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Welcome Message



Dear colleagues,

It is with great pleasure that we inform you that the next International Conference of Optometry and Vision Science (CIOCV'17) will be held in Braga (Portugal) on the 22nd and the 23th of April, 2017.

This conference is organized annually since 2004 at the University of Minho (<http://www.uminho.pt/home>) in Braga (Portugal) and once again we are working, spending time and taking care of every detail of the program to transmit new knowledge and information and recycling information that are useful in the optometric practice. We are developing a complete and diverse scientific program that will include current and important topics in the area of Optometry and Vision Sciences.

We hope to welcome you in Braga on this scientific knowledge sharing event and be aware that we will share new information very soon. Just follow us on the usual communication channels.

Please accept a warm welcome to the 14th International Congress of Optometry and Vision Science!

Best regards,

The Organizing Committee of CIOCV2017

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Webpage: ciocv.fisica.uminho.pt

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Sandra Franco, OD, PhD, Portugal

Sérgio Nascimento, PhD, Portugal

Program

- *Lectures*
- *Clinical Reports*
- *Free Papers*
- *Posters*

Lectures

Session		Saturday 22nd April 2017
8:00	Registration	
9:00	Opening session	Exmo. Senhor Secretário de Estado da Saúde Manuel Delgado Exmo. Senhor Reitor da Universidade do Minho António M. Cunha Exmo. Senhor Reitor da Universidade da Beira Interior António Fidalgo Exma. Presidente da Escola de Ciências da Universidade do Minho Margarida Casal
10:30	Myopia	Risk factors on the onset and progression of myopia <i>Dra. Amanda French</i> <i>Discipline of Orthoptics,</i> <i>University of Technology Sydney, Sydney, Australia</i>
11:00		Innovations in controlling the progression of myopia <i>Dr. Ian Morgan</i> <i>Research School of Biology, Australian National University, Canberra, Australia</i>
11.30	Coffee-Break/ Exhibition	
12:00	Ocular asthenopia and the influence of new Technologies.	Blue light-induced retinal photoageing <i>Coralie Barrau</i> <i>Essilor International, Charenton-lePont, France</i>
12:30		Computer Visual Syndrome <i>Dra. Sandra Franco</i> <i>University of Minho, Portugal</i>
13:00	Lunch/ Exhibition	
14:30	Contact Lenses in Presbyopia	Multifocal Contact Lenses: new designs and materials <i>Dr José Manuel Gonzalez-Mejome</i> <i>Universidade do Minho, Portugal</i>
15:00		Ocular dryness in presbyopic CL wearers <i>Dr. Carlos Resúa</i> <i>University of Santiago de Compostela, Spain</i>
15:30		Clinical Tips on Multifocal Contact Lenses fitting <i>Dr. Fernando Hidalgo Santa Cruz, OD, PhD, FAAO</i> <i>Director del Centro Boston de Optometría - Madrid</i>
16:00	Coffee-Break/Exhibition	
16:30	Scleral Contact Lenses	When scleral contact lenses should be used? <i>Dr. Maria Serramito Blanco</i> <i>University Complutense of Madrid, Spain</i>
17:00		Scleral contact lenses fitting <i>Dra. Rute Araújo</i> <i>University of Minho, Portugal</i>
17:30		Complications associated with scleral contact lenses <i>Dr. Gonzalo Carrazedo</i> <i>University Complutense de Madrid, Spain</i>
18:00	Closing ceremony of the first day with the support of: GrandVision – Portugal	

Session		Sunday 24th April 2016
8:30	Registration	
9:00	Free Papers	<p>Comparison of two multifocal and toric multifocal contact lenses with different optical zones: a new Filcon II 2 59% versus Omaficon A 62% <i>Irene Lozano Sierra</i></p> <p>Parental perspectives and wearer experience with a dual-focus daily disposable soft contact lens for myopia control <i>Peixoto-de-Matos SC</i></p> <p>Myopia control with soft contact lenses, state of the question. <i>Jaume Paune</i></p> <p>The role of Meibomian gland atrophy on contact lens discomfort <i>Rico-del-Viejo L</i></p> <p>Dysphotopsia in RLE surgery: pre- and post evaluation of light disturbances. <i>Escandón-García, Santiago</i></p> <p>Myopia control with a dual-focus daily disposable soft contact lens: 2-year results from a multicenter randomised clinical trial <i>González-Méijome JM</i></p>
10:00	Clinical cases	<p>Dra. Laura Moreno <i>University of Minho, Portugal</i></p> <p>Dr. Pedro Monteiro, Dra Amélia Nunes, Dr Francisco Ferreira <i>University of Beira Interior</i></p> <p>Dr. Carlos Resúa <i>University of Santiago de Compostela</i></p> <p>Dra. Sandra Franco <i>University of Minho, Portugal</i></p>
11:00	Coffee-Break/ Exhibition	
11:30	Binocular vision	<p>When and of how much should we prescribe prisms <i>Dr Andres Gene</i> <i>University of Valência, Spain</i></p>
12:00		<p>Influence of medication on binocular vision <i>Dra. Johanna Garzón P</i> <i>University of la Salle, Facultad de Ciencias de la Salud, Colombia</i></p>
12:30		<p>Early detection of the non- strabismic and accommodative binocular problems <i>Dr Andres Gene</i> <i>University of Valência, Spain</i></p>
13:00	Lunch/ Exhibition	
14:30	Neurodegenerative diseases	<p>The importance of neurobiology in the binocular vision <i>Dra. Johanna Garzón P</i> <i>University of la Salle, Facultad de Ciencias de la Salud, Colombia</i></p>
15:00		<p>Neurophthalmology: the vision beyond the eye <i>Dra. Andreia Soares e Dra. Cristina Almeida</i> <i>Hospital de Braga</i></p>
15:30		<p>Main considerations in patients with neurodegenerative diseases <i>Dra Natacha Moreno Perdomo</i> <i>Directora de Serviço de Oftalmologia, Hospital Santa Maria Maior EPE, Barcelos, Portugal</i></p>
16:30	Awards and certificates ceremony	
17:00	Conference end	

Posters

N ^o	AUTHOR(S)	TITLE
001	A. Gene-Morales, J. Gené-Morales, MC. Morales-Hernández	Retinal angiogenesis and physical activity
002	Adriana Gascó, María J. Pérez de Lara, Hanan Awad Alkozi, Victoria Eugenia Lledó and Jesús Pintor.	Increased levels of nucleotides and dinucleotides in glaucomatous mice model
003	Alba Martín-Gil, Begoña Fonseca and Gonzalo Carracedo	Dynamically stabilized toric soft contact lens fitting for elevated astigmatisms in patients with strabismic and nonstrabismic binocular vision disorders
004	Alba Martín-Gil, Begoña Fonseca and Jesús Pintor	Activation of trpv4 induces the release of diadenosine tetraphosphate in the aqueous humour
005	Alejandro Martínez Águila, Begoña Fonseca, Anahi González Bergaz, Alba Martín Gil, Jesús Pintor	Trendelenburg position: A simple method to test glaucomatous hypotensive compounds in a hypertensive condition
006	Amorim-de-Sousa A, Peixoto-de-Matos SC, Queirós A, González-Méijome JM	Evaluating Accommodative Response to Bifocal, Multifocal and Single Vision: Pilot Study
007	Ana González-Costa, Emanuel Barberá-Loustaunau, Estefanía González-Sánchez, Cristina Maiz-Fernandez	Diagnosis of schnyder dystrophy: a case report
008	Ana Rita Martins, Amélia Nunes, Arminda Jorge	Vision therapy in children with learning disabilities/ Terapia visual em crianças com dificuldades de aprendizagem
009	Anahi González Bergaz, Alejandro Martínez Águila, Begoña Fonseca, Jesús Pintor	Effect on tear secretion of dinucleotides and melatonin analogues in combined therapy.
010	Begoña Fonseca, Alejandro Martínez-Águila, Alba Martín-Gil, Anahi Gonzalez-Bergaz and Jesús Pintor.	Ap4A in combined therapy with Alphagan® and Timoftol® in a glaucoma model
011	Candela Rodríguez Pomar, Carlos Carpena Torres, María Serramito Blanco, María Jesús Pérez de Lara, Gonzalo Carracedo, Jesus Pintor	Evaluation of the anti-inflammatory effect of an humectant solution based on aloe vera
012	Carlos Carpena Torres, José Manuel López Alonso, Mercedes Burgos Martínez, Juan Gonzalo Carracedo Rodríguez, Jesús Carballo Álvarez	Variation of coma aberration with prismatic soft contact lenses
013	Catarina Ribeiro, Paulo Fernandes, Jorge Jorge.	Visual performance and sports productivity
014	Cátia Teixeira, Madalena Lira, Armando Ferreira	Influence of contact lenses power on Young's modulus
015	Cláudia Aguiar; Ana Rita Tuna; Francisco Bradro; Pedro Monteiro; Amélia Fernandes Nunes	Dinâmica de grupo em terapia visual / Group dynamics in visual therapy
016	Cláudia Vieira; Ana Amorim-de-Sousa; José Manuel González-Méijome; António Queirós	Variações Longitudinais da Superfície Corneal
017	Coelho-Marín G, Castanheira E, Queirós Pereira A, Lira M	Evaluation of transmittance changes between different batches of contact lenses
018	Concepción, P; Álvarez, M; González, A; Chamorro, E	Clinical case: Stargardt's disease
019	Cristina Pastrana Robles, Candela Rodríguez Pomar, Carlos Carpena Torres, María Serramito Blanco, Adriana Julián García, Gonzalo Carracedo Rodríguez	In Vivo wettability changes in soft contact lenses after different tear drops instillation
020	Dora Nazaré Marques; Jorge Manuel Martins Jorge; João Manuel Maciel Linhares	Chromatic discrimination in myopia / Discriminação cromática na miopia
021	Eduardo Ínsua Pereira, Madalena Lira	Influence of lens wear on equilibrium water content of daily disposable contact lenses

022	Esteban Porcar Izquierdo, Álvaro Máximo Pons Moreno, Juan Carlos Montalt Rodrigo, Josefa Benlloch-Fornés	Spanish version of a questionnaire to determine eye symptoms in VDU users.
023	Esteban Porcar Izquierdo, Marica D´Angelo, Álvaro Máximo Pons Moreno, Juan Carlos Montalt Rodrigo, Josefa Benlloch-Fornés	Eye Symptoms in university students using video display units
024	Felipe González, Maribel Fernández, Paz Santos, María Gil, Francisco Gómez-Ulla	Analysis of type i choroidal neovascularization in wet age-related macular degeneration using optical coherence tomography angiography
025	Francisco Olmos, Josefa I. Benlloch-Fornés, Esteban Porcar, Juan Carlos Montalt	Incidence of the teaching system in the performance of university students in the first semester of the third course of Optometry.
026	Francisco Olmos, Josefa I. Benlloch-Fornés, Juan Carlos Montalt, Esteban Porcar	Micro-cystic dystrophy of Cogan´s
027	Francisco Sañudo Buitrago; Andrés Gene Sampedro; Inmaculada Bueno Gimeno; Rosa Mª Hernández Andrés; Mª Teresa Diez Cuenca	Intra-stromal post-ring contact lenses: Is it possible?
028	García-Montero M, Rico-del-Viejo L, Tavberidze N, Lorente-Velázquez A, Hernández-Verdejo JL, Madrid-Costa D	Impact of blinking frequency on tear film optical quality dynamic in contact lens wearers.
029	García-Montero M, Rico-del-Viejo L, Tavberidze N, Lorente-Velázquez A, Hernández-Verdejo JL, Madrid-Costa D,	Comparison of tear film optical quality dynamics in contact lens wearers
030	Gema Álvarez Ropero, Mónica Álvarez Cerrato, Elena Durán Prieto, Mercedes Burgos Martínez, M. Jesús Vázquez Fustes, Irene Lozano Sierra	Fitting of a personalized toric hydrophilic lens of biomimetic material 80% WC in corneal ectasia after lasik
031	H. Pena-Verdeal, C. Garcia-Resua, Eva Yebra-Pimentel, M. J. Giraldez	Performance of Meibometry in symptomatic and non-symptomatic subjects stratified by OSDI
032	H. Pena-Verdeal, C. Garcia-Resua, M. J. Giraldez, E. Yebra-Pimentel	Correlation analysis of the area of tear film break-up and the tear break-up time test
033	Hanan Alkozi, Juan Sánchez-Naves, Maria Jesús Perez de Lara, Gonzalo Carracedo, Begoña Fonseca, Alejandro Martinez-Aguila and Jesús Pintor	Melatonin levels in the aqueous humour: connection with intraocular pressure
034	Hernández-Verdejo JL, Rico-del-Viejo L, García-Montero M, Tavberidze N, Lorente-Velázquez A, Madrid-Costa D	Impact of blinking frequency on the ocular surface temperature
035	Hernández-Verdejo JL, Rico-del-Viejo L, García-Montero M, Tavberidze N, Lorente-Velázquez A, Madrid-Costa D	Comparison of temporal ocular surface temperature changes induced by different contact lens materials
036	Irene Lozano Sierra, Simon Barnard, Francisco Mateos, Mercedes Burgos Martínez, Levit A, Johnson E	Esophoria control in a myopic dyslexic case with visual symptoms and soft toric multifocal center distance lens
037	J. Gené-Morales, A. Gene-Morales, I. Bueno-Gimeno, A. Gene-Sampedro	Relationship between different physical activity methods and intraocular pressure variation
038	Jorge Jorge, Catarina Ribeiro	Prevalence of refractive error in Portuguese schoolchildren´s
039	JOSÉ L. ROSADO	Previsores da miopia
040	Josefa I. Benlloch-Fornés, Inmaculada Bueno Gimeno, Salvador García DelPech	Astigmatic Vector Analysis in Keratoconus post surgical treated with Intracorneal rings and Crosslinking One year after
041	Josefa I. Benlloch-Fornés, Inmaculada Bueno Gimeno, Salvador García DelPech	Corneal epithelial thickness mapping by Optical Coherence Tomography in keratoconic eyes versus keratoconic eyes after intracorneal ring surgery.
042	Juan Carlos Montalt, Esteban Porcar, Enrique España-Gregori, Josefa I. Benlloch-Fornés, Cristina Peris-Martínez	Changes in corneal biomechanical parameters induced by corneo-scleral contact lenses to treat irregular corneas after LASIK surgery
043	Juan Carlos Montalt, Josefa I. Benlloch-Fornés, Esteban Porcar	Atypical micro-bacteria found in hidrogel of silicone contact lenses.
044	Juan Queiruga Piñeiro, Manual Alvarez Prada, Jesus Merayo LLOves	Treatment with plasma rich in growth factors (PRGF) in a patient with Marginal degeneration of Terrien

045	Liliana Reis	Ortho-k what has changed in the last years
046	M. Jesús Vázquez Fustes, Mercedes Burgos Martínez, Elena Durán Prieto, Irene Lozano Sierra	Evaluation of a new multifocal and toric multifocal contact lens with personalized optical zones and a new material (Filcon II2 59%)
047	Marina Martín Prieto, Jesús Carballo Álvarez, Ricardo Cuiña Sardiña	Scleral lens adaptation in keratoplasty
048	Marta Gonçalves, Pedro Monteiro, Francisco Brardo, Amélia Fernandes Nunes	Conhecimentos sobre saúde visual na população em geral / Visual health knowledge in the general population
049	Mercedes Burgos Martínez, Elena Durán Prieto, M. Jesús Vázquez, Irene Lozano Sierra	Evaluation of the impact of a new selective blue light and class 1 UV-blocking filter sihy lens (75% WC) examining contrast sensitivity and colour perception
050	Miriam Álvarez Robles	Relationship between visual capacities and alcohol ingestion
051	Ramón Llano, José Gutiérrez	Detection of papillary craniopharyngioma by optical coherence tomography and visual field, a case report
052	Reinier Stortelder, Mercedes Burgos Martínez, M. Jesús Vázquez Fustes, Elena Durán Prieto, Cristina Pastrana, Irene Lozano Sierra	Predictive fitting success rates for soft lens designs
053	Rico-del-Viejo L, Tavberidze N, García-Montero, M, Lorente-Velázquez A, Hernández-Verdejo JL, Madrid-Costa D,	Infrared meibography as a tool for meibomian gland dysfunction classification
054	Rute J. Macedo-de-Araújo, Eef van der Worp, Ana Amorim-de-Sousa, José M. González-Méijome	Unusual applications of mini-scleral contact lenses: Two case reports
055	Sara Festas, Marta Gonçalves, Cláudia Aguiar, Rita Tuna, Amélia Fernandes Nunes	Função visual e novas tecnologias na adolescência: relações e efeitos / Visual function and new technologies in adolescence: relation and effects
056	Tavberidze N, Lorente-Velázquez A, Rico-del-Viejo L, García-Montero M, Hernández-Verdejo JL, Madrid-Costa D,	Impact of a daily contact lens with high water content on the ocular surface of presbyopes and non-presbyopes.
057	Tavberidze N, Lorente-Velázquez A, Rico-del-Viejo L, García-Montero M, Hernández-Verdejo JL, Madrid-Costa D,	Impact on anterior ocular surface of three different types of soft contact lenses materials
058	Victoria Eugenia Lledó, Hanan Awad Alkozi, Xiaoyu Wang, María J. Pérez de Lara, Adriana Gascó Sánchez, Jesús Pintor	Effects of light on melanopsin and its presence in human crystalline lens epithelial cells.
059	Xabier Rodríguez Alonso, María Ayala Ayerbes, Jorge Chozas Enrique, Sergio Gómez García, Sara Gutiérrez Jorrín, Adriana Julián García, Ignacio Martínez Delgado, Juan Oliveros López, Yasmine Owen, Sara Peruzzo, Nadiuska Cristine Platero Alvarado, Cristina Yebra Cabrera, Juan Gonzalo Carracedo Rodríguez, Jesús Pintor Just	Comparision of tear break up time evaluated using different types of measurements

Lectures



Risk factors on the onset and progression of myopia

*Amanda French, PhD
University of Technology Sydney, Sydney, Australia*

Brief Curriculum Vitae

Dr Amanda French attended the University of Sydney where she completed a Bachelor of Applied Science in Orthoptics (2007) with class 1 honours and a university medal and in 2013 graduated with a PhD. Dr French's PhD thesis investigated environmental risk factors for the development of myopia, garnering a number of highly-cited publications and extensive media attention. She is currently a lecturer at University of Technology Sydney (UTS), and continues her research in the area of the epidemiology of eye health.

Abstract

Myopia has a heterogeneous aetiology, ranging from rare myopia-associated syndromes and familial high myopia that are largely genetic and have high heritability, to school myopia which has later childhood onset and is predominantly considered environmental in origin. School myopia has traditionally been attributed to high near work demands and more recently with technology such as computers, tablets and smart phones. However, there is little consistent evidence that these factors are important. Two environmental risk factors remain strongly implicated in the development of myopia; education and time outdoors. Environments with significant educational pressure, accelerated-learning streams or academically-selective schools and additional coaching classes, appear to promote myopia. Contrastingly, spending greater time outdoors is protective for the development of myopia, even when children spend high time in near work or have myopic parents. Modern lifestyles which favour educational achievement and promote indoor activities have contributed to rapid rises in prevalence over recent decades. This is particularly evident in East Asia where the prevalence is reaching epidemic levels, above 80% in school-leavers in some urbanised areas. In these locations, increases in myopia prevalence are paralleled by exponential increases in high myopia (<-6 dioptres). As high myopia is linked to a number of sight-devastating pathological conditions, this poses a substantial burden and has the potential to significantly increase the prevalence of visual impairment. Prevention strategies through reducing educational pressure and increasing time outdoors are a potential avenue for curbing the rising prevalence.



Innovations in controlling the progression of myopia

Ian Morgan, PhD

Research School of Biology, Australian National University, Canberra, Australia

Brief Curriculum Vitae

Ian Morgan graduated in 1969 with a PhD in Neuroscience from Monash University in Melbourne after completing a basic science degree at the University of Melbourne. He then spent 6 years at the Centre de Neurochimie in Strasbourg, before taking up a position at the Australian National University in Canberra. After discovering the fascinating problem of myopia in the late 1990s, while working on dopamine as a transmitter in the retina, he oriented this laboratory to study the role of dopamine in the control of eye growth and gradually expanded his interests to cover epidemiology and prevention. Since his first major paper on myopia in 2005, his papers have been the most cited on myopia published in 2005, 2008, 2012, helping to open up approaches to the prevention of myopia onset through increasing time outdoors in schools.

Abstract

In parallel with the increased prevalence of myopia in East and Southeast Asia, the prevalence of high myopia has also increased, from 1-3 percent of the population to over 20% in young adults. This roughly 10-fold increase in high myopia suggests that as this group ages, the prevalence of pathological myopia, and associated uncorrectable vision loss and blindness, will increase markedly, producing an epidemic of pathological myopia and visual impairment. Similar trends may be appearing in Europe. Because of the difficulty of dealing clinically with pathological myopia, this makes prevention the key. Successful trials aimed at preventing myopia through increased time outdoors at school, and advances in the control of myopia progression with low-dose atropine and orthokeratology, suggest that can now set a realistic public health target of reversing the increase in prevalence of high myopia, therefore preventing the potential increase in pathological myopia. This is now being done in Taiwan on a nation-wide basis. Changes to school systems may also be required, since systems that are based on early competition for accelerated learning streams and extensive use of out-side school hours learning seem to result in increased educational pressure on children, accelerating the development of myopia.



Blue light-induced retinal photoageing

Coralie Barrau, MPhil
Essilor International, Charenton-lePont, France

Brief Curriculum Vitae

Coralie joined Essilor Research & Development in 2011, after a physics-optics engineering degree from Institut d'Optique Graduate School ParisTech and two Master degrees with honours from Paris XI in fundamental physics and in optics for new technologies. As the head of a small scientific team, her research is centred on photobiology of the eye, photometry and interferential physics for new ophthalmic healthcare lenses. She is very involved in the collaborative research project between Essilor and Paris Vision Institute, dedicated to better understand and manage the deleterious effects of light onto the retina.

Abstract

Blue light is highly 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 light-induced toxicity has been largely studied on *in vitro* and *in vivo* models of AMD. However, the most toxic wavelengths within this broad range remained to be identified and valued in designing ophthalmic photoprotection. Together, Paris Vision Institute and Essilor R&D, under the supervision of Pr Sahel and Dr Picaud, investigated for the first time the precise phototoxic action spectrum on an AMD *in vitro* model in physiological light conditions (Arnault, Barrau et al., 2013). We also recently explored the spectral modulation of oxidative stress and cell defense mechanisms in the outer retina (Marie et al., ARVO 2015, 2016). All our findings provided us with precise tools to design the first ophthalmic selective filters with *in vitro* proven biological photoprotection potency. This perspective is a great step forward in terms of technological innovation and patient vision health protection.



Computer Visual Syndrome

*Sandra Franco, PhD
University of Minho, Portugal*

Brief Curriculum Vitae

With an undergraduation in Applied Physics – Optics, she gained her PhD in Sciences from the University of Minho in 2005. She is currently an Auxiliary Professor in the Physics Department of the University of Minho. She teaches in the course of Optometry and Vision Sciences and in the Mater of Advanced Optometry, both at the University of Minho. Her research is mainly on Ophthalmic Instrumentation, in particular in the assessment of the anterior segment of the eye. She also researches on the overall impact on the eye of the sustained near work vision and on visual ergonomics. She has been publishing several articles in scientific journals and book chapters and presenting communications in several national and international research conferences. She has also been supervising research grant holders and master students and did/do participates in national and European teams of research projects.

Abstract

Several research articles suggest that about 64% to 90% of computer screens users show visual symptoms at near or far vision like headache, asthenopia, eye discomfort, dry eye, diplopia, photophobia and blurred vision. These ocular and visual symptoms are related with long hours of use of computer screens and are denominated as computer visual syndrome (CVS).

These symptoms may have their origin on the existence of visual problems, working conditions and/or inadequate working habits. On the other hand, some authors support the idea that the prevalence among computer screen users is no different from the prevalence in occupations that have high demands of sustained near vision.

With such high prevalence of symptoms, the number of patients with computer screen visual complains will certainly increase. It is then paramount to know what are the possible causes of such complains, what are the specific procedures to follow during the visual exam and the available treatment opportunities and options.



Multifocal Contact Lenses: new designs and materials

*José Manuel Gonzalez-Meijome, PhD
University of Minho, Portugal*

Brief Curriculum Vitae

Graduated with Honors in Optometry, University of Santiago de Compostela, 1997. PhD in Sciences (Optometry) Portugal, University of Minho, 2007. Associate Professor at University of Minho since 2012. Published over 140 papers in peer-review ISI journals with impact factor cited over 1700 times (ISI WoS H-index=22), 3 books and 10 international book chapters. Editor in Chief for Journal of Optometry indexed in Pubmed Central, (Peer-review journal of the Spanish General Council of Optometry) since 2010 and member of the Editorial Board of Biomedical Research International and PLOS ONE. In 2016 received the Prize “International Optometrist of the Year” by the Polytechnic University of Catalonia (Spain).

Abstract

Presbyopia correction is considered the Holy Grail of ophthalmic solutions as this dysfunction of the accommodative system affects universally all human beings over the age of 45 years, inducing a severe reduction in the vision-related quality of life and great dependency on optical compensatory methods. Demographic trends show a marked increase in the number of presbyopes over the last 15 years and it will remain at a high proportion of the population over the next decades to come. Simultaneously, the contact Lens business is expected to grow fast, and a great part of the revenues are expected to originate in the older population cohorts. Therefore, there is an increasing interest of industry in new solutions for presbyopia correction and the contact Lens industry is not an exception. To cope with the demand several new developments in polymer Science, technological advances in manufacture, quality control and Clinical understanding of the presbyopic ocular Surface have driven a significant leap forward in this field with the recent launch of new geometries and bulk materials being delivered to the Marketplace.

The present talk will address the technical characteristics of newly developed products, showing their specifications of design and fitting approaches, coupled with the most recent knowledge on the power profiles of such lenses and their visual performance assessed with the state of the art clinical and experimental procedures in visual science and clinical practice.

Professionals and researchers attending this session are expected to gain a general overview of the current and future demand for presbyopia correction and the most recent developments in the correction of presbyopia with the state of the art contact lens solutions.



Ocular dryness in presbyopic CL wearers

*Carlos Resúa, PhD
University of Santiago de Compostela, Spain*

Brief Curriculum Vitae

Carlos Garcia-Resua was graduated with honors in Optometry (Santiago de Compostela University) in 1999. Then, he got a grant to perform research, and in 2003 he joined the “Optometry research group” of Optometry faculty of Santiago de Compostela University. His research was conducted on myopia, intraocular pressure measurement, and currently is focused on tear film. In 2016 he obtained the PhD in Optometry (Santiago de Compostela University) with a thesis entitled “Advances in the diagnosis of dry eye syndrome. Interferential lipid layer patterns“. He published 55 peer-reviewed articles, 1 book, 7 book chapters and 80 presentations in international meetings. In 2014 he became contract professor, and since 2016 he is Assistant Professor of the University of Santiago de Compostela.

Abstract

Dry eye disease (DED) causes damage to the interpalpebral ocular surface and is associated with symptoms of ocular discomfort and it is the leading cause of contact lens wear discontinuation. DED affects the quality of life because of symptoms such as pain and irritation, and also have effects on ocular and general health, perception, and visual function. Because of its multifactorial origin, it can be manifested in a variety of ways and, therefore, is difficult to diagnose. Because of that, a variety of tests are needed to determine the type of dry eye condition that is present in a patient. DED is especially common in the elderly, occurring in approximately 5-30% of the general elderly population, and affects women more commonly than men, so this is a great hallmark for presbyopic contact lens wearers.

DED is mainly classified into two types: aqueous-deficient and evaporative. The former is due to decreased tear secretion from the lacrimal gland, whereas the latter is caused primarily by meibomian gland dysfunction (MGD). Aging affects both types, so eye care professionals should pay attention to them, especially MGD, because this is believed to be the leading cause of DED worldwide.

The aim of this talk is to show DED in the elderly population (especially the presbyopic contact lens users). Also, the aetiology, signs and symptoms of this disease will be addressed together with a review of the tests used for tear film assessment. Finally, management of this type of patients will be discussed.



Clinical Tips on Multifocal Contact Lenses fitting

*Fernando Hidalgo Santa Cruz, PhD
Director del Centro Boston de Optometría - Madrid*

Brief Curriculum Vitae

He is the director and teaches in the Master in Optometry course at the Centro Boston de Optómetria, Madrid.
He got his PhD from the The New England College of Optometry and from the Universidad Camilo José Cela (Magna cum Laude), Madrid.
He was also a clinical teacher in four North-American universities.
He gave numerous talks in Germany, Brazil, Colombia, Denmark, USA, Spain, Hungary, Israel, Italy, Peru and Portugal.
He has more than 25 years of clinical experience as a multidisciplinary specialist in vision care.

Abstract

Presbyopia a progressive process that starts early in life and progresses through life, with its higher clinical manifestations from the 4th decade until the 6th decade of living. During this time, changes in symptoms and signs related to presbyopia are different. If the optical solution of choice are the contact lenses, it is paramount to know and to identify the individual characteristics of each case to better handle the optimal strategy of adaptation, design and estimation of the contact lens power.

In this talk, the different phases of presbyopia will be covered, as its clinical presentations and implications and specific considerations that may help in a better and faster adaptation of contact lenses for presbyopia. The arrangement of the talk will cover some clinical tips that will describe graphically each important point.



When scleral contact lenses should be used?

*Maria Serramito Blanco, PhD
University Complutense of Madrid, Spain*

Brief Curriculum Vitae

PhD student focused on scleral contact lenses and irregular cornea at Optics and Optometry Faculty in Complutense University of Madrid (UCM). She received her BS degree in Optics and Optometry from the University of Santiago de Compostela (USC) and her Msc degree from the UCM. Author of 3 papers in peer-review journals related with scleral contact lenses and irregular cornea.

Abstract

Scleral contact lenses are currently the first option for many specialized professionals, for treating irregular corneas.

In recent years, RGP lenses were the most used but the patients noticed them uncomfortable, because of this disadvantage, scleral lenses are adapted which are very comfortable

These contact lenses have a large overall diameter with the aim to bear over the sclera and to avoid any touch on the cornea. The main indications of scleral lenses are patients with irregular corneas who needs to improve their vision quality and patients who have ocular surface diseases and they need to protect the ocular surface of the environment. Then, patients with keratoconus, pellucid marginal degeneration, keratoglobus, or post-keratoplasty are good candidates for enhanced their vision with scleral lenses and severe dry eye patients as Sjögren Syndrome or Steven- Johnson increase their ocular confort during scleral lens wearing.



Sccleral contact lenses fitting

*Rute Araújo, MPhil
University of Minho, Portugal*

Brief Curriculum Vitae

She obtained her undergraduate and her master in Optometry and Vision Sciences from the University of Minho. She is a research assistant at CEORLab since 2013 and she has been involved in several lines of research related with contact lenses and optical quality. Now she is a PhD student at the University of Minho and her research is focused on scleral contact lenses, ocular surface and the optical quality of the human eye. She is an author and co-author of several communications in national and international conferences and of several research articles in journals indexed in the ISI Web of Science.

Abstract

In the past, scleral contact lenses (ScCL) were fitted only by few specialized practitioners as it required specific skills, and the fittings were expensive and time-consuming. Technological advances led to improved knowledge on the anterior ocular surface anatomy and allowed the development of new design possibilities and materials availability. These breakthroughs led to a renewed interest in these lenses over the last decade. Their performance providing superior vision in several cases of corneal irregularities and as protective devices in cases of ocular surface diseases are well known nowadays.

In order to achieve a proper fitting, it is necessary to know not only the characteristics of the ScCL available in the market but also the characteristics of the geometry of the anterior ocular surface, namely the sclera, as these lenses rest entirely beyond the corneal borders. ScCL have several specificities in their fitting process that cannot be ignored in order to maintain a healthy ocular surface. The characteristics of the scleral geometry may also result in fitting challenges and ocular complications that must be known in order to be avoided or solved.

This lecture will overview the current classification of different ScCL, the critical aspects of the ocular surface topography, the fitting challenges for vision rehabilitation in severe cases of ectasia and irregular corneas from a clinical perspective as well as critical factors that may determine the success in the long-term.



Complications associated with scleral contact lenses

*Gonzalo Carrazedo, PhD
University Complutense de Madrid, Spain*

Brief Curriculum Vitae

Associate Professor of Optometry and Contact Lenses at Optics and Optometry Faculty in Complutense University of Madrid. Author of 50 papers in peer-review journals, over 200 communications to international meetings and 3 patents related with dry eye. He has participated in 26 projects related with ocular surface, contact lenses and ocular hypertension. Co-director of the research group "Ocupharm Diagnostics".

Abstract

The scleral lenses are currently the first option for many practitioners for treating irregular corneas. The advantage of this type of lenses are the comfort and the high visual quality that have the patients. During the scleral lens fitting or wearing, some complications could appear. Bubbles under the lens, impingement, discomfort or blurred vision by turbidity are common events during the fitting process of scleral lenses. In this lecture, we are going to show the main complications of scleral lenses in irregular corneas and how we can resolve them.



When and of how much should we prescribe prisms

*Andres Gene, PhD
University of València, Spain*

Brief Curriculum Vitae

He is a Professor at the Department of Optics and Optometry and Vision Sciences at the University of Valencia.

He is a researcher at INTRAS (Research Institute on Traffic and Road Safety) at the University of Valencia.

He obtained his undergraduation in optics of the University Complutense of Madrid and in Optics and Optometry from the University of Alicante. He obtained his master in Clinical Optometry from the Pennsylvania College of Optometry and his PhD from the University of Valencia.

He is a teacher in graduation courses in Spain, Portugal, France and Brazil. He has been advising international companies on the field.

He was a Founding Member of the European Academy of Optometry and Optics and a coordinator in Spain of the Ibero- American Epidemiological Network in Visual and Ocular Health from 2011 to 2014.

Presently, he is a Secretary of the Deontological and Ethical Commission of the General Colleges Council of the Optics and Optometrists in Spain.

Abstract

In the majority of the binocular vision treatments, visual therapy is the option to improve the visual skills. Other times, together or isolated, the prismatic compensation is a necessary solution to enable an optimal function of the binocular system of the patient.

Prisms can be very helpful in the treatment of patients with symptomatic affections of the binocular vision, although expert opinions seem to vary widely about the best way to find the best prismatic power to prescribe. In fact, the general methods to determine the prismatic power can lead into a different recommended prismatic magnitude for the same patient. This lack of consensus, together with apparently misguided general guidelines and rules, may hold back some professional in prescribing prisms.

This talk will cover the prismatic assessment techniques and treatments, by:

- Presenting the tests that should be performed to assess the specific prismatic needs on each particular situation;
- Update the knowledge related with the use of prisms in the treatment and improvements of dysfunctions of the binocular vision;
- Understand how to deal with the prismatic compensation in binocular dysfunctions that we may find in our line of work.

The optometrist that has to make choices in the assessment of a clinical case must base his/her options by understanding the clinical case under assessment and, if the optical prism is the best solution for the case by providing the best optical visual quality, advise the prismatic compensation.



Influence of medication on binocular vision

Johanna Garzón P, PhD
University of la Salle, Facultad de Ciencias de la Salud, Colombia

Brief Curriculum Vitae

Graduated in Optometry, University of La Salle, Colombia; Specialist in ocular primary eye care, FUAAColombia; Magister in Sciences-Pharmacology by the National University of Colombia; Candidate PhD for Doctor in Advanced Optometry and Vision Sciences, University of Valencia, Spain. Academic career as a researcher in ocular pharmacology, dry eye, allergic conjunctivitis and ocular inflammation. Professor of the Faculty of Health Sciences of the University of La Salle, graduate and postgraduate Bogotá (Colombia); Professor in Anterior Segment and Contact Lenses postdegree, Universidad Santo Tomás Bucaramanga-Colombia. President of the Professional College Fedopto. Former national academic director of the association of Optimetría Fedopto and representative of education by Colombia before the World Council of Optometry. International speaker on topics related to ocular surface, ocular pharmacotherapy and ocular pathology. He has served as Editor-in-Chief of the Journal Science & Technology for Visual and Ocular Health, University of La Salle and Leader Line of Research in Ocular Pharmacology of the UAN Optometry Research Group. Author of the Books: Ocular pharmacotherapy: clinical applications of ocular pharmacology in the anterior segment and allergic conjunctivitis: diagnosis and treatment.

Abstract

Visual attention and control of eye movements are active cortical and subcortical learning processes involving neuronal pathways and sensorimotor and cognitive processes associated with biochemical signal neurotransmission. Several studies have shown that there are brain regions capable of triggering neurostimulatory effects on saccadic movements through the use of drugs, which is why the pharmacological use of stimulants or blockers on these systems, or their toxic effects, have consequences on vision binocular. In this way, the pharmacological effect on the receptors that coordinate the ocular movements triggers signaling cascades that manage to generate muscular contractions, paralysis or movements that did not previously exist. G proteins and ion channels, as well as second messengers and other receptors such as endocannabinoids, among others, play a fundamental role in the neurotransmission of these stimuli at the level of vergential movements. It is therefore important to identify the oculomotor biomarkers and neurochemical bases in the control of these movements to understand the effect of anticholinergic drugs, benzodiazepines, antipsychotics, anticonvulsants, antidepressants, adrenergic agonists, serotonergics, as well as the effect of beta-blockers, botulinum toxin and Alcohol, among others.

At present, diseases of the nervous system are increasing, and neuroleptics, which seek to eliminate psychotic behaviors such as schizophrenia, manic processes or depression, as well as minor tranquilizers (anxiolytics), are used to control their symptoms. Treat some neurotic behaviors. But it is also common the indiscriminate use of sleeping pills such as barbiturates that are opiate derivatives and benzodiazepines (BZDs) are used in medical practice as therapy for anxiety, insomnia and other affective states. The association of these drugs with ocular movements and binocular vision has its bases based on the neurotransmission, release and reuptake of substances and biochemical substances that have direct relation with the saccadic movements, managing to generate disorders in the motility, increased fatigue And work accident. Another example is the use of serotonin reuptake inhibitors, it's use has been increased for the treatment of depression, which otherwise, to the previous group of drugs, cause increase in the critical frequencies of fusion, which Has direct implications on vision and eye movements.

In this way, the most important aspects will be developed in this course to identify the positive or negative effect of neuropharmaceuticals and to have new possibilities in the treatment of alterations of oculomotor movements.



Early detection of the non-strabismic and accommodative binocular problems

*Andres Gene, PhD
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Brief Curriculum Vitae

He is a Professor at the Department of Optics and Optometry and Vision Sciences at the University of Valencia.

He is a researcher at INTRAS (Research Institute on Traffic and Road Safety) at the University of Valencia.

He obtained his undergraduation in optics of the University Complutense of Madrid and in Optics and Optometry from the University of Alicante. He obtained his master in Clinical Optometry from the Pennsylvania College of Optometry and his PhD from the University of Valencia.

He is a teacher in graduation courses in Spain, Portugal, France and Brazil. He has been advising international companies on the field.

He was a Founding Member of the European Academy of Optometry and Optics and a coordinator in Spain of the Ibero- American Epidemiological Network in Visual and Ocular Health from 2011 to 2014.

Presently, he is a Secretary of the Deontological and Ethical Commission of the General Colleges Council of the Optics and Optometrists in Spain.

Abstract

The technological advances and the increasing populational demand of optimal and efficient binocular vision are enough reasons to increase and improve the detections of binocular vision disfunctions.

It is paramount that the images in both eyes are clear so the information that goes into the brain is symmetrical and correct. The existence of suppression, uncorrected phorias or other conditions that affect binocular vision may affect the entire visual system. The best way to identify and/or prevent affections of the binocular visual system is the early detection. The screening and the monitoring of asymptomatic patients is widely considered as the best preventive methods.

This talk will cover some early detection techniques of the non strabismic binocular problems and accommodative problems, to:

- Update and provide new insights related with the management and control of the binocular vision with input from new and clinical knowledge, to improve the skills needed to perform a proper patient management;
- Provide an effective set and correspondent protocol of optometric exams, which will improve the diagnostic of such ocular conditions.

It will be demonstrated the importance of the optometric evidence based decisions on proper patient management. The importance of the information of the binocular vision on the early detection of non strabismic binocular problems and accommodative problems will also be addressed.



The importance of neurobiology in the binocular vision

*Johanna Garzón P, PhD
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Brief Curriculum Vitae

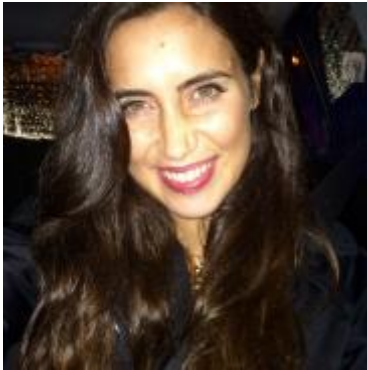
Graduated in Optometry, University of La Salle, Colombia; Specialist in ocular primary eye care, FUAAColombia; Magister in Sciences-Pharmacology by the National University of Colombia; Candidate PhD for Doctor in Advanced Optometry and Vision Sciences, University of Valencia, Spain. Academic career as a researcher in ocular pharmacology, dry eye, allergic conjunctivitis and ocular inflammation. Professor of the Faculty of Health Sciences of the University of La Salle, graduate and postgraduate Bogotá (Colombia); Professor in Anterior Segment and Contact Lenses postdegree, Universidad Santo Tomás Bucaramanga-Colombia. President of the Professional College Fedopto. Former national academic director of the association of Optometría Fedopto and representative of education by Colombia before the World Council of Optometry. International speaker on topics related to ocular surface, ocular pharmacotherapy and ocular pathology. He has served as Editor-in-Chief of the Journal Science & Technology for Visual and Ocular Health, University of La Salle and Leader Line of Research in Ocular Pharmacology of the UAN Optometry Research Group. Author of the Books: Ocular pharmacotherapy: clinical applications of ocular pharmacology in the anterior segment and allergic conjunctivitis: diagnosis and treatment.

Abstract

The analysis, integration and association of visual sensations, shape, size, color, depth, brightness, movement, objects, places and other physical phenomena occurs when nerve signals send information to different parts of the visual cortex. Visual perception involves the mental organization and interpretation that is done with the use of visual sensory information to reach awareness and understanding of the local environment, objects, events, situations and places.

The perception of the stimuli is not only due to the physical properties of the objects, such as wavelength, intensity and hue, but also is related to the changes induced by the transduction, filtering and transformation of the physical input in the system Human visual that are perceived by active processes of organization and structuring of the stimuli.

In this way, the integration of the oculomotor, saccadic and synchronous movements and the adaptive capacity of the central nervous system strengthen the formation of images through several mechanisms. This course will develop the most important aspects of the neurobiology of binocular vision, from neuronal plasticity to the amygdala's ability to process and integrate diverse information



Neurophthalmology: the vision beyond the eye

*Andreia Soares, MD and Cristina Almeida, MD
Hospital de Braga*

Brief Curriculum Vitae

Andreia Soares obtained her MD degree in Medicine from the School of Health Sciences from the University of Minho in 2011. She started her specific training in Neurosurgery in the Braga Hospital in 2013. In 2014, she started her specific training in Ophthalmology in the Braga Hospital. She is presently in her third year of hospital internship. Since 2013, she devotes her time to general ophthalmology with a particular interest in Neuro-ophthalmology and Oculoplastics.

Abstract

Neurodegenerative diseases manifest themselves in several forms in the visual system.

They may be related to the progressive or of rapid onset loss of visual acuity (VA), dyschromatopsia, changes in the ocular movements, existence of the relative afferent pupillary defect (RAPD), scotomas or changes in the ocular fundus as the atrophy or oedema of the optic disc.

There are several groups of neuropathies, including the ischemic, compressive, infectious, traumatic, toxic/nutritional, hereditary, and the ones related with demyelinating pathologies or other cerebral pathologies.

The ischemic neuropathies are classified in anterior and posterior, with an arterial or non-arterial aetiology.

Its signs are the rapid onset loss of vision and altitudinal visual fields defect.

The infectious optic neuropathies are inflammatory processes of the optic nerve. The patients may present a progressive or a rapid onset loss of VA, with associated pain in the majority of the cases.

The toxic/nutritional, compressive and hereditary optic neuropathies also present a progressive loss of the VA. The first ones are related with specific diets, drugs/toxins or drinking/smoking habits. The second ones may be related with an optic nerve or orbital tumour, vascular lesions, congenital or intracranial tumours.

The hereditary optic neuropathies are associated with a group of genetic diseases with the major clinical sign being the optic atrophy. The Leber's optic neuropathy and the dominant optic atrophy are the most prevalent ones.

The demyelinating diseases may present themselves on the visual system as an optic neuritis, changes in the perceptive visual field, changes in the ocular motility, vasculitis or retinal abnormalities.

In summary, it is paramount to assess the visual system of the patients with a neurodegenerative pathology.



Main considerations in patients with neurodegenerative diseases

Natacha Moreno Perdomo, MD

Directora de Serviço de Oftalmologia, Hospital Santa Maria Maior EPE, Barcelos, Portugal

Brief Curriculum Vitae

Natacha Moreno Perdomo, MD, graduated in Medicine in 1986 in the University of Havana. She is an ophthalmology specialist since 1989. In 2001, she registered in the speciality of Ophthalmology in the Ordem dos Médicos in Portugal. Since then, she worked as an hospital assistance in Hospital São Marcos in Braga until 2011. Since 2011, she has been working in the Hospital Santa Maria Maior in Barcelos. In 2015, she gained the degree in consultant in ophthalmology and started as a Director of Service in the Hospital de Barcelos. At the clinical level, she has experience in the field of the medic retina, low vision and ocular electrophysiology. She has been attending several national and international conferences. She has also been participating actively in the graduated and post graduated training.

Abstract

The main purpose of this communication is to address the ophthalmological repercussions of the most important neurodegenerative diseases. The visual assessment procedure, the exams that are used more frequently and their interpretation will be covered. Finally, the results obtained in the clinical practice will be related with the daily lives of the patients. This assessment is paramount as there are several variables that are required to take into account when performing a clinical prescription based on the clinical condition.

Clinical Reports



Avaliação de um paciente com baixa visão

Laura Moreno

Abstract

Esta comunicação tem como objetivo apresentar um caso clínico de um paciente com baixa visão. Para tal, abordaremos os passos seguidos, o que está por trás de uma nova prescrição ótica e/ou não ótica e os principais conselhos dados ao paciente.



Evolução de Caso Clínico de Retinopatia Diabética

Monteiro PML, Nunes AMMF, Ferreira FMPB

Abstract

Paciente do Sexo Feminino, com 60 anos de idade, com diabetes detetados em 2016.

Analisada no rastreio à retinopatia diabética da região da Cova da Beira, realizado nos Laboratórios de Ciências da Visão do Ubimedical, em colaboração com o Agrupamento de Centros de Saúde da Cova da Beira.

Serão apresentados dados clínicos de AV, topografia corneana, aberrometria e retinografia em duas visitas sucessivas, espaçadas de 8 meses. Verificou-se a evolução no OD de um quadro de retinopatia diabética não proliferativa para proliferativa com perda de visão do olho afetado.

Free Papers

Free Paper

#001

Comparison of two multifocal and toric multifocal contact lenses with different optical zones: a new Filcon II 2 59% versus Omaficon A 62%.

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Abstract

Key words: multifocal, toric multifocal, optical quality

Purpose: The presbyopic population continues to grow strongly, whilst multifocal contact lenses represent only 11% of the soft contact lens fittings.

The purpose of this study is to compare two multifocal and toric multifocal contact lenses: Filcon II2 59%, with personalized optical zones, versus Omaficon A 62%. Both are tested with both available geometries: Center Distance (CD) and Center Near (CN).

Method: A prospective, cross-over and randomized blind study was performed with 32 contact lens wearers. Checks were made on insertion and after one month of wear. Snellen high contrast visual acuity, mono and binocularly, for distance and near vision, ocular aberrations (Hartmann-Schack L80®, Visionix), contrast sensitivity (COI-test®, COI) and defocus curves were measured. Fittings were assessed (centration, movement, wettability and stability for toric lenses). Vision was also compared with ophthalmic lenses. Subjective comfort, handling and a questionnaire about patients' preferences were analysed. Statgraphics® was used for statistical analysis.

Results: No VA differences were found binocularly at any distance ($p>0.05$). No differences between lenses was found for defocus curves and contrast sensitivity. Among aberrations, spherical aberration gave a higher result for the Filcon II2 lens ($p>0.05$). Multifocal lenses were a satisfactory solution for 86% of the sample. 46% of the sample preferred the Filcon II2 lens, 29% the Omaficon A lens and 11% found both a satisfactory option.

Conclusions: The new lenses Filcon II2 59% can be a viable option for the refractive compensation of presbyopes offering very similar visual results to Omaficon A 62% contact lenses.

Free Paper

#002

Parental perspectives and wearer experience with a dual-focus daily disposable soft contact lens for myopia control.

Peixoto-de-Matos SC, Chamberlain P, Woods J, Back A, Jones L, Logan N, Saw S-M, Young G.
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Abstract

"PURPOSE: To evaluate the parental and wearer acceptance of daily disposable contact lens wear in the context of a myopia control clinical trial over a 2-year period.

METHODS: Neophyte myopic children aged 8 to 12 years, were enrolled in a prospective, randomised, double-masked, multicentre study. Subjects wore either a dual focus 1 day contact lens (MiSight® test, n=74) or Proclear® 1 Day (both omafilcon A, CooperVision) (control, n=70) and are being followed for 3 years. They were reviewed at 1 week, 1, 6, 12, 18 and 24 months. At 24 months, 60 subjects remained in the control group and 55 in the test group. Parents answered questionnaires regarding habits and activities of children. There were 27 discontinuations, with 52% (14/27) occurring in the 1st month, with the most common reason being lens fit at dispensing. This analysis reports the 2-year results.

RESULTS: Average wear time at 24-months was 6.5 ± 0.5 days/week and 13.1 ± 1.4 hours/day during the week and 12.1 ± 1.4 hours/day during the weekend. There was no significant difference between lens types ($p > 0.05$) but hours/day wear increased significantly following the 1-week ($p < 0.001$) visit for both groups and then remained relatively consistent. School work (80% Control vs. 85% Test), outdoor activities (82% vs. 91%), or playing video games (90% vs. 82%). Less subjects in the control than test group noticed ghosting (14% vs 49%), but only 5% of the Control and 11% of the test group reported "annoying" ghosting. Comfort in both groups was high with 95% control vs 98% test subjects reporting that they felt the contact lenses "never" or "sometimes". When MiSight subjects were asked how much they liked wearing a correction, 76% of subjects rated MiSight 'the best', whereas only 4% liked their glasses 'the best' ($p < 0.001$). Regarding parent's, before dispensing, less than half of the parents were at ease with their child wearing contact lenses (47%, extremely at ease, max rating out of 5), but this increased to 79% after 1 month ($p < 0.0001$) and remained high through 24 months (84%). Parents reported minimal involvement with lens insertion and removal at 24 months (99% assisted less than once a month). More support was required for lens insertion during the first week, with 19% of children requiring help > 2 times/week, this support reduced to 8% at 1 month. For lens removal, minimal parental assistance was required throughout the trial (4% of parents providing > 1 assist in the first week and none at 24 months). At 24 months parents rated their child 'extremely satisfied' happy' with overall experience, (87% vs 82%, $p = 0.15$; control vs test respectively), vision (78% in each group $p = 0.89$) and 'extremely comfortable' (77% of control and 65% of test, $p = 0.05$).

CONCLUSIONS: MiSight® was well accepted by children. Children in both groups preferred contact lenses to spectacles. Parents' initial concerns with their child wearing contact lenses were largely dispelled in the first few weeks of lens wear. Following this period, parents had very positive responses to their child's daily disposable soft contact lens wear experience and found they could mostly manage lens wear independently."

Free Paper

Myopia control with soft contact lenses, state of the question.

#003

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Abstract

Myopia is associated with ocular complications that can lead to permanent vision loss. Previous studies of multifocal contact lenses have reported reductions in myopic progression ranging from 30% to a 50%, and around 30% in axial length (AL) depending of lens design. We design a new design in Soft Radial Refractive Gradient (SRRG), measure the change on Relative Peripheral Refraction and evaluate the refractive change and axial elongation during a period of 1 year before treatment and 2 years after treatment with SRRG in comparison to orthokeratology (OK), and single vision (SV) spectacle lenses.

Methods: This was a prospective, longitudinal, non-randomized study. The study groups consisted of 30, 29, and 41 children, respectively. Cycloplegic refraction and axial length (AL) was measured during 2 years after recruitment and lens fitting. Other measurements included Accommodation LAG, aberrations and contrast sensitivity.

Results: Baseline refractive sphere was correlated significantly ($r^2=0.542$; $P<0.0001$) with the amount of myopia progression before baseline. After 2 years, the mean myopia progression values for the SRRG, OK, and SV groups were -0.56 ± 0.51 , -0.32 ± 0.53 , and -0.98 ± 0.58 diopter, respectively. The results represent reductions in myopic progression of 43% and 67% for the SRRG and OK groups, respectively, compared to the SV group. The AL increased more in the SV group compared to the SRRG and OK groups, with 27% and 38% lower axial elongation, respectively, compared to the SV group at the 2-year visit ($P=0.08$).

Conclusion: The SRRG lens significantly decreased AL elongation compared to the SV control group. The SRRG lens was similarly effective to OK in preventing myopia progression in myopic children and adolescent.

Free Paper

#004

The role of Meibomian gland atrophy on contact lens discomfort.

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Abstract

Purpose: To assess the impact of contact lens wear on ocular surface in a population with different meibomian glands (MG) dropout.

Methods: This study included 31 subjects fitted with Biotrue® ONEday (Bausch & Lomb). MG loss was scored analysing the meibography using Keratograph 5M (Oculus, Germany). Scores of upper and lower eyelids were summed to obtain the total meiboscore and then, the participants were divided into two groups according to it (group 1: Total meiboscore between 0 and 2; group 2: Total meiboscore between 3 and 6). Tear film osmolarity (TFO), tear meniscus height (TMH), non-invasive tear break-up time (NIKBUT), bulbar redness (BR) were performed before CL insertion, 20 minutes and 8 hours after CL wear. Contact lens discomfort (CLD) was rated after 8 hours of lens wear.

Results: The mean age of the participants was 35.3 ± 4.2 years. In the group 1, no statistically significant differences were found in any parameter as a function of the time ($p > 0.05$). Regarding group 2, there was a statistically significant reduction in TMH as a function of the time ($p < 0.05$). There was a statistically significant increase in BR after 8 hours ($p < 0.05$). Limbal redness also showed a statistically significant increase among the visits for this group ($p < 0.05$). After 8 hours of CL wear, the CLD was higher in the group 2 in comparison to group 1 ($p < 0.05$).

Conclusions: The results of this pilot study would suggest that meibomian gland drop out could compromise the ocular physiology and comfort during contact lens wear.

This study was supported by the EDEN project (642760; MSCA-ITN-2014-EJD: Horizon 2020), granted by the European Commission

Free Paper

#005

Dysphotopsia in RLE surgery: pre- and post evaluation of light disturbances.

Escandón-García, Santiago¹ Ribeiro, Filomena² González-Méijome, Jose Manuel
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Abstract

Background: Despite high levels of success in emmetropizing the eye and providing near and distance vision, multifocal IOLs have been under scrutiny due to frequent complaints of dysphotopic phenomena. Nowadays is possible to quantify the effects of the light disturbances, and more importantly follow-up patients and record changes overtime. Therefore, the present study was designed to test the hypothesis that there is a significant improvement in the medium term in the objective perception of light disturbances measured with a light disturbance analyzer, and the subjective perception obtained with a quality of vision questionnaire.

Purpose: The main purpose was to evaluate if there are any short-term changes in visual function and dysphotopsia under low illumination conditions after refractive lens exchange (RLE) in presbyopic patients implanted with multifocal intraocular lenses.

Methods: 30 eyes of 17 candidates to presbyopic RLE were implanted with multifocal IOLs, 13 of them bilaterally. Distance visual acuity was measured under photopic conditions and contrast sensitivity was measured without and with the presence of glare (28 lux) in dim illumination. Light disturbances were evaluated with a prototype device (Light Distortion Analyzer). Subjective quality of vision was also assessed with the Quality of Vision (QoV) questionnaire. All procedures were conducted at three visits, before surgery and 1 and 3 months after implantation of IOLs.

Results: Defocus curves at 1 month and 3 months revealed that no clinical or statistically significant difference was present in any vergence and shows the stability of the best correction at distance. CSF under photopic and mesopic with glare conditions shows a statistically significant improvement for the frequency of 3.00 cycles per degree ($p=0.032$). Light distortion under monocular conditions showed a significant increase from baseline to 1 month visit and this change was statistically significant ($p=0.039$) while the subsequent reduction at 3 months was not. In every visit, it was observed a binocular summation effect that reduced the LDI parameter and more significant at 1 month. QoV scores showed the same trends of worsening in the short term and a trend to improve at 3 months, but changes were not statistically significant for frequency or severity ($p>0.05$). However, a significant reduction in bothersome was observed at 3 months ($p=0.044$).

Conclusions: With modern multifocal IOLs, RLE is an effective technique for presbyopic correction to achieve spectacle independence. Despite an initial increase of dysphotopsia, it has been confirmed a trend to improve subjective perception of bothersome in a short-time period.

Free Paper

#006

Myopia control with a dual-focus daily disposable soft contact lens: 2-year results from a multicenter randomised clinical trial.

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Abstract

PURPOSE: To quantify the effectiveness of a contact lens with a dual focus optical design in slowing the rate of progression of juvenile-onset myopia over a 2-year period.

METHODS: Myopic children aged 8 to 12 years, with no prior contact lens experience were enrolled in a prospective, randomised, double-masked, controlled multicentre study at four investigational sites. Subjects wore either a dual focus 1 day contact lenses (MiSight®, test, n=74) or Proclear® 1 Day (both omafilcon A, CooperVision) (control, n=70) daily disposable CLs and are being followed for 3 years. Their initial myopia ranged from -0.75D to -4.00D and astigmatism was <1.00D. Cycloplegic autorefractometry and axial length measurement were performed at baseline and at annual follow-up visits.

RESULTS: Mean spherical equivalent autorefractometry (SE) at baseline was -2.02D (SD: 0.77) and -2.19D (SD: 0.81) for the test and control subjects, respectively. At 2 years, 60 subjects were evaluated in the control and 55 in the test group. There was no significant difference in demographic factors between the groups at Baseline. Retention was high with 81% of children completing 2 years' wear. The difference in mean cycloplegic SE progression was 0.40D (95% CI: 0.30D-0.51D) and 0.54D (95% CI: 0.40D-0.68D) at 12 and 24 months respectively ($p < 0.001$). The difference in mean axial length was -0.15mm (95% CI: -0.19mm to -0.11mm, $p < 0.001$) and -0.24mm (95% CI: -0.30mm to -0.19mm, $p < 0.001$) at 12 and 24 months respectively. A significant correlation between SE and axial length change was found for the control and test groups: $r = -0.77$, $p < 0.001$; and $r = -0.87$, $p < 0.001$, respectively.

CONCLUSIONS: After 24m wear of the dual-focus daily disposable soft contact lenses substantially slowed the progression rate of juvenile-onset myopia compared to single vision spherical soft lenses.

Posters

Poster

Retinal angiogenesis and physical activity

#001

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Abstract

Introduction: The wet form of macular degeneration (AMD) is a progressive illness, which is the most common cause of blindness in developed countries. The involvement in the ocular blood microcirculation, with hypoxia in the affected tissues, causes an alteration in the vascular endothelium. Vascular endothelial growth factor (VEGF) is a previous step of neoangiogenesis. As physical activity (PA) is a preventive factor for cardiovascular and diabetic diseases, the objective of this work is to analyze if there is a relationship between the ocular microcirculation and the PA to prevent AMD.

Material y method: A systematic review was carried out to analyze articles related to ocular microcirculation, pathological angiogenesis, AMD and the possible benefits of PA on these diseases, or their prevention.

Results: The studies analyzed confirm that the health of the endothelium is a key factor to be taken into account in the prevention and treatment of different ocular pathologies that can lead to blindness. At this time, the literature shows that exercises have a protective effect on oxidative stress. It also induced changes in ocular blood flow. Exercise is not currently advocated for AMD prevention, although different studies have also been found that seek to prevent these eye pathologies by monitoring and control PA and healthy living.

Conclusion: As prevention, the main methods are based on leading a healthy life model, performing PA adequately and controlling the diet. Physical exercise plays a significant role in sustaining physiological function of the eye. Some sports are thus considered interesting for preventing common ocular diseases."

Poster

#002

Increased levels of nucleotides and dinucleotides in glaucomatous mice model

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Abstract

"Glaucoma is a significant cause of human blindness characterized by ganglion cell degeneration and hypertension. The present experimental work describes the IOP assessment and the increased levels of ATP and Ap4A in aqueous humour in glaucomatous mice (DBA/2J) comparing with control mice (C57BL/6J). IOP measurements were assessed in control and glaucomatous mice (n=10 each strain) as function of age with a rebound tonometer (3-15 months of age). Then, aqueous humour collection was performed after anesthetizing the mice with an intraperitoneal injection. Finally, the samples were processed and measured by high pressure liquid chromatography (HPLC).

A significant IOP increase was observed in DBA/2J mice at 12 months when compared with the control mice (50%, **p<0.01). Glaucomatous mice exhibited changes in ATP and Ap4A levels in aqueous humour as long as the pathology progressed finding an increase in ATP (81%, ***p<0.001) and Ap4A (60%, *p<0.05) values and with respect to control mice.

This increase of nucleotides may contribute, together with other factors, to the changes in the functionality of the retina and the development of the physiopathology of glaucoma."

Poster

#003

Dynamically stabilized toric soft contact lens fitting for elevated astigmatism in patients with strabismic and nonstrabismic binocular vision disorders

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Abstract

"This work suggests the choice of a dynamic stabilization model versus a prism-stabilized on back surface toric soft lens in patients with strabismic and nonstrabismic binocular vision disorders.

We present two cases of elevated astigmatism, which neither of them were able to wear conventional toric soft contact lenses, with prism-stabilization, before.

In the first case, the patient was a male of 10 years old. He had a mixed astigmatism and an accommodative esotropia with cyclotorsion. Their visual acuity with glasses was 0 logMAR, but due to his cyclotorsion movements the prism-stabilization toric contact lenses had instability (with changes of 20° in axis) getting worse visual acuity.

In the second case, the patient, who is 42 years old, had a myopic astigmatism and bilateral nystagmus, which deteriorates his visual acuity. With the best correction on glasses his visual acuity was +0.6 logMAR in each eye, which improved to +0.54 and +0.56 logMAR with dynamically stabilized soft toric contact lenses.

While with prism stabilization model of toric contact lenses, visual acuity decrease respect to glasses to +0.68 and +0.66 logMAR due to nystagmus movements.

Both of them need to wear contact lenses mainly in order to practice sports, and in both cases dynamic stabilization fitting allowed them the wearing with optimal visual acuity and comfort.

The patients were evaluated with slit-lamp and placid-disk topography and their refractive errors were measured in order to decide the best stabilization model of soft toric contact lenses. With this aim, we compared the results of comfort (evaluated by means of Visual Analog Scale) and visual acuity between prism and dynamic stabilization designs of soft toric contact lenses.

Dynamic stabilization model was the only one fitting that allowed our patients with an elevated astigmatism and binocular vision disorders to wear contact lenses in their daily life with comfort and better visual acuity than with their glasses."

Poster

#004

Activation of trpv4 induces the release of diadenosine tetraphosphate in the aqueous humour

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Abstract

Purpose: The aim of this work was to investigate if the activation of TRPV4, by means of an IOP increase, induces the release of Ap4A to the aqueous humour of New Zealand white rabbits, whose rise in the aqueous humor has been previously related with glaucoma pathology.

Methods: In Vivo experiments were performed in New Zealand rabbits. Intraocular pressure was measured by means of a TonoVet rebound tonometer (Tiolat Oy, Helsinki) on normal and hypertensive eyes. Ocular hypertension was obtained by placing the animals in Trendelenburg position, which produces venous stasis. Aqueous humor was removed in any given condition after anesthesia and the aqueous was taken for HPLC analysis. In Vitro experiments were performed in immortalized non-pigmented epithelial cells from rabbit ciliary processes, kindly provided by Dr. Coca-Prados. Cells were incubated with a specific TRPV4 activator (GSK1016790A) and the specific TRPV4 blocker (HC-067047). The supernatants were collected and analyzed by HPLC.

Results: Ocular hypertension significantly increased Ap4A concentration in the rabbit aqueous humor ($280.64\% \pm 16.29$ vs. control, $p < 0.01$) this effect being reversed by HC-067047, where Ap4A concentration was similar to control group. In the case of the specific TRPV4 activator, GSK1016790A, this compound was able to increase Ap4A concentrations $96.20 \pm 31.51\%$ compared to control. In Vitro experiments showed an Ap4A increase of 2.32-fold after treatment with GSK1016790A and 6.66-fold for hypo-osmotic conditions, when compared to control. HC-067047 reversed this effect when GSK1016790A was used, but was only able to partially reverse it in hypo-osmotic conditions. At the same time, cells were treated with Gap junction channel blockers, CFTR, p-glycoproteins and exocytosis inhibitors in presence of GSK1016790A to identify the main mechanisms of Ap4A release triggered by TRPV4. The results obtained suggest that the Ap4A release mediated by TRPV4 is due mainly through pannexin-1 and vesicular exocytosis to a lesser extent.

Conclusion: These experiments demonstrated the involvement of TRPV4 in the release of Ap4A to the aqueous humor. This could explain the increased concentrations of Ap4A in glaucoma patients and support the idea of TRPV4 being an active target the control of intraocular pressure control."

Poster

#005

Trendelenburg position: a simple method to test glaucomatous hypotensive compounds in a hypertensive condition

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Abstract

"There is a simple and inexpensive way to transform normotensive animals into animals that present a hypertensive condition. This position is termed Trendelenburg position and produces a gravitational venous stasis that difficult the drainage of the aqueous humor and rises in IOP.

In the present experimental work, we study the effect of commercial hypotensive compounds (Xalatan, Trusopt®, Timofitol® and Alphagan®) used for the treatment of glaucoma and agomelatine and 5-MCA-NAT in rabbits submitted to ocular hypertension.

30 male New Zealand white rabbits were used for IOP measurements by using a TonoVet® contact tonometer.

Agomelatine and 5-MCA-NAT, formulated in isotonic saline (1% DMSO) was tested at a fixed volume of 10 µl at 100 µM. The commercial compounds were tested at a fixed volume of 40 µl.

Commercial compounds such as Timofitol®, Trusopt® and Xalatan® reached a reduction of IOP of $68.6 \pm 6.4\%$, $74.2 \pm 8.7\%$, and $69.9 \pm 6.6\%$, respectively in Trendelenburg position, being more effective than in prone position $35.0 \pm 4.3\%$, $30.1 \pm 4.2\%$ and $28.9 \pm 4.6\%$. However, Alphagan® produced almost the same reduction, decreasing $41.3 \pm 3.8\%$ in the hypertensive condition and $42.2 \pm 8.6\%$ in normal position.

Melatonin analogues, agomelatine and 5-MCA-NAT, reduced IOP in $47.5 \pm 8.4\%$ and $70.8 \pm 2.8\%$ respectively in a hypertensive condition, while in normotensive condition they were able to reduce only $23.5 \pm 2.9\%$ and $37.7 \pm 3.5\%$.

In conclusion, this is a simple and rapid manner of testing drugs for glaucoma in a hypertensive animal model."

Poster

#006

Evaluating accommodative response to bifocal, multifocal and single vision: pilot study

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Abstract

Purpose: Bifocal (or dual-focus) and multifocal contact lenses are prescribed in accommodating subjects with the purpose of myopia control and alleviation of asthenopia symptoms. However, it is uncertain how these systems act over the accommodative system under different viewing conditions. The purpose of this pilot study was to evaluate the static accommodative response to distance and near targets under monocular and binocular viewing conditions.

Methods: Five young subjects with spherical equivalent refractive error within +0.50 and -0.50 D) participated in this pilot study. Refractive error was measured with an open-field autorefractometer (WAM5500, Grand Seiko, Japan). In a first trial measurements were obtained in one eye without visual stimulus (measure eye) while the contralateral eye (viewing eye) was looking to 20/25 charts at different vergence targets (400 and 40 cm). In a second trial the same protocol was applied under binocular viewing conditions to consider the effect of near vision convergence on the accommodative response. The right eye acted always as 'measure eye' in this study, 5 consecutive readings were obtained, decomposed in vector notation and averaged.

Results: The average difference in the spherical component of the refractive error (accommodative effort) was $1,40 \pm 0,45$ D under monocular viewing conditions and $1,36 \pm 0,47$ D under binocular viewing conditions. Being inferior to 0.25D they were considered non-clinically relevant. Differences in astigmatism were similarly non-clinical relevant for the J0 ($0,12 \pm 0,17$ D) and J45 ($0,04 \pm 0,16$ D) components of the refractive error.

Conclusion: The methodology has potential to be successful deriving a reliable consensual accommodative response (measure eye) while the contralateral eye (viewing eye) is subjected to viewing conditions through complex optical designs. This opens the possibility to explore the role of bifocal and multifocal contact lenses in accommodating eyes with the purpose to control myopia progression or alleviating asthenopia symptoms."

Poster

Diagnosys of schnyder dystrophy: a case report

#007

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Abstract

"INTRODUCTION

Schnyder dystrophy is an autosomic dominant disease characterized by corneal stroma deposits and can be easily confused with others pathologies.

OBJECTIVE

Description of a Schnyder dystrophy case and it differential diagnosis.

CASE PRESENTATION

A six years old patient, referred to the clinic for presenting corneal deposits. Medical history: chromosome 9 inverted. Alterations were not found in other family members.

Best corrected visual acuity was 0.9 and crystal quill-shape were found in anterior corneal stromal were presented in both eyes. Fundus examination was normal. As ancillary test, we requested cholesterol and lipids blood accounts which were raised.

DISCUSSION

Schnyder's corneal dystrophy is diagnosed by making a differential diagnosis with other diseases that also produce corneal deposits such as lipoid dystrophies secondary to keratitis or Bietti's marginal crystalline dystrophy. We excluded this two pathologies because our case does not show signs of corneal neovascularization or retinal deposits.

Other systemic alterations that could produce corneal deposits are also ruled out because patient do not present other altered values in the blood analysis and do not present deposits in other tissues.

As deposits do not affect the visual axis, it is not necessary to perform treatments such as excimer laser photokeratectomy (PTK) or penetrating keratoplasty.

CONCLUSION

It is important to perform a correct differential diagnosis in the presence of alterations with deposits in the corneal stroma as they may be associated with other systemic alterations."

Poster

#008

Vision therapy in children with learning disabilities/ terapia visual em crianças com dificuldades de aprendizagem

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Abstract

"Undetected visual dysfunctions affect academic performance. It's essential to implement programs for visual evaluation/intervention in schoolchildren. Given that children with learning disabilities in reading (LDR) can benefit from early intervention with visual therapy (VT), this study aims to estimate the frequency and distribution of visual impairment in children with LDR, assess the impact of visual disturbances and the influence of VT on their quality of life.

Seventeen children with LDR (9 ± 1 years), followed in speech therapy/educational intervention in the pediatric service of 'Centro Hospitalar Cova da Beira' (Portugal), participated in this study. The control group included 103 children without learning disabilities (10 ± 1 years). The visual function evaluation included the application of the Inventory of Visual Efficiency questionnaire, and optometric measurement of various parameters of visual function. All children with LDR with altered visual function were advised to conduct a VT plan.

Children with LDR showed a higher percentage of visual function alterations (vergence function, accommodation and ocular motility) and reported more symptoms compared to the control group. After being subject to a VT plan there was a significant improvement in most visual parameters assessed, and a significant reduction of visual symptoms.

This study shows that improvement of objective/subjective parameters of visual function reduce visual symptoms, increasing comfort while carrying out schoolwork, improving the quality of life in LDR children. This study demonstrates the importance of evaluation of visual function in LDR children, as well as the benefits of VT and the importance of a multidisciplinary approach.

Keywords: Learning disabilities, visual function, visual therapy, reading, school performance"

Poster

#009

Effect on tear secretion of dinucleotides and melatonin analogues in combined therapy.

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Abstract

"Since some melatonin analogues and dinucleotides were able to increase tear secretion, the aim of this study was to test if a combined therapy with Ap4A and 5-MCA-NAT or Agomelatine could increase even more, tear secretion.

20 male New Zealand white rabbits (2.5 ± 0.5 kg) were used for tear secretion measurements by using the Schirmer I test, with 2 or 3 days of rest between experiments.

All compounds were tested on both eyes at a final concentration of $100 \mu\text{M}$ ($10 \mu\text{L}$). In combined therapy, Ap4A was applied 30 minutes before the melatonin analogue. Control animals received the same volume of saline solution.

Ap4A, Agomelatine and 5-MCA-NAT increased tear secretion about a 30% applied alone.

The combination of Ap4A with 5-MCA-NAT or Agomelatine, are able to increase tear secretion even more, with a maximum at 60 min. At 30 minutes, there is no differences between combined treatments and single compounds, being around 20% of increase. At 60 minutes the two compounds could increase tear secretion more than single compounds, being the 5-MCA-NAT's response (148.7 ± 5.1 %) better than Agomelatine's (137.6 ± 5.4 %).

The combination of Ap4A and 5-MCA-NAT increased tear secretion almost 50% and is a good candidate to make drugs for combined therapy of dry eye.

Patented with number P201500545"

Poster

#010

Ap4a in combined therapy with alphagan® and timoftol® in a glaucoma model

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Abstract

"Introduction: Glaucoma is a neurodegenerative disease that produces blindness. Till date some attempts have demonstrated the role of nucleotides modulating IOP, but never in a model of glaucoma. The aim of this study was to describe the effect of the dinucleotide Ap4A in glaucomatous mice IOP when topically instilled alone, and combined to glaucoma commercial drugs.

Methods: Experiments were performed on adult female C57BL/6J (control animals) and DBA/2J (glaucomatous animals). All animal maintenance and experimental procedures followed the ARVO Statement for the Use of Animals in Ophthalmic and Vision Research. Intraocular pressure was measured using a non-invasive rebound tonometer (Tono-lab®). In order to study the effect of Ap4A, and the effect of Ap4A combined to commercial drugs (Timoftol® and Alphagan®) two IOP measurements were taken before Ap4A was instilled, and once every hour for 6 h.

Results: The topical application of Ap4A when IOP is maximal (9-12 months) reduced IOP 30.6 ± 6.6 % in the DBA/2J and 17.9 ± 4.0 % in the C57BL/6J mice. There was an IOP reduction of 54.8 ± 6.1 % when instilled with Timoftol® and of 42.5 ± 5.4 % when instilled with Alphagan®

Conclusions: Ap4A was able to reduce IOP in glaucomatous mice 30% approximately, and also was able to improve the effect of the commercial drugs, reducing IOP. These results indicate the possibility of using Ap4A as an effective compound for the treatment of glaucoma in a single way because it doesn't have any side effects or as enhancer of conventional treatment."

Poster

#011

Evaluation of the anti-inflammatory effect of an humectant solution based on aloe vera

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Abstract

"INTRODUCTION

Dry eye syndrome is defined as a multifactorial disease of tears and ocular surface that results in symptoms of discomfort, ocular irritation, visual disturbance and tear film instability. This disease is accompanied of ocular surface inflammation and It has a high prevalence worldwide. The first option to reduce dry eye symptoms is the use of humectant solutions. Most of commercialized solutions have an effect on dryness as symptom, improving patients comfort, however they didn't have an effect upon ocular irritation and inflammation.

METHODS

20 patients with ages ranging from 38 to 66 (mean $51,90 \pm 8,44$) and symptomatology of dry eye disease participated in this study. They were recruited considering a cut-off of 13 points in McMonnies test. All measurements were performed in both eyes, before instillation and after 1 month and 3 months. We randomly select which eye used this humectant or saline solution. OSDI (Ocular Surface Disease Index), DEQ (Dry Eye Questionare), Oculus Keratograph® 5M measurements (ocular redness and NIKBUT), BUT, Schirmer, tear meniscus height, MMP-9, IL-1, IL-6 and TNF- α concentrations were performed.

RESULTS

No statistically significant differences were detected in the measurements before and after instillation of Visaid Aloe with Oculus Keratograph ($p < 0.05$). However, we detected a decrease in MMP-9 concentration after 1 month and 3 months ($p < 0.05$) and in IL-6 after 3 months.

CONCLUSION

Visaid Aloe reduce MMP-9 concentration in tear film after 1 and 3 months of use in patients with dry eye symptomatology. These results show the anti-inflammatory effect in the ocular surface."

Poster

Variation of coma aberration with prismatic soft contact lenses

#012

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Abstract

Purpose: To analyze the variation in vertical coma and the rest of ocular aberrations before and after fitting prismatic soft contact lenses (PSCL).

Methods: Thirty-seven eyes of 20 healthy subjects (24.30 ± 2.03 years) were evaluated in order to analyze the variation in ocular wavefront aberrations before and after fitting PSCL of different base-down prism values (1.0, 1.5 and 2.0 PD), designed to study its influence in the compensation of vertical coma aberration. A Hartmann-Shack sensor with a wavelength of 780 nm was used, considering a pupil size of 3 mm. Additionally, the influence of PSCL in visual function under photopic conditions in terms of high-contrast visual acuity and contrast sensitivity was evaluated.

Results: There were statistically significant differences ($p < 0.05$) in ocular aberrations from 1st to 7th order after fitting PSCL, but only the differences in vertical tilt, horizontal tilt, defocus, vertical astigmatism and vertical coma were clinically relevant (Strehl Ratio < 0.8). The mean of vertical coma (μm) was 0.022 ± 0.030 for control, 0.045 ± 0.064 for 1.0 PD ($p = 0.645$), 0.048 ± 0.053 for 1.5 PD ($p = 0.037$), 0.074 ± 0.047 for 2.0 PD ($p < 0.001$). The changes in visual function under photopic conditions were not clinically relevant.

Conclusions: Base-down PSCL induce a positive vertical coma aberration directly proportional to prism value without affecting the rest of ocular high-order aberrations. Furthermore, PSCL are suggested as a possible alternative to RGP lenses for partially compensating the high-order aberrations associated to irregular corneas."

Poster

Visual performance and sports
productivity

#013

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Abstract

Purpose: The objective is comparing the visual skills among younger players (beginners) and older players (seniors), in club soccer players. Besides that, it is intended assess if a better visual performance is equivalent to athletes with greater sports productivity.

Methods: They were evaluated 34 athletes, men's soccer practitioners (17 beginners and 17 seniors). They were measured visual capabilities and sporting ability of athletes. To evaluate the visual performance, tests were performed in order to assess the visual acuity of low and high contrast, dynamic visual acuity, objective refraction, binocular vision and accommodation, central and peripheral perception, color vision, stereopsis in near and distance vision, ocular dominance, dominant foot, sensory and motor reaction time, and coordination. The evaluation of sports performance technical-tactical of athletes was carried out by their coaches.

Results: Concerning to the comparison of visual skills between levels, just met statistically significant differences in cases of accommodative flexibility of left eye in close view and of the dynamic visual acuity of both eyes. It was observed that in all assessed sports skills the seniors athletes exhibit performance greater than or equal to the athletes beginners. However, except for the ability to play with the head up, these differences between levels are not statistically significant. It was also checked, the existence of statistically significant correlations between visual and sports features. In the beginners, the sensory reaction time, is related with sports parameters, such as, reaction to the ball loss ($p = 0,031$), decision making ($p = 0,033$), unpredictability ($p = 0,048$), play with both feet ($p = 0,009$), long passes ($p = 0,039$), short passes ($p = 0,032$) and completion ($p = 0,021$). The laterality correlated with reflections ($p = 0,028$), the unpredictability ($p = 0,024$), the ability to play with 2 feet ($p = 0,009$) and realization of short passes ($p = 0,012$). In seniors, a good stereopsis in distance vision has corresponded to greater reaction speed ($p = 0,035$) and the motor ($p = 0,010$) and total reaction times ($p = 0,038$) were associated with greater efficiency in completion.

Conclusions: There are no significant differences between the visual capabilities of younger athletes (beginners) and older athletes (seniors), being that, it only can find statistically significant differences in the dynamic visual acuity in binocular conditions. The athletes with subjective assessments of better sports performance show better sensory, motor and total reaction times, cross laterality and best estereopsis in distance vision."

Poster

Influence of contact lenses power on young's modulus

#014

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Abstract

"Purpose: The modulus of a material describes its ability to keep its shape and resist deformation. The modulus of a contact lens (CL) is measured using Young's modulus and is defined as the capacity of a lens material to align to the ocular surface and its resistance to being deformed and can influence comfort and ocular health. The aim of this study was to compare the Young's modulus of different CL power.

Methods: One bi-weekly and one daily disposable CL, Senofilcon A and stenfilcon A, with powers of: +6.00D, +3.00D, -0.50D, -3.00D, -6.00D and -9.00D were characterized by their Young Modulus using the Linkam TSS 350 System with LNP95 and the Dualcope® MP0R. Two samples of each CL were tested right after the lenses were taken out of the original pack. For the calculation of the Young Modulus (in MPa), the area, diameter and thickness of the CL were considered.

Results: The mean value of Modulus (in MPa) registered for Senofilcon A was $0,68 \pm 0,24$. When the power was considered, the values ranged between 0.24 ± 0.13 and 0.88 ± 0.17 .

The mean value registered for Stenfilcon A was 0.24 ± 0.09 . When the power was considered, the values ranged between 0.13 ± 0.09 and 0.37 ± 0.01 .

Conclusion: The results show that there is a variation in modulus with power of the CL evaluated which indicates that the stiffness of a CL can also be dependent on its power and thickness."

Poster

Dinâmica de grupo em terapia visual / group dynamics in visual therapy

#015

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Abstract

Introduction: The main objective of visual therapy (VT) is to re-educate and/or to stimulate the visual system to increase visual efficiency. (1) The aim of the study is to verify the feasibility of the implementation of VT sessions in group.

Methods: A total of 25 patients were included, aged 20-23 years, without refractive problems, 14 with normal binocular vision (NBV) and 11 with some underdeveloped parameter of binocular vision. All volunteers were evaluated before and at the end of the VT sessions, through a visual symptom questionnaire and in several optometric tests: cover test, near point convergence, positive and negative fusional vergences, accommodation amplitude and accommodative flexibility. The VT was held over a month, with 4 sessions.

Results: Significant changes ($p < 0,05$: Mann Whitney test) between the beginning and the end of the VT, were observed in visual symptoms intensity and accommodative facilities. The volunteers with some underdeveloped visual parameter, showed significant improvements in accommodative facilities and in the group of subjects with NBV there was a significant increase accommodative facilities and improvement of visual symptoms.

Conclusion: The results reveal that the VT sessions in group present positive results. In the subjects with NBV an increase of the visual efficiency was verified, with reduction of intensity of visual symptoms. In the patients with some underdeveloped parameter, this was not the case but it's evident the improvement of the parameter that was affected. Probably extending the period of training, the results could be more promising."

Poster

Variações longitudinais da superfície corneal

#016

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Abstract

"Corneal asphericity is an important morphological characteristic of the cornea due to its relationship with optical quality. Therefore, demographic studies are relevant to program surgical procedures and adapt contact lens.

Purpose: To validate an autorefractor/keratometer in the measurement of corneal asphericity, to evaluate corneal asphericity on a northern Portugal population and analyze its changes on a 5-10years period.

Methods: Asphericity and keratometric values of 107 eyes were analyzed and compared with the utorefractor/keratometer_NIDEK_ARK-700A and a videokeratoscope. Posteriorly subjects' optometric clinical registers were retrospectively analyzed. Subjective refraction, central keratometry and four peripheral measures of asphericity (nasal, temporal, superior and inferior) were recorded with the autorefractor/keratometer-KINED_ARK-700A. Longitudinal study of asphericity was made by comparing its value from two visits in a 5-10 years' period.

Results: The clinical differences found for keratometric values were $0,03 \times 120^\circ / 0,02 \times 30^\circ$. The mean asphericity value from 1484 RE (58.6% female) with mean age of $40,2 \pm 18,4$ years was $-0,24 \pm 0,12$. No statistically significant differences were found between gender ($p=0,424$), age ($p=0,268$), refractive groups ($p=0,107$) and corneal astigmatism orientation ($p=0,559$). The longitudinal analysis ($5,9 \pm 1,3$ years) of 190 eyes (62,1% female) did not show statistically significant differences for mean refractive error ($p>0,050$), asphericity ($p>0,813$) and mean central curvature ($p>0,084$). A strong positive and statistically significant correlation ($r=0,790$; $p<0,050$) between asphericity and age was observed.

Conclusion: Autorefractor/keratometer-NIDEK_ARK-700A and videokeratoscope measures of asphericity were similar. The mean asphericity value found is in agreement with the mean value for caucasian population. In a term, up to 10 years, asphericity value did not significantly change in this sample, softening the effect of eye spherical aberration."

Poster

#017

Evaluation of transmittance changes between different batches of contact lenses

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Abstract

"Aim: To evaluate the variation in transmittance in the UV-visible spectrum (230 nm 700 nm) between different batches of contact lenses (CL).

Methods: Five monthly and five daily CL were studied. For each brand and power (3.00D), three different batches were analyzed. Transmittance (%T) was measured in the visible and ultraviolet spectral region, using a Shimadzu UV 3101 PC spectrophotometer equipped with an integrating sphere.

Results: Visible Region (400-700 nm): The average values of %T for monthly lenses varied between 91.31 ± 2.64 and 95.83 ± 1.35 . It was verified a statistically significant difference between batches ($p < 0.05$) for all lenses. Regarding daily lenses, the average values of %T ranged between 91.90 ± 1.63 and 96.09 ± 3.00 . A statistically significant difference between batches was also found for all lenses ($p < 0.001$).

UVA Region (315-400 nm): The average values of %T for monthly lenses varied between 20.31 ± 32.32 and 93.58 ± 1.89 . In daily lenses, the values ranged between 18.70 ± 30.52 and 92.32 ± 3.43 . For both types, some CL showed statistically significant differences between batches ($p < 0.05$).

UVB Region (280-315 nm): The average values of %T for monthly lenses varied between 0.02 ± 0.07 and 91.23 ± 1.88 . For daily CL varied between 0.01 ± 0.03 and 79.84 ± 6.80 . In this region, some CL also showed statistically significant differences between batches ($p < 0.05$).

UVC Region (230-280 nm): The average values of %T for monthly lenses ranged between 3.29 ± 0.07 and 53.69 ± 35.65 . For daily CL varied between 1.35 ± 12.06 and 40.09 ± 23.70 . In this region, no statistically significant differences between batches were observed.

Conclusion: There are changes in transmittance values between different batches, more pronounced in some regions of UV-Visible spectrum. In the visible region, all lenses differ significantly in their transmittance, but the differences obtained may have no impact on visual performance."

Poster

Clinical case: stargardt's disease

#018

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Abstract

"Introduction: Stargardt's disease is a hereditary condition marked by a progressive loss of photoreceptor and pigment epithelium cells. Affected patients refers a bilateral and gradual loss of central vision that start between 6-20 years old. Currently, there is not any known treatment for improving the signs and symptoms of this condition.

Case presentation: The patient is a 29 years old male who was diagnosed with the condition at 8 years old. The main complaint is that he had bad VA for distance, impaired colour vision, sensibility to glare and difficulty of focusing. The examination showed a progressive VA loss (ETDRS test), central scotoma in both eyes (Campimetry), absence of colour vision (Ishihara test), alteration of retinal pigment epithelium without flecks (Retinography), depletion of photoreceptors layer and an increase of the retinal pigment epithelium reflectivity (Optical Coherence Tomography) and foveal hyper-fluorescence alteration (Angiofluoresceinography). The electroretinogram was normal.

Discussion: The patient affected by Stargardt's disease should be managed in a multidisciplinary way. From an ophthalmological perspective, it is essential a periodical evaluation of the changes in the retinal structure. The optometric evaluation is necessary for knowing the visual function evolution and analyse the needs of low vision aids to improve quality of life. But also, it is important the role of professional as nutritionist and therapist to evaluate and control possible risk factors (diet and environmental) that can lead to aggravate the retinal disease."

Poster

#019

In vivo wettability changes in soft contact lenses after different tear drops instillation

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Abstract

"Purpose: To analyze the influence of different tear drops over ocular surface wettability, comfort and visual function during soft contact lenses (SCL) wearing.

Methods: A pilot, experimental, prospective and cross-sectional study was done. Sixteen eyes of eight healthy subjects (25.25 ± 3.02 years) were evaluated before and after tear drops instillation at 1, 3, 5, 10, 20 and 30 minutes. The sample was divided into two groups: eyes with oculifilcon D SCL (hydrogel) and somofilcon A SCL (silicone hydrogel). Five types of tear drops were used: saline solution (placebo), an aloe vera based solution and different sodium hyaluronate concentrations (0.1, 0.2 and 0.3%). Wettability over the SCL surface was measured using dynamic corneal topography and was evaluated with the tear film surface quality coefficient (TFSQ) and TFQS area. Additionally, it was measured comfort with visual analogue scale (VAS) and visual function under photopic conditions in terms of high and low contrast visual acuity and contrast sensitivity.

Results: There was an increase statistically significant ($p < 0.05$, Student t-test) in wettability with 0.2% for hydrogel at 1 and 3 minutes and silicone hydrogel at 1 minute, with 0.3% for hydrogel at 1, 3 and 5 minutes and with aloe vera for hydrogel and silicone hydrogel at 1 minute. Comfort decreased statistically significant with 0.3% for silicone hydrogel at 1 and 3 minutes. Visual function did not suffer statistical significant changes.

Conclusions: Sodium hyaluronate concentration is directly proportional to wettability and residence time increasing in SCL without influencing comfort and visual function."

Poster

Chromatic discrimination in myopia / discriminação cromática na miopia

#020

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Abstract

"Purpose: To measure the chromatic discrimination thresholds of myopes and normal subjects and to assess if the chromatic discrimination in myopes is significantly worse than normals.

Methods: Chromatic discrimination thresholds were determined in 42 subjects using the Colour Assessment and Diagnosis (CAD) test and the Cambridge Colour Test (CCT). Subjects had refractive errors spanning from +1.25D to -8.96D and no other ocular abnormalities. Subjects were divided in non-, low, moderate and high myopes, and in small, medium and long eyes. Correlations between chromatic discrimination changes and the refractive error and the elongation of the eyes were tested.

Results: It was found that long eyes have significantly increased chromatic discrimination thresholds in the CAD test across all hues tested than medium and small eyes ($p < 0.05$), and in the red hues when compared to medium ($p < 0.05$) and small ($p < 0.01$) eyes as well. Similarly, high myopes have significantly increased chromatic discrimination thresholds in the CAD test across all hues tested ($p < 0.01$), and in the red ($p < 0.001$) and blue hues ($p < 0.05$) when compared to non- and low-myopes. In the blue hues, moderate myopes have significantly increased chromatic discrimination thresholds than non-myopes as well ($p < 0.05$). Such findings were not found when considering the CCT.

Conclusions: The chromatic discrimination in high myopes is significantly worse than non- and low-to-moderate myopes. These results indicate that the CAD test may be the most appropriate colour vision test in determining such differences and that the chromatic thresholds measures may be a useful tool in tracking myopia progression."

Poster

#021

Influence of lens wear on equilibrium water content of daily disposable contact lenses

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Abstract

Purpose: The aim of this study was to investigate the ability of six daily disposable contact lenses to retain its equilibrium water content after wear.

Methods: In this contralateral open trial, 27 subjects (8 males) with mean age of 28.2 ± 7.5 years were randomly fitted with 6 daily disposable contact lenses. The lenses materials used were: Stenfilcon A (Cooper Vision), delefilcon A (Alcon), nelfilcon A (Alcon), narafilcon A (Johnson & Johnson), nesofilcon A (Bausch & Lomb) and omafilcon A (Cooper Vision).

Equilibrium water content of 54 contact lenses was measured using a digital refractometer (CLR 12-70, Index Instruments, Cambridge, UK). The assessment was made before and after 11.5 ± 1.0 h of lenses wear. Four measurements per lens were performed and the mean value was considered for the analyses.

Results: There was an evident decrease in equilibrium water content for omafilcon A (-6.7%, $p=0.002$), narafilcon A (-4.4%, $p=0.008$) and nesofilcon A (-1.7%, $p=0.003$) after lenses wear. No significant changes were found for stenfilcon A (-0.6%, $p=0.950$) and nelfilcon A (0%, $p=0.860$).

Distinct results were found for delefilcon A that reported a slight increase in water content over the same period of time (+4.1%, $p<0.001$).

Conclusion: Despite the highlighted differences, the equilibrium water content variation was not considered to be clinically relevant after 11.5 ± 1.0 h of lenses wear. A larger sample is also needed to confirm the results."

Poster

#022

Spanish version of a questionnaire to determine eye symptoms in vdu users.

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Abstract

"AIM: To develop a Spanish version of an English questionnaire about eye symptoms in video display unit (VDU) users.

METHODS: We translated from English to Spanish the questionnaire developed by Hayes et al., following the WHO translation guidelines. Participants were university employees (teachers, technical and office workers) of the University of Valencia. They should use VDU at least 2 hours a day. In two sessions at a time separated by at least 48 to 72 hours, participants answered by email the type and nature of eye symptoms according to the ranking method established in a 0-to-4 points scale [4 (severe), 3 (moderate), 2 (mild), 1 (slight) or 0 (none)] for each symptom in original English and Spanish version. The agreement between these two versions was performed using the Bland-Altman method.

RESULTS: We collected 64 surveys. There were 39 females and 25 males; their age ranging from 25 to 63 years. The mean of differences (MD) between Spanish and English versions was 0.16 points and their standard deviation (SD) 1.69 points. The coefficient of agreement (COA = 1.96 x SD) was 3.31 points and the limits of agreement (at the 95% confidence interval) were 0.16 ± 3.31 points (MD \pm COA).

CONCLUSION: Clinically insignificant differences were found between the two versions; therefore, the Spanish version of questionnaire by Hayes et al., is a valid tool for the evaluation of eye symptoms in VDU users.

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Poster

Eye symptoms in university students
using video display units

#023

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Abstract

"Purpose. To determine eye symptoms in a population of university students with the use of video display units (VDU; TV, computers, laptops, smartphones and tablets).

Methods. University students of three Universities (Universitat de Valencia, Univeristà degli Studi di Milano y Università Degli Studi di Milano-Bicocca) between 19 and 30 years of age participated in the study. They answered by e-mail a written questionnaire developed by Hayes et col., to quantify and determine the type and nature of eye symptoms when they used VDU. Contact lenses wearers and those corrected by refractive surgery were excluded.

Results. A hundred surveys were reported. There were 58 females and 42 males. The main symptom was moderate to severe tired eyes (31%), then by sensitivity to bright lights (29 %), and eyestrain or burning eyes or blurred vision at far distances (21%). In addition, moderate to severe dry eye was reported in 18% and the difficulty in refocusing eyes from one distance to another in 17%. The symptoms were greater in females, increasing by the number of hours and age.

Conclusions. Significant eye symptoms associated to VDU use often occur in university students; therefore, they should take appropriate ergonomic measures to prevent or eliminate these eye symptoms.

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Poster

#024

Analysis of type I choroidal neovascularization in wet age-related macular degeneration using optical coherence tomography angiography

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Abstract

"Introduction: Age-related macular degeneration (AMD) is the main cause of vision loss in people over age 50 in developed countries. Optical coherence tomography angiography (OCTA) is a novel and non-invasive technique that uses decorrelation to detect blood flow in retinal vessels. The purpose of this study is to analyze type I choroidal neovascularization (CNV) in wet AMD by comparing the results obtained in fundus fluorescein angiography (FFA), Indocyanine green angiography (ICGA) and OCTA as well as to correlate morphologic characteristics.

Material and Methods: Patients were evaluated with FA, ICGA (Spectralis HRA; Heidelberg Engineering, Heidelberg, Germany) and OCTA (Angioplex, Cirrus HD-OCT models 5000; Carl Zeiss Meditec, Inc, Dublin, OH and DRI OCT Triton; Topcon corp, Tokyo, Japan). We analyzed CNV types using FFA and compared them with OCTA findings. Using OCTA, we classified CNV based on its location above or beneath the retinal pigment epithelium (RPE), focusing only on Type I and mixed lesions.

Results: 47 eyes of 44 patients with wet AMD diagnostic were included. Correlation was obtained in 93.6% of type I CNV and 100% of mixed (type I + type II).

Conclusions: OCTA is a fast, non-invasive technique useful in CNV. It allows to visualize Type I CNV and the hidden component of mixed CNV better than FFA due to its location under the RPE, except when a high RPE detachment exists. OCTA also allows the feeder vessel to be displayed."

Poster

#025

Incidence of the teaching system in the performance of university students in the first semester of the third course of optometry.

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Abstract

"AIM: To know the affectation of the stress in the academic performance in university students of the scientific-sanitary branch.

METHODS: 55 students, 58.18% women and 41.82% men, aged between 20-46 + 5.33, of third year of the Degree in Optics and UV Optometry were evaluated with the SISCO questionnaire in the same experimental conditions and the same investigator. The number of subjects enrolled per academic year was (4-12) +1 A 34.55% combined working life (9-50) + 13.08 h, with studies and displacement (0.5 to 90) + 22.36 km. The scales evaluated were: physical reactions (RF), psychological reactions (RP), behavioral reactions (RC) and strategies faced against stress (AE).

RESULTS: The most frequently reported items of stress were those related to Overload or saturation by excess of practices and / or tasks with 73.96% and restlessness / nervous ness by teachers' evaluations, with 66.15%. Regarding the RF subscale, the most frequently reported items were fatigue or physical fatigue with 57.29%. At the psychological level, 55.21% were reported having concentration problems in the study accompanied by a moral down turn, 45.31%. And 44.79% suffer from lack of motivation in the studies. This affects their success or failure in their career.

CONCLUSION: Taking exams and the complementary academic offered by the Plan of Bologna, are the main cause of high stress among current students."

Poster

Micro-cystic dystrophy of Cogan's

#026

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Abstract

"AIM: Differential diagnosis based on symptomatology and ocular biomicroscopy between Sd. Sjögren-Larsson and alteration of the epithelial basement membrane

METHODS: A 49-year-old woman suffering from photophobia, tearing, grit, burning eyes, and blurred vision in the distance after 15 years of carrying the same graduation. She does not wear contact lenses. She is kept for 2 months under optometric exam, as her vision is unstable at all distances.

RESULTS: After an optometric examination, she is given a new prescription for a distance OD -9.5 -4.25 3° AVccVL = 0.65 and OI -7.00 -4.75 172° AVcc VL = 0.7. The right non-dominant right eye is hypo-corrected in 1 spherical diopter so that it can work comfortably on intermediate vision using electronic work devices.

Lesions in the corneal epithelium are detected under periodic control with ocular biomicroscopy and after confocal microscopy the presence of lesions in the form of a fingerprint and of points bordered by the corneal epithelium. She is prescribed long-acting lubricant that regulates her tear PH during the day and nocturnal viscous solution with dexpanthenol. And she should use graduated sunglasses.

CONCLUSION: The therapeutic options of this type of microcystic corneal dystrophy from lesser to greater degree of recurrence include: lubricants, use of hydrophilic contact lenses, keratectomy and photokeratectomy. The aim is to improve vision in all cases and to mitigate changes in the basement membrane."

Poster

Intra-stromal post-ring contact lenses: is it possible?

#027

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Abstract

"Intra-stromal ring segments are rings of bio-compatible plastic material that are inserted into the corneal stroma to create a stretch tension that reduces the irregular astigmatism characteristic of keratoconus, other ectasia and corneal irregularities, in order to Improve visual acuity in patients with this type of problems. In the event that this surgery does not meet expected expectations, contact lenses; On occasion, are the only possible alternative to improve vision.

The adaptation of contact lenses, in these cases is a challenge; Since the cornea will be subject to the tensions caused by the rings and those induced by the lenses, trapping the cornea between two surfaces sometimes more rigid than it.

In this work, we intend to decipher the keys for a good adaptation of contact lenses in corneas in which intra-stromal rings have been implanted.

In relation to rings, size, number, centering, position and depth. Corneal topography will be an important element when choosing the type, material and design of contact lenses.

There are several clinical cases with different adaptations, which illustrate the exposure."

Poster

#028

Comparison of tear film optical quality dynamics in contact lens wearers

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Abstract

"Aim: to quantify and compare the tear film optical quality dynamics in contact lenses wearers using three different soft contact lenses.

Methods: Prospective, subject-masked pilot clinical investigation comprising contact lens wearers randomized fitted with three contact lenses; Samfilcon A (Ultra, Bausch & Lomb), Comfilcon A (Biofinity, CooperVision) and Lotrafilcon B (Air Optix, Alcon Laboratories). All participants wore each contact lens for 15 days' period in a random order with a week wash-out between stages. Serial measurements of objective scatter index (OSI) using the HD Analyzer (Visiometrics SL, Terrasa, Spain) were taken for 20 seconds. The mean OSI in 10 successive seconds was analyzed. The measurements were performed in the first visit before contact lens insertion and after 8 hours, and in the last visit (15 days) after 8 hours of wear.

Results: 10 participants with a mean age of 28.5 ± 5.6 (age ranged 23 to 40 years) were included. In the first visit, there was a statistically significant decrease on the mean OSI for 10 seconds ($P < 0.05$), and differences were not found among lenses. In the last visit, after 8 hours of wear, there also were statistically significant differences compared to those at baseline situation. Comparing the results among lenses we found differences among them, although they did not reach the statically significance.

Conclusions: The results found in this pilot study show that the tear film optical dynamic seems to be slightly deteriorated during contact lens wearing in a stressful condition (10 successive seconds without blinking)."

Poster

#029

Impact of blinking frequency on tear film optical quality dynamic in contact lens wearers.

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Abstract

"Purpose: To study and compare the impact of blinking frequency on tear film optical quality dynamics in contact lens wearers.

Methods: Prospective, subject-masked pilot clinical study comprising contact wearers randomized fitted with three contact lenses (Samfilcon A (Ultra, Bausch & Lomb), Comfilcon A (Biofinity, CooperVision) and Lotrafilcon B (Air Optix, Alcon Laboratories)). All participants wore each contact lens for 15 days' period in a random order with a week wash-out between stages. Serial measurements of objective scatter index (OSI) using the HD Analyzer (Visiometrics SL, Terrasa, Spain) were taken for 20 seconds. Two measurements in a random order were taken. In one of them the subjects were asked to blink every 4 seconds, and in the other every 9 seconds. The waiting time between measurements was 20 minutes. The measurements were performed in the first visit before contact lens insertion and after 8 hours, and in the last visit (15 days) after 8 hours of wear

Results: 10 participants with a mean age of 28.5 ± 5.6 (age ranged 23 to 40 years) were enrolled in this study. In the first visit, when participant blinked each 4 second differences were not found in the mean OSI among lenses ($P > 0,05$). When subjects were asked to blink each 9 seconds, differences were not found between lenses, however there was a decrease in mean OSI comparing to baseline situation (before CL insertion) for all lenses ($P < 0,05$). In the last visit, there also were statistically significant differences compared to those at baseline situation. Comparing the results among lenses we found differences among them, although they did not reach the statically significance.

Conclusions: The results of this pilot study suggest that blinking frequency could have significant impact on the tear film optical quality dynamic. New contact lens materials seem to be more robust to keep a stable tear film optical quality dynamic."

Poster

#030

Fitting of a personalized toric hydrophilic lens of biomimetic material 80% wc in corneal ectasia after lasik

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Abstract

"Key words: hydrophilic toric contact lens, ectasia, post-lasik

Introduction: It is important for the optometrists to know what implications must be considered when fitting contact lenses in cases of post-lasik ectasia.

A case is presented where a patient was fitted with personalized toric hydrophilic contact lenses.

Clinical history: 41-year-old patient wanted contact lenses for occasional use. Patient had lasik surgery of -5D in both eyes in 1998, with a retreatment after 5 months. Corneal ectasia was detected in RE in 2005 and in LE in 2007 and compensated with spectacles. In 2010, intrastromal rings were implanted and achieved binocular VA with spectacles of 0.96 (decimal scale).

Clinical examination: Corneal topography revealed a corneal ectasia treated with intrastromal rings.

Biomicroscope examination showed rings to be inferiorly centered at 85% depth in both eyes. Refraction was RE -2.00 '3.50x55 AV=0.98 and LE: -1.50'3.00x110 AV=0.98.

Treatment and evolution: Scleral contact lenses were attempted but the patient did not tolerate them.

Subsequently silicone hydrogel contact lenses (Filcon V3, 75% WC) were fitted with good comfort and fitting results. RE VA=0.9 and LE=0.7, which did not improve with over refraction. Thereupon aspheric lenses free of spherical aberration were tested (Filcon II3, 80% WC), getting monocular VA of 1.00 on each eye.

Conclusion: Personalized toric hydrophilic contact lenses, free of spherical aberration and of biomimetic material (Filcon II3, 80% WC), have shown in this case to be a viable option for a patient with post-lasik ectasias and have resulted in visual acuity close to that of spectacles."

Poster

#031

Performance of meibometry in symptomatic and non-symptomatic subjects stratified by osdi

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Abstract

"Purpose: Meibomian gland dysfunction (MGD) is the most common cause of evaporative dry eye and may also have some association with aqueous-deficient dry eye. The aim of the study was to evaluate whether Meibometry is able to differentiate between health and abnormal subjects classified by a standardized dry eye questionnaires (OSDI).

Methods: A total of 138 subjects were recruited among patients of the Optometry Clinic of the Optometry Faculty (USC, Spain). By Standard Meibometry with Meibometer® MB550, 5 curves were generated and averaged as the mean of the higher values on each patient. Results were obtained in Meibometer Units (MU). During all de study, room temperature, light and humidity were controlled. All subjects filled an OSDI questionnaire, and were then stratified following a two- and a three-subgroup classification of scores. Differences in MU among subgroups were analysed.

Results: In both, the two- and three-subgroup classification by OSDI score, statistical difference between subgroups was found (pared t-test: two-subgroup classification, $p = 0.017$; ANOVA: three-subgroup classification, $p = 0.025$): there was a statistical decrease in the MU when the score or severity of symptom questionnaire was higher.

Conclusion: Meibometry was confirmed to be a reliable method to distinguish normal non-symptomatic from abnormal symptomatic subjects. Future studies should be focused on establish a cut-off criteria for his technique."

Poster

#032

Correlation analysis of the area of tear film break-up and the tear break-up time test

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Abstract

"Purpose: Dry eye is a common disorder with a multifactorial aetiology involving tear film instability. This study was designed to analyse how the area of tear film break-up (AB) is related with classical tear break-up time test (TBUT).

Methods: A total of 110 subjects were recruited among patients of the Optometry Clinic of the Optometry Faculty (USC, Spain). By using a camera attached to the slit-lamp and before the instillation of 2- μ l of non-preserved 2% sodium fluorescein, three videos of the tear film were then recorded after instructing the subject to blink. From each video, 4 frames were extracted: one frame on the first or initial tear film break-up (AB-0), one frame 1 second after break-up (AB-1), one frame 2 seconds after break-up (AB-2) and finally one frame just before the next reflex blink (AB-F). In each extracted frame, AB was determined by using ImageJ. TBUT was determined on video-recordings by a masked observer through assistance software. Correlations between ABs and TBUT were calculated.

Results: Correlations between all AB and TBUT were significant (all $p \leq 0.013$) and showed a negative trend (Spearman ρ : AB-0, $r = -0.212$; AB-1, $r = -0.462$; AB-2, $r = -0.592$; AB-F, $r = -0.594$): higher AB values were related with lower break-up times.

Conclusions: There is a close relationship between tear film break-up time and the area of tear film break: subjects who showed "high" tear film rupture areas (stability) have lower break-up time test results."

Poster

#033

Melatonin levels in the aqueous humour: connection with intraocular pressure

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Abstract

"Purpose: To study the levels of melatonin in the aqueous humour of normotensive and hypertensive intraocular pressure (IOP) patients and to compare them to an animal model of glaucoma.

Methods: A total of 37 eyes of 37 patients who underwent cataract surgery were included in the study and were divided into normotensive patients, with IOP below 21 mmHg (n = 23), and hypertensive patients, with IOP > 21 mmHg (n = 14). Glaucomatous DBA/2J (n = 6) and control C57BL/6J (n = 6) mice presenting 3 and 12 months of age for each strain were also used. Human and mice aqueous humours were aspirated using a 30-gauge Rycroft cannula on a tuberculin syringe and further processed to quantify melatonin by high-performance liquid chromatography analysis.

Results: Melatonin levels in normotensive patients (IOP below 21 mmHg) presented values as medians (first quartile; third quartile) of 14.62 (5.38;37.99) ng/ml (n = 23), while hypertensive patients (IOP above 21 mmHg) showed melatonin concentrations of 46.63 (10.28; 167.28) ng/ml (n = 14; p < 0.039). Glaucoma mice presented melatonin values of 0.37 (0.34; 0.59) ng/ml (at 3 months of age, before the pathology starts), which increased to 1.55 (0.94; 1.88) ng/ml (at 12 months of age, when the pathology is fully developed and IOP is maximum; n = 6, p < 0.001). Control mice did not significantly modified melatonin concentrations between 3 and 12 months of age. Conclusion: Patients with high IOP present increased concentrations of melatonin in their aqueous humour compared to normotensive patients. This has been confirmed in a glaucomatous animal model in which it has been possible to see a correlation between the development of the pathology, with an increase in IOP, and a concomitant elevation of melatonin in the aqueous humour."

Poster

Impact of blinking frequency on the ocular surface temperature

#034

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Abstract

"Purpose: To study the impact of blinking frequency on apparent ocular surface temperature (OST).

Methods: A non-contact infrared thermography camera (FLIR A325; FLIR Systems Inc., Madrid, Spain) was used to record the changes in the ocular surface temperature after different blinking frequency. The ocular surface temperature measurements were recorded for 40 seconds. Participants were instructed to blink each 5 seconds and each 10 seconds. The order was randomized, and each measurement was separated for 20 minutes. A total of 2400 frames of the ocular surface were recorded (60 frames per second). The temperature data in graphic format (average, maximum and minimum) from the corneal and conjunctiva region was analysed as region of interest (ROI) previously delimited by the examiner. All images were analysed and processed with the FLIR Research IR software provided by the manufacturer.

Results: 20 eyes from 20 healthy subjects (age range 20 to 50 years) were enrolled in this study. Significant differences in the mean ocular surface temperature were found as a function of the blinking frequency studied. In addition, there were differences on ocular surface temperature changes depending on ROI analyzed. The ocular surface temperature gradient was more homogeneous when the blinking frequency was higher.

Conclusions: The temporal changes in temperature observed in this study could provide us a better understanding of the dynamic ocular response due to decreasing of the blinking frequency"

Poster

#035

Comparison of temporal ocular surface temperature changes induced by different contact lens materials

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Abstract

"Purpose: To assess the temporal changes on ocular surface temperature (OST) induced by different contact lens (CL) materials.

Methods: A non-contact infrared thermography camera (FLIR A325; FLIR Systems Inc., Madrid, Spain) was used to record the changes in the ocular surface temperature during contact lens wearing. All participants were randomized fitted with three contact lenses (Samfilcon A (Ultra, Bausch & Lomb), Comfilcon A (Biofinity, CooperVision) and Lotrafilcon B (Air Optix, Alcon Laboratories)). The ocular surface temperature measurements were taken before, 20 minutes and 8 hours after CL wear. A total of 2400 frames of the ocular surface were recorded (60 frames per second). The temperature data in graphic format (average, maximum and minimum) from the corneal and conjunctiva region was analysed as region of interest (ROI) previously delimited by the examiner. All images were analysed and processed with the FLIR Research IR software provided by the manufacturer.

Results: 18 eyes from 18 healthy subjects (age range 21 to 35 years) were enrolled in this study. Significant changes in the ocular temperature surface were found after contact lens insertion. Differences among CLs were not found at any of the regions analysed ($P > 0,05$).

Conclusions: The temporal changes in temperature observed in this study could provide us a better understanding of the dynamic ocular response to different CL materials and the biological processes that may occur during the CL wear."

Poster

#036

Esophoria control in a myopic dyslexic case with visual symptoms and soft toric multifocal center distance lens

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Abstract

"Purpose: To control esophoria at near in a case of a myopic dyslexic with visual symptoms by means of soft toric multifocal lens with center distance geometry.

Clinical history: 20-year-old myope, veterinary nurse student referred by an educational psychologist to investigate symptoms of unstable print and intermittent blurred vision when reading. Patient also had headaches and had been diagnosed dyslexia, wearing spectacles.

Clinical examination: Initial refraction gave RE -1.75/-1.75X105 = -0.16 (logMar) LE -1.75 /-0.75X45 = -0.16 and N4 at 40 cm. Esophoria at distance and near compensated with 3Δ on fixation disparity tests (Zeiss Polatest for distance and Mallett Fixation Disparity unit at near). Near point of convergence was normal. Binocular amplitude of accommodation was 12D. Cycloplegic refraction showed RE -1.50 /-1.50X105 = -0.16 LE -1.25 /-1.00X60 = -0.16. Neutralisation of the associated esophoria was also achieved with a binocular +1.25DS addition.

Diagnosis: Near esophoria causing the symptoms with myopia and oblique astigmatism.

Treatment and evolution: The patient was prescribed multifocal spectacles that eliminated the symptoms and improved significantly reading abilities and quality of life. Patient wanted to try again contact lenses as spectacles slipped from nose when working in the operating room. Personalized hydrophilic toric multifocal lenses center distance were fitted, with material Filcon II3, 80% WC (RE 15.00 8.60 -1.75 -1.75X105 and LE 15.00 8.60 -1.50 -0.75X45, addition of 1.50D). Contact lenses produced the elimination of symptoms.

Conclusion: Hydrophilic toric multifocal contact lenses center distance are a viable alternative to multifocal spectacle wear for symptomatic patients with near esophoria."

Poster

#037

Relationship between different physical activity methods and intraocular pressure variation

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Abstract

Introduction: Ocular hypertension is when the pressure inside the eye (intraocular pressure or IOP) is higher than normal. It is not the same as glaucoma, nevertheless, generally, the higher IOP play a role in an individual's susceptibility to glaucomatous optic neuropathy. IOP fluctuates throughout the day and it is affected by many endogenous and exogenous factors. Physical activity may modify IOP. The purpose of this communication is to know as different physical exercise may play a significant role in values IOP changes.

Methods: This work analyzes four different physical activity methods in the literature and the way they affect IOP. Exercises are defined as isometric, in which there is no muscle shortening; dynamic, in which there is muscle shortening; aerobic, when oxygen is consumed; and anaerobic, both lactic and alactic, when no oxygen is used to produce energy.

Results: Physical activity may modify IOP in both ways increasing and decreasing. It is demonstrated that continuous aerobic exercise may result on lower IOP after exercise as well as resistance training, but vigorous strength exercise may result in an elevation.

Conclusion: In order to prevent damage to the optic nerve it is important to differentiate between all the methods and different physical activities that can be carried out. The collaboration between visual health professionals (optometrist or ophthalmologist) and professionals in the sport and the physical recreation and health sectors, would be necessary in order to inform subjects looking forward to preventing dangerous elevation of IOP in risk population. "

Poster

Prevalence of refractive error in portuguese schoolchildren's

#038

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Abstract

"INTRODUCTION: The objective of this study was to determine the prevalence of refractive error among Portuguese school children in the north of Portugal.

MATERIALS AND METHODS: A school-based cross-sectional study was performed from April to November 2016 in three municipalities in the north of Portugal (Paredes, Celorico de Basto and Ponte da Barca) in a total of 12 schools. Refractive error was assessed by automated refraction and visual acuity assessment was measured using Snellen chart. To detect the presence of hyperopia, visual acuity was measured through a +1.00 D lens in children who in the 1st measurement had a visual acuity equal to or greater than 20/20. Myopia was defined as spherical equivalent of -1.00 D or less and visual acuity less than 20/20. Hyperopia was defined as spherical equivalent of + 0.50D or greater or when the visual acuity of +1.00D improvement over the lens. Only data for the right eye was considered for the statistical analysis.

RESULTS: A total of 1415 students were assessed (869 female) with a mean age (mean \pm SD) of 9.8 ± 2.9 years (ranging from 5 to 18 years). The mean refractive error M (spherical equivalent) was -0.33 ± 1.10 D. The overall prevalence of myopia and hyperopia in this study was 11.4% and 19.2%, respectively. The prevalence of myopia increases with age. In group of 5-year-old children no one was found with myopia. For those aged 6 years the prevalence is 7.0%, for 8 year olds it is 8.6%, 14.5% for 9 year olds, 12.8% for 10 year olds, 9.8% for 11 year olds, 11.1% for 12 year olds, 14.4% for those aged 13 years, 17.9% for those aged 14 years, 13.8% for those aged 15 years, 15.8% for those aged 16 years, 20.0% for those aged 17 and 31.6 % for those aged 18. The difference was statistically significant (chi-square <0.001).

For 15-year-old adolescents, the prevalence of myopia and hyperopia is the same, from this age myopia becomes the most prevalent refractive condition. Up to 14 years (with the exception of 13 years), hyperopia is the most prevalent refractive condition.

CONCLUSION: In this study, the definition of myopia used was the refractive error greater than or equal to -1.00D and the subject had a visual acuity lower than 20/20.

The results show that myopia increases with age and that from 15 years on it becomes the most prevalent refractive error."

Poster

Previsores da miopia

#039

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Abstract

"For the Optometrist myopia is a common refractive defect present in its clinical practice. Although at the present time it is not possible to prevent the onset of myopia, it would be useful to have a prediction of myopia onset for each particular patient.

Several factors were studied, in an isolated and / or combined way, as possible predictors of myopia. Among them AC/A, Accomodation Lag, Esophoria, Parental Antecedents, Refraction, Peripheral Refraction, Axial Length, Cornea, Lens and Visual Acuity. With the best values of Sensitivity and Specificity, refraction (more specifically the diminution of the small hyperopia) - is the best isolated predictor of future myopia, but is an approximate prediction.

The reduction of the small hyperopia, can allow the Optometrists to be able to predict in an approximate way, if the children between the 6 and 11 years, will develop myopia in the future.

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Poster

#040

Astigmatic vector analysis in keratoconus post surgical treated with intracorneal rings and crosslinking one year after

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Abstract

"AIM: To evaluate by vector analysis [1] the corneal astigmatism changes occurring in moderate keratoconic corneas [2] one year following. The surgical practice was to implant intracorneal rings(ICRS) with corneal cross-inking (CXL) [3].

METHODS: An experimental clinical study on twenty-five eyes were recruited. The mean age of patients was: 32.64 + 11.37 years (range 15 to 58y), 62,9% males and 37,1% females. During the study, all patients underwent a full assessment for ICRS including refraction with uncorrected distance visual acuity (UDVA) and corrected distance visual acuity (CDVA), slit-lamp biomicroscopy, topography, pachimetry and ORA assesment. The diagnosis of severity of the keratoconus was graded according to the criteria of classification of keratoconus as Amsler Scale on the basis of the Pentacam optical tomography (Oculus Inc, Lynnwood, Washington). Vectorial analyses were conducted in accordance with the method proposed by Thibos, [4] instead of refraction. Statistical analysis was performed using PASW Statistics 19 (SPSS, Inc, Chicago, IL).

RESULTS: The mean corneal power preoperative in the 3-mm central zone was 48,92 + 4,17 (range 40,7 to 56,9). The parameter Mc was a statistical significance between pre-and postoperative at 6 month. And in the same way, with ucp-u1; ucp-uc3; ucp-uc6; ucp-ucy. Not for J45c and for J0c preoperative and postoperative. A good significant correlation between J0c3 and J0cy, 0,536, $p < 0,05$; CHy and J45cp, -0,443, $p < 0,05$.

CONCLUSION: The astigmatism vectors along the 45-degree (J45) and 0-dregree meridians (J0), M and u, should be considered always in the management of ectasia using the practice combined ICRS implantation and CXL."

Poster

#041

Corneal epithelial thickness mapping by optical coherence tomography in keratoconic eyes versus keratoconic eyes after intracorneal ring surgery.

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Abstract

"AIM: To detect the corneal epithelial thickness with optical coherence tomography (OCT) and quantify it pre-and post-surgical treatment.

METHODS: Twenty-Three Keratoconic eyes from 20 subjects aged between 21-54 + 8.55 were evaluated in this study. The OCT system was OPTOVUE- RT100, edition 5.1. This instrument operated at a $\lambda=840\pm 10$ nm, $\Delta\lambda$ (FWHM) = 50 nm and exposition power in the eye pupil: 750 μ W. OCT Image Acquisition

Frequency: 26,000 A / second scanner with a range: Depth: 2 or 2.3 mm Transversal: from 2 mm to 12 mm.

RESULTS: The central, superior, and inferior epithelial thickness averages were 51.1 \pm 4.8 μ m, 56.8 \pm 9.5 μ m, and 51.6 \pm 6.8 μ m pre-surgical and 49.7 \pm 5.2 μ m, 58.5 \pm 9.8 μ m, and 55.4 \pm 5.8 μ m in post-surgical with intracorneal rings. The central, superior, and inferior pachymetric thickness averages were 474 \pm 38.7 μ m, 560 \pm 43.6 μ m, and 462 \pm 40 μ m pre-surgical and 469.6 \pm 44 μ m, 548.4 \pm 63.8 μ m, and 482.9 \pm 41.8 μ m in in post-surgical with intracorneal rings. Compared with normal eyes, keratoconic eyes had significantly lower inferior and minimum corneal epithelial thickness. The difference between pre-and post-surgical had significantly lower inferior and minimum corneal epithelial thickness,

CONCLUSIONS: The Optical Coherence Tomography is a good instrument to detect accuracy changes in the apical epithelial thinning from 2 to 5 mm for keratoconus diagnosis and following post-surgical treatment."

Poster

Atypical micro-bacteria found in hidrogel of silicone contact lenses.

#042

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Abstract

"AIM: To prove that the daily use of tap or saline water when cleaning or disinfecting silicone hydrogel (SiHy) contact lenses- instead of specific multipurpose solutions- can lead to a severe bacterial keratitis.

METHODS: A 26-year-old male patient with neither interesting systemic backgrounds nor family eye disorders, user for the past twelve months of soft hydrophilic contact lenses of silicone hydrogel for long-term use (AcuvueOasys de Vistakon), which he replaced every three months.

RESULTS: The tear film contains lysozyme, lactoferrin, β -lysine and immunoglobulins, but are not enough to combat the action of bacterial pathogens as the atypical micro-bactery or perhaps the *Pseudomona aeruginosa*, with high virulence due to several extracellular products as endotoxin or exotoxin A. The misinterpretation and misunderstanding of the daily use of the LC during these days induced the appearance of an irreversible corneal abscess with subsequent loss of AV.

CONCLUSION: *Pseudomonas aeruginosa* and other less common pathogens such as *Mycobacterium*, *Klebsiella oxytoca* and *Elizabethkingia meningoseptica* can act as opportunistic pathogens in unfavorable environmental and hygienic conditions and inadequate with specific contact lenses material or surfactant clean solution."

Poster

#043

Changes in corneal biomechanical parameters induced by corneo-scleral contact lenses to treat irregular corneas after lasik surgery

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Abstract

"Purpose: To evaluate corneal biomechanical parameters wearing corneo-scleral contact lenses (CScL) in patients with irregular corneas after laser in situ keratomileusis (LASIK).

Setting: FISABIO Oftalmología Médica and Aviñó; Peris Eye Clinic, Valencia, Spain.

Design: Retrospective case series.

Methods: Data from patients fitted with CScL due to corneal surface irregularities after complicated LASIK surgery, were selected by both eye clinics. Previously and after 1 year of CScL fitting, corneal hysteresis (CH), corneal resistance factor (CRF), corneal-compensated intraocular pressure (IOPcc) and central corneal thickness were evaluated. In addition, visual acuity, subjective comfort and wearing time CScL were reported.

Results: The study comprised 27 eyes (18 patients). Statistically significant differences were found in visual acuity between the best spectacle-corrected vision and after CScL fitting (0.16 ± 0.03 [SD] logMAR and 0.01 ± 0.06 logMAR, respectively; $P < .001$). In addition, the patients reported high subjective comfort ratings and prolonged usage times (12.67 ± 1.98 hours a day). Statistically significant differences were found in the CRF between before CScL fitting and after 1 year of CScL wear (7.57 ± 0.87 mmHg and 7.68 ± 0.84 mmHg respectively; $P = .015$). There was also a slight increase in CH although it was not statistically significant. Central corneal thickness and IOPcc presented similar values after 1 year of CScL wear.

Conclusions: Corneal biomechanical parameters increased slightly, although significantly for CRF, and no adverse effects on the cornea when wearing CScL for 1 year were found in post-LASIK eyes with irregular corneas."

Poster

#044

Treatment with plasma rich in growth factors (prgf) in a patient with marginal degeneration of terrien

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Abstract

"Introduction

Marginal degeneration of Terrien is an alteration of corneal periphery, bilateral, with asymmetric presentation unknown etiology. This pathology produces a corneal thinning progressive with a lipid infiltration in the corneal stroma and vascularization, remaining intact epithelium.

This peripheral thinning produces high astigmatism.

This case shows the evolution in a patient with this disease who was treated with plasma rich in growth factors (PRGF).

Clinic History

15-year-old patient frequently refers to red left eye caused by a peripheral corneal ulcer (X hours) that does not improve with treatment. Optometric exploration, corneal topography, anterior optical coherence tomography (OCT) and endothelial count were performed.

Diagnosis

He was diagnosed with inferior limbic insufficiency with the test performed. Finally the analysis of internal medicine performed on the patient concluded that it was a Marginal Degeneration of Terrien.

Treatment and evolution

He was treated with PRGF to try to improve his corneal surface.

	1ª VISIT	2ª VISIT	3ª VISIT	4ª VISIT
AV s/c	0.05	0.05	0.05	0.05
Refraction	-0.75esf-9.00cil@42	-9.00cil@45	-11.00cil@50°	-12.00cil@50°
AV c/c	0.7-2	0.7-2	8-1	0.8-2
Topography	K1:39.66D K2:50.75D	K1:39.73D K2:50.74D	K1:39.60D K2:50.44D	K1:39.66D K2:50.22D
Pachymetry	160	157	151	132

Conclusion

Treatment with PRGF, although it does not increase the peripheral corneal thickness, improves the corneal astigmatism and symptoms in a patient with Marginal degeneration of Terrien."

Poster

Ortho-k what has changed in the last years

#045

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Abstract

"Ortho-k what has changed in the last years

Nowadays contact lens are impressively used to performance the vision of their users, of all these applications Ortho-k is the most dynamic.

Ortho-k is far from a simple process of adapting lens successively flatter. The professional who believes that this is not like that is destined to be unsuccessfully. Since Ortho-k was developed, in the early 60's, the technological advances in support equipment and ortho-k lens (materials, fitting process, hygiene and conservation) are huge. The use of this technique during sleep, the extension of applicable refractions, FDA approval (Food and Drugs Administration) has increased the interest of the scientific community and increased the number of communications and publications about this subject.

The ortho-k evolution in the last few years allow broaden "the intention of solve ametropias through the programmed application of contact lens", and apply it to farsightedness, astigmatism and presbyopia.

A professional good standing comes from a correct and complete explanations of the advantages and disadvantages of each option presented to the ametropic patient. The patient should always get information about all options to solve their specific problem, with clinical and scientific basis, regardless of the personal beliefs of each professional."

Poster

#046

Evaluation of a new multifocal and toric multifocal contact lens with personalized optical zones and a new material (filcon ii2 59%)

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Abstract

"Key words: multifocal, toric multifocal, optical quality

Purpose: To evaluate a new multifocal and toric multifocal contact lens with personalized optical zones and a new material (Filcon II2 59%) available in geometries Center Distance (CD) and Center Near (CN).

Method: A new contact lens was designed with variable size optical areas dependant on add. Filcon II2 was designed with 59% water content, low coefficient of friction (0.05) and elasticity modulus of 0.36Mp to improve comfort.

Checks on insertion, 10 days and 1 month of wear were performed in 28 contact lens wearers. Pupil diameters were measured under photopic, mesopic and scotopic conditions, as well as topography and ocular aberrations (Hartmann-Schack L80®, Visionix), Snellen high contrast visual acuity, and defocus curves. A satisfaction survey was used to evaluate subjective comfort and handling. Vision was compared with ophthalmic lenses. Statgraphics® was used for statistical analysis.

Results: Distance VA was reduced with contact lenses from 1.19 ± 0.18 to 1.05 ± 0.17 ($p < 0.05$), and at near from 0.99 ± 0.09 to 0.95 ± 0.11 ($p > 0.05$). A weak relationship appeared between vision and addition ($p > 0.05$). Aberrations study showed positive spherical aberration in CD design (0.32 ± 0.23) and negative in CN design (-0.12 ± 0.11) as expected ($p < 0.05$). More coma was produced by CD design (0.41 ± 0.19) compared to CN (0.27 ± 0.13), $p > 0.05$. No differences were found in trefoil (CD 0.31 ± 0.19 , CN 0.21 ± 0.15 , $p > 0.05$). The lens gave a satisfactory visual solution to 70% of the sample.

Conclusions: The new multifocal and toric multifocal contact lens with personalized optical zones of Filcon II2 59% is a viable option for the visual correction of presbyopes."

Poster

Scleral lens adaptation in keratoplasty

#047

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Abstract

"Penetrating keratoplasty is referred to as a surgical procedure where an entire damaged or diseased cornea is replaced by donated corneal tissue.

Man 55 years with penetrating keratoplasty surgery, arcuate incision, dry eye and corectopia in right eye. In the last two years cataract surgery and retinal detachment in right eye treated with laser were comprehended. A scleral lens ICD (Paragon, USA) with 16,50 mm diameter and sagittal depth 4200µm. Peritoric and front toric design was fitted in order to correct the high order aberrations and generate a lacrimal reservoir. In order to adjust the design, definitive lens was modified in respect to the trial lens: Peripheral central clearance zone (PCCZ) of +5.00° (+1° steep =0,25 µm sagittal increase), toric Limbal Clearance Zone (LCZ) of +4.00° and +8.00° (flat and steep curves respectively) and Scleral Landing Zone (SLZ) of -3,00°. The lens stabilized at 90° and a front toric power of -5,25 SPH -4,50 CYL x 80° was lathed.

The lens adaptation was assessed with slit lamp SL-D4® (Topcon, Japan), Pentacam (Oculus, Germany) and Ivue OCT (Optovue, USA). The visual acuity (VA) was evaluated with Bailey-Lovie® (Precision Vision, USA) test at a distance of 4m.

The VA showed improvement from 0,4 (high polyopia) to 0,1LogMAR with a good tolerance. The patient wore the lens for 8 hours in a day for two periods of 4 hours renovating the artificial tears without preservatives. In this cornea with high irregularity, high order aberrations values and dry eye, sclera lens showed a comfortable and satisfactory solution."

Poster

#048

Conhecimentos sobre saúde visual na população em geral / visual health knowledge in the general population

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Abstract

Introduction: Health literacy refers to the “ability of individuals to access, understand and use information to promote and maintain health”. Low literacy levels are strongly related to low social status, low level of education and low incomes. Investment in health promotion programs and materials with proper information is likely to produce a substantial return on the health and well-being of populations.

The objective of the study was to infer about the type of visual health knowledge, in a sample of the population of the inner country.

Methods: 98 subjects participated, 69 females, aged between 18 and 61 years. The minimum education was the 12th year and only 5 people had never consulted a visual health professional. All were asked about the knowledge of the main visual problems: refractive errors, cataracts, diabetic retinopathy and glaucoma.

Results: More than 50% of participants never heard of refractive errors, neither diabetic retinopathy, 29% never heard of glaucoma and only 7% never heard of cataracts. The main source of knowledge about the issues are “family/friend who has the problem”, followed by “media” and to a lesser extent “a health professional”

Conclusion: The sample surveyed, with medium/high education levels, revealed low visual health knowledge, suggesting that the general population can present worse levels of visual health literacy. These results state the need to develop and implement strategies to increase levels of knowledge about visual health."

Poster

#049

Evaluation of the impact of a new selective blue light and class 1 uv-blocking filter sihy lens (75% wc) examining contrast sensitivity and colour perception

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Abstract

"Key words: green SiHy lens, blue light, contrast sensitivity, colour

Purpose: Changes in lifestyles and exposure, both at work and leisure time, to smartphones, tablets, screens and led illumination has raised concerns about the potential harmful effects of blue light.

The purpose of this study is to evaluate the impact of a new blue light and UV blocking silicone hydrogel lens measuring contrast sensitivity and colour perception, under photopic and mesopic conditions, and to compare it with same material with no filters.

Method: Prospective blind random study, 25 patients. Test lenses are made of Filcon V3, 75%WC, green handling tint and Class 1 UV. Control lenses have same material with no filters. In photopic and mesopic conditions, Snellen high contrast visual acuity contrast sensitivity (COI-test®), colour perception (Farnsworth-D15®) and comfort in a visual analogue scale (VAS) were evaluated. Statgraphics® was used for statistical analysis.

Results: Binocular photopic VA with test lens (TL) was 1.16 ± 0.31 , with control lens (CL) 1.20 ± 0.17 ($p > 0.05$). Binocular mesopic VA with TL was 0.90 ± 0.19 and CL 0.86 ± 0.17 . No differences were found in contrast sensitivity by type of lens ($p > 0.05$) but for frequencies 6, 12 and 18 differences were found depending on illumination condition ($p < 0.05$), worse for mesopic. No dyschromatopsia was detected, more failures found under mesopic condition for both lenses. Comfort on insertion 8.42 ± 1.22 for TL and 8.14 ± 1.41 for CL ($p > 0.05$).

Conclusions: The new SiHy lens evaluated (Filcon V3, 75% WC, green, with blue light and Class 1 UV filters, monthly replacement) has no influence in VA, under photopic and mesopic illumination, colour perception and contrast sensitivity."

Poster

Relationship between visual capacities and alcohol ingestion

#050

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Abstract

"Objective:

To know visual system variations under the effects of alcohol and to assess which visual capacities are affected.

Material and method:

We examined 30 patients, who performed the following tests: static visual acuity (VA), dynamic binocular VA, contrast sensitivity, saccadic movements, far and near stereopsis, hand-eye coordination, reaction time and central peripheral care, with three levels of alcohol by expired-air, 0.00mg /l, 0.25mg /l and 0.50mg /l.

Results:

The 46.7% of patients maintained the same static VA in the three alcohol levels, while 26.7% increased one line their static VA and 26.7% decreased.

The dynamic VA was maintained in 80% of the patients, with 0.25mg /l, however 63% decreased with 0.50mg /l, 30% of patients maintained the same and 7% increased.

Contrast sensitivity was maintained at low frequencies, 1.5 and 3 cycle /° at all rates, while the other frequencies, 6,12, 18 cycle /° decreased progressively.

Far stereopsis wasn't affected with 0.25mg /l and decreased by 23.3% with 0.50mg /l.

Near stereopsis decreased by 16.7% with 0.25mg /l and by 40% with 0.50mg /l.

Eye-hand coordination decreased by 56.7% 0.25mg /l and 80% with a rate of 0.05mg /l.

The reaction time decreased by 56.7% with 0.25mg /l and by 63.3% with 0.50mg /l.

Saccadic movements got worse in 63.3% with a rate of 0.25mg /l and in 90% with 0.50mg /l.

Conclusions:

Alcohol consumption decrease most of visual abilities studied. It confirms that a rate higher than 0.25mg /l isn't permitted for driving in Spain."

Poster

#051

Detection of papillary craniopharyngioma by optical coherence tomography and visual field, a case report

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Abstract

"Purpose: To describe the characteristics of visual acuity (VA), optical coherence tomography (OCT) and visual field (VF) of a case of pituitary tumor.

Case Report: The papillary craniopharyngioma is the second suprasellar tumor in adults after the pituitary adenoma, with an incidence of 2/100,000. Despite their benign histologic appearance, these tumors are characterized by a compression of the chiasm, affecting the fibers of both optic nerves and the visual field. The presentation of this case shows a 59-year-old woman consulted because of poor VA in the left eye (LE) = 0.6. Diagnostic tests have been performed, including a computerized campimetry with reduced mean values (RE = -3.86dB and LE = -4.04dB), as well as an analysis of the retinal nerve fiber layer (RNFL) and the ganglion cell layer (GCL) by OCT, that alerted on the type of pathology. The diagnosis of papillary craniopharyngioma was confirmed by a radiology unit and the surgery was performed by transsphenoidal endoscopy. Two months after surgery, an improvement in VA (1.0) and visual field improvement (RE = -3.47dB, LE = -2.33dB) was observed. A follow-up at 6 months maintained the same results.

Conclusion: This case illustrates the potential of an early and appropriate interpretation of OCT and VF in the detection of papillary craniopharyngioma."

Poster

Predictive fitting success rates for soft lens designs

#052

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Abstract

"Key words: predictive fitting, soft lens

Purpose: Custom contact lenses are available in a wide range of diameters and vaults. They allow practitioners to move beyond the limitations of the prevalent one-size-fits-all approach.

A new generation of ocular topographers is now available to measure the anterior surface beyond the cornea. The purpose of this study is to evaluate if a predictive developed algorithm can work for a tailor-made soft lens of SiHy material in order to lead to a predictive fit, reducing chair time and return rates.

Method: 63 eyes were empirically fitted with a specialty soft lens of SiHy (Saphir, mark´ennovy), and measured with a Profilometry-based ocular topographer (Eye Surface Profiler, Eaglet Eye). A predictive fitting algorithm was developed, where key parameters are sagittal height (SAG) and limbus diameter. The relationship between contact lens and ocular SAG was studied, as well as for the variable diameter (DIA) of the final lenses fitted.

Results: The relationship between the variables was assessed using the Pearson Correlation test. We found a strong correlation coefficient of 0.70 for SAG and a high significance of 0.01 at the diameter of the lens.

Conclusions: This study proves that there is a strong correlation between the vault of the studied tailor-made SiHy lens and the sagittal height of the eye.

It seems likely that the predictive algorithm could be used to successfully select the first trial lens and potentially reduce chair time and the number of lens returns. More studies are needed to quantify it."

Poster

#053

Infrared meibography as a tool for meibomian gland dysfunction classification

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Abstract

"Purpose: To study the morphological changes in meibomian glands (MG) using infrared meibography (IR-M) in order to understand better the changes observed on the ocular surface associated with the gland atrophy present.

Methods: A total of 150 subjects (age range, 18-90 years) were enrolled in this study and divided in four groups according to the morphological state of their MGs. The upper and lower eyelids were turned over and the MGs were observed using the Keratograph 5M (K5M, Oculus, Germany). Tortuosity and MG dropout were evaluated from the meibography image. No atrophy corresponds to 0 point, less than one-third to one point, more than one-third to two points, and more than two-thirds to three points as described by Arita et al. The OSDI questionnaire (Ocular Surface Disease Index) was performed in order to know patient's dry eye symptoms. Tear meniscus height (TMH), non-invasive tear break-up time (NIKBUT), bulbar redness (BR) were performed using K5M. Furthermore, corneal tissue integrity, bulbar conjunctival integrity and lid wiper epitheliopathy and MG assessment (expressibility, eyelid vascularity, capping and pouting) were performed in all the participants using a slit lamp.

Results: Differences in TMH, NIKBUT, BR and OSDI were found among groups ($p < 0.05$). There was a decrease of TMH and NIKBUT and increase of BR and OSDI as a function of the quantity of MG dropout.

Conclusions: The results of this study suggest that infrared meibography could be a useful tool for meibomian gland dysfunction classification.

This study was supported by the EDEN project (642760; MSCA-ITN-2014-EJD: Horizon 2020), granted by the European Commission."

Poster

Unusual applications of mini-scleral contact lenses: two case reports

#054

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Abstract

"Purpose: To report the breakage of a contact lens from an impacting object and unexpected improvement in visual acuity (VA) in an amblyopic eye in two patients wearing scleral contact lens (ScCL) involved in a clinical trial.

Case 1: A Caucasian 24-year-old male with high-regular astigmatism and hyperopia reported the breakage of his mini-ScCL (15.2mm diameter) in his eye during a motorbike reparation. Ocular examination showed absence of corneal damage other than a superficial punctate keratitis in the inferior area. All pieces of ScCL were recovered from the patient. We hypothesize that the wide scleral supporting area and the tear film must act as cushioning elements absorbing part of the kinetic energy of the object.

Case 2: A Caucasian 24-year-old female with an amblyopic left eye (LE) due to corneal ectasia and high myopia, with very poor vision with habitual correction. The other eye has moderate myopia with 0.00LogMar vision and no topographic alterations. A ScCL was adapted on her LE and VA has improved to +0.56logMar. We noticed an improvement of VA after 12 months of ScCL wear (+0.42logMar). We hypothesize that the sharp image provided by the contact lens in the amblyopic eye contributed to VA improvement.

Conclusion: ScCL had probably a benefit in terms of protection against the impact of a fast-moving object towards the eye in Case1. From the observations in Case2, ScCLs could provide an opportunity for visual rehabilitation in profound amblyopic patients, but this needs to be explored further in larger populations involving properly designed clinical trials."

Poster

#055

Função visual e novas tecnologias na
adolescência: relações e efeitos /
visual function and new technologies
in adolescence: relation and effects

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Abstract

Introduction: With the increasing use of digital devices, more users work in demanding and challenging visual environments. The main goal of this study is to relate visual signs and symptoms to the habits acquired while using digital technologies in a population of adolescents.

Methods: 190 students from grade 5 to grade 9 participated. Three factors were studied such as Visual symptoms (blurred vision, double vision, headache, burning, itching, excessive tearing and worse at the end of the day), habits acquired (working distance, computer hours, lighting, pauses and visual examinations) and optometric signs to infer about quality of visual acuity, binocular vision and accommodation.

Results: There was a positive and significant correlation between symptoms and bad habits. The most mentioned symptom was burning, itching and excessive tearing, while the least respected habit was the pauses. Participants with alterations in accommodation showed more symptomatology than patients with good accommodative capacity ($p = 0.016$), with headache complaints ($p = 0.028$) with greater intensity at the end of the day ($p = 0.01$) being the most significant factors. Adolescents with alterations in accommodation showed worse habits than adolescents with good accommodative function ($p = 0.004$).

Conclusion: The results of this study suggest that adolescents with worse visual-posture habits are those with more visual symptoms. It is also verified that the accommodation is the most affected visual function, among adolescents with more symptoms and with worse habits. These results suggest the need to sensitize and educate for the adoption of healthy visual-posture habits."

Poster

#056

Impact of a daily contact lens with high water content on the ocular surface of presbyopes and non-presbyopes.

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Abstract

"Purpose: To study the impact of a new daily contact lens with high water content on the ocular surface of presbyopes and non-presbyopes.

Methods: Seventeen presbyopes with a Multifocal Contact Lens (Nesofilcon A (Biotrue OneDay for Presbyopia, Bausch & Lomb), and 20 non-presbyopes subjects were fitted with a monofocal contact lens (Nesofilcon A (Biotrue OneDay, Bausch & Lomb). Tear film osmolarity (TFO) (TearLab Corporation, San Diego, CA), tear meniscus height (TMH), non-invasive tear break-up time (NIKBUT), bulbar redness (BR) (Keratograph 5M, Germany) and central corneal thickness (CCT) (OCT, Optovue, USA). In addition, contact lens thickness (CLT) were performed with OCT. All these measurements were taken before CL insertion, 20 minutes after and 8 hours after CL wear.

Results: The main age was 28.7 ± 4.2 years for the group 1 (non-presbyopes) and 53.9 ± 7.5 years the group 2 (presbyopes). In the group 1, no statistically significant differences were found in any parameter as a function of the time of use ($p > 0.05$). Regarding group 2, there was a statistically significant reduction in TMH as a function of the time (0.39 ± 0.18 , 0.27 ± 0.10 , 0.25 ± 0.11 ; baseline, 20 minutes, 8 hours, respectively; $p < 0.05$). Besides, there was a statistically significant increase in BR after 8 hours in comparison to baseline (1.17 ± 0.32 vs 0.85 ± 0.19 ; $p = 0.019$). Limbal redness also showed a statistically significant increase at baseline and after 8 hours of wear ($p < 0.05$).

Conclusions: These findings evidence that the same CL material can impact differently on the ocular surface of young patients in comparison to elderly patients."

Poster

#057

Impact on anterior ocular surface of three different types of soft contact lenses materials

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Abstract

"Purpose: To assess the impact of contact lens wearing on ocular surface.

Methods: Prospective, subject-masked pilot clinical study comprising contact lenses users randomized fitted with three types of contact lenses materials (Samfilcon A (Ultra, Bausch & Lomb), Comfilcon A (Biofinity, CooperVision) and Lotrafilcon B (Air Optix, Alcon Laboratories). All participants wore each contact lens for 15 days period in a random order with a week wash-out between stages. Keratograph 5M (Oculus, Germany) was used to measure tear meniscus height (TMH), non-invasive tear break-up time (NIKBUT) and bulbar redness (BR). Measurement were registered before contact lenses insertion, 20 minutes and 8 hours after insertion the first day and after 15 days of wearing.

Results: : 18 eyes from 18 healthy subjects (age range 21 to 35 years) were enrolled in this study.

Significant differences in TMH, NIKBUT and BR were found after 15 days of use in comparison to baseline ($P < 0.05$). We found a decrease of TMH and NIKBUT and an increase of BR.

Conclusions: The evaluation of subtle changes induced on ocular surfaces by contact lenses wearing may help to elucidate the causes of typical symptoms and possible drop out associated to CL users"

Poster

#058

Effects of light on melanopsin and its presence in human crystalline lens epithelial cells.

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Abstract

"Melanopsin is a photoreceptor detected in some ganglion cells of the retina. Among different roles, it regulates melatonin production.

Immortalized human lens epithelial cells were plated in multiwells and treated with light (white, blue, green and red) and total darkness for 2, 4, 8 and 12 hours. Supernatants were collected for melatonin measurements using HPLC. Immunocytochemistry and western blot assays were performed to study AANAT and melanopsin presence. Melanopsin activity was blocked by AA92593 at 1.5 μ M concentration and for second messenger inhibition a phospholipase C inhibitor U73122 was used at 3 μ M.

Melatonin levels after submitting cells to total darkness were significantly higher to ones submitted to white or specifically blue light, melatonin concentrations were 59.45 ± 15.71 pmol/106 cells in the darkness, and dropped to 37.61 ± 6.64 pmol/106 under blue light (**p<0.001, n=6). The involvement of melanopsin regulating melatonin was determined using a specific inhibitor as well as its signalling via phospholipase C by incubating cells together with PLC and demonstrating no inhibition of melatonin nor its enzyme AANAT (n=4, ***p<0.001).

Melanopsin is present in human lens epithelial cells. Its stimulation by light reduced the expression of melatonin synthesizing enzyme AANAT reducing melatonin levels in the extracellular medium."

Poster

#059

Comparison of tear break up time evaluated using different types of measurements

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Abstract

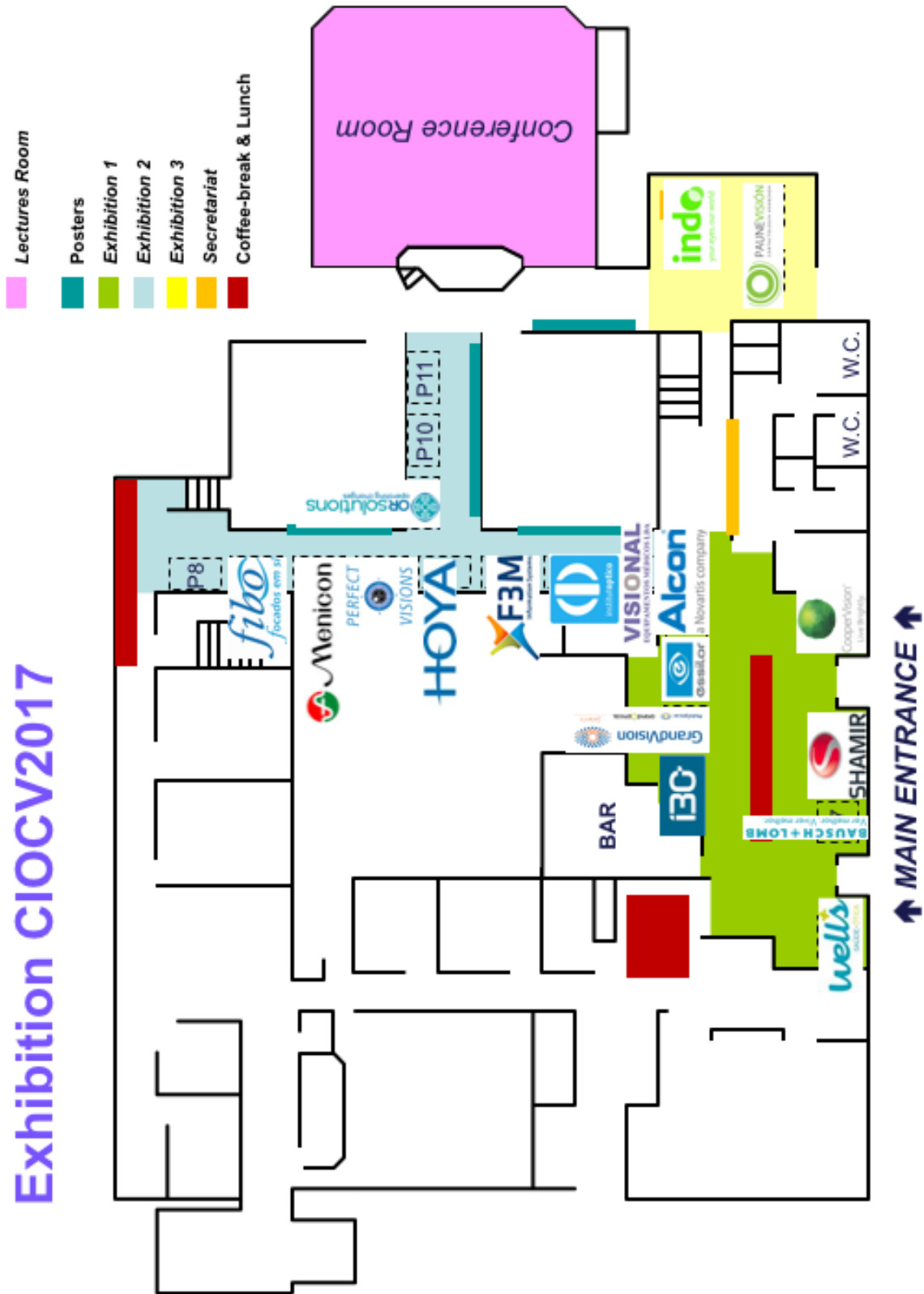
Objective. The aim of this study was to compare different measurements of stability and lacrimal quality (BUT/NIBUT) using invasive and non-invasive methods in a young population, as well as to know the reproducibility of each test.

Methods. Twenty-nine healthy eyes (23.83 ± 1.46 years) participated voluntarily in the study. The NIBUT, tear film system quality (TFSQ) mean and TFSQ area were evaluated using the Medmont E300 corneal topographer, and three measurements were made by the same examiner. Each measurement was done at five minute intervals in order to avoid the interference of increased lagrimal secretion. The measurement of the BUT was performed with fluorescein and the slit lamp. Fluorescein was inserted in the right eye which was then placed in the slit lamp with diffused light using a blue and yellow filter. In random order, each of the three examiners performed three measurements of the BUT of each patient without knowing the results obtained by the other examiners. The process described above was repeated for the left eye.

Results. It was found that BUT and NIBUT were not related ($p > 0.05$); the TFSQ and the TFSQ-area were significantly related ($p < 0.05$); and there exists an inverse relationship between the TFSQ and the NIBUT ($p < 0.05$), as well as between the TFSQ-area and the NIBUT. Moreover, the test results in terms of repeatability were: NIBUT (ICC 0.721), TFSQ (ICC 0.867) and TFSQ-area (ICC 0.841).

Conclusions. Invasive and non-invasive methods of measurement are not comparable to each other. The BUT is repeatable in each individual examiner, but not among the three examiners; whereas NIBUT, TFSQ mean and TFSQ area are repeatable."

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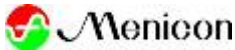
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