for Nampula, Mozambique

Conclusion

Identifying potential barriers and opportunities ensures that programme design is sustainable and appropriate to the local setting. Familiarity and engagement with stakeholders in existing child health and educational systems in Nampula, as outlined in this presentation, will inform the design of a child eye health programme and has the potential to enlighten child eye health programme design in other countries. The considerations discussed are relevant to organisations and institutions involved in the provision of primary child eye care through school screening.

Even though the dispensed spectacles contained only spherical power, the fact that they were new made recipients perceive them as more advantageous than recycled prescriptions. Some humanitarian missions dilate/cycloplege all patients, which despite some inherent disadvantages, should improve accuracy of correction and allow more pathology diagnoses.

Design and testing of a protocol aimed at improving the care of patients with visual deficits, from the collaboration between different professionals and regardless of patients' economic resources

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Introduction

An estimated 1.77% of the population has a visual deficit unrecoverable by medical or optical media. The population in general, and many health professionals, in particular, have little or no information about possible treatments that may allow for the improvement of the quality of life of these people. Finally, the tools and services that can enable this improvement in quality of life require economic resources that are not always available for people suffering from visual impairment.

Objective

To design and test a protocol to detect and assess people affected by visual deficits, with a multidisciplinary approach and pursuing a good result with an optimum use of resources.

Method

- to identify and systematise tasks corresponding to different professionals
- to identify the role of each of the institutions involved
- to reach agreements with various stakeholders to coordinate the actions of the professionals involved and sign cooperation agreements, when necessary
- to perform a pilot test in one of the hospitals
- to analyse the results
- to review and improve the protocol

Results

As a result of the implementation of the protocols and referral pathways, to date there have been a total of 44 visits to the Hospital in Terrassa: 30 women and 14 men.

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Design and testing of a protocol aimed at improving the care of patients with visual deficits, from the collaboration between different professionals and regardless of patients' economic resources

Reading (14), avoiding glare (12), mobility and orientation (7), money management (7) and sewing (7) are the main demands among the patients. Fourteen of the 44 improved their visual acuity in 0.1 or more after refractive examination. Regarding the counseling of patients, 20 of 44 were eligible for membership of the ONCE and were informed of this possibility. Only two of the 20 were aware of this possibility and the benefits of it. Eighteen were referred to a specialised low vision consultation, of those, 14 presented visual acuities between 0.1 and 0.3 and four between 0.3 and 0.5.

Conclusion

In many cases a simple refraction may improve quality of vision. Information, following established conventions and team work will substantially improve care for visually impaired patients. This preliminary work confirms the need to continue working on improving these things and to perform a rigorous cost study to propose its implementation in visual attention in the context of public health.

The economic costs associated with providing emotional and other relevant support in eye clinics - findings from the United Kingdom

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Co-authors: Hanna Gillespie Gallery, Miriam Louise Conway
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Purpose

Visual impairment causes an economic impact on society. Indirect costs associated with visual impairment may be reduced by providing support services such as emotional support to patients in eye clinics at the time of sight loss. In the United Kingdom this is provided by the Eye Care Liaison Officers (ECLOs). The aim of the study was to determine the costs associated with providing emotional and other support in eye clinics using data gathered from ECLOs.

Materials

An online survey was created and distributed to ECLOs in June 2010. The survey investigated how many patients ECLOs saw per day, time spent per patient, training costs incurred and the salary of the ECLOs so that the overall cost of an ECLO service could be calculated.

Results

The average cost of an ECLO per patient per contact was €22.34 assuming an average of nine patients were seen per day, in a 42 week year. The costs involved are likely to rise every year in line with inflation.

Conclusion

Provision of emotional and other support in eye clinics will increase the overall cost of the service provision, but the potential benefits of this service may outweigh the costs. Future studies need to be carried out to verify this.

Prevalence of refractive error in children in Mazamari, central Amazonian forest, Peru

Lead author: Elena Tomás Verduras
Co-authors: Isabel Signes Soler, José Luís Hernández Verdejo, Mercedes Moreno Pérez
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Introduction

The aim of this project was to provide an optometric and visual health examination to the children living in the Mazamari District, province of Satipo, Department of Junín, in the central Amazonian forest.

For more than 20 years, terrorism and drug trafficking has hit the Mazamari area, plunging the population into deeper poverty and turning it into a destroyed area. The terrorist actions inflicted by the group Sendero Luminoso dramatically increased the number of orphans in the province. Living conditions in the Mazamari District are precarious, children aged 0 to 15 years represent 60% of the population. Around 2,500 indigenous children are refugees or partial/total orphans. There is a high percentage of family abandonment due to the terrible situation that many single young mothers live in as they have no means of help.

The purpose of the organisation Visión Sense Fronteras was to check 820 school children at the Franciscan Mission, Aldea del niño Beato Junipero Serra.

Method

The work was developed at the Primary Health Care Centre located in the school Aldea del niño Beato Junipero Serra, in Mazamari.

820 children aged three to 16 were checked. VA measures were taken at five metres with the Snellen chart and natural light. External observation, pupil observation, IPD measure, eye movement, distance and near cover-test aided/unaided were also undertaken.

Keratometry (OMTE-1 Javal, Topcon, UK), IOP average (Icare, Medical Expo, Finland) static retinoscopy, ophthalmoscopy and subjective refraction (with test glasses) were carried out on all the people with VA < 0.8.

Results

Mazamari is 410km away from Lima (Perú) and it is a difficult trip getting there as it means crossing the Andes and reaching a height of 4.818m. Ticlio is the highest railway junction in the world. Its location turns Mazamari into a quite inaccessible place, cut off for many years and keeping unmixed indigenous groups there. Three groups of population were found living there: Colonos, Shipibos and Ashaninkas.

A high percentage of emmetropia was found in children aged three with a VA of 1 and later (with child growth) there were found high levels of mixed astigmatism with bilateral amblyopia that improved in three lines approx. with the best correction. There was also ametropia, big astigmatism (in a high percentage higher than 3 D) monocularly and no strabismus. The ametropies of farsightedness detected were of a high level.

Many cases of pterygium and scleral pigmentation registered due to climate conditions and the genetics of the population.

Conclusion

The organisation VSF think that working with this population in poor regions helps to decrease the number of people with preventable blindness, especially in this case with the children that represent the base of the future society.

Refractive errors in Germany – a statistical analysis

Lead author: Wolfgang Wesemann¹

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²University of Mannheim, Mannheim, Germany

Purpose

The optical industry has numerous data on the number and the refractive power of the spectacle lenses sold. However, very little is known on the ametropia distribution of the wearers of these lenses.

Method

The distribution of ametropia in Germany was evaluated in a cross-sectional study of more than 50,000 subjects. The data was provided by 43 independent opticians and optometrists from 11 federal states in Germany. Data analysis was carried out with SIGMASTAT and STATA.

Results

The age of the subjects varied between 1 and 110 years. The spherical equivalent varied between -26 and +21 dpt.

The poster will present answers to the following questions:

- How are the spherical equivalents distributed?
- How is the cylinder power distributed?
- How does ametropia change with age?
- How often does anisometropia occur? How is it distributed?
- What is the average pupil distance for men and women?
- How large are the between-subject differences in pupil distance?
- How does the pupil distance change with age?
- How does the add power change with age?
- Do ophthalmologists prescribe different additions as compared to optometrists?

Conclusion

The results establish a reliable data base which can be used to address important general questions such as:

- Is it meaningful to screen visual acuity of car drivers at regular intervals to ensure that vision is not deteriorating to a point that would make the driver unsafe? In order to answer this question we should know how many people become more myopic between 17 and 30 years of age.
- How many people will have a good visual quality with ready-made spectacles? In order to answer this question we need to know how frequent differences between ametropia of the right and the left eye occur.

Epidemiology of eye diseases in the elderly of Sari, Iran

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Purpose

The purpose of this study was to determine the prevalence of eye diseases among the elderly in the city of Sari in northern Iran.

Method

In a cross-sectional population-based study by random cluster sampling, subjects older than 54 years old from the city of Sari in northern Iran were selected. Ophthalmic examinations included: vision, subjective and objective non-cycloplegic refractions, visual acuity, slit lamp biomicroscopy, intraocular pressure measurement, clinical grading of lens opacities, measurement of vitreous opacities, and direct and indirect ophthalmoscopy.

Results

Of 1185 selected subjects, 79.1% of them participated in the study. The results of this study showed that the prevalence of cataract, age related macular degeneration (AMD), glaucoma and diabetic retinopathy were 29.6% (95%CI: 26.6-32.5), 5.8% (95%CI: 4.3-7.3), 3.7% (95%CI: 2.5-5) and 2.7% (95%CI: 2.6-3.7) respectively. The prevalence of AMD was correlated to the male gender significantly. These results indicated that all of these four eye diseases were correlated to the age and at least one disease was detected in 35.8% (95%CI: 32.7-38.8) of the participants.

Conclusion

The results of this investigation indicated that about 36% of the elderly have at least one eye disease and paying attention to this problem will lead to a better quality of life for these people.

Comparison of visual findings of athletes participating in the Special Olympics Lions Clubs International Opening Eyes by regions in 2010

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Special Olympics International, Washington, D.C, USA

Purpose

This study is a review of the vision screenings of athletes participating in the Opening Eyes by the six regions:

- Africa
- Asia Pacific
- East Asia
- Europe/Eurasia
- Latin America
- North America.

Special Olympics is a year round programme for individuals who have been diagnosed with intellectual or developmental disabilities.

Method

A standardised comprehensive vision programme is offered to Special Olympics athletes at no cost around the world. Data from the vision programme was entered into a central data system. Data was then analysed with SPSS 17.0 comparing the visual findings of the athletes by region seen during 2010.

Results

Data from 21,326 athletes was reviewed. Most of the athletes seen were male (64%) with no gender differences found among the regions. Athletes from Africa, Asia Pacific, East Asia, and Latin America were younger than the other regions. Athletes from Africa, Asia Pacific and Latin America were most likely to report that they have never had an eye exam. No regional differences in colour vision or strabismus (distance and near) were found. The prevalence of strabismus ranged from 13.2%-14.1% at far and 11.9%-13.1% at near. Refractive error did reflect regional differences, with Asia Pacific showing highest mean spherical equivalent (-1.150 D +/-3.58) while East Asia had the lowest (-0.64 D +/-3.58). Post hoc tests revealed significant differences only between these regions.

Conclusion

More significant differences in refractive error were expected to be found between the regions based on diversity reported in the literature than we found in our study. It is our interpretation that athletes participating in Special Olympics reflect more similarities in vision findings to each other than to the region that they represent. This is supported by the lack of the similarity in refractive error, strabismus and colour vision between them and their respective regions and more similarity to each other.

One difference to note is that athletes residing in North America and Europe/Eurasia were more likely to have had an exam than the other four regions. Limitations of this study include the fact that the history is provided by the athletes, the athletes represent only those who were interested in participating and may exclude those receiving care locally, and lastly, the data is entered into the data base at multiple locations around the world. Further study should include expanding the programme to individuals with disabilities that do not participate in Special Olympics to be able to generalise the findings.

Optical quality of the ready-made reading spectacles marketed in non-sanitary shops

Lead author: Cristina Bonnin-Arias¹

Co-authors: Juan José Navarro-Vals¹, Luis L. Lobato-Rincón¹, Victoria Aguirre-Vilacoro¹, Eva Chamorro¹, Celia Sánchez-Ramos^{1,2}

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²Department of Optometry and Vision, School of Optometry, Universidad Complutense de Madrid, Madrid, Spain

Purpose

Analysing the optical quality of the lenses in ready-made reading spectacles marketed in non-sanitary shops, according to the current European Standard (ISO 16034:2002).

Method

This project tested the spherical, cylindrical, and prismatic power of 132 lenses (RE/LE) from 66 ready-made reading spectacles, using the spectrometer / frontofocometer Humphrey Lens Analyzer 360 with Spexan. Their fulfillment of the current standard was checked, which states a tolerance up to 0.12D for spherical power, 0.09D for cylindrical power, and 0.33D for prismatic power. The measurements of spherical and cylindrical power were taken in the optical centre of the lens. The prismatic power was figured out by means of Prentice's Law, considering a nasopupilar distance of 32mm to find out the horizontal de-centring, and the difference between eye height to find out the vertical de-centring.

Results

The test results showed that 44% of the ready-made reading spectacles studied have lenses which do not fulfill the current standard. All the tested spectacles are defective for powers +1.75D, +2.75D, +3.75D, and +4.00D. Spherical defects were present in 23% of all tested spectacles, although this percentage was higher in those spectacles with more powerful lenses. All spectacles with a power over 3.00D showed spherical power errors, up to 0.56D. Regarding the defects related to cylindrical and prismatic power, a 3% of spectacles showed cylinder-related defects, a 29% showed horizontal prismatic aberrations, and a 6% showed vertical prismatic aberrations. In some cases, lenses showed one, two or more defects.

Conclusion

44% of tested ready-made reading spectacles have lenses which do not fulfill the current standard. Visual explorations and previous optometric prescriptions by sanitary staff experts in vision sciences can avoid the unsuitable use of ready-made reading spectacles, since they show a high percentage of defects in their optical quality and considering inappropriate self-prescriptions.

Low vision aids visual recognition and use

Lead author: Jennifer Brower

Co-author: Paula Stevens

Immediate past president, Association of British Dispensing Opticians (ABDO), London, UK

Purpose

The purpose of this poster is to present to delegates photographs of different types of low vision aids for identification and method of use. Many opticians do not undertake low vision work in any depth but with the steadily increasing numbers of low vision patients, it is important that opticians both understand and feel competent to undertake this rewarding work. Low vision services in many European countries are patchy and under resourced and this poster will help delegates understand how different types of low vision aids can help patients with various visual problems.

Method

The poster has been formulated following the author's many years of practical experience in the field of low vision in private and hospital practice, and as a low vision tutor and examiner, and has been co-authored by the Association of British Dispensing Opticians' CET co-ordinator. All the low vision aids featured are in common usage in the UK.

Results

This presentation will provide the principles and relevance of the featured low vision aids and their value to the patient. These include both optical and non optical aids, and take account of the relevance of the spectacle prescription and the subsequent suitability of different types of low vision aids.

Conclusion

The poster has been produced in a clear, easy to follow style with bright and sharp colour photographs. The range of aids featured will provide a good foundation for practitioners to build on what they will learn through this presentation and help them extend their knowledge of low vision aids.

A cross-sectional survey of current and anticipated future use of standard and specialist equipment by UK optometrists

Lead author: Priya Dabasia
Co-authors: John Lawrenson, David Edgar
City University, London, UK

Purpose

Newer imaging modalities, visual function tests and information technology play increasing roles in the delivery of optometric services. However, the rationale for purchasing such equipment and its impact on patient care have not been previously investigated. This study aims to determine current and anticipated use of equipment in optometric practice, and to elicit optometrists' views on adoption of specialist equipment.

Method

An anonymous questionnaire was developed, divided into five sections covering the use of standard ophthalmic equipment, specialist diagnostic equipment, and information technology in optometric practice. Most questions required Yes/ No responses, with 5-point Likert scales for questions relating to barriers and preferences. An advisory group confirmed the questionnaire's face validity, and minor amendments were made based on their feedback. The pilot survey opened in October 2012. A sampling frame was gathered from the College of Optometrists' membership database of over 10,000 UK-based registered optometrists. A total of 368 responses are required based on a power calculation. Assuming a response rate of 30%, the survey should be sent to a randomised sample of 1,227 members. Recruitment will be initiated by an email invitation to participate online via a hyperlink. Members without a listed email address, or who opt to complete the questionnaire on a paper version will be sent the survey by post. On completion, respondents can enter a prize draw to win shopping vouchers to the value of £100. Two follow-up mailings will be used to further maximise the response rate. The survey will close following two consecutive days without responses.

Results

Questionnaires will be collated online via Survey Monkey, and paper responses checked manually prior to optical scanning into a database. Dissemination of results and analysis will begin in March 2013. Respondents will be categorised as low, medium, or high adopters, based on their use or non-use of the technologies surveyed, and responses will be analysed separately. Chi-squared analysis will determine the likelihood that sampling variability or chance could be an explanation for any observed trends. Free-text responses will be interpreted independently by two research team members, and any disagreements will be reviewed by the principal investigator and resolved by discussion.

Conclusion

Survey results will identify aspects of optometric practice that may benefit from targeted CET/CPD e.g further training in the interpretation of diagnostics tests. The main themes emerging from the survey will be investigated using qualitative research methods, comprising semi-structured interviews with optometrists, followed by focus group discussions.

Survey on management of refractive errors in children aged up to eight years by ophthalmologists, orthoptists, opticians and optometrists in Germany, Austria and Switzerland

Lead author: Lena Gronde

Co-authors: Anita Killmann, Wolfgang Cagnolati, Peter Moest
Beuth University of Technology Berlin (University of Applied Sciences), Berlin, Germany

Purpose

The question of the adequate correction with glasses or contact lenses for children is one of the most difficult issues in paediatric optometry and ophthalmology. This study compares, in the context of a Masters thesis, the prescription behaviour of opticians / optometrists and ophthalmologists / orthoptists in Germany, Austria and Switzerland.

Method

Eye care practitioners of the three countries were interviewed using a questionnaire about the prescribing behaviour for hyperopia, partial correction according to cycloplegia, hyperopia with strabismus, myopia, astigmatism and functional tests in children up to 8 years. The questions were divided into three age groups: A (0 - 3 years), (B 3 - 6 years) and C (6 - 8 years). Afterwards a dioptric correction/prescription value was determined for each visual defect. A total of 11,885 questionnaires were sent and answered online via an online platform, or by letter. 378 surveys were evaluated.

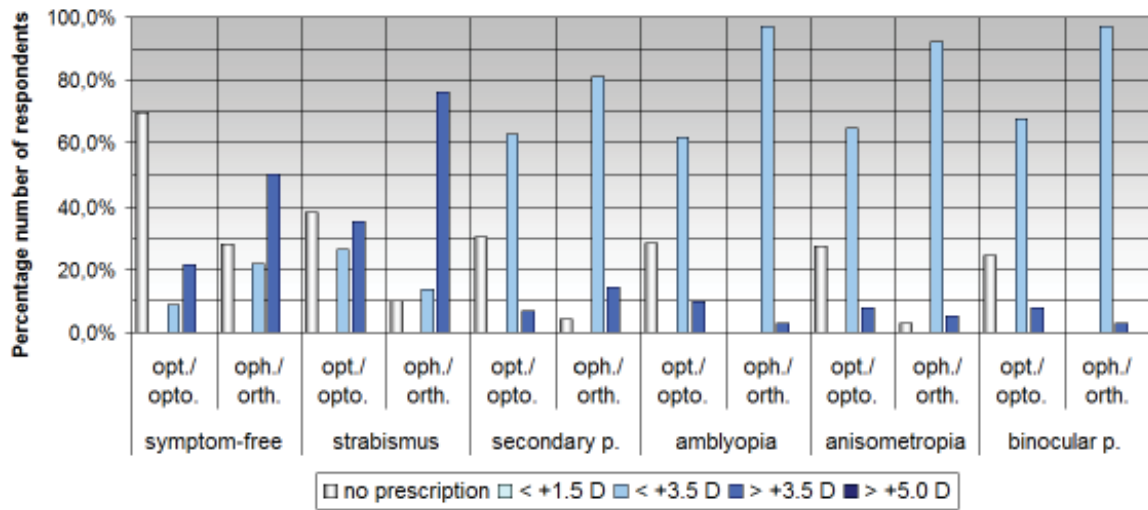
Results

Most opticians/optometrists (64%) prescribe an optical correction in age group A, for symptom-free children with hyperopia or hyperopia with secondary problems at a dioptric value of +3.5 D (and more). Ophthalmologists/orthoptists (65%) would correct asymptomatic hyperopia in age group A and B, and hyperopia with secondary problems in age group A in the same way (+3.5 D). Both occupational groups (91%) prescribe optical correction for a +3.5 D (and less) hyperopic child with strabismus, binocular problems, amblyopia and anisometropia in age group A. Ophthalmologists/orthoptists (66%) prescribe at the same level for children with asymptomatic hyperopia in age group C. Most of the eye care practitioners prescribe optical correction for children in age group C with +1.5 D (and less) symptomatic hyperopia. Optometrists and ophthalmologists would correct -2.0 D myopia (46%) and 2.0 D astigmatism (45%) in age group A, and in age group B from a dioptric level of 1.0 D (M. 30%, A. 49%), and in age group C from a dioptric level of 0.5 D (M. 41%, A. 51%). Most of the surveyed (36%) would reduce the dioptric value determined with refraction in cycloplegia (cyclopentolate-hydrochloride) by 0.5 D.

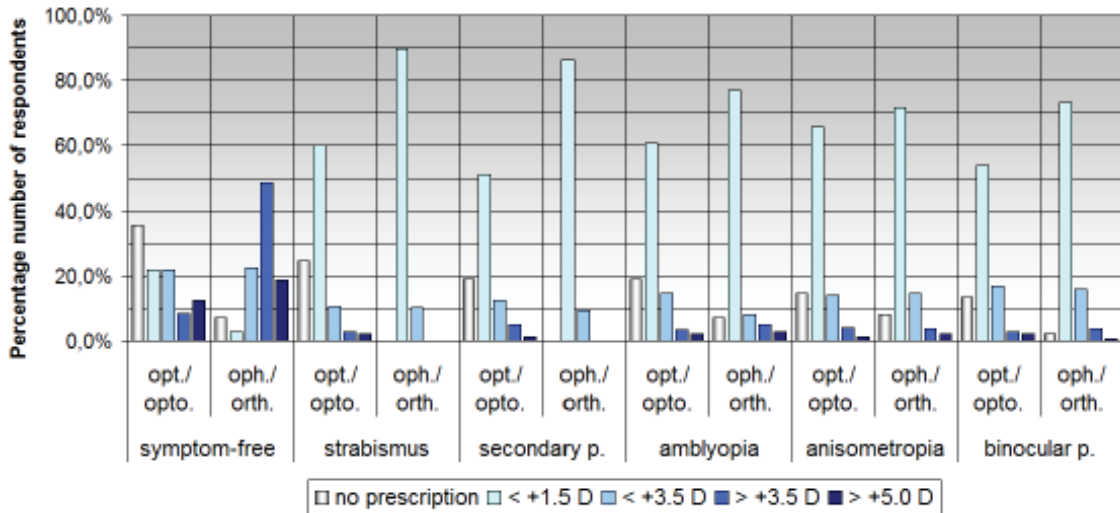
Conclusion

There is no difference in the prescribing philosophies for paediatric patients between German, Austrian and Swiss optometrists and ophthalmologists.

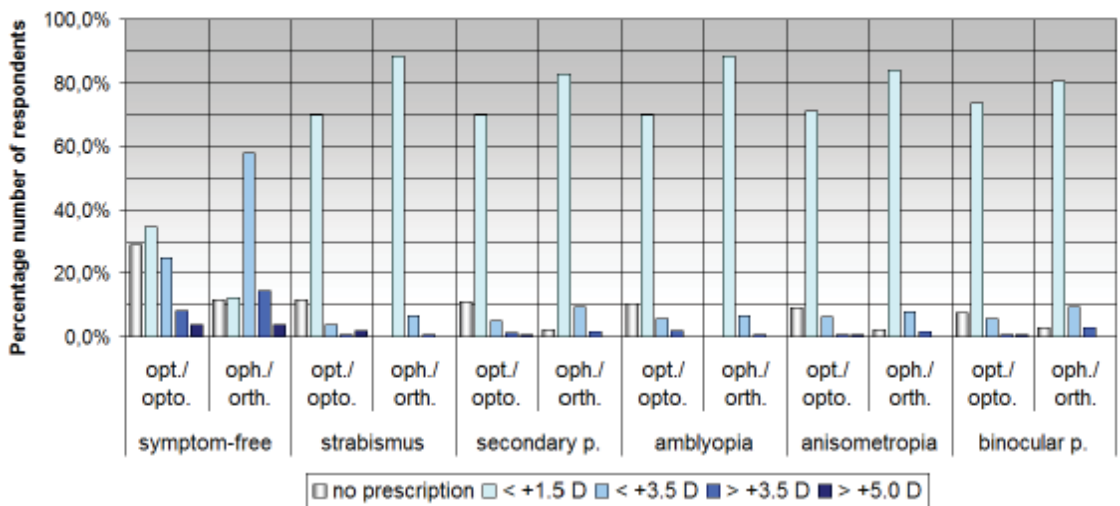
Prescription behaviour of opticians/ optometrists and ophthalmologists/ orthoptists in Germany, Austria and Switzerland
hyperopia - age group A (0 - 3 years)



Prescription behaviour of opticians/ optometrists and ophthalmologists/ orthoptists in Germany, Austria and Switzerland
hyperopia - age group B (3 - 6 years)



Prescription behaviour of opticians/ optometrists and ophthalmologists/ orthoptists in Germany, Austria and Switzerland
hyperopia - age group C (6 - 8 years)



Evaluation of the anterior chamber angle closure: comparison of the Van Herick technique with Scheimpflug camera

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Purpose

About 77 million people in the world suffer from glaucoma and around 10% of them are visually impaired. One of the risk factors is the anterior chamber angle closure. The aim of this study was the evaluation of the effectiveness of a simple and quick method to assess the angle, the Van Herick technique (vH), comparing the results with the measures of the chamber angle obtained with the Scheimpflug Camera (SC).

Method

The chamber angle was evaluated in 72 patients who didn't suffer from any pathology, using vH techniques and the SC. Because the vH gives categorical evaluation results, and the SC gives quantitative results (i.e. the measurement of the angle in degrees), the correlation - according to correlation coefficient and the coefficient of determination was - made in two ways. First it was evaluated comparing the measures between vH and SC, then it was given a score to every chamber angle value measured in degrees with SC, according to the grading system of Shaffer. Then the Pearson coefficient and the Coefficient of Determination (CD) between the qualitative score of vH and SC modified by Schaffer (SCS) was evaluated. The p-value was also calculated.

Results

The anterior chamber angle values range between 21.80 and 55.48 degrees with SC and between 2 and 4 grade with vH. The Pearson coefficient and the coefficient of determination resulted as follows: a) Pearson 0.68 ($p=0.0001$) and CD 0.49 between vH and SC; b) Pearson 0.75 ($p=0.0001$) and CD 0.60 between vH and SCS.

Conclusion

There was a good correlation between the results from the Van Herick technique and the measures of the Scheimpflug Camera transformed into categorical variable according to the Schaffer grading system. The use of the Van Herick technique can be considered useful for the measurement of the width of the chamber angle and hence for the screening of the presence of one of the risk factors for chamber angle closure. This opportunity must be further verified comparing the results of the Van Herick technique with the gonioscopy, i.e. the gold standard for the diagnosis of the chamber angle closure.

A rapid flip-chart screening tool for reduced vision in older people

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Objectives

In the UK, 20-50% of older people have undetected reduced vision and in most cases this results from correctable problems (refractive error and cataract). Many older people are not using state-funded community optometric care. This project sought to investigate whether vision screening in the community might (a) educate the public about the need for routine eyecare and (b) provide personalised advice to persuade people with poor vision to seek optometric care.

Method

A flip-chart vision screening test was used, which was refined after a preliminary study of 180 older people to include tests of: monocular presenting distance high contrast and low contrast visual acuities (VAs) and binocular near VAs. The results from this flip-chart vision screener on 200 people aged 65+ (mean age 77 years) are presented. 31.5% were seen in community settings including a community day centre, and the rest were seen in a primary care optometric practice. All participants were given a full optometric eye examination.

Results

Initially, we defined eye disease as significant gain in monocular distance VA or binocular near VA with new refractive correction, significant cataract, or at risk of rapid progression macular degeneration. The best sensitivity was obtained for a screener test combination of a fail on high contrast VA OR low contrast VA OR near VA (sensitivity 82%, 95% CI 74.2 to 87.8; specificity 61.5%, 95% CI 50.4 to 71.6). Alternatively, a screener test combination of low contrast VA alone gave sensitivity of 75.4% (67.1 to 82.2) and specificity 76.9% (66.4 to 84.9).

Conclusion

This rapid flip-chart vision screener does not replace the need for routine eye care, but may help to educate older people about the need for eye care and may be useful in detecting people who are not aware of a drop in their VA. In particular, this tool might be useful in rehabilitation centres, for example where older people are recovering from falls. The test results should include the caveat that the screening test does not replace the need for regular eye examinations, which are necessary to detect glaucoma.

Is a reading addition necessary for clinical contrast sensitivity measurements?

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Co-author: Julie A. Hughes
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Anglia Ruskin University, Cambridge, UK

Purpose

Clinical tests of contrast sensitivity are performed at near with letters large enough to be above the acuity threshold of presbyopes with normal vision. Is a reading addition necessary to obtain accurate thresholds?

Method

Contrast sensitivity was assessed using Pelli-Robson and Mars charts. Participants were presbyopes with normal or corrected-to-normal distance and near acuity. Contrast sensitivity was assessed with participants wearing distance refractive correction, and also wearing an appropriate addition for the working distance (+0.75DS for the Pelli-Robson at 1m; +2.00DS for the Mars at 50cm).

Results

The difference between contrast sensitivity measurements made with and without the reading addition was not significant for either chart (repeated measures t-test, $p > 0.05$ for Pelli-Robson and Mars).

Conclusion

Contrast sensitivity can be assessed in presbyopic visual normals with patients wearing either distance or near correction without affecting thresholds.

The quiet eye is not a true fixation

Lead author: Shehzad Naroo¹

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²OTG Research & Consultancy, London, UK

Purpose

Previous research in golf putting has reported that the Quiet Eye (QE) was the only gaze associated with both higher skill and increased success. The QE in golf is defined as the final fixation on the ball prior to the initiation of the backswing. The offset of the QE occurs when the gaze deviates off the ball by more than 3° visual angle for a minimum of 100ms. The authors propose that the QE definition is not consistent with fixation definitions in the current literature and does not provide accurate measurement of the vision strategy of golf putting; for reference a golf ball subtends an angle of 1.6° in the putting stance.

Method

Golf putting eye tracking data was recorded with a binocular eye tracker and analysed using novel bespoke software. The total number (TN), mean duration (MD) and total duration (TD) of fixations made to the ball during the swing phase of putts (corresponds with the QE) were measured using visual angle fixation criteria from 0.5° (True fixation) to 3° (QE). 482 putts from 27 golfers of various skill levels were included in this study.

Results

(i) MD increased 10x from 0.5° to 3°, but TN and TD of fixations only increased 3x from 0.5° to 3°; (ii) All three parameters measured for 0.5° and 3.0° were highly different and poorly correlated (0.5° vs. 3°; TN: 11.9 ± 3.7 vs. 4.0 ± 2.0 , $r = -0.037$; MD(ms): 57.7 ± 48.3 vs. 611.6 ± 559.4 , $r = 0.498$; TD(s): 0.62 ± 0.31 vs. 1.83 ± 0.96 , $r=0.385$).

Conclusion

0.5° represents a true fixation but 3° includes fixation, pursuit and saccade gaze behaviours. Rather than measuring pure fixation, 3° only measures attention to a region of interest around the ball. True fixation and attention are not correlated in golf. The current sport vision literature based upon the current QE concept (Fixation = 3°) needs to be re-assessed.

Acknowledgements: This poster was presented at the American Academy of Optometry in October 2012.

Diffuse illumination device to improve mesopic contrast sensitivity in drivers

Lead author: Juan José Navarro-Vals¹

Co-authors: Eva Chamorro¹, Marta García-Rojo¹, Antonio Langa-Moraga², Cristina Bonnin-Arias¹, Celia Sánchez-Ramos^{1,2}

¹Neurocomputing and Neurorobotics Group collaborator, University Complutense of Madrid, Madrid, Spain

²Department of Optometry and Vision, School of Optometry, Universidad Complutense de Madrid, Madrid, Spain

Purpose

To evaluate the influence of a diffuse illumination device located outside the field of vision that provokes a controlled pupillar miosis, on the contrast sensitivity in drivers tested in mesopic conditions.

Method

Cross-sectional prospective observational study in which contrast sensitivity by Pelli-Robson Test (CS) was evaluated in 49 drivers under 40 years old and 60 drivers over 40. The study was carried out in a simulated setting for night driving with and without the interposition of the diffuse illumination device. The mesopic contrast sensitivity was measured in the absence or presence of glare.

Results

In both age groups, a statistically significant improvement of contrast sensitivity was exhibited. In drivers aged over 40, baseline (BS) Pelli-Robson contrast sensitivity scores were: BS=0.83±0.3 and BSg=0.59±0.3 in absence and in presence of glare, whereas values for the interposition of diffuse illumination device (D) were: D=0.93±0.3 (p<0.05) and Dg=0.62±0.3 (p<0.05). On the other hand, in drivers aged under 40, baseline contrast sensitivity values were: BS=1.09±0.2 and BSg=0.95±0.3 whereas the interposition of the mentioned system showed the following values: D=1.27±0.3 (p<0.05) and Dg=1.11±0.3 (p<0.05).

Conclusion

Using a diffuse illumination device in the interior of the vehicle provides significant improvement in contrast sensitivity.

Commercial relationships/conflict of Interest: This study is part of a research project entitled 'Internal diffuser for improved road safety', subsidised by Comunidad de Madrid and FEDER funds granted to 'Avizor' company.

Eye disease prevention campaign in elderly people

Lead author: Paula Ortega

Co-authors: Jorge Alió, Verónica Santos, Graciela Del Rey, Inmaculada Rubio, Maite Latorre
Jorge Alio Foundation, Alicante, Spain

Purpose

Eye disease prevention directed towards the population over 65 years old from different towns in Alicante.

Method

This was a retrospective and observational study, involving those persons who voluntarily took part in the 'Prevention of blindness campaign' between 2006 and 2011, which takes place in senior community centres.

Visual examination was overseen by an optometrist under the medical criteria of an ophthalmologist. An optical report is sent to their homes, in accordance with the Data Protection Act. Patients were informed of their visual status and, if necessary, a specialist gave them pathological information.

Patients were classified as: 'normal', 'eye risk factors', or 'continue with treatment'. Within the group of people that could have eye disease, they were distinguished as follows: cataract, prescription changes, high intraocular pressure (IOP), opacified intraocular lens (IOL), pathological ocular fundus (FO).

The procedure to begin with was:

1. anamnesis (personal, family history, and personal ophthalmologic and systemic current treatment)
2. external exploration
3. visual monocular / binocular acuity with present prescription, subjective refraction
4. refractive and keratometric measures
5. noncontact tonometry
6. slit lamp exam
7. fundus examination with a non-mydratic panoptic ophthalmoscope.

Results

A total of 11,549 patients were reviewed between 2006 and 2011. 62% were female and 38% were men. 47% were considered as normal, 11% were classified as 'continue with treatment' and 42% were suspected of suffering any ocular pathology.

The main causes were: 42% cataracts, 38% refractive changes, 12% FO, 7% with high IOP and 7% opacified IOL existence.

...continued from previous page

Eye disease prevention campaign in elderly people

Conclusion

The leading causes of visual impairment in the world, bearing in mind the latest date published in 2012 by the World Health Organisation (WHO) are: 43% uncorrected refractive mistakes, 33% cataracts (second largest cause of blindness in the world) and glaucoma with 2%, not taking into account those who are not conscious of their visual problems.

In 2010, the Spanish population was more than 47 million inhabitants, with 8 million over 65 years old. In Alicante there are about 2 million people, of whom 342,298 are over 65 years old. Life expectancy is increasing so this will impact on daily life, and levels of general health. Prevention campaigns are important to maintain / improve their quality of life.

Prevalence of symptoms associated with the use of laptops for leisure

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Purpose

The use of VDU equipment in non-work activities devoted to leisure and study is increasingly common. Users frequently use laptops (and more recently tablets and smart phones). These devices have small screens, a keyboard and a mouse which is built in. They are easy to use anywhere, both indoors and outdoors, without controlled environmental conditions. Little is known about whether these features can cause some major health consequences.

Method

47 VDU users in a home or work environment participated in the study. The average age of users was 22.50 years (SD \pm 2.5). There were 24 men and 23 women. Of them, 74.5% were laptop users with an average of three hours of use (SD \pm 0.8 h). Optometric examinations were performed to rule out persons whose symptoms were not associated with the use of VDU, which could come from problems or anomalies in: the refractive status, binocular vision or ocular and systemic health. A questionnaire was included which was designed with the aim of obtaining the necessary information regarding the symptoms. Users of contact lenses and those who had had refractive surgery were excluded. Mild or insignificant symptoms were considered as normal.

Results

The most common problem, both moderate and severe, was the shoulder pain (25.5%). Other annoyances were: fatigue or eyestrain (17%), neck pain (14.9%), difficulty focusing near to far (12.8%), and finally, sore, blood-shot, itchy or watery eyes, and also complaints of photophobia (10.6%). These results show that one in four persons who use VDUs in leisure are likely need to care for their complaints and understand they can be connected to the use of their laptops.

Conclusion

It is important to pay close attention to users of laptops and make recommendations about their use. Information needs to be available about the risks and what precautions should be taken when using them.

The wider role of the Indian Optometric Association in shaping the development of the optometry profession in India

Lead author: Yogita Laxmikant Rajgandhi
Co-authors: Gaurav Anand, Anil Tyagi
Indian Optometric Association, New Delhi, India

Purpose

A strong attempt to shape the development of optometry by the oldest organisation in the country – the Indian Optometric Association.

Method

The Indian Optometric Association is a 45 year old Association actively involved with the promotion and upgradating of the profession of optometry in India. IOA has over 2000 registered members across the country and has been regularly hosting national conferences. IOA has hosted the WCO GDM joint meeting of IOA, WCO, APOC and Vision 2020 members in Goa. IOA is the internationally recognised body for the verification and authentication of job applicants seeking employment as optometrists in foreign countries.

Result

IOA plays a major role in the formation of ASCO-INDIA-year 2004, IOF-year 2011. IOA has given a very important presentation and submitted reports about Indian optometry in 2006 to the Sixth Pay Commission, which is a government apex body catering to the pay scale of government employees and educational standard. IOA has been conducting major activity in the area of continuing education programmes on a regular basis all over the country to promote optometric education in India. IOA has been actively celebrating World Optometry Day and World Sight Day, advocating eye care and eye wear amongst the masses and propagating the optometrist as the primary eye care physician.

Conclusion

IOA has submitted its representation to the Standing Committee of the Parliament of India for highlighting optometry as an independent profession and for regulation of optometry services under the National Health Commission of human resources. The optometrists has an important role in the prevention of blindness but is also generating high revenue for the government. The increase in the number of institutes in the past 10 years reflects that optometry is a prestigious and sought after career choice as a respectable profession in India.

Innovation to improve access and equity

Lead author: Jean Paul Roosen
Vision Solidarité Développement, Bures sur Yvette, France

Purpose

Home Eye and Vision Care Service & Mobile Optometry Clinic: a strategy to render primary eye and vision care to the underprivileged population in privileged countries and to develop an innovative practice approach to generalise service delivery.

Method

A three level strategy was developed to render eye and vision care services to the underprivileged population - homeless, nursing homes, and persons with intellectual disability.

From a human resources perspective, the aim was to create a multidisciplinary team of ophthalmologists, optometrists and opticians, form an organisation to raise funds for equipment (ophthalmoscopes, retinoscopes, handle refractometer, handle tonometer, trial cases, acuity charts, and set of ready made and optical frames) and to secure supply of lenses at low cost. Outreach camps were organised to deliver eye and vision care services to the specialist groups mentioned. The next goal is to make these services sustainable.

Results

To date, from this population, 3,149 people were screened and examined and the vision of 1,237 people was improved with spectacles, ophthalmological treatments and surgery.

Conclusion

The cost is not the main barrier to the Eye and Vision Care Services service, the lack of accessibility, administrative complexity and lack of interest are the main obstacles. The study proves that needs exist and the solution is to build a permanent eye and vision care service.

It has also given opportunities for academic training and an insight into an underprivileged world for optometry students, which will help to develop social responsibility among the eye and vision care professionals of tomorrow.

The look of Calcutta

Author: Silvia Tablada García
Hospital Rey Juan Carlos de Móstoles, Madrid, Spain

Purpose

To perform a visual health screening and to carry out eye tests in a slum of Park Circus, Calcutta, India. Children, adults and the elderly population were examined. Spectacles were provided in those cases where they were needed.

Method

Monocular and binocular visual acuity was measured with the Snellen chart at 5 metres distance. Visual acuity lower than 0.7 in the decimal scale was considered a fail in adults and 0.8 in children.

Subjects who failed the screening underwent a full eye test, including static retinoscopy, direct ophthalmoscopy, cover test, pupils reaction, eye movements and subjective refraction test with trial frame.

Results

A total of 200 patients were screened. From the 200 patients screened, 40 patients (20%) required optical correction.

145 children were screened (72.5%), and only two of them (1.4%) had high myopia (considered to be between -6.00D and -9.00D). Three children (2%) had astigmatism greater than 2.00D, three high hyperopic (2%) of +6D to +8D, and one child (0.7%) had congenital cataract. 45 adults (22.5%) were screened, aged between 30 and 55 years old. 62% required optical correction, for near distance.

The senior population was considered to be those patients over the age of 60. Out of the 10 seniors screened (5% of the sample), five (50%) had cataracts in advanced stages, three (30%) with abnormal optic nerve compatible with glaucomatous optic neuropathy.

100 sunglasses were given without distinguishing the age of individuals.

Conclusion

The affected children were very few, but those that were affected had high ametropia. Without the appropriate correction, children are facing great educational, social and occupational barriers.

The vast majority of adults over 40 don't have access to any kind of spectacle correction. Cataracts affect nearly 100% of the elderly, mostly to grade IV, and a lack of surgical correction means irreversible blindness.

Working in disadvantaged populations helps to reduce the number of people with blindness. This will help the development of the community, especially in the youngest population.

“The vision is the basis for learning. Staying blind means relying on others.”

Alcon

European Academy annual sponsor

Dear Eye Care Professionals,

As one of the main sponsors of the European Academy of Optometry and Optics (EAOO), we are delighted to welcome you to its 2013 Annual Conference. This is an important event in the eye care industry and we are very pleased to support this key educational meeting in line with our long-standing commitment to continuous education and support for you and your staff.

Last year we completed the integration of Alcon and CIBA VISION: we strengthened our position to continue shaping the future in eye care and pursuing our mission to provide innovative products that enhance quality of life by helping people see better. Alcon is based on a story of innovation and leadership. Founded in 1945, Alcon has grown from a small ophthalmic pharmacy to become the global leader of eye care. This achievement was possible by focusing on three areas: firstly, the development of high-quality, innovative products to meet patient needs in eye care, secondly, by valuing collaborative relationships with eye care professionals and the community and last but not least by driving our performance with science across all our business.

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We wish you a successful and inspiring conference and we look forward to continue working with you to meet the needs of our contact lens wearers!

Best regards,

Vision Care Team
Alcon, EURMEA

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¹ Based on the ratio of lens oxygen transmissibilities. Alcon data on file, 2009, 2010.

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² In a randomised, subject-masked clinical study; Alcon data on file, 2011.

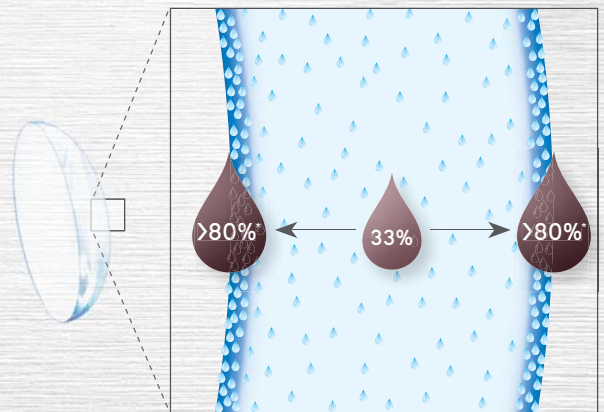
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* In vitro measurement of unworn lenses; Alcon data on file, 2011.

¹ Based on the ratio of lens oxygen transmissibilities among daily disposable lenses, Alcon data on file, 2010. See product instructions for complete wear, care and safety information.

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European Academy annual sponsor

Johnson and Johnson Vision Care are delighted to be one of the main sponsors of the European Academy of Optometry and Optics and would like to take this opportunity to welcome you to this fifth annual conference. The goals of the Academy, to engage, educate, inspire and motivate educators, students, researchers and practitioners are very much aligned with those of Johnson and Johnson Vision Care who are committed to work with Eye Care Professionals around the World to bring Healthy Vision to Everyone, Everywhere Everyday.

At Johnson and Johnson Vision Care we believe that innovation is driven by clearly understanding the need of patients requiring vision correction and those of the practitioners who prescribe products and maintain their safe wear. These insights, combined with excellence in research and product development have driven the history of innovation that we have been able to bring to the market. From the launch of The World's first disposable lens, ACUVUE® Brand Contact Lenses over 25 years ago Johnson and Johnson Vision Care developed the daily disposable segment with 1-DAY ACUVUE® and subsequently 1-DAY ACUVUE® MOIST® with LACREON® technology and another World's first, 1-DAY ACUVUE® TruEye®. We innovated in Silicone Hydrogel products with the development of HYDROCLEAR® PLUS technology, which, with ACUVUE® OASYS®, has been specifically designed to give your patients maximum comfort satisfaction, even in challenging environments. Most recently we have continued our innovation in astigmatic products where our Accelerated Stabilization Design provides superior stability and vision performance. This technology is now available in ACUVUE® OASYS® for ASTIGMATISM and 1-DAY ACUVUE® MOIST® for ASTIGMATISM.

But innovation goes beyond technology and at Johnson and Johnson Vision Care we also look to innovate in services which provide direct benefits to the Eye Care Professional Community. THE VISION CARE INSTITUTE® is one such example. With a mission of enhancing patient satisfaction through innovative education, the institute now approaches its 10th year since launch. With 14 sites around the World, nearly 100,000 practitioners have taken part in training at one of our purpose built educational facilities. At each facility the training is developed to be practical and pragmatic, combining an understanding of current beliefs and behaviours with the latest patient insights. The training is carried out by experienced practitioners, and the classes use the very latest technology in the business to provide a unique training experience. Most recently the institute has started to launch some unique online training material to supplement the classes and enable practitioners to learn at their own time.

So we wish all the attendees at this year's Academy a successful meeting with the opportunity to learn from the experts and share best practice with one another.

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1. A Special Issue: Ultraviolet Radiation and Its Effects on the Eye. Eye & Contact Lens (2011); 37(4): 167 – 272. 2. UV Consumer Insights Survey, November 2011, online questionnaire with 18-45 year-old soft CL wearers (Poland, n=300) and CL considerers (Poland, n=302). 3. JJVC Data on file 2012. ACUVUE®, 1-DAY ACUVUE® TruEye®, ACUVUE® OASYS®, 1-DAY ACUVUE® MOIST®, LACREON®, HYDRACLEAR® and SEE WHAT COULD BE® are registered trademarks of Johnson & Johnson Medical Ltd. © Johnson & Johnson Medical Ltd 2013.

Essilor

Malaga 2013 headline sponsor

Essilor is the world leader for corrective lenses. The success of the group, which is present in more than 100 countries, is the result of a strategy that has been driven by innovation for more than 160 years. From design to manufacture, the group develops a wide range of lenses to correct and protect eyesight. Its mission is to enable everyone in the world to see well using lenses tailored to their needs. The group therefore devotes 150 million euros a year on research and development to offer increasingly efficient products.

Its headline brands are Varilux[®], Crizal[®] and Xperio[®].

Essilor also develops and sells equipment for prescription laboratories, as well as instruments and services designed for optical dispensers and optometrists.

Innovation

Innovation is the driving force behind Essilor's strategy and the cornerstone of its excellent relations with eye care professionals and consumers alike. To provide technological solutions and innovative services, the Group is leveraging a wider range of expertise thanks to its dynamic partnership strategy. It has signed around one hundred scientific cooperation agreements with universities, public laboratories, leading industrial groups and innovative small and mid-size companies.

Shared intelligence has enabled Essilor to deepen its understanding of the visual system, eye diseases, lens coatings and materials. It is also a source of improvement that allows the Group to upgrade its capabilities with more advanced technologies from other fields.

Social responsibility

2.5 billion people see the world poorly and have no corrective eyewear. The world's most widespread handicap, poor vision adversely impacts the quality of life and often isolates people. It reduces the opportunities for children to learn and productivity for people in the workforce, while making the elderly more dependent and driving more dangerous for everyone. It also reduces access to knowledge, culture, sports and leisure activities, yet is too often wrongly seen as a minor problem. In addition to the enormous human cost, the problem is also very costly for society. The world leader in ophthalmic optics, Essilor realises the enormity of the challenge of effectively combating poor eyesight. In addition to its own initiatives, the Group works continuously with other stakeholders to deploy effective solutions.

Bausch + Lomb

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Bausch + Lomb is solely dedicated to protecting and enhancing the gift of sight for millions of people around the world – from the moment of birth through every phase of life. Our mission is simple yet powerful: Helping you see better to live better. The company is one of the best-known and most respected healthcare brands in the world, offering the widest and finest range of eye health products including contact lenses and lens care products, pharmaceuticals, intraocular lenses and other eye surgery products. Our talented and motivated colleagues work relentlessly to bring new innovations to our customers and patients.

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Optometry Giving Sight is the only global fundraising organisation that specifically targets the prevention of blindness and impaired vision due to uncorrected refractive error (URE).

It was created in 2003 by the World Optometry Foundation (WOF), the International Centre for Eyecare Education (ICEE) and the International Agency for the Prevention of Blindness (IAPB), as a means of mobilising resources from the global optometric community to fund the development of sustainable eye care projects for people in need.

Optometry Giving Sight is registered as a charity in the USA, Canada, Australia, UK, Ireland and Italy; operates as a project of the Norwegian Association of Optometrists; and is registered as a not for profit company in Singapore.

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local eye care
professionals

and

Establish



vision centres for
sustainability

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to

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Optometry Giving Sight funds sustainable eye care services for people who are blind or vision impaired due to uncorrected refractive error.

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