Universidade do Minho
Escola de Ciências

CIOCV 2025

CONGRESSO INTERNACIONAL DE OPTOMETRIA E CIÊNCIAS DA VISÃO
UNIVERSIDADE DO MINHO

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Departamento de Física
Universidade do Minho
Campus de Gualtar
4710-057 Braga (Portugal)

Telf: +351253604320 Fax: +351253604061
e-mail: ciocv@fisica.uminho.pt
URL: http://ciocv.fisica.uminho.pt

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Dear Colleagues,

The International Congress of Optometry and Vision Sciences (CIOCV) proudly marks its twenty-second edition.

Since our inaugural event in 2004, held at Building 1 of the Gualtar Campus, University of Minho—with just over 200 participants and six sponsors—the CIOCV has grown into a national and international reference in continuing education for Optometry and Vision Sciences. This achievement is thanks to your continued support and engagement.

This 22nd edition represents a significant milestone, one we are eager to celebrate. As part of our ongoing evolution, we have redefined certain aspects of the CIOCV to make it more modern and engaging, while upholding the same high standards of scientific rigor that have always guided us.

This year's program is diverse and forward-looking. It encompasses key areas such as neuro-optometry, binocular vision, myopia control, and artificial intelligence, among others. Moreover, we aim to highlight and promote the valuable scientific research being conducted across national and international research centres.

This achievement would not have been possible without your continued engagement and trust.

The organizing committee of the CIOCV'2025

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- *Free Papers*
- *Posters*

Lectures

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10:15 -11:00		Optometric Protocol in Children with Neurodevelopmental Disorders **Angel Garcia**
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12:00 - 12:30		Light and Defocus: an optical approach to slow myopia progression **Barbara Swiatczak**
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13:00:00-14:30		**Lunch**
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15:30:00-16:00		How much knowledge of AI do optometrists really require? **Danilo Andrade de Jesus**
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16:30:00-17:00		**Rapid Fire- Poster Presentation**
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17:30:00-18:00		Blue Light Filters: What they are, what they do and when to use them **José Manuel González Meijome**
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4	Tania Alvite Piñeiro	Visual function and retinal parameters in patients with Alzheimer´s disease: a pilot study
5	Lorena Elvira-Hurtado	Retinal Vascularization and Mild Cognitive Impairment: Results of a Pilot Study with OCTa
6	Dora N. Marques	Association between red-green color discrimination thresholds and color naming accuracy of natural colors
7	Cristina Vieites Alvite	Twelve-month refractive follow-up of pre-myopic and myopic myopic children: is there an alternative to cycloplegic refraction?
8	Marta Sofia Magro	Trends in Refractive Errors in Portugal (2022–2024): Insights from Optometric Records
9	Ainhoa Colina Jareño	Optic nerve anatomic changes in open angle glaucoma patients after Preserflo Microshunt surgery
10	Clara Abadías Ferreiro	Twelve-month changes in monocular visual acuity in myopic children without and with myopia control treatments.
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4	María Serramito Blanco	Impact of water polo training on ocular physiology and dry eye symptoms
5	Rute J. Macedo de Araújo	Lid Wiper Epitheliopathy: A Comprehensive Review of Identification Strategies and Future Directions
6	Maria Romaguera	Evaluation and Comparison of Soft Contact Lens Thickness using two Optical Coherence Tomography
7	Bodas-Romero, Julia	Topographic Profiles Assessment of 8 Soft Contact Lenses for Myopia Control
8	Clara Martinez-Perez	Binocular Status in Childhood in Children Aged 6 to 12
9	Jacobo Garcia-Queiruga	Repeatability of a handheld autorefractometer device specific for children
10	Veronica Noya-Padin	Myopia progression in myopic and astigmatic children wearing toric peripheral retinal defocusing contact lenses
11	Veronica Noya-Padin	Effect of speed and direction of stimulus movement on visual acuity
12	Hugo Pena-Verdeal	Analysis of the impact of piggyback system fitting on non-invasive tear break up time.
13	José A.R. Monteiro	Optimal color sets to represent the colors of natural scenes by k-medoids clustering
14	Veronica Noya-Padin	Differences in Dehydration Patterns, Refractive Index and Dimensional Changes Among Myopia Control Contact Lenses

15	Carmen Martín-Aranda	Influence of prolonged video game use on the amplitude of accommodation in young people.
16	Belen Sabucedo-Villamarin	Short-term changes in tear film stability following the application of various treatments for dry eye disease in a young healthy population
17	Belen Sabucedo-Villamarin	An 8-Year Follow-Up of Ocular Symptoms and Corneal Damage in Dry Eye Disease Participants
18	Noelia Nores-Palmas	Agreement between stationary and hand-held autorefractors for measuring objective refraction in children
19	Ana Privado- Aroco	Evaluation of visual acuity with multifocal catenary curve-based contact lens design in different degrees of astigmatism
20	Cecilia Díaz López	Ocular light scattering in users of digital displays with selective absorbance (λm+s) lenses.
21	Vasco Manuel Viana Mesquita	Characterization of Scleral Lens Fitting in Portugal
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25	Mariana Cunha	Refractive Errors in Rural Schools of the Central Region
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37	Noelia Nores-Palmas	Eye strain, binocular vision and visual quality comparison of a single vision and an extended depth of focus soft lens
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Lectures

Vision and Learning:

What the Scientific Evidence Tells Us?

Pilar Cacho Martínez, PhD
University of Alicante, Spain

Brief Curriculum Vitae

Diplomada en Óptica y Optometría por la Universidad de Alicante, licenciada en Documentación por la Universitat Oberta de Catalunya y doctora por la Universidad de Alicante en el programa de doctorado de Salud Pública.
Actualmente desarrolla su actividad profesional como profesora Titular de Universidad en la Universidad de Alicante. En el Máster Universitario en Optometría avanzada y salud visual imparte docencia en las asignaturas de Optometría basada en la evidencia y Rehabilitación visual. Su docencia en el grado de Óptica y Optometría está relacionada con varias asignaturas sobre visión binocular clínica y optometría en poblaciones específicas. Sus líneas actuales de investigación están centradas en la aplicación de la evidencia científica en el ámbito de la salud visual y en el análisis de diferentes aspectos de la visión binocular clínica, como la evaluación de los criterios diagnósticos de las disfunciones de la visión binocular y la caracterización de la sintomatología asociada a las disfunciones visuales.
Autora de diversos artículos científicos publicados en revistas internacionales de impacto y revisora de varias revistas científicas internacionales relacionadas con la Optometría y la Oftalmología.
Perteneciente al Grupo de investigación en Optometría (GIOptom) de la Universidad de Alicante.
Co-directa del proyecto de cooperación internacional "Mirada solidaria a Cuba" llevado a cabo por la Universidad de Alicante desde 1999 hasta la actualidad.
Directora del Capítulo de Visión Binocular y Optometría Pediátrica de la Sociedad Española de Optometría.

Abstract

Despite increasing attention to the visual factors influencing academic performance, the causal relationship between vision problems and neurodevelopmental disorders remains unclear. This presentation explores current scientific evidence on the association between visual dysfunctions and learning difficulties, particularly in the context of dyslexia and attention deficit hyperactivity disorder (ADHD).

A growing body of research has reported a higher prevalence of refractive errors (particularly uncorrected hyperopia), binocular vision anomalies such as convergence insufficiency, and strabismus in children diagnosed with dyslexia or ADHD. However, these associations do not imply causation. Rather, the relationship appears to be bidirectional, as children with neurodevelopmental disorders may be more prone to developing visual dysfunctions, while untreated visual conditions may contribute to difficulties in attention and reading performance.

Although vision therapy is often used in clinical settings to address symptoms related to reading, visual fatigue, or attention span, high-level evidence—such as randomized controlled trials and systematic reviews—fails to support its efficacy as a direct intervention for dyslexia or ADHD. Instead, the evidence strongly supports the correction of refractive errors as an effective measure to improve academic outcomes, with studies demonstrating improvements in reading fluency, mathematics achievement, and overall quality of life following optical correction.

This presentation aims to provide a critical overview of the scientific literature concerning the role of vision in learning. It highlights the need to differentiate between treating clinically significant visual dysfunctions for visual comfort and promoting unsupported interventions that claim to remediate learning disorders. Emphasis is placed on evidence-based optometric care and interdisciplinary collaboration to support children with academic difficulties.

Optometric Protocol in Children with Neurodevelopmental Disorders

Ángel García Muñoz, OD
University of Alicante, Spain

Brief Curriculum Vitae

Doctor en Salud Pública por la Universidad de Alicante. Diplomado en Óptica y Optometría por la Universidad de Alicante y licenciado en Documentación por la Universitat Oberta de Catalunya.
Actualmente es profesor titular del Departamento de Óptica, Farmacología y Anatomía de la Universidad de Alicante, coordinador académico de su Clínica Optométrica y coordinador académico del Máster Universitario en Optometría Avanzada y Salud Visual (MOASV). Pertenece al Grupo de Investigación en Optometría (GIOptom) y su ámbito de investigación se centra en la visión binocular clínica y en la epidemiología de las ametropías. Imparte docencia en asignaturas relacionadas con la optometría clínica y su aplicación en poblaciones específicas. Además, es codirector del proyecto de cooperación internacional "Mirada Solidaria a Cuba".
En el inicio de su etapa profesional fue presidente de la Delegación Regional de Murcia del Colegio Nacional de Ópticos-Optometristas (CNOO) y posteriormente vicedecano del CNOO. En la actualidad es vicepresidente primero de la Sociedad Española de Optometría y miembro del comité científico de OPTOM y OPTOM meeting, así como del Executive Board de la revista científica Journal of Optometry.

Abstract

This presentation focused on the challenges and adaptations required in optometric assessments for children with neurodevelopmental disorders (NDDs), such as Autism Spectrum Disorder (ASD), Attention-Deficit/Hyperactivity Disorder (ADHD), and Specific Learning Disorders (SLDs). These children often present with sensory, cognitive, and behavioural characteristics that complicate standard examination procedures.
In ASD, common visual behaviours include altered eye contact, hypersensitivity or hyposensitivity to stimuli, and a preference for local over global processing. Increased prevalence of astigmatism, exotropia, reduced accommodative responses, and inconsistent stereopsis are frequently observed. The clinical environment must be predictable, low-stimulation, and supported by visual aids such as pictograms or familiar objects to enhance cooperation.
Objective methods, such as static or Mohindra retinoscopy, are preferred for refractive assessment due to difficulties with subjective input. Accommodation is tested using simplified procedures. In ADHD, the key is to maintain short, structured exam sessions, positive reinforcement, and enthusiastic communication. For SLDs, a calm atmosphere and flexible timing are crucial.
The proposed protocol emphasises high-priority tests adapted to short attention spans and communication challenges. Prescription guidelines differ from those in typically developing children, with earlier correction of hyperopia and more frequent use of near additions based on accommodative lag findings.
Overall, the presentation highlights the importance of adapting clinical strategies and promoting interprofessional collaboration to ensure effective visual care and support for children with neurodevelopmental conditions.

Refractive error distribution in childhood: why is myopia growing around the world

Sotiris Plainis, PhD
University of Crete, Greece

Brief Curriculum Vitae

Sotiris completed his undergraduate studies in Optics and Optometry in Greece and UK, respectively. These were followed by postgraduate (MSc, 1995; PhD, 1999) and postdoctoral research at the Department of Optometry and Vision Sciences, UMIST, UK.
He is currently a research optometrist at the Laboratory of Optics & Vision, School of Medicine, University of Crete, with an active research group in visual optics, psychophysics and electrophysiology. He has been appointed as a Visiting Research Fellow at Aston University since 2017 and had served as an Honorary Lecturer at the University of Manchester. He is a member of the International Society for Contact Lens Research and the International Association of Contact Lens Educators and a Fellow of the British Contact Lens Association. He is an Advisory Board member of Zeiss Myopia Management committee and a past member of the Education Committee of the European Academy of Optometry and Optics (EAOO). He has published widely in his field (73 peer-reviewed publications) and edited a book ("Presbyopia: origins, effects and treatment", SLACK Incorporated)..

Abstract

Despite the significant distribution in the ocular refractive parameters of the eye since early in life, emmetropisation is supposed to coordinate ocular growth towards an approximately emmetropic state, minimising the development of ametropia.

It is well established that "refractive balancing" in emmetropic eyes between the corneal power and axial length occurs very early in childhood, accompanied by a gradual increase in axial length, which compensates for the reduced power of the crystalline lens, in the following years. Although there are characteristic gender and ethnic differences, i.e. emmetropic eyes are on average longer in boys compared to girls and in Asian compared to Caucasian eyes, the annual progression in axial size decreases for emmetropic older children up to the age of about 13-14 years. However, a subset of children's experiences pronounced elongation, resulting in a myopic shift in refraction rather than myopic shifts in all children.

This presentation aims to give insights into refractive balancing data during the development of emmetropic and myopic eyes, through analyses of ocular refractive parameters from different populations at different ages.

Light and Defocus: an optical approach to slow myopia progression

Barbara Swiatczak, PhD,
La Roche Ltd, Switzerland

Brief Curriculum Vitae

Barbara Swiatczak is a Senior Scientist in the Ophthalmology Discovery team at F. Hoffmann-La Roche Ltd in Basel, Switzerland. She holds a Ph.D. in Neuroscience from the University of Tübingen and has a background in medical biotechnology. Her research spans neurobiology, visual optics, and translational approaches to eye diseases, with postdoctoral experience in myopia research at the Institute of Molecular and Clinical Ophthalmology Basel (IOB). Dr. Swiatczak has received several prestigious awards, including the ZEISS Young Investigator Award and the Pfizer Research Prize, and has contributed to international collaborations across Europe.

Abstract

Myopia, or nearsightedness, is a common refractive error where distant objects appear blurry while near vision remains clear. It is caused by excessive elongation of the eye, which leads to light focusing in front of the retina. In recent decades, myopia has increased dramatically worldwide, becoming a major public health concern. By 2050, nearly 50% of the global population is expected to be myopic, with 10% affected by high myopia. Europe reflects this trend, with some countries reporting prevalence rates up to 50% among young adults. A particularly concerning development is the earlier onset of myopia in children, which is linked to a higher risk of developing high myopia later in life due to prolonged progression. This raises the likelihood of serious complications such as retinal detachment, myopic maculopathy, glaucoma, and choroidal neovascularization.

While single vision spectacles or contact lenses can restore clear vision, they do not address the underlying cause of axial elongation. To slow progression, new optical solutions have been introduced. Specially designed spectacle and soft contact lenses aim to control myopia by manipulating peripheral defocus or light distribution on the retina, influencing eye growth in children. Though effective in slowing progression, these interventions have not fully stopped eye elongation.

Emerging approaches now explore novel mechanisms, such as exposure to quasi-monochromatic light, peripheral contrast manipulation, and control of longitudinal chromatic aberration to promote emmetropization. Combination therapies that integrate optical, pharmacological, and environmental strategies are also being studied to improve outcomes.

Despite promising developments, a universal and fully effective intervention remains elusive. Continued research is essential to better understand myopia's biological and environmental drivers and to develop safe, individualized treatments—especially for children.

Current Options for Myopia Control

Nicola Logan, PhD
Aston University, UK

Brief Curriculum Vitae

Nicola Logan is a Professor of Optometry and Associate Dean for Research and Enterprise, School of Optometry, Aston University, Birmingham, UK. Nicola's research interests are the epidemiology of refractive error, mechanisms underlying the development of myopia and myopia control. Her current research projects include clinical trials in myopia control and risk factors for progression of myopia in children. Nicola leads an active myopia clinic at Aston University, and she collaborates with other researchers as part of the Myopia Consortium UK and internationally as a taskforce chair for The International Myopia Institute. Nicola has been the recipient of awards for excellence in research and paediatric optometry research and she has been awarded a Life Fellowship from The College of Optometrists, UK..

Abstract

Myopia is a growing public health concern due to its increasing prevalence and the associated risk of ocular complications. This presentation explores the latest evidence-based strategies for myopia control, with a particular emphasis on axial length as a key biomarker of progression and treatment efficacy. A strong correlation exists between increasing axial length and the risk of irreversible visual impairment, including myopic maculopathy.

Several optical and pharmacological interventions have shown efficacy in slowing myopia progression. These include orthokeratology, extended depth of focus (EDOF) contact lenses, dual-focus soft contact lenses, and spectacle lenses designed to induce peripheral myopic defocus (e.g. DIMS and HAL). Low-dose atropine (e.g. 0.025%) and emerging therapies such as repeated low-level red light therapy have also demonstrated promising results. Evidence from randomized controlled trials (RCTs), such as the MiSight 7-year study, supports the long-term safety and effectiveness of dual-focus lenses in reducing axial elongation and refractive error progression.

Combination therapies (e.g. atropine with spectacle lenses) are being evaluated for additive effects, while adherence and wear-time emerge as critical factors influencing treatment outcomes. Comparative analysis of spectacle lens types (e.g. Stellest vs MiYOSMART vs MyoCare) highlights the nuances in efficacy across populations and study designs. The importance of behavioural interventions and clinical decision-making based on age, myopia level, and family history is also emphasized.

Ultimately, effective myopia management requires ongoing monitoring, patient-specific tailoring of interventions, and awareness of long-term rebound effects upon treatment cessation. A strong, evolving evidence base—supported by systematic reviews and multi-centre studies—guides clinical practice and supports a proactive approach in managing childhood myopia.

Danilo de Jesus, PhD
Erasmus MC, NL

How much knowledge of AI do optometrists really require?

Brief Curriculum Vitae

Danilo Andrade De Jesus is Assistant Professor and Principal Investigator at the Eye Image Analysis Group (EyeR), a collaboration between Erasmus MC and the Rotterdam Eye Hospital in the Netherlands. With a Ph.D. in Biomedical Engineering, he specializes in image processing and AI applications in eye care. His research focuses on developing novel methods for analysing Adaptive Optics, Optical Coherence Tomography (OCT), and OCT Angiography imaging in conditions such as Inherited Retinal Diseases and Glaucoma.

He has contributed to multiple European projects, including a Marie Curie ITN in Vision Science. Before joining Erasmus MC, he was a postdoctoral researcher at KU Leuven, working on retinal biomarkers for glaucoma and hyperspectral imaging. He has also held research roles at Wroclaw University of Science and Technology, Poland, Tampere University of Technology, Finland, and the University of Coimbra, Portugal. As a leader in ophthalmic image analysis, he is dedicated to advancing AI-driven biomarkers for improved disease detection, monitoring, and clinical translation

Abstract

Artificial Intelligence (AI) is transforming healthcare, and optometry is no exception. From AI-assisted image analysis to automated diagnostics, these technologies are becoming increasingly integrated into clinical workflows. However, as AI tools become more accessible, the question remains: How much knowledge of AI do optometrists truly need?

This presentation provides a structured introduction to AI, covering topics like Machine Learning (ML), Deep Learning (DL), and the workflow of an AI project, including data management, model selection, and performance evaluation. Special emphasis is given to how optometrists interact with AI, focusing on recognising data quality, understanding model outputs, and assessing AI-driven decision-making in clinical settings.

We will also explore advanced AI techniques relevant to optometry, such as Convolutional Neural Networks (CNNs) for retinal image analysis, unsupervised learning models for pattern detection, and Large Language Models (LLMs).

By the end of this talk, attendees will gain a structured understanding of AI's workflow, the key concepts they should be familiar with, and the extent to which they need to engage with AI to enhance patient care.

Artificial Intelligence in Contactology

Alejandra Consejo, PhD
University of Zaragoza, Spain

Brief Curriculum Vitae

Alejandra Consejo, a physicist with a PhD in Biocybernetics and Biomedical Engineering, is a tenured professor and researcher at the University of Zaragoza. Her career spans international research collaborations, with extended stays in Poland, Belgium, and the United Kingdom. She has authored over 50 scientific articles and has received multiple international awards for her contributions to optometry and ophthalmology.
Prof. Consejo specializes in advanced modeling, data analysis, imaging, and artificial intelligence to study the human eye. Her research focuses on corneoscleral characterization, the impact of contact lens wear, and the early detection of ocular diseases. She was recently awarded an ERC grant to develop innovative methodologies for the early diagnosis of prevalent eye conditions.

Abstract

Artificial Intelligence (AI) is transforming contact lens practice by enhancing diagnosis, optimizing lens selection, and improving patient management. This presentation explores how AI-driven technologies are reshaping contactology, from automated refractive error detection to personalized contact lens fitting and real-time ocular surface monitoring.

AI applications in contactology span multiple domains. In diagnostics, deep learning algorithms analyze anterior segment images and tomographic maps to detect conditions such as refractive errors, dry eye disease, and keratoconus with high precision. These tools facilitate early detection and improve diagnostic consistency, aiding clinicians in decision-making. Moreover, AI-powered meibography and OCT-based assessments provide objective evaluations of the ocular surface, allowing better management of contact lens-related complications.

AI also enhances contact lens fitting. Traditional trial-and-error approaches can be time-consuming and uncomfortable for patients. AI-based predictive models, using corneal topography and tomography data, help determine the optimal lens parameters, reducing the number of trial lenses required. For orthokeratology and scleral lenses, AI algorithms analyze topographical changes and ocular tissue characteristics to predict fitting success, ensuring a more efficient and personalized approach. Beyond clinical applications, AI plays a growing role in patient engagement and practice management. Chatbots and virtual assistants provide educational content and reminders to improve adherence to lens care regimens. AI-driven customer relationship management (CRM) systems help optimize inventory, track patient preferences, and offer personalized recommendations, enhancing the overall patient experience. Despite its advantages, AI in contactology presents challenges. Data quality, algorithm transparency, and regulatory compliance remain key concerns. The European Artificial Intelligence Act and ethical considerations regarding patient data privacy will shape the future integration of AI into clinical practice.

This presentation will discuss current AI advancements in contactology, practical applications, and future directions.

Is Syntonic Optometric Light Therapy Effective?

Pilar Cacho Martínez, PhD
University of Alicante, Spain

Brief Curriculum Vitae

Diplomada en Óptica y Optometría por la Universidad de Alicante, licenciada en Documentación por la Universitat Oberta de Catalunya y doctora por la Universidad de Alicante en el programa de doctorado de Salud Pública.
Actualmente desarrolla su actividad profesional como profesora Titular de Universidad en la Universidad de Alicante. En el Máster Universitario en Optometría avanzada y salud visual imparte docencia en las asignaturas de Optometría basada en la evidencia y Rehabilitación visual. Su docencia en el grado de Óptica y Optometría está relacionada con varias asignaturas sobre visión binocular clínica y optometría en poblaciones específicas. Sus líneas actuales de investigación están centradas en la aplicación de la evidencia científica en el ámbito de la salud visual y en el análisis de diferentes aspectos de la visión binocular clínica, como la evaluación de los criterios diagnósticos de las disfunciones de la visión binocular y la caracterización de la sintomatología asociada a las disfunciones visuales.
Autora de diversos artículos científicos publicados en revistas internacionales de impacto y revisora de varias revistas científicas internacionales relacionadas con la Optometría y la Oftalmología.
Perteneciente al Grupo de investigación en Optometría (GIOptom) de la Universidad de Alicante.
Co-directa del proyecto de cooperación internacional "Mirada solidaria a Cuba" llevado a cabo por la Universidad de Alicante desde 1999 hasta la actualidad.
Directora del Capítulo de Visión Binocular y Optometría Pediátrica de la Sociedad Española de Optometría

Abstract

Syntonic optometric phototherapy, a technique based on viewing light through filters of different wavelengths, aims to induce physiological changes in the visual system by influencing the autonomic nervous system. This method has been proposed for the treatment of various visual dysfunctions, including binocular vision disorders, amblyopia, and oculomotor anomalies, as well as emotional and learning problems. Despite its clinical popularity among behavioural optometrists, there is a lack of robust scientific evidence supporting its efficacy.

This presentation offers a comprehensive systematic review of the scientific literature on Syntonic phototherapy. Using databases such as Medline, Scopus, Web of Science, and PsycINFO, as well as materials from the College of Syntonic Optometry, studies from 1980 to 2022 were analysed. Only eight studies met the inclusion criteria, the majority being pseudo-experimental designs, with no randomized controlled trials identified. The certainty of evidence was evaluated using the GRADE framework, revealing high risk of bias, imprecision, and methodological limitations.

Furthermore, a recent randomised clinical trial conducted by the author's research group involving 75 university students assessed the effects of red, blue, and placebo filters over 20 sessions. Variables analysed included visual symptoms, refractive error (M, J0, J45), binocular vision (vergence, accommodative function), and visual function (contrast sensitivity, visual field). Results showed no statistically significant differences between intervention and placebo groups across any variable, with effect sizes consistently low.

The findings indicate that Syntonic phototherapy does not provide benefits beyond placebo for visual or refractive function. Therefore, there is currently no scientific basis to support its clinical application in the treatment of visual anomalies.

Blue Light Filters: What they are, what they do and when to use them

José Manuel González Meijome, PhD
University of Minho, Portugal

Brief Curriculum Vitae

Graduated with honors in Optometry from the University of Santiago de Compostela (1997), with a Spanish Ministry of Education research and teaching grant. After a fellowship at the CCLRU (UNSW, Australia), joined the University of Minho (Portugal), where he is now Full Professor and Dean of the School of Sciences.
He teaches Optometry and Vision Sciences and coordinates the Clinical and Experimental Optometry Research Lab, focusing on topics like retinal response to myopia control treatments. He has authored over 220 indexed articles (WoS h-index = 41; >5500 citations), 3 books, 30 chapters, 4 patent applications, and over 500 presentations, including 160 invited or keynote lectures in 30 countries. He has led several national and European-funded projects, including a Marie Curie Innovative Training Network. He is Chief Editor of the Journal of Optometry, Vice-president of the European Academy of Optometry and Optics, member of the European Qualifications Board, evaluator for research agencies in 4 countries, and Portuguese Ambassador for the Society of Ocular Surface and Contact Lenses.

Abstract

Ophthalmic devices with short-wave visible light protection (also known as blue filters) have been marketed more intensively in the last 5 years and are now object of criticism due to the lack of evidence to endorse its efficacy for some of the claimed indications. Generally, there is lack of understanding about the transmission characteristics within the visible spectrum, potential effects on the systemic and eye health and on the indications and efficacy.
The purpose of this lecture is to gather the eye care professional's perception (ECP) on the technical characteristics of these lenses, and update on their potential applications where might provide some advantage to patients and how to communicate the pros and cons to patients with different visual problems. The literature was searched for independent technical reports characterizing the transmission spectrum, clinical trials, systematic reviews and meta-analysis reporting on the efficacy of short-wave visible light protection incorporated to spectacle lenses, intra-ocular lenses and contact lenses. The session will seek the interaction of the lecturer with the attendees using web-based voting platform PollEverywhere during the lecture and at the end to verify that the concepts presented have been acquired and integrated. Contrary to the general understanding, most of the devices allow transmission of a great part of the blue light between 440 and 500 nm, and only filter out part of the violet light within the 380 and 440 nm range. For several indications of these filters, research was not able to demonstrate efficacy to improve sleep, alleviate computer vision syndrome, or preserve the macular health. Some recent studies have successfully tested the potential use of some devices to reduce photostress, the glare discomfort and potentially improved night driving, but further research is necessary to confirm these potential benefits. ECP need to be permanently updated on the technical characteristics and literature supporting the optical devices they prescribe to their patients avoiding making claims that are not supported by the more solid and recent evidence. With that, practitioners and industry will provide consistent clinical recommendations, avoiding controversy and protecting their patients.

Visual impairment: Functional Assessment, Rehabilitation and Prescription of Aids

Adoración Callejo Calomarde, OD
Óptica Unyvisión, Spain

Brief Curriculum Vitae

Director and owner of Óptica Unyvisión in Pamplona, Navarra. Optometrist collaborator with ONCE (Spanish National Organization for the Blind). Holds a Diploma in Optics and Optometry from the Complutense University of Madrid and a Master's Degree in Optometry from the Boston Center for Optometry.
University Expert in Neuro-Visual Pathology and Acquired Brain Injury (UDIMA). University Specialist in Vision and Learning, Ophthalmology, and Pathological Anatomy, Faculty of Medicine, University of Murcia. Trained in visual field loss rehabilitation (SEEBV) and visual rehabilitation in acquired brain injury (SEEBV). Completed monographic courses in Low Vision and Visual Rehabilitation, and in Prism Prescription (Orduna Clinic).
Speaker at the Neuro-Ophthalmology Conferences and the SEEBV Conferences (Spanish Society of Specialists in Low Vision and Rehabilitation).

Abstract

This presentation explores a comprehensive approach to the assessment and rehabilitation of individuals with visual impairment, focusing on functional vision, adaptive aids, and optometric management. It begins by defining key terms such as deficiency, disability, and impairment, aligning with international classifications (CIE-11 and CIF), and emphasizes the evolving nature of disability as an interaction between individual conditions and social-environmental barriers. The classification of visual impairment is addressed through acuity and visual field criteria, with specific reference to legal definitions and national regulations. A detailed anamnesis is considered essential, including medical history, psychological state, and personal goals, to guide individualized rehabilitation planning.

The optometric assessment includes tests for distance and near visual acuity, contrast sensitivity, color vision, visual fields, binocular vision, and oculomotor functions. Advanced tools like microperimetry, contrast sensitivity tests, and ETDRS charts are used to detect functional limitations. For individuals with central vision loss (e.g. AMD, diabetic retinopathy), eccentric viewing training and low vision aids like telescopes, magnifiers, and electronic devices are recommended. For peripheral vision loss (e.g. glaucoma, retinitis pigmentosa), orientation and mobility training, visual field enhancement techniques, and virtual/augmented reality tools (e.g., Retiplus) are emphasized.

The use of selective filters, tiflotecnology, and assistive applications on smartphones and tablets is also covered, highlighting practical support in daily life activities.

Finally, the presentation stresses the importance of interdisciplinary rehabilitation, tailored reports for patients and professionals, and long-term follow-up to ensure that the prescribed aids are used effectively and adjusted as needed.

Discovering the Potential of Orientation and Mobility in Low Vision

Lluís Pérez Mañá, PhD
Polytechnic University of Cataluña, Spain

Brief Curriculum Vitae

Lluís Pérez Mañá is an Optometrist and PhD in Optical Engineering from the Polytechnic University of Catalonia (UPC). With over 22 years of experience, his career blends clinical practice, research, and teaching, with a strong focus on improving quality of life for individuals with visual impairment.
He holds a Diploma in Optics and Optometry (Terrassa, 2003) and earned his PhD in 2019 with a thesis on quality of life assessment in visually impaired patients. He also holds master's degrees in Low Vision and Visual Rehabilitation (University of Valladolid, 2011), Basic Rehabilitation for the Visually Impaired (Asociación Española de Optometristas Unidos, 2011), and Clinical Optometry (European University of Madrid and Illinois College of Optometry, 2008).
Currently, he is a Lecturer at the Terrassa School of Optics and Optometry and a researcher at the CD6 Technology Development Center, contributing to visual rehabilitation technologies. He has authored scientific articles, presented at national and international conferences, and worked clinically at Hospital Parc Salut Mar and the Discapacitat Visual Catalunya association. Luís is also Low Vision coordinator at the Catalan College of Optometrists, teaches in various postgraduate programs, and collaborates with the NGO Ocularis, training pediatric optometrists in Mozambique. His work is marked by scientific rigor, empathy, and a practical approach to visual rehabilitation.

Abstract

Transforming Lives through Orientation and Mobility: A Multidisciplinary Approach to Visual Impairment
Presented by Professor Lluís Pérez Mañá, a specialist in low vision and visual rehabilitation, this talk explores the transformative impact of orientation and mobility (O&M) training for individuals with visual impairment. Through a multidisciplinary lens, it highlights how these techniques foster autonomy, social inclusion, and quality of life.

Key topics include the role of spatial orientation and safe mobility tools (e.g., white canes, guide dogs, electronic aids), the emotional adaptation to vision loss, core O&M techniques, and the importance of teamwork with psychologists, optometrists, and other professionals. Real-life case studies and emerging technologies, such as electronic canes and smart glasses, are also discussed.

This session offers practical insights, professional inspiration, and is ideal for clinicians, educators, and anyone committed to supporting people with visual impairment.

Pupillary Alterations: Clinical Cues and Exploration

Carlos Perla Muedra, MD
Hospital Arnau de Vilanova, Spain

Brief Curriculum Vitae

Carlos Andrés Perla Muedra is a neurologist specializing in neuro-ophthalmology. He earned his medical degree from the University of Valencia in 1987 and completed his neurology residency at Hospital La Fe in Valencia. Since 1995, he has served as a consultant neurologist at Hospital Arnau de Vilanova, where he also coordinates the Neuro-Ophthalmology Unit.
Dr. Perla Muedra is Secretary of the Neuro-Ophthalmology Study Group of the Spanish Society of Neurology (SEN) and leads the regional group in the Valencian Community. He teaches neurology with a focus on neuro-ophthalmology at CEU Cardenal Herrera and the Catholic University of Valencia, and supervises clinical rotations and student research in the field.
A frequent speaker at national neurology workshops and low vision conferences, he is also a member of SEN, the Valencian Society of Neurology, and the European Neuro-Ophthalmology Society (EUNOS). His clinical interests include neuro-ophthalmology and demyelinating diseases.

Abstract

The pupil is the window through which we receive visual information from our surroundings. Pupillary abnormalities are an important component in the assessment of patients with neuro-ophthalmological conditions and can, at times, constitute a medical emergency.
Pupillary reactivity is regulated by the autonomic nervous system. The parasympathetic system causes pupil constriction (miosis) in response to light stimuli by contracting the iris sphincter muscle, which has a circular anatomical arrangement. In contrast, the sympathetic system triggers pupil dilation (mydriasis) in dim environments through the contraction of the iris dilator muscle, which has a radial fiber arrangement.
The pupil responds not only to light stimuli but also to emotional triggers, such as situations of alert or danger, which lead to mydriasis.
The first part of this talk will cover efferent pupillary disorders that result in anisocoria, whether due to mydriasis (parasympathetic pathway lesion) or miosis (sympathetic pathway lesion), and will present recommended diagnostic algorithms.
The second part will focus on the clinical features of afferent pupillary disorders, particularly relative afferent pupillary defect (RAPD or Marcus-Gunn pupil), a key neuro-ophthalmological sign for identifying optic neuropathy..

Optometric Care in Patients with Diplopia Secondary to Neurological Damage

Teresa Calderón González, OD
University of Granada, Spain

Brief Curriculum Vitae

Teresa Calderón González is a licensed pharmacist and optometrist, with a Master's in Advanced Clinical Optometry and currently pursuing a PhD at the University of Granada. She works as an optometrist at OPTO Centro de Optometría y Terapia Visual and in the ophthalmology department of the Hospital of Mieres (Asturias). Her previous experience includes clinical roles in both hospital and primary care settings, as well as in community pharmacy.
She has been an external lecturer at the University of Granada's Master's in Optometry and Visual Optics Research since 2016, and also teaches in postgraduate programs at the University of Valencia and OPTOAcademy, among others. She has delivered over 25 presentations at national and international conferences (OPTOM, CIOCV, SIYO, SNAO, among others) and is currently involved in research on amblyopia, diplopia, hemianopia, and learning difficulties..

Abstract

Acquired Brain Injury (ABI) refers to damage affecting brain structures in individuals who were previously neurologically intact. The most frequent causes include stroke (78%) and traumatic brain injury (TBI – 20%), while less common aetiologies (<5%) involve brain tumours, vascular malformations, neurodegenerative diseases, multiple sclerosis, and infections such as encephalitis or meningitis. These injuries frequently result in cognitive, emotional, behavioural, and/or physical impairment, including deficits in visual function.

Visual dysfunction is a common post-stroke complication, with up to 60% of stroke survivors presenting with visual symptoms. These impairments affect activities of daily living, mobility, and overall rehabilitation outcomes. Reported manifestations include hemianopsia, diplopia, oculomotor motility disorders, visual neglect, and visual agnosia, each associated with specific brain regions such as the occipital lobe, brainstem, cerebellum, or parietal cortex. Notably, 89% of individuals with ABI experience limitations in basic daily activities, and 71% require assistance.

Diplopia is particularly prevalent (16–35%) following brainstem or cranial nerve damage, involving the III, IV, and VI cranial nerves, and may result in vertical or horizontal deviations. In 25% of cases, binocular dysfunction persists for more than six months post-stroke.

Visual rehabilitation after acquired brain injury involves a comprehensive optometric assessment to determine the type and cause of visual dysfunction. Treatment may include the use of prisms or partial occlusion techniques to manage diplopia, with total occlusion being avoided in patients with visual neglect. In addition, orthoptic exercises and visual training strategies should be adapted to the patient's cognitive abilities to enhance effectiveness. The use of low vision aids, compensation techniques for visual field loss, and environmental adaptations also play a key role in promoting visual function. An interdisciplinary approach is essential, integrating professionals from neurology, optometry, occupational therapy, and rehabilitation to ensure a cohesive neuro-rehabilitation plan. Altogether, these strategies aim to improve visual performance and patient autonomy, ultimately supporting functional recovery and quality of life after brain injury.

Visual Therapy in Homonymous Hemianopsias: What can we do?

Beatriz Palacios, OD
University of Valladolid, Spain

Brief Curriculum Vitae

Beatriz Palacios is a PhD student in Vision Sciences at the University of Valladolid. She holds advanced degrees in Clinical Optometry and Visual Therapy from the Universities of Alicante and Valencia. Since 2016, her work has focused on vision therapy, particularly in strabismus and amblyopia.
In recent years, she has expanded into research on visual field defects, with a focus on homonymous hemianopia. She is currently the director of her own optometry and visual therapy center in Alcoy (Alicante) and leads the vision therapy area at a specialized center in Valencia.

Abstract

Acquired brain injury (ABI), most commonly caused by stroke (70% of cases), often results in significant visual impairments. Visual field loss affects approximately 30% of individuals with ABI, with homonymous hemianopia (HH) being the most frequent type.
HH leads to severe visual skill deficits that directly impact patients' quality of life. Current treatment approaches include:
Compensatory therapy: Aims to improve eye movements and develop strategies to compensate for the lost visual field.
Prismatic therapy: A passive treatment using yoked prisms to achieve limited field expansion.
Restorative therapy: Focuses on recovering portions of the blind visual field through perceptual learning techniques applied to the "border zone" near the scotoma.
Our ongoing clinical trial uses the treatment protocol developed by VisionaryTool, based on perceptual learning strategies. The intervention combines in-office sessions with home-based exercises to stimulate visual recovery.

Keys to Visual Field Interpretation in Neuro-Ophthalmology

Juan Marín Montiel, MD, PhD
Hospital Arnau de Vilanova, Spain

Brief Curriculum Vitae

Juan Marín Montiel is a senior ophthalmologist and Head of the Glaucoma Section at Hospital Arnau de Vilanova in Valencia, Spain. He earned his MD and PhD from the University of Valencia, with postgraduate specialization in ophthalmology at Hospital La Fe. With over three decades of clinical, academic, and research experience, Dr. Marín has focused on glaucoma, neuro-ophthalmology, and retinal manifestations of systemic diseases.
He is a professor of ophthalmology at the Catholic University of Valencia and has directed numerous doctoral theses, master's projects, and undergraduate research. He is the author of several ophthalmology books, over 30 book chapters, and more than 60 scientific publications. He has been an invited speaker at national and international congresses and has contributed significantly to clinical training, medical education, and public health programs.
Dr. Marín is also a recipient of the "Dr. Juan Pallarés" Award for ophthalmological research and has collaborated on multiple publicly funded research projects in glaucoma and genetic ophthalmology.

Abstract

Juan Marín-Montiel, Emma Marín-Payá

The visual field functions as a perceptual puzzle of the visual pathway. Its proper interpretation requires understanding the spatial and anatomical perspectives of both the retina and the visual pathway. This talk outlines key principles for interpreting visual field results in neuro-ophthalmology, including the reversed spatial orientation of visual field testing, the mapping of functional quadrants to anatomical retinal zones, and the significance of decussation at the optic chiasm.

By reviewing the anatomical divisions of the visual pathway—prechiasmal, chiasmal, and postchiasmal—the session explains how lesions in each segment produce characteristic patterns of visual field loss (e.g., unilateral deficits, bitemporal hemianopia, homonymous hemianopia). The talk concludes with clinical case studies from the multidisciplinary neuro-ophthalmology unit at Hospital Arnau de Vilanova, emphasizing the practical relevance of these interpretative keys in routine diagnosis.

Free Papers

Free Paper#1

Comparative Stability of Daily, Biweekly, and Monthly Contact Lenses Following 24-Hour Immersion

Clara Martínez Pérez, Ana Paula Oliveira

Abstract

Objective: To evaluate the stability of contact lenses (CLs) after 24 hours of immersion in a maintenance solution, comparing the weight variation among daily, biweekly, and monthly lenses, and exploring potential correlations between lens power and weight variation.

Methods: Hydrogel and silicone hydrogel CLs were categorized based on their frequency of use: daily, biweekly, and monthly. Each lens was weighed before and after 24 hours of immersion in a standard maintenance solution. The weight variation (final weight minus initial weight) was calculated for each lens. Statistical analysis was performed using independent t-tests to compare weight variations between groups, with significance set at $p<0.05$. Additionally, potential correlations between lens power (diopters) and weight variation were evaluated.

Results: A total of 20 daily lenses, 7 biweekly lenses, and 9 monthly lenses were analyzed. Daily CLs showed the highest stability after 24 hours of immersion in maintenance solution, with an average weight variation of +0.0002±0.0053g, significantly lower than that of biweekly lenses (-0.0063±0.0154 g; $p=0.013$) and monthly lenses (-0.0054±0.0101g; $p=0.021$). No significant differences were found between biweekly and monthly lenses ($p=0.543$). In general, daily lenses exhibited less dispersion, while biweekly lenses showed greater variability, with extreme losses of up to -0.0395g, and monthly lenses exhibited moderate losses of up to -0.0248g. When comparing brands within the daily lens group, "Precision 1" demonstrated greater stability ($p<0.001$) compared to "1-Day Acuvue Moist". No significant correlation was identified between lens power and weight variation ($p>0.05$), regardless of the frequency of use.

Conclusion: Daily CLs showed superior stability, likely due to material and design, while biweekly and monthly lenses exhibited greater variability. The lack of correlation between lens power and weight variation suggests that stability depends on lens composition rather than diopter strength. These findings highlight the importance of material choice in enhancing lens performance and user comfort.

Free Paper#2

What intrinsic factors affect the central corneal thickness?

Filipe Da Silva, João M.M. Linhares, Madalena Lira

Abstract

Purpose: The central corneal thickness (CCT) plays a very important role regarding the measurement of the intraocular pressure, evaluation of corneal uniformity, and selection of a suitable technique for corneal refractive surgery. The aim of this review was to provide a comprehensive and elucidative review of the intrinsic factors influencing CCT.

Methods: A topical search across scientific online databases for research articles related to corneal thickness was performed. The initial search method included the terms ('central corneal thickness' OR 'corneal thickness' OR 'cornea thickness') AND ('correlation' OR 'correlated' OR 'correlations' OR 'related'). A total of 7488 articles were identified, however, after screening and eligibility phases, 103 articles were included.

Results: It was found that the CCT decreases with age in adults and increases during growth in younger individuals. Females generally have a lower CCT compared to males, and oral contraceptives may also play a role in this difference. Africans and individuals of African descent typically have thinner CCT. Highland inhabitants have thinner CCT compared to lowland inhabitants, and CCT increases when lowlanders ascend to high altitudes. CCT varies throughout the day, with significant increases observed in the morning following sleep. Individuals with autoimmune diseases, such as rheumatoid arthritis and Sjogren's syndrome, tend to have lower CCT. Conversely, diabetes is associated with higher CCT, with CCT correlating with glycemic control. Additionally, autoimmune diseases such as psoriasis, autoimmune liver disease, and lupus erythematosus do not appear to affect CCT. Dry eye is associated with lower CCT, while treatments such cyclosporine A or artificial tears have been shown to increase CCT.

Conclusions: The CCT affecting conditions are multifactorial and bidirectional. Recognizing the impact of intrinsic factors affecting CCT not only enhances the understanding of corneal dynamics but also contributes significantly to the improvement of diagnostic and therapeutic strategies in vision and ocular health.

Free Paper#3

Efficacy of Regressive Geometry Lenses in Managing Transient Myopic Shifts in Diabetic Patients: A Randomized Trial

Ana Amorim de Sousa, Miguel Faria-Ribeiro, Madalena Lira, Jorge Jorge

Abstract

Objective: Hyperglycemia in diabetic patients can cause temporary refractive changes, often inducing myopic shifts, while glycemic treatment may trigger transient hyperopia. This study evaluated the visual performance of diabetic patients using regressive geometry ophthalmic lenses (POLO Diabetic), designed to address these shifts, compared to conventional lenses (POLO Life).

Methods: A prospective, double-blind, randomized study was conducted with 28 diabetic participants (Type 1 and 2), divided into monofocal (M) and progressive (P) lens users from POLO - Produtos Ópticos S.A. The study included a two-phase lens trial (POLO Life – PL – and POLO Diabetic – PD), each lasting approximately 15 days. Distance visual acuity (DVA), near visual acuity (NVA), and contrast sensitivity (logCS at 0.75, 1.5, 3, 6 12 and 18 cycles per degree - cpd) were assessed at dispensing and after 15 days. Two questionnaires evaluated subjective visual experience—one after each lens trial (Questionnaire 1) and another comparing both lenses (Questionnaire 2)—focusing on visual clarity, stability, adaptation ease, and symptom frequency (e.g., visual fatigue, headaches, discomfort).

Results: Both monofocal and progressive lens groups reported comparable visual performance between PL and PD lenses. No statistically significant differences were found in DVA (PD-PLM=0.01±0.01 logMAR and PD-PLP=-0.02±0.05 logMAR), NVA (PD-PLM=0.02±0.02 logMAR and PD-PLP=-0.01±0.04 logMAR), CS (median [IQR]; PD-PLM_0.75=0 [47], PD-PLM_1.5=0 [65], PD-PLM_3=0 [84], PD-PLM_6=0 [57], PD-PLM_12=-7 [36] and PD-PLM_18=14 [38] logCS; PD-PLP_0.75=0 [106], PD-PLP_1.5=0 [65], PD-PLP_3=0 [72], PD-PLP_6=98 [155], PD-PLP_12=-36 [104] and PD-PLP_18=0 [35] logCS) or subjective visual comfort (Questionnaire 1 and 2) after 15 days (p>0.050, post-hoc Bonferroni correction for Friedman Test). Participants generally rated both lenses as similar across most visual parameters.

Conclusion: PD lenses demonstrated equivalent visual performance to PL lenses for both monofocal and progressive users. Future research should involve a larger sample size and a longer study duration to elucidate long-term lens performance and optimize optical solutions for diabetes-related visual fluctuations.

Free Paper#4

Visual function and retinal parameters in patients with Alzheimer´s disease: a pilot study

Tania Alvite Piñeiro, Miriam Ramallo Pita, Marta Rodríguez Fernández, Maite López López, Uxía Regueiro Lorenzo, Mª Isabel Lema Gesto

Abstract

Objective: To assess the visual function and retinal parameters in patients with Alzheimer´s Disease (AD) and control subjects to identify potential alterations reflecting disease progression and to investigate possible imaging biomarkers for early AD diagnosis.

Methods: In this preliminary study, 15 AD patients and 8 age- and sex-matched healthy controls were initially recruited. All participants underwent a clinical protocol that included visual acuity (VA) assessment (Snellen test), slip-lamp examination, color vision evaluation (Farnsworth Munsell D15 saturated test), visual field testing using computerized perimetry, optical coherence tomography (OCT), and retinography. After conducting the optometric-ophthalmological examination, patients with conditions affecting the analysis of each parameter (such as age-related macular degeneration or lens opacity) were excluded. Statistical analysis was conducted with SPSS and GraphPad Prism 8. Bivariate comparisons were performed using the T-Student test or Mann-Whitney U test for normally and non-normally variables, respectively ($p<0.05$ considered statistically significant).

Results: No significant differences in VA were observed between groups ($p=0.358$). However, AD patients made significantly more nonspecific errors on the color vision test compared to controls (8.20 ± 3.70 vs 1.25 ± 1.50 (mean±SD); $p=0.010$). A decrease in the visual field index and mean sensitivity (approx. 2 times less), as well as an increase in the mean defect, were observed in AD patients; nevertheless, these differences were not statistically significant ($p=0.114$, $p=0.057$, $p=0.069$, respectively). OCT revealed a decreasing trend in retinal nerve fiber layer thickness in the superior (114.14 ± 9.17 vs 110.17 ± 12.24; $p=0.468$) and nasal (74.14 ± 8.13 vs 68.75 ± 10.71; $p=0.267$) regions of the optic disc, as well as in macular thickness (261.71 ± 16.40 vs 256.58 ± 23.13; $p=0.616$) in AD patients.

Conclusions: Our results suggest that AD patients exhibit alterations in visual function (including color vision and visual field), which may reflect disease progression. However, due to the small sample size, further research is needed, especially regarding OCT, to obtain more consistent results.

Free Paper#5

Retinal vascularization and mild cognitive impairment: results of a pilot study with octa

Lorena Elvira-Hurtado, Alba López-González, Inés López-Cuenca, José A. Matamoros, Lidia Sánchez-Puebla, José A. Fernández-Albarral, Mario Salas-Carrillo, Pedro Gil, Ana I. Ramírez, Juan J. Salazar, José M. Ramírez, Rosa de Hoz, Elena Salobrar-García

Abstract

Mild cognitive impairment (MCI) could be consider as a previous stage of Alzheimer's Disease (AD). This pilot study aims to explore retinal vascular alterations in patients diagnosed with MCI compared with cognitive healthy subjects, paired by age, using spectral-domain OCT angiography (SD-OCTA) to evaluate the vascular structure of the three vascular plexuses: superficial vascular complex (SVC), intermediate capillary plexus (ICP), and deep capillary
plexus (DCP). Thirteen healthy subjects and sixteen patients with MCI, matched by age, were included. All participants were free of ocular pathologies, underwent a comprehensive ophthalmologic evaluation, and macular OCTA (SD-OCTA, Heidelberg, Germany) to assess the vascular structure of the three vascular plexuses: SVC, ICP, and DCP. The obtained images were analyzed using AngioTool, an open-source software for quantitative vascular analysis, which
provides values for vessel area, vessel percentage area, total number of junctions, junction density, total vessel length, average vessel length, total number of endpoints, and lacunarity. Statistical analysis was performed using the Mann-Whitney U test to compare the MCI group with the control group, with statistical significance set at $p < 0.05$. Individuals with MCI showed a significant reduction in vessel area in the SVC ($p < 0.05$), along with significantly shorter vessel length in the SVC ($p < 0.05$) compared to cognitively healthy controls. No significant differences were found in the ICP and DCP in any of the parameters analyzed by AngioTool in these layers.
The analysis of the SVC may serve as a biomarker for the diagnosis and monitoring of this neurodegenerative condition, before AD. OCT angiography holds promise as a non-invasive tool for early detection of retinal vascular alterations, which could provide new avenues for non-invasive MCI detection and clinical follow-up

Free Paper#6

Association between red-green color discrimination thresholds and color naming accuracy of natural colors

Dora N. Marques, José A. R. Monteiro, João M. M. Linhares, Sérgio M. C. Nascimento

Abstract

Purpose: We investigated the relationship between red-green (RG) color discrimination thresholds and color naming accuracy across different background conditions, exploring how chromatic sensitivity and contextual factors influence color perception.

Methods: Thirty-one normal trichromats, five deuteranopes, seven protanopes, six deuteranomalous, and five protanomalous participated in a color naming experiment. Colors were derived from hyperspectral data of natural scenes [1] and presented in four backgrounds: Simple (uniform gray), Grayscale (achromatic natural scene), Scrambled (chromatically variegated natural scene), and Original (natural scene). Linear regression models assessed the association between RG thresholds (Colour Assessment and Diagnosis test) [2,3] and color naming hit scores (proportion of correct responses relative to the modal responses of normal trichromats) for each background. Color naming accuracy reflects the overall performance, calculated as the average hit score across trials.

Results: Strong negative correlations were observed between RG thresholds and naming hit scores across all conditions (Simple: $r = -0.893$; Grayscale: $r = -0.933$; Scrambled: $r = -0.954$; Original: $r = -0.898$; all $p < 0.001$). Regression models explained significant variance in scores (R^2: Simple = 0.798, Grayscale = 0.870, Scrambled = 0.911, Original = 0.806). Larger RG thresholds were associated with lower hit scores, indicating that individuals with more severe color vision defects made more naming errors. This relationship was strongest in the Scrambled and Grayscale conditions, suggesting that spatial and chromatic complexity exacerbate the impact of chromatic sensitivity. However, significant effects were also observed in the Simple and Original conditions, highlighting the role of chromatic sensitivity even in less complex or naturalistic settings.

Conclusion: Larger RG color discrimination thresholds predict lower naming hit scores, particularly in complex backgrounds. These findings underscore the critical role of chromatic sensitivity in color perception and provide insights into how individual differences in color vision affect performance across different visual contexts.

Free Paper#7

Twelve-month refractive follow-up of pre-myopic and myopic myopic children: is there alternative to cycloplegic refraction?

Cristina Vieites Alvite, Clara Abadías Ferreiro, Jacobo Fraguela Paz, Sofia C. Peixoto-de-Matos, José M. González-Méijome

Abstract

Purpose: Cycloplegic refraction has been indicated as the recommended method to assess children refractive error. Not all eye care practitioners are autothorized to use cycloplegia so combination fo objective and subjective refraction methods is widely used to assess pediatric refractive error with special atention to avoid undesirable effects of ocular accommodation. The present study assessed the changes in refractive error in pre-myopic and myopic children attending an optometric examination using retinoscopy, autorefraction and subjective refraction during 12 months.

Methods: Consecutive patients with age between 7 and 17 years, without any ocular or systemic condition besides myopia were evaluated by a comprehensive optometric examination in Narón (A Coruña, Spain) including non-cycloplegic retinoscopy, autorefraction and subjective refraction. History of myopia control treatment was recorded. The statistical analysis was carried out with the SPSS statistical package (IBM, Illinois, USA) to compare repeated measures (T-test); only the right eye was used for analysis. The protocol has been assessed and approved by the Galician Ethics Commmittee for Clinial Research.

Results: Data from thirty-eight children completing 12 months of follow-up were pre-screened. Of those 20 were under some myopia control treatment, four were excluded for orthokeratology lenses use which potentially affect the refractive analysis reliability. Finally, data from the right eyes of 34 subjects were analyzed. Spherial (Sph) and Cylindrical (Cyl) subjective refraction in clinical notation were averaged at Baseline (Sph: -1.66±1.43D and Cyl=-0.67±0.45D), at 6 months (Sph: -1.91±1.60D and Cyl=-0.69±0.46D), and at 12 months visits (Sph: -2.04±1.59D and Cyl=-0.52±0.55D). Retinoscopy values were not significantly different from the subjective refraction (diff.=-0.04±0.24D; $p>0.05$), while autorefraction values were significantly more myopic than retinoscopy (diff.= diff: -0.24±0.61D; $p<0.05$) and subjective refraction (diff.=-0.29±0.68D; $p<0.001$).

Conclusions: Refractive follow-up is essential in monitoring mypia onset and progression. When cycloplegic refraction is not available, static retinoscopy followed by subjective refraction searching the maximum plus for maximum visual acuity is an adequate procedure to protect agaisnt overminusing. Autorefraction will result in significantly more myopic values in the spherical and cylindrical component of refraction and could misslead the outcomes of the final prescription.

Free Paper#8

Trends in Refractive Errors in Portugal (2022–2024): Insights from Optometric Records

Marta Sofia Magro, Ana Isabel Pinto, Ana Pires, Vanessa Félix, Carmelo Baños Morales, António Queirós, José M. González-Méijome

Abstract

Objective:Refractive errors (RE) are common ocular conditions affecting millions worldwide. Analyzing clinical records helps monitor RE prevalence, enabling improvements in eye care services and overall quality of life. This study compares the prevalence of RE among users of optometric services in Portugal between 2022 and 2024.

Methods: Data from patients examined at 16 Mais Optica® optometric centers were analyzed using standardized clinical protocols. Patients who underwent an optometric examination and consented to participate were included, while those with ocular conditions affecting refractive status were excluded. The prevalence of different RE types was assessed across four age groups: 6–29, 30–44, 45–59, and ≥60 years. Prevalence rates and mean spherical equivalent (SE) values were compared between groups. Statistical analysis was performed using SPSS v.30.

Results: A total of 282 patient records from 2024 were analyzed. The mean age was 40.58±16.10 years (range: 6–100 years), with 65% of participants being female. The mean SE was -0.94±2.40 diopters (D) (range: -13.63 to +6.25D). SE distribution varied by age group, with mean values of -1.98±2.41D in the 6–29 age group, -1.78±3.48D in 30–44, -0.58±2.44D in 45–59, and +0.54±2.11D in those aged ≥60.

Compared to 2022 data collected using the same protocol, myopia remained the most prevalent RE, affecting 43% of patients in 2024—an increase from 41.3% in 2022. High myopia prevalence rose from 2.7% in 2022 to 5% in 2024. In the 6–29 age group, myopia prevalence decreased from 69.3% in 2022 to 62% in 2024, while hyperopia declined from 29.7% to 22% over the same period.

Conclusions: The distribution of refractive errors in 2024 closely resembles that of 2022, with myopia remaining the most common RE, particularly among younger individuals. However, the increase in high myopia from 2.7% to 5% raises significant concerns for future eye health.

Free Paper#9

Optic nerve anatomic changes in open angle glaucoma patients after Preserflo Microshunt surgery

Ainhoa Colina Jareño, Laura Morales Fernandez, Ruben Sanchez Jean, Lydia Medina Ramirez, Javier Garcia Bardera, Jose Maria Martinez de la Casa, Julian Garcia Feijoo

Abstract

Purpose: The aim of this study is evaluate the anatomic changes in open angle glaucoma patients with Preserflo Microshunt surgery.

Methods: An observational, prospective study was performed at Hospital Clinico San Carlos in Madrid. A total of 13 eyes with Preserflo Microshunt standalone glaucoma surgery were evaluated to determine the anatomic changes.

An Optic Coherence Tomography (OCT) image was performed to all patients in order to compare the distance between Bruch's Membrane, the depth of the lamine cribose and the total area of the papillary excavation before and one month after the surgery.

One horizontal and one vertical scan of the optic nerve was performed using a 25-line cube exam and follow-up software.

Results: Demography was 7 men versus 6 women with open angle glaucoma diagnosis according to the following subclassification 9 primary open angle glaucoma, 1 pseudoexfoliative, 3 pigmentary and 1 miopic.

There were statistically significant changes in the mean of horizontal and vertical vs before and one month after surgery of Bruch´s membrane (200,13 ± 57,77 µm and 213,59 µm±61,65 µm vs 339, 20 ± 128,20 µm and 302,95 µm±114,50 µm respectively), lamine cribose (501,60 ± 237,74 µm and 214,10 ± 61,80 µm vs 435,80 ± 288,65 µm and 256,99 ± 97,13 µm respectively) and area of the papillary excavation (0,40 ± 0,25mm2 and 0,32 ± 0,09mm2 vs 0,34 ± 0,23mm2 and 0,39 ± 0,15mm2 respectively)

Conclusion: A Bruch's membrane reduction was observed but also a reduction in the depth of the lamine cribose and the total area of the papillary excavation after the surgery. The OCT nerve scan, combined with the retinal fiber layer scan, may be useful for evaluating glaucoma progression.

Free Paper#10

Twelve-month changes in of monocular visual acuity in myopic children without and with myopia control treatments.

Clara Abadías Ferreiro, Cristina Vieites, Jacobo Fraguela, José M. González-Meijome

Abstract

Purpose: Current myopia management approach involves different correction modes including specially designed contact lenses and spectacle lenses, application of atropine drops, among other options. Some of these treatments can induce changes in the visual acuity of the young patient. Visual acuity is therefore a critical function to evaluate during follow-up to make sure the best correction is provided. The objective of this study was to analyze the fluctions of visual acuity of myopic young subjects attending an optometric clinic during 12 months follow-up period.
Methods: Consecutive patients with age between 7 and 17 years, without any ocular or systemic condition besides myopia were evaluated by a comprehensive optometric examination in Narón (ACoruña, Spain) including monocular decimal visual acuity evaluation after non-cycloplegic retinoscopy followed by subjective refraction to obtain the maximum visual acuity with the maximum plus refraction. History of myopia control treatment was recorded. The statistical analysis was carried out with the SPSS statistical package (IBM, Illinois, USA) to compare repeated measures (T-test); only the right eye was used for analysis. The protocol has been assessed and approved by the Galician Ethics Commmittee for Clinial Research.
Results: Data from thirty-eight children completing 12 months of follow-up were pre-screened. Of those 20 were under some myopia control treatment, all were included for subsequent analysis. Monocular and binocular visual acuity showed statistically non-significant improvement (ANOVA p≥0,05). over time from Baseline (1.04±0.13) to 6 months (1.08±0.12) and 12 months (1.12±0.16). Right and left eye monocular acuity was highly correlatd (r≥0.950: p<0.001). Subjects with myopia control (n=20) and without myopia control treatments (n=18) at 12 month follow-up had non statistical nor clinically significant best corrected visual acuity at baseline (1.05±0.09 and 1.04±0.15) or after 12 months (1.13±0.15 and 1.10±0.17).
Conclusions: Visual acutiy was kept with no statistically significant changes through the follow-up period in a mixed clinical populaion of myopic children wearing single vision and myopia control treatments. A slight clinically significant improvement was observed at 6 month (+0.04 decimal) and 12 month (+0.08 decimal). Best corrected monocular visual acuity improved overtime in subjects without or with myopia control treatments.

Free Paper#11

Short and medium-term changes in retinal activity with four different myopia control ophthalmic lenses

Bárbara Marinho, José Manuel González-Méijome, Paulo Fernandes

Abstract

Purpose: This study evaluated the effects on electroretinogram activity of four myopia control ophthalmic lenses randomly assigned after 30 minutes and 15 days of wear in young adults.
Methods: Nineteen myopic young adults (18-28 years, spherical refractive error -1.00D to 6.00D) completed this cross-over double-blind longitudinal trial. Each subject wore four myopia control lenses with distinct designs of defocus microlenses and power distribution: Aura3 and Aura6 (Fitlens), Myosmart (Hoya), and Stellest (EssilorLuxottica). Retinal electrophysiological response was assessed using multifocal global-flash ERG (mf-gfERG) with RetiScan (Roland Consult), providing a comprehensive retinal function analysis. Data were analyzed by dividing the retina into five rings, from central to peripheral. The protocol included three visits for each lens: baseline, 30 minutes post-initial wear, and after 15 days.
Results: Significant changes in DC amplitude were observed in the mid-peripheral and peripheral retina. Stellest showed the most pronounced and sustained adaptation effects, particularly in rings 4 and 5, with highly significant increases at both 30 minutes and 15 days ($p < 0.001$). Aura6 demonstrated consistent increases across multiple rings, suggesting a broad adaptation effect, while Myosmart showed more transient changes. For IC amplitude, Stellest exhibited the strongest and most persistent increases in rings 2–5, lasting up to 15 days. Aura6 showed early increases in rings 2 and 3, while Myosmart showed moderate increases at 30 minutes but no significant changes at 15 days. Aura3 showed a consistent increase throughout measurements, particularly in rings 1 and 4.
Conclusions: This protocol is sensitive to subtle retinal changes, supporting its use in preclinical evaluations of myopia control lenses. The study showed a design-dependent increase in global flash multifocal ERG peripheral response. These findings suggest that specific lens designs may induce distinct retinal effects, likely due to their unique defocus characteristics.

Posters

Poster#1

Effectiveness of Scleral Lenses in Visual Rehabilitation: A Clinical Case of Iridocorneal Endothelial Syndrome and Keratoconus

Jéssica Costa

Abstract

Purpose: Iridocorneal endothelial (ICE) syndrome is a rare eye disorder marked by abnormal proliferation of endothelial cells, causing corneal edema, iris atrophy, and peripheral anterior synechiae. Its co-occurrence with keratoconus, characterized by progressive corneal thinning and bulging, is exceptionally rare and presents unique clinical challenges. A 49-year-old patient diagnosed with both ICE and keratoconus in the RE had no useful vision in the affected eye for over 20 years, limited to light perception. The left eye provided primary vision. The patient presented with a corneal thickness of 361 microns at its thinnest point and an intraocular pressure of 15 mmHg (at 11 am). Two treatment options were considered aiming to restore some visual function in that eye: iris and pupil reconstruction surgery or adaptation of a scleral lens. Ultimately, the decision was made to proceed with a customized scleral lens as part of the visual rehabilitation plan.

Methods: An initial optometric assessment included corneal topography, visual acuity measurement, fluorescein staining, anterior segment imaging, and intraocular pressure evaluation. These were repeated at each follow-up to monitor progress.

Results: The scleral lens provided remarkable improvement, increasing visual acuity from light perception to 3/10 (Snellen Scale). Lens wear was gradually increased to full-day use with sustained vision and comfort. No significant changes in pachymetry or intraocular pressure were observed during lens use.

Conclusions: This improvement postponed surgical intervention, as the scleral lens optimized the ocular surface and enhanced visual function. The patient currently attends quarterly follow-ups to ensure continued monitoring and lens adjustments. This case highlights the significant potential of scleral lenses in rehabilitating vision in rare, complex conditions like ICE combined with keratoconus. Further studies are needed to evaluate their broader efficacy and limitations.

Poster#2

Psychosocial risks in workers in the ocular optics sector

Jorge Augusto Leal Duque Aveiro

Abstract

Due to their position in the interface between the health and commercial sectors, workers in the ocular optics sector are potentially exposed to various types of psychosocial risks and vulnerable to their impact. No studies have been conducted on psychosocial risks in eye care workers in Portugal.
To identify and characterize the psychosocial risks faced by eyecare workers in Portugal and to explore their impact on health and well-being, following a multidimensional approach based on the administration of the Copenhagen Psychosocial Questionnaire - COPSOQ.
This is an observational, cross-sectional, descriptive, comparative, and correlational study.
Eye opticians were recruited via email and invitations were shared on social networks and asked to complete an online survey. The survey included socio-demographic and professional status questions (gender, age, professional category, professional experience, type of optician, and district) and the validated Portuguese version of the Copenhagen Psychosocial Questionnaire—Middle Version (Silva et al., 2011).
The sample consisted of 500 participants (321, 64.2% female), with an average age of 41.28 (SD: 10.62; range: 19-83) years and an average professional experience of 15. 56 (sd: 10.65; range: 1-62) years, with 271 (54.2%) optometrists, 218 (43.6%) ocular opticians, and only 11 (2.2%) orthoptists working in independent opticians (n=277; 55.4%) and optical groups (n=223; 44.6%).
Compared to other Portuguese professionals, opticians have significantly lower levels in the General Health, Stress, Burnout, Sleep Problems, and Depressive Symptoms subscales.
Men have significantly higher levels in the subscales of Influence at work, Possibilities for development, Predictability, Transparency of work role, Social community, Quality of leadership, Justice and respect, Self-efficacy, Commitment, and Satisfaction; women in the subscales of Job insecurity, General Health, Sleep problems, Burnout, Stress, and Depressive symptoms.
Older workers (≥39 years) and those with more years of professional experience (≥16 years) perceive higher levels of Cognitive demands, Influence at work, Transparency of the work role played, Meaning, Commitment, and Satisfaction. At the same time, the under-39 group reports higher levels of Burnout, Stress, and Depressive symptoms.
Optometrists have higher levels of Quantitative demands, Cognitive demands, Emotional demands, Influence at work, and Work/family conflict than TOOs.
The health and well-being factors—general health (worse), Sleep problems, Burnout, Stress, and Depressive symptoms—correlate significantly, moderately, and positively with all the psychosocial risk factors (firmly with Work-family conflict), except for Cognitive demands and negatively with the protective factors (slightly with Commitment to the workplace).
To the best of our knowledge, this study was the first to empirically characterize psychosocial factors in the eyewear sector, thus helping to fill a gap in this area. This characterization can help interpret the individual and group results of workers in this area with greater acuracy. The most unfavourable factors in this sector seem to be Cognitive demands, Emotional demands, Work-family conflict, Work conflicts, Social support from superiors, Burnout, and Stress. As it is confirmed that the health and well-being of workers are related to most psychosocial factors, including those in which higher proportions of optical workers are at risk, it is essential to invest mainly in their prevention.

Poster#3

Expression of Melatoninergic and Dopaminergic Receptors in the Guinea Pig Posterior Pole for Myopia Research

Valdes-Soria, Gonzalo, Romaguera-Planells, María, Carpena-Torres, Carlos, De Diego-García, Laura, Martin-Gil, Alba, Carracedo, Gonzalo

Abstract

Objective: Experimental models of myopia suggest that increased retinal melatonin promotes axial elongation while retinal dopamine acts as a "delay" signal for myopia progression. Guinea pigs are commonly used in refractive development studies; however, only melatoninergic receptor 1A (MTNR1A) has been identified in retina and sclera while presence of melatonin receptor 1B (MTNR1B) and dopaminergic receptors DRD1 and DRD2 remains unclear. This study aimed to characterize melatoninergic and dopaminergic receptors in the guinea pig retina, choroid and sclera. Methods: Eight three-week-old, pigmented guinea pigs underwent optical biometry, optical coherence tomography and streak retinoscopy to measure axial length, choroid area and refraction under cycloplegia. Choroid area was quantified between 0.7 and 2.1 mm from the optic nerve head center using a custom-made Matlab software. Protein expression of MTNR1A, MTNR1B, DRD1 and DRD2 was analyzed by western blot in retinal, RPE/choroid complex and scleral samples. The study protocol followed ARVO Statements for Animal Research and was approved by the ethic committee at UCM (Spain). Data are presented as mean±SD, with significance set at $p<0.05$. Results: Guinea pigs' average refraction was 1.59±1.35 diopters, and axial length was 7.77±0.11 mm. Choroid area was 0.053±0.013 mm2 nasally and 0.049±0.015 mm2 temporally. All four receptors were detected in the retina, choroid and sclera. MTNR1A and MTNR1B protein levels were significantly higher in the retina and RPE/choroid complex than in the sclera ($p<0.05$). DRD1 expression was significantly higher in the retina compared to the choroid and sclera ($p<0.0001$), while DRD2 protein levels were similar across all tissues ($p>0.05$). Conclusions: Presence and expression patterns of melatoninergic and dopaminergic receptors in the naïve guinea pig posterior pole have been reported. The distinct receptor distribution patterns, combined with prior research, may help to clarify the intracellular signalling pathways involved in myopia and guide new therapeutic approaches for myopia control.

Poster#4

Impact of water polo training on ocular physiology and dry eye symptoms

María Serramito Blanco, Asunción Peral Cerdá, Julia Bodas Romero, Adolfo Aracil Marco, Gonzalo Carracedo Rodríguez

Abstract

Objective: Water polo athletes frequently encounter high levels of chlorine in swimming pool water, which may lead to ocular discomfort, epithelial damage, and dry eye symptoms. This study aimed to assess the physiological changes in the ocular surface following a water polo training session.
Methods: This pilot study was designed as a prospective, cross-sectional, pseudo-experimental analysis involving 20 athletes (40 eyes) with an average age of 19.2 ± 2.5 years. Assessments were conducted before and after training sessions, both with and without swimming goggles. The different subjective assessment questionnaires included the Ocular Surface Disease Index (OSDI), Dry Eye Questionnaire (DEQ), and Instant Ocular Symptoms Survey (IOSS). Additionally, Break-Up Time (BUT), Schirmer test and Tear Film Surface Quality (TFSQ) were assessed. Anterior segment images were examined to evaluate conjunctival hyperemia and fluorescein staining of the conjunctiva and cornea. Data analysis was conducted using JASP (version 0.18.3.0) and Sigmaplot.
Results: Dry eye symptoms worsened significantly after training. No statistically significant changes in TFSQ and BUT measurements were observed with goggle use ($p > 0.05$). However, Schirmer test results showed notable differences between pre- and post-training assessments, both with and without swimming goggles ($p < 0.005$). In addition, an increase in conjunctival hyperemia was observed, especially when goggles were not used. Significant epithelial damage was detected in both the conjunctiva ($p < 0.001$) and cornea ($p < 0.001$) after training, regardless of goggle use.
Conclusions: Water polo training has a considerable impact on dry eye symptoms, tear film stability, and ocular surface epithelial integrity. While swimming goggles help mitigate dry eye symptoms, Schirmer test variations, and ocular irritation caused by water polo practice, they do not appear to prevent conjunctival and corneal epithelial damage.

Poster#5

Lid Wiper Epitheliopathy: A Comprehensive Review of Identification Strategies and Future Directions

Rute J. Macedo de Araújo, Anitha Arvind, Rakesh Nanjappa, Krishna Kumar Gupta, Daddi Fadel

Abstract

Objective: Lid Wiper Epitheliopathy (LWE) is a clinical condition associated with ocular discomfort and visual disturbances due to epithelial damage in the marginal conjunctiva of the upper eyelid. The objective of this study was to review the current strategies for LWE identification, assess its association with ocular surface disorders, and discuss future directions for improving diagnostic methodologies.
Methods: A comprehensive literature review was conducted using PubMed, identifying 67 relevant studies. The selection criteria included studies that evaluated LWE diagnostic techniques, grading scales, and its association with contact lens wear and dry eye disease. Subjective and semi-objective grading methods were analyzed, along with novel advancements in LWE detection.
Results: The findings highlight the multifactorial etiology of LWE, with conflicting reports on its prevalence among contact lens wearers. LWE has also been linked to tear film instability, reduced mucin production, and eyelid margin abnormalities, complicating its diagnosis. Current grading systems, such as the Korb grading scale, remain widely used but present limitations in subjectivity and repeatability. Emerging semi-automated and photographic grading methods offer potential improvements but face challenges in standardization and clinical implementation.
Conclusions: Standardization and validation of LWE grading methodologies are critical for enhancing diagnostic accuracy and clinical decision-making. Future research should focus on refining grading systems, exploring the role of frictional forces and tear film composition, and developing automated diagnostic tools. Addressing these challenges will improve the assessment and management of LWE, ultimately enhancing patient outcomes.

Poster#6

Evaluation and Comparison of Soft Contact Lens Thickness using two Optical Coherence Tomography

Maria Romaguera, Gonzalo Valdes-Soria, Laura Ximena Sierra Buitrago, Carlos Carpena-Torres, Gonzalo Carracedo

Abstract

Objective: The inspection of contact lenses involves geometric metrology, such as measuring central thickness (CT), using ISO-standardized techniques (e.g., mechanical thickness gauges and, optical projection techniques) [1]. A potential method that could provide this functionality is optical coherence tomography (OCT), which proved effective in measuring soft and rigid lenses [2]. This study aimed to validate the in vitro measurement of the CT of soft contact lenses using two OCT systems and compare the results obtained from each system.

Methods: A total of 120 lenses, divided into 8 material groups (Etafilcon A, Balafilcon A, Nesofilcon A, Delefilcon A, Lehfilcon A, Stenfilcon A, Comfilcon A, and Lotrafilcon A), were analyzed. Each group comprised 15 lenses, categorized into 5 powers (+6.00D, +3.00D, -0.50D, -3.00D, and -6.00D), with 3 lenses per power. Lenses were placed on a circular support with a base curve of 8 mm, featuring white markings to indicate the center and diameter of each lens, ensuring optimal centering. Measurements were taken 5 seconds after placement using OCT, with three masked examiners performing evaluations under identical conditions. CT measurements were quantified using a caliper and the refractive index of each material. The study employed two OCT systems: the DRI Triton swept-source and the iVue-100 spectral domain. The validation included assessing inter-observer repeatability (Sw) for each material and comparing OCT measurements using Bland-Altman plots.

Results: Sw for all materials measured with both OCT systems was ≤ 5 µm, being the best repeatability observed for Etafilcon A (Sw = 2.39 µm) using the DRI Triton system. Comfilcon A and Lotrafilcon A materials showed the lowest difference in the comparison between the measurements of both instruments.

Conclusions: Both OCT systems demonstrated repeatability in measuring the central lens thickness. However, differences between the two OCT systems appear to exceed the repeatability of each system individually.

Poster#7

Topographic Profiles Assessment of 8 Soft Contact Lenses for Myopia Control

Bodas-Romero, Julia, Batres, Laura, Carracedo, Gonzalo

Abstract

Purpose: To analyze the effect of peripheral defocus soft contact lenses on corneal topography.
Methods: A study was conducted with 25 participants (18 females and 5 males) aged 24.30±2.53 years with myopia between -0.50D to -6.00D, and astigmatism no more than 0.75D. Eight myopia control soft contact lenses were evaluated, which were classified into three different designs: Dual focus (DF), Extended Depth Of Focus (EDOF) and Multifocal (MF) designs. Under scotopic conditions, corneal topography was measured the instrument OCULUS® Pentacam (Optikgeräte GmbH, Wetzlar, Alemania). Measurements were taken initially without contact lenses, and secondary for each lens. The horizontal axis of the tangential map for the central 10 mm for each lens was analyzed and compared with that of the first visit. SPSS (version 28.0.1.1; SPSS Inc., Chicago, IL, USA) was used for statistical analysis. A p-value<0.05 was considered statistically significant.
Results: The power and position of the maximum and minimum points of each profile were analyzed, as well as the distance between the maximum points.
All contact lenses demonstrated an asymmetrical profile, with slight temporal decentration and a significantly greater dioptric difference nasally (p<0.001). The smallest nasal-temporal difference (0.90±0.64 D) was observed in an MF lens with a +1.73D addition, while the largest (4.76±3.36 D) was observed in a high-addition MF lens (+8.49 D addition, p<0.05). The greatest maximum peak distance (6.15±4.46 mm) was also recorded in the high-addition MF lens, while the shortest distance was in an EDOF lens (2.74±8.91 mm).
Conclusions: All evaluated lenses showed an asymmetrical topographic profile, with temporal decentration and greater nasal power, being most pronounced in high-addition MF designs. Furthermore, EDOF lenses showed a shorter distance between maximum peaks. These findings suggest that lens design influences the corneal optics and optical profile, which may affect myopia control efficacy and visual quality.

Poster#8

Binocular Status in Childhood in Children Aged 6 to 12

Clara Martinez-Perez, Cristina Alvarez-Peregrina, Miguel Ángel Sánchez-Tena

Abstract

Objective: The aim of this study is to describe the prevalence of normal and altered outcomes in binocular vision tests in children aged 6 to 12 years, identifying potential issues that may require early intervention.

Materials and Methods: A prospective, descriptive, and cross-sectional observational study with a multicenter approach was conducted in nine schools in the Lisbon area between October and May 2022. Participants were selected using non-probabilistic sampling and included children aged 6 to 12 years without known histories of severe ocular pathologies. The evaluations were conducted following standardized protocols for binocular vision tests. Statistical analysis was performed using the SPSS 27.0 software (SPSS Inc., Chicago, Illinois).

Results: A total of 1875 surveys were collected. The participants' mean age was 9.22±2.71 years; 48.8% were boys and 51.2% were girls. In the distance Cover Test, 97.81% presented orthophoria, 0.59% esophoria, and 1.6% exophoria. In the near Cover Test, 80.13% showed orthophoria, 2.56% esophoria, and 17.31% exophoria. In the evaluation of near point of convergence, failure was defined as a distance greater than 10 cm. Based on this criterion, 97.21% did not exhibit failures, while 2.79% did. In stereopsis tests, failure was considered if values exceeded 60 seconds of arc. Based on this criterion, 55.95% of participants showed alterations, while 44.05% did not. Regarding the monocular estimation method (MEM), 71.50% of participants showed normal values (-0.25D to +0.75D), 28.45% had accommodative insufficiency (>+0.75D), and 0.05% showed excessive accommodation (<-0.25D).

Conclusions: The most frequent alterations were near exophoria, accommodative insufficiency in MEM, and stereopsis failures. These results highlight the importance of regular binocular vision assessments to detect anomalies that may impact children's academic and social development.

Poster#9

Repeatability of a handheld autorefractometer device specific for children

Jacobo Garcia-Queiruga, Noelia Nores-Palmas, Belén Sabucedo-Villamarin, Maria J. Giraldez, Eva Yebra-Pimentel

Abstract

Purpose: To validate the repeatability of the handheld autorefractor Plusoptix A12 (Plusoptix GmbH, Nuremberg, Germany) designed for children.

Methods: A total of 190 children aged between 7 and 9 years old (mean age 7.8 ± 0.7 years old; 50.53% female) from six diferent primary schools were involved in the current study. A visual screening was conducted among children from diferent grade levels and the Plusoptix A12 autorefractor was performed on every child

involved. The handheld device has an emoji face with an octagonal nose to attract the attention of the children. Additionally, the instrument has a screen that displays the refraction values before each measurement. To perform the measurement, the observer was placed in front of each child at 1 meter. Every child was asked to remain seated on a chair, look directly to the nose of the emoji face, and keep their eyes open. The instrument automatically measures the refraction of both eyes simultaneously. To assess the instrument's repeatability, three measurements were taken for each child. The instrument provides refraction values as sphere and cylinder; however, for statistical analysis, they were transformed into spherical equivalent (SE), and J0 and J45 vectors.

Results: SE showed statistically significant diferences between the 3 measurements (Friedman test, $p<0.001$). Post-hoc analysis showed significant diferences in SE between measurement 3 and measurement 1, as well as measurement 3 and measurement 2 (Bonferroni post-hoc, both $p\leq0.007$). No statistically significant diference in SE was found between measurement 1 and measurement 2 (Bonferroni post-hoc, $p=0.344$). The J0 and J45 vectors showed no diferences between any of the measurements (Friedman test, both $p\geq0.165$).

Conclusion: The repeatability of the Plusoptix A12 autorefractor is questionable, as there was no agreement in SE values across three measurements. However, the instrument demonstrated repeatability for the J0 and J45 parameters.

Poster#10

Myopia progression in myopic and astigmatic children wearing toric peripheral retinal defocusing contact lenses

Veronica Noya-Padin, Noelia Nores-Palmas, Maria J Giraldez, Eva Yebra-Pimentel, Hugo Pena-Verdeal

Abstract

Objective: To evaluate the effect of MYLO Toric myopia control contact lenses (CLs) on myopia progression in children.

Methods: Seven participants of mean age 12.0±1.32 (range: 9-13 years) were recruited among paediatric subjects attending the centre's Optometry Clinic. Inclusion criteria were myopia, astigmatism ≥0.75D, best-corrected visual acuity ≥0.9 (decimal) on a distance Snellen Chart (OptoTab SERIES), and absence of ocular conditions affecting the cornea, pupil size or refractive status. Participants underwent four sessions where the following tests were performed:

- *Session 1: Keratometry, white-to-white, subjective refraction (analysed as sphere, J0 vector and J45 vector) and ocular axial length (AL) (MYAH biometer) measurements.*
- *Session 2: Fitting of MYLO Toric peripheral retinal defocus CLs for myopia control, with parameters based on data collected in Session 1. If adjustments were required, replacement CLs were ordered and Session 2 repeated.*
- *Session 3: Subjective refraction and AL measurements after 3 months of Session 2.*
- *Session 4: Subjective refraction and AL measurements after 9 months of Session 2.*

Results: Sphere values in sessions 3 and 4 were significantly different from baseline (increase up to 0.20D; Sidak post-hoc, both p≤0.035), with no significant difference observed between sessions 3 and 4 (Sidak post-hoc, p=0.707). J0 and J45 vectors showed no significant differences between sessions (ANOVA, both p≥0.384). Regarding AL, significant differences were observed between the baseline session and sessions 3 and 4 (increase up to 0.06mm; Sidak post-hoc, both p≤0.047), with no difference between sessions 3 and 4 (Sidak correction, p=0.623).

Conclusions: Wearing MYLO Toric myopia control CLs resulted in a progression of myopia over the initial three-month period of CLs wear, and a cessation between the three- and nine-month follow-ups, in a cohort of myopic and astigmatic paediatric subjects. The astigmatic component remained stable the 9-month period.

Poster#11

Effect of speed and direction of stimulus movement on visual acuity

Veronica Noya-Padin, Noelia Nores-Palmas, Belen Sabucedo-Villamarin, Maria J Giraldez, Hugo Pena-Verdeal, Eva Yebra-Pimentel

Abstract

Purpose: Understanding the variation on visual acuity (VA) with motion direction, may have implications for optimising vision therapy programmes or even daily activities, such as driving or reading. The objective was to assess the effect of stimulus speed and direction on VA.

Methods: Inclusion criteria encompassed monocular VA≥0.9 (decimal), adequate ocular motility (score ≥3 on all skills evaluated in the NSUCO test), and absence of ocular pathology.

The VA of 19 participants recruited at the centre's clinic (58% females, mean age of 23.6±2.19 years) was measured monocularly (right eye) in far vision using the OptoTab POLAR 24' SMT4V screen (Smarthings4vision, Spain). VA was initially assessed with a static stimulus (speed: 0°/s). Subsequently, VA was measured with a moving stimulus in reading (left to right) and reverse directions (right to left) at speeds of 4, 8, 12 and 15°/s. The stimulus used for each VA level comprised a group of five letters, with each being awarded a score of +0.02.

For statistical analysis, parametric tests were employed (Shapiro-Wilk, all p≥0.090). The ANOVA test was employed to detect differences in VA across speeds in a consistent movement direction of the stimulus, and Bonferroni post-hoc was performed for pairwise comparisons. Lastly, a t-test was used to compare VA across both directions at each speed.

Results: VA exhibited variation between stimulus speeds in both movement directions (ANOVA, both p<0.001), with VA decreasing as speed of the stimulus increases (Bonferroni post-hoc, all p<0.001). The VA outcomes were comparable in both movement directions, with no significant differences observed between the reading and reverse directions for any of the tested speeds (t-test, all p≥0.096).

Conclusions: VA is affected by the speed of the stimulus, with deteriorated VA values obtained at increased speeds. However, the direction of movement within the horizontal axis had no significant effect on VA.

Poster#12

Analysis of the impact of piggyback system fitting on non-invasive tear break up time.

Hugo Pena-Verdeal, Alba Castro-Giraldez, Jacobo García-Queiruga, Carlos García-Resua, María J. Giráldez, Eva Yebra-Pimentel

Abstract

Objective: To date, no studies have reported the impact of piggyback fitting steps on tear or ocular surface parameters, either in pathological patients or in controlled conditions with healthy subjects [1]. This study evaluated variations in Non-Invasive Keratograph Break-Up Time (NIKBUT) after fitting two different piggyback systems, both based on the same soft contact lens (SCL) but using two different Rigid Gas Permeable Contact Lenses (RGPCL), in healthy subjects as a control reference.

Methods: Eighteen young volunteers were recruited for the study (mean age 22.6±2.6 years). Participants were free of ocular or systemic diseases, had spherical and cylindrical refractive errors between +2.00D and -5.00D and ≤1.00D respectively, and keratometric values ≤47.20D. Volunteers attended two sessions one-week apart (7±1 days). On each session, a different piggyback system was randomly fitted (1:1 ratio). First, the SCL (Precision1, Alcon) was fitted, always with a +2.00D power [2]. Then, one of the studied RGPCL (Menicon-Z, Menicon, and BIAS-S, Conoptica), always with a -3.00D power, was used to create the piggyback system [3]. While the radius was constant for all SCLs, appropriate adjustments were made to the RGPCL to achieve the best fit. Fittings were performed only in the right eye of each participant to avoid overstating statistical estimates precision. On each session, NIKBUT was measured three times and averaged with the Keratograph 5M (Oculus GmbH), and then compared before (pre-fitting) and after fitting (post-fitting) the assigned piggyback system for 15 minutes in the same session and between sessions [4].

Results: No statistically significant differences were found in the pre-fitting and post-fitting NIKBUT values in the same session (paired t-test, both p≥0.885) and between sessions (paired t-test, both p≥0.272) with both RGPCL types.

Conclusions: geometry and material of the RGPCL used in the piggyback system do not affect tear film stability in reference healthy subjects.

Poster#13

Optimal color sets to represent the colors of natural scenes by k-medoids clustering

José A.R. Monteiro, Dora Nazaré Marques, João M. M. Linhares, Sérgio M. C. Nascimento

Abstract

Aim: The aim of this study was to develop sets of colors that accurately represent the chromatic diversity of natural scenes compared to widely used standard databases: the Munsell Color System (MCS), the Natural Color System (NCS), and the World Color Survey (WCS).

Methods: Hyperspectral imaging data from 48 natural scenes, acquired from 400 to720 nm in 10 nm steps were used[1] as well as the reflectance from 1269 MCS, 330 WCS, and 1943 NCS samples. Data was converted into CIECAM16-UCS coordinates, assuming the CIE 2006 LMS function for 10°. The representativeness of three standard color sets was evaluated by computing color differences between these sets and the colors of natural scene. The color volume of the natural scenes was segmented into 0.5-unit cubes, with colors within the same cube considered indistinguishable[2]. The set of cubes representing 95% of the colors was selected to optimize representativeness and minimize outliers (DC-NS). The k-medoids clustering algorithm was applied to the DC-NS, grouping colors into clusters[3]. The algorithm was iterated 1000 times, testing cluster sizes from 100 to 1000 in steps of 100.

Results:The standard color sets had significant limitations in representing natural scene colors, with 49%, 61%, and 61% non-representative colors in the MCS, WCS and NCS, respectively, [4]. In contrast, the centroids from the optimized color sets were evenly distributed. As the number of clusters increased, the average color difference decreased, from 4ΔE' for 100 clusters and 2ΔE' for 1000[4]. A set of 200 colors derived with k-medoids was more perceptually representative than any standard set for datasets tested.

Conclusions: The optimized color sets were more representative than the standard color sets and remained robust across different datasets. This method allows for flexible selection of the number of colors while ensuring an accurate representation of colors of the database used.

Poster#14

Differences in Dehydration Patterns, Refractive Index and Dimensional Changes Among Myopia Control Contact Lenses

Veronica Noya-Padin, Hugo Pena-Verdeal, Eva Yebra-Pimentel, Madalena Lira

Abstract

Objective: To compare the in vitro dehydration rate of different myopia control contact lenses (CLs) and its influence on their refractive index and diameter.
Methods: Three models of CLs designed for myopia control were studied (n = 3 lenses per model): MiSight 1 Day, Bloom Day and MYLO. All CLs were -3.00D optical power and the base curve and diameter of MYLO (only model with adjustable parameters) were 8.6 and 14.5 mm respectively. Water content and refractive index were measured using the CLR12-70 CL device (Index Instruments, UK), and CL diameter was assessed with ImageJ software. Measurements were taken immediately after removing each CL from the blister pack and every 5 minutes for a period of 30 minutes. During this time, CLs were placed on a plastic net designed to allow uniform dehydration.
Results: The dehydration rate varied significantly among the CL models. After 30-minutes, MiSight 1 Day lost 88.2% of its initial water content, Bloom Day 85.5%, and MYLO only 41.6%. This dehydration process resulted in refractive index and diameter variations for all three CLs models tested (Greenhouse-Geisser, all $p \leq 0.005$). After 30 minutes of dehydration, the refractive index increased on average by 0.08 for MiSight 1 Day, 0.07 for Bloom Day and 0.05 for MYLO lenses. Regarding CL diameter MYLO exhibited the most pronounced reduction, with an average reduction of 4.4 mm, while MiSight 1 Day and Bloom Day showed reductions of 2.8 mm and 2.4 mm, respectively.
Conclusions: Myopia control CLs differ considerably in their dehydration dynamics. MiSight 1 Day and Bloom Day dehydrate more rapidly, leading to greater water loss and refractive index shifts, while MYLO retains moisture more effectively, but undergoes the greatest reduction in diameter. These differences may have implications for on-eye performance and clinical efficacy

Poster#15

Influence of prolonged video game use on the amplitude of accommodation in young people.

Carmen Martín-Aranda, Cecilia Díaz-López, Belén Martínez-Álvarez, Mame Diatou Toure-Sarr, Celia Sánchez-Ramos

Abstract

Objective: to determine the variation of accommodation amplitude after a long period of video game use.

Methodology: 30 video gamers aged between 19 and 40 years (25.10±4.98) were assessed for their accommodation amplitude before and after four hours of gaming. The measurement of the amplitude of accommodation was performed monocularly and with the Donders approach method. For this test, the user held the ETDRS test and fixated on the visual acuity line corresponding to their maximum near resolution ability. Once this line was located, the user brought the test towards his or her eyes until sustained blur was perceived. The distance between the test and the patient's eyes was measured in order to subsequently carry out its inverse and obtain the value of the amplitude of accommodation in dioptres. The statistical analysis used was the paired t-test for repeated samples. This test was selected because the measurements correspond to the same subjects at two different times.

Results: The results obtained for the pre-gaming group were optimal or even superior to those expected for their age. For both right and left eye the mean obtained was 15.29 ± 6.03 in the right eye and 15.13 ±6.32 in the left eye. After the game, although the results were still optimal, the accommodative amplitude was reduced by 4.91% for the right eye (14.54±5.80) and 4.10% for the left eye (14.51±5.50). These results did not express significant differences between the means obtained before and after the game as p-values of 0.3265 and 0.5064 were obtained for the right and left eye respectively.

Conclusion: Prolonged use of video games for four consecutive hours in young people did not affect the amplitude of accommodative amplitude measured by the zoom method.

Poster#16

Short-term changes in tear film stability following the application of various treatments for dry eye disease in a young healthy population

Belen Sabucedo-Villamarin, Laura Cacabelos-Torres, Jacobo Garcia-Queiruga, Eva Yebra-Pimentel, Hugo Pena-Verdeal

Abstract

Objective: To evaluate short-term changes in Non-Invasive Break-Up Time (NIBUT) in healthy young adults after applying artificial tears, an ocular bath, or eyelid cleansing wipes for Dry Eye Disease (DED) management.

Methods: 36 participants, aged from 18 to 35 years and free of ocular or systemic pathologies, were initially recruited for this single-session protocol. Participants were randomly assigned to one of three treatments groups (ratio of randomization 1:1:1): Group 1 - Artificial tears (Comfort Drops, Coopervision, California, USA), Group 2 - Ocular bath (Acuaiss, Disop, Madrid, Spain), or Group 3 - Eyelid cleansing wipes (Systane Lid Wipes, Alcon, Texas, USA). On each participant, NIBUT was measured at baseline (before treatment), and then at 2, 10, and 20 minutes after treatment application. All measurements were assessed using the Keratograph 5M (Oculus Optikgerate GmbH, Wetzlar, Germany) by the same evaluator. Statistical comparisons were performed between time points inter- and intra-groups.

Results: The final analysis included 35 participants (one was excluded due to a reflex tearing). Group 1 (Artificial tears, n=12) showed no significant differences in NIBUT over time, either in the overall analysis (ANOVA, p=0.620) or in pairwise comparisons (Bonferroni post-hoc, all ≥0.436). Group 2 (Ocular bath, n=12) showed no significant differences in NIBUT over time, either in the overall analysis (ANOVA, p=0.624) or in pairwise comparisons (Bonferroni post-hoc, p=1.000). Group 3 (Eyelid cleansing wipes, n=11) showed no significant differences in NIBUT over time, either in the overall analysis (ANOVA, p=0.532) or in pairwise comparisons (Bonferroni post-hoc, all p≥0.759). Finally, no significant differences were observed in the pairwise comparisons of repeated measures, either within treatment groups or between them (Bonferroni post-hoc, all p≥0.651).

Conclusions: The application of artificial tears, ocular baths and cleansing wipes does not result in any immediate alteration to the stability of the tear film after administration.

Poster#17

An 8-Year Follow-Up of Ocular Symptoms and Corneal Damage in Dry Eye Disease Participants

Belen Sabucedo-Villamarin, Jacobo Garcia-Queiruga, Veronica Noya-Padin, Eva Yebra-Pimentel, Maria Jesus Giraldez

Abstract

Purpose: To evaluate the changes in Ocular Surface Disease Index (OSDI) questionnaire values and corneal staining in Dry Eye Disease (DED) participants after 8-years since DED diagnosis.
Methods: 42 participants (mean age 50.6±1.4 years, 83.3% women) diagnosed with DED following the recommendations of the Tear Film and Ocular Surface Society in both Dry Eye Workshops I/II. Participants were diagnosed with DED if they showed OSDI values≥13, and at least one positive sign (Break-Up Time<10s, 308 mOsm/L and/or Corneal Staining≥1). Participants were assessed in two sessions 8 years apart. In both sessions, symptomatology was assessed using OSDI questionnaire, while corneal surface damage was evaluated through fluorescein staining (Oxford scheme) observed with the slit-lamp Topcon SL-D4. To gain a deeper understanding of the severity of the disease, participants were divided into two groups based on their OSDI values from the first session: Mild-to-moderate group (OSDI<33) and Severe group (OSDI≥33). Statistical analysis was conducted with IBM SPSS v.25 for Windows.
Results: Mild-to-moderate (n=19) and Severe (n=23) groups showed significant differences between sessions in OSDI values (Wilcoxon, both p≤0.007). The Sign test indicated that OSDI values decreased in 12 participants, increased in 4 participants, and remained unchanged in 3 participants in the Mild-to-Moderate
group (mean difference±SD;-4.53±6.38). Meanwhile, in the Severe group, the OSDI values decreased in 21 participants and increased in 2 participants (mean difference±SD;-16.78±10.77). Regarding corneal staining, significant differences were found between sessions in both groups (Wilcoxon, both p≤0.020). Also, the Sign test indicates that corneal staining increased in 16 participants and remained unchanged in 3 participants in the Mild-to-Moderate group (mean difference±SD;0.58±0.90); and, in the Severe group it increased in 16 participants and remained unchanged in 7 participants (mean difference±SD;1.00±0.80).
Conclusions: Contrary to expectations, despite increased corneal damage, participants with DED exhibited decreased symptomatology, which may be attributed to a hypostalgic effect.

Poster#18

Agreement between stationary and hand-held autorefractors for measuring objective refraction in children

Noelia Nores-Palmas, Belen Sabucedo-Villamarin, Veronica Noya-Padin, María Jesús Giráldez, Jacobo Garcia-Queiruga

Abstract

Purpose: to assess the agreement between ARK510A stationary autorefractor-keratometer and Plusoptix A12 hand-held autorefractor-keratometer regarding objective refraction in a paediatric population.

Methods: 193 paediatric participants were recruited among children from 6 school centres during a screening process. Children were aged from 3 to 10 years, with a mean age of 6.05 ± 1.90 years (48.7% males, 51.3% females). Each participant underwent a single measure of objective refraction with the ARK510A stationary autorefractor-keratometer (Nidek Technologies, Italy) and the Plusoptix A12 hand-held autorefractor-keratometer (Oculus GmbH, Germany). Two optometrists, each assigned to one device, conducted the examinations under identical lighting conditions, in random order, and blinded to the other device's results. Only children for whom objective refraction was obtained in both eyes were included in the final analysis. For statistical purposes, values of spherical equivalent refraction (SER) as well as vectors J0 and J45 from both eyes of each child were analysed independently and compared between two devices. Due to the non-parametric nature of the data (Kolmogorov-Smirnov; all data sets $p \leq 0.05$), the Wilcoxon test was used to compare results between the two devices.

Results: the final sample was composed of 160 children (320 eyes), with 45% male and 55% female, from 3 to 10 years with a mean age of 6.21±1.78 years. No significant differences were found between the two autorefractometers, neither in SER (Wilcoxon test; $p = 0.109$), nor in J0 (Wilcoxon test; $p = 0.313$) or J45 (Wilcoxon test; $p = 0.113$) vectors.

Conclusion: ARK510A stationary autorefractor-keratometer and Plusoptix A12 hand-held autorefractor-keratometer showed no differences in measuring objective refraction in a paediatric population. Given their agreement, both devices can be used interchangeably in clinical and screening settings. These results are particularly relevant for screening processes, as the Plusoptix A12 allows professionals to efficiently detect the magnitude of refractive errors.

Poster#19

Evaluation of visual acuity with multifocal catenary curve-based contact lens design in different degrees of astigmatism

Ana Privado- Aroco, Gonzalo Carracedo, Ashley Tuan, Cristina Bautista-Triviño

Abstract

Purpose: To assess the visual quality of patients with varying degrees of astigmatism fit in multifocal catenary curve-based contact lens (CL) design after a 1-week follow-up, in comparison to baseline measurements taken with spectacles.

Methods: This was a prospective, single-arm dispensing trial that assessed visual acuity (VA), measured using a VX22 Chart Display optotype screen, stereoacuity, evaluated with the Titmus test, and subjective visual quality and comfort, both measured using a Visual Analog Scale (VAS). Thirty participants, ranging in age from 19 to 39 years (23.4 ± 5.75), were fitted with NaturalVue Multifocal lenses (26 women; 4 men). The subjects were divided into three groups: low astigmatism (LA, between -0.75 and -1.25D, n=12), medium astigmatism (MA, between -1.50 and -2.00D, n=12), and high astigmatism (HA, between -2.25 and -3.00D, n=6).

Results: VA decreased with CL compared to the spectacle correction (P-value < 0.05, Student´s t-test for related samples), but 100% of the LA and MA groups and 83.33% of the HA group achieved VA better than 0 logMAR. Stereoacuity showed significant differences only in the MA group (p = 0.042, Wilcoxon test for related samples). Most participants (83.33% in LA, 75% in MA and 100% in HA) maintained stereopsis within 10" of arc of the spectacle measurements. Regarding the VAS scale, the statistical analysis showed worse subjective vision quality with CL compared to spectacles, as well as lower subjective comfort scores in the LA and HA groups (P-value < 0.05, Student´s t-test for related samples). However, 66.67% of participants in the LA group rated their vision as satisfactory, 33.33% in the MA group, and 83.33% in the HA group. For comfort, the LA group reported 50% very satisfaction, MA 41.67%, and HA 50%.

Conclusion: Multifocal CL provided good levels of visual acuity and stereoacuity. Although subjective vision quality was lower compared to spectacles, most participants rated their vision as satisfactory or very satisfactory. Comfort was generally positive, with no participants reporting unsatisfactory comfort.

Poster#20

Ocular light scattering in users of digital displays with selective absorbance (λm+s) lenses.

Cecilia Díaz López

Abstract

Objective: to measure the linear discrimination index to assess light scattering in a group of workers with digital screens with interposition of selective absorbance filters λm+s Method: the sample consisted of 31 participants, 13 men and 18 women, aged between 28 and 52 years (40,68±12,58). For the measurement, Halo v1.0 software, created and developed by the University of Granada, Spain, was used. The halometry test was performed under mesopic conditions, binocularly and at a distance of one meter. In the evaluation procedure, the patient position standards of clinical practice were maintained.

Results: before the work, the discrimination index had a mean value of 0,88±0,09 with the interposition of Clear lenses (with 100% transmittance). With Clear lenses (96% transmittance), the mean value of the discrimination index was 0,85±0,13 with Intensive lenses (with a transmittance of 77%), a value of 0,88±0,11 was obtained. The results for the comparison of this variable of the three lenses showed a p-value of 0,4802. After 4 hours of wear, a mean discrimination index value of 0,86±0,13, 0,88±0,10 and 0,88±0,11 was obtained for the clear, Clare and Intensive lenses, respectively. The results for the comparison of the discrimination index variable of the three lenses showed a p-value of 0,6754. In addition, the results compared by Student's t-test before and after 4 hours of work, analyzing each lens separately, indicated for the discrimination index in the first lens, a p-value of 0,3995, for the second Clare lens a p-value of 0,0726 and for the Intensive lens a p-value of 0,8836.Conclusion: selective absorption filters (λm+s) and visual fatigue did not influence light scattering inside the eye in digital display workers with a 4 hour workday use.

Poster#21

Characterization of Scleral Lens Fitting in Portugal

Vasco Manuel Viana Mesquita, António Queirós Pereira, Rute J. Macedo de Araújo

Abstract

Objective: To characterize the conditions and methods of scleral lens (SL) fitting in Portugal, including clinical indications, complications, technology used, and the professional profile. Additionally, to identify the reasons why some professionals have not yet adopted this technology.

Methods: An anonymous online survey was developed to assess SL fitting patterns and the demographic profile of practitioners. The survey was disseminated through online platforms, and a total of 59 responses were analyzed.

Results: The mean age of participants was 37±10,08 years. The majority (97%) reported having a degree in optometry, while 3% had a degree in orthoptics. Most respondents work in optical stores (76%), while 8% work in optometry clinics and 7% in ophthalmology practices. More than half (58%) had never fitted rigid gas permeable (RGP) lenses larger than 13 mm in diameter, with 32% of them citing lack of training as the main reason. In cases of corneal ectasia, 36% of participants considered corneal RGP lenses as the first-choice correction, while another 36% preferred SLs. In the past year, the most frequently fitted SL diameter ranged between 15.6 and 17 mm, with 16% of professionals having fitted more than 15 cases. Among those who had previously fitted SLs, 96% had done so for keratoconus cases, whereas only 24% had fitted them for dry eye cases. The most commonly used fitting tools were the slit lamp and fluorescein (100%), while the scleral topographer was used by only 12%.

Conclusions: Despite advancements in scleral lenses, there is still hesitation among eye care professionals in Portugal, primarily due to a lack of training and limited access to equipment. Additionally, those who fit SLs report challenges with patient handling, particularly in lens application and removal.

Poster#22

Assessment of Insulin Loading and Release Dynamics in Commercial Soft Contact Lenses

Maria Romaguera, Gonzalo Valdes-Soria, Gonzalo Carracedo

Abstract

Objective: Topical treatment with insulin has demonstrated promising results in promoting corneal healing in patients with corneal disorders. However, its topical administration through eye drops or gels presents significant challenges, including physiological barriers. As an alternative, the use of contact lenses as a drug vehicle could be interesting. This study aimed to assess the capacity of commercial soft contact lenses (SCL) to load and release insulin for ocular treatment.

Methods: Three materials were tested (Nesofilcon A, Stenfilcon A, Delefilcon A). Contact lenses were stabilized for 24 hours (h), dried at 37°C for another 24 hours, and subsequently loaded with 305 µM insulin (Actrapid 100 IU/ml) diluted in PEG 400-propylene glycol eye drops for 24h at 22°C. Loading amount was measured by spectrophotometry at 4, 6, and 24 h. Additionally, lenses were weighed in hydrated, dry, and rehydrated states using a precision balance. Insulin release was carried out in 0.9% saline solution and measured by spectrophotometry at intervals up to 24h.

Results: After 24h, insulin loading was 583.5±149.9, 935.5±70.8, and 912.3±96.5 µg/ml for Nesofilcon A, Stenfilcon A, and Delefilcon A, respectively, with significantly lower loading observed in the Nesofilcon A lens ($p<0.001$). Besides, no significant differences in lens weight were observed among the materials after rehydration with the loading solution ($p>0.05$). The cumulative insulin release for Nesofilcon A, Stenfilcon A, and Delefilcon A was 363.2±16.9, 573.4±17.7, and 560.4±17.0 µg/ml, respectively. Nesofilcon A showed significantly lower release levels compared to silicone hydrogel lenses (Stenfilcon A and Delefilcon A) ($p<0.05$).

Conclusions: Commercial SCL, particularly Stenfilcon A and Delefilcon A, load and release insulin effectively. These findings would contribute to the design and development of advancing therapeutic strategies for managing corneal epithelial defects associated with conditions such as neurotrophic keratitis, diabetic keratopathy, and dry eye disease.

Poster#23

Quality of life related to refractive errors among adolescents

Catarina Balseiro, Mariana Cunha, Sofia Brito, Marco Miguel, António Nunes, Amélia Nunes

Abstract

Purpose: The correction of refractive errors is essential for visual performance, but adherence to treatment during adolescence can be challenging due to aesthetic concerns and other typical age-related difficulties. This study aims to assess the impact of refractive error on the quality of life of adolescents using the Portuguese version of the Quality of Life Impact of Refractive Correction (QIRC) Questionnaire.

Methods: A total of 138 high school students, aged between 15 and 21 years, participated in this study. The sample was divided into three groups: full-time use (38), part-time use (13), and non-use (87) of refractive correction. The spherical equivalent was obtained as the average of three autorefractor (plusOptix) measurements without cycloplegia. Quality of life was assessed using the QIRC through the following dimensions: symptoms, convenience, concern, and social well-being. Group differences were analysed using the Kruskal-Wallis test.

Results: The participants had a mean±SD age of 17.4±1.2 years (63% male), and the average QIRC score was 49.22±8.5. Boys showed a significantly better quality of life ($p=0.009$) with average scores of 76.3 and 57.9, respectively. Significant differences were observed in the dimensions "symptoms" ($p<0.001$; boys: 76.04, girls: 53.15) and "social well-being" ($p=0.009$; boys: 76.3, girls: 57.9). Differences were also observed according to the use of refractive correction, with significant variations in the "convenience" ($p=0.008$) and "social well-being" ($p=0.018$) dimensions. The full-time use group reported lower convenience but higher social well-being.

Conclusions: The results suggest that boys have a better quality of life compared to girls, reflecting fewer complaints and a greater sense of well-being. Additionally, constant use of refractive correction may be inconvenient, possibly due to factors such as discomfort and limitations, but it improves social well-being, likely by enhancing interaction and self-confidence. These findings underscore the need for strategies to enhance comfort and adherence to refractive correction among adolescents.

Poster#24

Development of an Ex Vivo Porcine Corneal Healing Model: a pilot study.

Laura Ximena Sierra Buitrago, Gonzalo Valdés Soria, Alba Martín Gil, Laura de Diego-Garcia, Juan Gonzalo Carracedo Rodríguez

Abstract

Purpose: The aim of this study was to develop an ex vivo porcine corneal healing model and evaluate its functionality and viability.
Methods:
Porcine eyes were obtained from a local slaughterhouse, being extracted postmortem. For ex vivo wound healing model, all corneas were wounded using a 3 mm Whatman filter paper disc soaked in n-heptanol for 30 seconds (n=5). Anterior surfaces were isolated and filled with 1.5% agar-agar:DMEM, and incubated at 37°C, 5% CO, and 95% humidity to maintain tissue viability and cellular activity. Fluorescein staining was performed every 8 hours for 7 days, to assess wound closure. Photographs were collected with a camera and magnifying lens under cobalt blue light, maintaining the same distance and magnification
The wound area was quantified using ImageJ by manually selecting the stained wound area and measuring to determine changes in wound area over time. The percentage of wound closure was calculated using the formula:
% recovery=((Initial wound area-Wound area at day X)/(Initial wound area))x100
Mean values were calculated, and data were plotted in Excel with a linear trendline applied to determine the wound healing acceleration rate.
Results:
Every corneal button exhibited evidence of corneal decompensation, with a reduction in transparency after 5 days. At 8 hours, 80% of the corneas showed a recovery greater than 30%. Complete recovery was achieved within 16 to 32 hours, with variability among cases. The acceleration rate of 4.42% per hour demonstrates a consistent wound-healing process.
Conclusions:
The ex vivo porcine corneal model effectively replicates the wound healing dynamics with complete closure achieved within 32 hours. The healing process was progressive and steady, though some variability was noted. The results confirm that this model provides a reproducible and quantifiable platform for studying corneal wound healing. This framework also serves as a robust tool for evaluating future treatments.

Poster#25

Refractive Errors in Rural Schools of the Central Region

Mariana Cunha, Marco Miguel, Ana Roque, Amélia Nunes

Abstract

Objective: Refractive errors are common among school-aged children, making early diagnosis essential. In rural areas, distance from healthcare services and socioeconomic barriers challenge access to visual care, leading to underdiagnosis and progression of vision problems, impacting academic performance and quality of life. (1–3) This study aimed to assess the prevalence of refractive errors in rural schools in the municipality of Covilhã.

Methods: A total of 365 students, aged 10 to 18, from the 2nd and 3rd cycles of studies were evaluated. Spherical equivalent was obtained as the means of three autorefraction measurements (PlusOptix-A09) without cycloplegia, and habitual visual acuity (VA) was measured using logarithmic charts. Reduced VA was defined as worse than 0.1 LogMAR. Refractive error classification followed Matta/Silbert criteria. (4) The association between refractive errors, education cycle, and sex was analyzed using the Chi-square test.

Results: The mean age was 12.48±1.48 years, with 50.4% male students and 56.2% from the 3rd cycle. It was observed that 14.5% had never been examined by an eye specialist, and 26.0% had not attended one in the past three years. Approximately 30% had a refractive error, with hyperopia (11.8%) the most prevalent, followed by anisometropia (9.3%) and myopia (9%). Additionally, 20.8% had reduced visual acuity. Hyperopia was more frequent in the 2nd cycle ($p < 0.001$), while myopia was more prevalent in males ($p = 0.05$).

Conclusions: A high prevalence of refractive errors was observed among children and adolescents in rural areas, with hyperopia being more common in the 2nd cycle and myopia more frequent in males. Additionally, 20.8% had reduced visual acuity, while 14.5% had never been examined by an eye specialist and 26.0% had not attended one in the past three years, reinforcing the need for systematic vision screenings and improved access to eye care services in rural schools.

Poster#26

Exploring tear fluid biomarkers for alzheimer's disease: a systematic review.

Lorena Elvira-Hurtado, Inés López-Cuenca, Rubén Masa-Castro, Yael Hoz-Ruiz, Lidia Sánchez-Puebla, José A. Matamoros, Elena Salobrar-García, José A. Fernández-Albarral, Héctor Leal-Lassalle, Ana I. Ramírez, Juan J. Salazar, José M. Ramírez, Rosa de Hoz

Abstract

Alzheimer's disease (AD) is the leading cause of dementia, characterized by beta-amyloid (Aβ) and tau protein accumulation. Current early diagnosis methods, such as neuropsychological tests, imaging, and biomarkers in cerebrospinal fluid (CSF) and blood, are invasive and costly. This systematic review explores tears as a non-invasive biomarker source for early AD detection.

A systematic review was conducted using PubMed, Scopus, and Web of Science up to April 2024, focusing on tear biomarkers in Alzheimer's patients using related "MESH" terms. The analysis included proteins, microRNAs, and extracellular vesicles (EVs) detected via mass spectrometry, ELISA, and PCR. Tear collection methods, including Schirmer strips and capillary micropipettes, were reviewed. From 1,279 initial articles, 93 studies met the inclusion criteria following PRISMA 2020 guidelines. Tear biomarkers showed potential for early AD detection. Increased levels of Aβ40, Aβ42, t-Tau, and p-Tau were found in AD and mild cognitive impairment

(MCI) patients compared to healthy controls. MicroRNA-200b-5p was linked to AD, differentiating it from MCI. Tear exosomes contained proteins associated with neurodegeneration, highlighting their diagnostic potential. Advanced techniques like Raman spectroscopy and ELISA revealed significant compositional differences between groups. These findings suggest that tears could serve as a non-invasive diagnostic tool for AD. Tear biomarker analysis offers a promising, non-invasive approach for early AD detection, reflecting neurodegenerative changes. However, the lack of standardized collection and analysis methods limits its clinical use. Further largescale studies are required to validate findings and establish protocols for clinical application.

Poster#27

Impact of Digital Screen Exposure on Ocular Surface Health and Meibomian Gland Function: A Clinical Analysis

Fabiana Sousa, Madalena Lira

Abstract

Purpose: This study evaluated ocular health by analyzing blinking patterns and dry eye parameters, focusing on meibomian gland function and its association with digital device usage.
Methods: Thirty-one participants (20 female, 11 males; mean age: 26.6±8.8 years) were included. Exclusion criteria were ocular/systemic medication use, ocular pathology, or prior eye surgery.
Blink count was measured via video recordings and manual counting. NIBUT was assessed using a Tearscope Plus adapted to a slit lamp. TMH was measured through ImageJ software. Eyelid margin analysis evaluated hyperemia, irregularities, obstruction, and Meibomian gland dysfunction (MGD). Meibography was performed with the I.C.P. MGD device to quantify gland loss. A questionnaire on digital device usage, contact lens wear, and dry eye symptoms (assessed using the DEQ-5) was also administered.
Results: TMH and NIBUT showed a moderate positive correlation ($r = 0.455$, $p = 0.010$). MGD severity in the upper and lower eyelids had a strong correlation ($r = 0.710$, $p < 0.001$). TMH was inversely associated with gland loss in both the upper ($r = -0.498$, $p = 0.005$) and lower eyelids ($r= -0.380$, $p= 0.038$), with moderate and weaker correlations, respectively.
ANOVA revealed a significant decrease in TMH with increased screen time ($p= 0.014$), with values of 0.225 ± 0.02 mm for <4 hours, 0.154 ± 0.04 mm for 4-8 hours, and 0.140 ± 0.03 mm for >8 hours. NIBUT differences were not significant ($p= 0.565$), but a decreasing trend was observed.
Lower eyelid hyperemia showed a weak but significant correlation with DEQ-5 scores ($r= 0.353$, $p= 0.050$), while upper eyelid obstruction had a moderate negative correlation with NIBUT ($r= -0.450$, $p= 0.011$)
Conclusion: Prolonged digital screen exposure is associated with reduced tear film stability and Meibomian gland dysfunction, reinforcing the importance of ocular health monitoring in frequent screen users.

Poster#28

Impact of Long-Term Contact Lens Wear on Tear Film Stability, Blink Pattern, and Ocular Symptoms

Eduardo Insua Pereira, Madalena Lira, Ana Paula Sampaio

Abstract

Purpose: To investigate the impact of long-term contact lens wear on tear film parameters, blink pattern, and their relationship with ocular symptoms.
Material and Methods: A case-control clinical trial was conducted with thirty-four contact lens wearers (mean age 32.9 ± 9.1 years, seven men) and 33 non-lens wearers (control group, 29.4 ± 6.8 years, 12 men). Subjects were categorized asymptomatic (11 lens wearers, 11 controls), moderate (15 lens wearers, 9 controls), or severe symptomatic (8 lens wearers, 13 control) based on the Ocular Surface Disease Index questionnaire. Clinical evaluations were performed in the morning (10 - 12 am) with contact lens wearers observed with their lenses in situ. The clinical assessment included blink frequency and completeness, pre-corneal non-invasive break-up time (NIBUT), pre-lens non-invasive break-up time (PL-NIBUT), and tear meniscus height.
Results: The tested group had an experience of 9.7 ± 7.6 years wearing lenses, exhibited a significantly higher percentage of incomplete blinks (37% vs 19%, p< 0.001) and reduced tear meniscus height than controls (0.24 ± 0.08 vs 0.28 ± 0.10 mm, p= 0.014). PL-NIBUT was significantly reduced compared to NIBUT (7.6 ± 6.2 vs 10.7 ± 9.3 sec. p= 0.002). Among lens wearers, asymptomatic individuals demonstrated longer times (11.3 ± 9.7 sec.) than moderately (5.9 ± 2.5 sec.) and severely symptomatic (5.8 ± 2.0 sec., p=0.012). Similar differences were obtained for NIBUT among non-wearers, particularly between mild and severe symptomatic (15.0 ± 10.8 vs 7.4 ± 3.3 sec., p=0.01).
Conclusion: Long-term use of silicone-hydrogel lenses can negatively affect tear stability, production, and distribution through increased blink incompleteness and reduced tear meniscus height. Ocular symptoms correlate with tear stability parameters in both lens wearers and non-wearers, reinforcing the importance of monitoring tear film characteristics for optimal lens wear comfort and ocular surface health.

Poster#29

Repeatability and agreement of pupillometers under different lighting conditions

Erica Santucci, Anna Laura Piccioli, Irene Martìnez-Alberquilla, Laura Rico-Del-Viejo, Abinaya Priya Venkataraman, Alberto Dominguez-Vincent

Abstract

Pupillometers measure pupil diameter, essential in ophthalmology and optometry. Pupil size is influenced by lighting conditions, visual stimuli, and accommodation. This study evaluated the repeatability of two open-field and two closed-field pupillometers, under different conditions to determine the most accurate design.

This study included eighty healthy participants (mean age: 27.5 ± 8.8 years, range: 19 to 58 years). Pupil size was measured under mesopic (4 lux) and photopic (50 lux) conditions using two open-field pupillometers, TT PowerRef 3 (table-top power refractor) and HH PowerRef Plusoptix A12C (hand-held autorefractor), and two closed-field one, MS-39 (AS-OCT with LED) and NIDEK Tonoref III (AutoRefractor). All Instruments were calibrated, measurements were randomized, allowing at least two minutes of light adaptation between recordings. Repeatability was assessed ensuring the repeatability limit (R Limit), while agreement was analyzed using Bland-Altman statistics.

Descriptive metrics and repeatability analysis of pupil diameter showed that, under photopic conditions, AutoRefractor exhibited the lowest R Limit (0.52 mm), while HH Power Refractor recorded the highest (0.91 mm). Under mesopic conditions, the highest R Limit observed was for HH Power Refractor (0.78 mm). Regarding differences between pupillometers and the limits of agreement with corresponding intervals, under photopic conditions, the smallest mean difference was observed between TT and HH Power Refractors (-0.199 mm), whereas the largest was between MS-39 and AutoRefractor (1.919 mm). Under mesopic conditions, the smallest mean difference was observed between HH and TT power refractors (-0.516 mm) while the largest was between HH Power Refractor and MS-39 (1.466 mm).

Since R Limit remained 1 mm in both photopic and mesopic condition, each instrument repeatability was excellent. Agreement was better among same type pupillometers, under photopic conditions, while differences were higher among mixed type, under mesopic condition. Careful consideration is required when selecting the instrument based on clinical need.

Poster#30

Assessment of microbial contamination in contact lenses and contact lens cases in dry eye wearers following the application of hygiene guidelines.

Alicia Tardío Pariente, Patricia González Díaz, María Asunción Peral Cerdá, Aída Pitarch Velasco

Abstract

Objective: Given the known misuse and poor hygiene of contact lens (CL) wearers, it was proposed to determinate the microbial contamination in CL and in lens cases (LC) in users with dry eye after applying recommended hygiene guidelines. (1,2)

Methods: Twenty-eight subjects over 18 years old, monthly and biweekly soft CL wearers with an OSDI-6 ≥ 4 score, participated. The examination consisted of two different visits (before and after applying hygiene guidelines). The clinical part included an anamnesis, OSDI-6 and CLDEQ-8 ocular symptomatology tests and a survey about daily habits with their CL and the maintenance of LC. Slit lamp assessment of ocular integrity and tear stability measured by tear break-up time (BUT). Samples of CL and LC were collected at each visit for culture and isolation of microorganism in agar plates. Those were counted and identified by biochemical tests.

Results: A decrease in dry eye symptomatology was observed in OSDI-6 and CLDEQ-8 tests after following the recommended hygiene. 71-82% of the participants had bacteria on their CL and LC, mostly Gram-positive cocci (46-64%), such as Staphylococcus aureus and coagulase-negative Staphylococcus (CNS). CL and LC showed fungal contamination in the 11-36 % of the participants, being yeasts (7-14%) and filamentous fungi (4-21%). After following the hygiene guidelines, no significant variations in the frequency of isolation were found in either CL or LC, except an increase in Gram-positive cocci associated with a decrease in Gram-negative bacilli in CL. Low BUT values were associated with a higher abundance of Gram-positive cocci and bacillus in CL. Higher load of Gram-negative bacilli and of S. aureus and CSN in LC was observed in high BUT values.

Conclusion: The hygiene habits of CL wearers with dry eye influence microbial contamination of CL and LC. The application of the basic hygiene guidelines reduce dry eye symptoms.

Poster#31

Variation of ocular surface microbiota in contact lens wearers with dry eye in relation to their hygiene habits.

Patricia González Díaz, Alicia Tardío Pariente, María Asunción Peral Cerdá, Aída Pitarch Velasco

Abstract

Objective: The aim was to characterize the ocular surface (OS) microbiota after applying hygiene habits in individuals wearing soft contact lenses (CL) with dry eye, as these two factors are considered to alter the ocular microbiota. (1–3)

Methods: Twenty-eight participants over 18 years old, monthly and biweekly soft CL users with an OSDI-6 ≥ 4 score were included. The exam consisted of two visit: first at the beginning and other after following recommended hygiene maintenance. An anamnesis, test of symptomatology (OSDI-6 and DEQ-5) and a survey of habits that may influence dry eye and OS were performed. Slit lamp was used to assess ocular surface integrity and tear stability measured by tear break-up time (BUT). Samples were collected from the OS – lid margin (LM), bulbar conjunctiva (BC) and staining zone (SZ)– of the chosen eye. Bacteria and fungi were cultured and isolated in agar plates. Microorganisms were counted and identified by biochemical tests.

Results: The OS microbiota was characterized by being a sparse and poorly diverse population. It was mostly bacterial (median, 3-49 colony-forming units or CFU; range, 0-6-103 CFU), predominating Gram-positive cocci (54-89%), particularly Staphylococcus aureus (25-68%) and coagulase-negative Staphylococcus (CNS). Fungal populations were scarcer (median, 0 CFU; range, 0-4, 1-103 CFU), with filamentous fungi (10-29%) outnumbering yeasts (0-14%). No significant variations in bacterial and fungal abundance patterns were observed in each study area after applying hygiene guidelines. A decrease in dry eyes symptomatology was found after recommended hygiene. S. aureus was isolated more frequently in SZ than in BC after following the maintenance. Low BUT values were associated with higher abundance of Gram-positive cocci in BC and SZ.

Conclusions: Staphylococcus aureus and CNS are the main predominant microorganisms in the OS microbiota of contact lenses wearer and dry eye. It remains stable after applying recommended hygiene.

Poster#32

Customization of Hand-Painted Prosthetic Contact Lenses for Ocular Anomalies

Anna Laura Piccioli, Erica Santucci, Irene Martínez-Alberquilla, Laura Rico-del-Viejo, Javier Ruiz-Alcocer, Ignacio Lopez-Meca

Abstract

Illustrate three clinical cases of different prosthetic contact lens adaptations designed to restore the natural appearance of a healthy eye and, where possible, improve vision.

METHODS: Three cases of hand-painted prosthetic contact lens adaptation are presented. These lenses are customized based on the patient's specific needs. The iris color is selected to match the healthy eye as closely as possible. Different pupil options are considered: transparent to preserve vision, black to block light in cases of no visual perception, or fitted with a colored filter to enhance contrast, and, if necessary, refractive power is incorporated. These are hydrophilic lenses, made of non-ionic poly-HEMA material (hydration 38% to 67%) with an aspheric design, intended for daily use with a lifespan of up to one year. The adaptation process is guided by keratometric parameters to ensure proper centration, adequate fit, and optimal visual performance.

Three clinical cases are analyzed. First case is a patient with aniridia, partial or total absence of the iris, fitted with a lens featuring an artificial iris and a resized pupil to reduce aberrations and improve vision. Second case is a patient with post-traumatic aphakia and a torn iris, which was provided with a lens incorporating an artificial iris, an open pupil and corrective power to compensate the absence of the crystalline lens, restoring the vision. In the third case, a patient with corneal leucoma was treated with a lens featuring an artificial iris and a red filter over the pupil to enhance visual contrast.

In all three cases, the use of hand-painted prosthetic contact lenses provided both aesthetic and functional improvements, enabling the restoration of vision, when possible, and achieving highly satisfactory outcomes for patients. These lenses have proven to be an effective and well-tolerated solution, customizable to individual needs.

Poster#33

Effectiveness of insulin eye drops in the treatment of dry eye.

Lydia Medina Ramírez, Bárbara Burgos Blasco, Pilar Pérez García, Rodrigo Fernández Narros, Ainhoa Colina Jareño

Abstract

The aim of this study was to evaluate the effectiveness of Insulin eye drops in the control of dry eye disease (DED) in patients refractory to usual treatment with artificial tears.

Twenty eyes of 10 patients with DED followed in the Dry Eye unit of the Ophthalmology Department of the Clínico San Carlos Hospital in Madrid were treated with Insulin eye drops four times per day for 6 months.

Insulin eye drops were prepared at the hospital's Pharmacy Service based on available information in the literature, at a concentration of 1 IU/mL, using regular insulin in a solution for subcutaneous injection which was diluted in saline, filtered, and stored in glass containers.

Symptoms were evaluated through the Ocular Surface Disease Index (OSDI) questionnaire at baseline and 6 months visit. Corneal staining in the Oxford scale and conjunctival hyperemia with slit lamp, corneal sensibility measured with the Cochet Bonnet aesthesiometer, No Invasive Tear Break-up Time (NITBUT) and mean bulbar hyperemia measured with Keratograph were recorded and compared.

The mean age was 56.8 ± 15 years with 90% being women. There was a statistically significant improvement in the OSDI questionnaire (46.95 ± 14.45; 36.27 ± 17.83), corneal sensitivity (4.45 ± 1.0; 5.75 ± 0.35) and staining (2.25 ± 0.95; 0.6 ± 0.62) ($p<0.05$). No differences in the Keratograph (1.30 ± 0.49; 1.13 ± 0.35) and slit-lamp hyperemia (0.55 ± 0.41; 0.32 ± 0.49) nor in the NIBUT (10.59 ± 4.39; 8.87 ± 4.00) were found (all $p>0.05$).

Topical insulin is effective in treating dry eye disease refractory to conventional treatment. Further studies are needed to approve of this off-label treatment for this indication.

Poster#34

Is binocularity essential for multifocal contact lenses? A fitting case in alternating esotropia

Carlos Carpena Torres, María García, Raquel Hernández, Carla Manjón, Marina Medina, José Manuel Púa, Clara San José

Abstract

Objective: To fit multifocal soft contact lenses in a previous wearer of monofocal soft contact lenses with alternating esotropia.
Methods: Biweekly replacement multifocal silicone hydrogel (Senofilcon A) contact lenses were fitted in a 48-year-old myopic patient with alternating esotropia of 20Δ at distance and 30Δ at near. Initially, lenses with an aspheric center-distance design, a +1.50 D addition, a base curve of 8.4 mm, and a diameter of 14.3 mm were used. The initial spherical powers were -4.25 D in the right eye (RE) and -4.50 D in the left eye (LE). Two fitting visits were conducted, with both lenses being replaced after the first evaluation. At each visit, over-refraction and visual acuities at different distances were measured using defocus curves, complemented by the routine tests performed during contact lens fitting.
Results: At the first fitting visit, both eyes showed an over-refraction of -0.75 D with the contact lenses, with distance visual acuities of 0.9 (decimal) in the RE and 0.6 (decimal) in the LE, which did not meet the patient's expectations. At the second visit, after replacing the lenses with new ones of -5.00 D in the RE and -5.25 D in the LE, distance visual acuity improved to 1.2 (decimal) in both eyes. Additionally, intermediate visual acuity (67 cm) reached 1.2 (decimal), and near visual acuity (40 cm) was 0.9 (decimal), meeting the patient's visual needs in daily life at all viewing distances.
Conclusions: The use of defocus curves during multifocal contact lens fitting is essential for optimizing visual quality at different distances. This method enables a more precise assessment of each eye's individual vision, in contrast to manufacturer-provided fitting algorithms, which are based on binocular parameters and may not fully account for the specific visual needs of each eye.

Poster#35

Prevalence of myopia in children and adolescents

Alice Doellinger

Abstract

Objective: To assess the prevalence of refractive errors in school-age children and young people, the study of ocular biometry and the relationship between the two.
Methods: Through an observational and prospective study at a vision screening in a school in the municipality of Fafe, measurements of central refraction (PlusOptix), keratometry and axial length (AI-Scan Nidek Optical Biometer) and the children's visual acuity were obtained. Three age groups were studied according to the level of schooling (6-9 years, 10-12 years and 13-18 years). The definition of type of astigmatism was ±20º. Participation was voluntary and informed consent was obtained from the parents. The vector components of the refractive error M, J0 and J45 were considered in the study.
Results: A total of 127 students (aged 6 to 18) were observed, 63 of whom were female (50%). The total sample had an average ESF=+0.38±1.33D, and 90% had astigmatism (CIL=-0.70±0.86D), 75% of whom were with-the-rule astigmatism. On average, there were no significant differences between the different genders (0.08±0.22D). Of the total sample, 20% were nearsighted (-1.78±1.26D) with an average axial length of 23.68±1.28mm and an average keratometry of 7.68±0.31mm. The difference between genders in nearsightedness was also not significant, although male students were more nearsighted by 0.19±0.51D. The study by age group showed that 10% of 6–9-year-olds had myopia, 35% of 10–12-year-olds and 34% of 13–18-year-olds.
Conclusion: The prevalence of myopia in the different educational levels shows higher values for these age groups than those found in the same population a decade ago.

Poster#36

The Effect of Three Soft Contact Lens Designs for Myopia Control on Binocularity in the Pediatric and Juvenile Population.

José González Suaga, Cristina Arroyo Del Arroyo, Paloma Porras Ángel, Laura Batres Valderas, María Serramito Blanco, Juan Gonzálo Carracedo Rodríguez

Abstract

Objective:The aim of the study is to analyze the changes in binocular vision in the pediatric and juvenile population during the first 6 months of wear using three different soft contact lens designs for myopia control.

Method:A total of 34 patients participated in the study (11.6±1.39 years old) with a spherical equivalent (-2.125 ± 0.03 D). Horizontal phorias were measured at both distance vision (3 m) and near vision (40 cm) using the modified Thorington test. Additionally, monocular accommodative facility (right eye) was assessed using ±2.00 D flippers (40 cm). Finally, the monocular accommodative response was evaluated using an open field autorefractometer for both distance vision (4 m) and near vision (40 cm). All these tests were conducted after one week of contact lens wear and again at six months between 3 blinded groups of contact lenses (A, B and C).

Results:No significant differences were observed for distance phorias, while for near phorias, differences were found between group C and group A in the change of phorias from 1 week to 6 months. There were no significant differences (p>0.05) in accommodative flexibility between groups from 1 week to 6 months. Additionally, after 6 months of contact lens use, no statistically significant differences (p>0.05) were found among the three groups for consensual accommodative response data.

Conclusions:The changes in binocular vision among the three lens groups were similar, except for a significant difference in near phorias between group C and group A.

Poster#37

Eye strain, binocular vision and visual quality comparison of a single vision and an extended depth of focus soft lens

Noelia Nores-Palmas, Anton Pombo-Diaz, Mónica Velasco de la Fuente, Mercedes Burgos-Martinez, María Jesús Giráldez, Hugo Pena-Verdeal

Abstract

Purpose: To compare a single vision and Extended Depth of Focus (EDOF) contact lens (CL), in terms of visual acuity (VA), binocularity, accommodation, contrast sensitivity (CS), aberrations, and digital eye strain or binocular symptomatology in a young population, and to assess whether these parameters change after a month of use.

Methods: Eighteen healthy young volunteers (mean age of 22.6±2.0 years) were randomly fitted with either a single vision or an EDOF with 0.75 D addition power CL, both manufactured with the same material Filcon 5B (60) [75%]. In the first session (basal) subjective refraction and the parameters required for CL fitting were assessed. In the second session (CL insertion), the 'Convergence Insufficiency Symptom Survey' (CISS) and 'Digital Eye Strain Questionnaire' (DESQ) were administrated. Moreover, monocular and binocular VA, distance and near heterophorias, near point of convergence (NPC), CS, accommodative lag, and monocular high- and low-order aberrations were evaluated both with and without CL. In the third session (final), all questionnaires and tests were repeated while wearing CL. Statgraphics Centurion 18 were used to the analysis results, with Analysis of Variance (ANOVA), General Linear Model (GLM). The significance level was set at 0.05.

Results: In the intra-session comparison (between lenses), no significant differences were found in any parameter or questionnaire (all $p \geq 0.060$). In the inter-session comparison of each CL, significant differences were found in the NPC and aberrations between the basal and the final session (all $p \leq 0.050$), while no significant differences were found in all other parameters studied (all $p > 0.600$).

Conclusion: Using an EDOF CL with an additional power of 0.75 D or a single-vision CL for one month did not worsen VA, symptomatology or binocular parameters, except for NPC and aberrations. Furthermore, from a clinical perspective, both single-vision and EDOF CLs demonstrated comparable outcomes.

Poster#38

Safety and efficacy evaluation of Myopia X: a novel approach to slow the myopia progression.

Cristina Pastrana Robles, Paloma Porras, María Serramito, Carlos Carpena-Torres, Cristina Arroyo, Julia Bodas, Laura Batres, Gonzalo Carracedo

Abstract

Objective: To evaluate the safety and compliance to MyopiaX, an app that delivers blue light to the optic nerve head to control myopia progression.
Methods: In this multicenter, randomized, single-masked clinical trial (NCT04967287) children (6 to 12 years), with myopia between -0.75 D and -5.00 D were randomly assigned to MyopiaX or the control group. MyopiaX (Dopavision GmbH, Germany) app emitted blue light through a virtual reality headset. Participants used it for 10 minutes twice daily for 6 months and wear defocus incorporated multiple segments (DIMS) myopia control spectacles during the second 6 months. The control group wore DIMS spectacles for 12 months. Ophthalmological examinations and reports of adverse events (AE) were conducted to assess clinical safety. Sleep quality (modified Pittsburgh Sleep Quality Index) was monitored every 6 months to evaluate the impact of MyopiaX on the sleep-wake cycle. MyopiaX adherence was tracked via app. Axial length (AL) changes were analyzed with a paired t-test at 6 and 12 months per treatment group.
Results: 101 participants were enrolled in the study (MyopiaX: n=66, DIMS: n=35). Over the 12 months, AL growth was 0.18 mm in the MyopiaX group and 0.14 mm in the DIMS group. Myopia X adherence declined from 59.6% (months 0-6) to 34.55% (months 6-12), 16 related AEs were recorded in 16.6% of participants: 11 (68.7%) related to MyopiaX, 3 (18.7%) related to DIMS, 1 (6.2%) related to both DIMS and MyopiaX, and 1 (6.2%) related to study procedures. No functional or structural changes in ocular health and no sleep disturbances over 12 months were observed.
Conclusions: Blue light stimulation of the optic nerve head was safe and well tolerated for 12 months, with no impact on sleep quality. MyopiaX adherence correlated with AL growth, needing improvement. MyopiaX may offer an additional therapeutic solution for clinical myopia management.

Poster#39

Analysis of the effect of two different orthokeratology lens designs on ocular surface and axial length.

Paloma Porras Ángel, Cristina Arroyo del Arroyo, Julia Bodas Romero, Alba Martin Gil, Maria Romaguera Planells, Ainhoa Molina Martin, Elena Martínez Plaza, David Pablo Piñero Llorens, Laura Batres Valderas, Juan Gonzalo Carracedo Rodriguez

Abstract

Purpose: Orthokeratology (Ortho-K) is an effective method for myopia control. This study evaluated its safety, efficacy, impact on ocular surface quality, and axial length (AL) progression in users, mainly children, with different lens designs.

Methods: A prospective, randomized study assessed ocular surface quality and AL growth using non-invasive tests. Two Ortho-K lens designs were compared: L1 (tangential alignment) and L2 (aspheric alignment). Examinations were performed at baseline and at 6, 12, 18, and 24 months, measuring high- and low-contrast visual acuity (VA), tear breakup time (TBUT), tear meniscus height (TMH), and AL. Statistical analysis was conducted using SPSS, with $p<0.05$ considered significant. Results are shown as mean±SD.

Results:

13 patients (5 males, 8 females), mean age 14.38 ± 1.71 years (range: 11–17) were included. No significant TMH differences were found after 24 months between lens designs or across visits ($p=0.848$ for L1, $p=0.007$ for L2). TBUT showed slight improvement with L1 (7.17 ± 4.11 s at baseline vs. 11.35 ± 7.97 s at 12 months, 10.6 ± 5.95 s at 24 months), with a similar trend in L2. However, these differences were not statistically significant across visits ($p=0.149$ for L1, $p=0.089$ for L2) or between lens designs. As expected, high-contrast VA improved in both designs, reaching -0.15 ± 0.40 LogMAR at 6 months. AL increased in both groups: in L1, it grew from 24.02 ± 0.65 mm at baseline to 24.18 ± 0.70 mm at 12 months (+0.16 mm) and +0.26 mm at 24 months, while in L2, the increase was 0.10 mm at 12 months (24.03 ± 0.60 mm → 24.13 ± 0.60 mm) and +0.20 mm at 24 months.

Conclusion: Both lens designs showed similar effects on TMH and TBUT. With L2 showed less AL progression.

Poster#40

Visual and Postural Interactions in Elite Football Players: The Impact of Refractive Errors

Miguel Oliveira, Rui Fuste, Jorge Jorge

Abstract

Objective:To investigate the relationship between visual system parameters—specifically visual acuity and refractive error—and postural control in elite football players.
Methods:Thirty-four male professional football players were evaluated. Visual acuity was measured monocularly and binocularly, and refractive errors assessed using retinoscopy and subjective refraction. Postural stability was analysed using the Cyber-Sabots™ platform, which recorded center of pressure (CoP) metrics, including sway amplitude, velocity, and distribution area. Correlations between visual and postural parameters were analysed using Pearson's test, with significance set at $p<0.05$.
Results:Players demonstrated good binocular visual acuity (-0.03 ± 0.09 logMAR) and predominantly emmetropic refractive states. Better visual acuity was associated with reduced displacement ($r = -0.352$) and sway area ($r = -0.367$), indicating improved stability. Hyperopia and oblique astigmatism were moderately correlated with increased sway and instability. Anisometropia showed strong negative correlations with antero-posterior control ($r = -0.502$). Postural adaptations specific to football included forward lean, predominance of forefoot loading, and increased medio-lateral sway. Romberg quotients indicated a significant reliance on vision for balance.
Conclusion: Visual acuity, refractive errors, and binocular asymmetries significantly influence postural stability in elite football players. Integrating visual and postural assessments may support the development of tailored interventions to optimise performance and reduce injury risk.

Poster#41

Binocular Vision and Postural Stability in Professional Football Players

Jorge Jorge, Miguel Oliveira, Rui Fuste

Abstract

Objective:To investigate the correlations between binocular vision parameters and postural stability in professional football players.
Methods:Thirty-four male professional football players (mean age: 24.2 ± 3.9 years) were evaluated. Visual assessments included monocular and binocular visual acuity (logMAR), refractive error (diopters), phoria (Δ), fusional vergence (break and recovery, Δ), vergence facility (cycles per minute, cpm), accommodative facility (cpm), and stereoacuity (log arcsec). Phoria, fusional vergence, and vergence facility were assessed at both distance and near.
Postural stability was assessed using the Cyber-Sabots™ platform, which measured centre of pressure (CoP) parameters: anterior-posterior and medio-lateral sway (mm), sway velocity (mm/s), and sway area (mm²). Associations between visual and postural parameters were analysed using Pearson's correlation test, with significance set at $p < 0.05$. Results are presented as mean ± standard deviation.
Results:No significant differences were found between the right and left eyes in visual acuity or accommodative facility. Binocular visual acuity was positively correlated with improved anterior-posterior control ($r = 0.354$, $p = 0.040$) and medio-lateral stability ($r = 0.369$, $p = 0.032$). Distance phoria was associated with increased posterior sway ($r = 0.618$, $p = 0.032$), while higher exophoria correlated with compensatory postural adaptations ($r = 0.911$, $p = 0.032$). Negative fusional vergence break values at distance showed moderate correlations with reduced anterior sway ($r = -0.438$, $p = 0.010$) and increased posterior sway ($r = 0.439$, $p = 0.009$). Vergence facility at distance correlated strongly with global postural stability ($r = 0.575$, $p < 0.001$). Near stereoacuity (1.80 ± 0.13 log arcsec) was negatively associated with backward stability ($r = -0.348$, $p = 0.044$), reinforcing the role of depth perception in balance.
Conclusion: Binocular vision parameters, particularly vergence function and stereoacuity, significantly influence postural control in professional football players. These results support the inclusion of binocular vision assessment and training in sports performance and injury prevention programs.

Poster#42

Normative Visual Performance Standards in Professional Football Players

Jorge Jorge, Rui Fuste, Rui Sousa

Abstract

Objective: To establish normative visual performance standards in professional football players by evaluating visual acuity, refractive error, binocular function, and visuo-cognitive abilities across different levels of performance.

Methods: A total of 262 male professional football players (mean age: 24.6 ± 4.8 years) were evaluated. The assessment included static visual acuity (logMAR), dynamic visual acuity (logMAR), refractive error (diopters, D), binocular function [phoria (prism diopters, Δ), fusional vergence (Δ), vergence facility (cycles per minute, cpm), and accommodative facility (cpm)], and stereopsis (log arcsec). Visuo-cognitive abilities were assessed through multiple object tracking (milliseconds, ms), visual reaction time (ms), and peripheral perception (score out of 100). Results were categorized into five performance levels: Elite (10th percentile), Proficient (25th), Average (50th), Insufficient (75th), and Dysfunctional (90th).

Results: Mean static visual acuity was 1.09 ± 0.20 (decimal scale), with elite-level performance at 1.26 and dysfunctional-level at 0.90. Dynamic visual acuity averaged 0.72 ± 0.17 logMAR, with thresholds at 0.62 (insufficient) and 0.52 (dysfunctional). Mean anisometropia was minimal (0.20 ± 0.41 D). Phoria was orthophoric at distance (0.0 ± 2.1Δ) and exophoric at near (2.2 ± 4.7Δ). Accommodative facility averaged 11.7 ± 4.6 cpm. Distance stereopsis averaged 1.854 ± 0.155 log arcsec, with elite performance at 1.778 and dysfunctional at 2.000 log arcsec. Peripheral span averaged 40.7 ± 11.9 (score), multiple object tracking 1623.3 ± 430.5 ms, and visual reaction time 327.4 ± 37.8 ms.

Conclusion: This study provides normative benchmarks for visual and visuo-cognitive performance in professional football players. These reference values can be used to support performance monitoring, visual training, and clinical screening in sports vision practice.

Poster#43

Association Between Visual Function and Visuo-Cognitive Performance in Elite Football Players

Jorge Jorge, João Pedro Jorge, Sandra Medrano-Muñoz, António Dias

Abstract

Objective: To investigate the relationship between visual function—namely visual acuity, refractive error, and binocular vision—and key visuo-cognitive abilities in elite football players, such as perceptual span, multiple object tracking, and visual reaction time.

Methods: A total of 218 elite male football players (mean age: 24.6 ± 4.8 years) were assessed. Visual evaluations included visual acuity, refractive error, and binocular vision parameters: phoria, fusional vergence, vergence facility, accommodative facility, and stereoacuity. Visuo-cognitive performance was assessed using three validated measures. Perceptual span was defined as the number of visual elements correctly identified in the peripheral visual field. Multiple object tracking evaluated the ability to simultaneously follow several moving stimuli. Visual reaction time corresponded to the latency (in milliseconds) required to respond to a visual stimulus. Statistical analysis was performed using Pearson's correlation test, with significance set at $p < 0.05$.

Results: Perceptual span was positively correlated with monocular ($r = 0.185$, $p = 0.003$) and binocular ($r = 0.176$, $p = 0.005$) visual acuity, and negatively correlated with anisometropia ($r = -0.115$, $p = 0.045$), near esophoria ($r = -0.347$, $p = 0.010$), e near stereoacuity ($r = -0.178$, $p = 0.004$). Multiple object tracking showed negative correlations with horizontal phoria at distance ($r = -0.141$, $p = 0.019$) and near ($r = -0.444$, $p = 0.001$), as well as with stereoacuity at distance ($r = -0.255$, $p = 0.024$) and near ($r = -0.142$, $p = 0.018$). These correlations were stronger in players with esophoria. Visual reaction time was positively associated with emmetropia ($r = 0.141$, $p = 0.019$), distance phoria ($r = 0.121$, $p = 0.037$), and negative fusional vergence break at distance ($r = 0.124$, $p = 0.034$).

Conclusion: Binocular vision parameters, particularly phoria and stereoacuity, are significantly associated with key visuo-cognitive skills in elite football players. Esophoria and poor stereopsis negatively affect perceptual and cognitive performance. These findings support the inclusion of visual function assessment and targeted vision training in high-performance athletic programmes.

Poster#44

Visual and Cognitive Performance Differences Between Esports and Soccer Players

Jorge Jorge, Filipe Cymbron, Pedro Honório Silva, Pedro Almeida Couto

Abstract

Objective: To compare visual acuity, refractive error, binocular functions, and visuo-cognitive performance between esports and football players, aiming to identify sport-specific visual demands and support targeted training interventions.

Methods: Twenty-eight male esports athletes and thirty-eight male soccer players were assessed (mean age: 23.8 ± 4.3 years in both groups; $p > 0.05$), ensuring age and sex equivalence between groups.

Visual acuity was measured using an ETDRS chart. Refractive error was assessed by retinoscopy, and binocular vision function was evaluated through the Modified Thorington test (distance and near phoria), fusional vergence ranges (using prism bars), vergence facility (using a prism flipper), monocular accommodative facility (±2.00D flipper lenses), and stereopsis (Randot Stereo Test). Visuo-cognitive performance was assessed using the Senaptec Sensory Station, including perception span, multiple object tracking, and visual reaction time. Statistical comparisons between groups were performed using t-tests, with significance set at $p < 0.05$.

Results: Soccer players demonstrated significantly better visual acuity (right eye: 1.1 ± 0.2) than esports athletes (0.9 ± 0.1; $p < 0.001$). Esports athletes showed greater myopia (M = -0.67 ± 1.70 D) and higher astigmatism (J0 = 0.47 ± 0.53 D) compared to soccer players (M = 0.6 ± 1.06 D; J0 = 0.09 ± 0.43 D; $p < 0.001$). Soccer players also performed better in negative fusional vergence at distance ($p = 0.049$), near accommodative facility (12.4 ± 4.2 cpm vs. 9.4 ± 5.2 cpm; $p = 0.025$), and multiple object tracking (1811.3 ± 391.3 vs. 1523.4 ± 528.7; $p = 0.013$). No significant group differences were found in stereopsis or other binocular vision metrics.

Conclusion: Soccer players outperformed esports athletes in several visual and cognitive parameters, including visual acuity, fusional vergence, and visuo-cognitive tracking. Esports athletes exhibited higher levels of myopia and astigmatism. These findings highlight the relevance of tailored visual strategies for each sport, particularly for esports professionals who may benefit from targeted visual correction and training.

Poster#45

Prevalence and Risk Factors of Dry Eye Disease Among Medical Students at An-Najah National University.

Dana Swidan

Abstract

Objective Given their high screen time, academic workload, and other behavioral factors, medical students may be at increased risk of dry eye disease (DED). This study aimed to investigate the prevalence, severity, and risk factors of DED among medical students at An-Najah National University.
Methods: A cross-sectional study was conducted in April 2024 among 504 randomly selected medical students aged 17–25 years from the Faculty of Medicine and Health Sciences. Data were collected using the validated Ocular Surface Disease Index (OSDI) questionnaire, assessing dry eye symptoms. Scores were categorized as normal (0–12), mild (13–22), moderate (23–32), or severe (33–100). Participants self-reported their average daily screen time, smoking habits, and academic workload. Refractive errors were assessed based on students' self-reported type of refractive error, and seasonal allergies were assessed based on self-reported history of allergic symptoms. Data were analyzed using SPSS software, with independent t-tests and ANOVA used to assess associations between DED severity and key risk factors.
Results: Overall, 60.9% of participants reported DED symptoms, with 31.2% classified as mild, 16.1% as moderate, and 13.7% as severe. Female students had significantly higher OSDI scores than males (19.47 vs. 13.01, $p < 0.001$). Students with refractive errors, particularly myopia, had a significantly higher prevalence of DED than those without refractive errors ($p = 0.002$). Students spending 10+ hours on digital screens had significantly higher OSDI scores ($p = 0.021$), and those with seasonal allergies reported more severe symptoms ($p = 0.003$). Smoking and academic year showed no significant association with DED ($p > 0.05$).
Conclusions: DED is highly prevalent among medical students, with gender, refractive errors, prolonged screen exposure, and seasonal allergies identified as significant risk factors. Targeted interventions, such as screen hygiene education and ocular health awareness programs, are recommended to mitigate DED risk.

Poster#46

Bridging the Gap: Innovations in Choroidal Thickness Measurement by a Semi-automated Method

Aziza Obaid

Abstract

Objective: Changes in choroidal thickness (CT) are considered a potential biomarker for myopia progression. Numerous studies have shown that CT decreases as axial length increases. It is hypothesized that the thinning of the choroid in myopic eyes may be due to mechanical stretching of the sclera as the eye elongates, leading to a reduction in choroidal blood flow and tissue volume (1,2). The measurements are typically carried out by optical coherence tomography (OCT) and the manual method within the built-in OCT software is usually used to measure the CT (3,4). This method can be time consuming, Operator biased, and only sub-fovea areas or vicinities are usually measured. In this study a semi-automated method using ImageJ technique is introduced for assessing CT before and after a near task of 10 minutes.

Methods: CT was measured in 28 subjects using both a manual method and a semi-automated ImageJ-based method. Measurements were taken before and after a near task to assess agreement and potential changes in CT. Paired t-tests, Bland-Altman analysis, and Pearson correlation were calculated.

Results: The ImageJ method showed strong agreement with the manual technique, with correlation coefficients of 0.96 pre-task and 0.97 post-task ($p < 0.001$). Mean differences between methods were -1.6 ± 12.8 µm pre-task ($p = 0.50$) and 4.4 ± 13.0 µm post-task ($p = 0.08$). Bland-Altman analysis indicated narrow limits of agreement, confirming consistency between methods. Coefficients of variation were comparable (manual: 0.07, ImageJ: 0.06). No significant CT differences were observed pre- and post-task with either method ($p > 0.05$).

Conclusions: The semi-automated ImageJ method provides a reliable and repeatable alternative to manual measurement for assessing CT offering wider range of lines across the center and peripheral choroid. Both methods showed good agreement, supporting the possibility of ImageJ use for future studies examining CT changes.

Poster#47

The Impact of Contact Lenses on Digital Eye Strain: A Literature Review

Dana Swidan, Madalena Lira, Jorge Jorge

Abstract

Objectives: This literature review explores the relationship between Computer Vision Syndrome (CVS) and the use of disposable contact lenses among digital device users. Given the global prevalence of CVS ranging from 12.1% to 97.3% and the increasing demand on digital screens, understanding how contact lenses impact CVS symptoms is important for optimizing visual comfort and performance.
Methods: A systematic literature review was conducted using PubMed, Scopus, and Web of Science, focusing on studies published between 2010 and 2024. The study included keywords such as: "Computer Vision Syndrome," "contact lenses," "contact lens discomfort", "digital eye strain," "visual fatigue" and "tear film stability." Inclusion criteria consisted of peer-reviewed studies investigating CVS prevalence, symptoms and risk factors among contact lens wearers. Non-English articles and studies on non-disposable lenses were excluded. No formal meta-analysis was performed due to the variability of the study designs.
Results: The review indicated that contact lens wearers are at a higher risk of experiencing severe CVS symptoms, including dryness, irritation, and visual discomfort. Studies suggested that daily disposable contact lenses showed potential in reducing symptoms with providing better comfort, especially for heavy digital device users. These lenses minimized corneal staining and maintained tear film stability better than extended-wear lenses. However, there is still a lack of consensus on which specific lens materials or wearing schedules are most effective in reducing CVS symptoms.
Conclusions: Contact lens wearers, especially in heavy digital devices users, are at greater risk of CVS symptoms. Daily disposable lenses may offer a promising solution to alleviate discomfort and improve visual performance. However, further research is needed to determine the optimal contact lens materials and wearing schedules for digital device users to mitigate CVS effectively. Clinicians should consider these findings when advising patients on contact lens use in the digital age.

Poster#48

Relationship Between the Anteriorization of the Lamina Cribrosa After Preserflo Microshunt Implant Surgery and Intraocular Pressure

Ainhoa Colina Jareño, Laura Morales Fernandez, Ruben Sanchez Jean, Lydia Medina Ramirez, Javier Garcia Bardera, Jose Maria Martinez de la Casa, Julian Garcia Feijoo

Abstract

Objective: To analyze the possible anteriorization of the lamina cribrosa after glaucoma surgery with a Preserflo implant using Spectralis optical coherence tomography (OCT).

Material and Methods: Observational, prospective study. A total of 13 patients scheduled for isolated glaucoma surgery with a Preserflo implant were included. Clinical variables were recorded, and the following assessments were performed before surgery and one month postoperatively: intraocular pressure (IOP) measurement, analysis of lamina cribrosa (LC) depth, and cup-to-disc area ratio (C/D) using Spectralis OCT. Horizontal and vertical scans were performed using a 25-line cube in "follow-up" mode. Differences before and after surgery and correlations between the various parameters were evaluated.

Results: Thirteen eyes were operated on (9 with POAG, 1 with pseudoexfoliative glaucoma, 3 with pigmentary glaucoma, and 1 with myopic glaucoma). The mean preoperative IOP was 20.28 ± 6.53 mmHg, and the postoperative IOP was 10.15 ± 3.80 mmHg ($p<0.001$). Significant pre- and postoperative changes were observed in lamina cribrosa depth (501.60 ± 237.74 µm vs. 435.80 ± 288.65 µm; $p=0.009$) and in the C/D area (0.40 ± 0.25 vs. 0.34 ± 0.23; $p=0.011$). No correlation was found between IOP and lamina cribrosa depth ($r=-0.18$; $p=0.453$) or between IOP and C/D area ($r=-0.23$; $p=0.341$).

Conclusion: An anteriorization of the lamina cribrosa was observed after glaucoma surgery with a Preserflo implant. However, no correlation was found between this anteriorization and changes in intraocular pressure.

Poster#49

Chorio-retinal thickness in myopic and non-myopic using oct after exposure to repeated low level red light.

Muhammad Qasim, Jorge Jorge, Paulo Fernandes

Abstract

Purpose: To evaluate retinal thickness in myopic and non-myopic subjects after exposure to low level repeated red light using optical coherence tomography

Material & Methods: A Clinical observational study was carried out in CEORLab of University of Minho, Gualtar Campus. 20 participants (10 myopic and 10 non-myopic) of age between 18 & 40 years regardless of gender with informed written consent were recruited in this study. All participants underwent sequential 3min red light therapy, axial length and chorio-retinal thickness measurements at three time points i-e before RLRT, after the first therapy and then after second therapy (30min after the first therapy). Changes in axial length were recorded via Optical Biometer, differences in sub-foveal choroidal and segmental retinal thickness via Optical Coherence Tomography. Data was recorded in Microsoft Excel and analyzed using R- utilizing various statistical packages for accuracy and reproducibility.

Results: Based on this study, it was found that axial length remained relatively stable across sessions i-e 24.49mm before therapy and 24.50mm after the therapy in myopic while non-myopic showed a notable reduction in axial length from 23.91mm before therapy to 23.37mm after the therapy with p-value of 0.030. Regarding the thickness, choroidal thickness showed an upward trend in both myopic (353µm to 368µm) and non-myopic (396.1µm to 407.1µm) before and after exposure to red light therapy but these differences did not reach a statistical significance across session (p>0.05).

Conclusion: This study validate the increase in choroidal thickness after exposure to repeated red light therapy, however, it also highlight the importance and concerns of the variations in foveal and segmental retinal thickness after this therapy especially in exposures for longer period of times.

Poster#50

Effectiveness of atropine and spectacle lens combination treatment (aspect) in myopia control: 12 months results.

Nunila Gomez de Liaño, Noemi Guemes-Villahoz, Elena Hernandez-Garcia, Paloma Porras-Angel, Alicia Ruiz-Pomeda, Rafael Bella-Gala, Beatriz Martin-Garcia, Paula Talavero-Gonzalez, Rosario Gomez-de-Liano

Abstract

Objectives: To evaluate the effectiveness of the combination treatment using 0.025% atropine with Defocus Incorporated Multiple Segments spectacle lenses in myopia control. Compare the effectiveness of combined treatment 0,025% atropine and Defocus Incorporated Multiple Segments lenses versus 0.025% atropine with single-vision spectacle lenses in myopia management.

Methods: Randomized control trial that included children aged 4-16 years with myopia ranging from -1.00D to -6.00D and astigmatism ≤2.00D: group (1) 0.025% atropine and single vision spectacle lenses and group (2) 0.025% atropine and Defocus Incorporated Multiple Segments spectacle lenses. Spherical equivalent refraction (SER) under cyclopentolate and axial length (AL) measures were studied baseline and after 12 months undergoing treatment.

Results: A total of 102 children completed the study, 49 in group (1) and 53 in group (2), with mean ages of 9.50±2.78 years and 9.90±2.47 years, respectively. Mean SER progression was -0.19±0.42D (group 1) vs -0.09±0.35D (group 2) (p=0.13) and mean AL change was 0.18±0.16mm (group 1) vs 0.07±0.16mm (group 2) after 12 months. Group 2 showed no axial elongation after 12 months in 39.6% of treated children, decreasing to 12.2% in Group 1 (p=0.002).

Conclusions: The combination of 0.025% atropine and DIMS spectacle lenses proved more effective in controlling axial elongation than 0,025% atropine with single vision lenses. Furthermore, 39,6% of children in the combination treatment group experienced no axial elongation over 12 months.

Poster#51

Vision-related quality of life in children on combined treatment for myopia management.

Nunila Gomez de Liaño, Noemi Guemes-Villahoz, Paloma Porras-Angel, Alicia Ruiz-Pomeda, Rafael Bella-Gala, Beatriz Martin-GarciaRafael Bella-Gala, Elena Hernandez-GarciaBeatriz Martin-Garcia, Paula Talavero-Gonzalez, Rosario Gomez-de-Liano

Abstract

Objective: To evaluate and compare vision-related quality of life (VR-QoL) in children undergoing myopia control treatment with atropine eyedrops compared to children with combined treatment of atropine and defocus-incorporated multi-segment (DIMS) spectacle lenses.

Method: Longitudinal study that included myopic subjects aged 4-16 years: Group 1 children received 0.025% atropine eye drops and single vision lenses, Group 2 received 0.025% atropine and DIMS lenses. Demographic and clinical data, including cycloplegic spherical equivalent refraction (SER) and axial length (AL), were noted. VR-QoL was assessed using the Children's Visual Function questionnaire (CVFQ) and the Pediatric Eye Questionnaire (PedEyeQ) before initiating and after 12 months of treatment.

Results: 95 patients were included: group 1 n=50, mean age 8,94± 2,50 years, and group 2 n=45, mean age 9,51± 2,46years. PedEyeQ results showed no significant differences in VR-QoL between groups at 12 months (p>0.05). Both groups showed improved "Visual Function" scores (group 1 p=0.04, group 2 p=0.005) and improved "Social" scores (group 1 p=0.008, group 2 p=0.005.). CFVQ showed an increase in "General Vision" (p=0.03) and "Competence" (p=0.04) scores only in group 2. No correlation was found between the two tests.

Conclusions: Myopic children treated with atropine and those using combination treatment (atropine and DIMS) do not seem to have significant differences in overall VR-QoL following 12 months of treatment. Visual function item appears to improve in both groups, suggesting high visual tolerance to atropine eyedrops as monotherapy and in combination with DIMS spectacle lenses.

Poster#52

Validation of a modified iCare probe for intraocular pressure measurement during scleral lens wear

Rita Seco, Rute J. Macedo de Araújo, José M. González-Méijome

Abstract

Purpose: There is controversy on the potential impact of supported scleral contact lenses (ScCL) on intraocular pressure (IOP). To measure IOP in ScCL wearers is necessary to remove the lens, which can affect the aqueous dynamics. The primary goal of this work was to modify the tip of a rebound tonometer to measure IOP through a fenestration in the ScCL without removing the lens. We also aimed to evaluate the reliability of the IOP measurements obtained with the modified probe.

Methods:

Intraocular pressure (IOP) was measured in 36 healthy eyes using both standard and modified iCare tonometer probes (iCare, Helsinki, Finland) applied in the central cornea in a randomized sequence. The fenestration and the modified probe were created with a drilling machine. Additionally, central and temporal IOP measurements were obtained with the modified probe in 30 healthy eyes. Data were statistically analyzed using the R software.

Results: A paired t-test comparing measurements from the standard and modified probes in the central cornea showed a statistically significant difference (-0.53±1.207 mmHg, $p = 0.013$); however, the mean difference was not considered clinically significant. Measurements obtained with both probes exhibited a strong correlation ($r = 0.940$), demonstrating high linear agreement between methods. Additionally, central and temporal IOP measurements differed significantly ($p < 0.001$), with temporal values being on average 1.21 ± 1.54 mmHg higher, although the correlation between these two measurement sites remained strong ($r = 0.880$).

Conclusion: Central measures obtained with the standard and modified probe were significantly different but not clinically different. Central and peripheral measurements with the modified probe were statistically but not clinically significance.

Poster#53

Light disturbance analysis with 4 different myopia control ophthalmic lenses

Bárbara Marinho, Paulo Fernandes, José Manuel González-Méijome

Abstract

Purpose: This study evaluated the light disturbance effects associated with the use of four myopia control ophthalmic lenses randomly assigned after 30 minutes and 15 days of wear in young adults.
Methods: Nineteen myopic young adults (18-28 years, spherical refractive error -1.00D to -6.00D) completed this cross-over double-blind longitudinal trial. Each subject wore four myopia control lenses with distinct designs of defocus microlenses and power distribution: Aura3 and Aura6 (Fitlens), Myosmart (Hoya), and Stellest (EssilorLuxottica). Light Disturbance Analyzer, Binarytarget Lda. Braga, Portugal measured light disturbance induced by a bright source in a dark room, mapping its size and shape. Measurements were monocular for the dominant eye and binocular for straight and 30-degree lateral sight. Three metrics were analyzed: two assessing disturbance size, light disturbance index (LDI), and best-fit circle radius (BFCRad), and one evaluating distortion irregularity, BFC irregularity (BFCIrreg). The protocol included three visits per lens: baseline, 30 minutes post-wear, and after 15 days.
Results: After 15 days, all lenses showed a reduction in light disturbance, with a 20% reduction in LDI suggesting improved perception of small stimuli around the central light source. Aura3 trended toward significance ($p = 0.073$). The BFCRad decreased, indicating a smaller affected area in some conditions. BFCIrreg decreased by nearly 40%, except AURA6, which showed a significant increase in irregularity ($p = 0.032$). Although these changes were not statistically significant, all lenses reduced light disturbance over 15 days. These metrics provide an objective reference for understanding wearers' complaints related to bright light sources against dark backgrounds.
Conclusions: Values for light disturbances with these ophthalmic lenses were within normal ranges, found across baseline measures after wash-out periods. After 15 days, light disturbance effects significantly decreased, suggesting that, despite design differences, all lenses had similar favorable effects on visual quality.

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Poster#54

Analysis of a Visual Therapy Protocol for the Management of Convergence Excess

Carmelo Baños Morales, Estela Fraile García, Alejandro Parras Jiménez, Jesús Manuel López Infante, Irene Sánchez Pavón

Abstract

Purpose: Convergence excess is a binocular dysfunction increasingly relevant due to heightened near visual demands associated with digital device use. Traditional treatments include prismatic lenses and vision therapy. Scientific evidence for the efficacy of vision therapy in binocular vision disorders continues to grow, highlighting the importance to further validate structured treatment protocols to enhance clinical practices. This study evaluates the impact of a structured vision therapy protocol developed by University of Valladolid and General Optica on clinical optometric parameters in patients diagnosed with convergence excess.

Methods: A comprehensive optometric assessment was performed initially to establish baseline values, including monocular and binocular visual acuity, fusional vergence, accommodative function, stereopsis, and binocular vision quality. The structured vision therapy protocol, comprised six phases: Initial Phase (sessions 1-2), Accommodative Phase (sessions 3-5), Vergence Phase (sessions 6-8), Stereopsis and Reinforcement Phase (sessions 9-10). Each phase involved specific exercises progressively increasing in complexity and targeted therapeutic goals. Exercises were performed in-office (weekly sessions) and reinforced daily at home (15-20 minutes/day, minimum 5 days/week). Clinical evaluations were conducted every five sessions to monitor patient progress. Statistical analysis used the Wilcoxon signed-rank test ($p<0.05$).

Results: Four myopic patients (3 females, 1 male; mean age: 20.25±7.58 years, range 14-31) completed the protocol. Baseline findings included normal visual acuity (>1.0), normal stereopsis (20-50 arcsec), and normal near point of convergence. However, patients showed reduced fusional divergence, altered relative accommodation (NRA/PRA), decreased accommodative flexibility, and low accommodative amplitude. Post-treatment, all patients demonstrated significant improvements in binocular vision parameters, including restored fusional divergence, normalized NRA/PRA values, increased accommodative flexibility and amplitude, and resolution of associated symptoms.

Conclusions: This structured visual therapy protocol appears effective for managing convergence excess, resulting in measurable clinical improvements. Further studies with larger samples are necessary to strengthen the statistical validity and confirm these results.

Poster#55

Association between visual function parameters and academic performance in Portuguese adolescents.

Diogo Algarvio, Márcio Marques, Pedro Monteiro, Francisco Brardo, Amélia Nunes

Abstract

Purpose: To investigate the relationship between sociodemographic factors and visual health parameters in adolescents from the 2nd and 3rd cycles of basic education in the municipality of Covilhã and their academic performance.

Methods: A total of 470 students (50.4% male; 49.6% female), with a mean age of 12.81 ± 1.53 years, were included. Visual acuity (VA) was assessed using LogMAR charts (VA worse than 0.1 LogMAR was considered reduced). Refractive error was evaluated using a Plusoptix A09 autorefractometer without cycloplegia. The spherical equivalent (SE) was calculated for the right eye only, with myopia defined as SE < -0.75D (diopters) and hyperopia as SE > +1.25D. Academic performance was assessed by the average grades in two curricular areas: humanities and sciences, categorized as "approved" or "not approved". Sociodemographic variables included gender and cycle of studies. Associations were analyzed using the Chi-square test with a significance level of $p < 0.05$.

Results: Academic performance was strongly associated with the cycle of studies in both humanities ($\chi^2 = 188.633$, $p < 0.001$, Cramér's $V = 0.635$) and sciences ($\chi^2 = 238.062$, $p < 0.001$, Cramér's $V = 0.713$), with students from the 2nd cycle performing worse. A weak association was found between VA and academic performance in humanities ($\chi^2 = 4.426$, $p = 0.035$, Cramér's $V = 0.097$), and between gender and performance in sciences ($\chi^2 = 7.291$, $p = 0.007$, Cramér's $V = 0.125$), with male students performing worse. Importantly, the SE showed no significant association with academic performance in any domain.

Conclusion: The cycle of studies is the strongest factor associated with academic performance, with 2nd cycle students performing worse in both fields. VA showed a weak association in humanities, while gender had a weak association in sciences, with males performing worse. Interestingly, no association of SE with academic outcomes was found.

Poster#56

Comparative study between open-field autorefractometer in a sample of young adults

Márcio Marques, Diogo Algarvio, Pedro Monteiro, Amélia Nunes, Francisco Brardo

Abstract

Purpose: To compare sphere-equivalent measurements obtained from three open-field autorefractometers.

Methods: The study involved 69 young adults (12 males and 57 females) with an average age of 20.49 ± 3.78 years. The three open-field autorefractometers used were GrandSeiko WAM-5500 (GS), PlusOptix A09 (A09), and PlusOptix A16 (A16). Each participant underwent three measurements using each device. The sphere equivalent (SE) of each participant's right eye was used for comparative analysis.

Results: The mean SE values for GS, A09, and A16 were -1.52 ± 2.48D, -1.42 ± 2.48D, and -1.62 ± 2.52D, respectively. Friedman ANOVA revealed significant differences between the autorefractometers ($p < 0.001$). The pair with the largest difference was PlusOptix A09-A16 ($p < 0.001$), followed by GS-A09 ($p = 0.017$). The pair A16-GS ($p = 0.409$) did not show significant differences in SE means.

Conclusions: The results of this study demonstrated significant differences in the SE measurements obtained from the three open-field autorefractometers assessed. Although unexpected, there was a difference between A09 and A16, despite their shared data acquisition principle. Further studies are recommended, particularly in the pediatric population, as this equipment is often used in this group.

Poster#57

Assessment of corneal sensitivity in patients undergoing isotretinoin treatment: A comparison of non-contact esthesiometry and the Cochet-Bonnet esthesiometer

Concepción Renedo, Javier Lozano-Sanroma, Alberto Barros, Juan Queiruga-Piñeiro, Luis Fernández-Vega Cueto, Rosa Alvarado-Villacorta, Ignacio Alcalde, Jesus Merayo-Lloves

Abstract

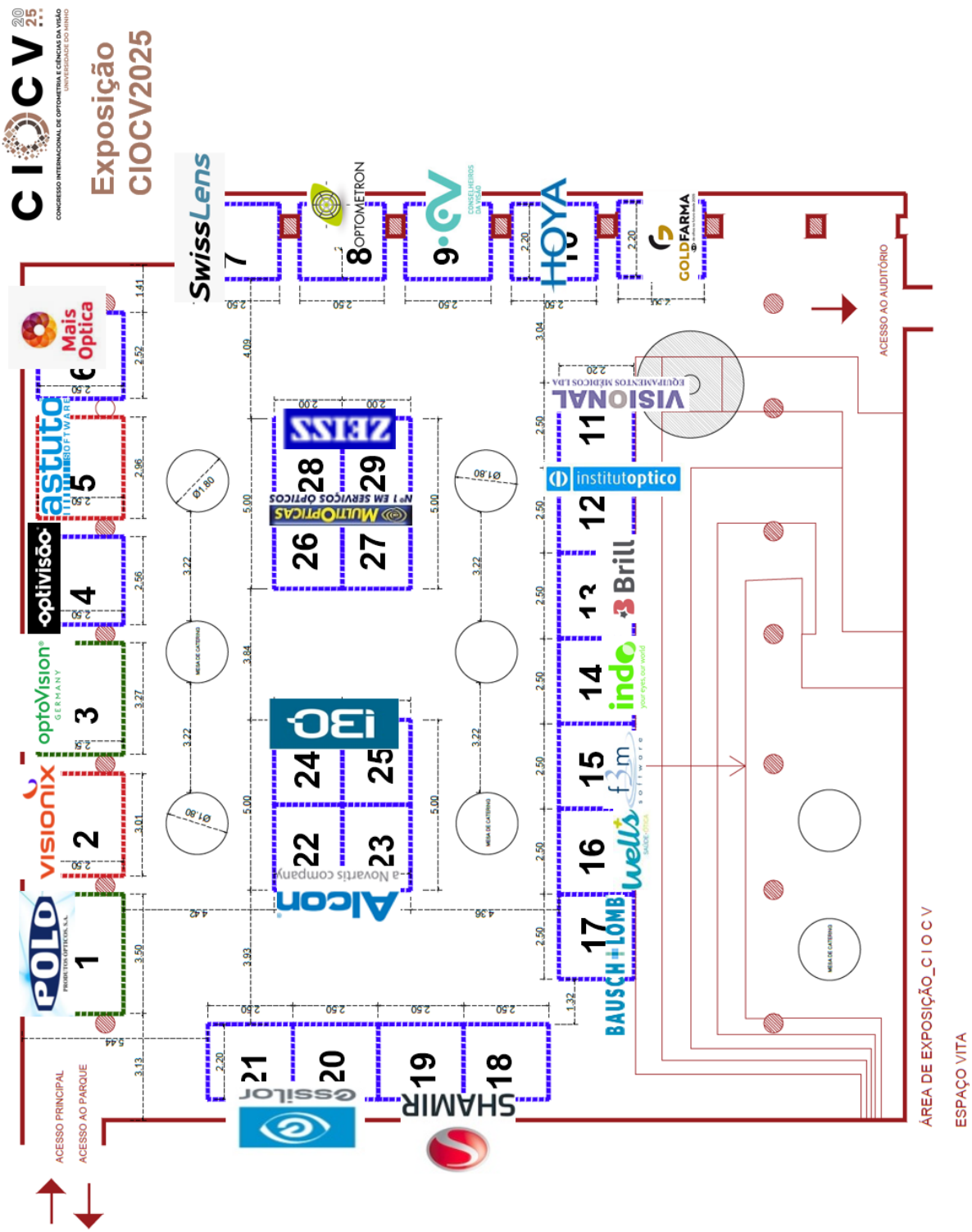
Purpose: Oral isotretinoin is frequently prescribed for treating acne vulgaris; nevertheless, there have been reports of side effects affecting the ocular surface. The innervation of the cornea is vital for maintaining the health of the ocular surface. We aimed to assess corneal sensitivity in patients undergoing isotretinoin treatment compared to healthy controls by using the innovative non-contact corneal esthesiometer (NCE) and the contact Cochet-Bonnet (CCB) esthesiometer.

Methods: A cross-sectional clinical study was conducted. We included two clinical groups: patients who had been on oral isotretinoin for a minimum of three months and healthy control participants. After obtaining informed consent, central corneal sensitivity was tested with the non-contact esthesiometer (Brill Engines, Spain) following the manufacturer's instructions. The device generates air pulses at varying intensities. For each eye, three measurements were taken at each level, beginning with the lowest intensity. The CCB esthesiometer was also used with a 0.08 mm of diameter nylon monofilament. The corneal sensitivity results were compared by converting them into force values. Additionally, ocular surface disease index (OSDI), visual analogue scale (VAS), non-invasive tear break-up time (NIBUT), Schirmer's test, and meibography grading, were also recorded.

Results: We included seven patients (7 eyes) with a mean age of 23±4 years treated with oral isotretinoin and 21 healthy controls (21 eyes) with a mean age of 44.7± 15 years. All participants were female. Comparing the forces applied by both esthesiometers, the values showed significant differences ($p<0.001$) in patients treated with isotretinoin and in healthy eyes ($p=0.0034$), as well. Patients undergoing isotretinoin treatment showed a significantly lower corneal sensitivity than those in the control group. Bland Altman plots showed that most data were inside the 95%CI limits. OSDI, VAS, and meibography grading were higher, while NIBUT and Schirmer's test showed lower values in patients treated with isotretinoin than in healthy volunteers.

Conclusions: Corneal sensitivity was significantly reduced in patients undergoing treatment with isotretinoin. The novel NCE could be used as a non-invasive alternative to the CCB esthesiometer in both healthy eyes and patients experiencing ocular surface issues related to isotretinoin; however, the values are not interchangeable. This is a pilot study; therefore, further studies with larger sample sizes are needed.

Conference Area



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