World of Pediatric Ophthalmology in TBILISI

TIOC - 2025

ABSTRACT BOOK

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Session Pediatric ophthalmology update

Pediatric conditions difficult to manage! Why? How to proceed?

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The presentation is about the situation that can be faced by the pediatric ophthalmologist in the newly born and up to school Age. In these clinical cases, vision is absent or severely delayed. I shall focus on the etiology of these conditions and the reason why they are difficult to manage and often difficult to treat. Causes in the anterior & posterior segments of the eye as well as the CNS shall be elaborated.

Disorders of Neurodevelopment and Somatic Health Characteristics in Blind and Visually Impaired Children. Diagnostic Challenges

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Blindness and visual impairment in childhood are not merely isolated ophthalmological pathologies but represent a complex medical and social phenomenon with systemic effects on a child's development. In recent decades, compelling evidence has shown that severe visual impairments are accompanied by comorbid neurological, mental, and somatic disorders in 65-80% of cases (Hatton et al., 2017).

Purpose: To analyze associated neurodevelopmental disorders and somatic diseases in school-aged children with blindness and visual impairment.

Results: 75 girls (40%) and 111 boys (60%), the mean age was 9.2 ± 2.5 years. 121 (65%) of participants had been disabled since childhood. A significantly high comorbidity of visual and neurodevelopmental disorders was identified: 41% with optic nerve atrophy had comorbid neurological diagnoses; 29% with retinopathy of prematurity suffered from organic disorders of central nervous system; 26% of children with nystagmus were diagnosed with intellectual disability or autism spectrum disorder. Somatic comorbidities were characterized by neurological diagnoses: 35% of children with optic nerve atrophy had cerebral palsy or other congenital malformations of brain; 15% with nystagmus exhibited cerebellar disorders (albinism, genetic syndromes).

Conclusion: Blindness and visual impairment in children are frequently associated with complex neurodevelopmental disorders and somatic pathologies, necessitating consideration of comorbidity when planning diagnostic procedures and rehabilitation. Children with blindness and visual impairment are recommended to undergo examinations by neurologists, psychiatrists, and geneticists. The results obtained allow us to take a fresh look at the problem of interdisciplinary management of such patients and can serve as a basis for improving early care programs.

Application of Finite Element Analysis in Pediatric Ocular Trauma

Kourosh Shahraki MD, Donny W Suh MD, MBA

Finite Element Analysis (FEA) provides a powerful, noninvasive way to understand how pediatric eyes and orbits respond to traumatic loads. Building on our prior work in shaken baby syndrome, sports-related ocular injuries, and related trauma, this

presentation highlights the practical advantages of FEA for pediatric cases. We use anatomically informed, multi material models of the pediatric eye to simulate blunt impact, rapid deceleration, and compressive events. Key benefits include:

1. ability to test hypothetical scenarios without risk to patients
2. generation of quantitative injury metrics and thresholds
3. personalization through imaging-based, patient-specific geometries
4. accelerated evaluation of protective strategies, helmet designs, and clinical interventions.

By translating clinical questions into controllable simulations, FEA accelerates understanding, prevention, and management of pediatric ocular trauma.

Macular Thickness and Vascular Density changes following treatment in unilateral amblyopia

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> **Purpose**: To evaluate structural and vascular retinal changes in amblyopic eyes using Optical Coherence Tomography (OCT) and OCT Angiography (OCTA), and to assess the impact of treatment on these parameters in children with unilateral amblyopia.

Methods: This prospective observational study included 60 children (age 5–12 years) with unilateral amblyopia (strabismic, anisometropic, or deprivation type). All patients underwent baseline assessment including best-corrected visual acuity (BCVA), contrast sensitivity (CS), OCT, and OCTA. Parameters measured were central macular thickness (CMT), ganglion cell-inner plexiform layer (GCL-IPL) thickness, macular volume, and superficial vascular density. Following 3 months of amblyopia treatment (occlusion and dichoptic exercises), these parameters were reassessed.

Results: At baseline, amblyopic eyes showed significantly higher

CMT (251.18 ± 32.66 µm vs 240.98 ± 17.47 µm), GCL-IPL thickness (83.87 ± 6.92 µm vs 78.47 ± 6.07 µm), and lower vascular density (44.52 ± 3.35% vs 53.52 ± 2.99%) compared to fellow eyes (all $p < 0.001$). Post-treatment, significant improvement was observed: BCVA improved (0.94 to 0.72 logMAR), CMT and GCL-IPL thickness decreased ($p < 0.001$), and vascular density increased to 45.62 ± 3.12% ($p < 0.001$). No significant structural or vascular changes were noted in fellow eyes.

Conclusion: Amblyopic eyes exhibit distinct macular structural and vascular alterations compared to normal eyes. Treatment leads to measurable improvements in both visual function and structural parameters, supporting a role for retinal and vascular plasticity in amblyopia recovery.

Teleophthalmology in Action: Closing the Treatment Gap with Remote Care

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Objective: To evaluate the feasibility of using telemedicine in the practical work of an ophthalmologist for conducting video consultations, diagnostic examinations, and courses of therapeutic procedures for various oculomotor and refractive pathologies.

Materials and Methods: A study was conducted on 468 children aged 4 to 12 years (mean age 5.6 ± 1.2 years) with the following conditions: myopia 195 patients, hypermetropia and astigmatism 69 patients, amblyopia 112 patients, strabismus 92 patients. All patients initially underwent an in-person consultation with an ophthalmologist in the clinic, where a complete ophthalmological examination was performed. They were recommended a course of vision therapy. Due to the inability to receive treatment at the facility for various reasons (distance, patients from remote regions), they were advised to undergo the treatment course via

the «Online Oko» telemedicine platform. Parameters assessed included visual acuity, accommodative reserve, and the presence of binocular vision. To complete the treatment course, patients were provided with a kit of devices. The treatment course lasted 10 days.

Results: Upon completion of the treatment course, visual functions were diagnosed with a check of visual acuity and binocular vision. All patients with myopia showed an increase in accommodative reserve after the treatment course. On average, this increase was 2.0 ± 0.5 D (range: 0.5 to 3.5 D). Out of 112 patients with amblyopia, 97 patients showed an improvement in visual acuity, with an average increase of 1.3 ± 0.65 lines on the Snellen chart. Out of 92 patients with strabismus and absence of binocular vision, 56 patients successfully regained binocular vision from a distance of 1 meter within the 10-day course.

Session Pediatric Glaucoma

Managing pediatric glaucoma: not little adults!

Sushmita Kaushik

Childhood glaucoma represents a rare but vision-threatening group of diseases distinct from adult-onset glaucoma in both etiology and management. Unlike adult glaucoma, where optic nerve damage is often slow and insidious, childhood glaucoma can present with rapid structural and functional changes due to the elasticity of ocular tissues in young eyes. The pathophysiology, clinical presentation, and surgical outcomes differ significantly, emphasizing the need for pediatric-specific diagnostic approaches and tailored interventions. Early signs such as corneal enlargement, photophobia, and epiphora often precede measurable visual field loss, making clinical vigilance crucial. Furthermore, intraocular pressure thresholds and optic nerve cupping are less predictive of disease severity in children, necessitating comprehensive evaluation and long-term follow-up. This is the one cohort of glaucoma patients where we don't have just Target IOP but also Target Vision. Surgical management remains the mainstay of treatment, often requiring multiple procedures and lifelong monitoring. Medical therapy plays a supportive role but is rarely sufficient as a standalone option. More importantly, it is important to remember that this is an evolving field, and the management can change as our understanding deepens. This presentation will highlight new ideas and strategies that we have developed in the last few years and how it has impacted overall management. Recognizing that children are not just small adults is essential to optimizing outcomes and preserving vision in this vulnerable population.

Tips for glaucoma diagnosis in children

Nana Digmelashvili, Innova Hospital, Tbilisi, Georgia; Natalia Maglakelidze Aversi clinica, Tbilisi, Georgia

Aim: To describe diagnostic tools in childhood glaucoma.

Materials and methods: Childhood glaucoma diagnosis and progression monitoring is different and more challenging compared to adult. General anesthesia is important for children diagnosing. Anesthetics impact IOP measurements, IOP results are impacted by other corneal changes also Optic disc evaluation and photography is important. Gonioscopy, axial length and refraction measurements, also electrophysiological testing are essential tests for glaucoma diagnosis and progression monitoring.

Results: Glaucoma diagnosis and progression monitoring may be challenging in certain cases. Up to 5 years age in most cases OCT scanning and visual field test cannot be assessed. Progression analyses is based on eye refraction, axial length and corneal size changes. Electrophysiological testing and optic disc photography is also valuable.

Conclusion: Glaucoma diagnosis is different and more challenging than in adult glaucoma. Al results should be analyzed individually.

Circumferential angle surgery for congenital glaucoma

Hala Elhilali MD, Professor of Ophthalmology Cairo University, Egypt

Gonioscopy-assisted transluminal trabeculotomy (GATT) is a minimally invasive procedure in which an illuminated microcatheter or 5-0 proline suture are used to incise the trabecular meshwork and inner wall of Schlemm's canal for 360°. The success rate of the GATT procedure was reported to be 90.5% with 1-year follow-up. Several

difficulties can be encountered during surgery that may prevent completion of the circumferential incision or necessitate conversion to a different procedure. These difficulties include: presence of blood in Schlemm's canal, bleeding that obscures the angle, difficulty in identifying the correct plane for the incision, creating a superficial incision and reaching a "stop". Management of each of these difficulties will be demonstrated in this video-based presentation.

Choosing surgery for childhood glaucoma

Sushmita Kaushik

Surgical intervention is the mainstay of management in childhood glaucoma, where timely and appropriate decision-making is critical to IOP control and preserving vision. Unlike adult glaucoma, pediatric cases often present with anatomical abnormalities and rapidly progressive disease, necessitating surgical decisions tailored for each case. Selecting the right surgical procedure involves careful consideration of the type of glaucoma—primary congenital versus secondary—age at presentation, corneal clarity, angle anatomy, and the presence of associated syndromes or systemic conditions.

This presentation will explore the current surgical options, including goniotomy, trabeculotomy, trabeculectomy, and glaucoma drainage device implantation, highlighting the indications, success rates, and potential complications of each. We will also address the role of newer techniques such as circumferential trabeculotomy and minimally invasive procedures. Special attention will be given to decision-making in resource-limited settings and the role of anesthesia in infants and young children.

Ultimately, the goal is to equip clinicians with a structured framework for choosing the most effective and safe surgical path for children with this complex and diverse condition.

Stem cell therapy for childhood glaucomatous optic nerve damage

Nana Digmelashvili
Innova Hospital, Tbilisi, Georgia

Aim: To describe the safety and feasibility of human mesenchymal stem cell transplantation in children with glaucomatous optic nerve damage.

Materials and methods: Different types of mesenchymal stem cell transplantation in children are becoming more and more popular worldwide in conditions like autism, showing its safety and efficiency. Approximately 2500 children undergo only hematopoietic stem cell transplantation annually in the United States. This number has been steadily increasing with growth rates 5-10% per year. Now more children have kept their own placental stem cells, and even more different types of stem cells are grown in laboratories. Stem cells intrathecal and retrobulbar transplantation have shown visual function improvements.

Results: Mesenchymal stem cell transplantation show improvement in visual function and positive changes on electrophysiological test results. intrathecal and retrobulbar transplantation are minimally invasive and show minimal side effects.

Conclusion: The results of analysis suggested that stem cell therapy for children with glaucomatous optic nerve damage might be safe and effective. However, the evidence was compromised by the limitations in current study size, lacking standardized injection routes and doses of stem cells, as well as shortages in diagnostic tools and long period follow-up studies. Therefore, it calls for more studies to systematically confirm the efficiency and safety of stem cell therapy for children with glaucomatous optic nerve damage.

Secondary glaucoma following vitreo-retinal surgeries

Tatsiana Imshenetskaya, Galina Vashkevich, Volha Yarmak, Maria Kozlovskaya, Robert Yermalkevich
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Purpose: To determine the preoperative and postoperative risk factors for the development of secondary glaucoma following vitreo-retinal surgeries and determine the most effective treatment methods.

Methods: We observed patients with all types of vitreo-retinal surgeries, including pars plana vitrectomy, scleral buckle, use of tamponading agents. Ocular examination was included IOP measurements, gonioscopy, extent of conjunctival scarring, the presence and location of a buckle/sponge, areas of scleral thinning, signs of inflammation, presence of silicone oil in the anterior chamber, iris bombe, peripheral anterior synechiae, surgical peripheral iridectomy, neovascularization.

Results: All our patients received medical therapy includes topical and systemic antiglaucoma medications, topical steroids and cycloplegics. Peripheral iridotomy with Nd:YAG laser was performed to relieve pupillary block, selective laser trabeculoplasty has been used successfully to reduce IOP patients with open angles. Diode transscleral cyclophotocoagulation and micropulse transscleral cyclophotocoagulation has been used in refractory glaucoma post pars plana vitrectomy with silicone oil. Surgical treatment using drainage devices was performed when drug and laser treatment were ineffective. in uncontrolled IOP elevations after pars plana vitrectomy.

Conclusions: Secondary glaucoma are very common complications following VR surgeries. Individual approach with combined use of medical management, laser and surgical interventions may be required patients with secondary glaucoma. Glaucoma drainage devices are often the useful surgical option, especially in patients with SO-induced glaucoma and surgical techniques will need to be tailored to the requirements of individual patients.

MIGS in juvenile open angle glaucoma

Sushmita Kaushik

Juvenile open-angle glaucoma (JOAG) is a rare, early-onset form of glaucoma characterized by elevated intraocular pressure (IOP) and progressive optic nerve damage, often requiring surgical intervention due to poor response to medical therapy. Traditionally, treatment has relied on more invasive procedures such as trabeculectomy or glaucoma drainage devices, both of which carry significant risks and long-term complications in young patients. In recent years, minimally invasive glaucoma surgery (MIGS) has emerged as a promising alternative, offering a safer profile with faster recovery and fewer postoperative complications.

This presentation will examine the evolving role of MIGS in the management of JOAG, focusing on procedures such as goniotomy, trabecular bypass stents (e.g., iStent), Kahook Dual Blade excision, and GATT. We will discuss our experience in efficacy of IOP reduction, safety outcomes, and early complications, particularly in the context of the more robust healing response seen in younger patients.

While MIGS is not yet the definitive solution for all JOAG cases, it holds significant promise as a first-line or adjunctive surgical approach, especially in early disease stages. Understanding when and how to incorporate MIGS into the treatment paradigm is essential to improving outcomes and preserving vision in this challenging patient population.

AAPOS session From Common to Complex: Modern Management of Childhood Eye Diseases

Pediatric Idiopathic Intracranial Hypertension
Jason Peragallo
Pediatric Idiopathic Intracranial Hypertension, USA

Pediatric idiopathic intracranial hypertension (PIIH) is a disorder of elevated intracranial pressure which can lead to papilledema and result in vision loss. These children frequently present to the

ophthalmologist with bilateral optic nerve edema. Bilateral optic nerve edema may be the presenting sign of other diseases which must be ruled out, including brain tumors and venous sinus thrombosis. Children with PIIH may be asymptomatic but may complain of headache, diplopia, pulsatile tinnitus, transient visual obscurations, nausea, or vomiting. In addition to optic nerve edema PIIH can present with bilateral sixth nerve palsies and facial nerve palsies. While adult patients are frequently obese and female, prepubertal children with PIIH have an equal male to female sex ratio and tend not to be overweight. Evaluation includes neuroimaging (preferably MRI brain and orbits, and MRV head) and lumbar puncture with opening pressure. Children with PIIH often have secondary causes leading to their elevated intracranial pressure, and an evaluation for these causes is necessary. Treatment focuses on removing any secondary causes of elevated ICP and lowering the intracranial pressure with medications such as acetazolamide or topiramate. Refractory or fulminant cases may require more aggressive treatment to prevent optic atrophy and vision loss, such as lumbar drain or permanent cerebrospinal fluid diversion. For patients who are obese, weight loss can treat PIIH.

The Effects of Electronics on the Pediatric Eye

Lisa Vredevoogd

The Effects of Electronics on the Pediatric Eye. Estimates of average use of electronics are at about 6 daily hours for children 8-10 and 9 hours for children ages 11-14. Linked to this increase is a concern about the negative effect of the electronics on these children. We analyzed the data on some of these effects, focusing as much as possible on review articles. The articles identified some problems that were definitely related to increased screen time and one that is still uncertain. This review will help ophthalmologists be more aware of some of the effects especially in children who spend excessive time with screens.

Mohney Brian Ocular Sequelae in a Population-Based Cohort of Children Diagnosed with Diabetes Mellitus over a 50-Year Period

Hiding in Plain Sight (Drusen/PHOMS, choroidal nodules in NF-1, physiologic ON cupping, dermoids, hemangiomas)

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In Children some ocular findings may not be well recognized or easily apparent (or hidden). Hemangiomas and dermoids require recognition and intervention in the first years of life. Likewise, the findings of optic nerve elevation related to Peripapillary Hyperreflective Ovoid Mass-Like Structures (PHOMS), optic nerve cupping, and choroidal lesions in NF-1 patients can all have future medical implications. Images, identification and management are discussed.

Is Amblyopia Fully Treatable at Any Age?

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Mughal Eye Trust Hospital, Lahore, Pakistan

Purpose: To determine whether visual recovery in amblyopia is influenced by a patient's age at presentation.

Methods: In a prospective interventional study, 1701 consecutive cases with poor vision were included irrespective of the patient's age. After wearing refractive correction for 8-12 weeks and experiencing no further improvement in the BCVA, amblyopia therapy was initiated, comprising full-time patching of the good eye, along with active use of the amblyopic eye through reading and writing for at least 6 hours daily. Regular two-weekly follow-ups were conducted.

The endpoint of therapy was achieving a BCVA equal to that of the good eye. A regular post-patching follow-up was conducted for 1-3 years. Statistical analysis comparing visual acuity at the start and end of therapy was performed using a paired t-test for each group.

Results: There were 896 male and 805 female cases. 1383 cases (81.3%) had previously failed amblyopia therapy. Forty-nine cases (2.9%) dropped out of the study. For a simplified analysis of the results, the 1701 cases were divided into three age groups:

Group A, comprising individuals aged 4-7 years (473 cases), Group B, those aged 8-12 years (618 cases), and Group C, those aged 13-46 years (610 cases). The overall success rates for Group A and B cases were 98% and 96.9%, respectively, while in Group C cases, the rate was 97.6%.

Conclusion: Full visual recovery is possible in amblyopia of any severity and age. The age of a patient at presentation should not preclude the initiation of therapy.

Orthoptics in management of strabismus

Zoran Pejic, MSc (Orthoptics & Special Education), INPP Practitioner, Orthovision Singapore, Founding President, Asia Pacific Orthoptic Association

> **Purpose**: To assess the impact of retained primitive reflexes (RPRs) on treatment outcomes in pediatric patients with Intermittent Exotropia (IXT) undergoing Cognitive Orthoptic Remediation using the I-CORE protocol.

Methods: A retrospective case analysis was conducted on pediatric patients diagnosed with IXT and treated using I-CORE. Patients were divided into two cohorts: those with retained primitive reflexes and those without, based on standardized neurodevelopmental assessments. Clinical parameters evaluated included duration of therapy, control of deviation, and binocular visual outcomes.

Results: Patients with RPRs demonstrated significantly prolonged treatment duration and slower improvement in binocular function compared to those without RPRs. These cases posed greater clinical challenges, requiring more intensive intervention and monitoring. Conversely, patients without RPRs showed faster and more consistent improvements in ocular alignment and visual control with I-CORE therapy.

Conclusion: Retained primitive reflexes appear to be a significant complicating factor in the orthoptic management of Intermittent Exotropia. Their presence is associated with increased treatment duration and complexity. Early identification and targeted intervention for RPRs may enhance treatment efficacy and should be considered a critical component in managing pediatric IXT.

Comparison of the effectiveness of using liquid crystal glasses "Strabo Glasses" and transcutaneous electrical stimulation to improve visual functions in children with partial optic nerve atrophy

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Relevance: Partial optic nerve atrophy (PONA) is one of the main causes of blindness and low vision, as it manifests itself as a whole complex of pronounced visual impairments, including impairments of binocular visual functions. Meanwhile, research in this area is primarily aimed at analyzing the effectiveness of neurotrophic and physiotherapeutic treatments to preserve and improve visual acuity in patients with PONA. Methods for improving binocular visual functions are considered mainly within the framework of surgical correction or reduction of the angle of strabismus.

> **Purpose**: to compare the effectiveness of using liquid crystal glasses and transcutaneous electrical stimulation in the functional treatment of congenital partial optic nerve atrophy in children.

Material and methods: We observed 99 school-age children with congenital PONA caused by perinatal pathology.

Depending on the treatment, the children were divided into three groups:

1) 32 children who studied with liquid crystal glasses Strabo glasses (LCG), developed at the Pediatric Eye Clinics “Yasnyi Vzor”.
2) 35 children who underwent a course of classical transcutaneous electrical stimulation (TES);
3) 32 children who received combined treatment, including classes with liquid crystal glasses Strabo glasses and transcutaneous electrical stimulation (LCG+TES).

The study groups were comparable in terms of key clinical characteristics.

In the LCD Strabo glasses used for visual training, an electric current created an alternate darkening of the right and then the

left liquid crystal glass. During the first 10 sessions, the alternating darkening duration was 150 msec and in the next 10 sessions it was 50 msec. Sessions were held for 15-20 minutes per day. Transcutaneous electrical stimulation (TES) was performed using the classical method after determining the threshold of electrical sensitivity and electrical lability to select individual treatment parameters.

Results: A significant increase in visual acuity was observed in the better-seeing eye and the worse-seeing eye because of treatment in all three groups of children ($p<0,001$). The improvement in visual acuity was more pronounced with combined than isolated use of TES and LCG ($p<0,05$).

When comparing electrophysiological parameters before and after treatment in all three groups of children, we found a decrease in the threshold of electrical sensitivity and an increase in electrical lability not only after using TES (alone or in combination with LCG Strabo glasses), but also after using only LCG without TES ($p<0,001$). It can be assumed that this effect is associated with the rhythmic alternation of the impact of visual stimuli and darkening on the retina of each eye. It should also be noted that there is a more significant improvement in electrical lability with a combination of LCG and TES compared to the isolated use of either method ($p<0,001$).

As a result of using the LCG Strabo glasses, alone or in combination with TES, we observed increases in the number of children with orthotropy and in the number of children with normal retinal correspondence ($p<0,001$). Also, the fusion amplitude significantly increased in children with normal retinal correspondence ($p<0,001$). It can be assumed that the increase in the amplitude of fusion is associated with the development and strengthening of fusion ability under the conditions of phase haploscopy created by LCG. After using only, the LCG, the number of children with binocular vision increased by 28,2% ($p<0,001$).

After using TES alone, the number of children with orthotropy and with strabismus angle, the number of children with normal retinal correspondence and the fusion amplitude was comparable before and after treatment ($p>0,05$). The number of children with and

without binocular vision according to the Worth test was comparable before and after the use of TES.

Conclusion: Thus, the use of LCG Strabo glasses alone or in combination with transcutaneous electrical stimulation in children with congenital partial optic nerve atrophy, caused by perinatal pathology, allows to increase visual acuity, improve electrophysiological parameters, reduce the magnitude of deviation, improve fusion ability, and increase the number of children with binocular vision.

Possibilities of using test images to detect achromatopsia

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Relevance: Congenital achromatopsia (ACHM, rod monochromatism) is a rare genetic disorder characterized by cone dysfunction. It is inherited in an autosomal recessive manner and the most common cause of the disorder is mutations in the CNGB3 gene (more often), or in the CNGA3 gene (less often). Differentiating achromatopsia from other diseases of the fundus (e.g., partial optic nerve atrophy, Leber's amaurosis, ocular albinism) is difficult due to possible similarity of clinical manifestations (low visual acuity, photophobia, nystagmus, pallor of the optic nerve, smoothing of macular reflexes). In the differential diagnosis of achromatopsia, the study of color vision is

of great importance. In patients with achromatopsia, the rod system mainly works, so they cannot correctly perceive color tones, but are able to distinguish the brightness of objects well.

Purpose: to evaluate the potential of using test images to detect achromatopsia.

Material and methods: 27 patients from 5 to 29 years old with congenital achromatopsia were observed, confirmed by the results of genetic diagnosis. According to the results of the genetic study, mutations were found in the CNGB3 gene in 23 (85,2%) patients and in the CNGA3 gene in 4 (14,8%) patients. The control group of patients with fundus pathology included 37 patients from 7 to 18 years old with congenital partial optic nerve atrophy (PONA) and 10 patients with from 7 to 18 years old oculocutaneous albinism. The control group without ophthalmopathology included 45 subjects from 7 to 20 years old.

At the first stage of the study, the perception of brightness of chromatic and achromatic images in patients with achromatopsia was compared. To do this, we used our own images, with certain characteristics of color tone, lightness (brightness) and saturation. Taking into account the results of the first stage of the study, which showed that blue images are the lightest and most poorly distinguishable on a white background for most patients with achromatopsia, tests were developed to detect achromatopsia (test No. 1 and test No. 2). Each test includes 4 gray (achromatic) silhouette images (with a lightness of L 80% for test No. 1 and L 50% for test No. 2) and 4 blue (R 0/ G255 /B 255). For blue images, the saturation is maximum (S 100%) in both tests and the lightness is L 80% for test No. 1 and L 50% for test No. 2.

Results: All subjects of the control group without ophthalmopathology, patients with PONA and oculocutaneous albinism, saw all blue and gray images in both tests and easily found blue images corresponding to gray (achromatic) ones. In the group of patients with achromatopsia with test No. 1 (L 80%), the vast majority – 25 (92,6%) patients either did not see blue images at all, or could not distinguish their shape and compare them with gray images. At the same time, all patients distinguished the shape of all gray images of the same lightness and could name them. With test No. 2 (L 50%), most patients also had difficulty with the shape of the

blue images, but their number was less and amounted to 18 (66,7%) patients. The remaining 9 (33,3%) patients could name blue images and compare them with gray ones. Of these, 2 patients with mutations in the CNGA3 gene and 7 patients with mutations in the CNGB3 gene. It can be assumed that in these patients, the lesion of the cone system was less pronounced than in the rest.

Conclusion: A comparative analysis of the perceived brightness of chromatic and achromatic images by patients with achromatopsia showed that the lightest color for them is blue, and the darkest is red. Developed on the basis of a comparative analysis of the perceived lightness of chromatic and achromatic images by patients with achromatopsia, the method for detecting this disease is simple and affordable, allows for preliminary differential diagnosis with other ophthalmopathology and to determine the tactics of further examination (the need for OCT, electrophysiological and genetic studies) to clarify the diagnosis.

Evaluation of the effects of combined treatment of vision therapy and patching for the management of hyperopic anisometropic amblyopia in adolescents

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Purpose: To compare visual outcomes and evaluate the effectiveness of maximum optical correction, patching, and dichoptic therapy in patients whose amblyopia was diagnosed after the age of 6 years.

Methods: The study retrospectively evaluated data from 32 isoametropic patient. Group I: 20 patients aged 6-10 years with mixed amblyopia (anisometropia combined with strabismus).

Group II: 12 patients aged 12-15 years with anisometropic amblyopia. Treatment outcomes were compared between the two groups. The effects of amblyopia severity, the cause of anisometropic amblyopia, and prior use of glasses were analyzed.

Results: The success rate was 100% in Group I and 66.7% in Group II. Patients with severe amblyopia showed better outcomes in Group I compared to those with moderate amblyopia across both groups. A statistically significant difference was observed between the two groups regarding positive results in patients with severe amblyopia (p=0.021). The improvement in visual acuity in Group I (0.42 ± 0.03; range 0.3–0.6) was significantly higher than in Group II (0.31 ± 0.04; 0.09–0.5) (p =0.021). Patients who had not previously worn glasses achieved better success rates, though the difference was not statistically significant (p=0.207).

Conclusion: The efficacy of maximum optical correction, visual therapy, and occlusion therapy is lower in teenagers compared to early corrective and occlusive therapy, the results are still promising. A combined approach involving active visual therapy: perceptual learning, dichoptic stimulation; optical correction, and patching proves effective in treating anisometropic and mixed amblyopia in patients aged 6-15 years who had not undergone prior treatment.

Unconventional approach to binocular interaction assessing

Olga Rozanova
25 Years of Pediatric LASIK
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Purpose: The retrospective analyses of the patients with hyperopia; hyperopic astigmatism, accommodation or partially accommodation strabismus, with or without amblyopia (resulting from anisometropia.) treated with Lasik aiming to theurapeutic and refractive effects; to assess the efficacy and safety of those interferences.

Methods: LASIK in children is very rare and still controversial even now, but it may be indicated in exceptional circumstances such as high anisometropia where the patients are poorly

compliant or have failed to respond to conventional amblyopia treatment.

265 children with anisometropic amblyopia in whom conventional therapy was unsuccessful underwent unilateral LASIK between 1999 and 2025. Mean patient age was 10.3 +/- 3.1 years (range: 8 to 15 years), and mean follow-up was from 1 to 15 years. At the last follow-up examination, spherical equivalent refraction, uncorrected visual acuity (UCVA), best spectacle-corrected visual acuity (BSCVA) - the standard full ophthalmological examination with thorough topography results and complications were recorded.

Results: A total of more than 526 eyes were assessed for retrospective analyses. Mean preoperative and postoperative manifest spherical equivalent refraction of the treated eyes was 5.17 +/- 1.65 and 1.39 +/- 1.21 diopters (D), respectively (P < .01). Mean UCVA was 0.06 +/- 0.09 (range: 0.01 to 0.5) preoperatively and 0.27 +/- 0.23 (range: 0.05 to 0.8) postoperatively (P < .01). Mean BSCVA was 0.20 +/- 0.17 (range: 0.01 to 0.8) preoperatively and 0.35 +/- 0.25 (range: 0.1 to 1.0) postoperatively (P < .01). 26 percent of eyes gained > or = 4 lines of BSCVA, 12 percent gained 2 to 3 lines, 3 percent of eyes gained 1 line, and 1.5 percent were unchanged; Some patients were lost for follow-up; only 1 eye lost 1 line of BSCVA due to haze in the flap-stroma interface. None of the patients reported significant halos or glare. There were no serious intraoperative or postoperative flap complications, data of the eyes were analyzed.

Conclusion: Based on our Long-term data LASIK may be employed as safe and successful treatment in children for the management of hyperopic anisometropic amblyopia in select cases. Visual acuity improved in the amblyopic eyes and was associated with decreased anisometropia; as well as strabismus component. The angle of deviation decreases (in case of partially accommodation strabismus) or disappears (in case of accommodation strabismus) The refractive response to hyperopic LASIK in children appears to be similar to that of adults with comparable refractive errors, in addition it can bring the special benefits treating amblyopia and accommodation or partially accommodation strabismus.

Multifaced Brown's Syndrome

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> H.W. Brown (1950) described a congenital eye movement disorders due to a tight tendon sheath and called it "superior oblique (SO) sheath syndrome". The complex of described symptoms is known as Browns Syndrome (BS).

But discussion continues still: where pathology is located, what structure is responsible (fibrous SO tendon, the narrow sheath or trochlea anomaly)? Every case is a unique one with different degrees of manifestations.

Diagnosis is based on clinical features complex: abnormal head posture, limitation of elevation in adduction of involved eye, down shoot in adduction, divergence in upgaze, V or Y pattern, positive Forced torsion test.

In 4 patients we noticed the spontaneously improving of eye movements after strong blinking or pressing of globe by finger (congenital intermittent Brown's Syndrome). Spontaneously improvement with an audible click, named superior oblique «click» syndrome (Roper-Hall et al., 1972). MRI and CT did not help to determine the level of pathology in our investigation.

Congenital BS requires the Surgical management. We performed and analyzed the results of 69 operations. The type of surgery was selected according forced torsion test result. Tenotomy of SO was performed in 53 cases, SO recession or loop recession (as a tendon lengthening procedure) - on 16 eyes. Intraoperatively SO tendons were discovered in severe contracted or shorted mostly, there were impossible to make any manipulation except tenotomy.

In 90% cases eyemovements were improved. In 81% overaction of Inferior Oblique (IO) occurred, that was eliminated by next step

IO surgery 3 months later.

Conclusions:

1. Nowadays there is not known exactly the level of pathology in BS.
2. SO tenotomy is most effective surgery in BS.
3. Postoperative Inferior Oblique Overaction requires next step surgery.

Management of isolated inferior rectus palsy

Ahmed Awadein

Purpose: To analyze the surgical outcome of different surgical options and suggest a protocol for the management of isolated inferior rectus palsy.

Methods: A retrospective observational study was performed on patients presenting with isolated inferior rectus underaction who underwent surgery. History, ocular motility, fundus torsion, intraoperative findings, and details of the surgical procedures performed were evaluated. The changes in ocular motility, angles of deviation, and fundus torsion for the different procedures were studied.

Results: A total of 41 patients (20 females). The mean age was 19.38 ± 11.6 years. The left eye was more commonly affected (26 eyes). Inferior rectus underaction was most commonly associated with trauma (70%). Exploration showed an apparently normal muscle in 16 cases (42%), scarring of the anterior part of the muscle in 7 cases (22%), congenital absence of the muscle in 3 cases, partial cut of the muscle in 3 cases and cut/avulsed muscle in 12 cases. In patients when the inferior rectus muscle can retrieved or sutured (n =9), surgical repair was performed. In 17 patients, the inferior rectus muscle was strengthened using either resection (n=13) or scleral muscle plication (n=4). The mean angle of deviation in primary position improved from 14 ± 8 PD to 4 ± 7 PD. The mean angle of deviation in downgaze improved from 25

± 12 PD to 9 ± 12 PD. Mean duction in downgaze improved from -2.4 to -1.2. Eight patients underwent resection and anteriorization of the ipsilateral inferior oblique muscle (RATIO) and 7 patients underwent reverse Knapp or reverse Nishida procedure. Postoperatively, the alignment was closer to orthophoria in the RATIO group (P= 0.37). However, there was a greater improvement in the depression in the reverse Knapp group (P = 0.004). Moreover, there was a postoperative limitation of elevation in the RATIO group that did not occur in the reverse Knapp group. The postoperative limitation of elevation was more in adduction that in abduction with RATIO.

Conclusions: Surgical procedure for isolated inferior rectus palsy should be tailored according to the intraoperative findings, preoperative angle of deviation and ductions. While successful alignment can be achieved in the primary position with most of the surgical procedures, restoration of full ocular motility is usually not possible.

Think Small, See Big: The Power of Mini-Incision Strabismus Surgery

Donny W Suh, MD, MBA

> Strabismus surgery has traditionally relied on large conjunctival incisions, which, while effective, can be associated with postoperative discomfort, delayed healing, and visible scarring. Minimally invasive techniques have allowed surgeons to achieve the same surgical goals while minimizing tissue disruption. This paper highlights the role of mini-incision approaches in the correction of subtle but visually significant forms of strabismus, including microstrabismus and Brown syndrome.

For microstrabismus, central tenotomy and plication of extraocular muscles performed through small conjunctival openings allow precise, graded weakening or strengthening without extensive tissue dissection. These techniques offer excellent surgical control for deviations that may be cosmetically minimal but functionally disabling, such as those associated with suppression

or amblyopia. The mini-incision method reduces operating time, facilitates quicker recovery, and maintains the integrity of surrounding tissues.

Similarly, for certain cases of Brown syndrome, a condition characterized by restriction of elevation in adduction due to superior oblique tendon tightness, a micro-superior oblique weakening procedure through a small incision provides effective release while avoiding the morbidity of larger tenotomies or silicone expanders. Early results demonstrate improved motility, reduction of abnormal head posture, and high patient satisfaction with minimal complications.

By “thinking small,” surgeons can “see big” improvements—less inflammation, faster healing, better cosmesis, and precise control of ocular alignment. Mini-incision strabismus surgery represents a significant step forward, offering a refined, patient-centered approach to correcting complex ocular motility disorders with minimal surgical footprint and maximal functional benefit.

Modified Duplication of the Extraocular Muscles: Features and Advantages

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Objective: To propose a method for creating a duplication of the extraocular muscles that ensures reliable fusion of the muscle fold with the sclera.

Material and methods: The study included 62 patients with convergent concomitant strabismus, aged 3 to 17 years, who underwent surgical intervention: recession of the medial rectus muscle and median duplication of the lateral rectus muscle. In the main group (32 eyes), a modified duplication with an incision of the superficial layers of the tendon before fixation to the sclera was performed (Russian patent for invention No. RU 2835833 of 04.03.2025). In the control group, the standard duplication

technique without incision was used. The stability of the achieved eye position was assessed.

Results: After 6 months, an increase in the residual angle of strabismus occurred in 1 patient in the main group, and in 8 children in the control group. Reoperation is planned for these patients.

Conclusion: The proposed duplication method provides reliable fixation of the muscle to the sclera, minimizes the risk of an increase in the residual angle of strabismus, and allows for a stable anatomical and functional result of the surgical treatment of strabismus.

The new method for calculating surgical treatment of nystagmus using the StraboSoft system

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Background: Nystagmus, characterized by involuntary rhythmic eye oscillations, is a severe pathology with a prevalence of 1:2000. It leads to significantly reduced visual acuity, oscillopsia, abnormal head posture, and serious social limitations, necessitating the development and refinement of effective treatment strategies.

Objective: To present a novel comprehensive approach to the diagnosis and treatment of patients with nystagmus, focusing on modern surgical techniques aimed at reducing oscillation amplitude and improving visual functions.

Materials and Methods: The diagnostic algorithm included a comprehensive examination: standard and null-zone visual acuity assessment, cycloplegic refraction, videonystagmography for quantitative analysis of nystagmus parameters and precise identification of the null zone, as well as OCT and electrophysiological testing (VEP, ERG). Surgical intervention was performed using the proprietary "STRABO" mathematical

modeling program to calculate the precise dosage of the operation on the extraocular muscles.

Results: The application of mathematical modeling enabled the precise dosing of surgery on the extraocular muscles to create a new null zone in the primary position. This resulted in a significant reduction in nystagmus amplitude, elimination of abnormal head posture, improvement of visual acuity, and, consequently, a marked enhancement in the patients' quality of life.

Conclusion: The proposed comprehensive approach, based on meticulous diagnostics and personalized surgical planning utilizing the "STRABO" software, represents a highly effective method for managing nystagmus. It allows for achieving stable functional and cosmetic outcomes, offering new possibilities for treating patients with this challenging condition.

Superior rectus transformation in management of Duane retraction syndrome

Tariek Mohammed Aldoais

Reoperative Strabismus: How Forced Duction and Intraoperative Exploration Shape Surgical Strategy (case report)

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Background: Reoperative strabismus in children is complex due to scar tissue, altered anatomy, and uncertain prior muscle positions.

Aim of the work: To demonstrate the role of Forced duction testing and careful intraoperative exploration in evaluation of

reoperative cases of unknown previous strabismus surgery.

Case Summary: Patient: 7-year-old boy. Presentation: Right hypotropia about 20 pd and small esotropia after unknown previous Strabismus surgery.

Findings:

- Rt eye;
- Limited elevation in abduction>adduction, superior oblique underaction. Left eye;
- inferior oblique overaction, superior oblique underaction, superior rectus overaction.

Intraoperative: Forced duction test: negative. Exploration showed: scarring and abnormal positioning of the right superior rectus muscle (largely recessed). Right inferior oblique muscle myectomized. .

Intervention: Tailored surgical approach was executed based on intraoperative findings, this included: (Right inferior rectus recession 5.00 mm + left inferior oblique recession 2.00 mm).

Outcome: Significant postoperative alignment improvement and the elevation in right eye noticed.

Conclusion: Forced duction testing and careful intraoperative exploration are vital in reoperative strabismus. A dynamic, tailored approach improves surgical outcomes in strabismus complex pediatric cases

Session Childhood Refractive Errors: Interactions of Anatomy, Environment, and Visual Function

Exploring the Interaction of Intraocular Pressure, Choroidal Thickness and Accommodation in Children with Progressive Myopia

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Purpose: Choroidal thickness (ChT) is increasingly recognized as a biomarker of myopia progression. Elevated intraocular pressure (IOP) is also linked to myopic pathophysiology. The interaction between IOP, ChT, and accommodation—particularly under peripheral defocus —remains unclear. This study aimed to examine these associations and the effect of long-term peripheral defocus in children with progressive myopia.

Methods: A prospective study of 78 children aged 7–13 years (-0.75D to -4.75D) was conducted. Baseline and follow-up data included cycloplegic refraction, axial length (AL), IOP, accommodative amplitude (AA), relative accommodation (PRA/NRA), and ChT in central and peripheral zones (1500/3000 μm). Peripheral defocus was induced by highly aspherical lenslet (HAL) spectacles worn full time. No additional treatment was used.

Results: Elevated IOP was found in 35 children and was associated with reduced AA, PRA, NRA, and thinner nasal-inferior ChT. After one month of HAL wear, IOP decreased in this group, and ChT increased in both groups. After 12 months, ChT partially regressed in the elevated-IOP group but remained stable in others. Myopia progression slowed in both groups; however, annual progression of spherical equivalent refractive error was higher in the elevated-IOP group. Annual axial elongation was comparable between groups.

Conclusions: Elevated IOP was associated with reduced accommodative function, likely reflecting ciliary muscle dysfunction. IOP normalization depends mainly on improved accommodation, requiring HAL with full correction for effective myopia control.

The structure of the microbiota of the ocular surface in children with and without myopia

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Introduction: Myopia is a common health problem worldwide, especially among the younger population. This is of particular concern, as its early manifestation can lead to the development of high-grade myopia and related complications such as retinal detachment, glaucoma, myopic maculopathy, and others. The microflora of the ocular surface plays an important role in maintaining eye health. Qualitative and quantitative changes in the microbiota of the ocular surface may be associated with the progression of myopia

Purpose: Comparison of the taxonomic diversity of the microbiota of the conjunctival eye cavity in children with varying degrees of myopia and in children without clinically confirmed myopia. The presence of pathological conditions provokes changes in the content of bacterial taxa in its composition, which may be associated with the progression of myopia. The study analyzed differences in bacterial composition at the level of genera.

Methods: Bioassays were collected from 29 children with varying degrees of myopia (58 eyes) aged 6 to 17 years, as well as from 12 children of the control group (24 eyes) aged 9 to 17 years. Biological samples from the conjunctival cavity were taken from all patients. However, 10 biological samples (in 5 patients) from the surface of the eye were not filtered due to the poor quality of readings, so these data were excluded from the analysis. The taxonomic composition of the microbiota of the conjunctival ocular cavity was analyzed by sequencing the 16S rRNA gene, as well as using bioinformatic and statistical methods.

Results: The microbiota of children with myopia has a greater alpha diversity compared to the control group. This is confirmed by the quantitative values of the Chao and Shannon indices.

There is a noticeable trend towards differences in bacterial composition between the control group and children with myopia. These differences are related to changes in the relative number of opportunistic bacteria depending on the degree of myopia. The structure of the microbiota in patients with myopia is characterized by a large number of taxonomic units compared to the control group, which indirectly indicates the presence of a pathological condition.

Conclusion: The microbiota structure of patients with myopia was characterized by a higher number of taxonomic units compared to the control group. The differences are related to changes in the relative abundance of opportunistic bacteria depending on the degree of myopia. Further study of the relationship between the microbiota of the eyes and the progression of myopia is needed.

To walk or not to walk. Prevention of myopia in schoolchildren in the conditions of the city of Eastern Siberia with the developed aluminum industry

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Aluminum production is accompanied by emissions of fluoride compounds into the atmosphere, which destroy all living things. Pollution of atmospheric air with fluorine leads to the disruption of the formation of the fibrous membrane of the eye due to the disruption of collagen synthesis. Weakness of the supporting properties of the sclera is considered the leading factor in the development of myopia in schoolchildren. Stabilization of myopia, prevention of its occurrence is the actual scientific and practical problem in all developed countries of the world.

Purpose: To study the publications on the role of air pollution with fluorine in the development of myopia in schoolchildren to determine the effective methods of its prevention.

Materials and methods: It is analyzed the publications over the last years.

Results: It is determined the incidence of myopia among schoolchildren living in an Eastern Siberian city with a developed aluminum industry statistically significantly exceeds the incidence of myopia among schoolchildren living in the European part of Russia. In Krasnoyarsk, moderate myopia in elementary grades was 10.9%, in middle grades 23.8%, in high school 31.4% of cases. In the European part of Russia, these figures were 5.6% in elementary school, 17.8% in middle grades, and 26.2% in high school students. Prevention of myopia is a scientific organization of the educational process, hygiene of visual load, physical activity, and time spent outdoors.

Conclusions: It is concluded that the issues of myopia prevention remain insufficiently covered. To study the effect of annual trips of children to an area free from the destructive effects of fluorine on the incidence of myopia in schoolchildren.

Keratometry and Biometry Data in Refractogenesis Assessment in Children

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Keratometry and AL (biometry) are decisive in refraction and used in IOL calculation formulae. In practice, in case of keratometry or AL data greater or smaller than average statistical values the formulae do not provide accurate achievement of target refraction.

Зависимость Прироста ПЗО от Кератометрии

при прогрессировании на - 1,0 дпр

Кера

тометрия	41	41,5	42	42,5	43,0	43,5	44,0	44,5	45,0	45,5	46,0
Прирост ПЗО	0,5	0,55	0,56	0,55	0,47	0,45	0,45	0,42	0,38	0,38	0,35

Aim: To analyze the dependence of refraction changes on keratometry values and AL growth dynamics.

Methods: The study group included 64 children examined in 2022 and in a year. Children with slight to severe myopia prevailed. Age was 8 to 16 years inclusively. Eleven subgroups with an increase of keratometry values were identified. AL growth and corresponding strengthening of refraction were calculated in each subgroup.

Result: An inverse correlation was found: with an increase of keratometry values, less AL growth is required for strengthening of refraction. The data was grouped in a table of necessary AL growth with keratometry values increase for myopia progression by - 1,0 D per year.

Conclusions: When analyzing myopia progression AL growth must be estimated in strict dependence on keratometry values. The composed table gives a possibility to estimate myopia progression by AL growth per year without the usage of long-acting cycloplegics.

Results of the analysis of visual functions in children who have had brain tumors

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Relevance: Due to the improvement of diagnostic quality and treatment efficiency of oncological diseases at the present stage of medicine development, there is a tendency towards increasing survival of patients with brain tumors (BT) who have undergone surgical treatment, radiation and chemotherapy all over the world.

It is known that during the period of disease development, neuro-

ophthalmological symptoms are observed in approximately half of patients with BT and depend primarily on the tumor localization, which is of great importance for the diagnosis of the disease. Meanwhile, in modern literature, relatively little attention is paid to the analysis of ophthalmopathology in patients who have undergone BT and are in remission.

Purpose: to study the structure of ophthalmopathology and the state of visual functions in patients with operated brain tumors in the period of remission.

Material and methods: The results of ophthalmological examination and outpatient card data of 224 children aged 7 to 17 (average 11.7±0.6) years with operated brain tumors in remission were analyzed. All children underwent rehabilitation courses at the Medical and Rehabilitation Research Center «Russian Field» and the RUDN Research Institute of Brain Development and Higher Achievements. The control group included 67 examined children aged 7 to 17 (average 11.5±0.7) years without ophthalmological and somatic pathology.

Along with classical methods of ophthalmological examination, the state of visual memory were evaluated using the “Expo” computer program (A.A. Kharkevich Institute for Information Transmission Problems, RAS) in two versions:

1) with achromatic (non-color) test-images;
2) with color test-images.

A series of 10 images were presented on the monitor screen in random order (with a presentation duration of each stimulus of 2 s) under binocular observation conditions with optimal optical correction of ametropia. After that, each image appeared on the screen separately, and the child had to determine whether he had already seen it or not. The result was assessed in points (maximum result 10 points, minimum 0 points).

Results: Based on the results of the ophthalmological examination, children with BT were divided into two groups: 1) 153 (68,3%) children with descending partial optic nerve atrophy (PONA), 2) 71 (31,7%) children without PONA.

Among the brain tumors in children with and without PONA,

medulloblastoma of the cerebellum and IV ventricle was the most common (43,2% and 42,3% respectively). The second most common type of tumor in both groups was pilocytic astrocytoma of the cerebellum and IV ventricle (15% and 21,1% respectively).

Among children with PONA, there was a comparable proportion of emmetropic (33,3% of cases) and myopic (37,3% of cases) refractions.

The predominant type of refraction in children without PONA was emmetropia (49,3% of cases).

The number of children with strabismus was higher in the group of children with PONA than without PONA (39,2% vs 16,9% of cases, $p<0,001$). Strabismus was most often observed in children with operated tumors of the cerebellum and the IV ventricle, probably as a symptom at a distance due to intracranial hypertension.

The number of children with nystagmus was higher in the group of children with PONA (15,7 of cases) than without PONA (4,2% of cases).

Pupillary disorders in the form of anisocoria and decreased pupillary reaction were detected in 9 (5,9%) children with PONA and were not observed in children without PONA. Retinal angiopathy and lagophthalmos with facial nerve insufficiency were observed in several children in both groups.

Since the most common localization of brain tumors was the cerebellum and IV ventricle, a more detailed analysis of visual functions was conducted in 35 children in the period of remission after removal of a tumor of this localization (it was medulloblastoma in 28 (80%) children and piloid astrocytoma in the remaining cases). Among them were 18 (51,4%) children with PONA and 17 (48,6%) children without PONA.

Children with PONA more often had strabismus and reduced visual acuity than children without PONA.

The amplitude of fusion (in children who had bifoveal fusion on the synoptophore) and the amplitude of absolute accommodation were comparable in children with and without PONA, but were significantly lower than in the control group.

Analysis of visual memory scores showed better results for colored stimuli than for achromatic one in all groups. Meanwhile, a significant decrease in visual memory scores with color stimuli was observed in children who have had BT compared to the similar indices of healthy children (control group).

Conclusions:

1) Descending partial optic nerve atrophy is observed during the period of remission in the majority (68,3%) of children with operated brain tumors.
2) Medulloblastoma of the cerebellum and IV ventricle is the most common type of brain tumor in both children with partial optic nerve atrophy (43,2% of cases) and children without partial optic nerve atrophy (42,3% of cases).
3) Descending partial optic nerve atrophy is often combined with oculomotor disorders: in 39,2% of cases with strabismus and in 15,7% of cases with nystagmus.
4) During the period of remission, after removal of the cerebellar tumor and the 4th ventricle, children may experience: decreased visual acuity (in patients with descending optic nerve atrophy), decreased amplitude of fusion and accommodation, as well as decreased visual memory.

Thus, the results of the study indicate the need for regular, long-term and detailed monitoring of the state of visual functions (including visual memory and spatial perception) in children who have had a brain tumor.

Enhancing Antioxidant Defense with Medicago Sativa Extract in High Myopia

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High myopia looms as a global vision threat, with its relentless axial elongation paving the way for devastating complications like retinal detachment and irreversible blindness. This progressive condition, driven by oxidative stress, disrupts the eye's biochemical harmony, accelerating tissue damage and vision loss1. Medicago sativa extract (MSE), derived from alfalfa, is rich in flavonoids and polyphenols, known for potent antioxidant properties that combat oxidative stress2.

Superoxide dismutase (SOD), a cornerstone antioxidant enzyme, stands as a critical shield against this oxidative onslaught, potentially slowing myopia's destructive advance2,3. In an engaging double-blind randomized controlled trial, we investigated the transformative potential of MSE, combined with low-dose atropine, in managing high myopia among adolescents. Participants, evenly divided into MSE and placebo groups, all received 0.01% atropine eye drops, with plasma SOD levels and axial lengths meticulously monitored over six months.

The MSE group showcased a dramatic rise in SOD, fortifying the body's antioxidant defenses, while the placebo group suffered a decline in SOD levels, leaving them vulnerable. Strikingly, MSE nearly halted axial elongation, a stark contrast to the placebo group's alarming progression4. Although SOD changes didn't directly correlate with axial length, MSE emerged as a vital adjunctive therapy, enhancing antioxidant capacity and offering a beacon of hope for curbing myopia's progression5.

These findings ignite excitement for MSE as a novel strategy, calling for broader studies to cement its role in preserving vision for those battling high myopia.

AAPOS session Modern Trends in Strabismus Surgery: Precision, Outcomes, and Innovations

Longstanding Horizontal Strabismus - Waiting 20 or more years for surgery

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Fifty patients had surgery for the first time after more than 20 years of strabismus. They were originally from 8 different countries across 4 continents. Among the patients some of them were citizens, immigrants and refugees. The reasons for late treatment were unavailability of care during childhood, lack of monetary resources, parent's lack of interest and parents fear of surgery. Special considerations for surgery are presented. Conjunctival histopathology after longstanding eye deviation is showed.

Patients with longstanding horizontal strabismus from different countries, cultures and backgrounds opt for surgery when they have the opportunity and are well informed.

Update on Childhood Intermittent Exotropia

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> **Purpose**: To summarize the findings of Randomized Clinical Trials performed by the Pediatric Eye Disease Investigator Group, comparing treatments for childhood intermittent exotropia, including yet unpublished findings from recent post-hoc analyses.

Methods: Six randomized clinical trials have been performed by the Pediatric Eye Disease Investigator Group comparing treatments for childhood intermittent exotropia

1) unilateral recess resect vs bilateral lateral rectus recessions

2) patching vs observation
3) pilot study of overminus spectacles
4) full study of overminus spectacles vs non-overminus
5) base-in prism spectacles vs no prism 6) full-time alternate patching vs observation.

Results: Beyond the primary published results of each of these randomized clinical trials, more recent secondary analyses of these data reveal nuances of interpretation that will be shared and discussed.

Conclusions: There is an increasing evidence-base for our management of childhood intermittent exotropia. Secondary analyses are increasing our ability to apply these results to our everyday practice.

Strabismus: Shaping How We See--And How We Are Seen. The Psychosocial Impact of Strabismus Across the Lifespan

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Purpose: Strabismus has historically been categorized as a cosmetic condition, but a growing body of evidence demonstrates profound psychosocial consequences across the lifespan. This presentation reviews recent data (2023–2025) and reframes strabismus surgery as reconstructive care that restores not only ocular alignment but also human connection and quality of life.

Methods: A narrative review of recent large database analyses, prospective cohort studies, and qualitative investigations was performed, with emphasis on new findings since 2023.

Results: Early Development & Social Connection: Eye contact, a foundational element of human communication, fosters neural synchrony, empathy, and caregiver–infant bonding. Misalignment

disrupts these processes, with potential long-term consequences for social and language development.

Pediatric Outcomes: A 2024 TriNetX study of 1,381 children diagnosed with strabismus before age 5 found that first surgery performed ≥7 years was associated with over twofold increased risk of psychiatric diagnoses by age 18, including anxiety (RR 2.19), ADHD (RR 2.18), and conduct disorders (RR 2.81).

Adult Outcomes: A 2024 JAMA Ophthalmology analysis of >19,000 adults in the U.S. All of Us cohort showed significantly higher prevalence of anxiety (32% vs 14%), depression (33% vs 14%), ADHD (aOR 2.03), bipolar disorder (aOR 2.08), and PTSD (aOR 1.46) in adults with strabismus.

Psychosocial Benefit of Surgery: Recent studies in Eye (2024) and the British & Irish Orthoptic Journal (2024) highlight postoperative improvements in confidence, daily functioning, and social participation.

Conclusions: Strabismus alters both how patients see and how they are seen. Evidence now affirms that surgical alignment improves psychosocial outcomes for children and adults, underscoring the need to recognize and advocate for strabismus surgery as reconstructive, not cosmetic, care.

Surgical Management of Diplopia in Dysthyroid Ophthalmopathy

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> Diplopia as a result of restrictive myopathy is encountered in 40% of patients with thyroid ophthalmopathy. The most common deviation is vertical strabismus; horizontal strabismus (esotropia) and torsional components (excyclotorsion or less commonly incyclotorsion) or combinations of the above may be encountered

as well.

Surgical treatment of strabismus is undertaken when the active, inflammatory phase of the disease has subsided, and a minimum 6 months of stability of ocular measurements is documented.

Alignment goals aim at an enlargement of the binocular field of vision prioritizing on orthotropia in primary gaze and downgaze position.

The mainstay of surgical management involves recessions of tight extraocular muscles (EOMs) with or without the use of adjustable sutures. The decision on which muscles will be recessed (unilateral versus bilateral surgery) and the amount of recession is customized based on preoperative orthoptic measurements in cardinal positions of gaze and primarily the degree of EOMs fibrosis and resultant restriction of motility, assessed by repeated intraoperative forced duction testing before and after detaching the operated EOMs.

Alternatively, the relaxed intraoperative muscle positionning approach, as well as EOM tendon elongation techniques in large angle strabismus have been advocated as well. The most commonly operated muscles are the inferior and medial recti muscles followed by the superior rectus. Recession of the inferior rectus muscle has been associated with a high rate of progressive overcorrection as well as lower eyelid retraction and A-pattern exotropia if large bilateral IR recessions are undertaken. The semiadjustable suture technique or the use of nonabsorbable sutures have been proposed in order to decrease the incidence of overcorrection. A successful alignment has been reported at a rate in 50-91% after one operation. The reoperation rate may vary between 13 and 53% in certain reports.

Conclusion: Strabismus surgery for addressing diplopia of restrictive etiology in the context of TAO is challenging yet particularly rewarding for patients who have been disabled with diplopia for a significant time.

A Stepwise Algorithm for Managing Concomitant Horizontal Esotropia

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Introduction: Concomitant esotropia encompasses a spectrum of disorders, including congenital/early acquired constant non-accommodative, constant, intermittent, partially accommodative, and fully accommodative esotropia. This presentation outlines a structured protocol for the diagnosis, treatment, and rehabilitation for each subtype.

Methods: A critical component of diagnosis involves a multimodal assessment that exceeds standard ophthalmological examination. It mandates: 1) Detection of amblyopia and underlying pathologies using OCT of the posterior pole and pattern VEPs to differentiate from optic nerve atrophy and other conditions, found in 15% of cases in a cohort of 2000 patients; 2) Evaluation of sensory fusion via synoptophore with dissimilar objects and the Maddox method to prognosticate post-surgical stereopsis potential; 3) Quantitative analysis of oculomotor function using a computerized video-oculograph to assess deviation in nine gaze positions and eye movement kinematics.

Surgical Intervention: Surgical correction is indicated in 95-96% of non-accommodative cases. We prioritize recession procedures. A novel, individualized calculation for recession dosage was developed based on a proprietary equation that considers the corrective angle, corneal diameter, and ocular globe anatomy (longitudinal/transverse diameters). This determines the precise muscle translocation posterior to the globe's equator to maximize its rotational effect. Surgical precision is enhanced by a bloodless technique utilizing a radiofrequency knife and 7-0 Vicryl sutures to minimize tissue trauma and adhesions.

Results and Discussion: For intermittent esotropia, calculations based on the maximum angle achieved a 94% orthotropia rate (±5°), outperforming calculations from the minimum or average angle. In partially accommodative esotropia (≥15Δ difference with/without correction; mean hyperopia +3.37D), a two-stage approach was implemented. First, refractive surgery (performed

after age 5 based on corneal maturity stability) eliminated the accommodative component. Globe axial length stability was predicted by its morphology. Surgery on the extraocular muscles was then performed based on the residual angle, achieving orthotropia in 93-95% of cases and eliminating the need for glasses. Refractive surgery alone resolved deviation in 23% of cases.

Conclusion: The proposed holistic strategy—integrating advanced diagnostics, an individualized mathematical model for surgical dosing, refined surgical techniques, and a two-stage refractive-oculomotor approach for accommodative cases—significantly improves outcomes in the management of complex concomitant esotropia.

IPOSC session LAZY "I" Amblyopia Around the Globe

Amblyopia Treatment Efficacy in Children: The Advantage of Early Refractive Management

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Amblyopia is a neurodevelopmental disorder of vision and a leading cause of preventable monocular visual impairment in children. While conventional treatments such as optical correction, patching, and pharmacological penalization remain standard, emerging evidence emphasizes the critical importance of early refractive management as a foundational therapeutic step. This review synthesizes current literature on the advantages of immediate and precise refractive correction in the management of pediatric amblyopia, particularly in cases of anisometropia and bilateral refractive errors.

Timely optical correction alone can resolve amblyopia in a significant proportion of patients, especially when implemented during the critical period of visual development. Studies demonstrate that providing accurate glasses or contact lenses before initiating occlusion or penalization allows the visual cortex

to begin processing clearer input, thereby enhancing neural plasticity. This approach often reduces the duration and intensity of additional therapies required. In cases where amblyopia persists despite refractive adaptation, subsequent patching or atropine treatment tends to be more effective due to the established optical foundation.

Key outcomes supporting early refractive intervention include improved binocular visual acuity, greater stereoacuity gains, and higher long-term stability of visual function. Moreover, early correction mitigates the risk of persistent amblyopia and promotes better compliance with combined treatment regimens. The evidence underscores that refractive management should not be regarded merely as a preliminary step, but as a core, active component of amblyopia therapy. Thus, prioritizing early and precise optical correction is essential for maximizing visual outcomes and reducing the burden of care in children with amblyopia.

Glasses and Patching for Amblyopia

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Purpose: To summarize the findings of Randomized Clinical Trials and Observational studies performed by the Pediatric Eye Disease Investigator Group and by Investigators in the UK and Europe, on the role of spectacles alone for the treatment of anisometropic, strabismic and combined amblyopia.

Methods: A series of observational studies and randomized clinical trials have been conducted to study the effectiveness of spectacles and patching in the treatment of anisometropic, strabismic and combined amblyopia. One of the ongoing controversies is whether children with amblyopia should first be treated with spectacles alone, or whether simultaneous patching (or other treatment) should be started initially.

Results: The results of these observational studies and randomized clinical trials, will be discussed, with particular attention to how specific study design may have introduced bias, and how that potential bias might influence our interpretation of study results.

Conclusions: There is an increasing evidence-base for our management of amblyopia, but specific study design may inadvertently create bias. Appreciation of potential sources of bias, even in randomized clinical trials, is important for interpretation and application of study results.

Management of strabismic functional amblyopia: focus on the use of fixation

Paris Vincent MD
Belgium

Full data of 222 successive patients has been collected. All of them were treated before the age of 7 years and followed until the age of 12y. The only way of follow up was based on the use of the Gracis biprism test at near and distance. Dynamic analysis of successive saccades induced by the biprism led to discover new concepts of responses to amblyopia treatment disregarding the use of visual acuity measurement. Under biprismatic control, very short periods of occlusion preceding long periods of optical penalization led to amblyopia resolution in 96% in strabismic patients. Objective assessment of fixation quality gave much more precious informations compared to visual acuity (VA) measurement in terms of pathological dominance and longterm use of alternate fixation, key of success in amblyopia treatment. Our method required only few, and brief follow up visits, which are valuable assets when facing to pandemia, divorces, economic problems or distance of displacement. Due to fantastic compliance, long term optical penalization for distance proved progressively that the only obstacle to success would remain the rare cases of sensorial resistance to occlusion

The role of technology in screening for amblyopia

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Purpose: To demonstrate the application of technology-enabled screening tools—including instrument-based photoscreeners, deep learning smartphone algorithms, and digital suppression charts—implemented across a large paediatric eye care network for early detection of amblyopia.

Methods: Multiple innovations from Sankara Eye Hospital were deployed to strengthen community-based screening. These included smartphone deep learning algorithms, digital suppression charts, and instrument-based photoscreeners. Key concepts and preliminary results are presented.

Results: Photoscreeners enabled rapid screening (4–6 seconds per child) by lay personnel, with costs substantially lower than manual retinoscopy. Automated risk assessment using convolutional neural networks, applied to facial and red reflex images, required no attachments or clinician expertise, supporting scalability in resource-limited areas. A digital dichotic chart provided mobile-based assessment of suppression and binocular visual acuity. All approaches reduced dependence on highly skilled personnel, allowing minimal training, and enabled high-throughput screening critical for school and community programmes. These tools addressed access gaps in underserved regions, enabling data-driven triage. Current limitations include false positives and technical artefacts.

Conclusions: Technology-driven solutions proved effective, scalable, and cost-efficient for amblyopia screening. By lowering reliance on workforce-intensive methods, they improve accessibility and community reach. Continued algorithm refinement and integration with teleophthalmology are expected to enhance performance and though multicentre longitudinal validation is needed to confirm generalisability.

New Treatments for Amblyopia

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Amblyopia is one of the most common causes of vision impairment in the young, affecting up to 4 % of the population. It is a neurological disorder and a dynamic and complex phenomenon. Early diagnosis of visual dysfunction associated with amblyopia is crucial, as the potential for successful treatment of amblyopia is best in young children. If not promptly recognized or treated, functional deficits from amblyopia may result and persist into adulthood, with an impact on productivity and quality of life

Mainstays in the treatment of amblyopia include refractive correction (glasses), occlusion therapy and pharmacological penalization with atropine dilating drops in the non-amblyopic eye. Although glasses and patching are the gold standard of amblyopia treatment, there are drawbacks. Children can be resistant to patching, for many reasons. Atropine offers the ability to bypass patient compliance, with a single nighttime drop affecting 24 hours of better-seeing eye blur. However, it's less effective if this eye is myopic. The long-lasting dilating effects are particularly difficult for blue irides and can compromise outdoor comfort.

New treatments for amblyopia focus on engaging both eyes to work together, moving away from traditional patching. Technologies like virtual reality and eye-tracking glasses offer engaging, binocular approaches for both children and adults, with options like Luminopia, CureSight, using eye-tracking to blur the stronger eye while the patient watches any content available on the website, Revital Vision and vivid vision. Other advances include pharmaceutical interventions aimed at improving neuroplasticity, though more research is needed for some of these methods.

The trends and causes of Amblyopia in Israel over a century

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Purpose: To estimate the prevalence of amblyopia, strabismus and amblyopia risk factors (ARFs) among young adults and to analyse trends over time of prevalence rates.

Methods: This cross-sectional study including 107,608 teenagers aged 17.4±0.6 years. Across the birth years, the analyzed trends of prevalence rates among young adults included: amblyopia, amblyopia severity and ARFs (strabismsus, anisometropia and isoametropia).

Results: The prevalence of amblyopia declined by 33% (1.2% to 0.8%) across 24 birth years. This may be due to a drop in unilateral amblyopia (1% to 0.6%), while the prevalence of bilateral amblyopia remained stable (0.2%). The decline in amblyopia was apparent in mild and moderate amblyopia, but not in severe amblyopia. Strabismus and anisometropia were detected in 6-12% and 11-20% of subjects with unilateral amblyopia, respectively, without trends. Strabismic amblyopia remained constant. Isoametropia was detected in 46-59% of subjects with bilateral amblyopia without a trend. Prevalence of strabismus in the study population decreased by 50% (1.2% to 0.6%). In subjects with present strabismus, the prevalence of mild unilateral amblyopia increased, while moderate or severe unilateral amblyopia remained stable.

Conclusions: The prevalence of unilateral mild and moderate amblyopia decreased significantly over a generation. The prevalence of strabismic, bilateral or severe (unilateral and bilateral) amblyopia remained stable. The establishment of the national screening programme for children and improved utility of treatment for amblyopia and strabismus coincide with these trends. Thus, it is possible that these early interventions resulted in modification of the natural history of these conditions and their prevalence in adolescence.

Session Strabismus & Eye Movement Disorders

Rectus Pulley Instability
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Background: Recuts pulleys are connective tissue sleeves encircle the muscle and prevents its sideslip over the globe. Any instability of these pulley cause change in pulling direction of extra ocular muscle and cause different pattern. Kushner reported on 1991 cases with large Y or V pattern exotropia and proposed a theory that this pattern was due to co-contraction of the LR muscle and that those patients have pseudo-inferior oblique Overaction. But The theory of Unstability of the pulleys explain more the Y pattern without any deviation in Primary position or Inferior Oblique Overaction.

Methods: in my talk i will present 3 cases with this rare form of pulley instability of Y pattern without deviation in primary position and without Inferior oblique over action and the possibility of its diagnosis by MRI of the ocular muscles, surgical management by Upward transposition of the lateral rectus and nasal transposition of the superior rectus muscle was done in the 3 cases with postoperative decrease in the Y pattern.

Conclusion: Rectus Pulley Instability should be in your Differential Diagnosis for Pattern Strabismus and explains the Y pattern without deviation in primary position or Inferior oblique overreaction. MRI is very helpful but not possible in all pediatric cases with suspect Pulley instability

Strabismus Management: What, Where, When, and How?

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Purpose: to propose a validated and effective approach of optimizing the perioperative period in pediatric strabismus surgery.

Methods: The study included 2,232 children aged 5–17 years who underwent strabismus surgery for functional recovery. All patients received combined anesthesia (general anesthesia with sub-Tenon's block using lidocaine solution), followed by sub-Tenon's administration of ropivacaine hydrochloride solution at the end of surgery after conjunctival suture placement, alongside intravenous dexamethasone at individualized doses. 22 hours postoperatively all children received low-frequency alternating magnetic field magnetotherapy sessions to stimulate ocular tissue metabolism and microcirculation. 24–26 hours postoperatively pleoptic-orthoptic-diploptic procedures were initiated based on individual indications.

Results: No significant increases in heart rate or blood pressure were observed at any surgical stage. 2 hours post-awakening pain intensity scored (0) on the verbal rating scale (no pain), with reduced blood cortisol levels. 10 hours postoperatively 179 children (8.02%) reported moderate pain (score 2), successfully managed with intravenous paracetamol (analgesic-antipyretic). No side effects such as nausea and vomiting were registered. These outcomes facilitated early rehabilitation and patient mobilization in the postoperative period.

Conclusions: The proposed stepwise protocol for perioperative optimization provided effective analgesia with modulation of surgical stress response. Blockade of nociceptive impulses didn't trigger oculocardiac or oculogastric reflexes, ensuring psychological comfort for children and parents. All this in most cases led to functional recovery of patients.

Video-Oculography vs. Standard Diagnostic Methods in Binocular Vision Assessment: A Comparative Study

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This study retrospectively analyzed data from 22 patients (aged 5–38 years, mean age 12.2 ± 7.1 years, 12 females/10 males) with divergent strabismus (type 2) to compare angle measurements across three diagnostic devices: Gazelab, PediaVision, and Synoptophore. All patients had a cyclotropia value ranging from -7 to -40 prism diopters. Best-corrected visual acuity was normal (0.0 logMAR) in both eyes for all subjects, and no amblyopia was documented.

The mean angle of deviation measured by Gazelab was -16.0 ± 6.2 degrees, PediaVision showed -14.8 ± 5.4 degrees, and Synoptophore measured -15.6 ± 6.7 degrees. Differences between devices were not statistically significant ($p > 0.05$), though individual variability was observed, particularly in cases with higher cyclotropia. Refractive errors, expressed as spherical equivalents, varied widely among patients (range: -6.875 to +2.125 D), with anisometropia present in 8 cases.

The results indicate good overall agreement between the three methods in quantifying divergent strabismus angles in non-amblyopic patients. However, device-specific discrepancies highlight the importance of standardized measurement protocols in clinical practice. This study supports the use of multiple complementary techniques for accurate strabismus assessment, especially in patients with significant cyclodeviation or anisometropia. Further research with larger samples is warranted to evaluate device reliability in more complex clinical scenarios.

Epidemic of diplopia in adults

Olga Rozanova

Accommodative and Vergence Disorders: Their Role in the Practice of an Ophthalmologist

Alla Egorova

Surgical removal of congenital ptosis by plasty of the frontal muscle in children with minimal or no function of the upper eyelid lifting muscle ("Frontal Flap" method)

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Ptosis is the drooping of the upper eyelid. Pathology that prevents the normal functional development of the visual organ in children and adults.

A cosmetic defect is also an important problem. The crucial point is the correct choice of a pathologically sound method of surgical treatment. The most common causes of ptosis of the upper eyelid are failure of the aponeurosis of the levator, weakness, underdevelopment, damage, hypofunction of the levator and the Muller muscle, as well as a violation of their innervation, fatty dysplasia, syndromic conditions (c-Markus-Gunn, c-Horner), false ptosis (with oenophthalmos).

Conservative treatment of congenital ptosis is ineffective.

Surgical techniques such as plastic surgery and resection of the levator, levator surgery with minimal or no function of the upper eyelid lifting muscle are not always effective in restoring the functionality of the upper eyelid when the function of the levator is impaired.

Trapezoidal suspension (Frontal sling) can sometimes lead to repeated operations. According to our observations in Rostov-on-Don, some children have a need for repeated operations, this may be due to scarring of the tissues of the upper eyelid, the possible development of inflammatory processes, and non-compliance

with recommendations in the postoperative period.

There were also complications in the form of inconsistent sutures and dislocation of the sling, suppuration along the sling channel and pronounced scarring, both in the thickness of the eyelid and on the skin. Eruption of a node on the surface of the baby's skin was also observed.

Each repeated operation is complicated by scarring, newly formed vessels, and naturally deformity and deterioration of the elasticity and quality of the eyelid skin in children, which affects not only the functional state of the upper eyelid, but also the aesthetic condition.

The choice of surgical tactics is an extremely important measure to eliminate or minimize the need for repeated operations, which is very important for children who have frequent visits to the doctor, the effects of general anesthesia and the psychological impact of an anatomical and physiological defect can lead to behavioral changes and psychoemotional disorders.

Purpose: In connection with the above and based on our own experience as a result of repeated operations, in search of a solution to the problem of congenital ptosis with minimal or no levator function, the Children's Regional Clinical Hospital decided to apply a foreign technique and evaluate our results after surgical treatment with a “Frontal flap”. The following purpose were set: to analyze the tactics of surgical execution, to evaluate the recovery period with this technique and its stages, to evaluate possible complications.

Materials and methods: The work was performed based on the children's regional clinical hospital of Rostov-on-Don, in the ophthalmological center. Surgical treatment of ptosis by the method of "Frontal flap " was used for 1 year in 14 children aged 1 to 16 years. In three children, surgical treatment of ptosis was repeated after surgical treatment of ptosis, and in one child it was the fifth stage of surgical treatment after various surgical treatment methods for ptosis. Ophthalmological examination of children included a standard amount of examinations on the basis of the ophthalmology department: visometry, biomicroscopy, ophthalmoscopy, keratorefractometry, tonometry, perimetry,

OCT, video and photo fixation before and after surgical treatment. Hospitalization in the ophthalmology department averaged 5 days, surgical treatment took from 1 to 1.5 hours using general anesthesia (sevoran). The recovery period in all children passed without complications.

Results: The surgical treatment of ptosis by the method of "Frontal flap" in 14 children showed satisfactory results. Within 5-6 months from the moment of surgical treatment of ptosis, a satisfactory position of the upper eyelid was noted, the absence of keratopathy, and complete closure of the ocular fissure was noted at night. All children showed satisfactory results and complete and partial symmetry compared to the paired eye, as well as satisfactory symmetry during simultaneous surgical treatment of ptosis of the upper eyelid of both eyes.

Within 6 months after surgical treatment of ptosis, there was an improvement in visual acuity in patients with a history of amblyopia due to severe ptosis of the upper eyelid (9 patients), and a decrease in the angle of strabismus, which is a concomitant diagnosis associated with the presence of ptosis of the upper eyelid (4 patients).

Conclusions:

1. Surgical treatment of ptosis by the method of "Frontal flap " is one of the highly effective methods for correcting ptosis of the upper eyelid in cases with minimal or no function of the upper eyelid lifting muscle.
2. In all cases of surgical treatment of ptosis with this technique, a positive result has been achieved. No complications were detected.
3. This technique has a number of difficulties during surgical treatment and requires highly qualified surgeons.
4. This technique gives a positive result, which allows it to be used in most cases in the presence of congenital and acquired ptosis of the upper eyelid with pronounced decreased function or lack of levator function.
5. Surgical technique allows you to perform an operation with one access, leaving minimal cosmetic traces.
6. No tissue grafting or the use of foreign materials is required,

which minimizes unwanted scarring and possible allergic reactions.

7. There may be incomplete closure of the ocular fissure within two months after the operation.

Session Current Trends in Pediatric Ophthalmology Practice

Beyond the Obvious: A Case of Recurrent Cranial Nerve Dysfunction in a Child

Csilla Serfozo

This case report describes a child who developed headache, diplopia, and unilateral mydriasis following the use of swimming goggles. The referral diagnosis suggested a traumatic cause that is rarely reported in the literature. No other systemic or neurological symptoms were present; MRI was unremarkable, and the symptoms resolved spontaneously and completely within a few days. However, the symptoms recurred a few months later. A comprehensive diagnostic workup was performed, including magnetic resonance imaging (MRI), blood tests, and cerebrospinal fluid (CSF) analysis. We suspect a rare condition underlying the symptoms, which will be revealed during the presentation.

Complications after Soft contact lenses

Damla Culha

Snow to Sand Syndrome: Protecting Pediatric Vision Across Extreme Biomes

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Children's eyes are adapting to the extreme environments in which they grow—but often at a physiological cost. From the low-light winters of snow-covered regions to the high-glare deserts of the Middle East, pediatric vision is shaped not only by climate but also by cultural routines and increasing screen exposure. This phenomenon, termed the Biome-Vision Paradox,

challenges one-size-fits-all approaches to pediatric eye care.

This presentation introduces a novel framework exploring how different biomes—snowy, desert, and temperate urban zones—impact ocular development. In snowy regions, prolonged indoor time and low UV exposure accelerate myopia progression. In deserts, intense sunlight and

airborne dust lead to photokeratitis and digital eye strain. Urban environments present their own

risks, with screen-induced accommodative fatigue on the rise.

We propose biome-specific innovations, including UV-Lamp Light Cafés, child-designed

polarized Sand Shields, and a universal Biome-Vision Triad protocol: Assess, Adapt, Activate.

Culturally rooted practices—from traditional outdoor habits to indigenous therapies—are also integrated to enhance compliance and long-term outcomes.

With 75% of the world's children projected to live in biome-extreme zones by 2050, this talk calls for a climate-conscious shift in pediatric ophthalmology. By aligning diagnostics and

prevention strategies with geography and lifestyle, we can empower the next generation not just

to see the world—but to thrive in it.

Microbial Spectrum and Resistance Trends in Infants with

Congenital Obstruction of the Nasolacrimal Duct: A Retrospective Study

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Purpose: To describe the microbiological landscape and antimicrobial resistance trends in infants with congenital obstruction of the nasolacrimal duct, and to provide evidence-based recommendations for empiric therapy.

Methods: Conjunctival specimens from infants under one year of age with clinical signs of nasolacrimal duct obstruction were retrospectively analyzed over a six-year period. Microbial cultures were grown using conventional media, and antimicrobial susceptibility was evaluated using an automated testing platform.

Results: Among 1212 isolates, gram-positive organisms accounted for 77.15 % of growth. The most common were Staphylococcus species, including Staphylococcus epidermidis (17.49 %), Staphylococcus aureus (10.73 %), and Staphylococcus saprophyticus (9.32 %). Gram-negative organisms comprised 22.28 %, led by Escherichia coli (5.78 %), followed by Pseudomonas species (4.54 %), Enterobacter cloacae (3.71 %), and Klebsiella species (3.63 %). Fungi were rare, with Candida albicans comprising 0.33 % of all isolates. High sensitivity was observed for moxifloxacin (92.52 %), levofloxacin (88.99 %). Notable resistance was found to erythromycin (32.84 %), clindamycin (28.13 %), and tetracycline (21.65 %).

Conclusions: The microbiota associated with congenital nasolacrimal duct obstruction in infants is predominantly gram-positive, with Staphylococcus species being most prevalent. Fluoroquinolones demonstrated the highest efficacy, supporting their use in initial treatment. These findings reinforce the importance of region-specific microbial monitoring to guide effective and responsible antibiotic selection in pediatric ocular infections.

Assessment of the Long-Term Efficacy and Safety of Laser Vision Correction in Children with Hyperopia, Astigmatism, and Strabismus: Perspectives and Risks

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«Focus Ophthalmology Center, Almaty

The development of excimer laser technologies has opened new possibilities for the treatment of pediatric refractive disorders. Initially, laser vision correction was considered contraindicated in patients under 18 years of age due to ongoing ocular growth and concerns about long-term safety. However, emerging reports have documented successful use of refractive surgery in selected pediatric cases.

Purpose: To evaluate the long-term efficacy and safety of laser vision correction using FemtoLASIK and photorefractive keratectomy (PRK) in children with varying degrees of hyperopia, including those with coexisting astigmatism and accommodative strabismus.

Methods: A review of recent international studies was conducted to assess outcomes of FemtoLASIK and PRK in pediatric hyperopic patients. Long-term parameters (follow-up >1 year) were analyzed, including visual acuity improvement, reduction in hyperopic refractive error, binocular vision function, postoperative complications, and refractive stability.

Results: Data from extended follow-up (up to 5–7 years) indicate that both techniques effectively reduce hyperopia in children. The average spherical equivalent decreased by 3–5 diopters, approaching emmetropia in most cases. Uncorrected visual acuity

improved by at least two lines in 60–80% of cases, with additional gains in best-corrected acuity, particularly in eyes with preexisting amblyopia. In children with accommodative esotropia, laser correction reduced or eliminated the deviation angle, resulting in restored binocular vision. Both procedures showed comparable effectiveness: FemtoLASIK offered faster recovery and less discomfort, whereas PRK eliminated flap-related risks. No severe complications were reported. In a few PRK cases, transient corneal haze and mild regression occurred but did not impact final visual acuity.

Conclusions: FemtoLASIK and PRK demonstrate high long-term efficacy and relative safety in carefully selected pediatric patients with hyperopia, including those with astigmatism and accommodative strabismus. These methods broaden the therapeutic options for treating refractive amblyopia and strabismus, providing stable and lasting improvements in visual function. Careful patient selection and extended follow-up remain essential.

Five Key Communication Barriers in Pediatric Strabismus: A Qualitative Study of Parental Perspectives

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Medical Academy of Postgraduate Education

> **Purpose**: To identify common communication barriers between pediatric ophthalmologists and parents of children with strabismus.

Methods: This qualitative study involved 20 semi-structured interviews with parents whose children were treated for strabismus. Interviews were transcribed and analyzed using thematic coding. Recurring communication challenges were categorized.

Results: Five main communication barriers emerged: (1) lack of clarity and structure in explanations, (2) inconsistent information between physicians, (3) dismissal of parental concerns and

emotions, (4) poor communication about long-term follow-up, and (5) excessive use of non-adapted medical jargon.

Conclusions: Effective communication in pediatric strabismus care must go beyond clinical expertise and include structured, empathetic dialogue with families. The findings inform a set of communication recommendations applicable in clinical practice and educational settings. These results offer valuable insight for developing training modules in pediatric ophthalmology.

Association of Optical Coherence Tomography Angiography Metrics With Detection of Impaired Macular Microvasculature and Amblyopic Eyes: The Hong Kong Children Eye Study

Charlene Yim

Optical coherence tomography angiography (OCTA) has emerged as a promising non-invasive imaging modality for evaluating retinal microvasculature. In our previously published cross-sectional study (2022), we demonstrated statistically significant differences in OCTA metrics (include the FAZ circularity, fractal dimension, vessel diameter index obtained via customized MATLAB program) between amblyopic children and age-matched controls. These findings suggested the potential utility of OCTA-derived parameters as biomarkers for amblyopia.

Objective: To investigate longitudinal changes in OCTA metrics over a three-year period in amblyopic children compared to controls, and to assess whether these metrics are associated with treatment response.

Methods: This prospective longitudinal study enrolled 40 children diagnosed with unilateral amblyopia and 1000 matched controls. OCTA imaging was performed at baseline and after three years. Key metrics analyzed included FAZ area, FAZ circularity, fractal dimension, vessel diameter index and vessel density. Subgroup analysis was planned to evaluate associations between OCTA

changes and amblyopia treatment outcomes. Preliminary data were analyzed using independent sample t test and linear regression adjusting for multiple covariates using model such as ANCOVA.

Results (Preliminary): Initial analysis of the three-year follow-up data revealed statistically significant difference of the change in fractal dimension (0.135; 95% CI, 0.049-0.221, P=0.002) and vessel diameter index (0.001; 995%CI, -0.002-0.005,P=0.006) between the amblyopia and control groups . Further analysis incorporating subgroup stratification is underway to explore potential associations with treatment response and disease progression.

Conclusion: Preliminary findings from this 3-year longitudinal study reveal statistically significant differences in two of the OCT metrics. Further result analysis will contribute to understanding the role of OCTA as a biomarker in amblyopia and its potential utility in monitoring treatment efficacy.

The clinical case of X-linked retinitis pigmentosa in childhood

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Purpose: Demonstration of a clinical case of X-linked retinitis pigmentosa in childhood.

Methods: The retrospective analysis of the outpatient card of a patient with X-linked hereditary retinitis pigmentosa was performed.

Results: Thus, a patient with an X-linked retinitis pigmentosa gene was found to have a decrease in maximum visual acuity, concentric narrowing of the visual fields, macular edema, and corresponding changes in the fundus consistent with the diagnosis of retinitis pigmentosa.

Conclusion: Thus, a patient with an X-linked retinitis pigmentosa gene was found to have a decrease in maximum visual acuity, concentric narrowing of the visual fields, macular edema, and corresponding changes in the fundus consistent with the diagnosis of retinitis pigmentosa. The advent of gene therapy is an event of extraordinary importance for patients with retinitis pigmentosa, who often remain visually impaired. Although the results of gene therapy in other NSCs are still limited to mainly preliminary experimental studies, they are still promising for their use in clinical practice soon.

Analysis of Electroretinography and Optical Coherence Tomography Findings in Various Retinal Diseases

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Purpose: To analyze ERG (electroretinography) data in various retinal diseases and correlate the findings with OCT (optical coherence tomography) results to identify relationships between structural and functional changes.

Methods: Retrospective analyses were performed on OCT and ERG data collected from patients with diabetic retinopathy, neuroretinitis and hereditary retinal pathologies.

Results: In a patient presenting with fundus albipunctatus, OCT imaging revealed numerous focal thickenings of the RPE (retinal pigment epithelium) with enhanced RPE signal intensity. ERG demonstrated a reduction in the rod b-wave amplitude, decreased cone response amplitude, diminished OP (oscillatory potentials) and reduced flicker ERG responses. Patients with non-proliferative diabetic retinopathy exhibited decreased OP alongside structural retinal alterations identified by OCT. However, the correlation between functional and morphological changes requires further investigation. In a patient with congenital aniridia, glaucoma, and nystagmus, OCT imaging was suboptimal due to fixation difficulties. ERG showed a mild reduction in rod response and flicker ERG amplitudes, while latency and amplitude parameters during rod-cone system stimulation remained normal. In neuroretinitis case, a subnormal ERG was observed. Corresponding OCT findings included areas of RPE thinning associated with previous macular exudation.

Conclusions: ERG serves as a valuable adjunct to other diagnostic modalities, providing a comprehensive evaluation of retinal function. It can detect functional impairments preceding structural abnormalities and is especially useful when OCT imaging is limited or inconclusive.

Long-Term Efficacy of Corneal Cross-Linking in Children with Keratoconus: 9-Year Results

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Objective: This prospective clinical study aims to establish evidence-based diagnostic criteria for pediatric keratoconus through advanced corneal imaging modalities, and evaluate the long-term efficacy and safety of accelerated corneal collagen cross-linking (CXL) as a therapeutic intervention in this vulnerable patient population.

Materials and methods: A cohort of 30 pediatric keratoconus patients underwent accelerated CXL. Pre- and post-treatment data (5-year follow-up) were collected using Scheimpflug imaging (e.g., Sirius) and optical coherence tomography (OCT). Diagnosis was confirmed via clinical history and imaging.

Results: No intra- or postoperative complications occurred. At 5 years, keratoconus progression slowed significantly. Median minimal corneal thickness decreased from 460,00 μm pre-procedure to 457,00 μm post-procedure.

Conclusions:

1. Keratoconus occurs in pediatric populations, mirroring adult disease.
2. Timely CXL effectively slows progression in children.

Pediatric keratoconus

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Objective: is to provide a comprehensive review on pediatric keratoconus in terms of, prevalence, risk factors, clinical presentation, management and recommendations for pediatric keratoconus.

Materials and methods: Extensive search were done in the major medical search engine Pubmed. Search words included Pediatric keratoconus, allergic conjunctivitis in children, vernal catarrh, crosslinking and keratoplasty in children.

Results: The prevalence of pediatric keratoconus ranges from 0.16% to 4.79% depending on the geographic location. The prevalence of keratoconus and keratoconus suspect in teenagers was found to be 2.7% and 19.8% respectively. This difference is due to variations in genetic and environmental factors. Ocular associations with pediatric keratoconus include vernal keratoconjunctivitis, atopy, Down syndrome, retinitis pigmentosa, Leber congenital amaurosis, mitral valve prolapse and connective tissue disorders, such as Marfan and Ehlers–Danlos syndromes. Symptoms include blurring of vision and rapid progression of myopia and astigmatism. Children with keratoconus may also present with acute hydrops. Signs of pediatric keratoconus include slit lamp findings of Fliecher ring and Vogt striae. Topographic findings include increase in keratometry, corneal thinning and Inferior superior asymmetry with skewing of steepest radial axes above and below horizontal meridian. Management include contact lenses, crosslinking and keratoplasty. Pediatric keratoconus is more aggressive than adult keratoconus and progresses more rapidly.

Conclusion: Crosslinking has a major role in pediatric keratoconus management given the aggressive nature of the disease in children. it is recommended to perform crosslinking as soon as the disease in diagnosed. Screening for keratoconus is recommended for children with the risk factors this includes children with allergies, Downs syndrome children, children with family history of keratoconus and children with myopia and astigmatism especially in high prevalence geographic areas.

Changing the Paradigm: Laser Vision Correction as Early Intervention for Accommodative Strabismus

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The study of the possibility and feasibility of early laser correction in childhood for medical reasons continues to be one of the relevant areas in modern ophthalmology.

The aim of the work was to assess the parameters of patients before and after laser correction for their accuracy relative to the expected result, the stability of the effect.

Materials and methods: A total of 50 patients aged 5 to 15 years (average 6.7±0.3) years with hypermetropia, accommodative and partially accommodative strabismus were observed. Of these, high hyperopia was observed in 17 patients, moderate hyperopia in 20 patients, and mild hypermetropia in 13 patients - complex hypermetropic astigmatism was observed in 33 patients. In 70% of cases, clinically significant convergent strabismus with an accommodative component of 5 to 30 degrees was observed. To assess the dynamics, the following indicators were used: refraction, AL (A-scan), as well as keratometry (Flat K and Steep K), pachymetry (in the center and periphery), OCT of the anterior segment of the eye for haze formation, synoptophore and video oculography to measure the angle of strabismus. Measurements were taken before laser correction and after (from 6 months to 5 years). The surgery was performed on the MEL 90 (Carl Zeiss), the AL data were measured on the Topcon Alladin optical biometer, keratotopography on the ATLAS keratotopograph (Carl Zeiss), refraction on the Nidek ARK-1 autorefractometer, OCT (Carl Zeiss).

Results: As a result, we observed a change in AL of 0.15 during the follow-up period. The standard deviation of refractive values (SE) is 2.61 before laser correction and 2.13 after laser correction. Mean change in sph of 3.27 diopters after laser correction, cyl of 2.39 diopters and Ax of 3. Change in visual acuity (VIS): an average improvement of ≈0.15 (from 0,83 to 0,98 conventional units). Change in strabismus angle: on average, a decrease of ≈8,6 degrees (from ≈16,8° to ≈8,2°). Haze (corneal opacities): Average 0.3 on a scale of 0-3 – indicating minimal opacities.

Conclusion: The surgery resulted in a significant reduction in hyperopia (average ≈3.27 D). Postoperative refraction approached emmetropia (normal vision). A significant decrease in the angle of strabismus was noted (on average by 8.6°). This confirms the hypothesis that the correction of hyperopia can reduce the accommodative load and, as a result, the angle of strabismus. Corneal opacities are minimal (mean 0.3/3). Slight enlargement of the axis (AL) of the eye after surgery (mean ≈0,2 mm). Thus, the results of the study demonstrate a stable trend in the indicators of refraction, AL, and keratometry in the long-term perspective after laser correction in childhood.

Descemet Membrane Endothelial Keratoplasty (DMEK) for pediatric age group

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Introduction: Endothelial Keratoplasty (EK) in pediatric eyes is not without its challenges and complications. The decreased scleral rigidity, smaller anterior chamber depth, presence of a clear crystalline lens, inability to strictly maintain posture in the postoperative period, and difficulty in intraoperative visibility pose a significant challenge. However, the benefits of EK over PK in the pediatric age group have meant surgeons are willing to accept these challenges as they attempt to improve the outcome of transplants in these eyes.

Purpose: To report the technique and outcome of Descemet membrane endothelial keratoplasty (DMEK) in pediatric patients older than 6 years of age.

Methods: Retrospective analysis of medical records of 8 eyes with Congenital Hereditary Endothelial Dystrophy (CHED) that underwent DMEK who had a minimum of 1-year follow-up.

Conclusions: DMEK can be a viable option for treating corneal endothelial problems in pediatric patients.

Effectiveness of corneal ulcer treatment in measles-associated infection

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Measles-related corneal ulcer is a complication of any form and localization of keratitis, resulting from the spread of a necrotic process into the deeper stromal layers with the development of a tissue defect.

This study evaluates the clinical course and treatment efficacy of measles-related corneal ulcers in children who underwent comprehensive therapy including L-lysine.

Materials and Methods: Fifteen children (25 eyes) were observed, including 5 girls and 10 boys under the age of 5. Bilateral eye involvement was noted in 9 children (18 eyes), and unilateral in 6 children (6 eyes). In addition to standard local antiviral therapy, L-lysine was administered intravenously at a dosage calculated based on the child's age and weight — 10 mg/kg of body weight.

Results: The clinical course of corneal ulcers was complicated by delayed medical attention and untimely treatment, resulting in rapid corneal lysis in the optical zone and perforation in 18.7% of cases. A combination of peripheral corneal vasculitis and iridocyclitis was observed in 31.2% of patients. Bilateral corneal involvement was recorded in 56.2% of cases. Conservative treatment was effective in 59.4% of cases. Recurrence of the disease occurred in 11% of children. The use of L-lysine in an inpatient setting significantly accelerated the resolution and healing of corneal ulcers, with rapid epithelialization of the lesion.

Conclusions: Corneal ulcer associated with measles is a severe clinical manifestation of ocular involvement in children. Treatment should include local and systemic antiviral and antibacterial therapy, as well as intravenous L-lysine, along with moisturizing and epithelialization therapy during the acute phase. Prolonged supportive therapy focused on hydration and epithelial repair,

regular monitoring (especially during periods of respiratory infections), and ongoing management of the child's immunological status are also essential.

Clinical case of Vivity intraocular lens implantation in bilateral congenital cataract

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Congenital cataract remains a significant issue in ophthalmology, particularly in the context of intraocular correction in preschool-aged children. Advances in optical technologies in cataract surgery, which provide high-quality vision at distance, intermediate, and near ranges, have opened new opportunities for the use of modern intraocular lenses (IOLs) in pediatric patients. One of the latest models is the AcrySof IQ Vivity® (Alcon), which employs wavefront-shaping technology to create an extended depth of focus.

This study evaluates the outcome of correction following surgery for bilateral congenital cataract in a 6-year-old child with implantation of the AcrySof IQ Vivity® (Alcon) IOL.

Materials and Methods: A 6-year-old girl with bilateral congenital zonular cataract grade 1–2 was referred for surgical treatment. At the request of informed parents and following a comprehensive ophthalmologic examination and IOL power calculation targeting emmetropia, standard phacoaspiration was performed with implantation of AcrySof IQ Vivity® IOLs in both eyes with a 1-month interval. Preoperative visual acuity was OD/OS – 0.2/0.3 (uncorrected) for distance, with complaints of near vision discomfort, especially in the right eye (0.2–0.3, uncorrected). Evaluation was performed using the Verion image-guided system, considering keratometry and biometry data to plan corneal incisions and paracenteses aimed at minimizing surgically

induced astigmatism. Calculated IOL power was: OD – 25.0 D, OS – 24.5 D.

Results: Dynamic follow-up was conducted at 1 week, 1 month, 3 months, 6 months, and 1 year. Assessments included distance and near visual acuity, biometry, refractokeratometry, and optical coherence tomography (OCT). A positive trend was observed: distance visual acuity improved to 0.9 by one year. Near vision correction with spectacles OU sph +1.25 D was prescribed from the first month, later reduced to +0.75 D. By 10 months, the child was confidently reading without glasses. Biometry confirmed well-centered IOL positioning. Refractokeratometry demonstrated stabilization of refraction. OCT showed preserved retinal structure and functional integrity, supporting the development of high visual acuity.

Conclusions: Further follow-up is planned, including an evaluation of contrast sensitivity. Multifocal correction plays an important role in the restoration of vision and binocular function, while minimizing the risks of amblyopia and strabismus.

Safety and Efficacy of Sural Fixation IOL implantation in the pediatric Population – (a Quasi Experimental 1 Group pre-test, post-test study in al- Azhar University and Giza Memorial institute of ophthalmological Research MIOR)

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Purpose: The purpose of this study is to investigate the safety and efficacy of using the Yamane technique of sutureless scleral IOL fixation in the pediatric population.

Method: The Yamane technique aims to fix the IOL in place by creating small, self-retaining flanges on the haptics, rather than relying on sutures or the natural capsule.

Procedure:

1. Scleral Incisions:
   Two small (27 or 30 gauge) incisions are made in the sclera, about 2-3 mm from the limbus (the border between the cornea and sclera).
2. Haptic Externalization:
   A 30-gauge needle is passed through one of the scleral incisions, then through the anterior chamber and into the eye. The haptic of the IOL is grasped with forceps and carefully pulled through the needle lumen.
3. Flange Creation:
   The haptic is then externalized through the second scleral incision using another needle in a similar manner.
4. Flange Formation:
   A heat source (like a cautery) is used to create a flange at the end of the haptic, preventing it from slipping back into the eye.
5. Scleral Tunnel Closure:
   The scleral incisions may be closed with sutures or left to heal naturally.

All subjects were followed up for best corrected visual acuity (BCVA), central corneal thickness (CCT), endothelial count, anterior chamber depth (ACD), white to white (WTW) diameter, angle of the eye, axial length (AL) central macular thickness (CMT) and intra ocular pressure (IOP).

Results: The results show that the BCVA has improved with no significant structural changes in the operated eyes after a 6 month period follow up period with no reportable complications.

As seen from the following graphs; the BCVA graph shows the positive impact of the Yamane technique after 6 months of follow up. This is true without affecting other structural changes as for CCT, endothelial count, ACD, IOP, AL and WTW.

No complications were reported in these cases as haptic protrusion or endophthalmitis.

Conclusion: The Yamane technique is a safe and effective procedure to be used in the pediatric population in cases where there is insufficient capsular support.

Optic Component Exchange of a Pediatric Modular Intraocular Lens: Initial Experience

Yevgeniy Batkov, MD

> **Purpose**: to report the first case of optic disc replacement in a patient who previously received a customized modular intraocular lens (IOL).

Methods: since March 2022, 52 children (62 eyes) received modular IOLs, primarily for congenital cataract (42 eyes), including 19 infants aged 2–12 months. The IOL power calculation target in infants was minimal initial hyperopia. As expected, this resulted in rapid development of myopic refraction. Notably, the phase of accelerated myopization was relatively short and culminated in refractive stabilization. In our first operated case, considering refractive stability at -9 diopter spherical equivalent, completion of the critical visual development period, and visually significant proliferative opacity within the visual axis requiring intervention, we performed an optic disc exchange to achieve emmetropia.

Results: the lens behaved predictably. The haptics maintained stable centered optic positioning without deformation (no twisting, no optic compression). There were no difficulties with explanting the outgoing optic. The incoming disc seated easily due to its reduced thickness compared to the previous one (first optic: +35 diopters, replacement: +23 diopters). The fixation flaps retained their elasticity—flexing and unfolding without fracture. The exchange was performed through a 2.65 mm self-sealing incision.

Conclusions: the initial experience demonstrates practical feasibility of refractive adjustment across a wide range of refractive change characteristic of early childhood. A 3-year follow-up period of using modular IOLs with dedicated pediatric design indicates the implant's reliability in terms of optic component centration, fixation, release, and subsequent secure re-fixation.

From most difficult to easiest step in pediatric cataract surgery

Mohammed Basuliman

Peculiarities of Surgical Management and Intraocular Correction of Congenital Cataract in Pediatric Patients

Egiyan Naira
KTEF AAO Virtual Reality Platform ROP Module
Faruk Orge MD, MBA, Director of Ophthalmology Akron Children's Hospital, Professor of Ophthalmology, Pediatrics and Biomedical Engineering, Vice President, AAPOS; Editor in Chief, AAO KTEF Pediatric Ophthalmology Education Center and Virtual Reality Center, Chairman IPOSC Advisory Board

Objective: To evaluate the utility of a specialized virtual reality (VR) simulator in training ophthalmologists for the diagnosis and treatment of retinopathy of prematurity (ROP), a potentially blinding disorder affecting premature infants.

Methods: This review assesses a VR training platform designed to replicate the complex clinical scenario of examining a premature infant and performing laser photocoagulation or intravitreal anti-VEGF injection. The simulator recreates a virtual neonatal intensive care unit (NICU) environment and provides a realistic, magnified view of the infant's retina. Using instrument tracking, it trains crucial skills: proper use of the indirect ophthalmoscope and scleral depressor for systematic examination, accurate identification of plus disease and zone-specific ROP pathology, and precise delivery of laser treatment to the avascular retina.

Results: The VR simulator provides a safe, controlled, and repeatable training environment without risk to vulnerable patients. It is shown to improve diagnostic accuracy in identifying key ROP landmarks and disease stages. For procedural training, it enhances proficiency in laser delivery technique, improving

speed and accuracy while minimizing the simulation of inadvertent treatment to non-target tissues. This allows trainees to develop competence and confidence before performing procedures on infants.

Conclusion: Virtual reality simulation represents a critical advancement in training for the management of retinopathy of prematurity. It effectively bridges the gap between theoretical knowledge and clinical expertise by providing realistic, hands-on practice in diagnosis and laser treatment. This technology is an essential tool for improving patient safety, standardizing training, and ultimately helping to prevent blindness in this high-risk pediatric population.

ISA session Complications in Strabismus Surgery

Lost/Slipped muscle
Andrea Molinari

Overcorrections in Strabismus Surgery

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Purpose: Overcorrection after strabismus surgery refers to a postoperative deviation in the opposite direction of the original misalignment, occurring either intentionally (e.g., in intermittent exotropia) or unintentionally. Contributing factors include surgical issues (e.g., slipped or lost muscles, stretched scars, excessive recessions) and patient-related factors (such as amblyopia, age, and anatomical variability). While some overcorrections resolve spontaneously, others persist and become symptomatic, potentially causing diplopia, visual suppression, loss of binocular vision, or cosmetic concerns. In this review we will focus specially in consecutive esotropia.

Results: The incidence of consecutive exotropia ranges from 0.3% to 7.3%, with cumulative rates reported up to 30%. Diagnosis relies on detailed clinical evaluation, including ocular motility testing, imaging, and intraoperative forced duction testing to assess for restriction or slippage. Treatment options include: 1. Conservative management: Observation, occlusion therapy, minus lenses, prisms, and early botulinum toxin (BT) injections—especially effective for consecutive esotropia. 2. Surgical management: In case of consecutive exotropia medial rectus advancement, lateral rectus recession, or combined approaches, depending on the underlying cause. Proper scar management, the use of non-absorbable sutures, topical anesthesia, and adjustable suture techniques can significantly improve outcomes.

Conclusion: Effective management of overcorrections requires accurate identification of the underlying cause. Initial conservative treatment is often appropriate, with surgery reserved for persistent or large deviations. Patient counseling and individualized surgical planning are essential to minimize complications and achieve long-term alignment stability.

Undercorrections in Strabismus Surgery

Kozeis Nikos

Undercorrection represents one of the most frequent postoperative challenges in strabismus surgery, often leading to residual ocular misalignment, suboptimal binocular function, and the need for secondary interventions. The phenomenon is multifactorial, influenced by surgical planning, intraoperative variables, tissue healing responses, and patient-specific anatomical or neurological characteristics. This review outlines the main causes and risk factors associated with undercorrections, including inadequate preoperative measurements, restrictive or paretic extraocular muscle conditions, and unpredictable postoperative scarring or muscle slippage. Furthermore, the clinical implications of persistent

deviations on visual development in children and on quality of life in adults are discussed. Strategies to minimize the risk of undercorrection, such as refined surgical dosimetry, adjustable suture techniques, intraoperative assessment tools, and personalized surgical planning based on patient-specific parameters, are highlighted. Early recognition and timely management of undercorrections remain essential for optimizing surgical outcomes and reducing the burden of reoperations.

Complications Following Strabismus Surgery: An IRIS Registry Study

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Introduction: We used the American Academy of Ophthalmology's IRIS® (Intelligent Research in Sight) Registry to obtain large scale data on the major complications following strabismus surgery.

Methods: We reviewed IRIS® registry data from 89,339 patients (134,635 eyes) undergoing strabismus surgery from 1/1/2013 – 12/31/2021 and calculated the rates of occurrence for endophthalmitis, corneal ulcer, lost/slipped muscle, and orbital cellulitis. We then performed secondary analyses to identify associated risk factors, temporal profiles of presentation, and visual outcomes.

Results: Any major complication following strabismus surgery occurred in 0.12% of patients (0.09% of eyes). Patient occurrence rates for endophthalmitis, corneal ulcer, lost/slipped muscle, and orbital cellulitis were 0.01%, 0.03%, 0.04% and 0.03% respectively. Endophthalmitis, corneal ulcer, and lost/slipped muscle were 2.5-4.5x more common in patients over age 65. Independent risk factors for complications were simultaneous horizontal and vertical muscle surgery (0.14%), 3 or more secondary surgical codes (1.15%), and female sex (0.13%). Postoperative visual loss occurred in a majority of patients with

each complication (80% for endophthalmitis), with a mean loss of approximately 1 line of vision for all except endophthalmitis (mean logMAR acuity 0.58). Half of the cases of orbital cellulitis and endophthalmitis were diagnosed within the 5 first days after surgery.

Conclusions: Major complications following strabismus surgery occur in approximately 1/1000 patients. Endophthalmitis following strabismus surgery occurs in 1/10,000 patients. Age>65, female sex, and complex procedures are associated with complications, which should be addressed in the informed consent process. We recommend postoperative evaluation within the first 5 days after strabismus surgery in order to diagnose endophthalmitis and orbital cellulitis as soon as possible.

Diplopia after Strabismus Surgery

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Purpose: Diplopia following strabismus surgery remains a critical concern in surgical planning and patient counseling. This review highlights the importance of pre-operative assessment in predicting and managing post-operative diplopia.

Methods: Pre-operative evaluation includes sensory testing for binocular vision potential, suppression, and abnormal retinal correspondence (ARC). Diagnostic tools such as prisms and the synoptophore aid in mapping binocularity, fusion ranges, and diplopic responses. Patients demonstrating diplopia during pre-operative testing are considered at higher risk post-operatively. Management strategies include prism adaptation, diagnostic botulinum toxin, and adjustable suture techniques.

Results: Diplopia after strabismus surgery can be expected or unexpected. Expected diplopia occurs in patients with

preoperative diplopia without fusion, staged surgical plans, or intentional overcorrection to achieve fusion. Unexpected diplopia arises from overlooked torsional components, ARC, central fusion disruption and inaccurate alignment. Risk factors associated with post operative diplopia include weak suppression, anomalous binocular functions and complicated deviations with ocular motility disorders. Management varies from prism therapy, exercises, optical manipulation and occlusion to additional surgical correction when necessary. Intractable diplopia is rare but should be considered.

Conclusions: Careful pre-operative sensory and motor testing provides essential predictive value for post-operative diplopia outcomes. Patients without a diplopic response during pre-assessment are low risk, whereas those with measurable diplopia require tailored counseling and management. Early identification of risk factors, combined with realistic pre-operative discussions, optimizes outcomes and minimizes the impact of intractable diplopia

Eyelid alterations related to strabismus surgery

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Purpose: Extraocular muscle surgery may have an impact on eyelid position and this feature of strabismus surgery is usually underestimated or may not be recognized. Palpebral fissure changes may present as a complication of strabismus surgery whereas in certain motility disorders the extraocular muscle eyelid relations may be used for the benefit of the patient for treatment of palpebral fissure problems. The aim of this presentation is to discuss the possible eyelid alterations related to strabismus surgery.

Methods: The etiology, preventive measures and treatment of possible palpebral fissure alterations will be presented by clinical case examples in a variety of different strabismus procedures.

Results: The eyelid alterations are related to anatomical and functional aspects as well as functional laws of binocular vision.

Rectus muscles pulls the eye back and oblique muscles pull the eye forward. Vertical rectus muscles have more impact than horizontals. Extraocular muscle recessions, resections, plications, transpositions and intermuscular septum dissections may alter eyelid positions. Awareness and prevention is far more important than treatment. On the other hand, by using the extraocular muscle eyelid relations, strabismus surgery may be used for treatment of certain eyelid problems based on anatomical aspects or by innervational strabismus surgery.

Conclusions: Strabismus surgeon needs to consider the possible eyelid changes in strabismus surgery, how to avoid them and how to convert it into an advantage for the benefit of the patient where necessary.

Surgical treatment of partial accommodative strabismus: problems and prognosis

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Partially Accommodative Esotropia (PAE) is a form of concomitant strabismus in which hypermetropic refraction induces excessive accommodation, leading to a convergent deviation of the eyes. A key diagnostic criterion is the reduction, but not complete elimination, of the esodeviation angle under maximum optical correction, indicating the presence of a persistent non-accommodative component.

This study evaluates the efficacy of an innovative treatment protocol that prioritizes laser refractive surgery to neutralize the accommodative factor prior to extraocular muscle surgery. The extraocular muscle intervention is then planned based on the residual strabismus angle remaining after the refractive surgery, utilizing the mathematical modeling for surgical dosing calculation provided by Professor Igor Aznauryan's Strabo software.

Materials and Methods: We analyzed 215 outpatient medical

records of patients diagnosed with PAE (2016–2025) with hypermetropia ranging from +3.5 to +7.0 D, aged 4–10 years. The preoperative deviation without correction ranged from 20° to over 35°, decreasing to 10–18° with full hypermetropic correction.

Patients were divided into two groups: Group 1 consisted of 187 patients (374 eyes) aged 6–12 years. As a first stage, they underwent laser correction for hypermetropia using our developed technology for intervention dosing, which accounts for potential refractogenesis and employs a specialized protocol for general anesthesia (Professor I. Aznauryan's technique).

Group 2 consisted of 28 patients for whom extraocular muscle surgery was performed as the first stage. This approach was dictated by age limitations and refractive instability, which determined the decision to prioritize extraocular muscle surgery initially. Some of these patients subsequently underwent laser correction for hypermetropia.

Results: In Group 1, three months post-operatively, 109 patients (58.3%) exhibited a minimal residual angle of 5–8°, which compensated further during follow-up. 78 patients (41.7%) had a persistent residual angle of 10–25°, necessitating extraocular muscle surgery (recession/resection). The surgical plan was calculated using the Strabo mathematical modeling software (Professor I. Aznauryan's technique). The combination of these interventions allowed for the achievement of complete or near-complete orthotropia (±5°).

In Group 2, all patients exhibited a residual esodeviation of up to 12° without correction after the primary surgery. Subsequently, 14 of them underwent laser correction, which ensured the achievement of orthotropia. However, 14 patients in this group later developed exotropia: in 12 cases following laser correction, and in 2 cases due to natural emmetropization. All of these patients required repeat surgical intervention for divergent strabismus.

Conclusions: The developed strategy for the comprehensive surgical treatment of partially accommodative esotropia aligns with the primary goal of ensuring functional and social rehabilitation of patients.

The comprehensive surgical approach is implemented in stages and includes:

First stage: Laser correction of hypermetropia using an algorithm for calculating the intervention volume (I. Aznauryan's technique) with the application of a specialized general anesthesia protocol.

Second stage: Surgical correction of the residual deviation via extraocular muscle surgery utilizing mathematical modeling technology (I. Aznauryan's technique).

Laser refractive correction in children is not only feasible but also a key component of the comprehensive surgical treatment of strabismus with an accommodative component.

When laser correction of hypermetropia is not possible, the optimal tactic is intervention on the extraocular muscles with surgical dosing based on the angle of strabismus under correction. Subsequently, during dynamic follow-up, indications for laser correction should be re-evaluated to achieve complete functional rehabilitation.

Diplopia following vertical strabismus surgery - Surprise for Surgeon

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Introduction: Nystagmus Blockage Syndrome (NBS) is a complex oculomotor disorder characterized by a convergence effort to dampen nystagmus, often leading to an esotropia and an abnormal head posture. This case report details the presentation, surgical management, and unexpected complication of persistent diplopia in an adult patient with NBS and associated vertical strabismus.

Case Presentation: A 39-year-old female presented to the clinic in March 2025 with complaints of nystagmus and low visual acuity in the left eye, with no prior surgical history. Video-oculography identified a nystagmus blockage zone corresponding to a forced head posture: turn to the right shoulder and head tilt to the right. Comprehensive diagnostic workup, including OCT of the optic nerve and macula, and electrophysiological studies (EFI), revealed no significant organic pathology to explain the amblyopia. Video-oculography further revealed a vertical strabismus: a right hypertropia of 18 prism diopters (PD) and a left hypotropia of 4 PD.

Management and Outcome: Surgical correction was planned using mathematical modeling software. A deep recession of the right superior rectus muscle was performed to address the vertical deviation. The early postoperative period showed excellent motor results: complete orthotropia, effective blockage of the nystagmus in the primary head position, and improved visual acuity. However, the patient immediately developed intractable, debilitating diplopia that persisted despite a course of conservative diploptic treatment. Subsequent video-oculography confirmed a new vertical deviation, now presenting as a left hypertropia that increased on adduction.

Conclusion: This case highlights a successful surgical correction of vertical strabismus and nystagmus blockage in an adult with NBS, achieving anatomical and functional goals. However, it underscores the significant risk of intractable diplopia post-operatively in adult strabismus patients, even in the presence of apparent orthotropia. This complication necessitates careful preoperative counseling and suggests that the adult brain's limited adaptive capacity to new sensory alignment can profoundly impact quality of life despite optimal surgical results.

A Surprising Indication to Perform Strabismus Surgery: Beyond Angles and Vision

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Strabismus is traditionally approached as a visual and functional disorder, with surgical correction aimed at restoring binocular alignment. However, emerging evidence highlights a profound psychosocial dimension that is often underestimated in clinical decision-making. This presentation explores the psychological and social consequences of strabismus across all ages.

Cultural and historical perspectives reveal that strabismus has long been linked to social perception, from the Mayans considering crossed eyes beautiful to South Asian beliefs about a squint as a sign of good fortune. Yet modern contexts show an overwhelming psychosocial burden. Children with strabismus face ridicule, bullying, and exclusion, with studies showing they are invited to fewer social events and often suffer from anxiety, withdrawal, or poor academic confidence. Adolescents report negative body image and impaired social competence, frequently reinforced by stereotypes in the media. Adults with strabismus experience reduced self-esteem, social avoidance, and even discrimination in employment, being perceived as less intelligent, trustworthy, or capable. These psychological impacts are independent of deviation size.

Following surgical alignment, multiple studies confirm significant improvements in self-confidence, interpersonal relationships, and overall quality of life, underscoring the broader reconstructive value of strabismus surgery. Holistic strabismus care must therefore consider psychological as well as visual outcomes. Ophthalmologists should routinely inquire about psychosocial concerns when counseling patients and families, correcting misconceptions that surgery is only cosmetic or should be delayed until adulthood.

In conclusion strabismus surgery extends beyond restoring ocular alignment—it restores dignity, confidence, and opportunity. Psychological wellbeing must be recognized as a valid and compelling indication for surgical intervention.

Permanent Vision Loss After Strabismus Surgery

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Nasal transposition of the split lateral rectus muscle is a relatively new option for treating complete oculomotor nerve palsy. While favorable outcomes have been reported, the procedure carries a potential risk of vision loss. We have performed this surgery in three patients with excellent results; however, in a fourth patient, it resulted in permanent vision loss.

A 12-year-old girl from Canada presented with complete left third nerve palsy following gamma knife therapy for a neurofibroma involving the third nerve in the cavernous sinus. Her visual acuity was 20/20 in the right eye and 20/32 in the left. She exhibited large-angle exotropia with no ocular motility. Surgery included superior and inferior oblique tenotomies followed by nasal transposition of the split lateral rectus muscle, which was sutured 2 mm posterior to the medial rectus insertion.

On postoperative day one, marked eyelid and conjunctival swelling developed. One week later, she reported complete loss of vision in her left eye. Despite satisfactory alignment, there was

no light perception. Fundus examination revealed optic disc swelling, dilated veins, and narrowed arteries. Intraocular pressure was 10 mmHg bilaterally. MRI demonstrated serous choroidal effusion and globe distortion. Immediate suture release was recommended but declined by the patient and her family, who were satisfied with the alignment.

Three months later, the optic nerve appeared pale, with evidence of complete arterial occlusion. This case underscores the rare but devastating risk of permanent vision loss associated with nasal transposition of the split lateral rectus muscle.

Session Pediatric Ophthalmooncology

Diagnosis and Treatment Strategies for Retinoblastoma: Current Approaches and Future Directions

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Retinoblastoma is a malignant tumour of the optical part of the retina with an aggressive growth and 100% mortality if not treated. Currently the diagnostic of retinoblastoma has a complex approach to detect tumor at early stages and even before clinical symptoms appear - in risk groups. Ophthalmoscopy of wide pupil in newborn is an obligatory condition, as well as ultrasound and OCT. The aims of diagnostics are disease staging and treatment tactics determination by interdisciplinary medical concilium. The treatment for retinoblastoma is combined and depends on the disease stage and characteristics of tumor growth. Due to systemic and local chemotherapy introduction into practice leading to tumor decrease as well as focal methods such as brachytherapy, laser coagulation and cryodestruction the two fold decrease in primary enucleations, eyesight preservation in 80%

and children survival in 99% of cases was achieved at present. However, it is necessary to understand that it is impossible to completely exclude enucleation and its timely performance in cases with complications and relapses is important in securing children' survival. Therefore, only early diagnostics is the key to eye and its functions survival and high quality of life preservation.

Clinical features and imaging presentation of orbital dermoid cysts

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Purpose: To analyze the features of the clinical and instrumental picture of dermoid cysts of the orbit in adults and children.

Methods: The analysis included 252 patients with dermoid cysts of the orbit treated during the period from 2014 to 2023, including 52 adult patients (median – 30 years) and 200 children and adolescents (median – 3 years). All patients underwent surgical treatment, the diagnosis was confirmed histologically. The results of the clinical and instrumental picture in adults and children were analyzed and highlighted.

Results: The first signs of a lesion in children were detected at the age of 6-12 months, in 94% of cases in the form of a painless formation in the area of the orbital margin (more often in the upper-inner part of the orbit), in 15% with the development of ptosis of the upper eyelid. The duration of the anamnesis in adult patients was from 2 months to 27 years (median – 4 years). Of these, 7 had recurrences (3 had a fistula and purulent discharge), and 2 had abscesses. Exophthalmos with downward displacement of the gloge was a common symptom. 72% of patients reported pain and pressure in the orbit, as well as swelling and redness. CT scans revealed a fatty mass, the presence and extent of destructive changes in the underlying orbital bone wall, and the

spread of the mass to adjacent anatomical areas. The results of a comprehensive ultrasound examination showed the presence of a cystic formation with a fatty content and heterogeneous structure (68%), an echographically detectable capsule, and the absence of signs of self-vasculization during color Doppler imaging examination.

Conclusions: Orbital dermoid cysts require a comprehensive clinical and instrumental examination of the patient to determine the nature of the disease in order to plan surgical intervention. It is necessary to have a clear understanding of the extent of the process, the involvement of surrounding structures, and the condition of the orbital bone walls. Surgical treatment should be performed in specialized ophthalmological facilities by specialists with expertise in orbital surgery.

Novel technique for intra cameral chemotherapy for retinoblastoma

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> **Purpose**: To describe the feasibility of a new one-step approach to aspirate the aqueous and apply melphalan in a single-go without repeated entries into the anterior chamber.

Methods: This retrospective non-comparative study was conducted at a referral center and included 12 patients. The one-step approach is described in a step-wise manner. No complications were observed among the patients.

Results: One single injection of intracameral melphalan proved to be a successful treatment in nine cases. Two patients required a second injection, which was administered two weeks after the first one following the same technique.

Conclusions: This proved to be a reasonable technique for the smooth application of melphalan in the anterior chamber studded with retinoblastoma seeds. Our outcomes revealed that it is an

effective, quick, and cost-effective technique. Longer-term data collection is underway, though initial findings are encouraging.

The level of awareness about retinoblastoma among physicians of various specialties

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> **Purpose**: To evaluate the level of awareness about retinoblastoma among physicians of various specialties.

Methods: A cross-sectional study was conducted via an online survey from January to February 2025. The questionnaire comprised 27 questions assessing primary healthcare (PHC) physicians' awareness of retinoblastoma. We collected 311 responses: 49 general practitioners (GPs), 41 pediatricians, and 221 ophthalmologists. Statistical analysis was performed using SPSS software. There are no financial disclosures related to study.

Results: Among GPs and pediatricians, most respondents were aware of retinoblastoma (81.6% of GPs, 92.7% of pediatricians). However, clinical experience was limited (20.4% of GPs, 31.7% of pediatricians). Pediatricians more frequently encountered suspected cases (51.2% vs. 26.5% for GPs, p=0.024) and referred children with a family history to an ophthalmologist (87.8% vs. 69.4% for GPs, p=0.032). The "white pupil" symptom was recognized by 90.2% of pediatricians and 63.3% of GPs (p=0.003). Only 14.3% of GPs and 34.7% of pediatricians were aware of modern eye-preserving treatment methods (p=0.027).

Ophthalmologists demonstrated high knowledge of clinical signs, with approximately 60% having encountered such patients. However, they showed insufficient awareness regarding the potential hereditary nature of the disease and the need for

screening all children born into families with a burdened history of retinoblastoma.

Conclusions: The study revealed an insufficient level of awareness about retinoblastoma among PHC physicians, particularly general practitioners. To improve awareness, informational activities are necessary, including publications, media appearances, presentations at professional platforms, social networks, and educational campaigns within the framework of the annual World Retinoblastoma Awareness Week.

Differential diagnosis of rhabdomyosarcoma with lacrimal sac phlegmon and eyelid neoplasm

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Rhabdomyosarcoma is one of the malignant tumors characteristic mainly of childhood. Rhabdomyosarcoma refers to soft tissue sarcomas that can be found in almost any part of the body, in the organs of the head and neck, including the soft tissues of the eye orbits.

> **Purpose**: To carry out differential diagnosis of rhabdomyosarcoma and benign neoplasms of the eyelid (chalazion), phlegmon of the lacrimal sac. To increase cancer awareness in the treatment of these visual organ pathologies.

Materials and methods: The work was performed at the Children's Regional Clinical Hospital in Rostov-on-Don, at the ophthalmological center. Two clinical cases with photo registration are presented: The first clinical case is the treatment of a neoplasm of the eyelid, according to the treatment regimen for chalazion of the lower eyelid, without positive dynamics, with surgical treatment and histological analysis confirming the diagnosis of rhabdomyosarcoma. The second clinical case is the probing of the phlegmon of the lacrimal sac with positive dynamics. Within 1month, repeated treatment of the patient with multiple neoplasms in the lacrimal sac and orbit. A histological

examination was performed to confirm the diagnosis of rhabdomyosarcoma.

Results: The patients were consulted by an oncologist and a multi-stage treatment of this disease was carried out at the Federal Center with positive dynamics.

Conclusions: 1. It is necessary to have oncological caution in the treatment of all neoplasms of the eyelids and phlegmon of the lacrimal sac. 2. Mandatory histological analysis is required during surgical treatment of neoplasms. 3. Dynamic monitoring of patients after the performed manipulations and surgical treatment is necessary.

Session Retinopathy of Prematurity (ROP)

Differential Diagnosis of Severe Forms of Retinopathy of Prematurity

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Retinopathy of prematurity (ROP) is a multifactorial disease with different course and requiring differentiated approach to observation and treatment. In 2005 and 2021, additions were made to the existing classification of ROP. Such forms of course as “plus” disease and the most severe form of ROP –aggressive posterior ROP (AP ROP) – were identified. Based on their own experience, the authors point out some features of the development and course of AP ROP, since errors in establishing a particular form of ROP lead to improper management of a child with ROP, making statistical analysis of morbidity impossible. Since difficulties mainly arise in differential diagnosis of AP ROP and “plus” disease, the authors conducted a comparative description of these forms of ROP.

Comparative analysis of refraction in children with retinopathy of prematurity treated with anti-VEGF therapy or laser coagulation.

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> **Purpose**: To compare refractive outcomes in children diagnosed with retinopathy of prematurity (ROP) who underwent treatment with either intravitreal anti-vascular endothelial growth factor (anti-VEGF) therapy using ranibizumab or retinal laser photocoagulation, and to assess the implications of these treatment modalities on early refractive development.

Methods: A retrospective observational study was conducted on patients under the age of three who had been treated for ROP

with either intravitreal ranibizumab injections or laser coagulation. All patients underwent follow-up ophthalmologic examinations including clinical cycloplegic refraction and ocular biometry (axial length, corneal curvature, and anterior chamber depth). Refractive and biometric data were statistically analyzed and compared between groups.

Results: The analysis revealed significant differences in refractive development between treatment groups. Patients treated with ranibizumab showed a lower incidence of high myopia and demonstrated axial growth patterns more consistent with physiological emmetropization, as compared to those who received laser photocoagulation. Biometric parameters in the anti-VEGF group indicated reduced disruption of ocular growth and refractogenesis.

Conclusions: Anti-VEGF therapy, particularly with ranibizumab, may provide advantages in maintaining more natural refractive development in infants with ROP when compared to laser coagulation. These findings support the importance of considering long-term refractive outcomes when selecting a treatment strategy, especially in patients at higher risk for significant ametropia.

«I See the World», a unique program for preventing an epidemic of blindness caused by retinopathy of prematurity in Kazakhstan

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Retinopathy of prematurity (ROP) is the leading cause of preventable blindness worldwide. In Kazakhstan from 2010 to 2016 the issue of ROP has become an epidemic of blindness.

The key to the successful diagnosis and treatment of ROP lies in establishing a screening system that involves a team of specialized ophthalmologists working together with modern

equipment to preserve vision in 100% of cases.

Objective: To evaluate the effectiveness of a unique project in organizing training, screening, and treatment of newborns with ROP.

Research methods: In 2021, the AYALA Foundation, along with an expert ophthalmologist in ROP a unique project titled “I See the World” was launched by non-governmental organizations and a company implementing advanced technologies. The project includes an original method of individualized ophthalmologist training and a step-by-step purchase of ophthalmic equipment across the country.

Results: Between 2021 and 2024, the “I See the World” project trained 26 ophthalmologists working within the unified ROP KZ system. The following equipment was procured: 12 digital wide-field cameras, 17 binocular ophthalmoscopes, and 8 laser systems. The number of premature infants screened increased from 6,519 in 2021 (1,390 diagnosed with ROP) to 8,021 infants in 2024 (1,569 diagnosed with ROP). Surgeries performed: 392 in 2021, 646 in 2024. The number of blind children decreased from 68 in 2021–2022 to 8 in 2024. The effectiveness of ophthalmologic screening reached 98%.

Conclusion: The creation of the “I See the World” project has established a unified system of early diagnosis and modern treatment methods, enabling the delivery of "the best possible vision to every premature infant."

Prognostic Role of Early Diagnosis and Treatment of Aggressive Retinopathy of Prematurity with Intraventricular Hemorrhage

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Aggressive retinopathy of prematurity (A-ROP) is one of the most severe forms of retinopathy, characterized by rapid progression and a high risk of retinal detachment. The combination of A-ROP with intraventricular hemorrhage (IVH) presents particular clinical significance. Despite advances in diagnostic and treatment methods, the effectiveness of early detection and optimal therapeutic strategies for A-ROP combined with IVH remains insufficiently studied and requires further scientific investigation.

The aim is to perform early diagnosis and timely treatment of aggressive retinopathy of prematurity with IVH, with an assessment of ophthalmological outcomes.

Materials and Methods: Data from 3,048 preterm neonates who underwent ophthalmologic screening were analyzed. Retinopathy of prematurity was diagnosed in 1,969 (64.6%) infants, with treatment administered in 487 (24.7%) cases. The study included 420 patients with complete clinical data. A-ROP was diagnosed in 122 infants, 81 of whom had concomitant IVH. These patients received intravitreal injections of anti-angiogenic agents (anti-VEGF). Patients were stratified into groups based on birth weight: extremely low birth weight (ELBW), very low birth weight (VLBW), and low birth weight (LBW). The degree of IVH, timing of intervention, and complications were evaluated.

Results: The most severe forms of IVH and frequent complications, including retinal detachment, were observed in infants with ELBW. More mature infants exhibited less severe IVH but maintained a high incidence of myopia.

Conclusion: IVH is a significant factor in the unfavorable course of A-ROP. Early diagnosis and timely intravitreal anti-VEGF therapy within a multidisciplinary approach reduce the risk of complications and improve ophthalmologic prognosis in this patient population.

Combined Surgical Treatment for Severe Forms of Retinopathy of Prematurity: Approaches, Efficacy, and Clinical Outcomes

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Retinopathy of prematurity (ROP) is a leading cause of childhood blindness globally (Drenser K.A. et al., 2021). Since 2008, Kazakhstan has recorded over 20,000 preterm births annually, including 4,200–4,500 infants with birth weight <1,000 g and gestational age (GA) <27 weeks. The incidence of ROP in this population reaches 86%, with severe forms in 26% (Sharipova A.U., 2022). Identifying effective and safe surgical treatments for severe ROP remains a critical challenge.

Aim: To evaluate the efficacy of a combined treatment method—laser photocoagulation (LPC) and intravitreal anti-VEGF injection—in managing severe active ROP in neonates born before 27 weeks GA.

Materials and Methods: This retrospective and prospective study included 56 infants with severe active ROP who underwent surgical treatment. Patients were divided into three groups:

- Main group (n=18): LPC + anti-VEGF;
- Comparison group 1 (n=22): LPC monotherapy;
- Comparison group 2 (n=16): anti-VEGF monotherapy.

Outcomes assessed: ROP reactivation, anatomical and functional results, and complications.

Results: Combined treatment ensured complete disease stabilization with no ROP reactivation. Monotherapy groups experienced complications including uveitis, retinal detachment, and cataract—absent in the combined group. High myopia was more frequent in monotherapy; only two cases occurred in the combined group.

Conclusion: The combination of intravitreal anti-VEGF therapy and laser photocoagulation currently represents an effective treatment approach for severe forms of retinopathy of prematurity in infants born before 27 weeks of gestation, achieving a 100% success rate in all treated cases.

Diplopia following vertical strabismus surgery - Surprise for Surgeon

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Nystagmus Blockage Syndrome (NBS) is a complex oculomotor compensatory disorder associated with the necessity to reduce or completely block the amplitude and frequency of oscillatory eye movements. This compensation is frequently accompanied by esotropia and an abnormal head posture. The present case report illustrates a rare manifestation of NBS—the development of persistent diplopia in an adult patient with concomitant vertical strabismus and excyclotorsion.

Case Description: A 39-year-old female patient presented to the clinic in March 2025 with complaints of nystagmus and reduced visual acuity in the left eye. There was no history of previous surgical interventions.

Diagnostic Data: Video-oculography revealed a nystagmus blockage zone corresponding to the abnormal head posture: turn to the right shoulder and tilt to the right. Optical coherence tomography (OCT) of the optic nerve and macula, as well as electrophysiological studies (EPS), revealed no organic pathology. Amblyopia of the left eye was diagnosed. Vertical strabismus was recorded: 18 PD of right hypertropia, 17 PD of left hypotropia, and 20 PD of left excyclotorsion.

Treatment and Outcomes: Surgical correction planning was performed using Igor Aznauryan's mathematical modeling software. First Stage: A deep recession of the right eye's superior rectus muscle was performed.

Outcome: Complete orthotropia was achieved, with suppression of nystagmus in the primary head position and an improvement in visual acuity.

Complication: Immediately following the procedure, the patient experienced debilitating diplopic perception. Video-oculography confirmed the presence of 20 PD excyclotorsion of the left eye and a positive adduction syndrome in the left eye. It should be noted that excyclotorsion was also observed prior to the first operation.

Second Stage: A plication of the left eye's superior oblique muscle was performed. Outcome: Diplopia was completely resolved, and no objective cyclotorsion was registered.

Conclusion: This clinical case demonstrates successful surgical correction of vertical strabismus, nystagmus blockage, and cyclotropia in an adult patient with NBS, achieving both anatomical and functional goals. However, it underscores the significant risk of persistent double vision following surgery in adults with strabismus, even in the presence of apparent orthotropia and the elimination of cyclotropia. This complication necessitates thorough preoperative counseling and indicates the limited adaptive capacity of adult patients with oculomotor disorders to new sensorimotor conditions. This maladaptation can significantly impair the patient's quality of life despite optimal surgical outcomes.

Local treatment for retinoblastoma (10 years outcomes)

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The new treatment modalities of retinoblastoma have been very effective in saving the vision, salvaging the globe, and improving the life expectancy of patients. The treatment options include chemotherapy, that can be intravenous chemotherapy, periocular chemotherapy, intravitreal chemotherapy and intraarterial chemotherapy, and local modalities i.e., transpupillary thermotherapy, cryotherapy, laser photocoagulation, radiation treatment using plaque brachytherapy or external beam radiation therapy (EBRT). The most common intravenous chemotherapy drugs are carboplatin, vincristine, and etoposide. The drugs for periocular chemotherapy are Topotecan and carboplatin. For intravitreal chemotherapy the most used drugs are methotrexate, topotecan and melphalan. For intra-arterial chemotherapy drugs

used are melphalan, topotecan and rarely carboplatin. The treatment options can be used as single treatment or as adjuvant to consolidate treatment, depending upon the stage of disease. Advanced stages of disease and orbital involvement have poor prognosis.

Vitreoretinal complications in the active and cicatricial period of retinopathy of prematurity

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Retinopathy of prematurity (ROP) is a severe vasoproliferative disease affecting the immature vascular system of the retina of premature infants, one of the main causes of irreversible vision loss in young children.

In conditions of declining fertility, the quality of health of newborns, especially premature babies, is of particular importance. In the Russian Federation, visually impaired people account for 20.7% of the total number of visually impaired people since childhood, and ROP ranks second in the structure of causes of childhood blindness.

Significant variations in the frequency and severity of ROP in different regions of the Russian Federation, related both to the quality of care for premature infants and the presence of regional risk factors, indicate the relevance of a targeted study of regional characteristics and regional measures to improve ophthalmic care for this category of patients.

Purpose: To assess the frequency and severity of ROP and its place in the structure of visual disability in various periods of ophthalmological care, as well as to assess the severity and frequency of vitreoretinal complications in the active and cicatricial period of retinopathy of prematurity.

Materials and methods: The work was performed based on the ophthalmological center of the Regional Children's Clinical

Hospital. This study is based on the dynamic observation of 2,350 premature infants born between 26.5 and 36 weeks (average: 31.3±2.07 weeks), with a body weight from 650 to 2,650 g (average: 1,650±6.85 g). About 5,700 examinations of premature infants were performed and 65 laser coagulations of the retina (65 children, 130 eyes) were performed. The dynamic follow-up of children in the scar period was 697 patients, repeated laser coagulation of the retina was performed in 112 patients (224 eyes).

The examination of premature babies was carried out in neonatal pathology departments. It included indirect ophthalmoscopy with an Omega 500 head ophthalmoscope (Heine, Germany) with 20 and 28 dpt lenses (Ocular and Volk, USA) and obtaining fundus images using a RetCam Shuttle camera (Clarity Medicalsystem, USA) with a 130-degree nozzle in conditions of drug-induced mydriasis. The timing of the initial examination was determined in accordance with Federal Clinical Guidelines in conjunction with a neonatologist. The International ROP Classification, adopted in 1984, was used to evaluate the survey results. with additions from 2005.

Laser treatment was performed on 65 children (130 eyes) in the active ROP period, 112 children (224 eyes) in the cicatricial ROP period, according to the generally accepted methodology based on our hospital in the intensive care unit of the neonatal pathology department directly in a cuvette under general anesthesia, under local anesthesia in the cicatricial ROP period in older children, using laser diode ophthalmocoagulators – infrared with a wavelength of 810 nm "Alod-01" (Alcom Medica, Russia) and green with a wavelength of 532 nm "Light Las" (Light Med, Taiwan), Zeiss Combi (Zeiss, Germany), lenses 20 and 28 dptr, three-mirror lens (Ocular and Volk, USA). To carry out vitreoretinal intervention, the children were sent to Federal centers.

Results: An analysis of the epidemiological situation by ROP revealed the significance of this pathology in the region. In the structure of visual disability in the period from 2021 to 2024 ROP took the 4th place and amounted to 10.2–19.2%. Among children with ROP-related disabilities, deeply premature infants range from 40-100%, which confirms the high risk of developing severe,

progressive forms of the disease leading to blindness and visual impairment in this category of patients. The need for careful monitoring of children in the cicatricial period is due to the recurrence of retinal detachment with and without retinal laser coagulation in the active ROP period. Retinal detachment was most often observed at the age of about 6-7 years, and 13-15 years.

Conclusions:

1. Retinopathy of prematurity in Rostov-on-Don and the Rostov region ranks fourth in the structure of visual disability, which indicates its high social significance.
2. Children with lower gestational age and birth weight are at high risk for ROP, which correlates with the need for laser treatment and vitreoretinal surgery in the active and scarring period of ROP.
3. ROP is an urgent problem, despite the fact that the number of severe forms of ROP has decreased and the need for vitreoretinal surgery in the active period, there is still a large percentage of retinal laser coagulation and vitreoretinal surgery in the scarring period.