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The Eye & Beyond

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# 2025 Poster Abstracts

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## Contents

**ID: 01**

## Abstract Title

**Rates of change and longitudinal variability of using multiple OCT retinal nerve fibre layer ring sizes in glaucoma**

## Contact

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## Conflict of interest

No

## Authors

## Abstract

**Objective**

To compare the proportion of segmentation errors, rates of change and longitudinal variability of optical coherence tomography (OCT) circumpapillary retinal nerve fibre layer (cp-RNFL) global and sectoral thickness measurements when using three different ring sizes in a cohort of healthy and glaucomatous eyes.

**Design**

Retrospective cohort study.

Subjects

205 eyes of 105 patients with normal, suspect or manifest glaucoma.

**Methods**

Subjects underwent cp-RNFL scans on four or more consecutive follow up visits (mean follow up 4.5 years). Scans were taken using the Spectralis® OCT (Heidelberg Engineering, Heidelberg, Germany). Global thickness and six sectoral thickness values in the three ring sizes (3.5, 4.1, 4.7mm) were extracted. Longitudinal variability was quantified by mean absolute regression residuals (MAR).

Main outcome measures

Rates of change (RoC) and longitudinal variability of global and sectoral cp-RNFL thickness across three ring sizes.

**Results**

The rate of global cp-RNFL thinning in the 3.5mm ring was -0.40 µm/year (CI -0.58 to -0.22, $p < 0.001$), while the inferotemporal sector displayed the greatest rate of thinning (-0.97 µm/year, CI -1.26 to -0.68, $p < 0.001$). There was no significant difference in the RoC of thickness values in the 4.1mm and 4.7mm compared to the 3.5mm ring size in the global or any of the six sectors. Longitudinal variability was consistently lower in the 4.7mm compared to the smaller ring sizes, with a significant difference observed in the inferonasal, inferotemporal and superonasal sectors.

**Conclusions**

While there was no significant difference in the global and sectoral RoC across ring sizes, the larger RNFL ring sizes demonstrated significantly lower longitudinal variability for inferonasal, inferotemporal and superonasal sectors compared to the smaller ring sizes. Using larger RNFL ring sizes may therefore provide more accurate estimates of the true rate of change overtime.

**ID: 02**

**Abstract Title**

**Quantitative Choroidal Analysis in Patients with Retinitis Pigmentosa**

**Contact**

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**Conflict of interest**

No

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**Abstract**

**Purpose**

To quantitatively evaluate choroidal parameters (thickness, area, volume) between different subtypes of RP and their relationship with functional and retinal structural parameters. Retinitis pigmentosa (RP) is a genetically diverse group of inherited retinal degenerations with common symptoms of nyctalopia, visual field constriction and progressive visual loss. Detailed retinal phenotypes are described using multimodal imaging. However, the choroidal characteristics in RP have not been adequately investigated. Herein, we report the structural characteristics of the choroid in patients with genetically confirmed RP and contrast this with functional and retinal structural parameters.

**Study Design:** Retrospective Cohort Study

**Methods**

This study was approved by the institutional review board of the University of British Columbia (H20-03258). Patients attending the UBC retinal genetics clinic with a diagnosis of RP who had spectral domain optical coherence tomography (SD-OCT, Heidelberg Spectralis) were included. Comparison between common X-linked (RPGR), autosomal recessive (USH2A) and autosomal dominant (RHO, PRPF31) genotypes were made. Using segmentation software (ITKSnap), SD-OCT images were manually segmented to calculate subfoveal choroidal thickness, subfoveal

choroidal area and estimated choroidal volume. These were statistically assessed against retinal parameters (central retinal thickness and total retinal area), refraction, visual acuity (BCVA) and genotype.

**Results**

Sixty-five patients met the inclusion criteria. Mean age was 47.3 ±19.5 years and 52.3% were female. Choroidal parameters did not differ between genders (p=.496). RPGR patients were younger (38.0 vs 51.5 years, p<.001), with higher myopia (mean -5.02 ±4.41D vs -1.82 ±3.22D, p<.001). Overall, thinner choroid was associated with older age (r= -.490, p<.001) and worse BCVA (r= -3.29, p<.001). Thin choroid (<100µm, mean 69.7µm) was most common in older patients (mean 58.7 ±14.7 years, p=.031) and in RPGR (15%) genotype and was associated with worse BCVA (LogMAR 1.13, p=.044). Thicker choroid (>390µm, mean 455.4µm) was most common in the RPGR (15.0%) and PRPF31 (18.8%) groups, and was not associated with age (mean 48.5 ±23.9 years, p=.993) or BCVA (mean LogMAR 0.78 ±0.87, p=.939).

**Conclusions**

Choroidal parameters are an important consideration in acquired disease states (e.g. pachychoroid spectrum) and are also relevant in RP. Choroidal thickness changes in RP are not explained by age-related choroidal thinning, nor by refractive error/axial length (AL) but appear to be dynamic and reactive to degree and rate of retinal degeneration. Further study is needed to determine utility as a method of predicting disease progression.

**ID: 03**

## Abstract Title

**Extracellular Vesicles in Dry Eye Disease and Sjogren's Syndrome: Diagnostic and Treatment Use**

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## Conflict of interest

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## Abstract

**Introduction** Exosomes are nanosized, bilayered extracellular vesicles (EVs) released from cells. They contain biological material like proteins, nucleic acids, and lipids from their parent cell. Exosomes assist in intercellular communication and transmit macromolecules between the cells. EVs are being explored for their diagnostic and therapeutic role in dry eye disease (DED) and Sjrogren's Syndrome (SS).

**Methods** Systematic review

**Results** A literature search on PubMed identified 184 articles of which 32 original studies of the diagnostic and therapeutic use of exosomes in DED and/or SS were shortlisted for analysis. We covered the progress in the last two decades about the classification and isolation of EVs and their role in DED. We specifically addressed the diagnostic predictability of exosomes, evaluated in Sjogren's Syndrome (SS) patients' tears, plasma, and saliva, where upregulation of inflammatory proteins was reported uniformly across studies. We explored the therapeutic effects of Mesenchymal Stromal Cell (MSC)-derived EVs in in-vitro and in-vivo studies of SS and DED mouse models. We found a significant response at a functional level with improved tear production and saliva flow rate, at a cellular level with reduced lymphocyte infiltration, improved corneal structural integrity, and decreased epithelial cell apoptosis, as well as dampening of the inflammatory cytokine response. The proposed mechanisms of EV action include PD-L1, PRDM, NLRP-3, and Nf-kb pathways and an increase in M2 macrophage phenotype.

**Conclusion** With this deeper understanding of miRNA-based molecular pathways, exosomes can be tailor-made with the required molecular targets being upregulated or downregulated to produce the maximal immunosuppressive

outcomes in humans. By directly targeting certain molecular pathways and combining this with tailored delivery methods best suited for the disease process, the required exosome concentration will also be less, allowing for more efficacy and reproducibility. However, the real-world translation of exosomes in DED is not yet in sight due to the barriers of cumbersome exosome extraction processes and a lack of large-scale human studies.

**ID: 04**

## Abstract Title

**Periorbital necrotizing fasciitis post retrobulbar alcohol injection: case report and literature review**

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## Conflict of interest

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## Authors

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## Abstract

**Introduction**

Retrobulbar injection of alcohol is used for management of blind painful eye, as an effective non-surgical option. A wide range of complications from retrobulbar block with neurolytic agents have been reported, including ophthalmoplegia, proptosis and chemosis, with most being self-limiting. Periorbital necrotizing fasciitis is a severe necrotizing infection that requires immediate recognition and management with intravenous antibiotics and surgical debridement.

**Methods** Case report and literature review

**Results**

A 57-year-old male was referred for management of blind painful left eye. A trial of retrobulbar alcohol injection was performed under sedation, with a total retrobulbar volume of 8mL. A temporary tarsorrhaphy was performed. Three weeks post-injection he developed extensive peri orbital cellulitis that rapidly progressed to necrotising fasciitis with extensive upper eyelid necrosis. The diagnosis was supported clinically and with CT imaging, he was managed with intravenous antibiotics and urgent surgical debridement. Three months post injection, there was acceptable recovery and cosmetic outcome. Necrotizing fasciitis (NF) and eyelid necrosis from retrobulbar anesthesia have been scarcely reported in the literature, with only 2 reports describing its occurrence. Retrobulbar alcohol has also shown to be involved in orbital fat necrosis in a rat model.

**Conclusion**

We report the first known case of periorbital necrotizing fasciitis following retrobulbar alcohol injection for painful blind eye treatment. It is important for the Ophthalmologist to understand the inherent risks of retrobulbar injection of alcohol, and to avoid injecting a large intraorbital volume with combined tarsorrhaphy. With further studies, a protocol including volume, concentration and route of injection should be developed for evidence based retrobulbar alcohol injection.

**ID: 05**

## Abstract Title

**Innervation in corneal bioengineering**

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## Conflict of interest

No

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## Abstract

**Intro**

Corneal disease and injury rank as the third leading cause of blindness, with corneal transplantation remaining the preferred treatment. Despite high demand, a global shortage of donor corneas and the complexities of providing them leave many patients untreated. Bioengineered corneas address the critical limitations of human corneal transplants. Given the crucial role nerves play in maintaining corneal function and integrity, the ability of bioengineered cornea to demonstrate functional nerve regeneration directly influences their longevity and stability. Despite advances in biofabrication techniques and an increasing appreciation of the importance of neural innervation, to this day none have completely replicated the complexity and functionality of the cornea with successful innervation. Furthermore, there remains a lack of comprehensive reviews on this topic.

**Study design and methods**

This presentation addresses the critical gap by evaluating the materials and fabrication techniques employed to produce and enhance innervation in bioengineered cornea.

**Results**

Approaches to facilitating innervation are discussed and methods of assessing innervation compared, both in vitro and in vivo. Finally, current challenges and future directions for innervated bioengineered cornea are presented.

**Conclusion**

By providing a comprehensive overview of the current state of research and highlighting challenges and future directions, this presentation aims to provide guidance for inducing innervation of bioengineered cornea.

**ID: 06**

## Abstract Title

**A bioengineered biomimetic collagen cornea model promoting nerve regeneration**

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## Abstract

**Intro**

Given the crucial role nerves play in maintaining corneal function and integrity, the ability of bioengineered cornea to demonstrate functional nerve regeneration directly influences their longevity and stability. In their healthy state, corneal nerves release numerous trophic substances. These factors, including neural growth factor (NGF), are crucial for corneal nerve survival and axonal regeneration.

**Study design and method**

This work aims to produces eletrocompacted (EC) collagen membranes that exhibit a structure similar to the native cornea while possessing the physiochemical and biological properties required to allow successful innervation once inserted and incorporated into cornea. Herein, cross-linked collagen membranes were fabricated using an electro-compaction method. Samples were then coupled with NGF prior to undergoing physiochemical testing. Later, primary human stromal cells were seeded on EC collagen surfaces to evaluate cell viability and proliferation using Live/Dead cells staining and a Prestoblue assay, respectively. Finally, a drug releasing test was performed to investigate the drug releasing kinetics of NGF from the electrocompacted membranes.

**Results**

The ECC membrane showed great promise for corneal epithelial bioengineering. The addition of NGF to samples did not substantially alter the physiochemical properties of the membrane.

**Conclusion**

The 3D biomimetic corneal stromal model described herein lays a foundation to build advanced 3D corneal tissue in vitro, with potential for further exploration of methods of promoting innervation.

**ID: 07**

## Abstract Title

**Patient reported outcomes in infectious keratitis: a systematic review**

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## Abstract

**Introduction**

Infectious keratitis is a sight-threatening condition which has a profound impact on patients quality of life. PROMs offer the opportunity to identify the impact of this condition and provide an alternative modality to objectively examine treatment response and outcomes. The primary objectives of this review were to systematically evaluate PROM tools used in infectious keratitis, assessing their validity and the quality of life (QoL) domains affected. The review aims to identify the current available PROM used to measure infectious keratitis, appraising their use in this disease process on a global scale, and identifying the burden infectious keratitis has on quality of life.

**Methods**

The protocol implemented for review was published in the International Prospective Register of Systematic Reviews (PROSPERO, CRD42023464686). A literature review was performed in Pubmed, Medline OVID, Embase OVID, Cochrane, Scopus, Web of Science and Psychinfo in October 2023. Full-length studies, published in English, featuring named and externally validated PROMs which were used to evaluate QoL outcomes of patients with infectious keratitis were included. Non-validated PROMs used in patients with infectious keratitis were excluded. Studies including but not explicitly defining corneal pathologies were also excluded. Study characteristics, PROMs and key results were summarised for all studies utilising Excel. Psychometric quality, validity and risk of bias of each PROM were assessed using previously validated criteria.

**Results**

Eight studies evaluated PROMS in infectious keratitis, with eight different PROMs [one generic, seven ophthalmic but not keratitis-specific] utilised. All patients with infectious keratitis demonstrated impaired QoL in all PROMs, with domains representing vision and visual function most impaired. Other QoL domains affected included emotional and mental state, mobility and dependence. Known group validity was high in seven (88%) PROMs. Only one paper (13%) utilised psychometric analysis to validate the PROMs before use.

**Conclusion:** Infectious keratitis has a negative impact on patient's QoL, across multiple domains. A variety of PROMS have been used to assess QoL in keratitis with most awaiting validation for infectious keratitis. The study was limited by the number of available studies in the literature.

**ID: 08**

## Abstract Title

**Secondary intraocular lens options in intraocular lens dislocation**

## Contact

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## Conflict of interest

No

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## Abstract

**Background**

Intraocular lens dislocation is an uncommon complication of cataract surgery. This review presents an updated summary and an easy-to-follow self-reference figure of the secondary intraocular lens (IOL) options that are described in literature for the management of IOL subluxation or dislocation.

**Methods and Results**

A broad review of the literature was performed. We evaluated different techniques for both IOL lens rescue and secondary IOLs, with a focus on the latter. We structured our review of each option by the salvageability of the IOL, the preservation of the bag, and subsequently the adequacy of capsular support. We then evaluated the techniques available for each option, with a clinical focus on the anatomical indications, technical considerations, advantages, and potential complications, before proposing an algorithm for determining the selection of each major secondary IOL implantation technique.

**Conclusion**

While there are numerous IOL techniques and lens options for addressing IOL dislocation, there is currently no consensus on the optimal method. The choice of secondary IOL and fixation techniques are often guided by patient anatomy and the nature of the dislocation, but in many cases are decided upon the surgeon's experience and preference.

**ID: 09**

## Abstract Title

**'Seeing both sides': A systematic review of the Miyake-Apple posterior video system's role in Ophthalmology**

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## Conflict of interest

No

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## Abstract

**Topic:** This systematic review examined the role of the Miyake-Apple system for simultaneous posterior and anterior imaging during anterior segment surgery in ophthalmic research and surgical training.

**Clinical Relevance:** The Miyake-Apple technique for posterior eye video analysis has proven itself to be a valued tool in research and education for anterior segment surgery, intraocular lens (IOL) design, implantation techniques and evaluating surgical complications. Such a knowledge base could also be incorporated into surgical simulators which are generally more readily available to training ophthalmologists.

**Methods:** A systematic review was conducted in accordance with the PRISMA2022 reporting guidelines. We identified articles describing use of the Miyake-Apple technique for posterior visualization by systematically searching PubMed, Medline, EMBASE and SCOPUS, on November 7, 2024. The Cochrane's collaboration tool for randomized controlled trials, the Newcastle-Ottowa checklist in observational studies were employed for risk of bias assessment.

**Results:** We identified 139 papers in the initial search. After screening 100 papers, 94 papers were included in the review. In all 94 studies, the employment of the Miyake-Apple technique for visualization was used for post-mortem eye analysis, yielding information about its role in (1) teaching and training, (2), understanding the effects of IOL implantation, (3), visualizing the impacts of experimental surgical techniques on the eye, and (4), its modern technical advancements to facilitate Miyake-Apple views with lower-resource endoscopic equipment

**Conclusion:** The findings of this review support the conclusion that the Miyake-Apple system can play an imperative role in the training and testing of ophthalmic surgeons, devices and surgical techniques. This technology has the potential to aid in the development of newer IOL explantation and replacement techniques as well as IOL fixation techniques. With advancing technology and innovative endoscopic posterior viewing techniques, barriers have lowered for adopting the Miyake-Apple system in ophthalmic surgical training globally.

**ID: 10**

## Abstract Title

**Is there a predisposition to uveitis in Turner Syndrome?**

## Contact

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## Conflict of interest

No

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## Abstract

**Purpose**

The clinical features and management of uveitis in Turner syndrome (TS) is described along with whether there is a uveitis predisposition.

**Method**

We report two cases of uveitis in TS and perform a literature review.

**Results**

TS-associated uveitis is non-hypertensive (100%) anterior uveitis (87.5%) that responds to topical therapy without unexpected long-term visual symptoms. Systemic treatment is uncommon as relapses are infrequent.

**Conclusion**

TS has an elevated risk of symptomatic normotensive unilateral or bilateral anterior uveitis and could be considered in idiopathic anterior uveitis in females with TS phenotype.

Exclusion of systemic causes of uveitis including infectious (e.g., syphilis, tuberculosis), non-infectious (e.g., sarcoidosis, HLA-B27) causes and specific syndromes (e.g., tubulointerstitial nephritis, juvenile idiopathic arthritis) remains paramount.

Systemic immunosuppression should be used sparingly as cases typically respond to topical therapy and there are increased risks in TS (e.g., further growth limitation in children, baseline increased risk of solid tumours).

**ID: 11**

## Abstract Title

**Ocular Inflammation in Inherited Retinal Degenerations**

## Contact

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## Conflict of interest

No

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## Abstract

Inherited retinal degenerations (IRD) are a common cause of visual loss in young patients. IRDs are clinically and genetically (>300 known genetic associations) heterogeneous. There are several ‘mimics’ in which late-stage features (e.g., intraretinal pigment migration, arteriolar narrowing) may mimic retinitis pigmentosa (RP) or other IRD phenotypes. Equally, early-stage disease (e.g., cystoid macular edema, reduced vision without classic pigmentary retinopathy) may suggest uveitis and lead to a delayed IRD diagnosis. In these cases, a set of curated investigations (e.g., infectious, inflammatory and genetic) can refine the diagnosis and provide guidance on prognosis and treatment.

Inflammatory signs (e.g., vitreous cells, macular edema, cataract) and breakdown of the blood-ocular barrier are frequently seen in IRDs. Some IRD-associated genes have also been associated with a predisposition to ocular inflammation (e.g., autosomal dominant neovascular inflammatory vitreoretinopathy, ADNIV).

The diagnostic clarity is sometimes poor. We describe two cases presenting as posterior uveitis, which eventually reached a diagnosis of RP and discuss the overlap of the clinical and molecular diagnoses of posterior uveitis and IRDs.

**ID: 12**

## Abstract Title

**How can ophthalmologists impact the significant delay to diagnosis in spondyloarthritis? Lessons from the UK**

## Contact

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## Conflict of interest

Yes
Authors Dr Thomas Ingram and Mr Joe Eddison receive Institutional funding to the National Axial SpondyloArthritis Society (NASS) from AbbVie, Biogen, Janssen, Lilly, Novartis and UCB.
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## Abstract

**Introduction**

Up to 40% of anterior uveitis (AU) patients have undiagnosed spondyloarthritis (SpA). Axial SpA (axSpA) is the commonest subtype of SpA, affecting 1 in 200 people. Despite this, there is a mean delay of 8.65 years from symptom onset to diagnosis. This lengthy period without diagnosis or appropriate treatment potentially leaves patients with functional impairment, declining psychological wellbeing and ongoing healthcare costs.

In 2017, NICE Guideline NG65 emphasised the ophthalmologist's role in back/joint pain surveillance in AU consultations to ensure undiagnosed SpA patients are appropriately referred to rheumatology. Section 1.1.13-1.1.14 of this guideline suggests:

Ophthalmologists should ask people with AU whether they have:

1. Consulted their GP about joint pain, or
2. Experienced lower back pain that started before the age of 45 and has lasted for longer than 3 months

A service evaluation was undertaken in Moorfields Eye Hospital NHS Foundation Trust to assess how closely NICE Guideline NG65 was adhered to.

**Methods**

The service evaluation obtained baseline data on whether patients diagnosed with AU attending uveitis clinics at Moorfields Eye Hospital between 1st January 2022 and 30th June 2022 were screened for back pain. The electronic patient record was searched for terms 'back' and 'pain' appearing within 60 characters of each other. Patients with other underlying conditions attributable to their AU were excluded. 956 patients were identified; 642 patients were seen at the doctor-led clinic, and 314 patients at the nurse specialist-led clinic.

**Results**

There was poor concordance with NICE Guideline NG65. 16.9% of AU patients had the presence/absence of back pain documented. Given that up to 40% of AU patients have undiagnosed SpA, 83.1% of patients with no documentation of back pain may represent a missed opportunity for timely referral to rheumatology, denying them early diagnosis and the opportunity to access advanced therapies to control their condition.

There was better back pain surveillance in the nurse specialist-led clinic, with 44.6% of patients having evidence of screening compared with the doctor-led clinic screening 3.4% of patients. A more structured, template- based consultation by nurse specialists may explain this discrepancy.

**Conclusion**

Here we report outcomes of a single centre, however we suspect that under-screening of back pain/SpA is widespread in clinics across the UK and globally. It is hoped that this commentary will highlight the diagnostic delay in SpA and the need for ophthalmology services to effectively screen and refer patients appropriately in line with NICE Guideline NG65.

**ID: 13**

## Abstract Title

**Guideline directed decision making for periorbital cellulitis in a Sydney paediatric emergency department**

## Contact

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## Conflict of interest

No

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## Abstract

**Introduction:** Periorbital cellulitis (POC) is a common ocular presentation to the paediatric Emergency Department (pED). Given concerns about the risk of progression to orbital cellulitis, children with POC are commonly referred for admission from the pED for treatment with IV antibiotics as an in-patient.

**Methods**

We performed a before-and-after study to evaluate the effectiveness of a guideline-based protocol for POC management within our pED. We compared the rate of inpatient admission, representation rate and serious adverse event rate in children presenting within a 12 month period prior to implementation of the guideline, to a 24 month period after implementation.

**Results**

181 children presented to the pED with a diagnosis of POC, within the ‘before implementation’ period. Of these, 101 children were admitted for IV antibiotics (56%) and 80 (44%) were discharged home with ambulatory care follow up. Within the ‘after implementation’ period, 307 children presented with POC. Within the follow up period, initial treatment decisions were made for 21 patients (23%) to be admitted for IV antibiotics, 63 (21%) were managed with IV antibiotics in ambulatory care, and 178 (58%) were managed on oral therapy. The number of patients initially managed as inpatients was reduced by over 87% ($p<0.0001$) and the number of patients initially managed with IV antibiotics was reduced by over 50% ($p<0.0001$). Despite this, only 5 patients (3%) managed orally and only 2 patients (2%) managed with IV antibiotics in the ambulatory care setting required re-admission. There was no mortality nor long term complications in either group.

**Conclusion**

Implementation of a guideline-based protocol for the management of POC within the pED, with effective utilisation of ambulatory care, can drastically reduce inpatient admissions in a safe manner.

**ID: 14**

## Abstract Title

**Through the looking glass: features of xerophthalmia in children of wealthy countries**

## Contact

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## Conflict of interest

No

## Authors

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## Abstract

**Introduction**

Xerophthalmia is a vision-threatening condition resulting from vitamin A deficiency. It is one of the leading causes of paediatric blindness worldwide but is uncommon in high-income countries with a well-nourished population and sound medical care. There have been numerous recent reports of xerophthalmia in high-income countries, including of an Australian boy with autism and restrictive dietary practices where the outcome was permanent bilateral vision loss. A compilation of the unique aetiology and characteristics of xerophthalmia in high-income, low-prevalence regions is needed to inform practitioners on the risk factors and features of presentation to be wary of.
The review aims to characterise the causes of xerophthalmia in children of developed countries, the features of their presentation, and their outcomes.

**Methods**

This systematic review was registered on Prospero (CRD42024492023) and followed the PRISMA Guidelines. Included articles were published in English between 2004-2023 and reported on ocular complications of vitamin A deficiency in children aged between 0-18 years from high income countries as defined by the World Bank. Two independent reviewers performed screening and data extraction. Analysis was performed with Excel and SPSS.

**Results**

The search yielded 2474 results; 43 case reports and case series met the inclusion criteria. There was a total of 61 included cases (mean age 9.9 ± 4.2 years, range 3-17 years). Affected cases were predominantly male (92%). The main causes of xerophthalmia were restricted dietary intake (75%), malabsorptive conditions (13.1%), and Dent disease (6.6%). Restricted dietary intake was associated with autism in most cases (49%), although a minority were associated with other psychosocial stresses and parentally imposed restrictions. Patients typically presented with a deterioration in vision, photophobia, ocular irritation and nyctalopia. Most common ocular findings included Bitot spots (25%), punctate keratopathy (23%), conjunctival xerosis (21%) and conjunctival keratinisation (21%). Ten patients (16%) had corneal ulcers. Mean final visual acuity was LogMAR 0.76 (Snellen equivalent 6/36).

**Conclusion**

Despite good nutrition and good healthcare, xerophthalmia remains a cause of ocular morbidity in developed nations. Our findings suggest an association between autism, restrictive dietary practices and xerophthalmia. Clinicians need to remain particularly vigilant of malnutrition in this paediatric population and consider investigating for vitamin A deficiency if there are complaints of visual disturbance, ocular irritation or dryness. A thorough dietary history must be taken as well as a nutritional screen and ophthalmological examination.

**ID: 15**

## Abstract Title

**Comparison of Toric Intraocular Lens Formula Accuracy and Factors Influencing Prediction Errors**

## Contact

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## Conflict of interest

No

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## Abstract

**Introduction:** Toric IOLs are effective in correcting astigmatism; however, with multiple IOL toric formulas available, identifying the most accurate formula is important. The IOLMaster 700 provides two toric IOL calculators, the Barrett TK and Haigis formulas, which sometimes differ in astigmatism predictions for a particular IOL power. This study investigates the accuracy of these formulas in predicting post-operative refraction and examines the impact of biometric and demographic factors on prediction errors, aiming to enhance the precision of refractive outcomes in cataract surgery.

**Methods:** This retrospective study included 52 eyes from 52 patients undergoing uncomplicated cataract surgery with Acrysof IQ Toric IOL implantation. Biometric data, including axial length (AL), anterior chamber depth (ACD), lens thickness, and total keratometry (TK1 flat keratometry, TK2 steep keratometry), were measured using the IOLMaster 700. Predicted residual spherical equivalence (SE) and astigmatism were calculated using Barrett TK and Haigis formulas. Post-operative refractive outcomes were assessed at least four weeks post-surgery. Difference in prediction errors in SE and astigmatism were assessed and linear regression was performed to identify factors influencing prediction errors.

**Results:** The median absolute error (MedAE) in SE prediction was comparable between Barrett and Haigis formulas (0.195 D vs. 0.185 D; p=1.000), with no significant difference in the proportion of eyes achieving prediction errors ≤0.25 D, ≤0.50 D, or ≤1.00 D. For astigmatism, the Haigis formula demonstrated lower mean absolute errors (MAE: 0.41 ± 0.33 D) and centroid errors (0.18 D @ 70°) compared to Barrett (MAE: 0.47 ± 0.36 D; centroid error: 0.32 D @ 76°; p=0.000). Regression analysis revealed significant associations between AL and SE prediction errors for Barrett (B = -0.102, p=0.028) and between ACD and SE prediction errors for Haigis (B = 0.384, p=0.035). TK2 was a consistent predictor of astigmatism prediction errors for both formulas, while gender showed variable significance.

**Conclusion:** Both Barrett TK and Haigis formulas exhibit similarly high accuracy in predicting post-operative SE, with Haigis performing slightly better for astigmatism prediction. AL, ACD and TK2 significantly influence prediction errors, suggesting that large myopic eyes with deep anterior chambers may lead to less accurate refractive predictions.

**ID: 16**

## Abstract Title

**Patient Perspectives on Living with Keratoconus.**

## Contact

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## Conflict of interest

No

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## Abstract

**Introduction**

Keratoconus is a progressive corneal disorder that affects quality of life (QoL). Knowledge on the real-world experiences of patients with keratoconus managed via multiple treatment modalities is lacking.

**Methods**

Semi-structured in-depth interviews were conducted with 33 participants (median 37 years, range 18-65 years, 24.2% female) diagnosed with keratoconus at a quaternary referral centre, Sydney Eye Hospital, Sydney, Australia. Transcribed interview data were analysed using a hybrid inductive-deductive thematic analysis approach. Themes were identified until thematic saturation was reached, where no further interviews revealed new themes. Themes were arranged into quality-of-life domains.

**Results**

25512551 comments were grouped into seven broad QoL domains : healthcare (n= 88), symptoms (n=647), career (n = 259)  enjoyment (n = 149), relationships (n=250), driving (n = 199), and financial burden (n=104). Common concerns included limited effectiveness of treatments, emotional strain, career disruptions, and financial burdens associated treatment. Notable psychosocial impacts included isolation, frustration, and altered social relationships. In general, treatment provided reassurance to patients.

**Conclusion**

Keratoconus has a multifaceted impact of on QoL. Tailored QoL measuring tools in keratoconus are needed.

**ID: 17**

## Abstract Title

**Bitemporal optic atrophy may be an important indicator of occult cerebral injury in children**

## Contact

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## Conflict of interest

No

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## Abstract

**Introduction**: The clinical patterns of optic atrophy resulting from retrograde transsynaptic degeneration (RTSD) following cerebral injury remain incompletely defined in paediatric patients. This study sought to elucidate the characteristics of optic atrophy in children with focal intracerebral lesions.

**Methods:** A retrospective analysis was performed on paediatric patients with optic atrophy and focal intracerebral lesions. Ophthalmic data were recorded, including visual acuity (VA), colour vision, formal automated visual fields, and optical coherence tomography (OCT) measurements of the peripapillary retinal nerve fibre layer (pRNFL) and ganglion cell layer.

**Results:** Six children (83.33% male) were included. The mean VA across all eyes was 0.30 logMAR (20/40 Snellen), with no significant difference between the ipsilateral and contralateral eyes relative to the location of the lesion. Colour vision (evaluated in five patients) was diminished in three patients. Bitemporal optic disc pallor was evident in five patients. OCT analysis demonstrated that average pRNFL thickness was significantly reduced compared to normative values in both the ipsilateral (95% CI: -40.76 to -11.69 µm, p = 0.0003) and contralateral eyes (95% CI: -38.46 to -5.83 µm, p = 0.0063). Notably, sectoral analysis showed that pRNFL thinning was most pronounced in the temporal (95% CI: -44.71 to -14.18 µm, p = 0.0021), inferotemporal (95% CI: -75.06 to -5.17 µm, p = 0.0294), and superotemporal sectors (95% CI: -76.82 to -18.51 µm, p = 0.0055) with time. Subgroup analysis of only nasal and temporal sectors further confirmed significantly diminished temporal pRNFL thickness relative to normative data (95% CI: -33.01 to -9.77 µm, p = 0.0012).

**Conclusions:** Bitemporal optic atrophy may be a sign of optic pathway RTSD in children, which could indicate underlying intracranial pathology. Paediatric patients presenting with optic atrophy, particularly with bitemporal atrophy, should undergo urgent neuroimaging to investigate for potential underlying intracranial lesions.

**ID: 18**

## Abstract Title

**Post-approval, real-world outcomes of Luxturna gene therapy for RPE65-mutation associated inherited retinal disease**

## Contact

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## Conflict of interest

No

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## Abstract

**Introduction**

Voretigene Neparvovec (VN) (Luxturna) is the first TGA-approved gene therapy for the treatment of inherited retinal disease and is suitable for patients with biallelic RPE65 gene mutations. This study examines the safety and efficacy of VN therapy in the context of emerging long-term and real-world data through systematic literature review and meta-analysis.

**Methods**

Systematic search of 5 databases and subsequent meta-analysis was performed according to PRISMA guidelines. Eligible studies were primary studies of patients with RPE65-associated IRD receiving VN, written in English and included visual function or safety outcome data. Exclusion criteria were single-patient case studies and selection of cohorts with known complications. Variables extracted were demographics, duration from baseline to final visual outcome assessment, change in visual outcome endpoints (FST, VA) and chorioretinal atrophy (CRA) event rate. Random-effects meta-analysis of weighted effect measures and standard errors for visual function outcomes and proportions for atrophy data was conducted using IBM SPSS Statistics Version 29.

**Results**

Of 206 articles identified from the database search, 9 studies were included in addition to the Australian FIRB! registry data. Of 10 total studies including 12 study populations, there were 4 major study populations and 8 minor study populations. The mean age of patients was 14.6 to 19.5 in the major study groups and 4.5 to 36.3 in the minor

study groups. Ages ranged from 2 to 51 years old. Follow-up duration ranged between 1 to 48 months. For full-field stimulus threshold tests, meta-analysis of 4 major study populations showed an improvement of 2.1 ln(cd.s/m2) (95%CI -2.60 to -1.60; P<0.001). Change in visual acuity was not statistically significant (P=0.036). Meta-analyses of minor study populations were similar. CRA defined as occurring anywhere had an odds-ratio (OR) of 3.64 (95%CI 2.05 to 5.23; P<0.001). CRA defined as atrophy occurring outside of the injection site had an OR of 3.35 (95%CI 1.83 to 4.88; P<0.001).

**Conclusion**

Systematic review and meta-analyses show that patients with bi-allelic RPE65-mutation associated IRD who received VN therapy had a significant improvement in FST of 2.1 log units across 4 major study populations. There was no significant change in visual acuity. CRA occurred in 3.35-3.64 eyes for each unaffected eye, corresponding to a 77-78% event rate post-VN therapy. VN is an efficacious gene therapy for eligible patients and further research examining CRA is needed to determine the significance and risk factors for its development.

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**ID: 19**

## Abstract Title

**Examining the fabric of the eye: Antoni van Leeuwenhoek, the draper and ocular microscopist**

## Contact

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## Conflict of interest

No

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## Abstract

**Aim**

We reviewed Antoni van Leeuwenhoek's (1632 - 1723) microscopic studies of comparative ocular anatomy in humans, mammals, birds, and fish.

**Methods**

We performed a literature search through Leeuwenhoek's published letters in the archives of the Royal Society and Digital Library of Dutch Literature (DBNL).

**Results**

Leeuwenhoek provided the earliest known microscopic descriptions of the tear film, eyelids, cornea, aqueous, crystalline lens, vitreous, retina, optic nerve, and photoreceptors, as well as the first descriptions of cataract, vitreous floaters and corneal pathology. We show his early descriptions and accompanying illustrations of ocular anatomy.

**Discussion**

Leeuwenhoek's contributions in anatomical microscopy to ocular biology have been overshadowed by his prolific work and first observations of protists and bacteria, spermatozoa, red blood cells, and dental plaque. Hist Delftian optical and artisanal heritage more than compensated for any lack of formal scientific training and, in keeping with his Royal Society ethos, shone light onto the "fabric of the eye" in order to better understand its function, which he had extended with his microscopes. His description of the aquatic mammal Cetacean eye foreshadowed an understanding of the optical complexities of aerial and submarine vision of whales. His observations challenged classical teaching at that time, particularly in relation to the optic nerve. Leeuwenhoek's work on ocular microscopy is significant in the history of ophthalmology.