Universidade do Minho
Escola de Ciências

CIOCV 2024

CONGRESSO INTERNACIONAL DE OPTOMETRIA E CIÊNCIAS DA VISÃO
UNIVERSIDADE DO MINHO

ABSTRACTS BOOK CIOCV' 2024

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Welcome Message

Dear Colleagues,

The International Congress of Optometry and Vision Sciences (CIOCV) celebrates its twenty first edition. We started in 2004 at building 1 of the Gualtar Campus of the University of Minho with six sponsors and just over 200 participants. Thanks to all of you, the CIOCV has become a national and international reference for continuing education in Optometry and Vision Sciences.

The realization of the 21st edition is undoubtedly an important milestone that we intend to celebrate. We have redefined some concepts of the CIOCV, making it more modern and appealing, but with the same scientific rigor as always. We will be at the Espaço Vita, in the center of the city of Braga, a welcoming and uniquely beautiful space, and for the first time, the event will take place at the end of September.

The contents of this edition are diverse and aim to cover areas such as neuro-optometry, binocular vision, corneal dystrophies, among other topics, while also promoting and highlighting the scientific research work carried out in various national and international research centers.

We are preparing everything so that this 21st edition of the CIOCV will be the meeting point for the sharing of reference science. We want to continue to contribute to making the future of Optometry based on knowledge and clinical practice of excellence.

We will be together soon!

The organizing committee of the CIOCV'2024

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Program

- *Lectures*
- *Free Papers*
- *Posters*

Lectures

Time	Session	Saturday, 28th September 2024
08:00		**Accreditation**
09:15		**Opening session**
09:30	1. Vision and Driving: Insights and Solutions	**The Impact of Visual Competence on Traffic Safety: Ocular Movements and Night Myopia, Challenges and Solutions** Andrés Gené-Sampedro · University of Valencia, Spain
10:30		**Effects of age-related vision changes, distraction and cannabis use on driving** Carolina Ortiz Herrera · University of Granada, Spain
11:00		**Coffee-Break - Posters- Exhibition Hall**
11:30	2. Oculomotor function	**Characterization and Scientific Evidence in Oculomotor Dysfunction Treatment through Visual Therapy** Carmen Bilbao – University of Zaragoza, Spain David Piñero – University of Alicante, Spain
12:00		**Clinical Cases of Oculomotor Disorders Treated with Visual Therapy** Carmen Bilbao – University of Zaragoza, Spain David Piñero – University of Alicante, Spain
13:00		**Lunch - Posters- Exhibition Hall**
14:30	3. Innovations in Optical Technology: Presbyopia and Virtual Reality	**Advances on presbyopia compensation with autofocus spectacle lenses** Bruno Berge · Laclarée, France
15:15		**Next-gen Virtual Reality: why focus cues should be reproduced correctly, and why it is so difficult to do so.** Simon Watt · Bangor University, Walles, UK
16:00		**Coffee-Break - Posters- Exhibition Hall**
16:30	4. Intraocular Lenses for Presbyopia: Selection and Outcomes	**Intraocular Lenses for Presbyopia: Exploring Advantages and Challenges in their Classification and Selection** Alejandro Cerviño · University of Valencia, Spain
17:00		**Candidate Preparation and Intraocular Lens Selection in Presbyopia Correction** Jose Vicente García · University of Valencia, Spain
17:30		**Follow-up Strategies to Optimize the Results of Intraocular Lens Implantation in Presbyopia Correction** César Albarrán · University of Valencia, Spain
18:00		**Closing session of day 1**

Time		Sunday 29th September 2024
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09:00 11:00	5. Research Insights: Exploring Innovation	**Free Lectures and Clinical Cases**
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11:30	6. Contact Lens Innovations: Sustainability and Advanced Fitting	**Recycle Contact Lenses: Sustainable Solutions to an Environmental Problem** Madalena Lira · University of Minho, Portugal Ana Vera Machado · University of Minho, Portugal
12:00		**The Art and Science of Scleral Lens Fitting: From the Basics to Advanced Technology** Daddi Fadel · Center for Ocular Research and Education, Canada Rute Macedo de Araújo · University of Minho, Portugal
13:00		**Lunch - Posters- Exhibition Hall**
14:30	7. Advancements in Ophthalmic Referral and Technology	**Retinal Examination through Optical Coherence Tomography in Mild Cognitive Impairment** Lorena Elvira-Hurtado · Instituto de Investigaciones Oftalmológicas Ramón Castroviejo. Universidad Complutense de Madrid. Spain
14:45		**Biomechanics, Tomography, and Tear Proteomics in Offspring of Keratoconus Patients.** Maite López-López · Universidade de Santiago de Compostela, Spain
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Free Papers

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2	Filipe Da Silva, João M.M. Linhares, Jorge Jorge, Madalena Lira	Tear Film Stability in Children: A Descriptive Approach
3	Maria Romaguera Planells, Julia Bodas Romero, Gonzalo Valdés Soria, Laura Batres Valderas, Rachel Marullo, Percy Lazon de la Jara, Juan Gonzalo Carracedo Rodriguez	Halo Assessment Based on Blinking with Different Monofocal and Multifocal Soft Contact Lenses
4	Eduardo Insua Pereira, Madalena Lira, Ana Paula Sampaio	Assessing tear inflammatory molecules and their ocular physiology correlations in new contact lens wearers
5	Fabiana Sousa, Gonzalo de la Cruz, Beatriz Remeseiro, Oscar Luaces, Madalena Lira	Assessing a Novel Blink Evaluation Method: A Comprehensive Comparison with Established Methodologies for Clinical Utility
6	María Mechó-García, María Arcas-Carbonell, Elvira Orduna-Hospital, Ana Sánchez-Cano, Norberto López-Gil, Rute J. Macedo-de-Araújo, Miguel Faria-Ribeiro, Paulo Fernandes, José Manuel González-Meijome, Jos Rozema	Exploring ocular wavefront and monochromatic aberrations during accommodation: A statistical model approach in a large population.
7	Clara Martinez-Perez, Miguel Ángel Sánchez-Tena, Cristina Alvarez-Peregrina	Exploring the Impact of Lifestyle Habits on Myopia Development in Children: A Focus on Sleep, Outdoor Activities, and Digital Device Use
8	Alba Castro-Giraldez, Jacobo Garcia-Queiruga, Belen Sabucedo-Villamarin, Maria J. Giraldez, Hugo Pena-Verdeal, Eva Yebra-Pimentel	Analysis of symptom and sign evolution in evaporative dry eye disease participants after two months of treatment with Systane Complete® artificial tears.
9	Navarro-Gil FJ, Carpena-Torres C, Huete-Toral F, Crooke A, Dominguez-Godinez CO, Carracedo G	Effect on a Dry Eye Model of the Release Through Contact Lenses of Melatonin and Analogues
10	Mario Cantó Cerdán, Antonio Martínez Abad, Carlos J. Hernández Rodríguez	Evidence on the Parameters of Oculomotor Skills and Normative Values: A Scoping Review
11	Inés López-Cuenca, Lidia Sánchez-Puebla, Alberto Arias-Vázquez, Elena Salobrar-García, José A. Matamoros, José A. Fernández-Albarral, Lorena Elvira-Hurtado1, Takaomi C. Saido, Takashi Saito, María I. Cuartero, Carmen Nieto Vaquero, María A. Moro, Ana. I. Ramírez, Juan J. Salazar, Rosa de Hoz, José M. Ramírez	Unveiling Retinal Pathology in an Alzheimer's Disease Murine Model APPNL-F/NL-F: Insights from Optical Coherence Tomography Analysis
12	Clara Abadías Ferreiro, Cristina Vieites, Raquel Sánchez, Jacobo Fraguela, Sofia C. Peixoto-de-Matos, José M. González-Méijome	Six-month refractive change and axial elongation in children and adolescents wearing myopia control devices compared to controls in an optometric practice
13	Inês Pinheiro, Paulo Fernandes, José Manuel González-Meijóme, António Queirós	Relative peripheral defocus induced with Orthokeratology: Systematic Review and Meta-analysis

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2	Rute J. Macedo de Araújo, Daddi Fadel, Melissa Barnett	The patient·physician relationship and role of empathic communication in contact lens practice – patient satisfaction
3	Veronica Noya·Padin, Noelia Nores·Palmas, Alba Castro·Giraldez, Maria J Giraldez, Hugo Pena·Verdeal, Eva Yebra·Pimentel	Influence of peripheral defocus contact lenses decentration on astigmatic component in myopic children
4	Wellington Sales Silva	Optometrist Training in Brazil: a humanistic perspective for curricular redefinition.
5	Hugo Pena·Verdeal, Verónica Noya·Padin, Jacobo García·Queiruga, Noelia Nores·Palmas, María J. Giraldez, Eva Yebra·Pimentel	Temporal variations in convergence insufficiency symptoms among Spanish university students: pre· and post·pandemic perspectives
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8	Jorge Jorge, Paulo Fernandes	Comparison of PlusoptiX A16, Vision Screener V100, WAM 5500 Autorefractor, and Subjective Refraction in a Clinical Population
9	Jacobo Garcia·Queiruga, Belen Sabucedo·Villamarin, Hugo Pena·Verdeal, Maria J. Giraldez, Carlos Garcia·Resua, Eva Yebra·Pimentel	Changes in the TMH of untreated dry eye subjects grouped in 3 three different periods of time
10	Noelia Nores·Palmas, Veronica Noya·Padin, Alba Castro·Giraldez, Eva Yebra·Pimentel, Hugo Pena·Verdeal, María Jesús Giráldez	The relationship between accommodative response, refractive status and ocular phoria
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13	Cristina Arroyo del Arroyo, Andrea Martínez Pedreño, Sonia Menchen Cañadas, Gonzalo Carracedo Rodríguez	Gabor Patches for Neuroadaptation in Multifocal Contact Lenses Wearers: A Pilot Study
14	Laura Ximena Sierra Buitrago, Vanesa Escobar Rodríguez, Laura Deepa Llorente Díez, Laura de Diego·Garcia, Gonzalo Carracedo, Alba Martín Gil	Effects Of Extract of Artemia Salina On Paracellular Corneal Barrier Function

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36	Bárbara Marinho, Paulo Fernandes, José Manuel González-Méijome	Retinal electrophysiological activity and visual function after ocular stimulation with repeated low-level red-light for myopia control.
37	Mirian Demera Marcillo, Dayan Flores Cervantes, Inas Baoud Ould Haddi	Ocular Dominance in Children and Its Impact on Vision
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Lectures

The Impact of Visual Competence on Traffic Safety: Ocular Movements and Night Myopia, Challenges and Solutions

Andres Gené Sampedro, PhD
University of Valencia, Spain

Brief Curriculum Vitae

Professor at the Department of Optics and Optometry and Vision Sciences at the University of Valencia. Researcher INTRAS (Research Institute on Traffic and Road Safety) at the University of Valencia. Graduated in Optics by the University Complutense Madrid. Degree in Optics and Optometry Universidad Alicante. Master's in Clinical Optometry Pennsylvania College of Optometry. Doctor by the University of Valencia. Teacher in postgraduate training (Spain, Portugal, France, Brazil). Advisor to international companies in the sector. Founding Member European Academy of Optometry and Optics. Spain Coordinator of the Ibero-American Epidemiological Network in Visual and Ocular Health 2011-2014. Secretary Deontology and Ethics Committee of the General Council of Colleges of Optical Optometrists Spain.

Abstract

Traffic safety is a complex and dynamic process that impacts the public health of modern societies; also, it is highly dependent on human factors. Safe driving results from the interaction between the cognitive, visual, and motor capacities of the driver, together with the car and the environment.

Driving itself is a complex task that requires specific visual skills and optimal vision. In fact, we know that the visual route is what provides us with more information and the one that mainly contributes when maintaining a safe driving. Therefore, good vision is essential for safe and efficient driving.

Apart from the ocular competencies assessed in driving examination centers (e.g., visual acuity and refraction errors), ocular movements, visual attention, and processing are crucial for proper driving and could, therefore, provide more complete information on the appropriateness of a person to drive.

On the other hand, during night-driving, information of the visual environment decreases mainly due to dim lighting and glare from oncoming headlights and impacts visual function along with other more complex visual process; visual acuity or contrast vision degrades, glare sensitivity increases and for some people a change in refractive state occurs, a condition called commonly "night myopia". It can pose a safety risk to road traffic, as it makes nighttime driving difficult.

Night myopia significantly impairs driving performance, especially under conditions of low illumination. Wearing corrective lenses can improve visual performance and reduce the impact of night myopia on driving performance.

Clinical assessment of the strabismic patient

Carolina Ortiz Herrera, PhD
University of Granada, Spain

Brief Curriculum Vitae

She is currently a Full Professor in the Department of Optics at the University of Granada. In 2009, she obtained an International PhD degree with a Cum Laude. On the research side, she belongs to the CLARO group (https://blogs.ugr.es/claro-group/) being her main lines of research the study of visual function and optical quality in different ocular pathologies, binocular vision, vision and driving, and low vision. Author of more than 40 papers in journals indexed in Journal Citation Report and more than 50 communications in national and international congresses.

Abstract

The overall aging of the population is leading to an increase in the number of older drivers. Vision is the fundamental sensory mechanism used when driving. Age-related vision changes can significantly impact driving safety. As people age, various physiological changes in the eyes, such as a loss of lens transparency, can diminish visual capabilities, leading to an increased risk of driving accidents. Evaluating visual capabilities is crucial for ensuring the safety of older drivers and other road users. Visual acuity is the standard test for licensing purposes; however, it only presents a weak correlation with safety risk in older drivers, and it is important to know which parameters of visual function are better predictors of safe driving ability. On the other hand, distraction while driving is one of the major contributors of road accidents and fatalities. One of the main causes of driver distraction is the use of smartphone applications such as navigation, social media, message, music, among others, that affects drivers of all ages. The use of smartphone while driving includes visual, manual, and cognitive distractions, causing unintentional lane changes, increased reaction time and greater variability of speed, significantly increasing the crash risks. Finally, the consumption of alcohol and other drugs such as cannabis, the most widely used illegal drug in the world, is becoming more and more frequent in the population, so we consider it interesting to know how it affects vision and its relationship with the driving performance.Once the examination and adequate diagnosis have been carried out, the optometrist must inform the patient (frequently the parents) and set a goal, explaining the steps that we will have to follow to obtain it, which in the best of cases will be the functional cure of the patient.

Characterization and Scientific Evidence in Oculomotor Dysfunction Treatment through Visual Therapy

Carmen Bilbao Porta, PhD
University of Alicante, Spain

Brief Curriculum Vitae

Carmen Bilbao Porta, PhD from the University of Alicante, is an Optometrist with a practice in a multidisciplinary team. She is an Associate Professor at the University of Zaragoza and teaches at various universities and the College of Optometrists. Additionally, she is an entrepreneur with a digital marketing company specializing in optometry. Carmen also conducts research focused on studying eye movements in different population groups.).

Abstract

This presentation focuses on the transformative power of Visual Therapy in treating oculomotor dysfunctions, an urgent and often underestimated need in modern optometric practice. Oculomotricity, which includes saccadic movements, fixations, and regressions, is fundamental for smooth reading and academic success, especially in children with learning disorders.

We will present compelling clinical cases demonstrating how Visual Therapy can revolutionize the coordination and efficiency of eye movements. Through these real-life examples, we will highlight the importance of designing personalized therapeutic programs tailored to the unique needs of each patient.

We will explore the latest technologies and advanced software that allow meticulous analysis of visual activity, providing precise diagnosis and effective monitoring of treatment progress. These innovations are redefining optometric practices and elevating clinical outcomes to new heights.

Additionally, we will delve into how oculomotricity influences reading and other cognitive processes and examine the critical connection between oculomotor dysfunctions and learning disorders. Our presentation underscores the urgency of integrating Visual Therapy into daily practice to effectively address these challenges and significantly improve patients' quality of life.

To make the learning experience more dynamic and relevant, we will discuss various clinical cases. We will conclude with an interactive Q&A session, offering participants the opportunity to discuss, explore, and clarify how to implement and maximize the benefits of Visual Therapy in their clinical practices. Join us to discover how you can make a difference in your patients' lives with these innovative techniques!

Clinical Cases of Oculomotor Disorders Treated with Visual Therapy

David Piñero, PhD,
University of Alicante, Spain

Brief Curriculum Vitae

Doctor from the University of Alicante in 2010, Graduated in Optics and Optometry from the University of Alicante (2011), obtaining the Extraordinary Diploma Prize in Optics and Optometry (1998), Graduate in Documentation from the Open University of Catalonia (2007) and University Specialist in Pre- and Post-Surgical Optometry from the University of Valladolid (2002). He is a Full Professor of the Department of Optics, Pharmacology and Anatomy at the University of Alicante. He is an associate editor of the scientific journals Journal of Optometry, BMC Ophthalmology and Journal of Ophthalmology. He has a great and intense research activity, having published more than 450 scientific articles. He has received several awards and recognitions for his career and scientific work, having been considered in 2021 by the Expertscape portal as the first world expert in corneal topography, as well as the second world expert in aberrometry and the fourth world expert in ocular refraction according to his scientific career. He received recognition as “Honorary Optometrist” by the College of Opticians-Optometrists of the Valencian Community in December 2014

Abstract

Would you like to successfully work on oculomotor dysfunctions in your patients and are you looking for effective methods?
This course 'Clinical cases solved with visual therapy in oculomotor dysfunctions' at the CIOCV 2024 congress is specially designed so that you feel comfortable when developing a Visual Therapy plan in these cases.
You will learn a set of detailed procedures and protocols to help you develop effective vision therapy plans. Through real clinical cases and practical situations, from reading difficulties to acquired brain damage, you will learn to apply advanced vision therapy techniques that will transform your professional practice and enrich your ability to make a significant difference in the lives of your patients..

Advances on presbyopia compensation with autofocus spectacle lenses

Bruno Berge, PhD
Laclarée, Lyon, France

Brief Curriculum Vitae

Physicist and entrepreneur, I have worked in the field of tunable lenses for 25 years. The first company I created (Varioptic, now part of the Corning group) became the world leader in the liquid lens market for miniature digital cameras. For 6 years I have embarked on another adventure with Laclarée: having noticed in myself and those around me that many presbyopic people (45 years and over) have difficulty with current corrective lenses, even the latest generation, we are developing adaptive autofocus glasses that will be on the market in 2024.

Abstract

We will present the status of most recent existing projects and products related to correcting presbyopia with variable lenses. The basic principles of underlying technologies will be discussed, and relative performances will be compared. A particular focus will be made on fluidic lenses, which can enable a true restauration of natural accommodation, as shown by the results of an exploratory clinical trial and by field tests using personalized adaptive eyeglasses

Next-gen Virtual Reality: why focus cues should be reproduced correctly, and why it is so difficult to do so.

Simon Watt, PhD
University of Bangor, Wales, UKI

Brief Curriculum Vitae

Simon Watt completed a PhD on the role of binocular vision in hand-movement control at Surrey University in 2001 (supervisor: Mark Bradshaw), followed by a postdoc at the School of Optometry, UC Berkeley (supervisor: Martin Banks). He moved to a faculty position at Bangor University, Wales, in 2004. He does basic and applied research on binocular vision and 3-D displays, as well as studying fundamental aspects of tool-use, upper-limb prosthesis use, and multisensory integration.

Abstract

Virtual Reality (VR) headsets are poised for adoption in mass consumer settings and numerous specialist applications (including Optometry). In principle, an ideal VR headset would reproduce the natural light-field at the eye with sufficient fidelity to provide essentially natural stimulation to the visual system. In practice, while 'basic' image properties (resolution, dynamic range etc.) continuously improve, the problem of incorrect focus cues in VR persists. Conventional 3-D displays, including commercial VR headsets, present images on a single focal plane. This results in an incorrect stimulus to accommodation, causing the well-known vergence-accommodation conflict. Less widely appreciated, the retinal blur gradient is also incorrect, causing fine-scale inconsistencies between natural and virtual images. This talk explores the implications of incorrect focus cues from two main perspectives. We first consider conventional 3-D displays, and ask whether tolerance to incorrect focus cues depends on individual differences in visual-system parameters that would be expected to play a role (accommodation ability and phoria). Results suggest all VR users would benefit from correct focus cues. A second line of work explores the challenge of reproducing focus cues correctly in future displays. These studies demonstrate how presenting a continuous stimulus to accommodation is tractable, thereby eliminating vergence-accommodation conflicts. They also reveal a (surprising) role of higher-order aberrations in the appearance of images, however. This suggests achieving an ultimate goal of VR—imagery that is indistinguishable from the real world (i.e. that passes a so-called 'Visual Turing Test')—may require solving the challenge of taking into account individual eye optics.

Premium Intraocular Lenses for Presbyopia Correction: Classifications, Features and Selection Criteria

Alejandro Cerviño, PhD
University of Valencia, Spain

Brief Curriculum Vitae

Prof. Alejandro Cerviño is a Full Professor of Optometry and Vision Sciences at the University of Valencia (Spain). With over 200 publications, including more than 120 in peer-reviewed journals, he leads major research projects and consults for companies within the fields of Ophthalmology and Optometry. He is on the editorial boards of the Journal of Optometry, Journal of Ophthalmology, and Life, and is also a member of several international review panels for research proposals in competitive calls, within and outside Europe.

Abstract

Presbyopia is a ubiquitous condition affecting individuals over the age of 40, significantly impacting their quality of life. Recent advancements in premium intraocular lenses (IOLs) provide promising solutions for presbyopia correction. The significant increase over the last decade in the range of intraocular lens options that fall under what we would consider 'Premium IOLs for Presbyopia correction' has led to various attempts to classify and categorize the different available options. This presentation will delve into the latest classifications, features, and selection criteria of these lenses.

By exploring the classifications of premium IOLs, each type will be examined in terms of design, mechanism of action, and visual performance outcomes.

Furthermore, the presentation will overview the critical criteria for selecting the appropriate IOL for individual patients, serving as a preliminary approach ahead of the more detailed coverage that will follow in the subsequent presentations of the session.

Preoperative study in premium intraocular lenses

José Vicente García-Marqués, PhD
Castro Ophthalmological Clinic, Valencia, Spain

Brief Curriculum Vitae

José Vicente García Marqués has a doctorate in Optometry and Vision Sciences from the University of Valencia. He obtained a Degree in Optics and Optometry at the University of Valencia in 2016, and received an extraordinary award from the University of Valencia and the Valencian Community. In 2017, he completed the Master in Advanced Optometry and Vision Sciences at the University of Valencia, and also obtained the extraordinary Master's award. In 2022, he defended his doctoral thesis related to the ocular surface, contact lenses and dry eye, where he received the qualification of excellent cum laude.
He has more than 20 scientific articles in indexed journals, more than 30 communications at international conferences and various book chapters. He obtained a predoctoral scholarship where he was part of the Optometry Research Group (GIO), collaborated in the Degree in Optics and Optometry at the University of Valencia and carried out two research stays at the Universidade do Minho (Braga, Portugal) with the CEORLab research group. He currently collaborates in the Master in Advanced Optometry and Vision Sciences at the University of Valencia and works at the Castro Ophthalmological Clinic in Valencia. In his work at the clinic, he carries out the pre- and post-operative study of cataract surgery and refractive surgery.

Abstract

Premium Intraocular Lenses (IOLs) restore visual function at different distances and reduce spectacle dependence after cataract surgery. Preoperative study of patients' characteristics is vital to choose whether the patient is a candidate to be implanted with a Premium IOL. Knowing patients' needs, visual goals, lifestyle, profession, hobbies, and expectations is crucial. Generally, most of these lenses are pupil-dependent, so it is essential to evaluate the pupil diameter and know how the different optical zones of the lens are distributed. The study of corneal topography is also vital to determine the quantity and quality of corneal astigmatism. Premium IOLs should not be selected for eyes with significant corneal HOAs. Spherical aberration (SA) should be considered when selecting patients. Thus, it is necessary to check whether the corneal SA is not below a normal range before implanting an aspheric IOL. An appropriate IOL power calculation formula should be selected for eyes with an abnormal shape, such as eyes after corneal refractive surgery. The kappa angle and white-to-white must also be evaluated to achieve a correct alignment with the visual axis. Thus, it has been reported that values of chord mu and alpha above 0.5-0.6 mm are not recommended for implanting a Premium IOL. In this way, the preoperative study of patients is essential to choose the appropriate IOL for each individual, and it helps surgeons decide which IOLs are better for each patient depending on their needs and the anatomical characteristics of their eyes.

Postoperative Follow-up of Patients Implanted with Premium Intraocular Lenses

César Albarrán, PhD
University of Valencia, Spain

Brief Curriculum Vitae

César Albarrán obtained his degree in Optics and Optometry in 1996, completed a Master in Advanced Optometry and Visual Sciences in 2012, and received his PhD in Optometry and Vision Science in 2017, from the Universitat de Valencia. He is currently Associate Professor at the Department of Optics and Optometry and Vision Science at the UV, and his research interests include physiological optics and optometry applied to refractive surgery.

Abstract

Despite the wide variety of multifocal intraocular lens (IOL) models and the seemingly diverse range of technologies used to achieve multifocality, for practical purposes, we can classify multifocal IOLs into two main groups: refractive and diffractive.
Each of these types of IOL has particularities that require a different postoperative evaluation by the optometrist regarding the determination of refractive status and the measurement of visual acuity (VA). Additionally, the potential limitations in visual capacity that each type of multifocal IOL can impose at different working distances also vary.
Therefore, it is essential for the optometrist to be knowledgeable about the different types of multifocal IOLs to perform an accurate postoperative evaluation. This knowledge will equip them with clinically applicable tools to propose solutions to specific problems associated with each type of multifocal IOL.
In this talk, some clinically applicable tips will be offered to avoid errors in the evaluation of patients implanted with multifocal IOLs. The validity of some of the tests included in both objective and subjective refraction examinations will be discussed, and the concept of the defocus curve will be addressed, which is of great importance for characterizing the performance of multifocal IOLs and for proposing optical aids in specific situations.

Madalena Lira, PhD
University of Minho, Portugal

Contact Lenses Valorization: Sustainable Solutions for an Environmental Issue

Brief Curriculum Vitae

Graduated in Applied Physics, with a Ph.D. in Sciences from the University of Minho in 2007, currently an Associate Professor in the Department of Physics and a member of the Physics Center at the University of Minho. She has extensive experience in scientific research, with several articles published in specialized journals and participation in national and international conferences.

Abstract

Authors: Madalena Lira 1, Rita Alves 2, Pedro Rodrigues 3, Ana Paula Sampaio 2, Fernanda Cássio 2, Ana Vera Machado 3
1 Physics Center of Minho and Porto Universities (CF-UM-UP), University of Minho
2 Centre of Molecular and Environmental Biology (CBMA), University of Minho
3 Institute of Polymers and Composites (IPC), University of Minho

This presentation is divided into two parts, each addressing critical aspects of the environmental impact and potential recycling of contact lenses. In the first part we will discuss a comprehensive two-year study conducted to evaluate the environmental impact of contact lenses. Our research reveals that contact lenses do not degrade, raising significant concerns about their contribution to environmental pollution. The findings from this study are intriguing and emphasize the urgent need for improved disposal practices and user awareness.

Contact Lenses Valorization: Sustainable Solutions for an Environmental Issue

Ana Vera Machado, PhD
University of Minho, Portugal

Brief Curriculum Vitae

Associate Professor with Habilitation in the Department of Polymer Engineering at the University of Minho in Portugal. She obtained her Ph.D. in Polymer Science and Engineering from the University of Minho in 2000. Her research covers areas, such as polymer modification, polymerization, polymer nanocomposites, and online monitoring, with a focus on the development of sustainable and smart materials. Ana Machado has extensive experience in supervising research projects and publishing in high-impact journals.

Abstract

Authors: Madalena Lira 1, Rita Alves 2, Pedro Rodrigues 3, Ana Paula Sampaio 2, Fernanda Cássio 2, Ana Vera Machado 3
1 Physics Center of Minho and Porto Universities (CF-UM-UP), University of Minho
2 Centre of Molecular and Environmental Biology (CBMA), University of Minho
3 Institute of Polymers and Composites (IPC), University of Minho

The second part of the presentation will focus on ongoing research aimed at repurposing used contact lens materials to create value-added products. We will explore innovative approaches and preliminary results that demonstrate the potential for incorporating recycled contact lens materials into new products, thus reducing waste and promoting sustainability. This segment underscores the importance of developing circular economy solutions for everyday items like contact lenses.

The Art and Science of Scleral Lens Fitting: From the Basics to Advanced Technology

Daddi Fadel DOptom
University of Waterloo, Canada

Brief Curriculum Vitae

Daddi Fadel DOptom, FSLS, FBCLA, FAAO, FIACLE is clinical scientist at Center for Ocular Research and Education. She is a Pioneer of modern lens designs, and a specialist in contact lenses for irregular cornea, scleral lenses, myopia control, and orthokeratology.
She is internationally recognized as a KOL, who has several peer-reviewed publications. She lectures extensively in 5 languages.
Dr. Fadel and Dr. Barnett are authors of the “Clinical Guide for Scleral Lens Success”. Fadel is the author of the book “Scleral Lens Complications: Their Recognition, Etiology, and Management”.
She is internationally recognized as a KOL, Editor-in-Chief of the Journal of Contact Lens Research & Science, and author of several peer-review articles and books.200 lectures at national and international conferences and has published 51 articles in peer-reviewed journals.

Abstract

Interest in scleral lenses is growing, as evidenced by the proliferation of manuscripts, blogs, and social media groups dedicated to lens fitting and their physiological impact on the ocular surface. Optometrists should recognize the significance of these lenses and invest time in developing their fitting expertise.
Various techniques are used for fitting scleral lenses, including biomicroscopy, scleral topography, OCT, anterior segment tomography, and impression technique. Understanding these methods optimizes scleral lens practice, leading to more successful fittings, avoiding unnecessary modifications, and reducing frustrations, time, and costs for both practitioners and patients.
Research has shown that 65.7% of eyes exhibit scleral shapes differing from commonly designed spherical or toric haptic designs, highlighting the uniqueness and distinct surface profile of each eye. Consequently, generic scleral lenses can never adequately substitute for specialized lenses tailored to individual eyes. Clinicians must be proficient in various techniques to ensure optimal vision, fitting success, and comfort when prescribing scleral lenses. This presentation aims to increase awareness about scleral lenses, discuss basic notions, describe how to start a scleral lens practice and explain how to fit them. It will also cover the customization of scleral lenses using diverse available techniques and address potential issues and complications clinicians might encounter during scleral lens fitting, drawing from both clinical experience and literature reports. Practical guidelines to effectively resolve these challenges will be provided.

The Art and Science of Scleral Lens Fitting: From the Basics to Advanced Technology.

Rute J. Macedo de Araújo, PhD
University of Minho, Portugal

Brief Curriculum Vitae

PhD in Optometry and Vision Sciences (University of Minho - Braga, Portugal). Invited lecturer in Department of Physics of University of Minho and research assistant at Clinical and Experimental Optometry Research Lab (CEORLab) since 2013. Her investigation is focused on contact lenses, mainly scleral lens fitting for visual rehabilitation, but also optical quality of the human eye, electrophysiological response of the human retina and light disturbance analysis. She has several publications in peer-review ISI journals, is author of several communications in national and international conferences and is co-author of a book chapter.

Abstract

Interest in scleral lenses is growing, as evidenced by the proliferation of manuscripts, blogs, and social media groups dedicated to lens fitting and their physiological impact on the ocular surface. Optometrists should recognize the significance of these lenses and invest time in developing their fitting expertise.

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Retinal Examination through Optical Coherence Tomography in Mild Cognitive Impairment

Lorena Elvira-Hurtado. MScOptom
Complutense University of Madrid, Spain

Brief Curriculum Vitae

Graduated in Optics and Optometry from the Complutense University of Madrid (UCM) in Spain, where she also completed a Master's degree in Vision Science Research. She is currently developing her doctoral thesis at the Ramón Castroviejo Institute of Ophthalmological Research (IIORC) at UCM. Her research focuses on the relationship between cognitive decline and the visual system, investigating changes in both visual function and the retina.

Abstract

Mild cognitive impairment (MCI) represents an intermediate stage between normal aging and dementia, such as Alzheimer's disease, characterized by a decline in cognitive functions without significantly impacting the subject's daily life. For several decades, the retina has been employed in the study of neurodegenerative diseases due to its direct connection to the brain and its shared characteristics with the central nervous system. One of the main advantages of studying the retina lies in its accessibility, as it can be examined non-invasively using various techniques, allowing for high-resolution imaging. This facilitates the analysis of aspects such as the thickness of different retinal layers and vascularization. Furthermore, monitoring these changes over time provides valuable insights into the progression of these diseases. In this communication, we will explore the use of optical coherence tomography (OCT) in MCI. OCT holds great potential as a non-invasive tool to identify retinal alterations associated with this condition, which could aid in the early diagnosis and monitoring of this clinical condition.

Biomechanics, Tomography, and Tear Proteomics in Offspring of Keratoconus Patients.

Brief Curriculum Vitae

Maite López-López, MScOptom
University of Santiago de Compostela, Spain

Maite López-López graduated in Optics and Optometry from the University of Santiago de Compostela and is currently a PhD student in the department of surgery and medical-surgical specialties at the same university. Her master's and doctoral studies have mainly focused on the search for tear biomarkers that could determine new diagnostic and therapeutic strategies for corneal ectasia, trying to elucidate the molecular mechanisms that lead to biomechanical instability of the corneal tissue and the ectasia onset. Maite has been working for 6 years with the Medical Contact Lens Unit of the Instituto Galego de Oftalmoloxía, specializing in the fitting of contact lenses for the irregular cornea management. She is also the author of 11 scientific articles, and numerous contributions to national and international conferences.

Abstract

Keratoconus (KC) is a progressive corneal ectasia that remains one of the leading causes of corneal keratoplasty worldwide with limited visual recovery. Positive family history of the disease is recognized as one of the main risk factors for its development, supported by the high risk reported in the first-degree KC relatives, and also by the common abnormalities observed in the corneal biomechanics and morphology in KC relatives, who often exhibit steeper and thinner corneas, even with features resembling subclinical KC or KC suspect.
For a long time, our group has been focused on understanding the molecular mechanisms that lead to the biomechanical instability and weakness of corneal tissue that preludes the onset of corneal ectasias. Our latest projects aimed to find the earliest molecular drivers and biological pathways involved in the KC pathophysiology. In this way, the purpose of the present work was to analyze the corneal biomechanics, tomography, and tear proteome profile of keratoconus offspring (O-KC) in comparison to control subjects, trying to get closer to the molecular drivers underlying the alterations in corneal biomechanical properties at at-risk stages of KC disease. Briefly, this study included 160 eyes of 80 O-KC young participants and 42 eyes of 42 control subjects without KC family history. Biomechanical and tomographic assessments were performed, and O-KC eyes were classified as low, moderate, and high risk of KC development based on the corneal biomechanical behavior. Tear fluid was extracted using Schirmer Strips and analyzed by micro–liquid chromatography coupled to tandem mass spectrometry (LC-MS/MS). Our results showed that 29% of O-KC eyes showed moderate/high alterations in corneal biomechanical behavior, and tear analysis revealed dysregulated proteins in the O-KC groups compared to the control, even in those cases without detectable alterations in corneal biomechanical properties. Additionally, the bioinformatic analysis on dysregulated proteins highlighted their relationship to oxidative stress, cell adhesion, and cytoskeleton organization processes, as well as with major mechanotransduction paths such as RhoA, mTOR, or E-cadherin/N-cadherin signaling.

Fernando Silva, MD
Hospital Trofa Saúde, Portugal

Ophthalmology Referral: Best Practices and Procedures

Brief Curriculum Vitae

Degree of Medicine at Coimbra University Medical School. Degree of Ophthalmology at Hospital de Santo António - Porto. Coordinator of Ophthalmology Department at Hospital Privado de Braga. Former Tutor of Medicine students - Minho University Medical School. Coordination of eleven postgraduate courses entitled "Premium Cataract Sur-gery", integrated into the International postgraduate programme of Minho Medical School. Special interest in the field of cataract surgery and surgical correction of re-fractive errors (corneal, lens and iol implantation surgeries).

Abstract

This will be an interactive talk, assessing the most common signs, symptoms, and diseases that could affect our patients and the need and urgency of refer-ral.
The person who exhibits this conditions should be referred to an ophthalmol-ogist, for definitive diagnosis and necessary medical treatment.

Free Papers

Free Paper #1

The Role of Purinergic Metabotropic Receptors in Myopia Development. A Pilot Study

Gonzalo Valdes-Soria, María Romaguera-Planells, Laura de Diego-Garcia, Alba Martín-Gil, Gonzalo Carracedo

Abstract

Purpose: While there is evidence supporting the effectiveness of pharmacological and optical treatments in slowing myopic growth, the precise biochemical mechanisms underlying their control over axial length growth remains unknown. Consequently, the purpose of this pilot study was to investigate the intracellular pathways implicated in myopia development and to assess the potential involvement of purinergic metabotropic receptors (P2YRs). Methods: Form deprivation myopia (FDM) was induced in 4-week-old pigmented rabbits that were monocularly deprived for 45 days of any visual stimulus. Myopic model validation was performed by corneal topography, biometry and retinoscopy refraction under cycloplegia prior and upon the completion of the experimental procedure. Changes in the expression of P2YRs in scleral tissue were evaluated by western blot. High-performance liquid chromatography (HPLC) was used for nucleotides (ADP, ATP) and dinucleotides (Ap4A, Ap5A) quantification in sclera, retina, and vitreous humour. Ethical approval was obtained from the relevant Research Ethics Committee (Spain). GraphPad Prism 9 was used for statistical analysis, with $p<0.05$ considered statistically significant. Results: Following light deprivation, a significant increase in myopic refractive error was observed ($p=0.044$) on deprived eyes, with a mean difference of -3.31±1.46 dioptres compared to baseline. Corneal flattering occurred in both deprived and control eyes ($p=0.0004$), without changes in corneal astigmatism ($p>0.05$). No significant changes were obtained on axial length measurements due to unreliability of the ultrasound biometer ($p>0.05$). Gq coupled P2Y4 receptor protein levels notable increased ($p=0.012$), while no significant changes were obtained for P2Y6 and P2Y11 ($p>0.05$). ADP, ATP and Ap5A concentrations showed a slight increase in sclera and retina of myopic eyes, whereas in the vitreous humour their levels decreased when compared to controls ($p>0.05$). Conclusions: These findings suggest P2YRs as a potential G coupled receptor pathway involved in progressive myopia, that could be targeted for the development of new interventions to slow down myopic growth.

Free Paper #2

Tear Film Stability in Children: A Descriptive Approach

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

Abstract

Purpose: Tear film stability is an important parameter responsible for maintaining good ocular surface health. It serves as a protective barrier, nourishing and lubricating the eye while also defending against foreign particles and pathogens. The purpose of this study was to describe the stability of the tear film in Portuguese children aged between 6 and 11 in the north of Portugal and provide valuable insights within pediatric populations.

Methods: This study was conducted in a semi-urban area in northern Portugal. All children attending grades 1 (normally starting at age of 6 years old) through 4 (normally leaving this school grade at the age of 10 years old) in schools within the Paredes Municipality were included. Factors such as ocular surgical interventions, developmental issues, and neurological problems were considered as exclusion criteria. The stability of the tear film was assessed using the non-invasive tear break-up time (NIBUT) measured with the Tearscope Plus (Keeler, Windsor, UK). NIBUT was measured three times, and the mean of the three measurements was considered in the study.

Results: Two thousand and ninety-four children (2094 eyes) were included (1072 females, 1022 males). It was found that the mean NIBUT was of 14.81 ± 5.40 seconds (ranging from 1 to 28 seconds). Approximately 20% of children had a NIBUT<10 seconds, and about 7% had a NIBUT≤5 seconds. Around 40% of participants had an NIBUT between 10 and 20 seconds, while 40% had an NIBUT of 20 seconds, with only 0.1% of participants having an NIBUT greater than 20 seconds.

Conclusions: This study is the first of its kind conducted in the North of Portugal involving a large school community in a semi-urban region. For the studied population, the results show that 20% of the children had an NIBUT<10 seconds, indicating loss of tear film homeostasis.

Free Paper #3

Halo Assessment Based on Blinking with Different Monofocal and Multifocal Soft Contact Lenses

Maria Romaguera Planells, Julia Bodas Romero, Gonzalo Valdés Soria, Laura Batres Valderas, Rachel Marullo , Percy Lazon de la Jara, Juan Gonzalo Carracedo Rodriguez

Abstract

Objective: This study aimed to determine if there are differences in the halo size and decentering produced by different types of soft contact lenses based on blinking, using the Light Disturbance Analyzer (LDA) instrument.
Methods: Twenty non-presbyopic participants (range 21–39 years) were fitted with four types of soft contact lenses: three single-vision designs (Stenfilcon A, Senofilcon A, and Lotrafilcon A) and one multifocal design (Senofilcon A). Refractive errors ranged from -0.50D to -8.00D myopia and ≤0.75D of astigmatism. Halo size was measured monocularly at 2 meters using the LDA under scotopic conditions. The LDA comprises a central 5 mm LED light and 240 peripheral 1 mm LEDs distributed across 24 meridians. Measurements were taken during free and hold blinking (20 seconds between blinks) with the different contact lenses and spectacles (baseline). Participants rated comfort and subjective vision quality using a visual analogue scale (VAS) for each lens type. Data analysis was performed using SPSS Statistics V27.0, with $p<0.05$ considered significant.
Results: The mean spherical equivalent refraction was -2.55±2.29 D (mean age 27.94±8.06). Halo size differences between free and hold blinking were statistically significant for all lenses ($p<0.01$), with larger halo sizes observed during hold blinking. Halo decentration (x, y) did not show significant differences between the contact lenses ($p>0.05$). However, significant differences were found in halo size during free blinking comparing the Stenfilcon A (10.48±2.82 mm) with baseline and multifocal design lenses ($p<0.01$). There were no statistically significant differences in comfort ratings (VAS), but significant differences in subjective vision quality were found between single-vision and multifocal designs ($p<0.001$).
Conclusions: This study concludes that blinking frequency is an important factor to consider, as it can impact halo size and, consequently, vision quality. Further investigation into other factors that may affect vision quality and different lens materials and designs is recommended.

Free Paper #4

Assessing tear inflammatory molecules and their ocular physiology correlations in new contact lens wearers

Eduardo Insua Pereira, Madalena Lira, Ana Paula Sampaio

Abstract

Purpose: This study aimed to evaluate changes of the tear Transforming Growth Factor (TGF)- beta1 and Interleukin (IL1)- beta concentration in new contact lens wearers and explore their correlations with ocular physiological responses.

Methods: In this clinical study, 12 neophytes (5 males) with a mean age of 24.0±5.0 years were fitted with delefilcon A contact lenses. Additionally, an 11-member control group (6 males, mean age 25.0±5.0 years) was included to evaluate biomarker levels in tears of individuals who were not lens wearers. Physiological responses (bulbar and limbal hyperaemia) were graded using the Cornea and Contact Lens Research Unit grading scale. Capillary tubes were used to collect tear samples on the same day before lens insertion (9–10 a.m.) and in the afternoon (before lens removal, 7–8 p.m.). Enzyme-linked Immunosorbent Assay kits were used to assay the tear samples for TGF- beta1 and IL1-beta concentrations.

Results: Subjects wore lenses for an average of 7 hours and 20 minutes (range: 6 to 9 hours). Bulbar and limbal hyperaemia increased significantly throughout the day ($p< 0.001$). The IL1-beta levels were higher in neophytes than in controls (3.2 ± 4.7 vs 0.1 ± 0.1 pg/mL; $p=0.05$), correlating significantly with bulbar ($r=0.405$, $p=0.008$) and limbal hyperaemia ($r=0.499$, $p=0.027$). No substantial differences were detected for TGF-beta1 between the groups.

Conclusion: The presence of TGF-beta1 in tears does not appear to be significantly affected by delefilcon A lens wear. The association between ocular physiological parameters and IL1-beta levels suggests that lens wear may disrupt ocular surface homeostasis by altering cytokine regulatory mechanisms. However, the low concentration of IL1-beta might limit its role in the subclinical inflammatory response to lens wear, underscoring the need for further research in this area.

Free Paper #5

Assessing a Novel Blink Evaluation Method: A Comprehensive Comparison with Established Methodologies for Clinical Utility

Fabiana Sousa, Gonzalo de la Cruz, Beatriz Remeseiro, Oscar Luaces, Madalena Lira

Abstract

Purpose: The primary objective was to evaluate a new developed computer-based method for blink evaluation comparing it to established methodologies to assess its strengths, weaknesses, and utility in clinical settings. We aimed to determine its advantages and limitations and evaluate its potential to enhance existing practices in ocular healthcare. Methods: The study included twenty-four participants (13 females and 11 males, aged 21-54 years, average age 27.70 ± 8.215 years). The Eye-LRCN (Long-Term Recurrent Convolutional Network for Eye Blink Completeness Detection) (1) method was compared with two established techniques. Participants underwent a 30-second evaluation using Eye-LRCN to automatic blink detection and manual validation for accuracy. The second method involved blink counting from slit lamp video recordings under low light conditions, while the third used the Tearscope Plus adapted to a slit lamp, with participants focusing on the light for 30 seconds. Results: Mean blink counts with Eye-LRCN, Tearscope, and Slit Lamp were 7.25±5.936, 13.38±5.500, and 11.00±4.663, respectively. ANOVA indicated significant differences, particularly between Eye-LRCN and Tearscope. Only 44.83% of recorded blinks were complete, detectable only with Eye-LRCN. The average time between blinks was 0.1136±0.0519 seconds, with complete blinks lasting 0.1508±0.0706 seconds and incomplete blinks 0.0810±0.0428 seconds. The average time between blinks was 1.6062±1.2152 seconds. Participants felt more comfortable and blinked less with the new method, suggesting environmental influence. Conclusion: The new method recorded fewer blinks than traditional methods, likely due to the absence of external stimuli, potentially offering a more accurate count of spontaneous blinks. It simplifies blink counting and provides information on blink completeness useful for identifying ocular anomalies. The method's non-invasive nature and practicality make it valuable in settings with limited resources.

Free Paper #6

Exploring ocular wavefront and monochromatic aberrations during accommodation: A statistical model approach in a large population.

María Mechó-García, María Arcas-Carbonell, Elvira Orduna-Hospital, Ana Sánchez-Cano, Norberto López-Gil, Rute J. Macedo-de-Araújo, Miguel Faria-Ribeiro, Paulo Fernandes, José Manuel González-Meijome, Jos Rozema

Abstract

Objective: The aim was to investigate how accommodative demand affects Zernike coefficients up to the 6th order in healthy young adults. Subsequently, using this dataset, the aim was to create a model that faithfully captures the wavefront characteristics of the initial subjects.

Methods: Monocular wavefront measurements were conducted to 191 subjects (26.15 ± 5.56 years old), using the Imagine Eyes irx3 aberrometer, stimulating accommodation across a range of demands, from 0 to 5 D in steps of 1 D. Using Principal Component of Analysis (PCA), the 250 Zernike coefficientes (25 ZC x 6 AD) were converted into eigenvectors (EV) for dimensional reduction. The first 49 EV were chosen to modeled as a sum of two multivariate Gaussians, allowing the generation of random synthetic data set (1000 synthetic wavefronts) that closely resembled the original clinical data. Analysis included two one-sided TOST and F-test, adjusted with Bonferroni correction for significance.

Results: Original data showed an increase in Zernike coefficient C(2,0) during accommodation, while both astigmatism C(2,±2) decreased in magnitude. Additionally, C(4,0) exhibited gradual decrease with higher accommodation demand.

The first 8 EV resemble Zernike polynomials, including defocus (EV 1), astigmatism (EV 2, 3 and 4), spherical aberration (EV 6 and 7) and coma (EV 8). A mixture of higher order polynomials appeared beyond EV 9. The distributions of Zernike coefficients up to the 6th order in each accommodative target vergence of the generated data were significantly equal to those of the original data (TOST and F-test, $p > 0.05/150$).

Conclusions: The study found that wavefront aberration coefficients vary significantly during 5D accommodation in individuals aged between 20 and 40 years old. Additionally, the 49 EV selected preserved 99.97% of the population variance. As a result, the synthetic data generated by the proposed model closely mimics the original clinical data.

Free Paper #7

Exploring the Impact of Lifestyle Habits on Myopia Development in Children: A Focus on Sleep, Outdoor Activities, and Digital Device Use

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

Abstract

Purpose: Lifestyle habits play a crucial role in refractive status (RS), particularly affecting the incidence and progression of myopia among children. Considering these factors, the purpose of this study is to investigate the complex interplay between lifestyle factors and the development of myopia in children, emphasizing the impact of outdoor exposure, digital device usage, near vision activities, and sleep quality and duration on refractive changes. Methods: The study was conducted in various schools in Lisbon from September to May 2021, involving children aged 5 to 17 years. Clinical procedures involved an optometric examination, including a comprehensive questionnaire covering personal data, family ocular history, lifestyle, and medical history, as well as the "Children's Sleep Habits questionnaire". To measure daily sunlight exposure, three ordinal categorical variables were defined: low (0 to 1.6 hours/day), moderate (1.6 to 2.7 hours/day), and high (>2.7 hours/day). The same classification was used for near vision hours per day: low (0 to 2 hours/day), moderate (2 to 3 hours/day), and high (>3 hours/day), including the percentage of digital device use: <25%, 25% to 50%, and >50%. Refractive errors were determined using the spherical equivalent (SE), classifying hyperopia (SE□+0.5D), myopia (SE≤-0.5D), and emmetropia (-0.5D<SE<+0.5D) Results: A total of 1,965 children in Portugal with an average age of 9.22±2.71 years were analyzed. The children were classified as emmetropic (32.93%), myopic (12.72%), and hypermetropic (54.35%). A significant association was found between RS and the hours spent on outdoor activities, indicating that myopic children spend less time in these activities (p=0.032). Regarding hours of near activity, myopes dedicate more time, highlighting a higher proportion of digital device use in this group during near activities (both p<0.001).

In terms of sleep habits, myopes go to bed and wake up less regularly at the same time compared to other groups (p<0.001). Also, it was found that myopes have a greater tendency to need one of the parents in the room to fall asleep, although this difference is less notable when compared to other groups (p<0.001). Interestingly, myopic children showed greater difficulty in falling asleep alone in their bed, but there were no significant differences in behaviors such as "fighting" at bedtime, being afraid to sleep in the dark, or having frequent nightmares (p>0.05). No significant differences were found in behaviors such as sleepwalking, snoring, or experiencing breathing difficulties during sleep among the different RS groups (p>0.05). Another notable aspect was the greater reported sensation of tiredness during the day by myopes, which could reflect an inferior quality of sleep (p=0.001).

Conclusion: The study demonstrates that myopic children spend less time outdoors and more time on near vision activities, especially with digital devices. Additionally, they exhibit irregular sleep patterns and a greater tendency to feel tired during the day, suggesting a possible relationship with poorer sleep quality. These findings underscore the need for a comprehensive approach that not only promotes outdoor time and reduces near vision activities but also encourages regular sleep habits. Future research
should explore the underlying mechanisms of these associations to develop specific interventions that address these lifestyle factors and mitigate the progression of myopia in the pediatric population.

Free Paper #8

Analysis of symptom and sign evolution in evaporative dry eye disease participants after two months of treatment with Systane Complete® artificial tears.

Alba Castro-Giraldez, Jacobo Garcia-Queiruga, Belen Sabucedo-Villamarin, Maria J. Giraldez, Hugo Pena-Verdeal, Eva Yebra-Pimentel

Abstract

Objective: This study aimed to evaluate the symptoms and signs of Evaporative dry eye (EDE) after two months of treatment with Systane Complete® (Alcon Inc, Forth Worth, USA) artificial tears.

Methods: 20 participants were recruited for the study. All recruited participants were between 18 and 65 years old and should accomplish Tear Film Ocular Society Dry Eye Workshop II criteria to be classified as mild-moderated EDE patients: Ocular Surface Disease Index (OSDI) questionnaire ≥ 13, Non-Invasive Keratograph Break-Up Time (NIKBUT) < 10s, Tear Meniscus Height (TMH) > 0.20 mm. Participants attended three sessions one month apart (30 ± 3 days): basal, one month and two months before treatment. All these measurements were performed with the Keratograph 5M (Oculus Optikgerate GmbH). In all sessions, OSDI, NIKBUT, central, temporal and nasal TMH value, temporal and nasal bulbar redness, and meibometry were performed. From the basal session, the participant followed a treatment with artificial tears Systane Complete® (Alcon Inc): 1 or 2 drops in each eye, fourth a day, for every day of the month. Differences between baseline measurements and post-treatment measurements were analysed.

Results: General significant differences were found in the OSDI score across sessions (Friedman test, $p = 0.018$), whereas pairwise analysis showed significantly higher scores between the basal session and the other two sessions (Wilcoxon test, both $p \leq 0.016$), but not between following sessions (Wilcoxon test, both $p \leq 0.040$). No statistically significant differences were found across the sessions of NIKBUT (Friedman test, $p = 0.080$), all TMH value parameters, meibometry or bulbar redness temporal and nasal (ANOVA for repeated measurement, all $p \geq 0.232$)

Conclusions: The use of Systane Complete® artificial tears for two months improves the symptoms of EDE, but generates no change in the studied signs.

Free Paper #9

EFFECT ON A DRY EYE MODEL OF THE RELEASE THROUGH CONTACT LENSES OF MELATONIN AND ANALOGUES

Navarro-Gil FJ, Carpena-Torres C, Huete-Toral F, Crooke A, Dominguez-Godinez CO, Carracedo G

Abstract

Objectives: Melatonin (M) and its analogs (MA) agomelatine (AG) and 5-MCA-NAT (5MC) released through contact lenses (CLs) increase tear secretion. The objectives were to verify this action in a rabbit dry eye model (RDEM) and to evaluate the effect on the ocular surface (OS).

Methods: Male New Zealand rabbits (3-4 kg) under ARVO guidelines (n= 8 eyes per material). RDEM was induced by instilling benzalkonium chloride (BAC) (35 µl, 0.1%) every 12 h for 10 days. Cls were chosen after a previous "in vitro" loading-release study with the compounds. They were pre-incubated (12 h) daily (n= 6 per material) at different concentrations. 5MC+Stenfilcon-A [250 µM], AG+Poly-HEMA [100 µM], M+Comfilcon-A [1 mM]. CLs were adapted on the 3nd day 30 min after BAC instillation. Renewed daily (8 days). Control group without load (n= 2 eyes per material). Tear secretion (TS) was measured (5 min) using Schirmer strips (van Bijsterveld). Control measurements (100%) were performed 5 min before insertion of the CLs. Subsequently, was measured every 60 min (6 h), on days 3, 5, 8 and 10. Pre- and post-treatment evaluation was performed TBUT, corneal staining (CS), and conjunctival hyperemia (CH) using slit lamp and conjunctival impressions for analysis of Globet cells density (GCD) by confocal microscopy. Statistical analysis SSPS Statistics 23. Granmo 6.0 (sample size). Data: ± SEM. $P < 0.05$.

Results: TS (control 100%): 5MC = 287.5% ± 51.5% (5 h). AG = 121.0% ± 9.26% (6 h). TBUT: 5MC (-0.3s ± 0.6s). CS (control 166.66 ± 25.1%): AG = 58.33% ± 22.3%). 5MC = 72.72% ± 24.6%. CH No differences. GCD decrease (control group -55.5% ± 13%): AGO = -34.5% ± 4.5%. M = -25.27% ± 6.7%. Not with 5MC = 17.36% ± 9.3%.

Conclusions: The release of 5MC+Stenfilcon-A produces a significant increase in TS, an improvement in tear stability and corneal damage while preserving the density of goblet cells in an RDEM.

Free Paper #10

EVIDENCE ON THE PARAMETERS OF OCULOMOTOR SKILLS AND NORMATIVE VALUES: A SCOPING REVIEW

Mario Cantó Cerdán, Antonio Martínez Abad, Carlos J. Hernández Rodríguez

Abstract

Objective: To evaluate the current evidence on oculomotor measurement parameters and their normative values through a scoping review.

Methods: A Medline search of primary studies was conducted. The search was carried out using a search equation with free and controlled languages. Original articles analyzing normal oculomotricity parameters in healthy populations of any age, studies using a clearly differentiated healthy population control group, and articles using any oculomotor measurement test were included. Case series, clinical cases, animal studies, and populations with neurological, developmental, or pathological disorders without a well-defined control group or sample size of less than 20 subjects were excluded. Measurement methods with or without inappropriate stimuli were also excluded. The review was performed separately by the authors of this study and subsequently pooled to perform the final inclusion.

Results: A total of 609 articles were identified, of which 461 were excluded after the first review of the title and abstract. In the second step, further 120 investigations were discarded. A total of 28 articles from the initial search were included, and 6 more articles were added from the free search, resulting in a total of 36 articles. It was found that there are different ways of measuring oculomotor skills, with different stimuli, measurement distances, and variety within each oculomotor skill parameter. Within the saccadic movements, 18 different aspects were found, such as amplitude or number, 9 in smooth pursuit, such as velocity or pursuit gain, and 5 in fixation, such as time or number of fixations.

Conclusions: There is no clear evidence on normative values for oculomotor skills, and there is no consensus on the method of measurement, stimulus used, or working distance. Furthermore, there is no agreement on which aspects of oculomotor skills should be measured.

Free Paper #11

Unveiling Retinal Pathology in an Alzheimer's Disease Murine Model APPNL-F/NL-F: Insights from Optical Coherence Tomography Analysis

Inés López-Cuenca, Lidia Sánchez-Puebla, Alberto Arias-Vázquez, Elena Salobrar-García, José A. Matamoros, José A. Fernández-Albarral, Lorena Elvira-Hurtado1, Takaomi C. Saido, Takashi Saito, María I. Cuartero, Carmen Nieto Vaquero, María A. Moro, Ana. I.

Abstract

Purpose: Investigating retinal alterations in the AD mouse model APPNL-F/NL-F compared to wild-type mice using optical coherence tomography (OCT).

Methods: A cross-sectional study involved 36 mice per group, evaluated longitudinally at 6, 9, 12, 15, 17, and 20 months using OCT. We anlyzed: retinal nerve fiber layer + ganglion cell layer (RNFL+GCL), inner plexiform layer (IPL), inner nuclear layer (INL), outer plexiform layer (OPL), and outer nuclear layer (ONL) based on ETDRS sectors under anesthesia. Statistical analyses included Mann-Whitney U tests and two-way ANOVA (*p<0.05, **p<0.01, ***p<0.001).

Results: In WT mice, the INL significantly decreased from 6 to 17 months (N2, S1, T1, p=<0.001; N1, S1, S2, p=<0.001). OPL thickened during 6-9 months and 17-20 months (p=0.025, p=0.011), whereas the ONL exhibited notable thinning (p=<0.001), particularly in S1, S2 (p=0.003, p=<0.001), and T1 from 6-17 months (p=0.031). Conversely, in the APPNL-F/NL-F model, RNFL+GCL significantly decreased in sector I1 (p=<0.001), and IPL showed significant thinning from 6-12 months to 15-20 months, notably in S1, T1, I2 (p=<0.001), and N1 to S1 (p=0.012, p=0.031). The INL thickened at 6 months compared to 15-17 months, notably in S1, I1 (p=<0.001), I2 (p=<0.001), while OPL thinned from 6-12 months to 15-20 months, particularly in N1 (p=0.019), S1 (p=0.008), N2 (p=<0.001), I2 (p=0.027) from 12-17 months. The ONL initially thickened and then significantly thinned from 9-15 months, with ongoing thinning in superior sectors from 9-17 and 9-20 months. Comparison between WT and APPNL-F/NL-F mice showed consistent RNFL+GCL thinning in APPNL-F/NL-F, except for S2 thickening at 15 months (p<0.05). Thinning was observed at 6 months in inferior sectors and N1 (p<0.05), at 9 months in T1 (p<0.05), and at 12 months in T1, I1 (p<0.05). At 15 months, N2 thinned, while S2 thickened (p<0.05).

Conclusion: This mouse model replicates human AD, indicating retinal abnormalities correlating with brain pathology.

Free Paper #12

Six-month refractive change and axial elongation in children and adolescents wearing myopia control devices compared to controls in an optometric practice

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

Abstract

Purpose: To evaluate the change in refraction and axial length in a population of children and adolescents using single vision optical correction during a period of 6 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 including non-cycloplegic retinoscopy and subjective refraction, followed by axial length measurement with a low-coherence optical biometer (AL-SCAN®, Nidek CO., LTD, Japan). History of myopia control treatment was recorded but not all the subjects were using myopia control at the initial and follow-up visits of the study. The statistical analysis was carried out with the SPSS statistical package (IBM, Illinois, USA); only the right eye was used for analysis. Descriptive data were obtained and a comparison of means for age, axial length (AXL), spherical equivalent (SE) subjective refraction and comparison of proportions for gender distribution were compared between the group that used and that did not use myopia control (MC) methods.

Results: Data from twenty-nine subjects were analyzed. Of those, 13 were using some treatment for MC (SE: -2.31±1.25D; AXL=24.26±0.68mm), and 16 were using single vision optical devices (SE: -2.29±0.91D; AXL=24.40±0.91mm). There were no differences between subjective refraction or axial length at baseline ($p>0.05$). Myopia control methods were used during the 6 month follow-up and included orthokeratology (n=2), special ophthalmic lenses (n=5), soft contact lenses (n=1), topical ocular treatment with atropine (n=3), combination of treatments (n=2). After 6 months, the progression of myopia was -0.12±0.51D (axial length change=0.06±0.10mm) in the group using MC treatments and -0.23±0.27D (axial length change=0.13±0.12mm) in the group wearing single vision optical devices ($p<0.05$).

Conclusions: Despite the limitations of the study design, this prospective study using a consecutive sampling in a clinical optometric context resembles the outcomes of previous clinical trials evaluating the reduction in myopia progression and axial elongation with myopia control treatments. The results show the average 6-month change in refractive error and axial length and are relevant for future evaluation of subjects without and with myopia control treatments.

Free Paper #13

Relative peripheral defocus induced with Orthokeratology: Systematic Review and Meta-analysis

Inês Pinheiro 1, Paulo Fernandes 1,2, José Manuel González-Meijóme 1,2, António Queirós 1,2

Abstract

Purpose: The purpose of this study was to evaluate the effect size for relative peripheral defocus induced with orthokeratology lenses (PDOK) in children and adolescents, through a systematic review and meta-analysis.

Methods: We conducted a systematic search of PubMed and Web-of-Science databases for randomized controlled trials (RTCs) and cohort studies that investigated the effects of PDOK, with keyword search "peripheral refraction" AND "orthokeratology". Inclusion criteria were as follows: Spherical equivalent (M) peripheral refraction at 25º and/or 30º, standard deviation or standard error of the mean and graphical or tabular presentation of the values on the horizontal meridian before and after the orthokeratology treatment. Relative peripheral refraction (RPR) were calculated. Of the initial 133 studies, the following were eliminated: 9 were not written in English, 18 review studies, 5 meta-analysis studies, 4 systematic reviews and 88 studies for not meeting the inclusion criteria. Four studies provided data up to 12 months and five studies followed participants less than three months so they were analysed separately before being pooled together to derive an overall effect from the 9 studies.

Results: Out of the 9 studies included, 3 were RCTs and 6 were cohort studies, involving a total of 239 participants, between 6 and 30 years of age. The pre-treatment refractive error was M=-2.48±0.29D and the studies ranged from 14 days to 1 year of follow-up. In all the studies, there was a myopic increase at 30º Nasal (-2.13±1.05 D) and 30º Temporal (-2.40±0.47 D), with an average 30ºNasal/Temporal of -2.27±0.83D. Forest plot provided in an overall effect size of myopic defocus M=-2.29 with 95% CI -1.94 to -2.64, Z=12.84 p<0.001). A random effects model was used considering the heterogeneity observed (I2=63%; p<0.001). There was a greater induction of myopic blur at 1 year (M=-2.64, 95% CI -2.42 to -2.85, Z=24.52 p<0.001; I2=0%; p=0.84) than to treatments of less than 3 months (M=-1.98, 95% CI -1.94 to -2.64, Z=7.37 p<0.001; I2=63%; p<0.001).

Discussion: While the treatment at 12 months shows an homogeneous behaviour among studies, shorter follow-up times renders a larger heterogeneity and for that reason, longer follow-up periods should be preferred to estimate a more solid effect size. Orthokeratology treatment has been shown to be effective in inducing myopic defocus at 30º eccentricity for short or longer longitudinal treatments in children and young people.

Posters

Poster #1

Ocular Rehabilitation - Exploring the Therapeutic Potential of Scleral Contact Lenses in Stevens-Johnson Syndrome

Jéssica Costa

Abstract

Purpose:A 69-year-old female diagnosed with Stevens-Johnson Syndrome over four decades presented significant ocular complications in the right eye, as keratinization of the eyelid margin, inferior symblepharon, trichiasis, corneal neovascularization affecting the paracentral region, 360-degree limbal insufficiency, and paracentral nubecules. Recently, the patient developed corneal ulcers resulting in reduced visual acuity due to residual opacities. Schirmer test and OSDI questionnaire were performed to evaluate the severity of dry eye. Schirmer test resulted in less than 10 mm after 5 minutes, and OSDI questionnaire score was 78.1, indicating moderate to severe dry eye.

Methods: Currently, the patient is administrating topical lubricants,mantaining eyelid hygiene, and using a therapeutic hydrophilic contact lens, achieving a visual acuity of 2/10 (decimal scale). Due to the severity of the ocular surface pathology and significant vision loss, a scleral contact lens was fitted on the right eye as part of an ocular rehabilitation plan.

Results: The initial assessment involved corneal topography, visual acuity measurement, Schirmer test, OSDI questionnaire (pre and post SCL), and biomicroscopy with fluorescein staining. A customized scleral contact lens was produced according to the patient eye's morphology.

The fitting of the scleral contact lens significantly improved visual acuity to 5/10 and reduced ocular discomfort (OSDI score: 52.07, indicative of mild dry eye). Although the results of Schirmer test remained below 10 mm, the patient reported a decrease in photophobia symptom.

This clinical case highlights scleral contact lenses as a valid option for managing ocular lesions associated with Stevens-Johnson Syndrome. However, given the limited scope of this report as a single case study, further research is essential to fully understand the efficacy and limitations of scleral contact lenses in treating this condition.

Conclusions: The patient continues wearing the scleral contact lens comfortably during day and night, with quarterly follow-ups scheduled for ongoing monitoring and adjustments.

Poster #2

The patient-physician relationship and role of empathic communication in contact lens practice – patient satisfaction

Rute J. Macedo de Araújo, Daddi Fadel , Melissa Barnett

Abstract

Purpose: This study aimed to investigate the relationships between eye care practitioners and contact lens patients, focusing on how empathic interactions influence patient satisfaction.

Methods: A multilingual electronic survey (English, Portuguese, Spanish and Italian) was distributed via email and social media to groups of patients and practitioners. The 18-item questionnaire solicited information regarding the demographics and professional background of their physicians, assessed their communication skills and measured their empathy. This included aspects such as time spent communicating and listening, interest in the patient's personal situation, continuity of care and cost of services. Participants were also asked if they would recommend their physician to friends or relatives. Responses were analyzed based on (a) contact lens type; (b) patients with negative experiences (that would not recommend their physician); (c) practitioner's level of education. Ratings were converted to a numerical scale and scores compared using Wilcoxon rank sum tests.

Results: From 804 respondents, 68.4% were aged over 46 years and 58.1% were female. About 10.6% of the respondents reported they would not recommend their physician due to feeling excluded from decisions (55.3%), lack of personal interest (63.5%), lack of written recommendations (84%) and unmet expectations (77%). Patient satisfaction varied by contact lens type, with individuals using soft and scleral lenses reporting more positive experiences. Optometrists received higher ratings for care quality, relational communication, symptom management, and preventative advice compared to other vision care specialists.

Conclusions: The findings highlight the critical role of empathy in enhancing patient satisfaction within eye care settings. Empathetic practices, such as attentive listening, clear explanations of treatments, and patient-centered communication, significantly influence the perceived quality of care. Moreover, factors like the type of contact lens and the specific recommendations provided by the physician play important roles in shaping patient experiences.

Poster #3

Influence of peripheral defocus contact lenses decentration on astigmatic component in myopic children

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

Abstract

Purpose: To evaluate possible astigmatic changes resulting from the decentration of peripheral defocus contact lenses (CL).

Methods: Thirteen participants of mean age 11.8 ± 1.26 (from 9 to 13 years) were recruited among the myopic paediatric subjects attending the Optometry Clinic of the centre. Inclusion criteria were myopia, best-corrected monocular visual acuity ≥0.9 on a distance Snellen Chart, and absence of ocular conditions affecting the cornea, pupil size or refractive status.

Participants were randomly fitted with one type of peripheral defocus CL in both eyes:

- Group 1 (n = 14 eyes): Comfilcon A, non-adjustable parameters aspheric design (radius 8.6 mm, diameter 14.0 mm).
- Group 2 (n = 12 eyes): Filcon 5B, adjustable parameters extended depth of focus design (radius from 7.1 to 9.8 mm, diameter from 13.5 to 15.5 mm).

The study was performed in 3 sessions:

- Session 1: Keratometry, white-to-white and refraction measurements were taken for CL ordering.
- Session 2: CL fitting. If adjustments were necessary, replacement CL were ordered, and this session was repeated.
- Session 3: After 3 months of session 2, refractive assessment without CL was conducted, alongside topography with the CL fitted. ImageJ software was used to measure the amount of CL decentration in the topographic images.

Results: No significant differences in CL decentration were found between adjustable and non-adjustable parameter CL (Mann-Whitney test, $p = 0.899$). After 3 months of CL daily use, neither group exhibited significant changes in astigmatism, assessed by J0 vector (Wilcoxon test, both $p \geq 0.202$), J45 vector (Wilcoxon test, both $p \geq 0.225$), cylinder power (Wilcoxon test, both $p \geq 0.564$) or cylinder axis (Wilcoxon test, both $p \geq 0.715$).

Conclusion: Both adjustable and non-adjustable peripheral defocus CL were not perfectly centred, yet no impact on astigmatic defect was observed after three months of use.

Poster #4

Optometrist Training in Brazil: a humanistic perspective for curricular redefinition.

Wellington Sales Silva

Abstract

Goals: This Master's research aimed to understand possibilities for relationships between the Humanistic and Technological bases within the scope of the Curriculum for Initial Training of Optometrists.
Methods
The method used was the Case Study, through which the Optometry Curriculum in Brazil was auscultated, in two Brazilian universities. A Global Competency-Based Model of Scope of Practice in Optometry, was considered and the National Curricular References for Bachelor's and Degree Courses were analyzed, as well as the General National Curricular Guidelines for the Organization and Operation of Technological Courses.
Results
It was found that the Initial Training of Optometrists in Brazil is being built under a structuralist and modern Curriculum aegis, restricting the Humanist perspective to a dichotomous approach between man and machine, and the primacy of technique in curricular processes. The Initial Training is focused on the instrumentation of the technique as an enhancement of action in Health, whose conception of Technology is restricted to technological artifacts and their handling, as if technology were something outside of the human. Currently, in Brazil, there are 6 thousand practicing optometrists and more than 4 thousand undergraduate students.
Conclusions
The curricular processes for the training of Optometrists in Brazil can be dynamized as a singularization in context, based on a notion of Technology as a process that transcends the mere use of technological artifacts, and a notion of Humanity that considers the response and positioning of subjects in the face of these processes, as a way of being there. This innovative core of study opens a field of deepening, exposing the possibility of theoretical airing and the construction of a formative ethos for the Optometrist, which should stand out for the differentiation and subversion of its current technical, mechanistic and uncritical institutionality.

Poster #5

Temporal variations in convergence insufficiency symptoms among Spanish university students: pre- and post-pandemic perspectives

Hugo Pena-Verdeal, Verónica Noya-Padin, Jacobo García-Queiruga, Noelia Nores-Palmas, María J. Giraldez, Eva Yebra-Pimentel

Abstract

Objective: The present study aimed to assess the symptomatic status of convergence insufficiency symptomatology in university students from 2018 to 2023 considering the educational environment of Spain's pre- and post-COVID-19 pandemic confinements.

Materials: A Spanish version of the Convergence Insufficiency Symptom Survey (CISS) questionnaire was administered annually from 2018 to 2023, excluding 2020 due to confinement, targeting an initial group of 217 third-year Optics and Optometry degree students aged 19 to 26. Statistical analyses were conducted to evaluate differences in CISS scores between years, both the total questionnaire score and the score divided by questionnaire subsections. In addition, odds ratios (OR) along with the 95% confidence intervals (CI) were calculated to assess the association between the CISS score values and participants' status before and after 2020.

Results: In the final group (178 participants), significant differences were found between years in the total scores and subgroup analyses (Kruskal-Wallis, all $p \leq 0.049$). Pairwise comparisons revealed significant differences in the performance subgroup score between 2018 and 2021, as well as between 2019 and 2021 (Wilcoxon, both $p \leq 0.004$), while in the total score, there was a statistical difference between 2018 and 2021 (Wilcoxon, $p < 0.001$). Distribution analysis indicated a significant difference between groups (Chi-square, $p = 0.004$), with participants from 2019 or earlier more likely to exhibit lower CISS scores (OR 3.47, 95%CI 1.04 - 8.58).

Conclusion: The present study shows significant temporal variations in symptomatic status related to convergence insufficiency symptomatology among university students between 2018 and 2023, indicating a potential impact of the COVID-19 pandemic confinements and post-pandemic dynamics on these outcomes.

Poster #6

Factors Influencing Dynamic Visual Acuity in Elite Football Players

Jorge Jorge, João Pedro Jorge, Rui Fuste

Abstract

Objective: To investigate visual system parameters that may influence dynamic visual acuity in professional football players.

Methods: The study analyzed 40 professional male football players with an average age of 24.9 ± 4.8 years. The screening process included a survey, measurement of refractive error, and assessments of static and dynamic visual acuity, as well as binocular vision parameters. Dynamic visual acuity was evaluated binocularly, using COI-SV software (Centro de Optometría Internacional, Madrid, Spain) at a 5-meter distance. A black letter, representing a static visual acuity of 0.00 LogMAR, moved randomly along a curved path on a 56-inch screen at 40 cm/s. The letter size increased until correctly identified by the participant.

Results: The mean refractive error among participants was -0.29 ± 0.61 diopters (D). The findings showed that 22.5% of players were myopic, and 7.5% were hyperopic. Static visual acuity for the right eye averaged 1.11 ± 0.21, while dynamic visual acuity was 0.73 ± 0.17. A positive and moderate correlation ($r = 0.465$, $p = 0.003$) was observed between monocular static visual acuity (right eye) and dynamic visual acuity. Negative and moderate correlations were found between dynamic visual acuity and astigmatism ($r = -0.417$, $p = 0.007$), as well as stereopsis ($r = -0.437$, $p = 0.005$).

Conclusions: The study suggests that athletes with lower static visual acuity in distance vision, poorer stereopsis in distance vision, or higher levels of myopic astigmatism tend to have lower dynamic visual acuity compared to other athletes. This highlights the importance of assessing and potentially improving visual parameters for better performance in football.

Poster #7

Comparative Study of PlusoptiX A16 and Vision Screener V100 Photoscreeners in School-Age Children

Jorge Jorge, Paulo Fernandes

Abstract

Objective: This study aimed to compare the PlusoptiX A16 and Vision Screener V100 photoscreeners in a cohort of school-age children.

Methods: A total of 133 children, averaging 6.4 ± 0.5 years of age, were assessed using both the PlusoptiX A16 and Vision Screener V100 photoscreeners. Measurements were conducted in random order under low ambient lighting.

Results: The average refractive error values for the M component were 0.27 ± 0.67D with the PlusoptiX A16 and 0.21 ± 0.58D with the Vision Screener V100. For the J0 component, the averages were 0.16 ± 0.38D with the PlusoptiX A16 and 0.06 ± 0.33D with the Vision Screener V100, while for the J45 component, they were 0.03 ± 0.17D and 0.06 ± 0.22D, respectively. When comparing the two instruments, statistically significant differences were found in the M ($p = 0.017$) and J0 ($p = 0.004$) components. Agreement rates between the PlusoptiX A16 and Vision Screener V100 were 80.5% for sphere, 82.0% for cylinder, and 40.6% for axis when considering a range of ±0.75 D for sphere and cylinder and ±25.0 degrees for cylinder axis. Overall agreement across all three parameters was 73.7%.

Conclusion: The Vision Screener V100 shows a good level of agreement with the PlusoptiX A16 overall, but it tends to underestimate myopic spherical equivalent, overestimate hyperopia, and underestimate J0 astigmatism.

Poster #8

Comparison of PlusoptiX A16, Vision Screener V100, WAM 5500 Autorefractor, and Subjective Refraction in a Clinical Population

Jorge Jorge, Paulo Fernandes

Abstract

Objective: To assess the accuracy of the PlusoptiX A16 and Vision Screener V100 photorefraction devices in comparison to the WAM 5500 open-field autorefractor and subjective refraction.

Methods: One hundred and eighty-six subjects, with a mean age of 30.3 ± 20.1 years, were evaluated using the PlusoptiX A16 and Vision Screener V100 photoscreeners, the WAM 5500 open-field autorefractor, and subjective refraction. Measurements were taken in random order in a room with diminished ambient lighting. In the subjective examination, the endpoint was the best visual acuity achieved with the maximum positive sphere.

Results: Statistically significant differences in the M component were observed across different measurement techniques. Subjective refraction yielded the most negative mean values compared to other techniques, with significant differences for the WAM 5500 autorefractor (mean difference = -0.119 ± 0.577 D, p = 0.032) and PlusOptix A16 (mean difference = -0.169 ± 0.648 D, p = 0.003). Among the three objective methods, no significant differences were found for the M component. In terms of J0 astigmatism, subjective refraction showed more positive values, suggesting a higher prevalence of with-the-rule astigmatism, compared to the PlusOptix A16 and Vision Screener V100 (mean differences of 0.073 ± 0.341 D, p = 0.025; and 0.115 ± 0.432 D, p = 0.002, respectively). Similar trends were seen between the WAM 5500 and the PlusOptix A16 or Vision Screener V100. For J45 astigmatism, no significant trends of overestimation or underestimation were found across the devices.

Conclusions: Subjective refraction provides the most negative mean values for the M component, with significant differences compared to the WAM 5500 and PlusOptix A16. For J0, subjective refraction indicated higher with-the-rule astigmatism compared to the other methods. The three objective refraction devices can be used interchangeably among themselves as a starting point for subjective examination.

Poster #9

Changes in the TMH of untreated dry eye subjects grouped in 3 three different periods of time

Jacobo Garcia-Queiruga, Belen Sabucedo-Villamarin, Hugo Pena-Verdeal, Maria J. Giraldez, Carlos Garcia-Resua, Eva Yebra-Pimentel

Abstract

OBJECTIVE: The aim of the present study was to assess whether tear meniscus height (TMH) changes over different time periods as the disease progresses.

METHODS: This is a retrospective longitudinal study that included 71 participants (142 eyes) diagnosed with Dry Eye Disease (DED) since at least 2013. All the participants were diagnosed with DED in the first ocular examination because they showed DED symptoms and at least one positive ocular sign of ocular homeostasis alteration: osmolarity ≥ 308 mOsm/L, fluorescein break-up time < 10 s, or corneal staining ≥ 1. During the period from 2021 to 2023, a new ocular examination was performed to assess how TMH could change over the time. These distributed the participants into 3 groups: 8-year, 6-year, and 4-year follow-up groups. None of the participants followed the recommendations for the use of artificial tears since the first ocular examination. TMH was measured using the slit-lamp Topcon SL-D2 and the EasyTear View interferometer attached to it. A video of the meniscus was recorded at x40 of each participant in both sessions using the Topcon DV-3 or DC-4 video camera mounted on the slit-lamp. From each video, a frame clearly showing the meniscus was extracted and TMH was measured using the Image-J open-source software.

RESULTS: Differences in TMH were found between both sessions in the 8-year follow-up group (Wilcoxon test, $p = 0.006$). Neither 6-year follow-up group nor 4-year follow-up group showed differences between sessions (Wilcoxon test, both $p \geq 0.165$).

CONCLUSION: The present study observed that changes in the TMH could be obtained after periods of at least 8 years from the first ocular examination. In shorter periods of 4 or 6 years, no changes in the TMH could be found in DED suffers who did not adhere to the treatment guidelines for the disease.

Poster #10

The relationship between accommodative response, refractive status and ocular phoria

Noelia Nores-Palmas, Veronica Noya-Padin, Alba Castro-Giraldez, Eva Yebra-Pimentel, Hugo Pena-Verdeal, María Jesús Giráldez

Abstract

Purpose: Previous reports have hypothesised that the accommodative system plays an important role in learning difficulties and may even be related to myopia onset and progression in paediatric populations. This study aimed to assess differences in near ocular phoria, and refractive status based on accommodative response.

Methods: Refractive status, near ocular phoria, and accommodative response were measured in 54 children aged 4 to 13 years in a single visit. On the study visit, refractive status by subjective refraction, near ocular phoria using normative Cover Test procedures, and accommodative response via monocular estimation method retinoscopy, were assessed. All tests were carried out with the trial frame and under the same light conditions. While refractive status was obtained in monocular conditions, both ocular phoria and accommodative response were obtained under binocular conditions. Accommodative response measurements were employed to classify the children into three groups: low lag (accommodative response <0.50D), normal lag (accommodative response = from 0.50 to 0.75D) and high lag groups (accommodative response >0.75D). Group differences were calculated using the Kruskal-Wallis test, with pairwise differences analysed using the Mann-Whitney test and Bonferroni correction. Correlations were analysed by Spearman's rho.

Results: 54 children (mean age = 9.96±0.28 years) were included in the analysis. Low lag group showed statistically significant differences between normal and high lag groups both in ocular phoria (Mann-Whitney; p=0.021 and p=0.009, respectively) and refractive status (Mann-Whitney; p=0.002 and p=0.001, respectively). The accommodative response showed positively moderated correlated with ocular phoria (Spearman Rho; r=0.564, p<0.001) and negatively weak correlated with refractive status (Spearman Rho; r=-0.398, p=0.006), indicating that greater accommodative response results in more ocular esophoria and myopia.

Conclusions: the present study showed that a greater accommodative response in children seems to be associated with increased ocular esophoria, emphasizing the importance of evaluating accommodative function in regular paediatric eye care.

Poster #11

Ocular redness measurement agreement between Keratograph 5M and subjective evaluations

Belen Sabucedo-Villamarin, Jacobo Garcia-Queiruga, Aba Castro-Giraldez , Noelia Nores-Palmas, María Jesús Giraldez , Eva Yebra-Pimentel

Abstract

Purpose:
Ocular redness or hyperemia, a common sign of inflammation, has traditionally been assessed subjectively. Nevertheless, objective assessments using devices such as the OCULUS Keratograph 5M (OCULUS, Optikgeräte GmbH, Wetzlar, Germany) are becoming increasingly prevalent. The present study aimed to compare automated measurements from the Keratograph 5M with assessments by experienced observers using image-based grading scales.
Methods:
25 participants were randomly selected from volunteers. The bulbar hyperemia of the right eye for each participant, was captured and measured by the Keratograph 5M by one observer. During this process, an automatic evaluation of the ocular bulbar redness from nasal and temporal areas on a five-grade scale (from 0 to 4; scores were interpolated to 0.1 units) was provided by the device. Subsequently, five independent observers evaluated the images in a masked and randomized manner, following the device's criteria scale and instructions. The images were anonymized by the observer who conducted the Keratograph capture, and automated evaluation. Software and inter-observer agreement was assessed using Intraclass Correlation Coefficient (ICC), while Cohen's kappa coefficient was employed to assess agreement by pairs between each observer and the device.
Results:
The interobserver ICC between the software and the observers were 0.720 and 0.753 for the Nasal and Temporal bulbar redness respectively. The software showed significant agreement only with Observer 1 on both Nasal and Temporal bulbar redness evaluation (Cohen´s Kappa: $\kappa \geq 0.059$, $p \leq 0.043$) and Observer 5 on the Nasal bulbar redness evaluation (Cohen´s Kappa: $\kappa = 0.064$, $p = 0.009$), whereas all the other comparison both Nasal and Temporal bulbar redness showed no agreement (Cohen´s Kappa: all $p \geq 0.412$).
Conclusions:
Although statistical methods showed a good general agreement between observers, the Keratograph 5M seems to underestimate both the nasal and temporal bulbar redness scores compared with the subjective evaluations. Therefore, automatic objective and subjective methods should not be considered interchangeable.

Poster #12

Halo quantification in 8 soft contact lenses for myopia control

Julia Bodas-Romero, Laura Batres, Gonzalo Carracedo

Abstract

Purpose: To compare the size and position of the halo with different soft contact lenses for myopia control.

Methods: A study was performed with 18 participants (15 females and 3 males) with a mean age of 23.72±2.14 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 3 different designs: Dual focus (DF), Extended Depth Of Focus (EDOF) and Multifocal (MF) design.

Under scotopic conditions and monocularly, participants were placed 2 metres away from the instrument (Light Disturbance Analyzer, Binarytarget Lda. Braga, Portugal). The instrument used a central LED light of 5mm diameter, which is always turned on, and 240 LED lights of 1mm diameter peripherally, distributed in 24 meridians. 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: Two main parameters of the halo were analyzed: halo size (BFCr) and halo direction (BFCx and BFCy). All study lenses showed statistically significant differences ($p<0.05$) in halo size compared to their habitual correction.

The lens design with the largest BFCr was a high addition MF design with BFCr of 16.04±8.52 mm. The smallest BFCr was a low addition MF design, with a BFCr of 3.42±1.41 mm.

As for the halo position results, the lens that showed the largest deviation was a MF design lens, with a BFCx of 2.80±1.75 mm, while the lens that showed the best halo centration was an EDOF design, with a BFCx of 0.02±0.32 mm.

Conclusions: All myopia control designs evaluated in this study have created a larger halo size than the participants usual correction. The halo size is related to the addition of the lens, not just the design. Further studies are required to assess the relationship between these parameters.

Poster #13

GABOR PATCHES FOR NEUROADAPTATION IN MULTIFOCAL CONTACT LENSES WEARERS: A PILOT STUDY

Cristina Arroyo del Arroyo, Andrea Martínez Pedreño, Sonia Menchen Cañadas, Gonzalo Carracedo Rodríguez

Abstract

Objectives: To evaluate the effect of using a training software (OPTIcTRAIN) using Gabor patches on visual performance during the fitting of multifocal contact lenses (MCL) in neophyte wearers.

Methods: A randomized longitudinal study was conducted at the Optometry Clinic of Complutense University of Madrid (Spain). Participants were fitted with Comfilcon A MCL and randomly assigned to either a Gabor group (receiving daily training) or a control group. Measurements were taken at baseline (V0), MCL fitting day (V1) and after 10 (V2) and 20 days (V3) of CL wear, assessing visual acuity (VA) under different conditions (photopic and mesopic, high (HC) and low contrast (LC)) at far, intermediate and near distances, contrast sensitivity, and subjective measures using visual analogue scale and global rate changing scale (GRCS).

Results: Twelve subjects (10 females, 2 males; mean age: 51.41±5.41 years) were included. After 20 days, the Gabor group showed significantly higher HCVA (p=0.016) and LCVA (p=0.034) under photopic conditions at intermediate distances (-0.03±0.05, 0.11±0.09, respectively) compared to the control group (0.08±0.07, 0.26±0.10, respectively). No significant differences (p>0.05) were observed between groups in VA under mesopic conditions. Contrast sensitivity did not significantly differ between groups at any visit. However, after 20 days, the Gabor group's contrast sensitivity (6 cpg) increased to values similar to baseline (V0: 6.33±0.81 vs V1: 5.17±0.75; p=0.038; V1 vs V3: 6.00±0.89, p=0.025), whereas the control group experienced a significant decrease (V0: 6.50±0.54 vs V1: 5.83±0.75; p=0.046). After 20 days, the Gabor group showed a significant improvement in halo perception (p=0.043) on the GRCS (44.00±4.04) compared to the control group (26.67±7.47).

Conclusions: A visual training program using Gabor patches may enhance high and low-contrast VA at intermediate distances under photopic conditions, improve contrast sensitivity for medium spatial frequencies, and enhance subjective perception of halos during initial adaptation to MCL in presbyopic wearers.

Poster #14

EFFECTS OF EXTRACT OF ARTEMIA SALINA ON PARACELLULAR CORNEAL BARRIER FUNCTION

Laura Ximena Sierra Buitrago, Vanesa Escobar Rodríguez, Laura Deepa Llorente Díez, Laura de Diego-Garcia, Gonzalo Carracedo, Alba Martín Gil

Abstract

Purpose: Artemia salina (AS) extract solutions contain dinucleotides, such as diguanosine tetraphosphate (Gp4G), which can activate purinergic receptors, such as P2Y2. They are involved in functions like corneal wound healing and corneal barrier function. There are two types of corneal barrier: transcellular, mediated by mucins, and paracellular by tight junctions. The aim of this study is to assess the potential of a new artificial tear based on an extract of 4% AS to modulate the paracellular barrier function of the human corneal epithelium.

Methodology: AS extract composition was characterized by High Performance Liquid Chromatography (HPLC). Experiments were performed in an immortalized human corneal epithelial cells line. Cells were treated with AS extract for 15 minutes, and protein extraction occurred 2 hours post-treatment. Tight junction levels, specifically zonula occludens-1 (ZO-1) and CLDN-7, were assessed via Western blot. To decipher the intracellular pathways underlying the effect of AS, cells were treated with dinucleotides contained in AS and P2Y2 receptor antagonists.

Results: Adenosine monophosphate and diphosphate, diguanosine triphosphate and tetraphosphate, diadenosine tetraphosphate were identified and quantified in 4% AS extracts, being Gp4G identified as the most abundant nucleotide. Treatment with AS extract significantly reduced in 30% ZO-1 levels respect to control ($p<0.005$), being partially blocked by P2Y2 receptor antagonist. In contrast, AS extract did not affect the expression of CLDN-7. Gp4G treatment significantly decreased CLDN-7 protein levels compared to control ($p<0.005$), without mediation by P2Y2 receptors. Whereas Ap4A treatment significantly reduced both ZO-1 and CLDN-7 levels ($p=0.017$ and $p<0.005$, respectively).

Conclusion: AS extract has been demonstrated to modify the barrier function of the corneal epithelium through changes in tight junction levels, thereby increasing corneal permeability. This effect, partially mediated by P2Y2 receptors, does not stem from a single nucleotide. However, these findings suggest the involvement of additional, yet unidentified receptors in this process.

Poster #15

Development of PeriQuest: A questionnaire to capture "Human Factors" in perimetry

Ana Siverio Colomina, Mario Cantó Cerdán, Maria Jesús Chaves Samaniego, Zaira Cervera Sanchez, Pilar Yebana Rubio, Mahesh R. Joshi, Ivan Marín Franch, Paul H Artes

Abstract

Objective: To develop PeriQuest, a questionnaire item that captures patients' views and perceptions of various aspects of perimetry.

Methods: Through informal consultations with colleagues, we drafted an exhaustive list of 45 questions to capture patients' attitudes and experiences with visual field testing, including the testing environment, perimetry technicians, and the instructions they provided. These questions were administered in Spanish to 110 patients aged between 26 and 68 years) attending an ophthalmology clinic, and had previous experience with visual field tests. Rasch model (using Andrich Rating Scale Model) was applied to investigate the category probability curves and Andrich thresholds, infit and outfit mean square, local dependency using Yen's Q3 statistic, Differential item functioning (DIF) for gender and presbyopia, person and item reliability, unidimensionality, targeting and ordinal to interval conversion table.

Results: The most important themes identified by Principal Component Analysis included worry about the test results, long periods of not seeing any stimuli, distraction by the eye patch, and pacing of stimulus presentations. Surprisingly, most patients (90/110, 82%) indicated that they would tolerate a longer test duration if this would improve the test results. Category probability curves suggested to collapse a response category. Rasch analysis reduced the questionnaire from 45 to 11 items. The final version of the questionnaire showed that 11 items fit the model without local dependency and no significant DIF for sex. Person reliability was satisfactory (0.81). The first contrast of the residual was 1.921 eigenvalue, showing unidimensionality and targeting was 1.63 logits.

Conclusions: Our findings challenge widely held but arguably simplistic beliefs ("visual field tests are too long"). We hope that the questionnaire will evolve into a tool that can support the development of more "patient friendly" perimetry and ultimately help reduce negative attitudes to visual field testing.

Poster #16

Exploring the Relationship Between Outdoor Exposure Time, Solar Intensity, and Myopia Development in Children

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

Abstract

Purpose: Recent studies suggest that regular exposure to outdoor environments and natural sunlight plays a crucial role in preventing myopia, as sunlight stimulates the production of dopamine in the retina, which is essential in inhibiting excessive elongation of the eye, a key factor in the development of myopia. The aim of this study is to analyze whether there is a correlation between time spent outdoors and the intensity of solar exposure with the value of the Spherical Equivalent (SE).

Methods: This prospective, analytical, and longitudinal study focused on a population of children between the ages of 5 and 11 in Lisbon, Portugal, excluding those with prior pathologies or under treatment for myopia, to ensure diversity in educational levels and lifestyles.

To measure this exposure, participants wore the Scienterra UV dosimeter for a full week, including weekends. The dosimeters were programmed to record light intensity every two minutes, providing detailed data on each participant's UV exposure.

The analysis of the data focused on the Standard Erythemal Dose (StED), a standard measure of UV dose, which depends on various factors including the time of day, time spent in the sun, use of sunscreen, and the season. Data collection specifically focused on the time frame from 16h to 21h, excluding school hours, to capture the critical window for UV exposure in the children's daily routine outside of academic commitments.

Results: A sample of 100 children with an average age of 7.88±1.38 years has been analyzed. The mean SE value was 0.60±1.07D. Using the K-means clustering method, two distinct clusters were identified based on SE values, light intensity, and exposure time, ensuring significant differentiation (both $p<0.001$). Cluster 1 is characterized by grouping individuals with a low average SE value (0.25±0.69D), the highest average weekly light intensity (0.0488 Watts/m²), and a moderate exposure time (2.23 hours). In contrast, Cluster 2 shows a different dynamic, with the highest SE values (2.08±1.27D) observed alongside a lower light intensity (0.0289 Watts/m²) than in Cluster 1, and the highest weekly exposure time (4.03 hours). Applying Spearman's correlation, it was found that there is no significant correlation between the SE value and light intensity (correlation of -0.0674 with a p-value of 0.5055). However, the correlation between the SE value and weekly exposure time was weakly positive (0.2076) and statistically significant ($p= 0.0383$), suggesting a mild but significant relationship between exposure time and SE value; so, the duration of exposure seems to impact myopia development.

Conclusion The study highlights that the duration of light exposure has a more significant impact on SE values than light intensity. This suggests that preventive measures focusing solely on intensity may be insufficient without considering exposure duration. The weak but significant correlation between exposure time and SE highlights the need for holistic strategies to mitigate light-associated risks, indicating that public health policies and occupational safety practices must balance both factors. This finding emphasizes the necessity of a more comprehensive approach to prevention, advocating for future research to explore the impact of different exposure patterns on ocular health.

Poster #17

Exploring the Relationship Between Tear Film Stability, Digital Device Usage, and Ocular Discomfort: Insights from a Comprehensive Questionnaire Study

Fabiana Sousa, Jacobo García Queiruga, Hugo pena Verdeal, Madalena Lira

Abstract

Purpose:
Investigating retinal alterations in the AD mouse model APPNL-F/NL-F compared to wild-type mice using optical coherence tomography (OCT).
Methods:
A cross-sectional study involved 36 mice per group, evaluated longitudinally at 6, 9, 12, 15, 17, and 20 months using OCT. We anlyzed: retinal nerve fiber layer + ganglion cell layer (RNFL+GCL), inner plexiform layer (IPL), inner nuclear layer (INL), outer plexiform layer (OPL), and outer nuclear layer (ONL) based on ETDRS sectors under anesthesia. Statistical analyses included Mann-Whitney U tests and two-way ANOVA (*p<0.05, **p<0.01, ***p<0.001).
Results:
In WT mice, the INL significantly decreased from 6 to 17 months (N2, S1, T1, p=<0.001; N1, S1, S2, p=<0.001). OPL thickened during 6-9 months and 17-20 months (p=0.025, p=0.011), whereas the ONL exhibited notable thinning (p=<0.001), particularly in S1, S2 (p=0.003, p=<0.001), and T1 from 6-17 months (p=0.031). Conversely, in the APPNL-F/NL-F model, RNFL+GCL significantly decreased in sector I1 (p=<0.001), and IPL showed significant thinning from 6-12 months to 15-20 months, notably in S1, T1, I2 (p=<0.001), and N1 to S1 (p=0.012, p=0.031). The INL thickened at 6 months compared to 15-17 months, notably in S1, I1 (p=<0.001), I2 (p=<0.001), while OPL thinned from 6-12 months to 15-20 months, particularly in N1 (p=0.019), S1 (p=0.008), N2 (p=<0.001), I2 (p=0.027) from 12-17 months. The ONL initially thickened and then significantly thinned from 9-15 months, with ongoing thinning in superior sectors from 9-17 and 9-20 months. Comparison between WT and APPNL-F/NL-F mice showed consistent RNFL+GCL thinning in APPNL-F/NL-F, except for S2 thickening at 15 months (p<0.05). Thinning was observed at 6 months in inferior sectors and N1 (p<0.05), at 9 months in T1 (p<0.05), and at 12 months in T1, I1 (p<0.05). At 15 months, N2 thinned, while S2 thickened (p<0.05).
Conclusion:
This mouse model replicates human AD, indicating retinal abnormalities correlating with brain pathology.

Poster #18

Sex-related differences in ocular dimensions among Africans and Europeans

Mame diatou toure sarr, belen Martinez Alvarez, Carmen Martin Aranda, Vanesa Blazquez Sanchez, Celia Sanchez Ramos

Abstract

Purpose: Studies examining the relationship between ocular biometry and sex have yielded varied and often contradictory results. Some research suggests significant differences between men and women in certain ocular measurements, such as corneal size, corneal thickness, axial length of the eyeball, and lens diameter. However, other studies have found these differences to be minimal or nonsignificant. The objective of this study was to compare biometric measurements in populations of different races.

Methods: The sample consisted of two ethnic groups: 88 Caucasians (CAU), comprising 26 men and 62 women, and 129 Africans (AFR), consisting of 50 men and 79 women. The following variables were analyzed: axial length (AL), corneal diameter (WTW), curvature (K) and astigmatism (ASTC), refractive errors (RX), corneal and anterior chamber depth (ACD). All participants signed informed consent. Ocular biometry assessment was performed using the Zeiss IOL MASTER 500 (Carl Zeiss Meditec Inc., Dublin, California). The assessment of refractive status was performed with the Nidek HandyRef-K portable autokeratorefractometer, with three measurements by the same. The spherical equivalent (SE) was defined as the spherical value plus half the cylindrical value.

Results: The p-value in AL between Caucasian men and women was 0,2772, Africans showed p-valor 0,2670. However, when comparing males of different ethnic groups, a p-value of 0,0216 was obtained, and 0,0233 for females. WTW showed no differences in its comparison between the different sexes of the same ethnic group, but a p-value of 0,0004 was found when comparing CAU males to AFR males, and the same was found for females, with a p-value of 0,0001. KM showed no statistically significant differences in any of the comparisons. The ASTC variable did not show significant differences among Caucasians, but did in Africans, showing a p-value of 0,0195. When comparing the ASTC of Caucasian and African men, a p-value lower than 0,0001 was obtained, and the same p-value was obtained in women. In the RX variable, no significant differences were found between the different sexes of the same racial group, but differences were found between white and black men, obtaining a p-value of 0,0032, the same thing happens for the female participants, who obtained a p-value of 0,0007. The last variable compared was the ACD, showing no significant differences between the different sexes of the same racial group, but when comparing men and women of the two racial groups, a p-value lower than 0,0001 was obtained in both cases.

Conclusions: this study have found significant differences across almost all the variables. This highlights the need for targeted interventions and further research to address ocular health inequalities within African communities.

Poster #19

ANALYSIS OF THE EFFECT ON THE OCULAR SURFACE OF TWO DIFFERENT ORTHOKERATOLOGY DESIGNS.

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

Abstract

Objectives: Orthokeratology (orthok) is currently one of the methods with the most scientific support in the myopia management. With increasing use, especially among children, it is important to evaluate the safety and efficacy of this treatment on the ocular surface. The objective was to evaluate the effect on the ocular surface of the orthok wear with two different lens designs.

Methods: A prospective, multicenter, randomized study evaluated the ocular surface quality between two different orthok lens designs: L1 with an aspheric alignment zone and L2 with a tangential alignment zone. Eight visits were conducted: baseline (spectacles wear), after 1 night, 7 nights, 15 nights, 1, 3, and 6 months of orthok wear. Tear film break-up time (BUT), tear meniscus height (TMH), and tear film surface quality (TFSQ) were measured at all visits using a small cone topographer. Statistical analysis was performed with $p<0.05$ considered significant. Results are shown as mean±SD

Results: A total of 69 patients completed the study (25 men and 44 women) with a mean age of 18.3±8.0 years. No statistically significant differences were found ($p>0.05$) in TMH between lenses nor between visits. Regarding BUT, a slight improvement was observed for L1 between the baseline visit (7.9 ±4.6 s) and 6-months visit (9.2 ±5.2 s), although there were not statistically significant differences ($p>0.05$). Regarding TFSQ, no significant differences ($p>0.05$) were found between lenses during the follow-up visits compared with baseline. It was performed a Pearson Correlation between TFSQ and BUT, being R=0.10 for L1, and R=-0.50 for L2, although there were not significant differences ($p>0.05$). Also a Pearson Correlation between TFSQ and TMH was performed, showing a R=-0.34 for L1 and a R=0.54 for L2, but there were not significant differences ($p>0.05$).

Conclusion: Both orthok lens designs showed similar behavior keeping the integrity of the ocular surface.

Poster #20

Daylight illuminant preference for viewing human faces across male and female observers

Andreia E. Gomes, Sérgio M. C. Nascimento , João M. M. Linhares

Abstract

Purpose: The color of the skin of the human face is a fundamental feature for assessing health, beauty, and human interaction. The light source intensity and
spectral composition strongly affect color perception, therefore it is important to define the best lighting for viewing the color of the skin. This study aimed at determining the optimal daylight illumination for viewing human faces, by male and female observers.

Methods: The spectral reflectance of 11 hyperspectral images of human faces (4 African and 7 Caucasian), from 400 to 720 nm in 10 nm steps, was converted into tristimulus values assuming CIE 1931 standard observer and CIE D illuminants with correlated color temperatures (CCT) from 4000K to 25000K (represented by CIE x chromaticity coordinates from 0.4 to 0.25). Each face was rendered into RGB images under 41 daylight illuminants with average luminance of 12 cd/m2c. A total of 103 normal color vision observers (67 females and 36 males) circulated through the images, in a circular endless loop with random starting CCT, selecting the image that produced the best visual impression. The distribution of the frequency of the selected CCT was modeled using a Gaussian function assuming its peak (xpeak±FWHM) as the preferred lighting condition.

Results: It was found that the preferred CCT was of about 5300K (0.338±0.087) across all observers and faces, 5422K (0.335±0.085) for females and 5080K (0.344±0.087) for male observers, a difference not statistically significantly ($p>0.05$ using t-test).

Conclusions: These results suggest that the optimal daylighting for viewing faces is not influenced by the observer's sex.

Poster #21

Reviving the colors of paintings by removing the protective varnish layer: a physical and virtual intervention

José A.R. Monteiro, Liliana Cardeira, Ana Bailão, Sérgio Miguel Cardoso Nascimento, João M.M. Linhares

Abstract

Purpose: To evaluate the chromatic changes found in paintings when the protective varnish layer (PVL) was physically removed, and digitally removed by using a Neuronal Network (NN).

Methods: The reflectance spectra of 5 hyperspectral images of paintings, from 400 to 720 in 10 nm steps, with and without PVL, were converted into the CIECAM16-UCS, considering the CIED65 illuminant.

The removal of the PVL was simulated by a Sequential Neural Network implemented with a dense structure (33-33 nodes) associated to a tanh activation function, the Nadam optimizer, and the 'mean squared error' loss function. The neural network was trained during 50 consecutive epochs using data from a strip of pixels that surrounded the image of the painting with and without the PVL. After training, the simulation of the removal of the PVL considered the full hyperspectral image of the painting

The chromatic differences between paintings with and without the PVL, physically and digitally removed, were estimated considering variations of the just-noticeable different (JND) colors and the color gamut.

Results: The removal of the PVL led to an increase in the JND (1.8 times on average) and in the color gamut, a result dependent on the initial condition of the PVL and individualized per painting. The NN produced a digital removal of the PVL with an average color difference from the original of approximately 2.6±0.5 (or 1.1±0.2 ignoring J') units. This result would be worse if the NN was cross-trainer with data from a different painting than the one used in the simulation.

Conclusions: These results indicate that removing the PVL increases the chromatic diversity of the painting. The digital removal of the PVL using a NN provided an output close to the original painting, if the area of the painting used to train the NN was of the painting used.

Poster #22

Visual Satisfaction in Daily Activities after Cataract Surgery: Comparison of Intraocular Lenses

Inas Baoud Ould Haddi, Dayan Flores Cervantes, Emilio Dorronzoro Ramírez, Cristina Bonnin Arias , Vanesa Blázquez Sánchez

Abstract

Objective: To evaluate the subjective visual performance of patients who underwent cataract surgery, focusing on their daily activities.

Methods: An observational, prospective, and cross-sectional study was conducted in accordance with the principles of the Declaration of Helsinki. All surgeries were performed by the same experienced surgeon (E.D.R) at the Sanitas La Moraleja University Hospital in Madrid. The total sample included 60 eyes from 30 different patients who received the implantation of three types of intraocular lenses (IOLs): 10 patients with Tecnis® EyhanceTM, 10 patients with PhysiOL® IsoPure 123TM, and 10 patients with AcrySof® IQ VivityTM. The evaluation was performed 30 days after surgery using the VFQ-14 questionnaire to measure patient satisfaction with the selected IOL. Data were analyzed with SPSS software (version 28.0), with a p-value<0.05 considered as the criterion for statistical significance.

Results: The AcrySof® IQ VivityTM IOL showed superior performance in the ability to read small print compared to the Tecnis® EyhanceTM IOL. Statistically significant differences (p-value 0.003) were observed in comparison to the PhysiOL® IsoPure 123TM IOL. Similarly, in reading books or newspapers and performing fine manual activities, the AcrySof® IQ VivityTM IOL had higher rates of patients without difficulty compared to the other lenses, with this difference being statistically significant (p-value 0.016). Additionally, in night driving, the AcrySof® IQ VivityTM IOL stood out, with 100% of patients reporting no difficulty, unlike Tecnis® EyhanceTM and PhysiOL® IsoPure 123TM, which showed greater difficulty. No statistically significant differences were observed in other items of the questionnaire.

Conclusion: The results of the VFQ-14 questionnaire indicate that the AcrySof® IQ VivityTM IOL generates greater satisfaction in daily activities such as reading and night driving, compared to Tecnis® Eyhance™ and PhysiOL® IsoPure 123™. These findings highlight the importance of considering patient satisfaction when selecting an intraocular lens, focusing on improving visual quality of life and adapting to individual needs.

Poster #23

PUPIL DIAMETER AS AN INDICATOR OF THE BALANCE OF THE VEGETATIVE SYSTEM IN VIDEO GAMERS.

CARMEN MARTÍN ARANDA, CECILIA DÍAZ LÓPEZ , MAME DIATOU TOURE SARR , CRISTINA BONNIN ARIAS, CELIA SÁNCHEZ-RAMOS RODA

Abstract

Pupil diameter modification is an involuntary action performed by the sympathetic (dilation) and parasympathetic (constriction) vegetative systems. The aim of this work is to analyze the vegetative system between video gamers and control group by measuring the pupillary diameter.

Methodology: The Power Refractor II device was used to evaluate pupil size under scotopic light conditions. First, the user adapted to darkness for 3 minutes. Subsequently, the user was positioned one meter away from the device. This device has a fixation point and the user must look at it for 10 seconds while the device performs the measurement. The measurements were performed on 29 video gamers, with a mean age of 25.10±4.98 years, before and after playing video games for four hours and compared with a control group of 45 participants with a mean age of 21.51±1.34 years who did not play video games

Results: there are significant results comparing the control group with video gamers before four hours of gaming, obtaining pupil diameters 13.24% higher for the right eye of the video gamer group and 12.70% higher values for the left eye of the video gamer group compared to the control group. Moreover, there are also significant results comparing the control group with the video gamers after four hours of gaming, obtaining pupillary diameters for the right eye 11.54% and for the left eye 10.05% higher again for the video gamer group.

Conclusion: Video gamers have larger pupil diameters before and after four hours of gaming compared to the control group. This means that the sympathetic autonomic system is more active in video gamers than the parasympathetic autonomic system. This pupillary dilation may be caused by the need for high visual and emotional attention demand.

Poster #24

Optometric management of Marfan Syndrome: a clinical case

Ana Isabel de Jesus Pinto, Marta Sofia Magro, Ana Pires, Carmelo Baños Morales, Irene Sánchez Pavón

Abstract

Objective: Marfan Syndrome is characterized as a rare hereditary condition caused by an autosomal dominant genetic alteration. It affects connective tissue and its elastic fibers. At the ocular level, the bilateral alterations include subluxation of the lens (40-56%), myopia (28%), and retinal detachment (0.78%). This study aims to analyze the role of the optometrist in the complications of Marfan Syndrome.

Methods: The optometric management of a 36-year-old male patient with Marfan syndrome was planned. Several diagnostic tests were performed, including visual acuity (VA) measurement, refraction, biomicroscopy, keratometry, measurement of pupillary diameter in scotopic and fotopic conditions, iris and corneal diameter. The AV in the right eye (RE) with the best correction was 0.5; the left eye (LE) showed amaurosis. To improve the visual function and the aesthetic appearance, a progressive lens was fitted to the RE and a therapeutic contact lens in the LE.

Results: At 5 years of age, the patient underwent lens surgery with intraocular lens implantation in both eyes to correct bilateral lens subluxation, after which he required multifocal compensation. At the age of 12, he presented retinal detachment in the LE, causing loss of vision in this eye, while in the RE it was necessary to prescribe a progressive lens. In the LE, was fitted a type D therapeutic contact lens to achieve an aesthetic improvement. The patient reported an improvement in visual perception and visual comfort over time.

Conclusion: Patients with Marfan Syndrome should undergo periodic ophthalmologic follow up's visits. However, collaboration with the optometrist is very important for the detection of possible ocular complications. The optometric management with a correct prescription and use of contact lenses will be essential for the patient to have the best visual quality and, therefore, the best performance of their visual system.

Poster #25

Comparison of refractive parameters provided by a new open field aberrometer and the subjective refraction

Antonio Martínez-Abad, Mario Cantó-Cerdán, Marina José-Martínez, Ana Belén Plaza-Puche, Pilar Yébana, Alejandra E Rodríguez, David P Piñero, Jorge L Alió

Abstract

Aim: To compare and evaluate the agreement of the refractive parameters provided by a new open field aberrometer (OFA-Osiris CSO®) and those obtained by the subjective refraction.

Methods: This was an observational, prospective, and cross-sectional study composed of healthy eyes. All subjects underwent an exhaustive optometric evaluation including subjective refraction and ocular aberrometry with the OFA-Osiris device. The sphere, cylinder and axis were obtained from both methods, converted to polar notation using M, J0 and J45 vectors for accurate refractive management. The refractive data provided by ocular aberrometry was extracted at 4 and 5 mm pupil diameter. The Wilcoxon sum tank test was applied for the comparison between methods and the Bland-Altman plots were used for the agreement analysis.

Results: A total of 183 subjects of a mean age of 24.85±5.19 years-old were included. When selecting a pupil diameter of 5 mm with ocular aberrometry, the refractive measurements did not present statistical differences with the subjective method obtaining a mean M of -1.58±2.26D and -1.59±2.3D respectively (p: 0.228), a mean J0 of 0.03±0.27D and 0.01±0.26D respectively (p: 0.280), and a mean J45 of 0.01±0.24D and 0.01±0.26D respectively (p: 0.259). However, considering an aberrometric pupil diameter of 4 mm, the M vector was significantly different to the one obtained by subjective refraction (-1.49±2.33D and -1.59±2.30D respectively, $p<0.001$). Bland-Altman plots revealed limits of agreements higher than 1D.

Conclusions: The aberrometric refraction provided by a new open field aberrometer presented good agreement with the subjective refraction, especially considering a pupil diameter of 5 mm. However, it may present clinical differences between both techniques, therefore the subjective refraction must be considered as the gold standard for the refractive evaluation.

Poster #26

Halometry in cataract patients operated with aspheric IOL.

Cecilia Díaz-López, Carmen Martín-Aranda, Cristina Bonnin-Arias, Celia Sánchez-Ramos

Abstract

Objective: analyse the Halometry in a group of cataract patients before and after phacoemulsification surgery and compare them with a control group.
Methodology: the Halo v1.0 software was used, created and developed by the Laboratory of Vision Sciences and Applications (University of Granada, Spain). We
studied 22 patients who underwent cataract surgery with the Tecnis Eyhance lens (model ICB00, Johnson & Johnson), with ages between 75.77± 4.4 and a control
group of 29 people with an average age of 66.44± 6.3. This test was performed before and after surgery on the same individuals.
Results: The discrimination index has a mean value of 0.90±0.0 for the control group and 0.74±0.1 for the cataract group. After the operation, the mean value is 0.81±0.1. The alteration index with value for the control group of 0.14±0.1 and the group before surgery has a value of 0.24±0.1. After the intervention, the value is 0.19±0.1. The results compared with t student's indicate for the discrimination index variable that the control group versus the preoperative patients present significant diferences with a p-value of <0.0001. The control group compared to the intervention group obtained a p-value of 0.0047. For the alteration index, a p-value of 0.0007 was obtained between the control and preoperative groups; and a p-value of 0.0076 with the operated group.
Conclusion: cataract patients presented lower values before and after in the discrimination index and higher values in the alteration index compared to the control group, which indicates an improvement in the dispersion of light inside the eye without reaching the values obtained by subjects without cataract.

Poster #27

Pilot study of binocular computerized campimetry in patients with strabismus

Sonia Ribadulla Torreiro, Mª Inés Pérez Flores

Abstract

Purpose: Binocular vision is a complex retino brain process that involves optical, sensory, and motor aspects. This process entails the fusion and interpretation of visual sensations from both eyes to generate a single perception, which includes the appreciation of depth (stereopsis). This requires the spontaneous and coordinated motor collaboration of both eyes.

Methods: Patients with strabismus present an alteration of the binocular visual field (BVF). In patients with esotropia, there is a reduction of the BVF compared to patients with orthotropia and exotropia. Furthermore, in patients with strabismus and diplopia, quantifying the binocular visual field free of diplopia allows for obtaining more functional information about the patient's visual condition.

Results: Various tests have analyzed the impact of strabismus on the binocular visual field and its consequent influence on the visual perception and quality of life of patients . Questionnaires have been developed to evaluate diplopia through a scoring algorithm based on information provided by the patients . There are also comparative studies on the effectiveness of different tests that quantify the severity of diplopia.

Conclusions: Our objective is to describe and analyze the effectiveness of the binocular Esterman program of the Humphrey® perimeter modified with the fusion exploration technique using a red lens in patients with strabismus. With the red lens test, we study binocular vision by evaluating the patient's fusion. We believe that this test allows for creating a binocular map that facilitates the observation and quantification of the BVF in patients with strabismus without diplopia, as well as the areas of single vision in patients with strabismus and diplopia.

Poster #28

Efficacy of Systane Complete Preservative-free on general dryness eye symptomatology assessed through questionnaires

Carmelo Baños Morales, Raquel García García, Adela Hernandez Rodriguez, Gabriela Martínez Arias, Irene Sánchez Pavón

Abstract

Purpose: The aim of this study is to analyze the efficacy of Systane Complete Preservative-free on general dryness eye symptomatology using the Ocular Surface Disease Index(OSDI) test and at the end of the day with the Dry Eye questionnaire(DEQ-5).

Methods: Subjects (N=34) aged between 18 and 65 years, who had not used contact lenses or artificial tears in the last month and had no ocular surgeries in the past year, were recruited. Inclusion criteria included an OSDI test score between 12 and 32 points, indicating mild to moderate degree of dryness. Participants were instructed to use 4 drops of Systane Complete Preservative free per day, distributed throughout the day, with the last drop approximately two hours before bedtime. Both questionnaires (OSDI and DEQ-5) were administered, after 7 days, 14 days and one month. An optometric check-up as conducted at the first and last visit to ensure that the ocular surface and vision were within normal limits. Statistical analysis was performed using Wilcoxon signed-rank tests.

Results: Preliminary results showed a significant decrease in the score of both questionnaires. For DEQ-5, the score decreased (9.23±3.51 baseline score to 2.94±3.04 final score), with the change being statistically significant ($p<0.03$) except between visit 3 and visit 4 ($p=0.31$). For OSDI, the score decreased from (22.94±6.64 baseline score to 6.51 ± 6.32 score), with statistically significant changes between all visits ($p<0.01$) except the score between visit two and four ($p=0.39$) and visit three and four ($p=0.15$). Satisfaction improved during the first week and continues to improve in the second week. However, the improvement stabilized by the third week and remained consistent throughout the month.

Conclusion: The use of 4 drops per day of Systane Complete preservative-free improves the symptomatology of general ocular dryness and dryness at the end of the day.

Poster #29

Colour naming of natural colours by normal trichromats

Dora N. Marques, José A. R. Monteiro, Joana B. S. Costa, Joana F. A. Sequeiros, João M. M. Linhares, Sérgio M. C. Nascimento

Abstract

Purpose: To investigate how normal trichromats name colours that are representative of natural scenes seen in isolation or set in natural images.

Methods: A set of 182 colours derived from hyperspectral data of natural scenes was tested in four background conditions on a calibrated LCD monitor with one repetition. Simple background: a 2º circle on a uniform grey background for 0.5 s. Complex background: a 0.6º diamond-shaped patch embedded in the original image, the greyscale image, or the scrambled colour scene. Observers named colours using the eleven Portuguese basic colour terms. Shannon's entropy, consistency, and consensus were analysed. Response times were recorded. Fourteen normal trichromats participated.

Results: Entropy was highest for the simple background (2.2±0.1) indicating higher naming variations, followed by the greyscale image and the scrambled colour backgrounds, which had equal entropy (2.1±0.1), and was lowest for the original image (2.0±0.1). Both consistency and consensus were highest for the lowest entropy. Consistency within observers was the same in the simple, the greyscale image and the scrambled colour backgrounds, and increased in the original image background. Consensus among observers increased from the simple background, followed by the scrambled colour, the greyscale image and finally the original image. Reaction times increased in the same direction as consensus, with observers taking longer to respond when entropy was lowest.

Conclusions: Context influences colour naming in normal trichromats. They use the colour information of natural scenes more effectively when both spatial and colour content are provided, than with either type of content alone or when both are lacking, although they take longer to do so.

Poster #30

In Focus: Investigating Retinal Vascular Alterations by OCTA in Alzheimer's Disease using the APPNL-F/NL-F Mouse Model

Inés López-Cuenc, Lidia Sánchez-Puebla, María González Jiménez, Elena Salobrar-García, José A. Matamoros, José A. Fernández Albarral, Lorena Elvira-Hurtado, Juan J. Salazar, Ana I. Ramírez, Takaomi C. Saido, Takashi Saito, Carmen Nieto Vaquero, María I. C

Abstract

Purpose: Investigate retinal vascular structures and thickness in the APPNL-F/NL-F mouse model of Alzheimer's disease (AD) across various ages, comparing them to age-matched wild type (WT) controls.

Methods: We conducted a cross-sectional case-control study with an experimental group (APPNL-F/NL-F) and a control group (WT mice, C57BL/6J), each with n=36. Six mice per group were studied at 6, 9, 12, 15, 17, and 20 months. Spectral-domain OCT angiography (SD-OCTA) and AngioTool software evaluated the retinal vascular plexuses, while OCT measured inner and outer retina thickness, represented using ETDRS sectors.Statistical analysis used GraphPad Prism 9.0, with Student's t-test for parametric samples and Mann-Whitney U test for non-parametric variables. Data were expressed as mean and standard deviation, with significance levels of *p<0.05, **p<0.01, ***p<0.001, and ****p<0.0001.

Results: At 6 months, the APPNL-F/NL-F mice showed significant reductions in SVC vascular parameters, except for average vessel length (p=0.029) and vessel non-uniformity (lacunarity) (p=0.0008), which increased. By 15 months, most parameters continued to decrease significantly (p=0.0134 and 0.0471). Regarding retinal thickness, significant inner retinal thinning was evident at 6 months in temporal (p=0.0022) and nasal sectors (p=0.0065), with outer retinal thickening in temporal (p=0.0043), inferior (p=0.0043), and nasal sectors (p=0.0130). At 12 months, inner retinal thinning extended to temporal (p=0.0173 and 0.0238), inferior (p=0.0108 and 0.0130), and nasal sectors (p=0.0108 and 0.0238), and outer retinal thickening (p=0.0476). By 17 months, outer retinal thickening was observed in nasal (p=0.0130), temporal (p=0.0368), and inferior sectors (p=0.0390 and 0.0065). At 20 months, inner retinal thinning was notable in the temporal sector (p=0.0303)

Conclusion: Early retinal vascular and structural changes were identified in the APPNL-F/NL-F model preceding cognitive alterations observed at later stages. These findings suggest a closer resemblance to human AD retinal changes compared to other transgenic models, emphasizing the potential of retinal assessments in early AD diagnosis.

Poster #31

Changes in the photopic negative response of myopes with a novel ophthalmic lens for the control of myopia progression

Sara Silva-Leite, Paulo Fernandes, José Manuel González-Meijome

Abstract

Purpose: This study aimed to evaluate retinal ganglion cell activity using the photopic negative response (PhNR) electroretinogram in myopic young adults wearing novel ophthalmic lenses designed to manage myopia progression.

Methods: This experimental cross-sectional pilot study included nine myopic subjects (mean age ± standard deviation (SD): 25.7 ± 4.7 years) with refractive errors lower than 6.00 D (spherical equivalent of -2.51 ± 1.42 D in the right eye and -2.38 ± 1.71 D in the left eye). The PhNR test, reflecting retinal ganglion cell activity, was assessed in the sensorial dominant eye with the RETI-port/scan21 system (Roland Consult, Wiesbaden, Germany). This study analysed the amplitude (microvolts) from baseline to the peak PhNR trough (BT) and from the b-wave peak to PhNR trough (PT), as well as the implicit time (ms) of the a- and b-waves. PhNR was evaluated with monofocal lenses (control) and perifocal lenses (test), which have an add power of +2.50 D on the temporal side and +2.00 D on the nasal side, for myopia management purposes.

Results: A statistically significant delay of 1.20 ms in the a-wave was observed between control and test conditions ($p = 0.039$). No statistically significant differences were found in the b-wave implicit time (control: 24.30 ± 12.19 ms, test: 25.57 ± 12.66 ms, $p = 0.400$). The BT component was 1.36 microvolts higher with perifocal lenses, while the PT component was 1.24 microvolts lower, however, these differences were also not statistically significant ($p = 0.953$ and $p = 0.629$, respectively).

Conclusions: We observed changes in the amplitude and implicit time of retinal ganglion cell activity, as measured by the PhNR test when comparing perifocal ophthalmic lenses to monofocal lenses, with only the delay of the a-wave reaching statistical significance. Further research with larger sample sizes is necessary to explore these findings.

Poster #32

Postoperative application of a ray tracing-based simulated optical model.

Laura Remon, Diana Gargallo, Iván Pérez, Francisco Javier Castro Alonso

Abstract

Cataract surgery is now considered a type of refractive surgery, and patients have high expectations for achieving optimal visual outcomes to enhance their quality of life. The individual selection of the optimal intraocular lens power (IOLP) is crucial to visual quality optimization after cataract surgery.

In the present study, we evaluated the utility of OSLO, an advanced optical tool, for designing numerical models of a pseudophakic eye based on the real ocular parameters (biometry and keratometric data) measured to accurately calculate the ideal IOL positions. By using OSLO, we aim to optimize the estimation of IOL position and improve refractive outcomes after cataract surgery. A retrospective observational study in 43 eyes implanted with the same monofocal intraocular lens (IOL) was conducted. Preoperative and postoperative biometric data were obtained from Lenstar LS900. Actual lens position (ALP) and subjective refraction were obtained postoperatively. Optical simulations (OSLO EDU 6.6.0) were used to optimize ALP for emmetropia (ALPIDEAL). The results of the paired t-test between REOSLO-REOBJ was p-value = 0.660 and between REOSLO- RESUB was p-value = 0.789, did not show any significant statistical differences between them. Finally, there are statistically significant differences between ALP and ALPIDEAL ($p < 0.05$), being the difference -0.04 ± 0.45 mm [ranging from -1.00 to 1.20 mm]. A significant correlation between ?ALP (?ALP=ALP- ALPIDEAL) and RESUBJ was found. Further research is needed to verify whether IOL calculation can be improved using the information obtained from ray tracing-based simulated optical modelling and ALPIDEAL.

Poster #33

Myopia control profile in children and adolescents in an optometric practice

Raquel Sánchez, Cristina Vieites, Jacobo Fraguela, José M. González-Méijome, Clara Abadías-Ferreiro

Abstract

Purpose: The objective of this study was to evaluate the frequency of myopia control treatments in a sample of pediatric patients attending a private optometry practice.

Methods: Patients with myopia and/or astigmatism, aged between 7 and 17 years, who attended consecutive optometry consultations were recruited. The refraction and biometric data of those using any strategy to control the progression of myopia were compared with the remaining children. Statistical analysis was conducted using the SPSS statistical package (IBM, Illinois, USA), considering only the right eye for analysis. Descriptive data were obtained, and a comparison of means for age and axial length, as well as a comparison of proportions for gender distribution, were performed between the group using and not using myopia control methods.

Results: Fourteen out of 70 recruited patients (20%) used some method of myopia control: 6 used atropine, 2 orthokeratology, 3 special ophthalmic lenses, 2 soft contact lenses, and 1 combination treatment of myopia control contact lens with atropine. The remaining patients used glasses or monofocal contact lenses to correct their vision. Compared to those not using any myopia control method, patients undergoing myopia control were older on average (11.9±2.4 vs. 11.1±3.2 years; $p>0.05$) and had higher axial length values (24.43±1.00 vs. 24.20±1.06 mm; $p<0.05$). While the gender distribution in the general sample was 51% male and 49% female, in the subgroup under myopia control, the proportion was 57% male and 43% female.

Conclusions: One in five children and adolescents sampled in this prospective study were under some form of myopia control treatment, with therapeutic options divided almost equally between pharmacological and optical treatments. These patients were older and had longer eyes. It is necessary to expand the sample to obtain more representative information on the current treatments provided to children with myopia and to conduct follow-up studies to evaluate potential changes in clinical practice.

Poster #34

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

Diogo Algarvio, Ana Figueiredo, Márcio Marques, Mariana Cunha, Marina Sebastião, Patrícia Almeida, Sofia Brito, Francisco Brardo, Pedro Monteiro, Amélia Nunes

Abstract

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

Methods: The study included 470 students with an average age of 12.81 ± 1.53 years, comprising 50.4% male and 49.6% female. Visual acuity (VA) was assessed using LogMAR charts (worse than 0.1 LogMAR was considered as reduced), and the spherical equivalent (SE) of refractive error was measured using a Plusoptix A09 autorefractometer without cycloplegia (myopia SE<-0.75; Hyperopia SE>1.25), with only the right eye considered. The sociodemographic variables controlled were gender and the cycle of studies attended. Academic performance was evaluated based on average grades in humanities and sciences. Associations between the variables were analyzed using the Chi-square test, with a significance level of $p<0.05$.

Results: The study's results indicated that academic performance was strongly associated with the cycle of studies in humanities and science ($\chi 2$: 188.633 p=<0.001; Cramer´s V=0,635 and $\chi 2$: 238.062 p=<0.001; Cramer´s V=0,713) with worse results in the 2nd cycle in both fields; was also weakly associated with VA ($\chi 2$: 4.426 p=0.035; Cramer´s V=0,097) in the humanities; and was weakly associated with gender ($\chi 2$: 7.291 p=0.007; Cramer´s V=0,125) in the sciences field, with male students performing worse. No significant associations were found among other parameters.

Conclusion: The study demonstrated a strong association between academic performance and the cycle of studies in both humanities and sciences, with students in the 2nd cycle performing worse in both fields. There was a fragile association with visual acuity (VA) in humanities. In the sciences, a weak association was observed between gender and academic performance, with male students performing worse. Interestingly, no association of SE with any factors was found.

Poster #35

Relationship between intraocular pressure, myopia and environmental factors.

Marta Magro, Ana Pires, Pedro Lata Fernández, Jose María López Conde, Beatriz Palma Panadero, Ana María Lázaro Barranco, Irene Sánchez

Abstract

Objetive: Glaucoma is one of the leading causes of irreversible blindness in developed countries with a high number of underdiagnosed cases. Among other risk factors, Glaucoma is associated with increased intraocular pressure (IOP) and myopia, particularly myopia magna (> 6 diopters (D)). The main objective of this study is to investigate the possible correlation between IOP values and various environmental factors in a population of myopic patients, to advance the understanding of the pathophysiology of glaucoma.

Methods: A prospective, multicenter study was designed in healthy patients treated in optical centers aged between 18 and 40 years. Intraocular pressure was measured with non-contact tonometers, correlating with the following environmental factors: pressure, temperature, ozone (O3), nitrogen dioxide (NO2), particulate matter smaller than 10 microns and 2.5 microns (PM10 and PM2.5) measured at the reference meteorological stations at the centre where IOP has been measured.

Results: The study analyzed intraocular pressure (IOP) values in 358 patients with myopia less than 6D and 33 with high myopia. No significant correlation was found between IOP values and atmospheric pressure or O3. Statistically significant correlations were observed between IOP values of both eyes, and the temperature recorded on the day of measurement. For patients with myopia less than 6D $r=0.18$; $p<0,01$ (right eye) and $r=0.17$; $p<0,01$ (left eye) and for patients with myopia greater than 6D: $r=-0.43$; $p<0,01$(right eye) and $r=-0.50$; $p<0,01$(left eye). Additionally, significant correlations were found between IOP values and concentrations of PM2.5 and PM10 in patients with myopia less than 6 diopters.

Conclusions: Slight correlations were found between different environmental factors and IOP values in patients with myopia below 6D. The inverse correlation between temperature and IOP is relevant risk factor for the development of Glaucoma. However, further clinical studies are needed to better understand these fluctuations in different populations, considering the study's limitations.

Poster #36

Retinal electrophysiological activity and visual function after ocular stimulation with repeated low-level red-light for myopia control.

Bárbara Marinho, Paulo Fernandes, José Manuel González-Méijome

Abstract

Purpose: This study aimed to evaluate if the electroretinogram (ERG) can detect repeated low-level red-light (RLRL) induced changes in retinal activity, and to access the short-term effect of retinal electrical activity after a single 3-minute RLRL stimulation.

Methods: Ten myopic eyes of healthy young adults aged 18 to 25 years (myopia -1.00 to -5.00) were included. Subjects with eye pathologies, previous eye surgery, previous myopia control treatments or with systemic diseases were excluded. Baseline measurements included refraction, binocular vision screening, best-corrected high and low contrast visual acuity and axial length. Measures included before and after three minutes of RLRL stimulation: high and low contrast visual acuity, axial length, contrast sensitivity (photopic and mesopic) and ERG monocular assessment with various strategies. Photopic 3.0 ERG and On-Off ERG assessed on-off pathways; pattern ERG tested ganglion cell layer changes.

Results: Contrast sensitivity 1.5 to 18 cycles per degree was unchanged. Axial length decreased by 0.02mm in OD and 0.01mm in OS, within device error. Pattern ERG showed no significant differences in activity, implicit time, or amplitude, indicating high reproducibility with standard deviation. Photopic 3.0 ERG mean b-wave changed from 46.5µV to 44.1µV post-RLRL, suggesting slight on-off bipolar activity decrease. On-Off response had a 1.7µV a-wave amplitude decrease; b-wave was unchanged. D-wave had a 2µV decrease, suggesting OFF-bipolar response change, but not statistically significant ($p>0.05$ for all, Wilcoxon).

Conclusions: The results demonstrate that the ERG technique is repeatable and can detect changes associated with RLRL therapy, though no significant differences have been observed so far. After three minutes of RLRL treatment, changes in retinal on-off circuit activity are observable. However, the connection between these changes and the therapy's mechanism of action remains unclear.

Poster #37

Ocular Dominance in Children and Its Impact on Vision

Mirian Demera Marcillo, Dayan Flores Cervantes , Inas Baoud Ould Haddi

Abstract

Objective: To determine the effect of different types of ocular dominance on accommodative flexibility.

Methods: An observational, prospective, and cross-sectional study. The sample consisted of 53 patients with an average age of 11.75 ± 2.77 years. The following parameters were assessed: ocular dominance (motor, sensory, and directional), and accommodative flexibility both monocular and binocular. A p-value ≥ 0.05 was considered the criterion for statistical significance, and the correlation was conducted using Pearson's test.

Results: The data obtained from the measurements of ocular dominance showed that in 13.2% of the cases, all three dominances were in the same eye; in 15.1%, two dominance values were in the same eye while the other was in the opposite eye. The values of accommodative flexibility (D) were: AF OD (6.75 ± 4.23) D, AF OS (6.53 ± 4.35) D, and AF OU (6.87 ± 3.95) D. When related, it was detected that if the coefficient r ≠ 0, there is a correlation between the variables.

Conclusions: It was detected that there is the most significant relationship between sensory dominance and accommodative flexibility, whether in OD, OS, or OU, with a direct correlation in these cases. Additionally, when motor dominance is related to flexibility, the relationship is weak and inverse, with similar data in the directional dominance.

Poster #38

Percentiles of ocular growth in pre-myopic and myopic children and adolescents

Critina Vieites Alvite, Raquel Sánchez Centoira, Jacobo Fraguela Paz, José M. González-Méijome, Clara Abadías Ferreiro

Abstract

PURPOSE: The objective of this study is to characterize the axial length profile in a sample of children and adolescents in Galicia using percentiles derived from a European population.

METHODS: Were included subjects who attended routine optometry examinations consecutively and aged between 7 and 17 years. Axial length values obtained with low-coherence optical biometer (AL-SCAN®, Nidek CO., LTD, Japan) as a function of age were compared against percentile normative values defined for the European population of children, adolescents and young adults. The statistical analysis was carried out with the SPSS statistical package (IBM, Illinois, USA); both eyes from each individual were used for analysis.

RESULTS: Seventy subjects were analyzed (36 males:34 females; 11.3±3.1 years); 14 subjects were removed as they were under some kind of myopia control treatment (8 males, 6 females; 11.86±2.43 years). In the group of 56 patients who did not use any myopia control method (28 males, 28 females, 11.18±3.19 years), 1% of eyes were hyperopic, 15% pre-myopic, 14% emmetrope, 45% had low myopia up to -3.00 D of spherical equivalent (SE), 22% had moderate hyperopia (-3.01 to -5.99 D) and 4% had high myopia (equal or worse than -6.00D). There was a gender difference in the distribution of eye growth with 25% of male eyes being below the percentile 50 (18% for female eyes) while 43% of male eyes were above the percentile 95 a proportion raised to 53% for females (Chi2 <0.05).

CONCLUSIONS: The patients evaluated show a high growth percentile in both male and female children and adolescents, being worse for females. The risk for high myopia in adulthood is significantly higher in females than males and this raises a potential gender-related burden of ocular comorbidities related with myopia in elderly.

Poster #39

Study on the current and future vision of the profession among optics and optometry degree students in Spain

Ana Margarita Pires, Carmelo Baños Morales, Marta Sofia Milheiro Joaquim Chaves Magro, Ana Isabel Pinto de Jesús, Irene Sánchez Pavón

Abstract

Purpose: This study aims to evaluate the current perspectives, educational experiences, and professional expectations of students pursuing a degree in Optics and Optometry in Spain. By understanding their motivations, knowledge, and expectations, the study seeks to provide insights that could enhance educational programs and align them better with industry demands.

Methods: An anonymous survey was conducted among 168 Optics and Optometry students from five universities in Spain: Universidad Complutense de Madrid, Universidad de Granada, Universidad de Valladolid, Universidad de Zaragoza, and Universidad Politécnica de Catalunya. The survey included 20 closed and 3 open-ended questions, covering demographic information, reasons for choosing the degree, perceived knowledge about the profession, and future career aspirations. Data were collected and analyzed to ensure a thorough understanding of the participants' views.

Results: The survey revealed significant insights into students' perspectives and expectations. The average age of respondents was 22.78 years, with a majority being female (78.6%). Most students chose the degree due to personal interest and perceived employability. However, 50% of the students reported having little to no information about the degree before enrolling. Key expectations included acquiring practical and theoretical knowledge, with a strong emphasis on employability and professional growth. Additionally, 77.4% of students expected to enter a profession with high employability. Practical training, including internships in optometric establishments and clinical settings, was highlighted as critical. The results also underscored a need for better communication skills and business management training.

Conclusion: The survey evidenced that numerous students have limited knowledge of the studies and profession of Optics and Optometry before their enrollment. It suggests that academic and industry collaborations are essential to enhance educational content and career development. This study provides valuable insights that can help shape the future of optometric education and improve the professional readiness of graduates.

Poster #40

Coverage of refractive errors correction, in adolescence: a pilot study.

Ana Figueiredo, Mariana Cunha , Diogo Algarvio, Márcio Marques , Marina Sebastião , Patrícia Almeida , Sofia Brito , Francisco Brardo , Pedro Monteiro , Amélia Nunes

Abstract

Purpose

To estimate the effective coverage rate of refractive error correction among adolescents attending the 3rd cycle of basic education in the city of Covilhã.

Methods

The study was approved by the ethics committee and met the requirements of the Declaration of Helsinki.

Monocular distance visual acuities (VA) were assessed using ETDRS (Early Treatment of Diabetic Retinopathy Study) charts, in the modes of uncorrected VA, habitual correction VA, and pinhole VA (ph).

According to the World Health Organization's proposal, uncorrected VA was used to identify refractive correction needs, which were classified as met, under-met, and unmet need. Given the importance of visual acuity in the learning process at school age, the refractive correction needs were considered present when visual acuity was worse than 0,1logMAR.

Results

The study sample included 247 students with an average age of 14 ± 0.8 years, of which 51% were girls and 49% were boys. The results showed that in this sample, 50.2% had reduced uncorrected visual acuity that improve with pinhole or with habitual correction. It was also found that of those, 36 students (14.6%) had their needs met, 43 (17.4%) had their needs under-met, and 42 (17%) had unmet needs. The effective coverage rate of corrected refractive errors in the study sample was 29.7%.

Conclusions

We found a reduction in visual acuity with the naked eye in around 50% that improves with pinhole or with habitual correction, suggesting a need for refractive correction. We also found that less than 30% of the sample recovered visual acuity to normal values with its usual correction. These data suggest that the effective rate of correction of refractive errors in the studied sample is low.

Poster #41

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

Márcio Marques, Ana Figueiredo, Diogo Algarvio, Mariana Cunha, Marina Sebastião, Patrícia Almeida, Sofia Brito, 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 #42

Effectiveness in measuring biometric parameters with Pentacam and IOL Master 700

Dayan Flores Cervantes, Emilio Dorronzoro Ramirez, Nieves Gil Ciganda, Inas Baoud Ould Haddi Cristina onnin Arias 1;, Mirian Demera Marcillo, Cristina Bonnin Arias, Vanesa Blazquez Sanchez

Abstract

Objective

To analyze the relationship in measuring anterior chamber depth (ACD), white-to-white distance (WTW), and keratometry (Km) parameters using two measurement instruments employing different technologies.

Materials and Methods

Observational, prospective, and cross-sectional study. The sample consisted of 37 patients, totaling 74 eyes and with an average age of (34.30 ± 6.52) years. In the preoperative examination, the parameters ACD, WTW and Km were measured with Pentacam HR (Oculus Optikgeräte GmbH, Germany) and IOL Master 700 (Carl Zeiss Meditec, Jena, Germany); all the measurements were taken by the same optometrist and expert (DFC). When analyzing the ACD parameter, measurements were taken in two ways; on the one hand, ACD1 measured with IOL Master was obtained from the epithelium and, on the other hand, ACD2 which was measured from the endothelium subtracting the corneal pachymetry.

All participants signed the informed consent, the established protocol was followed in the study, and then the measurement of the test was carried out, asking the patient to place their head on both instruments, supporting the chin and forehead while looking at the central fixation light.

A $p<0,005$ criterion of statistical significance was considered, and the correlation was performed with the Spearman test.

Results

When analyzing the parameters measured with preoperative Pentacam®, the following average values of the parameters were obtained: ACD (3.34 ± 0.25) mm, WTW (11.77 ± 0.36) mm and Km (44.08 ± 1.32) D. On the other hand, with the IOL Master 700®, the following values were obtained: ACD1 (3,19 ± 0,27) mm, ACD2 (3,20 ± 0,29) mm, WTW (12,15 ± 0,37) mm) y Km (44,32 ± 1,40). When comparing the variables ACD, WTW, and Km, a high correlation was found between them (being ACD r=0.852, WTW r=0.796, and Km r=0.943, respectively). No statistically significant differences were found between them, with $p>0.05$ in all cases.

Conclusions

When analyzing the parameters ACD, WTW, and Km, a high correlation was found, but no statistically significant differences were found for both instruments, as for both Pentacam® and IOL Master®, $p>0.05$ was obtained. Therefore, it can be assumed that Pentacam® and IOL Master®, offer interchangeable measurements between both devices.

Poster #43

Effect Of Orthokeratology On Axial Growth Control Of The Eye: Review And Meta-Analysis

Inês Mota Silva, Ana F. Pereira-da-Mota, António Queirós

Abstract

Purpose: The study aimed to evaluate the longitudinal effect on axial eye length in myopic children and adolescents treated with orthokeratology (OK) lenses compared to spectacles (GL) through a systematic review and meta-analysis.

Methods: A systematic search of PubMed and Google Scholar was conducted, using keywords “Axial Length” AND “orthokeratology” AND “spectacles.” Inclusion criteria included spherical equivalent (M), standard deviation or standard error of the mean, and graphical/tabular presentation of axial length values before and after treatment. From 91 initial studies, 67 were excluded, leaving 24 for detailed analysis. Data were available at 24, 18, 12, 6, 3, and 1 month from 10, 8, 19, 17, 2, and 3 studies respectively, covering 2172 eyes treated with OK and 2095 with glasses.

Results: The 24 studies included 59 comparisons from 1 to 24 months and showed no significant differences in initial axial length [AL(GL) = 24.39 ± 0.34 mm; AL(OK) = 24.44 ± 0.38 mm] and initial refractive error [M(GL) = -2.59 ± 0.70 D; M(OK) = -2.53 ± 0.44 D] between the groups ($p > 0.565$, independent samples t-test) and for time intervals ($p > 0.591$, ANOVA). The analysis encompassed 4267 eyes with a mean age of 10.23 ± 1.21 years. The overall effect size of myopic defocus was AL=-0.16 (95% CI -0.19 to -0.14, Z=12.71, $p<0.001$). A random effects model accounted for heterogeneity ($I^2=97\%$; $p<0.001$, df=58). Greater myopia control was observed at 24 months (AL=-0.26, 95% CI -0.29 to -0.22, Z=13.71, $p<0.001$; $I^2=0\%$; $p=0.95$) compared to treatments under 3 months (AL=-0.04, 95% CI -0.06 to -0.01, Z=2.60, p=<0.009; $I^2=86\%$; $p<0.001$).

Conclusions: Treatment over 24 months shows homogeneous behavior among studies. Shorter follow-up times show larger heterogeneity, suggesting longer follow-up periods for a solid effect size. Orthokeratology is effective in myopia control progression compared to spectacles in children and adolescents.

Poster #44

Symptoms of Somatic sensation, visual impairment and cognitive performance in university students.

Mariana Cunha , Pedro Monteiro, Francisco Brardo , Ana Figueiredo , Sofia Brito, Márcio Marques, Diogo Algarvio, Amélia Nunes

Abstract

Purpose

To evaluate visual symptoms in the three dimensions of the Convergence Insufficiency Symptom Survey (somatic sensations, visual impairment and cognitive performance), in university students, grouped by visual function status into normal binocular vision (NBV), binocular vision and accommodation dysfunction (BVAD) and uncorrected refractive dysfunction (URD).

Methods

The diagnostic criteria for classifying NBV, BVAD and URD as described in the scientific literature were followed, and visual symptoms were assessed using the factorial structure of the CISS questionnaire. A descriptive data analysis was carried out and the differences in symptoms between the different states of visual function were studied using the Kruskal-Wallis test and post-hoc analysis. Statistical significance was considered for values of $p<0.05$. The University of Beira Interior ethics committee approved the study.

Results

A total of 344 students took part, with an average age of 21±2.71, 65% were female. Of the study sample, 30.5% had NBV, 16.3% had URD and 53.2% had BVAD.

Significant differences were found in symptoms of somatic sensations and cognitive performance between NBV and BVAD subjects ($p=0.008$; $p=0.009$ respectively), with the BVAD group showing the most symptoms.

Significant differences were found in the symptoms of impaired vision between the NBV and BVAD groups ($p<0.001$) and between the NBV and URD groups ($p= 0.004$), with the NBV group showing fewer symptoms. There were no statistically significant differences between BVAD and URD.

Conclusion The results suggest that dysfunctions in binocular vision and accommodation produce significant symptoms in all three dimensions of the CISS questionnaire, compared to subjects with NBV. The impaired vision dimension also indicates that it similarly affects individuals with BVAD and URD.

The analysis of the CISS questionnaire in its factor structure may bring gains in screening activities.

Poster #45

Influence of the lens material in daily CLs incorporating drug-loaded Chitosan/Hyaluronic Acid nanoparticles

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Abstract

Purpose: To investigate the behavior of different contact lens materials with incorporated Chitosan/Hyaluronic Acid (Ch/HA) nanoparticles loaded with the anticancer drug methotrexate (MTX). Methods: MTX-loaded nanoparticles were characterized with respect to their size and zeta potential (by Dynamic Light Scattering), stability, drug encapsulation efficiency, drug loading capacity and release profile (using UV/visible absorption and fluorescence spectroscopies). Two different materials of silicone-hydrogel daily contact lenses (CLs) were investigated: Senofilcon A and Delefilcon A. The contact lenses were immersed in the solution of drug-laden Ch/HA nanoparticles for two days at a temperature of 4ºC. Before and after this procedure, the CLs' refractive index and water content were measured with the refractometer CLR-1270 (Index Instruments) and UV/visible transmittance was determined with the Shimadzu UV-VIS-NIR (model UV-360 Plus). Release tests were carried out in a pH 7.4 buffer solution at room temperature (25±1ºC) under agitation of 380 rpm.

Results: The obtained nanoparticles (NPs) have a negatively charged surface (-10 mV), and hydrodynamic diameters of 284 ± 16 nm (at pH=7.4) and stability for at least one month at 4 ºC. The NPs exhibit a drug encapsulation efficiency of 98 ± 0.5% and a loading capacity of 64 ± 0.3%. The NPs adsorption efficiency to silicone-hydrogel CLs was 96 ± 0.7% (corresponding to 19±0.14 mg of NPs). The release of MTX from the CLs showed a sustained release profile. Senofilcon A lenses released 33 ± 5% and Delefilcon A lenses released 26 ± 4% of MTX content, after 24 hours. No variations in CLs' refractive index and water content were detected after immersion ($p>0.05$) and UV/visible transmittance was always above 85%. Conclusion: The Ch/HA nanoparticles are suitable for a sustained release of the anticancer drug MTX from daily silicone-hydrogel CLs, with Senofilcon A presenting a higher release capability.

Poster #46

Repeatability of cone and rod optical density and recovery rates using the Imaging Retinal Densitometer

Vera da Silva, Tom Margrain, Rhianon Reynolds, Ashley Wood

Abstract

Purpose: Imaging Retinal Densitometry (IRD) is a novel technique that assesses visual pigment optical density (OD) and recovery rates (RR), topographically across the macula. The purpose of this study was to determine inter-session repeatability of the IRD for the measurement of OD and RR of cones and rods, separately.

Methods: Fifty-one healthy participants aged 25 to 85 years old were included. Multimodal imaging was used to confirm the absence of macular changes. IRD collected multispectral reflectance data from the central retina (21°) to determine cone and rod OD and RR for each participant. First, dark-adapted data was collected for 1 minute after 30 minutes in the dark. Then, a bright white light bleached >95% of cone and rod pigments for 2 minutes, which was followed by the adaptation recording (10 minutes). The procedure was repeated at two visits on different days. Cone data was extracted from a single pixel at the fovea (0.4°), while rod data was averaged across an annulus of 6°-8° radius. Repeatability was assessed by calculating repeatability coefficients (RCs) using the Bland and Altman (1986) statistical technique.

Results: Repeatability coefficients (RCs) were 0.062 for cone OD and 0.051 for rod OD. For the recovery rates, the RCs were 0.487 OD/s for cone RR and 0.081 OD/s for rod RR. Paired t-tests showed no significant differences between visits for any of the parameters, with p-values of 0.342, 0.248, 0.151, and 0.861 for cone OD, cone RR, rod OD, and rod RR, respectively.

Conclusion: This study established the repeatability coefficients for the parameters obtained using Imaging Retinal Densitometry in a cohort with healthy retinas. These will be useful when determining clinical changes in future studies, for example in pathologies such as age-related macular degeneration, which are known to affect outer retinal function.

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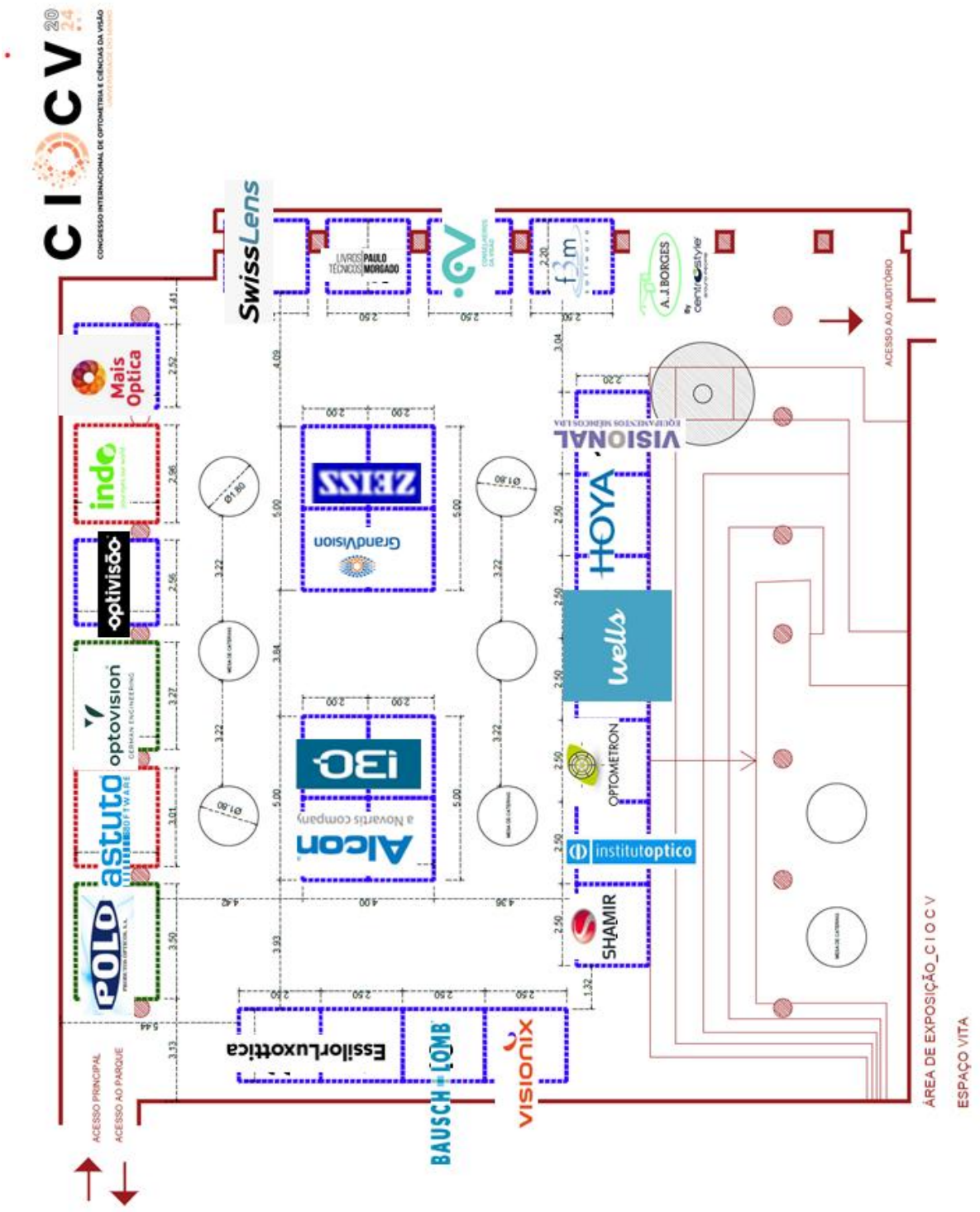

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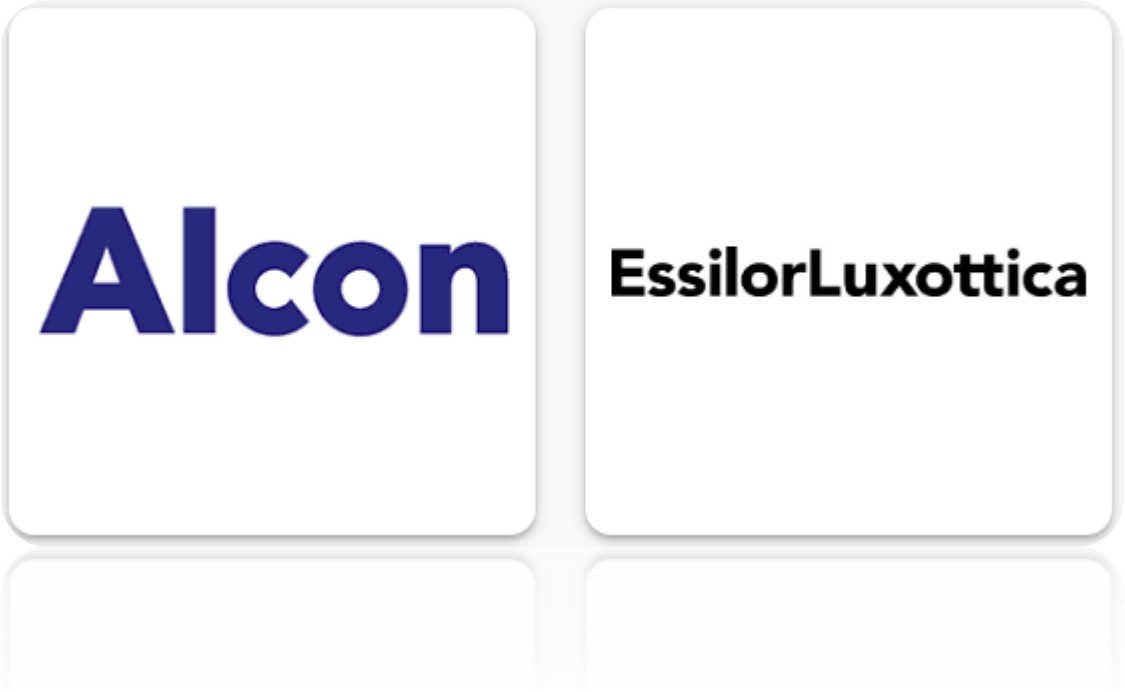

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