



Programme and Abstracts

BERLIN2016

Creating a forum for optometry and optics in Europe

19-22 May, Germany



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The information provided in this booklet is correct at the time of printing.

Welcome From the President



Dear colleagues,

On behalf of the European Academy of Optometry and Optics and the European Council of Optometry and Optics, I would like to welcome you to our eighth annual conference, Berlin 2016.

This year our conference takes a new setting and I would like to thank our hosts, Beuth University of Applied Sciences, for all the resource and time they have dedicated to organising this fantastic event.

We think the Berlin 2016 programme provides a perfect balance of engaging topics, clinical aspects, cutting edge research and discussions, and also a social programme which ensures you get some time to see a bit of Berlin. I hope you will be joining us for the EAOO dinner which will take place on the Alexander von Humboldt boat cruise to take in some lovely views from the river Spree.

As this is my first conference as President, I would like to take this opportunity to thank all of our lecturers, discussion and workshop leaders and facilitators, and poster presenters; without you we would not have our conference each year. You are the reason we can share skills, knowledge and experiences with our colleagues across Europe. We must take this opportunity to network and discuss the challenges we all face within our profession in the hope that we can make a positive change in the countries in which we practice.

I would also like to thank our platinum sponsors, HOYA and J&J who have been loyal supporters of the Academy and our aims. We are also incredibly grateful to Essilor

who have been our gold sponsor for the past three conferences, our Silver sponsors Anglia Ruskin and Thea Pharmaceuticals, Bronze sponsors Kide Systems, Oculus, Optima, Block Optic, Optos, and ebiga-VISION GmbH. We must also mention our education partner Alcon and student sponsor Knecht & Muller. It is with their support and belief in the Academy that we offer such an ever-changing, wonderful conference each year.

We also welcome many members of the European Council of Optometry and Optics (ECOO), who are holding their spring meeting alongside the Academy conference. ECOO and their member network are constantly supporting and representing the views of optometry and optics professionals across Europe, working together to meet the challenges we all face.

Mostly I would like to thank you all for attending Berlin 2016, we hope you enjoy the next three days and the opportunity to meet new colleagues, listen and engage in lectures and discussion about the things that interest and intrigue you.

Finally, for your chance to win a complimentary conference ticket to our next conference, Barcelona 2017, please do complete your feedback forms and help us make next year even better than this year.

Best wishes for a fantastic Berlin 2016,

Dr Mireia Pacheco-Cutillas
President, European Academy
of Optometry and Optics

Introduction About the Academy

The Academy was launched in Lausanne, Switzerland in May 2009, at the Spring Meeting of the European Council of Optometry and Optics (ECOO). The Secretariat is hosted by the College of Optometrists, London, United Kingdom. Our mission is to facilitate the changing face of optometry and optics in Europe by engaging, educating, inspiring and motivating our educators, students, researchers and practitioners to achieve the highest level of practice.

Member benefits:

• Networking

You have the opportunity to collaborate with a network of members, practitioners, industry bodies and educators across Europe and beyond.

Special Interest Groups (SIGs)

give you the opportunity to build links with other members on specialist topics which interest you.

• Professional development

Our annual conference, a must-attend event in the optometry and optics calendar, provides you with excellent learning, networking and social opportunities to help develop your skills and knowledge. Members receive a discounted ticket rate to our conference. In addition to this, **Academy Fellowship (FEAEOO)** is awarded to members who have made a significant contribution to optometry or optics, and shown commitment to the profession. A growing number of members are awarded a Fellowship each year, contributing to their professional development, success and acclaim all over Europe. If you are interested in becoming a Fellow then please attend

the professional development session taking place on Friday at 14.15.

• Recognition

Academy membership and Fellowship are ways for your colleagues, patients and the public to recognise your professional status, and your commitment to continuous development of your skills, knowledge and understanding.

You can **use our member logo**, which will show you support the advancement of optometry and optics and other Academy strategic aims.

• Resources

Members have **access to the password-protected area** of our website, including our member directory, Special Interest Group forums, and an 'ask the expert' page. You can also log into our online resource hub, which provides you with access to our conference sessions all year round. You will be offered a discounted subscription to the journal, **Optometry in Practice** and access to the **Journal of Optometry** (Spain).

How to join

Membership of the Academy is available to individuals, organisations and students:

- undergraduate and postgraduate student – €50
- individual – €150
- educational organisation – €375
- organisation – €500

Become an Academy member by visiting our website

www.eaoo.info/membership



Study the future

With a wide range of forward-looking degree courses and a staff of highly qualified specialists, Beuth University of Applied Sciences encourages the career opportunities of all prospective and current students, regardless of their social background.

BACHELOR'S AND MASTER'S DEGREE PROGRAMS IN THE FIELDS OF BUSINESS, ENGINEERING AND SCIENCE

Architecture · Ophthalmic Optics/Optomety · Business Administration · Biotechnology · Electrical Engineering
Facility Management · Landscape Architecture · Food Science and Technology · Mechanical Engineering
Applied and Computational Mathematics · Mechatronics · Pharmaceutical and Chemical Engineering
Embedded Systems · Business Administration & Engineering · and more



Important information Berlin 2016

Clinical workshops

The programme features a total of 13 clinical workshops (more workshops than ever before) on Friday and Saturday morning. Each workshop will last up to three hours and will provide you with an opportunity to explore a topic in depth and gain practical skills. Workshops are not included in the attendance fee for the main conference. Please see page XX for more workshop details.

Conference sessions

The programme is made up of different types of sessions. Each one focuses on research findings, clinical skills or educational issues, although many cover more than one of these to help encourage interaction and networking. Each session also has a topic title to explain the overall content. The types of sessions at Berlin 2016 include:

- **Presentations:** involve a presenter providing information and learning for most of the session, with some time for questions and discussion.
- **Discussions:** will involve the introduction of one or more relevant topics that fit under the session title, before the key discussion points for each are discussed by all those attending.
- **Special Interest Groups (SIGs):** open to all delegates at the conference, these sessions bring together colleagues with interests in specific areas and are led and presented by experts in the field. Topics include binocular vision, cornea, contact lenses and refractive technology, optometric education, optometric low vision rehabilitation and primary eye care.

Poster presentations

Over 50 posters will be displayed on the mezzanine level throughout the conference. They will cover new research and clinical and educational issues. The posters will be available for viewing throughout the event and presenters will be beside their poster at various times for you to ask questions, giving you a great opportunity to meet colleagues and learn more. You can talk to poster authors on Friday from 15:45–16:45 and on Saturday, 13:30–14:30.

Lunch and coffee breaks

Refreshments will be provided in the allocated lunch and coffee breaks shown in the programme.

Presentation prizes

There will be two poster prizes awarded in Berlin: the Poster Presentation Prize and the New Poster Presenter Prize. The Programme Panel will make the final decision on the prizes. The Prizes have been provided by the College of Optometrists.

Feedback form

Please fill in your conference feedback form and leave it at the registration desk for a chance to win a ticket to next year's conference in Barcelona.

Important information Berlin 2016

CET points

Many of the programme sessions have been approved for Continuing Education and Training points (CET), as certified by the General Optical Council (GOC) in the UK. Please refer to the national regulator within your country to confirm the eligibility of UK points for your own professional regulator. A list of sessions with CET points applied for can be found in the table on pages XX.

In order to receive CET points, you must complete a CET form which should be deposited in a box at the end of the session.

ECOO Spring Meeting

The European Council of Optometry and Optics' General Assembly and meetings will take place from Thursday to Saturday. Please see the programme on page [TO INSERT] for the full list of meetings taking place including open meetings which all delegates can attend.

A weekend in Berlin

The Berlin WelcomeCard (BWC) is a city ticket that gives you free travel on public transport and discounts at 200 Berlin attractions and it is a good idea to buy one of these if you intend to explore the city. There are different BWC ticket types, **starting at €19.50**, combining travel on public transport in Berlin (zones AB) or also the surrounding region (zones ABC) for 48 hours, 72 hours or 5 days.

The capital city of Germany has a population of 3.5 million. Covering an area of 892 square kilometres, Berlin is the

Goliath among German cities. By international comparison, the German capital is the second largest city in the European Union in terms of its population and the fifth largest in terms of its area.

If you have some spare time then Berlin is a city that has lots to offer. With 175 museums, Berlin has more museums than rainy days. It also boasts more than 50 theatres and around 300 cinemas. The city has 4,650 restaurants, around 900 bars and 190 clubs and discotheques. It also has more doner kebab shops than Istanbul! The streets that meander through the German capital cover a distance of 5,350km (70km of which is autobahn) and these are lined with more than 400,000 trees. There are around 1.2 million cars registered in the city. It is very easy to get around using the autobahn and investing in a Berlin WelcomeCard is a good idea for anyone using the public transport system more than once a day.

Berlin has been the German capital on several occasions throughout its history. Starting out as the capital of the Margraviate and Electorate of Brandenburg, this city on the River Spree later became the capital of the kingdom of Prussia and then the German Empire. East Berlin was the capital of the German Democratic Republic. Since German reunification in 1990, Berlin has been the capital of Germany once more. You can get free maps of the city from the conference registration desk. You can find out more about Berlin at www.visitberlin.de

Thea Pharmaceuticals logo: a stylized eye icon with a blue dot in the center, followed by the text "Thea Pharmaceuticals" in a blue, sans-serif font. Below the logo is the tagline "Driving Innovation, Education and Professionalism".

Navigation menu: A vertical bar on the right side of the page with colored segments and circular icons. From top to bottom: "Dry Eye" (teal), "Glaucoma" (blue), "Infection" (pink), "Allergy" (yellow), "Anti-inflammatory" (orange), "Lid Hygiene" (light orange), "Nutrition" (yellow), and "Surgery" (purple).

Main text area: A large, light blue, rounded rectangular area containing the following text:

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E-Mail: theasupport@theapharma.co.uk
www.thea-pharmaceuticals.co.uk

Important information Berlin 2016

BERLIN 2016 VENUES*

Conference venue

Beuth University
Beuth University of Applied Sciences
Luxemburger Strasse 10
Berlin 13353

U Closest U-bahn stop:
Amrumer Straße or Leopoldplatz

Clinical workshops

Beuth Optometry School
Beuth Hochschule für Technik Berlin
Augenoptik/Optomietrie
im FB VII
Kurfürstenstr. 141
D-10785 Berlin

U Closest U-bahn stop:
Kurfürstenstraße

ECOO dinner

Date: Friday 20 May
Time: 19:30 – 22:45
Venue: Nolle restaurant
S-Bahnbogen 203, Georgenstraße,
10117 Berlin

www.restaurant-nolle.de/en
This dinner must be pre-booked.

U Closest U-bahn stop:
Friedrichstraße

Academy dinner

Date: Saturday 21 May
Time: 19:15 – 22:30
Venue: Alexander von Humboldt boat,
run by Stern und Kreis
Board at the Hotel Abion:
Hotel Abion
Alt-Moabit 99
10559 Berlin
This dinner must be pre-booked.

U Closest U-bahn stop:
Turmstraße

*Delegates must make their way
to all venues and locations.

CONFERENCE SPONSORS

Platinum:

HOYA Vision Care Europe
www.hoya.eu

Johnson and Johnson Vision Care
www.jnjvisioncare.co.uk

Gold:

Essilor www.essilor.com

Silver:

Thea Pharmaceuticals
www.thea-pharmaceuticals.co.uk

Silver uni:

Anglia Ruskin University
www.anglia.ac.uk/study/professional-and-short-courses/optometry-adaptation

Bronze:

Kide systems www.kidegroup.com

Oculus www.oculus.de

Optima and Block Optic
www.optimapharma.de

Optos www.optos.com

ebiga-VISION GmbH
www.ebiga-vision.com

Poster Prizes:

College of Optometrists
www.college-optometrists.org



Important information Berlin 2016

CAMPUS MAP



ECOO meetings and General Assembly will take place in room 501 (5th floor), Haus Gaus building. We will direct delegates to ECOO meetings from the Grashof building.

Academy sessions take place in the Haus Grashof building.

Academy workshops take place at the Optometry School.



ENABLING YOUR CAREER PROGRESSION

If you're thinking about how to take your career to the next stage, our expanding range of higher qualifications could help take you there. A higher qualification can develop your skill set, lead to promotion, help you in day-to-day practice, give you the chance to do more work and equip you to work in enhanced services.

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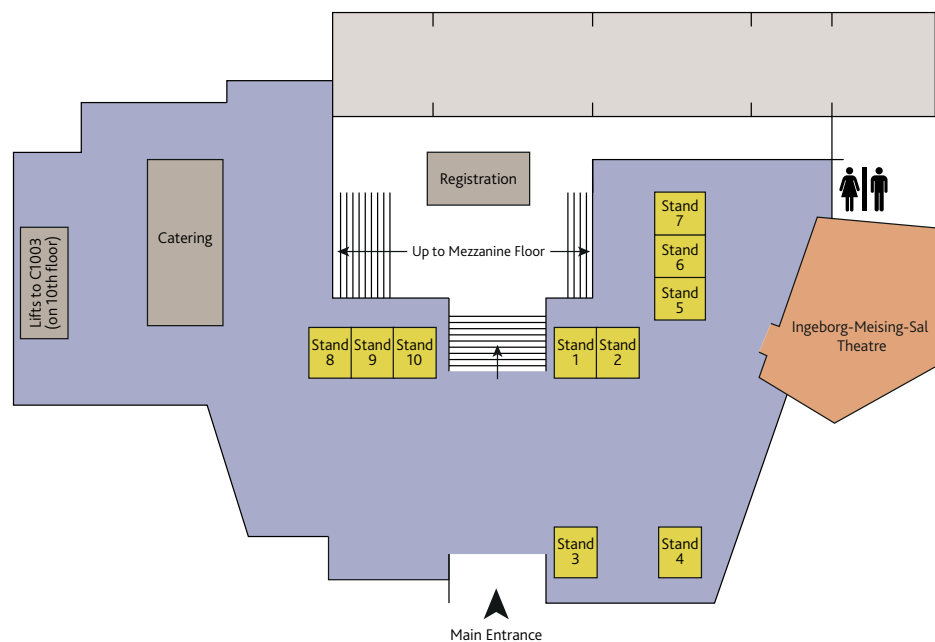
college-optometrists.org/HQ



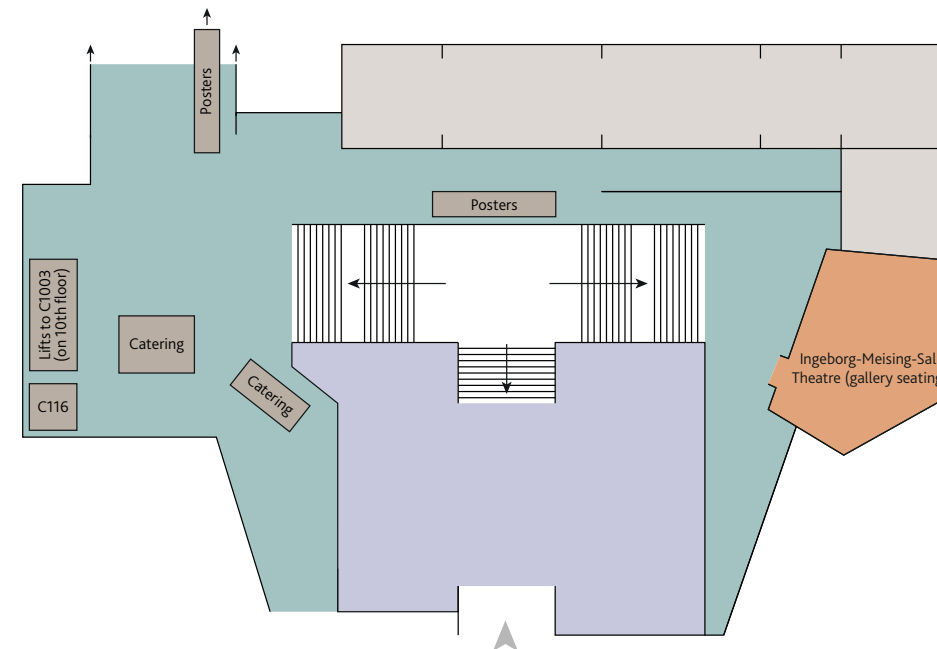
THE COLLEGE
OF OPTOMETRISTS

Important information Berlin 2016

FOYER GRASHOF BUILDING Ground Floor



FOYER GRASHOF BUILDING Mezzanine Floor



EXHIBITION STANDS

1 & 2	Hoya Vision Care Europe
3	Oculus
4	Optos
5	Johnson & Johnson Vision Care
6	Kide Systems
7	ebiga-VISION
8	Optima + Block Optic
9	Anglia Ruskin University
10	Essilor

Optical exhibition:

This year, the Academy conference will include a small exhibition giving you the opportunity to engage with industry colleagues and supporters.

The exhibition will be open from Friday noon until the end of the conference. Please take the opportunity to speak to our exhibitors in the coffee and lunch breaks and any other spare time you may have.

**Ingeborg-Meising-Sal = Plenary room
C1003 (10th floor) = Breakout room
C116 = Breakout room**

Proud to contribute

HOYA is proud to be the platinum sponsor of the European Academy of Optometry and Optics Conference for the second year in a row. As a leading player in optometry and optics, HOYA sees it as an obligation to contribute to developments in its field and allow others to benefit from its ever-increasing knowledge and innovative products.

A pioneer in optics

Celebrating its 75th anniversary this year, HOYA's revolutionary optical and healthcare solutions continue to push technological boundaries for its distribution partners and customers around the world.

Since its establishment in 1941, HOYA's mission has been to create products that add true value to society by enhancing people's quality of life. In order to fulfil this mission, HOYA continues to listen closely to its customers and consumers, and to invest strategically in new products and technologies.

HOYA is active in the Information Technology and Life Care segments, manufacturing spectacle lenses, intraocular lenses and optical lenses as well as medical endoscopes and key components of semiconductors, LCD panels and HDDs. With more than 150 offices and subsidiaries worldwide, HOYA employs a multinational workforce of over 34,000 people.

A partner in business

HOYA works hard to understand the individual needs of its customers and consumers. From the latest lens materials and design techniques to unbeatable service and sales support, HOYA provides optical and business solutions that build success.

Personalisation will continue to be HOYA's focal point in the years ahead, both in product development and services for opticians. HOYA's latest iD V+ progressive, single vision and indoor designs are proof of that. And with the introduction of its Vision Simulator and EyeGenius high-precision measurement system, HOYA has set the trend towards future lens consultation.

With the dedication of HOYA and the other participants, this edition of the EAOO conference in Berlin promises to be a great success.

Johnson & Johnson Vision Care Companies, proud sponsors of the European Academy of Optometry and Optics

Johnson & Johnson Vision Care Companies is delighted to continue its sponsorship of the EAOO organisation and annual conference. This year marks the 28th anniversary of the introduction of the first weekly disposable soft contact lens to Europe. Since then, Johnson & Johnson Vision Care Companies has led the expansion of lens modalities, materials and designs and to this day, continues to transform and innovate within the contact lens industry. Today the ACUVUE® Brand is world leader in contact lenses¹.

At Johnson & Johnson Vision Care Companies, we are committed to supporting your success by delivering innovative technologies that address your patients' needs. ACUVUE® Brand Contact Lenses offer more than just vision correction. The unique EYE-INSPIRED™ Design addresses different needs and offers patients an exceptional experience that truly impacts the way they see, the way they are seen and the way they live their lives.

We are also committed to delivering best in class professional education aimed at Eye Care Professionals, support staff and students. This is to help further develop the clinical, technical and communication skills that make a real difference to the service you deliver to your patients. We have a large professional team to support you with

your learning and we are all passionate about education.

The many ways in which we support your education includes The Johnson & Johnson Vision Care Institutes® that have the facilities to offer you the best hands-on, interactive clinical educational experience. The courses run all year round at our state-of-the-art institutes and have a wide range of courses on offer that will cater to your educational needs. We aim to enhance clinical skills and inspire learning for thousands of practitioners every year.

We also provide education and support through our professional-directed websites across Europe. These contain valuable materials that help enable Eye Care Professionals to deliver satisfaction to their patients and are also a valuable resource for ACUVUE® Brand Contact Lenses product information.

Through our ACUVUE® Eye Health Advisor® Conferences across Europe we also bring world renowned speakers to deliver the latest research and clinical findings to help Eye Care Professionals to stay up-to-date so that they can provide the latest in eye care solutions for their patients.

We hope that you enjoy this conference in Berlin!

¹ JIVCC data on file based on multiple sources including 3rd Party industry reports, quarterly competitor results and analyst briefings

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Programme Thursday 19 May

Time	Meeting schedule
Thursday 19 May	ECOO Executive meetings Room 501, Haus Gaus building
08:00	Registration Foyer, Grashof building
08:30–11:30	ECOO Diploma Board of Management <i>Closed meeting</i>
11:30–13:00	ECOO Board of Examiners <i>Closed meeting</i>
13:00–14:00	Lunch
14:00–15.30	ECOO Board of Examiners <i>Closed meeting</i>
15.30–18:30	ECOO Executive Committee <i>Closed meeting</i>



Programme Friday 20 May

Time	EAOO conference sessions			ECOO meetings Room 501, Haus Gaus building
08:45	Conference registration opens Foyer, Grashof building			
08:30–12:00	EAOO clinical workshop registration at School of Optometry (off-site) at Beuth Optometry School, Beuth Hochschule für Technik Berlin (Delegates to make their own way to the workshops, see page XX) Nearest U-Bahn: Kurfürstenstraße			09:15–10:15 ECOO Public Affairs & Economic Committee <i>Closed meeting</i> 10:15–12:15 ECOO Public Affairs & Economic Committee <i>Open meeting</i>
12:30–13:30	Lunch & Exhibition Foyer, Grashof building			
	Ingeborg-Meising-Sal	C116 lecture room	C1003	ECOO meetings Room 501, Haus Gaus building
13:30–14:00	EAOO AGM (members only)			13:30–14:30 ECOO Professional Services Committee <i>Closed meeting</i>
14:00–14:15	EAOO opening address			
14:15–15:15	GLAUCOMA IN CLINICAL PRACTICE <i>Dr Robert Harper:</i> Engagement with the enigma <i>1 CET applied for</i>	WINNING EUROPEAN RESEARCH FUNDING <i>Dr Sven Jonuscheit:</i> EURECO project: European research collaboration in optometry <i>Dr Fabrizio Zeri:</i> MSCA: Possibilities for researchers in the field of Vision Science	PROFESSIONAL DEVELOPMENT <i>Academy Manager, Caroline Christie and Fellows</i> Route to fellowship, case reports and advice on application	14:30–16:30 ECOO Professional Services Committee <i>Open meeting</i>
15:15–15:45	Coffee & Exhibition Foyer, Grashof building			

Time	Ingeborg-Meising-Sal	C116 lecture room	C1003
15:45–16:45	POSTER SESSION Meet the presenters Mezzanine, Grashof building	OPTOMETRY AND OPTICS EDUCATION SIG <i>CHAIR – Professor Asen Pashov</i>	POSTER SESSION Meet the presenters Mezzanine, Grashof building
	SCOPE OF PRACTICE <i>Dr Robert Harper:</i> National survey of optometrists working in UK hospital eye service <i>Declan Hovenden:</i> Data from optometry Electronic Patient Records (EPRs) to study population refractive error <i>Ashleigh Kernohan:</i> Systematic review of economic evaluations in primary eye care	<i>Dr Rachel Eichler:</i> Values and Knowledge Education (VaKE), to prepare students for patient care, Israel <i>Irene Langeeggen:</i> Social entrepreneurship and international practice – an educational benefit in Norway? <i>Dinah Paritzky:</i> From sage on the stage to guide on the side: optometric pedagogy for the 21st century, Israel <i>Kristina Mihic:</i> Optometry summer academy in Croatia <i>Professor Chris Hull:</i> Evaluation of a blended-learning approach teaching approach, City Univ London	DISCUSSION WORKSHOP Dispensing <i>Fiona Anderson, Peter Black and Kevin Milsom</i> Presbyopic options and solutions in 2016 <i>3 CET applied for</i>
16:45–17:45			
18:00–19:30	Networking / Welcome reception (Music provided by Beuth University Orchestra) Foyer, Grashof building		
19:45–22:45	ECOO Get Together Dinner Nolle restaurant (Attendees to make their own way to the restaurant) Nearest U-Bahn - Friedrichstraße		

Sessions taking place in rooms C1003 and C116 have limited capacity. Places will be allocated on first come, first served basis.

Programme

Saturday 21 May

Time	EAOO conference sessions			ECO
08:30	Conference registration opens Foyer, Grashof building			
08:30–12:00	EAOO clinical workshop registration at School of Optometry (off-site) (Delegates to make their own way to the workshops, see page XX) Nearest U-Bahn: Kurfürstenstraße			
	Ingeborg-Meising-Sal	C116 lecture room	C1003	
09:00–10:00	OCULAR SURFACE <i>Dr Stefan Bandlitz:</i> Corneal & conjunctival staining <i>Professor Christine Purslow:</i> Blinking blepharitis has a lot to answer for... 1 CET applied for	VISUAL ERGONOMICS <i>Dr Björn Drobe:</i> Light, contrast and posture: link between myopia and ergonomics? <i>Dr Mariano González-Pérez:</i> Analyzing computer-related visual and ocular symptoms <i>Dr Damien Paillé:</i> Postural data measurement during the interaction with electronic devices	DISCUSSION SESSION Communication skills <i>Helmer Schweizer:</i> Enhance your communication skills 1 CET applied for	
10:00–11:00	MYOPIA CONTROL <i>Professor Mark Bullimore</i> Myopia control from evidence to implementation 1 CET applied for	BINOCULAR VISION Research topics <i>Dr Matt Dunn:</i> Monocular contributions to the nystagmus null zone <i>Dr Wolfgang Jaschinski:</i> Fixation disparity, measured objectively and subjectively as a function of vergence load <i>Dr Sotiris Plainis:</i> Effects of monocular blur (monovision) on binocular supra-threshold performance	DISCUSSION WORKSHOP Peer review <i>Niall Farnon:</i> Tales from clinical practice Group discussion on series on interesting case records 3 CET applied for	08:30–12:30 ECO General Assembly Room 501, Haus Gaus building
11:00–11:30	Coffee & Exhibition Foyer, Grashof building			
11:30–12:30	VISUAL IMPAIRMENT <i>Maureen Cavanagh:</i> The socio-economic implications of visual impairment <i>Jennifer Brower:</i> Low vision assessment and management 1 CET applied for	CORNEA, CONTACT LENSES AND REFRACTIVE TECHNOLOGY SIG <i>CHAIR: Dr Daniela Nosch:</i> Topic for discussion: CL fitting controversies in 2016 In association with IACLE	DISCUSSION WORKSHOP Retinal pathology <i>Dr Rebekka Heitmar & Dr Byki Huntjens:</i> Retinal pathology – Clinical Cases 3 CET applied for	

Time	Ingeborg-Meising-Sal	C116 lecture room	C1003
12:30–13:30	Lunch & Exhibition Foyer, Grashof building		
13:30–14:30	POSTER SESSION Meet the presenters Mezzanine, Grashof building	ECO SESSION European diploma <i>Robert Chappell:</i> Update on the European Diploma	POSTER SESSION Meet the presenters Mezzanine, Grashof building
14:30–15:30	EAOO keynote speaker – Ingeborg-Meising-Sal Professor James Wolffsohn Recent developments in contact lens and surgical presbyopia correction 1 CET applied for		
15:30–16:00	Coffee & Exhibition Foyer, Grashof building		
16:00–17:00	REFRACTIVE MANAGEMENT AND DISPENSING <i>Professor Bruce Evans:</i> Non-tolerance to optometric prescriptions, how to turn defeat into victory Volkhard Schroth: New approach to fixation disparity: determining aligning prisms without using trial prism lenses 1 CET applied for	QUALITY OF VISION <i>Dr Yousef Aldeyasi:</i> Evaluation colour vision and contrast sensitivity of gas station workers in Saudi Arabia <i>João Alves:</i> Human-operator independent preferential looking test for visual acuity assessment <i>Professor Jae-Myoung Seo:</i> Neural re-organization of peripheral retina after eccentric viewing training <i>Maria Covadonga Vázquez-Sánchez:</i> Distance and near vision of elderly people with cognitive impairment	PRIMARY EYE CARE SIG <i>CHAIR: Eduardo Teixeira</i> Vision screening in school children <i>Peter Gumpelmayer:</i> Optometric screening in first year primary school – a review <i>Mila Dragomirova:</i> Children's vision screening in a Bulgarian school
19:15–22:30	Academy Dinner Berlin river cruise on the Alexander von Humboldt boat (Delegates to make their own way to Hotel Abion prior to boarding the boat) Nearest U-Bahn: Turmstraße		

Sessions taking place in rooms C1003 and C116 have limited capacity. Places will be allocated on first come, first served basis.

Programme
Sunday 22 May

Time	EAOO conference sessions		
	Ingeborg-Meising-Sal	C116 lecture room	C1003
09:00–10:00	<p>OCULAR HEALTH</p> <p><i>Dr Jeffrey Weaver:</i> Vitamin controversies</p> <p><i>Bill Harvey:</i> Current thinking in maculopathy</p> <p>1 CET applied for</p>	<p>BINOULAR VISION SIG</p> <p><i>CHAIR: Steen Saust</i></p> <p><i>Steen Aalberg</i> Neuro-optometric Rehabilitation by mTBI or concussion</p>	<p>DISCUSSION WORKSHOP Contact lenses</p> <p><i>Niall Farnon:</i> Contact lenses for athletes</p> <p><i>Angel Chun Ki Wong:</i> Clinical management of keratoconous patient with special occupational needs</p> <p><i>Dr Langis Michaud:</i> Presbyopic astigmat: what are the options?</p> <p>3 CET applied for</p>
10:00–11:00	<p>PAEDIATRICS AND DYSLEXIA</p> <p><i>Dr Marie Bodack:</i> Lens anomalies in paediatric patients</p> <p><i>Dr Dorothy Thompson:</i> Visual electrophysiology – extending the role of optometry</p> <p><i>Professor Bruce Evans:</i> Dyslexia: the role of the optometrist</p> <p>1 CET applied for</p>	<p>POSTERIOR SEGMENT Research topics</p> <p><i>Shroug Aldaham:</i> Relationship between retinal thickness and photopic high and low contrast visual acuity in type 2 diabetics without retinopathy</p> <p><i>Coralie Barrau:</i> Blue light-induced retinal photo-ageing and application in ophthalmic photoprotection</p> <p><i>Dr Marieh Esmaeelpour:</i> The choroid in health and ocular pathology</p>	<p>DISCUSSION SESSION Driving</p> <p><i>Dr Julie-Anne Little:</i> Update on the visual standards for driving in Europe</p> <p>1 CET applied for</p>

Time	Ingeborg-Meising-Sal	C116 lecture room	C1003
11:00–11:30	<p>Coffee & Exhibition Foyer, Grashof building</p>		
11:30–12:30	<p>OCULAR DISCOMFORT</p> <p><i>Dr Frank Eperjesi:</i> Vague aches and stabbing pains</p> <p>1 CET applied for</p>	<p>OCULAR SURFACE Research topics</p> <p><i>Dr Georgi Georgiev:</i> Evaluation of the differential impact tear film constituents on evaporation kinetics and ferning patterns</p> <p><i>Professor Peter Gierow:</i> Effect of age and gender on tear osmolarity in comparison to a dry eye questionnaire</p> <p><i>Dr Daniela Nosch:</i> Is there a relationship between corneal sensation, blinking, ocular surface temperature & tear film quality?</p>	<p>LOW VISION SIG</p> <p><i>CHAIR – David Berkow</i></p> <p>Topic for discussion: LogMAR acuity testing in low vision practice presentation from Bennett McAllister</p>
12:30–13:30	<p>EAOO keynote speaker – Ingeborg-Meising-Sal Dr Pearse Keane How images can reinvent the eye examination 1 CET applied for</p>		
13:30–14:00	<p>EAOO Closing Address – Ingeborg-Meising-Sal Fellowship award presentations and presentation of poster prizes</p>		
14:00–15:00	<p>Lunch, Networking & Exhibition Foyer, Grashof building</p>		

Sessions taking place in rooms C1003 and C116 have limited capacity. Places will be allocated on first come, first served basis.

Information

Clinical skills workshops

This year the clinical skills workshops will take place offsite at the Beuth Optometry School. In a change to previous years, transport to and from workshops will not be provided and delegates will have to make their own way to the venue.

Clinical workshops

Beuth Optometry School
Beuth Hochschule für Technik Berlin
Augenoptik/Optometrie
im FB VII
Kurfürstenstr. 141
D-10785 Berlin

 Closest U-bahn stop:
Kurfürstenstraße

Workshop attendees should arrive at 08:30 on the morning of the workshop for registration. Workshops will last around three hours and delegates can make their own way back to the main conference venue, Grashof building, Beuth University of Applied Sciences, for lunch.

The following workshops will take place on Friday and Saturday at Berlin 2016:

Friday 20 May	Presenters
Art & Science of prescribing low vision devices	Dr Henry Greene & Dr Stefanie Holzapfel
Direct ophthalmoscopy – enhance your skills	Dr Pavel Benes & Dr Petr Vesely
Heterophoria and Fixation Disparity – the German approach	Professor Ralph Kruger & Georg Stollenwerk
How to assess and evaluate microtropia?	Dr Julie Demaree
Management of patients with high ametropias	Christian Franchi & Dominique Meslin
Neurological evaluation for the optometrist	Dr Marie Bodack & Dr Robert Austin
The art of fitting RGP corneal lenses	Professor Peter Moest & Döerte Krueger

Saturday 21 May	Presenters
Advanced techniques for investigating glaucoma	Patrick Gunn, Amanda Harding & Joanne Marks
Diagnostic tools for investigating neuro & paediatric anomalies	Costas Katsoulos, Carolin Trukenbrod & Ricarda Schmidt
Glaucoma detection with limited scope	Nicholas Rumney & Jessica Maclsaac
Introduction to indirect slit lamp ophthalmoscopy	Professor Holger Dietze & Dr Sven Jonuscheit
Paediatric dispensing	Fiona Anderson, Peter Black & Kevin Milsom
Vision therapy: six techniques you can start doing today	Dr Ruth Shoge & Dr Marie Bodack

Reference guide

Poster presentations

Poster number	First author	Poster title
13	Shroug Aldaham	Disk halo size and mesopic visual acuity in type 2 diabetics without retinopathy
35	Tariq Alhamad	Artificial retina: Argus II, pre/post examination and visual rehabilitation
36	Mar Argudo Iturriaga	Functional and biomechanical changes in keratoconic corneas after implantation of two types of intracorneal ring segments
37	Dr Pavel Beneš	A comparison of different methods used to measure the corneal surface
1	Alicja Brenk-Krakowska	How unstable binocular fixation affects reaction times and procedural motor learning in subjects with dyslexia
14	Simon Browning	The use of autofluorescence in monitoring drusen regression
55	Dr Inmaculada Bueno-Gimeno	Effect of axial length and refractive error on macular, retinal nerve fibre layer thicknesses and optic disc parameters in healthy children
56	Dr Inmaculada Bueno-Gimen	Correction of diplopia after retinal detachment surgery with scleral buckle: report of three cases
57	Dr Inmaculada Bueno-Gimen	Technology as a teaching tool at the University of Valencia, Spain
38	Kamila Ciężar	The care of patients with accommodative dysfunction
39	Kamila Ciężar	The evaluation of two daily disposable soft contact lenses
2	Monika Czaińska	Neural generators of binocular summation – EEG study
15	Dr Mari Carmen García-Domene	Correlation between choroidal thickness and visual perception in patients with high myopia
40	Yasna Glauser	Peripheral Epithelial Corneal Hyperfluorescence (PECH) in association with soft contact lens (CL) wear

Poster presenters are listed in alphabetical order by surname. You can locate each poster and presenter using the number next to their name

16	Paul Grace	Investigation of the efficacy of an online diagnostic algorithm for improving the optometric referral and diagnosis of ocular fundus lesions detected with Optical Coherence Tomography (OCT)
17	Maryam Hammadeh-Llorente	Evaluation of the change of choroid thickness in patients with macular hole after vitrectomy surgery
3	Rosa Hernandez	Improvement in test of visual perceptual skills, visual acuity, and stereopsis in a group of amblyopic children
18	Declan Hovenden	Are optometrists in Ireland interested in using data from their Electronic Patient Records (EPRs) to contribute to national research into refractive error and ocular health?
4	Professor Ebrahim Jafarzadehpur	Comparison of visual electrophysiological responses in basketball referees and non-referees
41	Alfonso Jimenez	Central and off-axis visual acuity with personalized free-form progressive lenses
42	Dr Amit Jinabhai	Evaluation of bandage contact lenses following refractive or therapeutic procedures
43	Costas Katsoulos	Scleral lenses for ptosis
19	Dr Peter Kehoe	Wide field patient care
20	Ju-Hwan Lee	Change of contrast sensitivity in tinted lenses
44	Grzegorz Lewicki	The influence of age on central corneal endothelial parameters and central corneal thickness
45	Dr Antonio López-Alemay	Validation of the grading scales alterations of the structures of anterior segment of the eye
21	Julia Löwen	Multifocal electroretinogram in patients with a central-scotoma due to macular degeneration
46	Dr Raul Martin	Effect of yellow filter (455nm) on visual function with multifocal contact lens

Reference guide

Poster presentations

47	Dr Raul Martin	Improvement GP contact lens fitting in keratoconus eyes using the CL fitting software of Oculus Keratograph
22	Melanie Müller	Visual requirements for driving - The third European directive 2006/126/EG, a European survey
23	Naganathan Muthuramalingam	Optometric practice in Italy: a baseline survey
48	Natascha Nachbur	Comparing the reproducibility of post-cataract operation refraction measurements in two devices
5	Juan Carlos Ondategui	Effect of different stimulus parameters and age on saccades and pursuits eye movements
6	Juan Carlos Ondategui	Repeatability and reproducibility in the clinical evaluation of ocular motility with commonly used tests
49	Sara Ortiz-Toquero	Development of an open access app to GP contact lens fitting in keratoconus
24	Adrian Titi Pascu	Occupational monograph for optometrists
50	Eric Pazo	The impact of eye massage on clinical signs and ocular surface physiology
7	Dr Anna Przekoracka-Krawczyk	Fixation disparity destabilization after short-time transcranial direct current stimulation over the posterior parietal cortex in subjects with symptomatic heterophoria
25	Yogita Rajgandhi	Vocational rehabilitation: Indian prospective
26	Raúl Alberto Ribeiro Correia de Sousa	Anchor and adjustment effects in clinical optometric practice
8	Kai Bong Sa	Oculomotor training improves reading eye movement in children with reading problems
9	Professor Luigi Secli	Visual coherence: new method of visual analysis
27	David Severa	Monocular refractive values obtained under monocular and binocular conditions

28	Amelie Schultze	Corneal biomechanics in glaucomatous eyes with and without diabetes type II
58	Dr Einat Shneor	Visual screening in college populations: outcomes for community service, training optometry students and research
29	Manuela Smandzich	Mohindra retinoscopy vs cycloplegic refraction
10	Melisa Subero	Near vision area without binocular distortions in personalized free-form progressive lenses with an increasing curvature frontal base curve
51	Dr Robert Szuba	Spherical aberration in the numerical model of a crystalline lens in diabetic subjects
52	Sung Hei Jimmy Tse	Atypical limbal epithelial bullae associated with scleral lens wear: a case series
53	Sung Hei Jimmy Tse	Reverse geometry scleral lens fitting in a post-radial keratotomy
59	Uduak Udom	World Council of Optometry
30	María Covadonga Vázquez-Sánchez	Functional vision of older people in Galician nursing homes
54	Dr Jose Vega	Non-invasive assessment of the tear film layer in symptomatic and asymptomatic subjects
11	Dr Petr Veselý	Influence of aniseikonia on stereoscopy vision
31	Matic Vogrič	Vision testing on electronic devices versus traditional methods
12	Monika Wojtczak	Cortical sources of event – related potentials related to vergence eye movement preparation
32	Professor Abbas Ali Yekta	Intraocular pressure with an air-puff tonometer in a young population
33	Professor Abbas Ali Yekta	Prevalence and risk factors of asthenopia among the students of Kermanshah, Iran
34	Fabrizio Zeri	Does high and low contrast visual acuity change with aging? A cross sectional study in healthy population

Reference guide

Continuing Education and Training (CET) points

CET points applied for correct at time of printing

Session	Session type	Time	Presenters	Target audience	CET Points
Friday 20 May					
Art and science of prescribing low vision devices	Skills workshop	09:00 – 12:00	Dr Henry Greene and Dr Stefanie Holzapel	Optometrist, Dispensing Optician	3
Direct ophthalmoscope – enhance your skills	Skills workshop	09:00 – 12:00	Dr Pavel Benes and Dr Petr Vesely	Optometrist	3
Heterophoria and fixation disparity – the German approach	Skills workshop	09:00 – 12:00	Professor Ralph Kruger and Georg Stollenwerk	Optometrist	3
How to assess and evaluate microtropia	Skills workshop	09:00 – 12:00	Dr Julie Demaree	Optometrist	3
Management of patients with high ametropias	Skills workshop	09:00 – 12:00	Christian Franchi and Dominique Meslin	Optometrist, Dispensing Optician	3
Neurological evaluation for the optometrist	Skills workshop	09:00 – 12:00	Dr Marie Block and Dr Robert Austin	Optometrist	3
The art of fitting RGP corneal lenses	Skills workshop	09:00 – 12:00	Professor Peter Moest and Dörte Krüger	Optometrist, Contact Lens, Optician	3
Glaucoma – Engagement with the enigma	Lecture	14:15 – 15:15	Dr Robert Harper	Optometrist	1
Dispensing – Presbyopic options and solutions in 2016	Discussion workshop	16:45 – 17.45	Fiona Anderson Peter Black Kevin Milsom	Optometrist, Dispensing Optician	3

Session	Session type	Time	Presenters	Target audience	CET Points
Saturday 21 May					
Advanced techniques for investigating glaucoma	Skills workshop	09:00 – 12:00	Patrick Gunn Amanda Harding Joanne Marks	Optometrist	3
Diagnostic tools for investigating neuro & paediatric anomalies	Skills workshop	09:00 – 12:00	Costas Katsoulos, Ricarda Schmidt and Carolin Trukenbrod	Optometrist	3
Glaucoma detection with limited scope	Skills workshop	09:00 – 12:00	Nicholas Rumney and Jessica MacIsaac	Optometrist	3
Introduction to indirect slit lamp ophthalmoscopy	Skills workshop	09:00 – 12:00	Professor Holger Dietze and Dr Sven Jonuscheit	Optometrist	3
Paediatric spectacle dispensing	Skills workshop	09:00 – 12:00	Fiona Anderson Peter Black Kevin Milsom	Optometrist, Dispensing Optician	3
Vision therapy: six techniques you can start doing today	Skills workshop	09:00 – 12:00	Dr Ruth Shoge and Marie Bodack	Optometrist	3

How to claim CET points

At the end of the lecture or workshop please put your completed CET form in the designated box.

Session	Session type	Time	Presenters	Target audience	CET Points
Saturday 21 May					
Ocular surface	Lecture	09:00 – 10:00	Dr Stefan Bandlitz and Professor Christine Purslow	Optometrist, Contact Lens, Optician	1
Communication skills – Enhance your communication skills	Interactive lecture	09:00 – 10:00	Helmer Schweizer	Optometrist, Contact Lens, Optician, Dispensing Optician	1
Myopia control – From evidence to implementation	Lecture	10:00 – 11:00	Professor Mark Bullimore	Optometrist, Contact Lens, Optician, Dispensing Optician	1
Tales from clinical practice – Clinical cases	Discussion Workshop (peer review)	10:00 – 11:00	Niall Farnon	Optometrist	3
Visual impairment	Lecture	11:30 – 12:30	Maureen Cavanaugh and Jennifer Brower	Optometrist, Dispensing Optician	1
Retinal pathology – Clinical cases	Discussion workshop	11:30 – 12:30	Dr Rebekka Heitmar and Dr Byki Huntjens	Optometrist	3
Recent developments in contact lens and surgical presbyopia correction	Lecture	14:30 – 15:30	Professor James Wolffsohn	Optometrist, Contact Lens, Optician, Dispensing Optician	1
Refractive management and dispensing	Lecture	16:00 – 17:00	Volkhard Schroth and Professor Bruce Evans	Optometrist, Dispensing Optician	1

Session	Session type	Time	Presenters	Target audience	CET Points
Sunday 22 May					
Ocular health	Lecture	09:00 – 10:00	Dr Jeffrey Weaver and Bill Harvey	Optometrist, Dispensing Optician	1
Contact lenses – Clinical cases from around the world	Discussion workshop	09:00 – 10:00	Niall Farnon, Angel Chun Ki Wong, Dr Langis Michaud	Optometrist, Contact Lens, Optician	3
Paediatrics and dyslexia	Lecture	10:00 – 11:00	Dr Marie Bodack, Dr Dorothy Thompson, Professor Bruce Evans	Optometrist	1
Update on the visual standards for driving in Europe	Lecture	10:00 – 11:00	Dr Julie-Anne Little	Optometrist, Dispensing Optician	1
Ocular discomfort	Lecture	11:30 – 12:30	Dr Frank Eperjesi	Optometrist, Dispensing Optician	1
How images can reinvent the eye examination	Lecture	12:30 – 13:30	Dr Pearse Keane	Optometrist	1

How to claim CET points

At the end of the lecture or workshop please put your completed CET form in the designated box.

Professor James Wolffsohn

Recent developments in contact lens and surgical presbyopic correction

Life and Health Sciences, Aston University, Birmingham, UK



Target group: Optometrist, Contact Lens Optician and Dispensing Optician

Optometrist



Contact Lens Optician



Dispensing Optician



Number of CET points: 1

Overview:

The world population is ageing as are the demands on near and intermediate vision later in life from digital technologies such as smart phones and tablets. While multifocal spectacle lens designs can adequately provide the visual needs of a presbyope, they have limitations over contact lens and surgical options, such as the need to look through specific parts of the lens to achieve the correct focal length for the object being observed, their susceptibility to fogging and their cosmetic appearance.

We all have a wardrobe of clothes for different occasions, so why don't we promote the same for refractive correction options? Contact lens and surgical corrections for myopia have been available for many years, but recent developments include better measurement technology to assess lens design, adjusting lens design with lens power and/ or pupil size, mix and matching designs between eyes, diffractive bi and trifocal intraocular lenses, segmented non-symmetrical intraocular lens designs, light adjustable intraocular lenses, accommodating intraocular lenses, corneal inlays, scleral and corneal surgery for presbyopia.

This presentation will highlight these options and examine the research evidence on how effective they are. In particular, research techniques to assess defocus curves, contrast loss and dysphotopic effects will be explored to aid delegates in interpreting the research and commercial literature on new lens designs and their potential benefit to patients.

The presentation will conclude with how a better knowledge of lens designs can inform day to day clinical practice in managing presbyopic patients.

Learning objectives:

- Explain the principles of presbyopic correction.
- Explore how success with presbyopic corrections can be assessed.
- Discuss the available options for correcting presbyopia with contact lenses and with surgical techniques.
- Application of theory into practice.

Biography:

Following a 1st class Optometry degree from Manchester, a pre-registration year at Moorfields Eye Hospital, London, a PhD at Cardiff University and a clinical/research fellowship at the University of Melbourne, Australia, Professor Wolffsohn was appointed by Aston University in 2000, where he was Head of Optometry 2004-9, being awarded a personal Chair in 2007.

Professor James Wolffsohn is now Deputy Executive Dean for Life and Health Sciences at Aston University. James has published over 165 peer reviewed academic papers and given numerous international presentations. His main research areas are the development and evaluation of ophthalmic instrumentation, contact lenses, intraocular lenses and the tear film.

He is the academic Chair of the British Contact Lens Association, having been a past president and is Chair of the 2nd Dry Eye Workshop Diagnosis Sub-committee.

Dr Pearse Keane

How images can reinvent the eye examination

Moorfields Eye Hospital and UCL Institute of Ophthalmology, London, UK



Target group: Optometrists, Dispensing Optician

Optometrist



Dispensing Optician



Number of CET points: 1

Overview:

Imaging technologies have proven fundamental to many advances in the understanding and treatment of ocular disease. In the 1990s, the introduction of a wholly new form of non-invasive cross-sectional imaging, optical coherence tomography, revolutionised the management of retinal disease. Such technology has become increasingly common, and for many it has become a normal part of the eye examination.

However, the technology is always developing. Not only can newer versions of current technology produce better images, but brand new technology can change the nature of the eye examination once again. Binocular Optical Coherence Tomography, for example, can simultaneously image the whole-eye of subjects (cornea to retina), and is also able to image both eyes at the same time, thereby allowing measures of pupillometry and ocular motility.

This presentation will provide an overview of current retinal imaging, as well as highlighting emerging technologies that are likely to transform the provision of eye care in the 21st century.

Learning objectives:

- to improve the recognition of patients presenting with suspect glaucoma by using OCT images and to differentiate them from healthy eyes to ensure the appropriate management
- to improve the recognition of patients presenting with macula degeneration by using OCT images and to differentiate them from healthy eyes to ensure the appropriate management
- to improve the recognition of patients presenting with diabetic retinopathy by using OCT images and to differentiate them from healthy eyes to ensure the appropriate management.

Biography:

Pearse A. Keane, MD, FRCOphth, is an honorary consultant ophthalmologist at Moorfields Eye Hospital, London and an NIHR Clinician Scientist, based at the Institute of Ophthalmology, University College London (UCL).

Dr Keane specialises in applied clinical imaging research, with a particular interest in optical coherence tomography (OCT). He joined Moorfields in 2010; prior to this, he carried out OCT research with leaders in the field at the Doheny Eye Institute, Los Angeles. He is originally from Ireland and received his medical degree from University College Dublin (UCD).

In January 2015, he was awarded a prestigious "Clinician Scientist" award from the National Institute of Health Research (NIHR) in the United Kingdom (UK) - the first ophthalmologist in the UK to receive such an award. His remit from this award is to explore the potential of new medical technologies and innovation in the treatment of visual impairment and blindness, with a particular focus on ophthalmic imaging. In April 2015, he was ranked no. 4 on a worldwide ranking of ophthalmologists under 40, published in *"the Ophthalmologist"* journal.

Essilor is the world leader in ophthalmic optics. The success of the group, which is present in 120 countries with 65.000 people, is the result of a strategy that has always been driven by innovation. From design to manufacture, the group develops a wide range of ophthalmic lenses to correct and protect eyesight. Its mission is to enable everyone in the world to see well thus "to improve lives by improving sight". For that purpose, the group devotes more than 150 million euros a year in research and development.

Social Responsibility:

2.5 billion people in the world see the world poorly because they have no corrective eyewear. 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. Yet the issue is too often wrongly seen as a minor problem. Essilor realizes the enormity of the challenge and focus its strategy in effectively combating poor eyesight. For that purpose, Essilor created the Vision Impact Institute, an independent organization advocating the importance of good corrected vision. Its president, Mrs Maureen Cavanagh, will be participating to the 2016 conference.

As every year, Essilor International is delighted to support the EA00 conference in Berlin, as gold sponsor, and to bring several new contributors and speakers to this 2016 event.



ebiga-VISION presents the latest developments in innovative tools for AMD-prevention and research: **MacuLux®PROFILER** is a densitometer for the assessment of the macular density of the eye. Densitometers by the American manufacturer MACULARMETRICSII have been used by leading researchers around the world in hospitals, research and industrial laboratories, including the National Eye Institute (NEI) and Macular pigment research centers in Waterford (Ireland) and Athens (Georgia, USA). A majority of the knowledge we have about macular pigment today is based on research done with this very densitometer technology! Now ebiga®VISION is making this latest model of the densitometer available for European researchers and ,state-of-the-art'-eye-doctors.



SIGHTRISK LTD.

SightRisk (www.sightrisk.com): The world's leading AMD risk assessment software technology which uses the latest scientific evidence to generate a customized prevention plan for individuals at risk of developing AMD. **Sightrisk** provides a solution to an international problem: age-related vision loss. We provide online risk assessment tools to identify people who are at risk of developing blindness, and provide personalized advice on how to reduce this risk before the disease has a chance to develop.



multiQuity (www.multiquity.com): The **multiQuity test suite** provides unprecedented speed and accuracy across the spectrum of vision testing. The acuity and contrast tests enable grading to be made across a range of many hundreds of levels compared to the coarse scales of traditional vision tests. The SightRisk multiQuity app is a state-of-the-art vision test suite. Unlike tradition PC based vision tests, it has been designed from the ground up to maximise the potential of computer processing and tablet technology.



Clinical skills workshop 1

Art and science of prescribing low vision devices

Presenters: Dr Stefanie Holzapfel¹ and Dr Henry Greene²

¹ *Beuth University of Applied Sciences, Berlin, Germany*

² *Ocutech Inc., South Carolina, USA*

Target group: Optometrist, Dispensing Optician

Optometrist



Dispensing Optician



Number of CET points: 3

Workshop content:

Part 1: This section of the workshop will introduce delegates to the principles guiding the choice of the telescopic and microscopic visual aid for a person with sight loss. It will include a comparison with other existing visual aids, and a summary assessment of the person with sight loss.

The workshop will comprise short introduction lecture and hands-on trial and comparison of the various options available. Delegates will learn how to measure and fit the telescopic and microscopic systems.

Emphasis will be put on the process of teaching the person with sight loss how to use their visual abilities to reach the best results from the chosen system.

After summarising the visual assessment of a person with sight loss, the presenters will clarify when microscopic and telescopic systems will succeed and how to choose the type and magnification of the system. Fitting of the aids and glazing requirement will be clarified, and advice will be provided about how to train the person for best use of their residual vision.

Part 2: This section of the workshop will emphasise the importance of maintaining distance vision for visually impaired patients thereby allowing them to stay connected to the world around them. Loss of distance vision impacts independence and contributes to feelings of isolation and can lead to depression.

Bioptic telescopes are miniature optical devices mounted towards the top of eyeglasses allowing the wearer to alternate their vision between their normal eyeglass lens and that through the telescope by a quick tilt of the head and eyes. They allow visually impaired patients to see better for a broad range of distance and midrange activities including driving, where legal. They may be used continuously for static activities such as TV and theatre or intermittently, when the user is more active.

Clinical factors including visual acuity, response to magnification, central field loss, contrast sensitivity and ocular dominance can impact the individual response to bioptic telescopes and hence can inform the appropriate choice of device and the prognosis for a successful result.

Bioptic telescopes should be selected to address the visual needs of the user and fit in such a way as to maximise their functionality. Clinical practice should include management of patient and family expectations and training to maximise their adaptation to the device.

Learning objectives:

- to understand the options available to successfully assess a patient with sight loss and different strategies needed to assess the vision of a patient presenting with significant visual field loss.
- to improve understanding of telescopic and microscopic visual aids and how to assess and prescribe appropriate devices for patients with sight loss.
- to improve the understanding of telescopic and complex visual aids available for patients and how to assess and prescribe appropriate devices for patients to help them utilise their residual vision.
- to be comfortable with the decision making process regarding the type of bioptic to recommend / prescribe, including the fitting, demonstrating, and ordering of the device to optimise success.

Clinical skills workshop 2

Direct ophthalmoscopy – enhance your skills

Lead presenter: Dr Pavel Benes¹

Facilitator: Dr Petr Vesely^{1,2}

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

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

Target group: Optometrist



OCULAR EXAMINATION



OCULAR DISEASE

Number of CET points: 3

Workshop content: Direct ophthalmoscopy is still an essential tool for retinal and intraocular assessment in the domiciliary setting and for those patients where indirect techniques prove a challenge. The view of the tissue to be observed is very much influenced by the pupil characteristics of the patient, the clarity of the media of the patient, the viewing distance and the brightness, diameter, focus and wavelength of the incident light used.

A number of software-based simulations have been developed to demonstrate the influence of each of these factors. The images are presented on the retinal area of a dummy eye held within a manikin / phantom head. The image can be changed to represent differing media changes, as well as employ photographic representation of common retinal conditions including a range of different forms and severities of age related macular degeneration, retinal detachment and glaucomatous discs.

The delegate will be able to develop their skill in adapting their direct ophthalmoscope to maximise the image, note the benefit of different stop settings and, for some images, be able to understand the benefit of red-free and blue style filters.

Direct ophthalmoscopy is a skill used by many and all notice how performance improves with practice. This workshop is aimed at the newly qualified practitioner wishing to improve upon their current level of skills and also to offer useful feedback on those wanting to assess their own level of confidence and skill in a teaching environment.

Learning objectives:

- to improve upon current level of skills with direct ophthalmoscopy and also to offer useful feedback on those wanting to assess their own level of confidence and skill in a teaching environment with visual and verbal feedback.
- understand the implications of media opacity on direct techniques.
- be able to recognise a range of common retinal and maculopathic conditions represented photographically and anatomically representative photographic simulation in order to decide upon severity, nature and so to influence subsequent management.

Clinical skills workshop 3

Heterophoria and fixation disparity: the German approach

Lead presenter: Professor Ralph Kruger^{1,2}

Facilitator: Georg Stollenwerk²

¹ Beuth University of Applied Sciences, Berlin, Germany

² International Association for Binocular Vision

Target group: Optometrist



BINOCULAR VISION

Number of CET points: 3

Workshop content: This workshop will introduce delegates to a methodology for measuring and correcting heterophoria and fixation disparity (MKH). The methodology was developed at Beuth University of Applied Sciences, Berlin, in the 1960's and has since frequently been used in Germany, Switzerland, Austria and other European countries. This workshop will provide an overview of the idea behind this approach, in particular of the role of fixation disparity as a reaction to stress of motor fusion.

The MKH comprises of a series of tests, which aim to detect different stages of heterophoria and fixation disparity. The tests are presented in a subsequent order, and for each individual test the aligning prisms is determined. These tests are commonly integrated into many modern electronic vision testing systems

but often there is a lack of knowledge how to use the tests and how to interpret their results.

Aimed at practitioners, who are familiar with the physiology of binocular vision, the concept of MKH and the basic principles for applying this technique to common binocular vision problems will be explained and demonstrated.

Demonstration patients will allow delegates to ask a series of specific questions in order to determine the correct aligning prism. The questioning technique and the insertion of the correct aligning prism for each test in the series will be closely supervised and facilitated by the workshop presenters.

Learning objectives:

- to understand and revise the principles of heterophoria and fixation disparity
- to understand the basic concepts of the MKH methodology
- to determine the correct aligning prism for common types of heterophoria and fixation disparity
- to be able to interpret the test results and to prescribe prismatic lenses for common types of heterophoria and fixation disparity.

Clinical skills workshop 4

How to assess and evaluate microtropia

Lead presenter: Dr Julie Demaree¹

¹ Hawthorne Vision Center, Portland, Oregon, USA

Target group: Optometrist



BINOCLULAR
VISION

Number of CET points: 3

Workshop content: Monofixation Syndrome (microtropia) is a subtle binocular dysfunction associated with amblyopia and reduced stereo acuity.

When a patient presents with reduced visual acuity in one eye, the underlying cause is either pathology or amblyopia caused by strabismus or anisometropia. When standard testing does not reveal any of these conditions, the optometrist may have difficulty determining the cause of the reduced visual acuity in one eye.

Patients with monofixation syndrome often pass most tests of binocularity. They usually have gross stereopsis and the amount of strabismus is too small to detect with a cover test. If the refraction does not reveal anisometropia, there does not appear to be a functional problem leading to the development of amblyopia. To avoid needless referrals of patients with monofixation syndrome for testing for pathology, optometrists must know how to test for monofixation syndrome.

This workshop will briefly discuss monofixation syndrome and the tests used to detect this subtle binocular problem. The 4 base out prism test, Bagolini lenses, Stereofly, and Worth 4 dot tests will be performed by delegates on both normal patients (other participants) and a patient with monofixation syndrome.

At the conclusion of the workshop patients will be able to perform the tests in their own practice environment and diagnose monofixation syndrome.

Learning objectives:

- to increase awareness of monofixation syndrome and consider this as a clinical diagnosis when a patient presents with reduced VA in one eye and standard testing does not reveal pathology or amblyopia caused by strabismus or anisometropia.
- to become familiar with a range of consulting room techniques to include the 4 base out prism test, Bagolini lenses, Stereofly, and Worth 4 dot tests to detect the presence of monofixation disparity.
- to better detect and manage patients thereby avoid unnecessary referrals for suspect pathology to ophthalmology of patients with monofixation syndrome.

Clinical skills workshop 5

Management of patients with high ametropias

Lead presenter: Christian Franchi¹

Facilitator: Dominique Meslin²

¹ Private practice, France

² Essilor Academy Europe

Target group: Optometrist,
Dispensing Optician

Optometrist



OPTICAL
APPLIANCES



REFRACTIVE
MANAGEMENT

Dispensing Optician



OPTICAL
APPLIANCES



REFRACTIVE
MANAGEMENT

Number of CET points: 3

Workshop content: Higher value or complex refractive corrections are more prone to error due to the enhanced impact of factors such as centration misalignment, prismatic induction, and vertex distance variation. The quality of vision achieved is also heavily influenced by the design of lens chosen for any particular high value correction and there are several lenses available specifically able to correct very high refractive error (up to +/-40.00DS for example) which best utilise material and curves to offer clarity without too much compromise of weight, cosmetics and with minimum aberration. This skills workshop will cover this area in two ways.

The first part of the workshop offers the delegate the opportunity to handle, measure and experience the ordering of a range of

specialist lenses that might be required to correct high ametropia. Specialist lenses from a range of manufacturers will be discussed and the most appropriate lens for a range of example high myopic, high hyperopic, high astigmatic, and prismatic refractive errors will be discussed and decided upon in a supervised group setting.

The second element will look at the avoidance of errors during the dispensing process. This will include a practical session involving refraction of a high prescription and a demonstration of the impact of vertex distance and trial frame fit errors. There will then be practical hands-on experience of frame and facial measurements and, for each, consideration will be given to the impact of small adjustment upon the final correction.

Learning objectives:

- understand the best lens choice for higher value ametropia corrections, including those with high cylinder or prism component.
- understand how to dispense high value lenses in order to avoid errors relating to parallax, vertex changes and centration error and those factors in frame fitting that may influence the final visual quality.
- to be able to make the right recommendation in terms of progressive lens choice, prescription and fitting for complex presbyopic patients and deal more confidently with any cases of non-tolerance.
- understand the process of refraction using a trial frame when assessing very high value corrections (up to 40.00DS) to avoid vertex and centration errors and to best decide on final correction to be prescribed.

Clinical skills workshop 6

Neurological evaluation for the optometrist

Lead presenter: Dr Marie Bodack

Facilitator: Dr Robert Austin

Southern College of Optometry, Memphis, Tennessee, USA

Target group: Optometrist



Number of CET points: 3

Workshop content: Patients with neurological disorders may first present to an optometrist for evaluation. The optometric examination can provide insight into potential neurological issues. The clinical history should focus on the onset and duration of the problem, associated symptoms, changes over time, prior treatments and level of severity of the symptoms. Additional neurological testing, including motor and sensory function, cranial nerve testing, cerebellar function, and reflexes may be useful in the assessment of these patients.

This workshop will review the basics of the optometric neurological examination including pupil assessment, visual field testing, oculomotor assessment (motilities and cover testing), colour vision and optic nerve evaluation. Additional ancillary examination of cranial nerve function, cerebellar function and reflexes will be taught.

Modifications to testing based on patient age and mental abilities will be discussed followed by a review of some case presentations of neurological conditions to include optic nerve photos and visual field plots.

Learning objectives:

- to refresh knowledge of the 12 cranial nerves and become more familiar with symptoms of neurological problems that can present in practice.
- To become more skilled at taking a directed history for a patient with a potential neurological problem.
- To become more comfortable in carrying out tests of optic nerve function including optic nerve assessment, colour vision, pupil testing and visual field testing.
- To review some case presentations of neurological conditions (optic nerve photos and visual fields may be used).

Clinical skills workshop 7

The art of fitting RGP cornea lenses

Lead presenter: Professor Peter Moest

Facilitator: Dörte Krüger

Beuth University of Applied Sciences, Berlin, Germany

Target group: Optometrist, Contact Lens Optician

Optometrist



Contact Lens Optician



Number of CET points: 3

Workshop content: This clinical skills based workshop will cover how to choose the first RGP lens in relation to the eccentricity and the astigmatism of the cornea and other key parameters such as corneal and pupil diameters, palpebral aperture, corneal physiology and prescription. It offers delegates hands-on experience of selecting and fitting a range of RGP lenses under supervision, however before commencing the movement and fit characteristics of different lens geometries will be demonstrated via fluorescein patterns shown on a video slit lamp.

Pre-selected demonstration patients will be fitted with three different RGP lenses so delegates can gain confidence in their interpretations of lens fit in particular fluorescein patterns. Delegates will then

be encouraged to fit RGP lenses on one another from the wide range of lens designs available at Beuth University Clinic. Facilitators will encourage the use of a wide range of RGP corneal contact lens designs including spherical, aspheric and aspheric bi-curve back surface options.

The concluding section of the workshop will look at the selection of RGP lenses for the presbyopic patient and the importance of optimal centration for simultaneous design lenses and fast yet smooth and stable movement for alternating (translating) lens designs, in order to maximise both distance and near vision.

Learning objectives:

- ability to accurately measure and record key parameters in relation to corneal curvature, diameter and sag. Accurate recording of pupil diameter under different illumination levels and measurement of vertical palpebral aperture and lower lid position for more specialist lens designs.
- to understand how to make the appropriate initial RGP lens selection based on external eye measurements.
- to recognise an "optimum fit" fluorescein pattern and differentiate this from a marginally flat, steep or indeed toric pattern.
- an improved understanding of RGP parameter changes and the impact on lens fit, comfort and vision.
- the ability to develop a strategy for selection and optimisation of multifocal contact lenses to include; simultaneous and alternating RGP lens designs to ensure the best possible outcome with respect to patient vision.

Clinical skills workshop 8

Advanced techniques for investigating glaucoma

Lead presenter: Patrick Gunn
Facilitator: Amanda Harding and Joanne Marks

Manchester Royal Eye Hospital, Manchester, UK

Target group: Optometrist



Number of CET points: 3

Workshop content: This workshop will give delegates the opportunity to develop essential skills required when providing a comprehensive glaucoma assessment. This will include:

- assessing the anterior segment with slit lamp biomicroscopy to look for secondary signs of glaucoma
- Goldmann applanation tonometry
- pachymetry
- measurement of anterior chamber depth.

Optometrists from the Manchester Royal Eye Hospital with a specialist interest in glaucoma will take delegates through the process, step by step, of assessing the anterior segment for signs of glaucoma. There will then be the opportunity to practice these skills with patients. Goldmann applanation tonometry will be explained and demonstrated and then delegates will practice this skill. The importance of pachymetry in glaucoma will be discussed and the technique then

demonstrated. Delegates will have the opportunity to learn about how to assess the anterior chamber depth using a slit lamp and there will be a demonstration of techniques used at the hospital eye service, including gonioscopy.

Cases from the Manchester Royal Eye Hospital will be discussed to enable practitioners to interpret information gained from these techniques to make a diagnosis of glaucoma.

This workshop will give delegates the opportunity to observe and practice skills currently used as part of best practice in glaucoma care and management. This will be aimed at clinicians of all levels.

Learning objectives:

- uses a slit lamp to examine the external eye and related structures.
- uses both a non-contact and contact tonometer to measure intraocular pressure and analyses and interprets the results.
- uses diagnostic drugs to aid ocular examination.
- evaluates glaucoma risk factors, to detect glaucoma and refer accordingly.

Clinical skills workshop 9

Diagnosing tools for investigating neuro and paediatric anomalies

Presenters: Costas Katsoulos¹, Carolin Truckenbrod² and Ricarda Schmidt³

¹ Optometry department Athens Eye Hospital, Athens, Greece

² Beuth University of Applied Sciences, Berlin, Germany

³ Post graduate Optometrist, Beuth University of Applied Science, Berlin, Germany

Target group: Optometrist



Number of CET points: 3

Workshop content:

Part 1: Strabismus assessment

Delegates will review and carry out cover test methods (alternating; cover-uncover; and prism cover test) and the Hirschberg test, followed by repeating the Hirschberg test using an automated photo optometric device (APOD) off-centre fixation target technology.

Pupil assessment

Delegates will review and carry out assessment of pupillary reflexes (direct, consensual, near and a test for RAPD). They will measure and record pupil size in two different ambient lighting conditions using a conventional method (mm rule). The results of these measures for each subject will be compared to the automated measurements obtained using an APOD. The importance of change in anisocoria size in different ambient illumination will be reviewed in the context of MRD and Horner's syndrome.

Part 2: Examination of real life patients presenting with manifestations of neurological disease, to include advanced examination of the pupils, ocular motility and gaze defects.

Ocular motility examination techniques, to test for complex strabismus cases and gaze defects indicative of neuro-ophthalmological pathology.

Basic revision of the relevant cranial nerves and examination of patients presenting with ptosis and optic neuritis.

Learning objectives:

- to review objective methods of assessing eye alignment for the detection of strabismus.
- to better understand the advantages and limitations of conventional methods of assessing eye position (cover test; Hirschberg) and compare these to an automated Hirschberg test.
- an improved capability to differentiate various forms of pupil dysfunction (Horner's Syndrome, Aide's tonic pupil and bilateral tonic pupils).
- improved knowledge of the cranial nerves to better evaluate patients presenting with ophthalmic manifestations of neurological disease (cerebral vascular incidents, stroke, multiple sclerosis, myasthenia gravis etc) and decide on referral pathway.
- examine and evaluate patient presenting with ptosis (congenital, Horner's, levator dehiscence, RGP contact lens related) and manage / refer accordingly.

Clinical skills workshop 10

Glaucoma detection with limited scope

Lead presenter: Nick Rumney¹
Facilitator: Jessica Maclsaac^{1,2}

¹ BBR Optometry Ltd, Hereford, UK
² Aston University, Birmingham, UK

Target group: Optometrist



Number of CET points: 3

Workshop content: Whilst some optometrists in some jurisdictions are already actively managing glaucoma with a full set of qualifications and skill set including prescribing, the fact remains that for many European optometrists this remains an aspiration. Nevertheless optometrists are usually the main source of glaucoma referral. A high false positive rate is a frequent problem arising out of this referral.

Although the principle reason for this is the low prevalence of glaucoma in unscreened populations there are significant measures optometrists can take to minimise false positive rates safely. This workshop will concentrate on clinical technique, the minimisation of artefact and the use of data obtained to facilitate clinical decision making in the primary care arena in which optometrists practice.

The workshop will introduce each of three techniques, results achievable without diagnostic drugs, namely, Icare tonometry, threshold related visual fields, SL examination of the optic disc and anterior chamber angles.

- Introduction
- Epidemiology
- Icare tonometry – followed by hands-on experience
- Threshold related visual fields – followed by hands-on experience
- SL-BIO disc analysis – followed by hands-on experience
- Summary.

The workshop will emphasise the importance of not relying on single measures of risk in the opportunistic case detection of a common disease (in optometric practice) but of low prevalence.

Learning objectives:

- what glaucoma's you are actually looking for and in whom.
- what you need to know to exclude the presence of glaucoma.
- what you need to have to exclude the presence of glaucoma.
- what you need to do to exclude the presence of glaucoma.

Clinical skills workshop 11

Introduction to indirect slit lamp ophthalmoscopy

Lead presenter: Professor Holger Dietze¹
Facilitator: Dr Sven Jonuscheit²

¹ Beuth University of Applied Sciences, Berlin, Germany
² Glasgow Caledonian University, Glasgow, UK

Target group: Optometrist



Number of CET points: 3

Workshop content: Delegates will be introduced to the principles for investigating the posterior eye using three-dimensional slit lamp ophthalmoscopy (90D Volk Lens).

This clinical skills based workshop comprises a brief introduction to the optical principles of the technique and the appearance of a normal fundus. The remainder of the time will be aimed at developing and enhancing hands-on experience, delegates performing closely supervised 90D-slitlamp-ophthalmocopy of the posterior eye on a range of subjects. Starting with the key areas of the disc and macula, delegates will move on to examination of the peripheral fundi of both dilated / non-dilated eyes and assess and document the images seen.

Learning objectives:

- an understanding of the physical properties of indirect lenses including magnification and field of view and how these relate to examining the fundus in comparison to direct ophthalmoscopy.
- to use a slit lamp and Volk (90D lens) to obtain an appropriate view of the fundus and correctly record the result on a record card.
- an understanding of the different drugs available for mydriasis, their indications and contraindications and potential side effects.

Clinical skills workshop 12

Paediatric spectacle dispensing

Lead presenter: Fiona Anderson

Facilitator: Peter Black and Kevin Milson

Association of British Dispensing Opticians
(ABDO), UK

Target group: Optometrist,
Dispensing Optician

Optometrist



Dispensing Optician



Number of CET points: 3

Workshop content: Practitioners often encounter poorly-fitting spectacle frames dispensed in community opticians' practices, and are regularly asked for advice regarding frame fit. This workshop explores the principles behind paediatric spectacle frame dispensing and fitting using ground-breaking and innovative techniques with custom-constructed and anatomically correct paediatric model heads.

Six heads have been commissioned by the Association of British Dispensing Opticians and custom-made to include a range of children's ages and features which will refresh and enhance the participants' paediatric frame fitting skills. They will also learn how paediatric facial anatomy develops with age.

Participants will use the heads and sample spectacle frames with facilitator guidance to assess spectacle frame fitting, and learn how the developing facial features influence paediatric spectacle frame fitting.

The workshop will also highlight the features of paediatric spectacle frames which can be specified during spectacle dispensing, such as headbands, curl sides and other adaptations which can help with frame stability, positioning and comfort.

The second part of the workshop aims to revisit and refresh paediatric dispensing knowledge and skills through a series of case studies.

Learning objectives:

- takes accurate facial measurements and appreciates the implications of anatomical features and how these relate to the final fitting of the appliance.
- demonstrates understanding of frames covering relationship between children's frames, lenses and face, appropriate lens and frame selection and justification for children and is able to suggest appropriate frame adjustments and modifications.
- appreciates the implications of developing anatomical features, knows about inset bridges, curl sides and the custom-made frame option for children.
- understands and recognises situations that need to be addressed when dealing with the dispensing, fitting and on-going care of children and their eyewear.
- can suggest suitable frame types and materials for children's frames, knows how to make adjustments and take appropriate measurements, can suggest specialist frame parts where appropriate such as specialist bridge and side options.
- understands the duality of communication with both child and parent/guardian and can tailor communication skills to suit the age of the child and understanding of the parent/guardian.
- is aware that paediatric dispensing is a protected function and takes steps to ensure that any such dispensing is carried out with regard to the Opticians Act, and advice and guidelines set out by ABDO and the UK College of Optometrists.

Clinical skills workshop 13

Vision therapy: six techniques you can start doing today

Lead presenter: Dr Ruth Shoge¹

Facilitator: Dr Marie Bodack²

¹ Pennsylvania College of Optometry, Salus University, Philadelphia, Pennsylvania, USA

² Southern College of Optometry, Memphis, Tennessee, USA

Target group: Optometrist



BINOCLULAR
VISION

Number of CET points: 3

Workshop content: The most common vision disorders that require treatment with vision therapy are convergence insufficiency, accommodative excess, accommodative infacility, and eye movement disorders. These vision problems can affect people of all ages; therefore it is important for optometrists to be able to provide vision therapy services for these problems.

This workshop is designed to demonstrate that by learning to perform as few as six vision therapy techniques many patients seen with common binocular vision, accommodative and eye movement disorders can be effectively treated.

Delegates will be presented with handouts and video demonstrations to learn the basic administration of each technique. Skills to be developed include learning the six basic vision therapy techniques to treat vergence, accommodative, and eye movement disorders.

Delegates will then have the opportunity to practice these techniques on one another and be taught how to best modify techniques to increase or decrease the difficulty of the activity whilst maintaining patient responses and maintain motivation.

Learning objectives:

- to better appreciate and fully understand the six basic vision therapy techniques to treat vergence, accommodative, and eye movement disorders.
- to learn to rehabilitate accommodative disorders by using the near/far Letter Chart and Accommodative Rock techniques, and learn the importance of monocular, bi-ocular, and binocular treatment strategies.
- to learn to rehabilitate eye movement disorders using Letter Chart Saccades and Letter Tracking techniques.
- to learn to rehabilitate vergence disorders using the Brock String and Vectograms.
- to be aware that success of vision therapy techniques include remembering the importance of checking for suppression, common responses of patients, corrective techniques, and maintaining motivation while continuing to challenge the patient.



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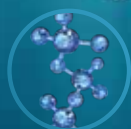
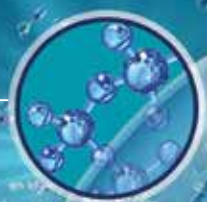
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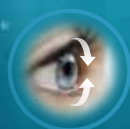
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Clinical presentation 1

Glaucoma: Engagement with the enigma

Presenters: Dr Robert Harper

Manchester Royal Eye Hospital, Central Manchester University Hospitals NHS Foundation Trust and Manchester Academic Health Sciences Centre, Manchester, UK

Target group: Optometrist



STANDARDS OF PRACTICE



OCULAR EXAMINATION



OCULAR DISEASE

Number of CET points: 1

Overview: Glaucoma is a significant cause of visual morbidity throughout the world. This spectrum of diseases is held in fascination by both researchers and clinicians alike, impacting upon both structure and function, and upon both anterior and posterior structures of the eye, with treatments and interventions ranging from the therapeutic to the surgical.

Engagement of the optometric profession in many European countries plays a key role in glaucoma detection, with enhanced case finding strategies having been in operation in some areas for more than 10 years. Such services have been successful in relation to addressing the effectiveness of case finding processes, with evidence for a reduction in the false positive referral rate from ~40% to ~10%. Yet optometric engagement with glaucoma goes well beyond detection, and there are important and growing opportunities for optometrists in offering enhanced services in the community, and in extended role services in hospital glaucoma

clinics, each contributing to the significant burden of this disease in the broader context of ophthalmic healthcare.

This presentation will provide a perspective on optometry and glaucoma, with respect to both detection and monitoring. The challenges of case finding and the requirements for the clinical assessment of new referrals will be reviewed. Selected clinical cases will be used to emphasise clinical decision making dilemmas, with regard to both the diagnosis and the management of glaucoma related presentations (i.e. from optometric referrals to subsequent management), with some new treatment options being briefly highlighted.

Finally, the challenges of service provision in the modern era of a growing, ageing population of increased longevity will be highlighted, alongside the importance of optometry fully engaging with the enigma that is glaucoma.

Learning objectives:

- to understand the role of the optometrist in glaucoma care – detection and management.
- to understand how to comprehensively assess a patient at risk of glaucoma.
- to understand how to evaluate the different management options for different glaucoma related diagnoses.
- to learn about different medical and surgical treatment options for a variety of different patient presentations in glaucoma.

Winning European research funding

EURECO project: European research collaboration in optometry

Lead author: Dr Sven Jonuscheit

*Vision Sciences, Department of Life Sciences,
Glasgow Caledonian University,
Glasgow, UK*

Background: The scope of optometric practice continues to change and optometrists are taking on extended responsibilities in many countries. While the provision of optometric services is not uniform across Europe, the scope of optometric practice is widening. Across Europe, optometric education is heterogeneous, reflecting the variability in scope of practice, national regulations, as well as health service structure and requirements.

While collaborations between higher education institutions at European level exist, these are often bilateral in nature. Many bilateral partnerships are supported through the Erasmus student exchange programme of the European Union. The Erasmus programme allows students to spend time, usually one semester, at a partner institution. However, while Erasmus exchange visits are also open to educators, these can be more difficult to arrange. In order to promote the cross-European exchange in optometric education and research as well as to contribute to the harmonisation of the profession in Europe, academics of four higher education institutions from Germany, Norway, Spain and the UK have

joined forces. This presentation describes the initial steps towards the European Research Collaboration in Optometry (EURECO), which aims to facilitate a closer working relationship between optometric educators and researchers in Europe.

Methods: A simple and feasible research study with a low participation threshold was developed, building on existing bilateral partnerships. This study involves assessments of self-reported visual function in undergraduate optometry students. The study will be conducted at Beuth University of Applied Sciences (Germany), Buskerud and Vestfold University College (Norway), the University of Valladolid (Spain), and Glasgow Caledonian University (UK). At each institution, two cohorts of optometry students (first and final year) will be invited to take part. For comparison, a class of first year non-vision sciences students will be assessed. Demographic information will be obtained and a short eye-related history obtained. Participants will be asked to complete the Visual Function Questionnaire 25. Habitual visual acuity will be measured using the logMAR chart. Between-group comparisons will be made. Self-reported and measured visual function will be compared.

Results: The EURECO project and its first study have evolved over several years, building on existing bilateral collaborations. It is hoped that this research will further enhance opportunities for international partnerships. The first study, albeit relatively simple in nature, will provide an insight into how first year optometry students perceive their visual function, taking into account any spectacle wear, country specific educational characteristics, and habitual visual acuity.

Conclusions: The EURECO project has overcome the first hurdles and a working relationship has been established. Two important aspects in developing this partnership were to ensure the feasibility of the planned research project taking into account the scope of practice in each country and the value of expanding existing bilateral collaborations.

Winning European research funding

Marie Sklodowska-Curie actions: Possibilities for researchers in the field of vision science

Lead author: Dr Fabrizio Zeri

School of Life and Health Sciences, Aston University, Birmingham, UK

Aim: Since 1988 the European Union (EU) has created funding programmes or Frameworks Programmes, (FPs) to support and encourage research in the European Research Area (ERA). During the last 30 years the FPs' budget has steadily increased and this demonstrates the commitment of the EU and European Commission in developing research.

It is now the 8th FP, called Horizon 2020, the biggest ever EU Research and Innovation programme with nearly €80 billion of funding available over seven years (2014 to 2020). The FPs have always supported career development and training of researchers in Europe. This part of the FPs goes under the name of Marie Curie Actions, now renamed Marie Sklodowska-Curie Actions (MSCA). Raising awareness of MSCA among EAOO associates, and in general with researchers in the fields of optometry and vision sciences, could offer a useful perspective for those who would like to develop, in different ways, a future in the research field. This presentation will share the experience of a successful project granted an Intra-European Fellowship (IEF) for Career Development in the area of optometric and vision sciences.

The grant was achieved in 2013, within the FP7. The specific objectives of FP7-IEF were:

".....to support the career development, or restart, of experienced researchers at different stages of their careers, and seeks to enhance their individual competence

diversification in terms of skill acquisition at multi- or interdisciplinary level and/or by undertaking intersectoral experiences.....".

This happened within this project, that brought an Italian researcher to Aston University in the UK (host organization) to research in an interdisciplinary way within the vision sciences.

Results: In the first pillar, "Excellent Science", of Horizon 2020, it is still possible to find MSCA funds to support the career development and training of researchers at all stages of their careers. They can be doctoral candidates or highly experienced researchers. Furthermore MSCA encourage transnational, intersectoral and interdisciplinary mobility:

"...The MSCA enable research-focused organisations (universities, research centres, and companies) to host talented foreign researchers and to create strategic partnerships with leading institutions worldwide."

Many vision scientists and researchers could apply for these funds, especially if they come from countries in which it is not as straightforward to develop a career in an optometric area.

Conclusions: Marie Sklodowska-Curie Actions represent a concrete possibility for researchers in the optometric and vision sciences to develop their own scientific career and at the same time share knowledge and experience among the clinical, professional, industrial and educational structures of European countries.

Professional development

Route to fellowship, case reports and advice on application

Presenters: Caroline Christie

European Academy of Optometry and Optics

What is Fellowship?

Fellowship is a mark of achievement to which all members of the Academy can aspire. The award of Fellowship is held in high esteem but it is achievable through success in a variety of optometry or optics related work and is accessible to many people.

The Academy's Fellowship programme awards members who have made a significant contribution to optometry, optics and vision science at a local, national and/or international level and/or members who have shown excellence and/or innovation in one or more of the following fellowship categories:

- Clinical practice: includes case studies / reports
- Research in optics, optometry or vision science
- Education in optics, optometry or vision science
- Professional advancement and/or management of visual healthcare

This session hosted by Interim Academy Manager, Caroline Christie herself a fellow, in conjunction with members of the Fellowship Working Group, Case Record Assessors and Fellows of the Academy, is hoped will encourage more members to consider applying for Fellowship of the Academy in the coming years.

Given the wide scope of practice across Europe and beyond, discussion and debate around the Clinical Practice category will be main focus with sample records available for open discussion re format / presentation rather than specific clinical content / excellence.

The session will discuss and consider changes to current assessment criteria the development of a portfolio and look at a move towards the adoption of a point based system, for assessing achievement similar to other international fellowship award schemes.

Please come and share your views and experiences it is after all Your Academy.



Scope of practice

A national survey of the scope of practice of optometrists working in the UK hospital eye service

Presenters: Dr Robert Harper

Manchester Royal Eye Hospital, Central Manchester University Hospitals NHS Foundation Trust and Manchester Academic Health Sciences Centre, Manchester, UK

Purpose: The role of the optometrist in the Hospital Eye Service (HES) has undergone significant development in recent years to include extended areas of clinical practice more traditionally undertaken by ophthalmologists, at the same time as a growing demand for increased capacity in ophthalmic services. This presentation covers the findings of a national survey of the scope of practice of optometrists working in the UK HES.

Methods: A survey was designed to incorporate questions on the provision of core services before seeking detailed information on the scope of practice within extended roles, to include: ophthalmic sub-specialist areas where optometrists currently practice; the undertaking of specific procedures within these services; the relative autonomy of practice within these extended roles; and the training and accreditation requirements for working within extended roles. The SurveyMonkey® website was used to disseminate the questionnaire to the head of optometry in 79 HES units throughout the UK.

Results: Responses were received from 70 of the 79 (88.6%) questionnaire invitations issued. A substantial majority of respondents (N=67/70, 95.7%) indicated that optometrists undertook extended roles. Glaucoma is the leading extended role service provided by optometrists (60 respondents), with roles in macula (N=46), medical retina/diabetes (N=36) and corneal services (N=36) also being relatively common. A wide variety of clinical procedures or interventions are undertaken as part of these services, which for a small number of optometrists now also includes the undertaking of specific laser procedures. There is evidence for a significant degree of autonomy within these extended roles. The primary mode of training is an 'apprentice' model, incorporating sessions worked under supervision in ophthalmology clinics. Methods of accreditation for optometric participation in extended role services are varied.

Conclusions: Optometrists working within the UK HES continue to undertake the traditional clinical roles of refraction, clinically necessary contact lenses, and low vision rehabilitation. However, it is also clear that these professionals now undertake a wide range of extended clinical roles, with a transformed scope of practice now incorporating diverse roles traditionally undertaken by medical practitioners.

Scope of practice

Using data from optometry Electronic Patient Records (EPRs) to study population refractive error

Lead author: Declan Hovenden

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

Purpose: In recent decades the prevalence of myopia has been shown to be increasing significantly. This is now being recognised as an important (if somewhat neglected) public health issue with prevalence rates in East Asia already at 80-90% among school leavers and studies from the U.S. demonstrating an increase of 60% since the 1970s.

While several refractive error prevalence studies have been conducted across the world, in Ireland such research is rare. Approximately 650,000 primary eye examinations are carried out by optometrists in Ireland annually and most of these optometrists record their patients' refractive error data electronically.

This study aimed to explore the potential to develop a means of extracting, collecting and analysing data from optometry Electronic Patient Record (EPR) systems in order to study refractive error rates at a population level.

Methods: Software was developed to extract data from the most widely used optometry EPR system in Ireland. A pilot implementation of this data extraction tool was conducted (in accordance with data protection legislation) involving six different optometry sites and their EPR systems. These data were analysed and the resultant information was used to produce a refractive

error profile for the study population. The results were compared with those of relevant conventionally-conducted refractive error prevalence studies.

Results: The development of software to extract data from optometry EPRs was relatively straightforward and a pilot implementation of this novel data extraction software resulted in the gathering of anonymised data on approximately 30,000 individuals. The refractive error data were analysed and a profile demonstrating the rates of myopia, hyperopia and astigmatism was produced. The results compared well with those of the Gutenberg Health Study (a large-scale population-based prospective study of 15,000 subjects over seven years) and the Northern Ireland Childhood Errors of Refraction (NICER) Study.

Conclusion: This study has shown that it is technically possible and relatively straightforward to extract the real-world EPR data relevant to the study of population refractive error in an efficient, inexpensive, timely manner. Once implemented, this mechanism could be repeated as required and may be of value to those researching myopia progression and the possible introduction of "myopia control" interventions in the future.

Acknowledgements: This study formed part of the work for an MSc dissertation and ethical approval was granted by the Ethics Committee of the School of Computer Science and Statistics, Trinity College Dublin.

Scope of practice

Systematic review of economic evaluations in primary eye care

Lead author: Ashleigh Kernohan^{1,2}
Co-authors: Helen Mason,²
Cam Donaldson,² Sven Jonuscheit¹

¹ Department of Life Sciences, Glasgow
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Glasgow Caledonian University, Glasgow, UK

Background: Demand for hospital eye care services is increasing due to an aging population and advancing technology in the treatment of eye disease. To ease the burden on secondary care services, primary eye care providers are undertaking a greater role in community disease management. Using an economic approach can help allocate the resources in such a way as to bring maximum benefit to the investment.

This project aimed to use a systematic review to assess the extent and quality of evidence for the efficiency of primary eye care services in high-income countries.

Methods: A search strategy was developed by using a scoping search in Google Scholar and PubMed to identify key terms and to develop a systematic review protocol. The search was conducted in May 2015 to identify relevant articles in MEDLINE, Embase, Web of Science and CENTRAL (The Cochrane Library). Grey Literature was searched and assessed including Opengrey, HMIC (Ovid) and Ethos. The WHO International Clinical Trials Registry Platform (ICTRP) and the World Health Organization's library online catalogue (WHOLIS) were also searched. The conference proceedings for the Association

for Research in Vision and Ophthalmology were screened for relevant abstracts.

Inclusion criteria: Studies including an economic evaluation of interventions provided by primary eye care providers were included. A broad definition of economic evaluation was used, meaning any studies with both cost and clinical outcomes would be considered for inclusion.

Data collection and analysis: Publication titles were screened for relevance. Abstracts of titles deemed relevant were read and assessed by two independent reviewers. Studies which met the inclusion criteria based on abstract assessment were then included. Studies which were deemed unclear were read in full by two reviewers to determine inclusion. A third reviewer moderated in cases of disagreement. A data extraction tool was developed and used for extracting relevant data. The study quality was assessed using the CHEERS checklist to give each study a relevant score.

Results: The systematic search revealed a total of 12,082 studies. Following title screening, 204 studies were identified as relevant. Based on abstracts screening 15 papers were included with a further seven papers being added after the full text was analysed, leading to 22 papers included and analysed in detail.

Conclusions: This systematic review showed a relative scarcity of evidence for the use of economic evaluation in the context of primary eye care, the quality of which is variable.

Optometry and optics education

Using Values and Knowledge Education (VaKE), an innovative teaching technique, to prepare students for patient care

SIG Chair: Professor Asen Pashov
Lead author: Dr Rachel Eichler

*Department of Optometry, Hadassah Academic
College, Jerusalem, Israel*

Background: Students at the end of their second year of optometry school have acquired a lot of theoretical and practical optometric knowledge. However, have educators done all that they can to prepare these students for seeing patients formally at the start of their third year? This presentation covers an innovative pedagogical technique that is being piloted at Hadassah Academic College within the course "Introduction to Patient Care".

This course acts as a bridge for second year students between acquiring optometric knowledge and starting clinical work with patients. The teaching method of constructivism is used in the course. Constructivism encourages students to be critical thinkers, involves students in the learning process and requires students to apply knowledge to new situations. Through the use of Case Based Learning (CBL), Evidence Based Learning (EBL) and Team Based Learning (TBL) the course helps to prepare the students for patient care in the upcoming year and throughout their life. This spring, the course will pilot VaKE (Values and Knowledge Education), a practical theory combining values and education. It has been adapted to optometric education as part of the Tempus funded consortium "Life-Long Learning in Applied Fields" (LLAF).

Methods: VaKE will be used to complement this already highly original and exciting course.

VaKE is based on the idea that dilemma discussions trigger interest and learners' inquiry while developing self-awareness in clinical decision making. The content of VaKE is primarily constructed by the learner and not conveyed by a teacher to a passive learner. VaKE demands critical reflection, aiming towards self-enhancement in knowledge, skills, feelings, and values. A standard procedure for VaKE consisting of eleven steps (Patry et al. 2013) will be described in detail in the presentation with its special adaptation to optometric education. VaKE has been successfully implemented in many educational programmes, including a pilot at the Optometry School in Aalen, Germany. Results of our pilot this spring will be presented at the conference.

Conclusion: The course "Introduction to Patient Care" is valuable in helping the students develop their professional identities. Through using CBL the student gains experience that will help him/her when confronting patients. The process of seeking the information needed through EBL trains the student to become a lifelong learner. Working in pairs and groups, and having the "audience" critique and comment, adds a lot to the students' perception and interpretation of the case at hand. Lastly, we predict that inserting a VaKE module into the course will help the student develop self-awareness and the ability to reflect upon crucial decisions that he/she will be required to make in his/her professional career. This course will produce optometrists who can maintain their competency and at the same time be self-aware and empathic throughout their patient interactions.

Special Interest Group (abstract 2/5) Optometry and optics education

Social entrepreneurship and international practice – an educational benefit for the Norwegian optometry student?

Lead author: Irene Langeggen

Department of Optometry and Visual Science, Buskerud University College, Kongsberg, Norway

Optometrists are members of an independent and autonomous health care profession. The World Council of Optometry (WCO) defines scope of practice (Optometry, 2011). "Universal eye health: a global action plan 2014-2019" has three objectives, and optometry education can be seen to be part of the third objective - "multisectoral engagement and effective partnerships to strengthen eye health" (WHO, 2015). Academic institutions encourage students to look to the future and prepare for challenges. Junior achievement Buskerud, Norway, has encouraged Buskerud University College to bring innovation into education. Innovation within the education of optometry is to bring learning to students through new means and methods.

The Global Action Plan (WHO, 2015) has five principles: "universal access and equity, human rights, evidence-based practice, a life course approach, and empowerment of people with visual impairment."

Knowledge exchange (KE) is based on building a curriculum and the exchange of students and staff. Social entrepreneurship involves changes in innovation of a product or service, and also for the receiver of the product or service. Optometry students often concentrate their knowledge to align with the typical European standard of optometry. To broaden their horizon and

perspective on a profession, which is vital to life quality, the final year optometry students have an elective subject, "Social entrepreneurship and international practice".

The aim is to establish a Junior achievement for students (Europe, 2015), with the goal of developing a product or service needed in Madagascar. To do this the students have to be innovative, taking into consideration access to their product or service, and costs. This year the students are to work on opportunities within eye health care between Norway and Madagascar.

The students have to establish a network in Norway and Madagascar. They receive mentors for advice in all aspects of social entrepreneurship. They will learn mutual respect and exchange of knowledge. Multidisciplinary teams will be a part of international practice and a way of marketing their product or service, too.

In this way, Buskerud University College will increase the international student exchange rate. We will also gain KE, increase partnerships and the use of networks to avoid blindness in a poor country. Our institution will also bring sustainability to the network of partners in Madagascar. We can provide final year students, products and services. The "Social entrepreneurship and international practice" subject challenges students to work within the framework of the university college and establish a national and international network through mentors and others; aiming for better visual health care for the people of Madagascar.

Special Interest Group (abstract 3/5) Optometry and optics education

From sage on the stage to guide on the side: optometric pedagogy for the 21st Century

Lead author: Dinah Paritzky

Hadassah Academic College, Jerusalem, Israel

Higher education has undergone a dramatic change over the last few years. The traditional model is being replaced by a pedagogy that focuses on the students rather than on the lecturers. Our aim as educators is to teach our students not just "what" to learn but more importantly, to teach them "how" to learn, and how to continue learning after they finish their formal education.

This can be better achieved by constructivist methodology (aka "the guide on the side"), a form of active learning that requires problem solving and critical thinking skills, rather than frontal lectures (aka "the sage on the stage"). In reality, a successful optometric curriculum will likely contain elements of both. There are many excellent articles on pedagogy available. However, many optometric educators have undergone no formal education as teachers and they find that these articles utilise jargon that is difficult to understand and do not present ideas in a way that is easy to implement.

Content: This presentation will summarise the new pedagogical techniques available to optometric educators, with an emphasis on practical ways to embed these methodologies in an optometry curriculum. This presentation will be a useful tool for experienced educators, who may find it difficult to change their teaching methods,

and for new educators who need guidance. For each methodology a short explanation will be given, followed by examples of application in an optometric course.

By the end of this presentation delegates will know how to:

- Move students to active learning from passive learning (constructivist approach)
- Encourage lifelong learning.

Step 1: Approaching your course:

- Learning outcomes – how to write them

Step 2: Designing your course using one or more of the following:

- Problem based learning
- Case based learning
- Distance learning
- Flipped classroom
- Team based learning
- Evidence based practice

Step 3: Assessing your students:

- Formative assessment vs. summation assessment
- Exam writing

Step 4: Assessing your teaching:

- Peer review
- Student feedback.

Special Interest Group (abstract 4/5) Optometry and optics education

Optometry summer academy in Croatia

Lead Author: Kristina Mihic

University of Applied Sciences, Velika Gorica, Croatia

Content: In 2015, The University of Applied Sciences Velika Gorica organised an optometry summer academy in Zadar, Croatia. Students taking part in the summer academy had an opportunity to study different fields of optometry, including paediatric optometry, vision therapy, sport vision, lens fitting, myopia control, aftercare, ophthalmoscopy and low vision. The advanced techniques were taught in seminars and workshops with plenty of hands-on opportunities. The summer academy was organised to unite knowledge from different countries and with a desire to improve optometric education internationally.

Results: The summer academy had 30 participants from six different countries. The main aim was to train the individual optometrists from different countries and to develop similar standards.

Conclusions: The summer academy has shown that optometrists can work to the same standard no matter where they come from. All participants were satisfied with the acquired knowledge. It is important to exchange experiences, knowledge and practice. A survey was conducted and the optometry summer academy was evaluated with an excellent grade.

Special Interest Group (abstract 5/5) Optometry and optics education

Evaluation of a blended-learning approach to the teaching of visual optics within a UK optometry degree programme

Lead author: Professor Chris Hull

Division of Optometry and Visual Science, School of Health Sciences, City University, London, UK

Purpose: Approaches to teaching the sciences that underpin optometry in the UK have traditionally been based on a combination of face to face lectures, tutorials and laboratory sessions. However, modern students have been exposed to a greater variety of learning methods from a young age. This fact, combined with the changing demographic and demands of students attending the optometry programme at City University London, has led to the trial of a blended learning approach for teaching visual optics in the first year. The hypothesis was that blended learning would provide students with a more flexible mode of learning with greater active learning and the ability to provide formative feedback.

Methods: Evaluation took place after 11 weeks and at the end of the module (20 weeks). Both were paper-based feedback surveys, each administered at just one session. The cohort size was 97 students. The evaluation at 11 weeks used a structured questionnaire developed in conjunction with our Learning, Enhancement and Development unit specifically to test the following aspects of the blended learning design: the teaching and learning approach, the virtual learning environment and the online learning activities. The standard university module evaluation questionnaire was used after 20 weeks to allow comparison with previous years.

Results: 94% of respondents to the mid-term survey (N=82 out of a total cohort of 97) agreed or strongly agreed with the statement that the module provided them with more flexibility to study at a time and a pace that suited their requirements. 96% (N=79) of students taking part in the survey agreed or strongly agreed that the online learning activities supported the face to face sessions. Only 19.5% (N=16) of students confirmed that they had studied a module where resources had been delivered online before. 72% (N=52) of students agreed or strongly agreed that they were clear about their progress on the module (the feedback took place prior to any summative assessments). A common comment in the literals, asking what advice to give to another student about how best to approach the module, was to set aside time and keep up with the screencasts and associated material. There were a number of suggestions for improvement but few common themes; 9.8% (N=8) of students would like some face to face lectures and the same percentage wanted additional examples and model answers. Overall satisfaction at the end of the module was 90% compared to an average of 89% for the four years prior to the blended learning redesign.

Conclusions: Student feedback and literals support the hypothesis that students found the blended learning design more flexible allowing them to choose when to study, at what pace and with greater opportunity for increased learning activities and hence formative feedback. The literals indicated that some students found the transition to more independent learning challenging. Results also suggest that this approach does not have a negative impact on student satisfaction or performance for a module that had previously achieved high satisfaction scores. Blended learning encourages independent learning, provides students with control and flexibility over their learning and can provide high levels of student satisfaction.

Discussion workshop

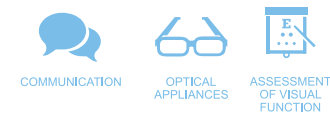
Dispensing to the presbyope – case discussion

Lead presenter: Fiona Anderson
Facilitators: Peter Black and Kevin Milsom

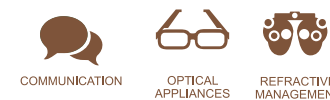
Association of British Dispensing Opticians (ABDO)

Target group: Optometrist, Dispensing Optician

Optometrist



Dispensing Optician



Number of CET points: 3

Overview: The needs of presbyopic patients are ever changing with the advent of new digital technologies such as smart phones, tablets and laptop computers. Patients invariably have longer working lives and busier social lives, which all have demands on their vision.

Through discussion of case records and scenarios that arise in everyday practice, this session will give eye care professionals a better understanding of the presbyopic patient's needs and possible dispensing solutions. Cases will discuss obstacles posed by prescription and lifestyle needs, the suitability of bifocals, varifocals and occupational lenses.

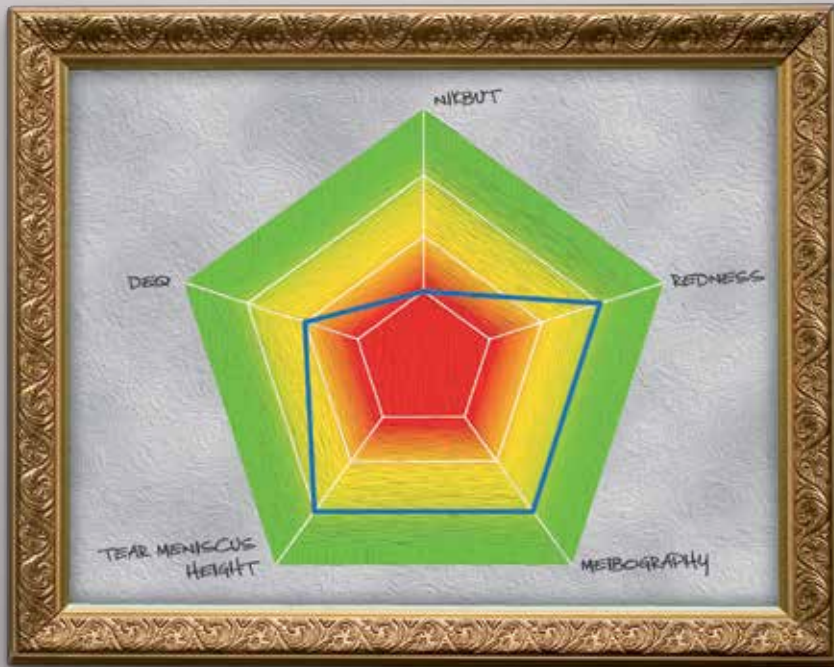
Cases to include:

- Case 1:** An anisometropic patient who wants PPLs.
- Case 2:** Bifocal wearer who will be having base In for near for the first time.
- Case 3:** A company executive with reduced vision due to trauma.
- Case 4:** A 59 year-old with high digital device and PC use and a driver.
- Case 5:** Care home patient with dementia and approximately -6.00DS R and L.
- Case 6:** A PPL wearer with a high add.

Learning objectives:

- can elicit patients' concerns and anxieties regarding their quality of vision, and provide sensible and practical reassurance.
- approaches elderly patients in a sensitive and professional manner, taking into account their additional needs and disabilities.
- can identify any potential problems with regard to anisometropia, convergence insufficiency, and unexpected changes in prescription and is knowledgeable of the correct dispensing action.
- can help the patient to maximise their vision by advising on contrast, lighting and the effect of glare.
- can relate the prescribing of prisms in spectacles to the management of convergence insufficiency and the provision/principle of convergence relief.

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Clinical presentation (abstract 1/2) Ocular surface

Staining of the ocular surface

Presenters: Dr Stefan Bandlitz¹ and Professor Christine Purslow^{2,3}

¹ Higher School of Optometry, Cologne, Germany

² Cardiff University, Cardiff, UK

³ Thea Pharmaceuticals UK and Ireland

Target group: Optometrist,
Contact Lens Optician

Optometrist



Contact Lens Optician



Number of CET points: 1

Learning objectives:

- to understand the importance of a detailed slit lamp examination of ocular surface and adnexia (lids / lashes) to access ocular surface health leading to better patient management.
- to better understand the aetiology of corneal and conjunctival staining.
- to investigate and interpret the different staining pattern of the ocular surface, grade severity of staining and recognise the clinical significance of any findings.
- to be better equipped to explain to patients the potential impact on ocular comfort if they do not blink enough and

ways in which to better deal with situation / symptoms.

- to understand the importance of an evidence-based approach to management of anterior blepharitis and MGD.

Overview: In optometric practice a variety of staining agents are available to evaluate the ocular surface. Besides the frequently used sodium fluorescein, other dyes like rose Bengal and lissamine green are employed to study the tear film and the status of the cornea and conjunctiva. While fluorescein seems to be the most effective dye for corneal staining, lissamine green or rose Bengal are more effective for conjunctival staining. However, there are many misconceptions regarding the properties of commonly used dyes and about their proper use. Understanding the mechanism of staining is relevant to enable the eye care practitioner to make better decisions and to achieve the best outcome for the patient.

This 30 minute presentation reviews the properties and mechanism of action of the three most commonly used vital dyes, rose Bengal, lissamine green and sodium fluorescein. The aetiology of corneal and conjunctival staining as well as the application of the different dyes in clinical practice will be discussed. The emphasis is on staining patterns that are contact lens related or caused by dry eye. Furthermore, the prevalence and clinical significance of these findings will be discussed and common grading scales for ocular surface staining will be presented.

Blinking blepharitis has a lot to answer for...

Overview: This 30 minute presentation will highlight the often overlooked role that the eyelids play in the health and happiness of the ocular surface. Indeed, the most common cause of ocular surface dryness is one form of posterior blepharitis: meibomian gland dysfunction (MGD). The presenter will share sound reasons how modern life explains the clinical observations of increasing prevalence of MGD, and how it develops in the first instance. Its importance and impact on ocular surface wellbeing will also be presented.

By the end of this presentation, delegates will be able to appreciate that eyelids deserve more examination and management than we have probably allocated in the past, and that ocular surface 'happiness' is not simply staining on the cornea. The lecture will conclude with a useful summary of evidence-based approaches on management of blepharitis.

Light, contrast and posture: the link between myopia and ergonomics?

Lead author: Dr Björn Drobe

Essilor R&D Optics Asia, Singapore, Singapore and Wenzhou MU – Essilor International Research Centre, Wenzhou, China

Purpose: The prevalence of myopia in Asia has reached alarming levels that often exceed 70% in teenagers, making myopia one of the first causes of visual impairment in those countries. Previous studies have pointed out the influence of light, contrast and short working distance on myopia onset and progression. In this study, several postural aspects related to myopia were investigated, including light, contrast and specific near work activities.

Methods: Near posture (working distance and head tilt) was measured continuously using an electromagnetic motion tracking system (Fastrack, Polhemus, USA) in a controlled desk and chair environment. In a first experiment, near posture of 120 myopic Chinese children from grade one to six, aged six to 13 years old, was measured for three different tasks: reading, writing and the playing of a portable video game. In a second experiment, near posture of 24 adult Chinese myopes was measured for a reading task in four different levels of illumination (3, 30, 300, and 600 lux) and for two different contrasts of printed material (90% and 45%) in random order.

Results: In children, working distance increased significantly with age ($p < 0.01$) and was strongly task related ($p < 0.001$): distance for reading was furthest while portable video game playing was shortest. For the youngest child group (grade one and two), average video game playing distance was as close as 19.4 ± 0.8 cm, while the oldest child group (grade five and six) read on average at 28.4 ± 0.9 cm. Working distance was negatively correlated with head tilt ($p < 0.001$).

In adults, reading distance significantly increased with illuminance ($p < 0.001$) and contrast ($p < 0.001$). Again, reading distance was negatively correlated to head tilt ($p < 0.01$) and decreased significantly with illuminance and contrast. A plateau was reached for both variables at 300 lux.

Conclusion: The type of near task, as well as illuminance and contrast, significantly affected near posture (distance and head tilt). As a short working distance has been reported to precede the onset of myopia and to be correlated to faster myopia progression in children, we recommend that near work should be carried out under high levels of light and contrast. Moreover, as the portable video game playing induced the shortest distance, the usage of those devices could be considered myopigenic.

Visual ergonomics

Analysing computer-related visual and ocular symptoms with the English version of the CVSS17 scale

Lead author: Dr Mariano González-Pérez^{1, 2}
Co-authors: Beatriz Antona-Peñalba¹,
Rosario Susi-García³, Ana Barrio-De Santos¹

¹ Faculty of Optics and Optometry, Complutense University Madrid, Madrid, Spain

² Private Practice, Madrid, Spain

³ Faculty of Statistical Studies, Complutense University Madrid, Madrid, Spain

Background: A PRO instrument (in Spanish) to measure computer-related visual and ocular symptoms (CRVOS) was published by Investigative Ophthalmology and Vision Science (IOVS) in July 2014 and it is the first Rasch-based linear-scale to quantify CRVOS among computer workers. Recently, a validated cross-cultural English version has been developed.

Purpose: After developing the cross-cultural English version of the Computer-Vision Symptom Scale (CVSS17), this presentation will explain to optometrists how to work with this tool.

Methods: The replies of 636 subjects completing the questionnaire were assessed using the Rasch model and conventional statistics to generate a new scale designated the Computer-Vision Symptom Scale (CVSS17). Validity and reliability were determined by Rasch fit statistics, principal components analysis (PCA), person separation, differential item functioning (DIF), and item-person targeting. To assess construct validity, the CVSS17 was correlated with a Rasch-based

visual discomfort scale (VDS) in 163 VDT workers; this group completed the CVSS17 twice in order to assess test-retest reliability (two-way single-measure intraclass correlation coefficient [ICC] and their 95% confidence intervals, and the coefficient of repeatability [COR]). After that, direct translation, back translations, and pre-test administration were conducted to produce the CVSS17 English Version, which was distributed among a group of computer workers to verify its psychometric equivalence with the original version.

Results: The CVSS17 contains 17 items exploring 15 different symptoms. These items showed good reliability and internal consistency (mean square Infit and Outfit 0.88–1.17, eigenvalue for the first residual PCA component 1.37, person separation 2.85, and no DIF). Pearson's correlation with VDS scores was 0.60 ($p < 0.001$). Intraclass correlation coefficient for test-retest reliability was 0.85 and COR was 8.14. English cross-cultural adaptation may be considered equivalent to the original version.

Conclusion: The English version of the CVSS17 has been revealed as a useful tool to quantify CRVOS in computer workers.

Visual ergonomics

Postural data measurement during the interaction with electronic devices and its application in eyewear

Lead author: Dr Damien Paillé

Essilor R&D, Vision Science, Paris, France

Purpose: During the last decade, we have seen an explosion in smartphones, tablets, e-readers and other hybrid devices that concentrate the functions of a computer in a portable device. These “mobile” devices can be used anywhere and in any condition: standing while on public transportation, sitting on a sofa, lying in bed. These new behaviours are considerably different from how we interact with traditional media. This project aimed to study the impact of the use of these new devices on our postural behaviour.

Methods: Firstly, a number of opinion surveys on the use of digital technologies were reviewed, for the purpose of defining the age group of our population, selecting the devices to be tested and to ensure that the conditions under which these devices are likely to be used in everyday life were covered as completely as possible. As a result, three devices were selected (smartphone, tablet and e-readers) and three conditions (standing up, sitting on a couch and lying in a bed). Seven different tasks which were among the most representative were chosen (reading a weather forecast, reading an email, writing an email, playing a video game, looking for information, watching a video, and reading a text).

In order to measure the subjects' postural parameters, a technical platform equipped with a motion capture system was used. The latter is composed of eight synchronised infrared cameras (VICON ©) that are able to capture the X, Y and Z coordinates of retro-reflective markers in real time. 22 subjects participated in the study. They were first fitted with a headset equipped with four markers, and four other markers were placed on the upper part of their body to mark the position of the trunk. Before starting the experiment, a series of photographs of the subject's head was taken, and were used to calculate the position of the axis of rotation of each eye in the headset's reference point.

Once the calibration phase was completed, the subject had to follow a specific scenario in which he or she performed 14 different activities one after the other, using the three different devices, in the three different positions.

For each of the activities, the data on the positions of the axis of rotation of the eyes, the device and the trunk were processed, so as to extract data including eye-screen distance, eye declination, and rotation of the head relative to the trunk and rolling of the head.

Results: Our results confirmed a modification of our postural behaviours relative to such traditional media as paper. When handling recent digital devices, our posture is very stable, or even rigid. The head remains vertical and perpendicular to the trunk. Also, when using such devices as the smartphone, tablet and e-book reader, the eyes are lowered more sharply and the viewing distance is closer than is the case for paper.

Conclusion: These parameters have been taken into account in our latest generation of occupational lenses.

Interactive lecture

Communication skills – enhance your communication skills

Presenter: Helmer Schweizer

Head Professional Affairs, Distributor Markets, Alcon, EMEA

Target group: Optometrist, Contact Lens Optician, Dispensing Optician

Optometrist



Dispensing Optician



Contact Lens Optician



Number of CET points: 1

Overview: In an eye care practice, communication between the eye care professional and the patient is essential. The quality of communication can increase its effectiveness and thus save both the eye care professional and the patient valuable time, and avoid misunderstanding and errors.

This presentation will first look at basic communication skills and techniques and then apply those to eye care practice, looking at some specific patient types and what kind of approach may help.

In principle, the eye care professional has to adjust to each individual patient and not the patient to the eye care professional. Different people have different preferences when it comes to communication. Some like to listen, some are more graphical oriented and some are easy to be influenced by other senses, like touch, smell etc. It is therefore recommended that an eye care professional does use all possible channels / levels of communication. Many know the theme: treat people like you would like to be treated. It is also known as the 'golden rule'. It is true for many things like respect etc, but when it comes to communication, the 'diamond rule' may be better; treat people like they want to be treated. This also reflects patient centric orientation.

The session will also speak about body language and how to read basic signs. It will then integrate this into the communication approach towards the patient.

Clinical presentation

Myopia control from evidence to implementation

Learning objectives:

- understand the different channels of communication.
- understand the importance of awareness of one's own preferred style of communication and that of the patient.
- learn about the need and the ability to adjust to the patient's preferred style.
- understand how to read basic body language signs and how to react to those.
- based on examples, learn to apply knowledge.

Presenters: Professor Mark Bullimore^{1,2}

¹ University of Houston, Texas, USA

² World Council of Optometry, St Louis, USA

Target group: Optometrist, Contact Lens Optician, Dispensing Optician

Optometrist



Dispensing Optician



Contact Lens Optician



Number of CET points: 1

Overview: For over a century parents have asked clinicians if anything can be done to slow the progression of myopia in their children. Most practitioners shrug their shoulders, add another 0.50 DS to the child's prescription and see him or her in a year. The tide has now turned. A number of treatments have been shown to cut progression rates in half and a motivated clinician could expand his or her practice to incorporate myopia control.

This presentation will review the evidence from peer-reviewed clinical trials, the evidence from animal research underpinning the various approaches, and discuss implementing of myopia control strategies into delegates' practice.

Depending on the scope of practice, overnight corneal reshaping contact lenses, multifocal soft lenses, executive bifocals, or atropine are all worthy of consideration. We should anticipate additional evidence on clinical myopia control to be forthcoming. Optical therapies will be refined, particularly for contact lenses, and additional clinical trials will enhance our understanding of the underlying mechanisms. Given the effectiveness of atropine, commercial development of designer myopia drugs has likely stalled, although a sustained release device would be an attractive alternative to daily drug installation.

Finally, the mechanism underlying the benefits of outdoor activity should be better understood and could prompt changes in classroom lighting – perhaps representing the ocular equivalent of fluoride for teeth. In the meantime, now is the time for clinicians to offer treatment options to their young patients.

(abstract 1/3)

Binocular vision – research topics

Monocular contributions to the nystagmus null zone

Learning objectives:

- to understand animal research and how it supports some myopia therapies.
- to understand the scientific evidence for the control of myopia progression using corneal reshaping contact lenses (orthokeratology) and multifocal soft lenses.
- to understand the effectiveness of atropine and other anti-muscarinics in controlling myopia progression.

Travel grant:

**Lead author:** Dr Matt J Dunn*School of Optometry and Vision Sciences,
Cardiff University, Cardiff, UK*

Purpose: Early-onset nystagmus commonly occurs in conjunction with disorders of binocular vision. Individuals with infantile nystagmus (IN) have a 'null zone': an angle (or multiple angles) of gaze at which the intensity of the eye oscillations is minimised. This project sought to determine whether the null zone differs when recorded under monocular viewing conditions, and whether the binocular null zone can be predicted based on the relative contributions from each eye.

Methods: Nystagmus intensity was recorded for five seconds in each of 45 gaze positions across a two-dimensional spatial map spanning 40° in each direction for 20 individuals with early onset nystagmus. In this way, the null zone was mapped three times: once for each eye, and binocularly. Visual suppression was mapped at each of the gaze angles using a stereoscopic projection system running a custom-made Worth 4-dot program, in order to test the hypothesis that the layout of the nystagmus null zone may be influenced by eye dominance. In addition, the effect of convergence on nystagmus was determined using high-speed eye tracking at three gaze angles across the horizontal midline. All individuals underwent a clinical examination by an optometrist to determine associated clinical comorbidity.

Results: Difference maps were derived from the recordings to determine the relative contributions of each eye to the binocular nystagmus null zone. The extent to which the total null zone can be predicted from the monocular null zones is currently undergoing analysis.

Conclusion: Nystagmus often coexists with strabismus, and it is known that beat direction is different for each eye in fusion maldevelopment nystagmus syndrome. The present study is the first to investigate whether infantile nystagmus could share a similar feature (and thus be considered a true pathology of binocular vision). In addition, no studies have yet been published investigating the null zone across a two-dimensional spatial map. It is hoped that the results of this study will aid in the development of a unifying theory for the underlying cause of nystagmus.

Acknowledgements: The author acknowledges funding from the College of Optometrists for this project.

Binocular vision – research topics

Fixation disparity, measured objectively and subjectively as a function of vergence load

Lead author: Dr Wolfgang Jaschinski

Leibniz Research Centre of Working Environment and Human Factors, Dortmund, Germany

Introduction: For the diagnosis of binocular imbalance, several measures are used that differ in the fusion conditions. The fixation disparity refers to a viewing condition with a fusion stimulus. In clinical optometry, the subjective fixation disparity typically subtends a few minutes of arc and is indicated by a perceived offset of dichoptic nonius markers that are presented in alignment. Objective fixation disparity is a vergence error as large as about one degree and is measured with eye trackers in the research laboratory. The correlation between the subjective and objective fixation disparity is medium at best. Fixation disparity curves describe the quantitative extent to which fixation disparity changes as the vergence load is increased. This study investigated correlations between these two types of fixation disparity curves, either by changing the viewing distance or by applying an absolute disparity offset at a fixed viewing distance.

Methods: In a first experiment, a central fusion target was presented at viewing distances of 40, 30 and 24 cm. Two repeated sessions were made for measuring both types of fixation disparity as a function of viewing distance in 20 observers. As it is well known, subjective fixation disparity generally became more exo in most observers when the target was shifted closer. Objective fixation disparity,

however, became more exo in some subjects and more eso in other subjects. These eso shifts with increasing convergence in some observers were reliable between the two repeated sessions, but could not be explained by accommodative influences or the pupillar artifact on objective fixation disparity measures. Therefore, the second experiment investigated vergence dynamics.

In a second experiment, a central fusion stimulus was present in a haploscope at a fixed viewing distance of 60 cm where a series of step disparity stimuli of one, two, and four degrees (crossed and uncrossed) were presented for 900 ms each. For quantitative analyses, from a sample of 40 participants, ten observers were selected since these were able to perform also the large vergence responses and reached fusion. The resulting fixation disparity at the end of the step stimulus was plotted versus the stimulus disparity and gave the typical slope of fixation disparity curves.

Results: The slope of these curves showed a medium correlation between the subjective and objective fixation disparity. Crossed disparities induced convergent eye movement characterised by a convergent velocity. Interestingly, convergence velocity was well correlated with the slope of the objective fixation disparity curves: observers with a higher convergence velocity showed a more eso objective fixation disparity as the convergence stimulus was increased. Divergence step stimuli did not show such a relation.

Conclusions: These different quantitative parameters of the objective and subjective and fixation disparity curves suggest that the supposed underlying motor and sensory mechanisms, respectively, react in a different way depending on vergence load. Vergence dynamics is related to static fixation disparity: the eso shifts in objective fixation disparity with increasing convergence load in some observers seem to be associated with a fast dynamic convergence mechanism in these individuals.

Binocular vision – research topics

Effects of monocular blur (monovision) on binocular supra-threshold performance

Lead author: Dr Sotiris Plainis^{1,2}

Co-authors: Ganga M¹, Papadatou E¹, Laretzaki J¹, Pallikaris IG¹, Parry NRA²

¹ *Laboratory of Vision and Optics (LVO), University of Crete, Crete, Greece*

² *Faculty of Life Sciences, University of Manchester, Manchester, UK*

Purpose: To explore binocular supra-threshold performance under monocular blur (monovision) conditions using pattern visual evoked potentials (pVEP), simple reaction times (RT) and visual acuity (VA) measures.

Methods: The effect of defocus, induced by positive powered contact lenses up to 3.00D (in 0.50D steps), on the pVEP, RT and VA was measured on 12 volunteers (average age, 29±7 years). All recordings were performed at 1m distance with best spherocylindrical correction under binocular viewing with monocular (dominant or non-dominant eye) or binocular defocus. VEPs were elicited using reversing 10 arcmin checks (4 reversals/s) with 100% contrast. RTs were measured to the onset of a horizontal sinusoidal grating with a spatial frequency of 4 c/deg and a contrast of 10%. Stimuli were presented on a display with a mean photopic luminance of 30 cd/m². VA was also measured under the same conditions using ETDRS acuity charts.

Results: In all conditions, the average P100 amplitude and implicit time of pVEP was greater and faster, respectively, under monocular as compared to binocular defocus. When compared to the in-focus condition, monovision correction reduced the amplitude of the P100 component of the pVEP and increased its latency, by about 5 ms. Similarly, RT was increased by ~20-25 ms in monovision correction. These effects were independent to eye dominance. In addition, pVEP P100 latency and RT were found to covary well, being more susceptible to defocus compared to VA.

Conclusions: Supra-threshold measures of visual processing, such as pVEP and RT, form more “sensitive” procedures, compared to acuity (threshold) measures, for evaluating visual performance in monovision correction. Their high covariance with defocus reveals a common source of variability in the underlying neural responses.

Discussion workshop (peer review)

Tales from clinical practice – clinical cases

Presenters: Niall Farnon¹

Facilitators: Caroline Christie²

¹ *University of the West Indies Optometry Clinic, St. Augustine, Trinidad, Trinidad and Tobago*

² *European Academy of Optometry and Optics, London, UK*

Target group: Optometrist



Number of CET points: 1

Overview: This session shares with delegates from across Europe examples of patients with a variety of conditions, some of which may not be seen / managed in everyday practice in West Indies or indeed some European countries. The facilitator will share examples of how the University Clinic has made a difference in the patient's life by utilising technology to investigate symptoms / signs but by also listening carefully to patient history, key to any diagnosis. Delegates will discuss and reflect in small groups on how best to manage patients with similar conditions in their countries, given scope of practice.

Case 1 – Tractional retinal detachment

- A. Background – Diabetic patient attends for regular eye exam
- B. Outcome - Patient has tractional retinal detachment in one eye
- C. Review management - tractional retinal detachment

Case 2 – Mis-diagnosis keratoconus

- A. Background – Patient referred for RGP fitting due to keratoconus

- B. Outcome – Patient does not have keratoconus
- C. Review management – differential diagnosis irregular cornea vrs keratoconus

Case 3 – Mis-diagnosis retinitis pigmentosa

- A. Background – 65yr old referred for 2nd opinion re recently diagnosed retinitis pigmentosa
- B. Outcome – Patient has no signs of RP
- C. Review management – retinal lesions vrs retinitis pigmentosa

Case 4 – Congenital glaucoma

- A. Background – Patient's first eye exam aged 12yrs old
- B. Outcome – Patient has congenital glaucoma
- C. Review management – congenital glaucoma

Learning objectives:

- to review the importance of taking and recording a detailed case history.
- to ensure delegates understand importance of making link between presenting symptoms, vision central & peripheral, ocular and medical history prior to reaching a provisional diagnosis.
- to enable delegates to manage similar case scenarios including where necessary onward referral to specialist clinics / ophthalmology if outside scope of practice.
- to apply what has been learnt regarding the ocular pathologies highlighted in the cases discussed once back in everyday practice.

Visual impairment

The socio-economic implications of visual impairment

Presenters: Maureen Cavanagh¹ and Jennifer Brower²

¹ Vision Impact Institute, USA

² Association of British Dispensing Opticians, London, UK

Target group: Optometrist



STANDARDS
OF PRACTICE



OCULAR
EXAMINATION



OCULAR
DISEASE

Number of CET points: 1

Learning objectives:

- to raise awareness of the global social and economic burden of visual impairment, in particular uncorrected refractive error, and to better understand the different forms of evidence (impact analysis, quality of life, systematic reviews, case studies) that can be used to influence commissioners / politicians and advocate change.
- can identify, recommend and dispense low vision devices most appropriate for the patients visual impairment after considering the patient's ocular condition.
- improved knowledge of the range of optical low vision aids to include simple hand and stand magnifiers, hand held telescopes, alongside common types of non-optical low vision aids such as typoscopes.
- can better advise the patient on the benefit of appropriate lighting in the home / workplace; how to minimise different types of glare and how to improve contrast out of doors and in the home environment, text type etc to improve quality of life and enhance outcome of any device prescribed.
- to improve listening skills to ensure fully take account of patients with impaired visions' views, preferences and concerns and to respond in an honest and appropriate way to concerns and questions.

Overview: The world's population is approximately 7.2 billion, of which, there are 4.5 billion people who need vision correction. Of those, there are still 2.5 billion in the world who need vision correction and are left uncorrected due to lack of awareness, access or affordability. The three most prominent areas of uncorrected refractive error (URE) are China, India and Africa. URE is the second leading cause of blindness behind cataracts. In fact, if we could only provide vision correction to these 2.5 billion people we could reduce other eye diseases including blindness.

The Vision Impact Institute's mission is to raise awareness of the importance of healthy vision, including the socio economic impact of URE and the quality of life benefits of vision correction. They do this by providing an open platform website with evidenced based research on the implications of visual impairment to children, workers, adults, the elderly and drivers. The statistics are alarming and the evidence points to changing policies throughout school systems, department of motor vehicle and transportation and many more governing bodies to gain alignment that eye care examinations should be a requirement.

In the coming months. The Vision Impact Institute will be commissioning the very first URE systematic reviews, this evidence should help pave the way for all of us to continue giving vision a voice and making the necessary changes to help people live better lives through better sight.

Clinical presentation (abstract 2/2) Visual impairment

Low vision assessment and management

Overview: This presentation is a step-by-step guide to assessing and dispensing low vision aids and advice to a low vision patient. By the end of the presentation delegates should understand the basic principles of low vision assessment, appreciate the relationship between the pathology and the subsequent suitability of different types of low vision aids, and understand the need for multi disciplinary care involvement and an appropriate aftercare regime.

The presentation sets out a detailed assessment routine: observation, patient ocular and medical history, visual needs and wants, types of magnification, magnification for distance and near, refraction, demonstration of optical and non-optical low vision aids, illumination, supply of aids and aftercare.

Special Interest Group Cornea, contact lenses and refractive technology

Contact lens fitting controversies 2016, In association with IACLE

SIG Chair: Dr Daniela Nosch

School of Optometry & Vision Sciences, Cardiff University, Cardiff, UK, and Institute of Optometry, University of Applied Sciences (FHNW), Olten, Switzerland



Discussion workshop

Evidence-based practice applied to retinal imaging

Presenters: Dr Rebekka Heitmar¹ and Dr Byki Huntjens²

¹ Aston University, Birmingham, UK

² City University, London, UK

Target group: Optometrist



STANDARDS
OF PRACTICE



OCULAR
EXAMINATION



OCULAR
DISEASE

Number of CET points: 3

Overview: This highly interactive discussion workshop will provide a brief case review of clinical cases including OCT images in the area of systemic and retinal vascular disease. As part of the case review delegates will discuss in small groups new research evidence in the area of retinal imaging and discuss how this new evidence can be used in clinical optometric practise.

The task for each group will be divided as detailed below:

- Critical review of the paper
- Are the techniques described in the paper suitable to be applied to optometric practice: pros and cons (i.e. is the equipment needed available, is an optometrist trained enough to complete the test, time constraints, clinical benefit)?
- Considering the new evidence detailed in the paper: how can this benefit clinical optometric practice and what are the benefits for the patient?

- Does the paper provide “enough” evidence that additional retinal parameters warrant a change of current practice?

Each group will have ample time to discuss, with facilitators moving between groups. To conclude the workshop each group will present their findings and discuss the pros and cons of emerging research evidence on clinical practice and its implementation.

Learning objectives:

- appraise when to intervene while viewing retinal disorders using OCT images and evaluate the effectiveness of the most common treatment options with particular reference to practice standards and evidence based practice.
- understand the need to provide effective patient care and management based on current good practice when using the OCT.
- understand that, with the use of EBP, only to provide or recommend examinations and (further) treatments if these are clinically justified, and in the best interests of the patient.
- understand how an OCT can be used to examine the optic nerve, macula and screen for vitreo-retinal disorders.
- understand the management and treatment of a range of common retinal conditions.

Professional advancement

Update on the European Diploma

Presenter: Robert Chappell

*Chairman of the Board of Management,
European Council of Optometry and Optics,
Brussels, Belgium*

This presentation will provide an opportunity for educators to become better informed about the European Diploma in Optometry and its relevance to the development of optometric education and the scope of practice in Europe.

This session will include the opportunity for interactive discussion with members of the Accreditation Visitors Panel, and both staff and students from universities that have already been fully or partially accredited.

The Diploma sets a common standard of optometric practice for the benefit of patients and as a stimulus to the career development of optometrists. In 2019, changes will be made to the current Diploma examinations and the increasing role of accreditation will be discussed.

The European Council of Optometry and Optics (ECOO) Accreditation Scheme offers exemption from part or all of the European Diploma examinations. The Accreditation Scheme covers the whole range of optics/optometric education and is of relevance and value to training programmes across Europe.



Clinical presentation (abstract 1/2)

Refractive management and dispensing

New approach to fixation disparity: determining aligning prisms without using trial prism lenses

Presenters: Professor Bruce Evans¹ and Volkhard Schroth²

¹ Institute of Optometry, London, UK

² Institute of Optometry, University of Applied Sciences and Arts, Olten, Switzerland

Target group: Optometrist, Dispensing Optician

Optometrist



Dispensing Optician



Number of CET points: 1

Learning objectives:

- to enhance ability to resolve non-tolerance cases in a constructive way.
- identify potential problems, undertake appropriate investigation including appropriate action and explain to patient exactly what course of action will be taken and obtain patient's agreement.
- to improve understanding of the diagnosis and investigation of heterophoria.
- relates tests and symptoms to management, identifies and manages significant phoria.
- to understand relationship between fixation disparity and aligning prisms.
- is able to identify the values for fd in min arc and prisms in pdpt, can differentiate between positive values (esophoria) and negative values (exophoria).
- to understand advantages and disadvantages of using prisms for patients with asthenopia.
- to build skills in managing decompensated heterophoria, understand principles of management, evidences correct management and able to discuss options.

Overview: This presentation presents a new approach to measure and correct a fixation disparity. The delegates will have a greater understanding of and confidence in treating symptomatic patients using aligning prisms. The introduction provides background information about fixation disparity (fd) and its relationship to aligning prisms. The advantages and disadvantages of prism corrections will be discussed briefly.

The presentation will describe a new method to determine the aligning prisms. A history of the development of devices, test figures and an expert-software within the last four years will be given and a section on fundamental research will be included. An important finding is the effect of aligning prisms on the objective and subjective fd. It could be reduced significantly after wearing prisms continuously for several weeks, even if the fd could not be reduced to zero. Further research revealed a close correlation between the amount of fd and the aligning prisms when the new test figures were used. This finding leads to the direct conversion of the fixation disparity value [min arc] into a prism amount [pdpt]. The use of prism trial lenses is now no longer needed.

This new method is called "EyeGenius" and it uses a series of three pre-tests to verify the presence of normal binocular vision and a minimum level of asthenopia. A questionnaire has been integrated to ensure that only symptomatic patients receive the prisms. During the second pre-test, the visual acuity is screened and the third is a random dot stereo test. The fd is measured on electronic devices at far and near distance, for both horizontal and vertical fd. By using such devices, the patients have to set nonius lines to congruence in an interactive, repetitive measurement, thus minimising the influence of the examiner. An expert-software calculates the prism values and weights the far-near differences where appropriate.

Summary: Determining aligning prisms for asthenopic patients is quick, safe and easy when a new approach to fixation disparity is used. Expertise in refraction is an essential prerequisite.

Refractive management and dispensing

Non-tolerance to optometric prescriptions: how to turn defeat into victory

Overview: Non-tolerance occurs when there is a prescription that the patient finds so hard to tolerate that they return to the prescriber. The prevalence of non-tolerance is about 2% of eye examinations, or 3% of those prescribed spectacles. Non-tolerance is most common in presbyopes. The causes of spectacle non-tolerance will be reviewed and it is shown that the limits of repeatability of subjective refraction are wider than the precision required by some patients. Therefore, even the best optometrists will encounter occasional non-tolerance cases. Prescribing too much plus, or too little minus, are common causes of non-tolerance. Following a “if it ain’t broke, don’t fix it” approach will reduce the risk of non-tolerance. More experienced practitioners develop a greater tendency to modify their subjective findings in a way that avoids large changes in prescriptions that are likely to cause tolerance problems.

Excellent communication skills are essential. Avoid blame, be positive, and create an atmosphere of cordiality and mutual engagement with a problem-solving approach. A recheck appointment must not be rushed. 10% of non-tolerance cases result from pathology. Research on the “recovery paradox” demonstrates that if a practice can recover from a non-tolerance episode, then this provides a greater opportunity for the practice to impress the patient with their excellence than if there had not been an adverse event.

Non-tolerances represent an opportunity to turn an unhappy patient into somebody who recommends the practice to their friends and family.

Quality of vision

Evaluation of colour vision and contrast sensitivity of gas station workers exposed to aromatic fuel products in Saudi Arabia

Lead author: Dr Yousef Aldebasi

Department of Optometry, Qassim University, Buraidah, Saudi Arabia

Purpose: Previous studies in adults and animals with high level exposure to organic solvents suggested impairments in visual functioning. The objective of this study was to investigate the relationship between the gas-station workers occupationally exposed to a mixture of aromatic fuel products and their visual functions, such as colour vision and contrast sensitivity.

Methods: The study conducted a prospective case-control study on forty workers (40 males, 32.15 ± 5.38 years old) who were exposed occupationally to organic solvents for more than two years, compared with forty controls (40 males, 32.55 ± 5.63 years old) who were working in an environment free of solvent exposure. Informed consent was obtained from all the subjects after explanation of the nature of the study. All the subjects who had given their consent underwent visual acuity measurement, objective and subjective refraction, colour vision assessment with Ishihara pseudo-isochromatic plates and Lanthony Desaturated panel D-15 test, and contrast sensitivity assessment using the software program FrACT. Weber and Michelson contrast were used for contrast measures. Subjects with known hereditary colour vision defects were excluded. All the procedures were evaluated and approved by the local ethical committee and carried out in the optometry clinic at Qassim University.

The ocular examination details of each worker were recorded in a standardised form for analysis. The t-test was used to compare contrast sensitivity measures, the Mann-Whitney test for comparing colour vision between exposed and non-exposed groups and the ANOVA test for comparison of contrast sensitivity measures with duration of work. Linear correlation was used to estimate the relationship between contrast sensitivity and duration of work in the exposed group. The level of significance was determined at $p < 0.05$.

Results: All gas station workers gave correct responses to the Ishihara pseudo-isochromatic plates and 20% of gas station workers showed tritan defects in Lanthony Desaturated panel D-15 testing compared to controls ($p > 0.05$). The contrast sensitivity measures were found to be significantly reduced in the exposed group (mean Weber contrast: 1.73 ± 0.32 ; mean Michelson contrast: 0.87 ± 0.16) compared with the non-exposed group (mean Weber contrast: 0.72 ± 0.29 ; mean Michelson contrast: 0.36 ± 0.14) ($p < 0.05$). There was no significant difference between mean contrast sensitivity at different spatial frequencies and duration of work for exposed group ($p < 0.05$). Significant negative correlations between contrast measures and duration of work were noted ($p < 0.05$), while the correlation values were found to be low ($r = 0.412$, $r^2 = 0.17$).

(abstract 2/4)
Quality of vision

Human-operator independent preferential looking test for visual acuity assessment

Conclusion: These preliminary findings suggest that occupational exposure to fuel products is associated with colour vision and contrast sensitivity impairment in gas station workers. Hence, visual function screening should be included in the evaluation of early neurotoxicity of chemicals in exposed workers. Follow-up studies are needed to evaluate these psychophysical performances of exposed subjects.

Lead author: J. M. Alves¹
Co-authors: P. M. Serra¹ & P. T. Fiadeiro²

¹ *Faculty of Health Sciences, University of Beira Interior, Covilhã, Portugal*

² *Faculty of Sciences, University of Beira Interior, Covilhã, Portugal*

Purpose: In the presence of two simultaneous targets, a somehow complex target and a homogenous one, with equivalent luminosity and dimensional properties, the human being tends to drive its attention to the complex target. This naturalistic evidence has led to the development of Preferential Looking (PL) tests, largely used for the assessment of visual acuity (VA). Clinical usage of conventional PL tests, however, requires observational experience from the clinician and can be time consuming. The purpose of this study was to develop and implement an automatic system able to measure VA based on PL technique.

Methods: A computer using MATLAB® and the Psychophysics Toolbox controlled a pilot station that comprises a LED monitor for stimulus presentation and a CMOS image detector to image the ocular region. The stimulus presentation used a spatial double-forced choice paradigm with the stimulus (vertical square gratings) and homogenous windows (sizes: 2°-by-2°) separated horizontally (separation: 2°) distancing 4.0 metres from the participant. The eye movements were extracted from the ocular region images (capture rate: 17 Hz) during stimulus presentation (2.5 seconds) and analysed using custom software. The Relative Fixation Time (RFT), time spent looking at the stimulus window, was used as the metrics to characterise the PL⁴. Distance uncorrected VA was measured monocularly in 20 participants (22.9 ± 5.3 years) by randomly presenting stimuli with variable spatial frequency (range: 13.2 cpd (0.36 logMAR) to 131.7 cpd (-0.65 logMAR)), with each frequency presented six times. The average RFT's as function of the spatial frequency were modelled using a sigmoidal curve and the VA determined by the spatial frequency corresponding to the middle point between upper and lower plateaus of the curve. Further, an ETDRS distance VA chart with Tumbling E's was used to assess letter acuity and the participants' tested eye refractive error (RE) was measured on an open-field autorefractometer (Ship-Nippon 5500 Tokyo, Japan). The procedure was repeated on two separate days to assess test-retest repeatability.

(abstract 3/4)
Quality of vision

Results: The visual acuities measured by the PL technique (grating acuity) and the ETDRS chart (letter acuity) differed by approximately 0.45 ± 0.32 logMAR in both days ($p < 0.001$). The intraclass correlation coefficients (ICC) between both VA techniques were 0.70 [range: 0.25; 0.88] and 0.71 [range: 0.26; 0.88] for day 1 and 2, respectively. The mean difference and agreement between the two testing days were for the PL technique equal to 0.02 ± 0.04 logMAR, ICC: 0.87 [range: 0.68; 0.95]; and for the ETDRS chart equal to 0.002 ± 0.088 logMAR; ICC: 0.99 [range: 0.98; 1.00]. The participants' RE spherical equivalent were strongly correlated with VA measured using either of the techniques (PL technique: $R = 0.82$ and $R = 0.87$ for day 1 and 2; ETDRS chart: $R = 0.93$ and $R = 0.93$ for day 1 and 2).

Conclusions: Reliable and repeatable human operator independent measurement of VA is possible using automatic preferential looking systems. The RFT is a metric which provides important information, regarding the participants' ability to detect the stimulus. This approach widens the application of the PL test to specific populations where, for instance, specialised human resources are not available.

Neural re-organisation of peripheral retina after eccentric viewing training

Lead author: Professor Jae-Myoung Seo¹
Co-authors: Haksam Kim¹, Ju-Hwan Lee¹, Yeongcheol Kim¹, Min-Young Heo²

¹ Department of Optometry, Gwangyang Health College, Gwangyang, Korea

² Biomedical Engineering, Chonnam National University, Gwangju, Korea

Purpose: It is known that eccentric viewing training is one of the effective visual rehabilitation techniques for patients with age-related macular degeneration. This study investigated where the neural re-organisation arises following eccentric viewing training.

Methods: Fourteen young adults without any known ocular disorder took part in the experiment, in which they monocularly watched a video for one hour. The target was set up to place on the lateral locus of the retina in 20 degrees of eccentricity. The one hour session was repeated each day for 21 days. Measurements were taken by perimeter (Humphrey Field Analyzer II 730-122200-3.5, Carl Zeiss Meditec) to determine the light perception, and through a multifocal electroretinogram (mERG, Reti-port/scan 21 Brandenburg, Roland Consult) to determine whether the neural re-organisation starts in the retinal area or beyond.

Results: In the trained retinal locus of the retina, there was a significant improvement for mERG following the eccentric viewing training ($p < 0.028$) while no significant improvement was found on the superior locus ($p > 0.26$) and inferior locus ($p > 0.95$) that were not trained. For the measurement of light perception, there was a significant improvement in the trained locus ($p < 0.047$) while no significant improvement was found on the centre of the retina ($p > 0.62$), superior locus ($p > 0.15$) and inferior locus ($p > 0.2$).

Conclusion: There is a significant improvement in the outer plexiform layer of retina and also in the whole visual pathway after 21 days with eccentric viewing training. Although many studies adopt text for eccentric viewing training, a TV series with an hour running time was chosen and it was proved to be an alternative training tool for eccentric viewing training. It is assumed that the peripheral vision tires more rapidly compared to central vision. Therefore, it is recommended to conduct eccentric viewing training more often for a short period.

Quality of vision

Distance and near vision of elderly people with cognitive impairment: a study in Galician nursing homes

Lead author: Maria Covadonga Vázquez Sánchez¹

Co-authors: Gigirey Prieto LM¹, del ORO Saez CP², Seoane Trigo S³

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Introduction: Poor vision is common among elderly people and several studies show connections between visual impairment and cognitive function. The Spanish National Statistics Institute estimates that more than 260,000 older adults live in Galician Government nursing homes, and cognitive decline is one of the main reasons for admission. Moreover, data from different studies reveal that vision problems are more common among institutionalised older adults.

Objectives: (1) To evaluate presenting visual acuity for distance and near vision of elderly people with cognitive impairment, and (2) to determine connections between the visual and cognitive states of elderly Galician residents.

Methods: A total of 364 elderly adults (aged 65 years or more) underwent a visual and cognitive screening. We tested presenting visual acuity (binocular visual acuity with habitual correction if worn) for distance and near vision (E-Snellen; usual

working distance for near vision). Binocular presenting visual acuity less than 0.3 using E-Snellen was used as a cut off point for a diagnosis of visual impairment (WHO criteria). Exclusion criteria included immobilised residents unable to reach the USC Dual Sensory Loss Unit for visual screening. To screen cognition the Mimi-mental Examination Test (Spanish version) was employed. A total score of ≤ 24 points was used in the definition of cognitive impairment. Analysis of categorical variables was performed using chi-square tests. Pearson and Spearman correlation tests were used, as well as variance analysis to determine differences between groups of interest (SPSS 19.0 version).

Results: The percentage of residents with cognitive decline was 32.2%. The prevalence of visual impairment for distance and near vision was greater among those subjects with cognitive impairment compared to those with normal cognition (Table 1). Correlation exists between distance visual acuity and Mini-mental Test scores (age and sex controlled) as well as between near vision and cognitive test results ($p < 0.01$) (Table 2).

Conclusion: These results show that people with cognitive impairment have poorer functional distance and near vision than those with normal cognition. The next step will be to analyse the individual contribution of distance and near vision loss to cognition.

Table 1: Visual impairment prevalence and cognition

Visual impairment (BPVA <0.3) ^α	COGNITION	
	Impairment	No Impairment
Distance Vision	34.5%	17.7%
Near Vision	28.8%	10.5%
Both distances	13.6%	5.6%

^α BPVA: binocular presenting visual acuity

Table 2: Vision of residents with and without cognitive impairment

COGNITION IMPAIRMENT	BPVA (MEAN VALUE) ^β			
	Fair distance	CI (95%)	Near distance	CI (95%)
YES	0.49 ± 0.26	0.42 - 0.55	0.45 ± 0.26	0.38 - 0.52
NO	0.59 ± 0.25	0.53 - 0.62	0.67 ± 0.29	0.61 - 0.72

Special Interest Group – Primary eye care

Vision screening in school children

SIG Chair: Eduardo Teixeira

Vice President, European Academy of Optometry and Optics

Presentation 1 – Optometric screening in first year primary school – a review

Lead author: Peter Gumpelmayer

Optometrist, Linz, Austria

Since 1976 the Members of the Upper Austrian Optometric and Optical Council (Landesinnung der Augenoptiker Oberösterreich) have tested first year primary school children in the province of Upper Austria, Austria.

The Provincial Medical Department (Landessanitätsdirektion Oberösterreich) called for a system to screen all first year pupils entering school in the province. Prevention is the main motive for the Provincial Health Administration to pay for this scheme.

Rodenstock R5 and R11 test equipment is used to screen for: visual acuity, heterophoria, amblyopia and latent hyperopia.

Each year 12,000 – 14,000 pupils are examined. The screening method and the administration of the screening will be presented. The results of the testing over the decades will be discussed.

An outlook of proposed system changes is presented, as are the costs and challenges facing the Upper Austrian Optometric and Optical Council.

Presentation 2 – Children's vision screening in a Bulgarian school

Lead author: Mila Dragomirova

Co-authors: Gabriela Mihaylova, Iva Petrova

Sofia University, Sofia, Bulgaria

Purpose: The need to conduct vision screening programmes in Bulgaria is confirmed by the few studies made by ophthalmologists in recent years. Until now, the country has no national screening programme. A school screening has been undertaken by a team of optometrists and this is a new experience for Bulgaria. Children from a school in Devnya, a town of about 8,000 people in the country's northeast, have been examined. The aim was to identify children with decreased visual acuity - corrected or uncorrected, and children at risk for amblyopia. An additional goal was to find the number of children who have never been examined before.

Methods: The screening was performed by a team of optometry students, final year of the Bachelor's program at Sofia University and two graduate optometrists in October 2015. A specially prepared questionnaire was filled in for every child. Children passed through three tests – auto refractometer, visual acuity and stereo fly test. For all children written permission to participate in the screening had been received from the parents. Results and conclusions were completed in two copies, and one was sent to the parents by the school management.

Results: 335 children, aged five to 19 years old, 158 girls and 177 boys, were examined. 102 children did not pass some of the tests: decreased visual acuity was observed in one or both eyes and a complete eye examination was recommended.

Only 28 children had had eye glasses prescribed before. 227 children declared that they had never attended an eye examination before.

Conclusion: The results obtained in this study show an alarmingly high percentage of children with uncorrected refractive errors and children who have never been to an eye examination. These results agree with the conclusions from earlier studies. The first step to solving these problems is to carry out regular screenings of children's vision. For this purpose it is important to develop a comprehensive national screening programme and to train a sufficient number of qualified specialists.

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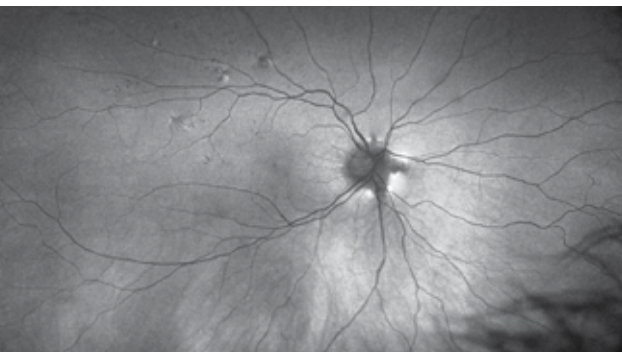
The Daytona is designed as a desktop model offering multiple wavelength imaging, including options for colour, red-free, and autofluorescence with green laser light. Simultaneous, non-contact, central pole-to-periphery views of up to 82% or 200 degrees of the retina are displayed in one single capture, compared to 45 degrees achieved with conventional methods.



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- Red and green lasers; each wavelength provides information for interpretation and diagnosis. Channels can be viewed separately:
 - Green (532 nm) “red-free” visualizes the sensory retina to the RPE
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Building *The* Retina Company

Clinical presentation (abstract 1/2) Ocular health

Vitamin controversies

Presenter: Dr Jeffrey Weaver^{1,2} and Bill Harvey^{3,4}

- ¹ *Certifying Board Services, American Osteopathic Association. USA*
- ² *University of Missouri-St. Louis, St Louis, Missouri, USA*
- ³ *Clinical Editor, Optician Magazine, UK*
- ⁴ *Directorate of Optometric Continuing Education and Training, UK*

Target group: Optometrist, Dispensing Optician

Optometrist



Dispensing Optician



Number of CET points: 1

Learning objectives:

- the ability to communicate effectively with a diverse group of patients with a range of optometric conditions and needs.
- understand the development of a management plan for those with maculopathy including the use of eccentric viewing methods and their monitoring.
- understand the latest developments in the early detection, monitoring and management of AMD - including dark adaptation assessment, local shared care monitoring with OCT and the use of microperimetry in designing appropriate vision therapy. There will also be a mention of the use of psychiatric appraisal techniques.
- understand the variety of screening for at risk patients regarding AMD, the use of shared care schemes in the primary care setting, and the use of modern vision function assessment in the establishment of vision training and eccentric viewing management plans.

Clinical presentation (abstract 2/2)

Ocular health

Current thinking on maculopathy

Overview: This first 30 minute presentation will examine the controversy related to the recommendation of vitamins, specifically Vitamins A, C, D, E, zinc and daily multivitamins. With many controversies regarding vitamin use, should vitamins be recommended to patients? Despite their widespread recommendations by optometrists and other healthcare providers, and even worldwide public health distribution, the use of vitamin supplements is controversial. While there are benefits of many vitamins, some may cause more harm than benefit.

The following issues involving vitamins will be presented:

- Could the worldwide distribution of Vitamin A be considered a failure?
- Is there any proven benefit of high-dose Vitamin C?
- Is increasing Vitamin D from sun exposure worth the risk of skin cancer?
- Does Vitamin E protect the heart or cause prostate cancer?
- Should all macular degeneration patients take vitamins that include Zinc?
- Do multivitamins prevent disease?
- What is the best approach to making recommendation to optometric patients?

Overview: The second 30 minute presentation will look at how developments in optometry are influencing the eye care professional's role in three stages of the course of maculopathy.

The first stage is screening and early diagnosis. Recent research has emphasised the role of rod receptor loss in early degenerative maculopathy and this is being exploited in new techniques aimed at assessing dark adaptation reduction. There are also useful central vision analysis techniques, both paper-based and electronic, which are helping to improve upon the low sensitivity of the traditional Amsler. The presenter will explain how a new generation of screening instruments are able to detect the earliest degenerative changes in the rods so making early detection possible by the assessment of impact upon dark adaptation curves and photo stress recovery.

The second stage might be considered to be the management of the disease and here the increasing use of OCT in the community primary care setting is helping reduce the burden on secondary care that has arisen with the effective use of anti-VEGF intervention.

The third and final stage might be considered to be the assessment of central vision loss and how careful measurement of the extent and nature of the impairment may help the patient to better adapt to their

visual environment. Recent ongoing research is highlighting the importance of psychological profiling of macular disease patients by optometrists and implies this is increasingly important in their long-term visual and lifestyle management.

Furthermore, despite some evidence of the limitations of eccentric viewing techniques, microperimetric assessment is being used to establish accurately the preferred retinal locus (PRL) and techniques have been developed using audio-feedback to help re-establish a new PRL as maculopathy progresses.

The presenter will include reference to the recent DEPVT study from Cardiff University in the UK, which implies that eye care practitioners have a useful role in the psychological profiling of the visually impaired, who have been identified as of particular risk of clinical depression which itself will influence the success of any management plan.

Adequate appraisal of the adaptation of any individual to their sight loss has a major effect on subsequent motivation when adhering to the plan so the evidence for association with sight loss and depression will be explained and what various approaches might be adopted to address this.

Special Interest Group - Binocular vision Neuro-optometric rehabilitation mTBI or concussion

SIG Chair: Steen Saust

Kraskin and Skeffington Institute, Copenhagen, Denmark

Presenter: Steen Aalberg^{1,2}

¹ *Kraskin and Skeffington Institute, Copenhagen, Denmark*

² *Vision care Clinic, Sonderborg, Denmark*

While diagnosing a concussion is still difficult due to lack of visibility on scans and other medical examinations, the clinical signs and subjective symptoms from vision are much more obvious. Examining and treating these patients represents a challenge, as most testing or training activities tend to trigger serious discomfort and fatigue. Still, even small gains in visual function are perceived as major steps towards recovery, and neuro-optometric intervention should be initiated early in the process of rehabilitation.

This 20 minute presentation / introduction will cover a few practical and theoretical things to consider before stepping into this area and hopefully produce some thought provoking discussion and debate within the SIG group both during the conference and via online forum post event.

Discussion workshop Contact lenses – Case reports from around the world

Presenter: Niall Farnon¹, Angel Chun Ki Wong² and Dr Langis Michaud³

¹ *University of the West Indies Optometry Clinic, St. Augustine, Trinidad, Trinidad and Tobago*

² *The Optometric Clinic, The Hong Kong Polytechnic University, Hung Hom, Kowloon, Hong Kong*

³ *University of Montreal, Montreal, Canada*

Target group: Optometrist, Contact Lens Opticians

Optometrist



Contact Lens Opticians



Number of CET points: 3

Overview: This discussion workshop session covers different contact lens fitting and aftercare scenarios, each containing challenging topics that can present in practice and should evoke conversation and discussion with respect to the potential implications to the practitioner and patient as well as debate on solutions to the issues encountered.

Cases include:

- contact lenses for sports enthusiasts and professional athletes
- a patient with irregular cornea and high demands / expectations
- a presbyope with moderate astigmatism looking for what works best!

In summary, these cases will leave delegates more informed about contact lens choice and fitting options and reflect on:

- advantages of contact lenses as means of vision correction
- listening carefully whilst asking probing questions related to patients' expectations of contact lenses as a means of vision correction
- key factors for success and what success actually means
- selecting best lens for each individual patient
- keeping up to date with the latest technologies.

Clinical presentation (abstract 1/3)

Paediatrics and dyslexia

Lens anomalies in paediatric patients – Dr Marie Bodack

Learning objectives:

- A better understanding of importance of carrying out comprehensive history & symptoms in relation to wearing hours (comfortable wearing time) lifestyle in particular working environment, leisure activities in particular sporting pursuits when it comes to achieving successful contact lens wear.
- Improved understanding of key strategies to consider when making the initial selection of contact lens products (contact lens material / design / modality, care products for cleaning / disinfection) to optimise success.
- The ability to use keratometry / topographical maps to assess regularity of the cornea and to better understand the implications of findings with respect to contact lens performance in particular vision.
- The ability to develop a fitting strategy for selection and optimisation of multifocal contact lenses to include; system and customised designs in Soft/ SiH, hybrid and RGP materials across a range of designs to ensure the best possible outcome with respect to both patient vision and comfort.

Presenter: Dr Marie Bodack¹, Dr Dorothy Thompson² and Professor Bruce Evans³

¹ Southern College of Optometry, Memphis, Tennessee, USA

² Great Ormond Street Hospital for Children, London, UK

³ Institute of Optometry, London, UK

Target group: Optometrist



OCULAR DISEASE



ASSESSMENT OF VISUAL FUNCTION

Number of CET points: 1

Learning objectives:

- understand how visual electrophysiology tests are combined to diagnose and localise visual dysfunction in children with sub-normal vision.
- understanding of the role of retinoscopy in the assessment of vision and ocular health in children.
- understanding of the visual factors that may be associated with specific learning difficulties (e.g. dyslexia).

Overview: Three unique paediatric patients with lens anomalies will be presented. They were all initially noted to have anomalies with their crystalline lenses during retinoscopy. The specific lens anomalies were determined with dilated examination. All patients were age 6 or younger at initial presentation. For one patient, this was her first eye exam and the parents had concerns about vision. The other two patients had had normal eye exams previously. One patient was previously prescribed glasses, the other not.

Case 1: Four year old female presented because she got close to the television. First eye examination. Visual acuity two cycles per minute OD and OS with Lea Gratings. Retinoscopy revealed -5.50 OD and -4.50 OS. The reflex was irregular. Dilated examination revealed inferior temporal lens subluxation OD>OS. Differential diagnosis included Marfan's Syndrome or homocystinuria, with Marfan's being diagnosed.

Case 2: Four year old female presented for her annual exam because she had lost her glasses two months previously. She was prescribed glasses (-5.00 OU) one year prior. Visual acuity was not able to be obtained with Cardiff cards or matching symbols. Retinoscopy revealed very dull reflex with -7.00 OD and -8.00 OS. A central opacity was found in OS. Dilated examination revealed scattered nuclear opacities and posterior lenticonus OS.

Clinical presentation (abstract 2/3) Paediatrics and dyslexia

Visual electrophysiology – extending the role of optometry – Dr Dorothy Thompson

Case 3: Six year old male presented for his annual examination having failed school vision screening, last eye examination two years prior. Visual acuity was 20/125 OD, 20/100 OS. Retinoscopy revealed a dull reflex OU and a refractive error was unable to be determined. Dilated examination revealed an irregular “bubble-like” appearance to the posterior lens surface. The retina was not able to be visualised. The patient had no known medical history. Additional testing revealed elevated glucose levels (>700 blood, >1000 urine). The patient was diagnosed with diabetes.

In conclusion, retinoscopy may reveal a variety of lens anomalies in paediatric patients. Additional testing may include dilation or, if the opacity presents retinal visualisation, B-scan ultrasound. In some cases a systemic anomaly may be present. Systemic anomalies should be suspected in cases where the lens is subluxed. The most common systemic disorder to be considered is Marfan. Paediatric cataracts may be congenital or acquired. In acquired cases, especially bilateral, a systemic aetiology should be suspected. Additional testing may include blood work. Depending on the level of visual acuity, patients may need to be referred for cataract surgery. In many cases, patients may need to be referred to medical specialists including endocrinologists or cardiologists (Marfan's).

Overview: Visual electrophysiology tests provide objective information about visual pathway function. The results characterise the ‘bio-electrical’ changes in the retina and pathway to the striate cortex produced by visual stimulation. The International Society for Clinical Visual Electrophysiology of Vision, [ISCEV], publishes standards and guidance for performing the tests. These are freely available from www.ISCEV.com. There are five main tests:

- The electro-oculogram, EOG, indicates RPE physiology.
- A full field flash electroretinogram, ffERG, summates activity over the whole retina and to different flash strengths presented under dark and light adapted conditions will distinguish rod and cone photoreceptor and inner retinal function.
- Black and white check stimulation localises an ERG from macular region of the retina – this is the pattern ERG, PERG, which distinguishes maculopathy from ganglion cell and optic nerve dysfunction.
- Multifocal patterns stimulate even smaller, localised regions of retina and the mfERG is useful in detecting geographic areas of macular disease.
- The visual evoked potential or VEP reflects the central visual field representation at the occipital lobe. It reflects changes in the striate cortex to flashes or patterns and can localise optic nerve, chiasmal and post chiasmal pathway function.

Aims:

- To describe how the tests are performed and the results analysed using case studies with unexplained subnormal visual acuity from optometric practice.
- To present recent equipment developments which make visual electrophysiology an increasingly feasible adjunct for the community optometrist.

Methods: Visual electrophysiological tests are usually carried out in hospital practice, often in the UK, by optometrists. Adherence to International Society for the Clinical Visual Electrophysiology (ISCEV) standards allows us to communicate and transport meaningful results across international borders. Indeed, in the UK we have shown that test results in the same eyes are replicated with low coefficients of variance across national centres.

There is a determination to bring these tests into the community consulting room, to make them less invasive, more rapid and more widely applicable. Examples of this are seen in paediatric visual electrophysiology where tests have to be quick, robust but also sensitive. This presentation will show the diagnostic specificity of ERG and VEPs adapted for alert children with a chair time of 20-30 minutes and how this can be applied to investigate patients with subnormal visual acuity referred from optometric practice. It will then describe recent innovations in

Clinical presentation (abstract 3/3) Paediatrics and dyslexia

Dyslexia: the role of the optometrist – Professor Bruce JW Evans

commercially available portable equipment. For example, some designed for flicker ERG acquisition and analysis have an application in screening diabetic retinopathy. It takes two minutes per eye using a hand held instrument with a single sticker electrode and no pupillary dilation.

Conclusion: Visual electrophysiological tests are adaptable. They can provide diagnostic information and have an emerging role in functional screening and surveillance. The handheld integral designs are suited to screening in optometric practice and may become an adjunct or replacement for fundus screening in diabetic retinopathy.

Purpose: Several visual anomalies have been claimed to co-occur with dyslexia.

Methods: PubMed and other databases were searched for case-control and cross-sectional studies that aimed to detect visual correlates of dyslexia. Relevant visual conditions and tests were classified. For the several correlates that were identified, the evidence was considered to determine whether they are likely to be non-causal correlates, contributory factors, or causes of dyslexia.

Most dyslexic children have normal vision but some visual conditions are more prevalent in dyslexia than in good readers. The main correlates, in decreasing order of the strength of evidence, are binocular instability, the magno deficit, visual stress, and accommodative anomalies. Visual stress remains controversial but is believed to cause eyestrain, headaches, and visual perceptual distortions and is alleviated with coloured filters. Each of these conditions occurs in less than a quarter of dyslexics. These conditions are unlikely to cause dyslexia, but may contribute to some children's reluctance to read.

Posterior segment – research topics

Relationship between retinal thickness and photopic high and low contrast visual acuity in type 2 diabetics without retinopathy

Lead author: Shroug M. Aldaham¹

Co-authors: María del Carmen Martín-Ridura², Ana Rosa Barrio¹, Beatriz Antona¹, María Jesús Pérez-Carrasco¹, María Cinta Puell¹

¹ *Applied Vision Research group, Faculty of Optics and Optometry, Complutense University of Madrid, Madrid, Spain*

² *Diabetes Unit, Health promotion and prevention services, Madrid City Hall, Madrid, Spain*

Purpose: To assess the thickness of the macula, ganglion cell-inner plexiform (GCIPL) layer, and retinal nerve fibre layer (RNFL) in type 2 diabetics without retinopathy, and to analyse their relationship with photopic high and low contrast visual acuity (HCVA and LCVA).

Methods and materials: A total of 27 normal control and 27 type 2 diabetics without retinopathy were recruited. The mean age (\pm SD) was 60.9 ± 5.1 and 63.6 ± 6.8 years for the controls and diabetics, respectively ($p > 0.05$). The diabetic group had well controlled glucose, and a duration of diabetes of >4 years. Both groups had a best corrected visual acuity of 1.0 (decimal) or better. VA was measured using the HC (96% contrast) and LC (10% contrast) Bailey-Lovie charts (photopic luminance conditions of 85 cd/m²). Macular, GCIPL, and RNFL thicknesses were acquired by the Zeiss Cirrus 4000 HD-spectral domain optical coherence tomography (HD-OCT) (Carl Zeiss Meditec, Dublin, CA).

The macular cube 512x128, and the 200x200 optic disc cube scanning protocols were used to obtain the macular/GCL-IPL and the RNFL thicknesses, respectively. For both protocols, three consecutive measurements were obtained for each patient. The average of the three measurements was taken. The scan was accepted as a reliable measurement when the signal strength was ≥ 6 (according to the manufacturer's recommendations) to all protocol measurements acquired.

Macular subfields were analysed according to the early treatment diabetic retinopathy study (ETDRS) grid. The grid comprises of central 1 mm disc (C); inner 3 mm ring: temporal (T3), nasal (N3), superior (S3), inferior (I3); outer 6 mm ring: temporal (T6), nasal (N6), superior (S6), inferior (I6). Mixed model ANOVA was conducted to find any significant differences in the macular subfield thicknesses. Independent t-test was used to find any significant differences between the two groups. Correlation analyses were performed to find any association between central macular thickness, average GCIPL, and RNFL thickness measurements with photopic HCVA and LCVA.

Results: The diabetic group showed a significantly worse photopic VA than controls (HCVA 0.02 ± 0.08 and -0.04 ± 0.07 , $p < 0.05$; LCVA 0.16 ± 0.92 and 0.09 ± 0.09 , $p < 0.05$, respectively). A significant decrease in thickness was found in the central macular subfield (C), inner temporal (T3) and inner inferior (I3) macular subfields compared to controls (mean \pm SD micro meter) (C: controls: 271.93 ± 20.0 , diabetics: 258.02 ± 20.8 , $p = 0.013$; T3: control: 321.18 ± 16.0 , diabetics: 312.45 ± 12.3 , $p = 0.025$; I3: controls: 329.57 ± 15.3 , diabetics: 321.12 ± 14.9 , $p = 0.039$). There were no significant differences in the thicknesses neither in the average GCIPL, nor in the RNFL between the two groups. No significant correlation was found between the central macular subfield, GCIPL, RNFL and photopic HCVA and LCVA in the diabetic group.

Conclusions: Type 2 diabetics without retinopathy and good VA showed a localised thinning of the central, inner temporal and inner inferior macular subfields. HCVA and LCVA tested under photopic luminance conditions were not associated with the macular thickness, GCIPL and RNFL.

Blue light-induced retinal photo-ageing and application in ophthalmic photoprotection

Lead author: Coralie Barrau

Essilor International, Charenton-le-Pont, France

Purpose: Blue light is suspected to be involved in retinal ageing and in age-related macular degeneration (AMD) onset or progression (Sui et al., 2013) (Marquioni et al., 2015). Blue-induced toxicity has been largely studied on *in vitro* and *in vivo* models of AMD. However, the most toxic wavelengths within this broad range remain to be identified and evaluated in designing ophthalmic photoprotection. This study investigated for the first time the precise phototoxic action spectrum on an AMD *in vitro* model in physiological light conditions. It also explored the photomodulation of oxidative stress and cell defence mechanisms in the outer retina (retinal pigment epithelium - RPE). Finally, it aimed to design the first ophthalmic solutions with proven *in vitro* biological photoprotection potency.

Methods: As an *in vitro* model of the ageing outer retina and AMD, primary cultures of RPE incubated for six hours with various A2E concentrations were used (a well-characterised chromophore contained in lipofuscin). Light exposure was provided by two custom-made cell illumination systems; (i) an LED-based fibred device composed of 10 nm-wide illumination bands distributed within the blue-green range in 10 nm increments for light toxicity characterisation and (ii) a fibred device generating programmable and variable spectra and irradiances within the visible range for filter photoprotection assessment.

Cells were exposed for up to 18 hours to irradiances normalised to the daylight spectrum reaching the retina after being filtered by the ocular media. Caspase-3/7 apoptotic activity and oxidative stress biomarkers, such as hydrogen peroxide, superoxide anion, glutathione ratio, superoxide dismutase activity, mitochondrial analysis or respiration rate, were quantified. All these biomarkers were used to validate the photoprotective potency of our ophthalmic selective filtering solutions.

Results: Apoptosis significantly increased in the blue-violet 415-455 nm range. High levels of both hydrogen peroxide and superoxide anion were also detected in this narrow range. Under blue illumination at 430 and 440 nm, significant mitochondrial changes were observed: mitochondria exhibited peri-nuclear clustering, a globular shape and the respiration rate was reduced. Also, catalase, SOD2 and GPX1 mRNA expressions were significantly photomodulated. This strong blue-violet toxicity determined exclusive specifications for the development of a truly new category of ophthalmic lens. The new technology embodies three features simultaneously: (i) selective filtering of noxious light, (ii) the passing through of all beneficial blue-turquoise light (460-510 nm) and (iii) maintenance of transparency. *Crizal® Previncia®* is the first generation. The *in vitro* photoprotective efficacy of the lenses was assessed.

Conclusion: The photo-ageing of the outer retina is driven by oxidative stress production, decrease of cell antioxidant mechanisms, mitochondrial dysfunction and apoptosis, with an action spectrum maximal in the blue-violet range up to 455 nm. These findings provide us with precise tools to study light-induced stress in retinal ageing and AMD and have been valued in designing the first selective photoprotection ophthalmic filters, without disrupting essential visual and non-visual functions. *In vitro* proven efficacy supports strong expectation that the new filters prevent patients from accelerated retinal photo-ageing. This perspective is a great step forward in terms of technological innovation and patient vision health protection.

Posterior segment – research topics

The choroid in health and ocular pathology

Lead author: Dr Marieh Esmaeelpour

Medical University Vienna, Vienna, Austria

Purpose: This project aimed to use a 3D-1060nm-Widefield-OCT to examine choroidal thickness (ChT) maps and vascular structure in healthy subjects and in a range of ocular maculopathies: diabetes mellitus (DM), age-related-macular degeneration (AMD), and central serous chorioretinopathy (CSC).

Methods: Three-dimensional choroidal tomograms and vascular segmentations from subjects (n=43) with DM and neovascular (pre- and post-treatment) and other phenotypes of AMD (n=50) and CSC (n=2) were compared with age and axial eye length matched eyes of 20 healthy subjects. Visual acuity, axial eye length, and fundus photographs were taken. Images taken with a 3D-1060nm-Widefield-OCT (512x 512 A scans at ~7 µm axial resolution over 36° angle) were used to generate maps automatically.

Results: Overall choroidal thickness and structural blood vessel alteration were observed and measured over a wide field of view. The thickness results and vascular layer distribution related to the type of maculopathy and were significantly different in comparison with healthy subjects (p<0.05).

Conclusions: Enhanced depth penetration of 1060 nm OCT enabled the in vivo investigation of choroidal blood vessels and choroidal thickness. Although retinal changes in DM, AMD and CSC are well documented with OCT, choroidal thickness and the vascular structure of Haller's and Sattler's layer has the potential to become an important new biomarker in posterior eye pathology.

Interactive Lecture

Update on the visual standards for driving in Europe

Presenter: Dr Julie-Anne Little

Vision Science Research Group, School of Biomedical Sciences, University of Ulster, Coleraine, UK

Target group: Optometrist, Dispensing Opticians

Optometrist



Dispensing Opticians



Number of CET points: 1

Overview: This lecture will provide eye care clinicians with an overview of the visual standards for driving in European countries. It will set out the requirements of the medical annex of the European Commission (EC) 2009 directive on driving licenses, and will discuss the current body of research concerning vision and driving.

Visual standards for driving typically concentrate on visual acuity and field of vision, but the recent update to the EC directive also includes contrast sensitivity, glare sensitivity, and twilight vision in its description of other functions that could 'compromise safe driving'. While it is welcome that these additional aspects of visual function are included, it is difficult to

apply any meaningful context due to the lack of evidence available to describe 'normal' expectations for these measures.

Furthermore, despite the fact that driving is unarguably a visual task, there is a failure to demonstrate that particular visual acuity threshold is critical /necessary for 'safe' driving. Nevertheless, studies that investigate vision and driving using simulated or real closed-circuit road conditions demonstrate a significant effect of reduced visual acuity, reduced contrast sensitivity and cataracts on driving performance. Other work has also demonstrated decreased accident rates after cataract surgery.

As eye care clinicians, we want to positively contribute to driver awareness of the importance of good vision, but also try to maximise visual function to ensure people can continue to drive, within the boundaries of the regulations, for as long as possible. This lecture will update clinicians' knowledge to help better communicate to their patients about vision and driving.

Learning objectives:

- to raise awareness of the European Commission (EC) visual standards for driving.
- to give eye care clinicians knowledge to better communicate visual standards for driving to patients.
- to increase understanding of the current research relevant to vision and driving performance.

Clinical presentation

Ocular discomfort – vague aches and stabbing pains

Presenter: Dr Frank Eperjesi

School of Life and Health Sciences,
Aston University, Birmingham, UK

Target group: Optometrist,
Dispensing Opticians

Optometrist



Dispensing Opticians



Number of CET points: 1

Overview: To describe the typical pathophysiology behind common yet diagnostically challenging complaints and to emphasise additional findings that may increase the significance of the presentation.

Content: Stabbing eye pains, pressure feeling in the eye, chronic bilateral aching eye pain, jumpy or twitching eyes, chronic puffy swelling around the eyes, darkening circles around the eyes, chronically itchy eyes (that appear quiet and white on examination), tender eye lid (that appears white and quiet on examination), eyes that itch and burn in the morning, transient, scum-like blur that comes across the vision, exaggerated, forceful blinking, extreme sensitivity to everyday levels of light, poor night-driving vision.

The presentation will provide insight into diagnostic and management options in these challenging cases.

Learning objectives:

- identify what constitutes a common yet diagnostically challenging complaint.
- demonstrate knowledge of diagnostic options in the further investigation of common complaints.
- identify options appropriate in the management of common complaints.

(abstract 1/3)

Ocular surface – research topics

Evaluation of the differential impact of tear film constituents on the evaporation kinetics and ferning patterns of tear microdroplets

Lead author: Dr Georgi As. Georgiev¹

Co-authors: Slavyana Ivanova¹,
Vesselin Tonchev², Norihiko Yokoi³

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² *Institute of Physical Chemistry 'R.Kaischew'-BAS, Phase Formation and Crystal Growth Department, Sofia, Bulgaria*

³ *Department of Ophthalmology, Kyoto Prefectural University of Medicine, Kyoto, Japan*

Purpose: To determine the impact of key natural and exogenous tear film (TF) constituents on the evaporation kinetics and ferning patterns of (sub)microlitre tear droplets. The TF constituents selected were: tear film lipid layer (TFLL), bovine submaxillary mucin (BSM) and high molecular weight (1.10+6) hyaluronic acid (HA).

Methods: Unstimulated or mildly stimulated (via a stream of air) human tears were collected in glass capillary tubes from the eyes of five healthy volunteers with no signs of ocular surface disease (three females and two males; 29.8± 5.26 (SD) years old). The samples used were intact human tears, delipidated (via 2/1 chloroform/methanol extraction) tears, and tears with inclusion of BSM or HA (0.01%, 0.1% and 0.3% concentration of the polymers). The evaporation of 0.8-1 µl tear droplets on microscopic slides was monitored at 25°C and 35°C in Axisymmetric Drop Shape Analysis setup. The evaporation kinetics were analysed to yield the evaporation coefficient

determined only by the samples' composition (i.e. independent of the changes in the drop shape). The ferning patterns obtained after the completion of the samples' evaporation were analysed using the 4-point (Rolando) and 5-point (Masmali) grading scales.

Results: TFLL suppressed tear evaporation only modestly (≤15%) and had no effect on ferning. Both BSM and HA notably (up to 60%) suppressed the microdroplets' evaporation in concentration dependent manner. BSM and HA also increased the density and thickness of the post-evaporation tear ferns. This was detected as transition from 0 to 1st grade on the Masmali scale, while the Rolando scale was not able to distinguish the morphological changes.

Conclusions: A new approach is proposed to measure the evaporation resistance of clinically relevant (sub)microlitre samples of human tears. TFLL proved of limited efficiency in suppression of tear evaporation while BSM and HA showed notable positive impact. These findings combined with tear ferning data suggest that it may be necessary to rethink the role of TF constituents to the overall functionality of human tears. The combined evaluation of the evaporation kinetics and ferning patterns of tear microdroplets may serve as a viable tool for differential evaluation of the effect of eyedrop compounds on TF and for diagnosis of dry eye.

Ocular surface – research topics

The effect of age and gender on tear osmolarity in comparison with a dry eye questionnaire

Lead author: Professor J. Peter Gierow
Co-author: Lucyna Kacz

*Department of Medicine and Optometry,
Linnaeus University, Kalmar, Sweden*

Purpose: The aim of this study was to compare the osmolarity of the tear film in people in different age groups, and of different gender. Since it has been suggested that osmolarity might be affected by the severity of Dry Eye, the patients were also asked to complete a dry eye questionnaire.

Methods: In this study, 55 patients were divided into five age groups, 20-29 yrs, 30-39 yrs, 40-49 yrs, 50-59 yrs, and >60 yrs. 27 were men and 28 were women. The subjects were between 20 and 75 years old, with an average age of 44.7 ± 16.1 years. After completion of the Texas Eye Research Technology Center symptoms questionnaire (TERTC-DEQ, Narayanan et al 2005) the osmolarity in both eyes was measured using the TearLab™ (TearLab Co, San Diego), and the average calculated.

Results: There was no statistically significant correlation ($p > 0.05$) between age, gender and osmolarity of either males ($r = 0.2007$), females ($r = 0.0300$), or in the group overall ($r = 0.0877$). There was a significant positive correlation between osmolarity and TERTC-DEQ for women ($p = 0.01$) and for the whole group ($p < 0.05$), but not for men ($p > 0.05$).

Conclusion: Neither gender nor age affected the osmolarity, but the osmolarity of the eye increased with increasing score in the TERTC-DEQ symptom questionnaire, even though a larger sample group might be needed to verify this in both men and women.

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Ocular surface – research topics

Is there a relationship between corneal sensation, blinking, ocular surface temperature and tear film quality?

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Purpose: To explore the relationship between spontaneous eye-blink rate (SEBR), tear film quality (non-invasive tear break-up time, NIBUT, tear film lipid pattern and tear meniscus height, TMH), ocular surface temperature (OST) and central corneal sensitivity threshold (CST) under normal conditions, in order to answer the question, 'What role do corneal sensitivity and tear film quality play in triggering a blink?'. In addition, the correlation between the degree of iris pigmentation and CST was explored.

Methods: 42 volunteers with good ocular health (OSDI < 15.0) were recruited for this prospective randomised clinical study. SEBR, CST (using the NCCA air gas aesthesiometer), OST (via a thermal infrared camera), NIBUT and lipid pattern of the tear film (using the Keeler Tearscope Plus) were recorded on right eyes only.

Results: 42 subjects participated (average age: 27.76 ± 5.36 years; 11 males). The median for CST was 0.35 mbars, for SEBR it was 11 blinks/min, and for NIBUT it was 34.55 seconds. A moderate and statistically significant correlation between CST and NIBUT ($r = 0.535$; $p < 0.001$) and between CST and SEBR ($r = -0.398$; $p < 0.001$) was observed. A good correlation was noted between SEBR and NIBUT ($r = -0.696$, $p < 0.001$). A poor correlation was found between CST and iris pigmentation ($r = 0.071$; $p = 0.320$; Spearman's test).

Conclusions: This is the first study to show a moderate correlation between corneal sensitivity and blink frequency, and a strong correlation between tear film quality, blink frequency and ocular surface temperature, emphasising that ocular surface condition represents one important trigger for the initiation of a blink.

However, the mechanisms involved in the initiation of an eye-blink are complex, as local ocular sensory input only represents one trigger, next to other external influences and internal factors that are under cortical control. A relationship between the degree of iris pigmentation and corneal sensitivity could not be established in this study.

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