COSIG ANNUAL MEETING 2021

A National Conference on Ophthalmology and Global Health

11:00 AM TO 6:30 PM (ET)
VIRTUAL CONFERENCE

MAY 29, 2021

KEYNOTE SPEAKERS
Dr. Hélène Boisjoly
Dr. Jennifer Rahman
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ABOUT US

The Canadian Ophthalmology Student Interest Group (COSIG) seeks to enhance the education of medical students interested in ophthalmology by providing educational resources; facilitating connection between medical students, residents, and educational institutions; and supporting student research and advocacy efforts.
SCHEDULE

TIME (ET)       EVENT INFORMATION

11:00 - 11:30   Opening Remarks
11:30 - 12:30   Opening Keynote
12:30 - 13:30   Lunch ET
13:30 - 14:30   MEDSKL-COSIG Trivia
14:30 - 16:00   Sponsorship Exhibit / Lunch PT
16:00 - 17:00   Resident-Led Mentorship
17:00 - 17:10   Break
17:10 - 18:10   Closing keynote
18:10 - 18:30   Closing remarks
After obtaining her degree in ophthalmology from Université de Sherbrooke in 1981, Dr. Hélène Boisjoly specialized in Cornea at the Massachusetts Eye and Ear Infirmary and the Schepens Eye Research Institute, affiliated with Harvard University (1981-1983). In 1992, she obtained a Master of Public Health degree from the Bloomberg School of Public Health at Johns Hopkins University. She was a clinician-scientist with salary supported from 1986 to 2001 by the Fonds de recherche du Québec-Santé (FRQ_S). She worked at Université Laval (1983-1993) in Québec City before moving to Université de Montréal where she became Head of the Department of Ophthalmology at Maisonneuve-Rosemont Hospital (1993-1998). She was the first Scientific Director of the FRQ_S Provincial Vision Health Research Network (1996-2002). A full professor at Université de Montréal since 1998, she served as the Chair of its Department of Ophthalmology (2000-2008) and as Dean of the Faculty of Medicine (2011-2020).
Opening Keynote

Dr. Hélène Boisjoly C.M. MD MPH

Dr. Boisjoly’s research interests include corneal transplant outcome, ocular herpes viral disease, and functional visual outcomes after ocular surgeries and in patients with low vision from chronic eye diseases. She received research funding without interruption until 2013, publishing more than 80 original scientific articles. She trained 120 residents and 50 graduate students, including a number of fellows. She is a member of several Boards of directors and organizations for the advancement of science and medical education. Since 2012, she leads Université de Montréal as a member of the prestigious M8 Alliance, an international network of universities and academies dedicated to improving global health. Member of the Order of Canada and of the Canadian Academy of Health Sciences, she was also awarded the Lifetime Achievement Award of the Canadian Ophthalmological Society.
CLOSING KEYNOTE

DR. JENNIFER W. RAHMAN, BSCH MD FRCSC

Dr. Rahman is an Eye Physician and Surgeon specializing in the treatment of glaucoma. Dr. Rahman is one of a handful of glaucoma consultants serving patients in Manitoba, Nunavut and Northwestern Ontario. Dr. Rahman established GEM Clinic in 2011 and is the Medical Director of GEM Clinic.

Dr. Rahman was born in England, and raised in Winnipeg where she graduated from Saint Mary's Academy High School. She completed a Bachelor of Science Honours in Biology from Queen's University at Kingston, and then briefly entered the After-Degree Education Program at the University of Manitoba. Before completing this additional degree, she was accepted into Medical School at the University of Manitoba and graduated in 1997. She then entered a 5-year Ophthalmology Residency program at Queen's University.
Before starting regular practice, she joined the DC-10 "Flying Eye Hospital" team of Orbis International (a charitable eye care organization) for one year, traveling to China, Bangladesh, India, Ethiopia and Tanzania. Upon return, Dr. Rahman started practicing as a Comprehensive Ophthalmologist in Winnipeg in 2003-2004, and then entered a year-long Glaucoma Fellowship program at Dalhousie University. She returned to Winnipeg in 2005 to start a full-time clinical and surgical practice, providing both glaucoma and cataract surgery.

Dr. Rahman has volunteered for the Canadian and the International Blind Sports' Associations and the International Paralympic Committee (IPC), and is an Assistant Professor at the University of Manitoba.
SPEAKERS COMMITTEE

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COSIG Executive Director
McGill University

ANDREW SAMUEL
COSIG Annual Meeting Co-Chair
University of Manitoba

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University of British Columbia
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Memorial University of Newfoundland

RESIDENT ADVISOR

Dr. Michael Nguyen
Vice President, Council of Canadian Ophthalmology Residents (CCOR)
PGY3 Resident, University of Toronto
# Resident-Led Mentorship

## PGY-5
Dr. Mathew Palakkamanil  U of A  
Dr. Cristina Bostan  U de M  

## PGY-4
Dr. Michael Mak  U of C  
Dr. Stephanie Cote  Western  

## PGY-3
Dr. Michael Nguyen  U of T  

## PGY-2
Dr. Fady Sedarous  Western  
Dr. Dara Onasanya  U of M  

## PGY-1
Dr. Gaya Sivakumar  Western  
Dr. Teresa Park  U of M  
Dr. Julia Wiens  U of M
COMP will connect Canadian medical students (mentees) with ophthalmology residents (mentors) for the purposes of networking and career exploration.

Participants will also be invited to monthly mentorship webinars from September 2021 to May 2022, featuring discussions with ophthalmologists and resident physicians on various dimensions of career and personal development in ophthalmology.
VIRTUAL INTRODUCTORY STUDENT COURSE IN OPHTHALMOLOGY (VISCO)

VISCO is a free virtual ophthalmology course that aims to increase accessibility to expert ophthalmology knowledge, no matter what stage you are at in your medical training.

The course is composed of two parts:
1. 6 weekly workshops presented by ophthalmology faculty and residents across Canada, and
2. A high-yield structured reading guide using curated resources that is meant to provide background knowledge to supplement the workshops.
PRESENTOR: Adrian Kuchtanuk Khan

CO-AUTHORS: Omar Zaher1; Monali S. Malvankar-Mehta

AFFILIATIONS: 1 Schulich School of Medicine and Dentistry, University of Western Ontario, London, ON, Canada 2 Department of Ophthalmology, Schulich School of Medicine and Dentistry, University of Western Ontario, London, ON, Canada 3 Department of Epidemiology and Biostatistics, Schulich School of Medicine and Dentistry, University of Western Ontario, London, ON, Canada

TITLE: The association between Obstructive Sleep Apnea and Diabetic Retinopathy: A systematic review and meta-analysis

PURPOSE: The purpose of this study was to evaluate the association between obstructive sleep apnea (OSA) and diabetic retinopathy by performing a systematic review and meta-analysis of published studies.

METHODS: A systematic search was performed for papers published from inception to March 2021 in MEDLINE, EMBASE, CINAHL. Additional searches were carried out for grey literature. Two authors conducted the study selection, and the quality assessment and data extractions were performed by the main author and checked by the other authors.

Note: The meta-analysis will be done by the end of the week and the results will be included in the presentation

RESULTS: Three longitudinal studies and 22 cross-sectional studies were included in this systematic review. There was limited evidence that OSA was associated with diabetic retinopathy, however, some evidence suggested that OSA was associated with a greater severity of diabetic retinopathy and advanced diabetic retinopathy in people with type 1 and type 2 diabetes mellitus. Oxygen desaturation index, mean oxygen saturation or time spent with <90% oxygen saturation were not associated with DR, however, there was evidence that minimum oxygen saturation had an impact on diabetic retinopathy. Finally, limited evidence showed that CPAP non-compliance was associated with diabetic retinopathy.

CONCLUSION: Our results suggest significant associations between OSA severity and DR in diabetic patients. Additional studies should be conducted to determine if CPAP treatment is associated with reduced progression of diabetic retinopathy. Furthermore, larger studies are required to determine if there are differences in progression of DR in patients with type 1 vs type 2 diabetes with OSA.
PRESENTOR: Alexandre Lachance

CO-AUTHORS: Alexandre Lachance; Fares Antaki; Mélanie Hébert; Serge Bourgault; Mathieu Caissie; Éric Tourville; Ali Dirani

AFFILIATIONS: Département d’ophtalmologie et d’oto-rhino-laryngologie – chirurgie cervico-faciale, Centre Universitaire d’Ophtalmologie, Hôpital du Saint-Sacrement, CHU de Québec - Université Laval, Québec, QC, Canada; Département d’ophtalmologie, Centre Hospitalier de l’Université de Montréal (CHUM), Montréal, Québec, QC, Canada; Département d’ophtalmologie et d’oto-rhino-laryngologie – chirurgie cervico-faciale, Centre Universitaire d’Ophtalmologie, Hôpital du Saint-Sacrement, CHU de Québec - Université Laval, Québec, QC, Canada; Département d’ophtalmologie et d’oto-rhino-laryngologie – chirurgie cervico-faciale, Centre Universitaire d’Ophtalmologie, Hôpital du Saint-Sacrement, CHU de Québec - Université Laval, Québec, QC, Canada; Département d’ophtalmologie et d’oto-rhino-laryngologie – chirurgie cervico-faciale, Centre Universitaire d’Ophtalmologie, Hôpital du Saint-Sacrement, CHU de Québec - Université Laval, Québec, QC, Canada; Département d’ophtalmologie et d’oto-rhino-laryngologie – chirurgie cervico-faciale, Centre Universitaire d’Ophtalmologie, Hôpital du Saint-Sacrement, CHU de Québec - Université Laval, Québec, QC, Canada

TITLE: Automated Machine Learning Prediction of Visual Acuity from Preoperative OCT Images After Macular Hole Surgery

PURPOSE: Automated machine learning (AutoML) is a new area in artificial intelligence research. We designed a machine learning model using AutoML to predict the visual outcome from preoperative OCT images in eyes with successful macular hole (MH) closure following vitrectomy.

METHODS: We developed a single-label classifier using AutoML (Google Cloud AutoML Vision) to predict the visual outcome (“<70 letters” vs. “≥70 letters”; 20/40) at 6 months in eyes with successful primary surgery for idiopathic MH. We used retrospective data obtained from consecutive eyes with successful primary surgery for idiopathic MH between 2014 and 2018 at the Centre Hospitalier Universitaire de Québec – Université Laval. We included a single eye per patient and excluded eyes with ocular comorbidities. Baseline horizontal fovea-centered high-definition 30-degree OCT scans were obtained in all patients. Precision, recall and area under the precision-recall curve (AuPRC) were used to evaluate the model performance.

RESULTS: The dataset included 383 patients/eyes. Baseline VA was 51 ± 14 letters and 49% (187/383) of eyes had visual acuity (VA) of 70 letters or more at 6 months. The model correctly classified postoperative VA 68% of the time for the “<70 letters” category and 79% of the time for the “≥70 letters” category. The model had a precision of 73.68%, recall of 73.68%, and AuPRC of 0.799.

CONCLUSION: The discriminative performance of the model suggests a potential for VA prediction using preoperative OCT images alone. Additional work will focus on external validation and model explainability to understand the mechanisms guiding the model’s predictions.
PRESENTOR: Amy Basilous
CO-AUTHORS: Chris, Govas; Matthew, Deans; Robin, Deans
AFFILIATIONS: Ross University; Western University; Western University
TITLE: Evaluation of a novel AI-powered algorithm to aid in clinician decision making
PURPOSE: To present a novel AI-powered algorithm and compare diagnostic outcomes of referrers and the algorithm.

METHODS: A questionnaire based on the algorithm was made available to primary care physicians and emergency departments in Windsor, Ontario. Questions focused on history and physical examination, without requiring fundoscopy. Patients with vision loss were assessed and questionnaires were completed for those who would require specialist care. The completed questionnaire and an attempted diagnosis were sent with a referral to an ophthalmologist, who conducted an independent assessment. Data from the questionnaires were then entered into the algorithm to produce an algorithm differential diagnosis.

RESULTS: Fifty patients with vision loss were included in this study. Referrer diagnoses were correct in 24% of cases. The algorithm’s top diagnosis was correct in 76% of cases. Accuracy increased to 94% with the algorithm’s top two diagnoses included and 96% with the top three diagnoses. In serious cases of vision loss (n=33), referrer diagnostic accuracy was 30%. Algorithm diagnostic accuracy using the top diagnosis was 76% and increased to 91% and 94% when the top 2 and top 3 diagnoses, respectively, were included. The algorithm’s top diagnosis was correct in 15 cases not accurately diagnosed by referrers. The algorithm correctly identified that cases were not serious conditions 88% of the time.

CONCLUSION: Non-ophthalmologists were often unable to accurately diagnose causes of vision loss. The presented algorithmic tool was successful at improving diagnostic accuracy in these cases. This diagnostic aid has the potential to optimize patient outcomes by improving the triage of patients.
RESEARCH ABSTRACTS

PRESENTER: Anastasiya Vinokurtseva

CO-AUTHORS: Matthew Quinn, Mandy Wai, Victoria Leung, Cindy M. L. Hutnik

AFFILIATIONS: Queen’s University School of Medicine Dept of Ophthalmology, Western University, Western University, Schulich School of Medicine Dept of Ophthalmology

TITLE: Patient Reported Outcome Measures (PROMs) in glaucoma: a systematic review.

PURPOSE: The treatment algorithm for glaucoma patients includes a variety of management options. Accurate understanding of patient preferences is critical for optimal resource allocation in access to technological innovations, such as minimally invasive surgeries, which are comparable in safety and effectiveness to existing older therapies. Patient-reported outcome measures (PROMs) are instruments designed to identify which health outcomes and healthcare experiences are the most important to patients. Despite recognized importance of PROMs, especially in effectiveness research, awareness and utilization in the routine clinical setting remain low. The purpose of the current study was to identify and assess Patient-Reported Outcome Measures (PROMs) for clinical ophthalmology practice.

METHODS: Systematic literature search in 6 databases (EMBASE, MEDLINE, PsycINFO, Scopus, BIOSIS, WebOfScience) from date of inception. Studies were included in the qualitative review if they reported measurement properties of PROMs in adult glaucoma patients. CONsensus-based Standards for the selection of health Measurement Instruments (COSMIN) were used for assessment of the included PROMs.

RESULTS: Search strategy identified 2255 records. After deduplication, 1058 records remained and entered the title and abstract screening. Following level 1 screening, 153 records were assessed in full-text screening. In 44 included studies, 62 instrument reports discuss 37 distinct instruments. Most used measures were glaucoma-specific: Glaucoma Quality of Life (GQL) and Glaucoma Symptom Scale (GSS); and vision-specific: National Eye Institute Visual Function Questionnaire (NEI-VFQ). All three have sufficient validity (especially construct), with GQL and GSS having sufficient internal consistency.

CONCLUSION: GQL, GSS and NEI-VFQ have considerable validation in a glaucoma patient population. Limited reports on interpretability and responsiveness in all 37 identified instruments make identification of optimal questionnaire for clinical use challenging and warrant further studies.
PRESENTOR: Arjan Dhoot

CO-AUTHORS: Marko M. Popovic; Soomin Lee; Sherif El-Defrawy; Matthew B. Schlenker

AFFILIATIONS: University of Toronto Department of Ophthalmology & Vision Sciences; University of Toronto Faculty of Medicine; University of Toronto Department of Ophthalmology & Vision Sciences; University of Toronto Department of Ophthalmology & Vision Sciences


TITLE: Postoperative Eye Protection Following Cataract Surgery: A Systematic Review

PURPOSE: There is a high variability in the use of post-operative eye protection amongst ophthalmologists. Post-operative eye protection treatment modalities include an eye shield, an eye patch, an ocular bandage, and instant vision. The aim of this study is to review and compare the evidence of various options for eye protection.

METHODS: A systematic literature search was conducted and original comparative articles that reported on subjective symptoms (e.g. foreign body sensation, photophobia, tearing, and pain) and post-operative outcomes (e.g. tear film break up time, best corrected visual acuity, etc.) after usage of an eye protection method were included.

RESULTS: Overall, 598 eyes across 8 articles were included. Included studies investigated ocular bandages (n=6), eye patches (n=4), instant vision (n=2), and eye shields (n=1) post-operatively. In 3 studies, patients receiving ocular bandages self-reported symptoms, including pain (n=3), foreign body sensation (n=4), photophobia (n=3), and tearing (n=3), at a reduced or equivalent rate compared to other treatment modalities. With the ocular bandage, 3 studies reported increased tear film break up time and 1 study reported improvements in corneal wound healing compared to a control group. Two studies reported reduced tear film break up time for the eye patch relative to ocular bandage and another study reported reduced tear film break up time for instant vision compared to the eye patch.

CONCLUSION: Patient-reported symptoms are acutely reduced for patients receiving an ocular bandage relative to instant vision following cataract surgery. Patients prefer receiving some form of postoperative protection as opposed to instant vision.
RESEARCH ABSTRACTS

PRESENTOR: Bonnie He

CO-AUTHORS: Gareth Mercer, Leonard Levin

AFFILIATIONS: McGill, McGill

TITLE: Exploring Ophthalmologists’ Adoption of Telemedicine During the COVID-19 Pandemic: A Mixed Methods Study

PURPOSE: To describe patterns of telemedicine utilization by Canadian ophthalmologists during the COVID-19 pandemic.

METHODS: This was a mixed methods design with a cross-sectional survey and semi-structured interviews. Canadian ophthalmologists practicing between March and July 2020 were invited to complete an online questionnaire assessing basic demographics, clinical practice characteristics and telemedicine utilization prior to and during the pandemic. Standard descriptive and bivariate statistics were used to analyze the data. Agglomerative hierarchical cluster analysis was used to identify groups who varied on the types of visits offered using telemedicine. Ten one-on-one interviews were conducted and further analyzed based on thematic content analysis to explain trends observed in the survey data.

RESULTS: Seventy-three ophthalmologists (32% female) from across all provinces completed the survey. Six percent reported using telemedicine prior to the pandemic compared to 80% during the pandemic. A significant majority (81%) primarily used the telephone for telemedicine visits. Overall, visit volumes during the pandemic declined to 40% of pre-pandemic levels, with a smaller decline for ophthalmologists who used telemedicine for all visit types than those who did not. Those who used telemedicine for all visit types were more likely to use telemedicine software and to anticipate a modest-to-large role for telemedicine in their future practice.

CONCLUSION: For many Canadian ophthalmologists, integrating telemedicine into clinical practice may have partially offset the disruption to normal clinical activities during the pandemic. While the majority saw telemedicine as a temporary solution, a sizeable minority appear to have made considerable use of the technology and see an ongoing role for it once regular clinical activities resume.
PRESENTOR: Deeksha Kundapur

CO-AUTHORS: Trisha, Kandiah

AFFILIATIONS: University of Ottawa, Faculty of Medicine

TITLE: The Merits of Online Ophthalmology Teaching: A Virtual Ophthalmology Conference

PURPOSE: To determine the usefulness of a virtual conference in addressing the lack of ophthalmology exposure and teaching in current curricula.

METHODS: Upon completion of the conference, 38 students were sent surveys containing pre- and post-rating items with Likert scale responses. Survey items were broadly categorized into the following themes: current level of ophthalmology-related teaching, career interest in ophthalmology, physical examination skills, and preparedness to assess basic ophthalmological complaints.

RESULTS: The survey completion rate was 47.4%. Only 27.8% of students were satisfied with their current exposure to ophthalmology. After the conference, students were more comfortable assessing basic ophthalmological complaints, dealing with ocular emergencies, performing a comprehensive eye exam, and recognizing when to refer to Ophthalmology. The number of students who reported that they are strongly interested in pursuing ophthalmology as a career more than doubled (120% increase). Overall, 94.4% of students found the conference extremely or very useful.

CONCLUSION: As illustrated by our findings, a virtual approach to delivering ophthalmology-related content is a possible tool to combat the current paucity of ophthalmology teaching offered by Canadian medical schools. Given the above, our virtual conference had a positive impact on students’ interest in pursuing ophthalmology as well as their comfort in ophthalmological settings.
PRESENTOR: Eisi Mollanji

CO-AUTHORS: Mohammad Kreime; Eisi Mollanji; Rustum Karanjia

AFFILIATIONS: Department of Ophthalmology, University of Ottawa; University of Ottawa; Department of Ophthalmology, University of Ottawa

TITLE: Screening and Characterizing Charles Bonnet Syndrome in Patients with Leber’s Hereditary Optic Neuropathy

PURPOSE: Charles Bonnet Syndrome (CBS) is a condition involving visual hallucinations as a result of vision loss, but it is not well-characterized nor routinely assessed for. Patients with Leber’s Hereditary Optic Neuropathy (LHON) experience CBS, but there is limited reporting on it. This is the first study screening for and characterizing CBS in the LHON patient population.

METHODS: A recently validated French-Canadian CBS screening questionnaire was adapted to an online bilingual (English-French) format, while being tailored to LHON patients. The 59-item questionnaire was distributed to numerous mailing lists and online communities consisting of LHON patients. Quantitative and qualitative response data was used for cross-sectional analysis.

RESULTS: A total of 63 LHON patients (71% male) completed the questionnaire – with 56% screening positive for CBS. Comparing CBS-positive and CBS-negative patients revealed significantly different LHON mutation distributions (p = 0.01137). Among CBS-positive patients, 74% reported experiencing hallucinations for at least a year. Furthermore, 37% said the images disturb their sleep, while 49% reported they negatively affect their mood. Additionally, only 49% had heard of CBS before and just a single patient (3%) had been diagnosed with CBS by a healthcare professional.

CONCLUSION: The results show there is a significant prevalence of CBS among LHON patients, but only a minority of these patients are being assessed and managed for the condition. There is also indication that their CBS tends to be long-lasting and can be associated with various negative health outcomes. Overall, this study will provide a better understanding of the intervention needs for patients with CBS.
AUTHOR: Emaan Chaudry

CO-AUTHORS: Hasan Y Khan, Yasser A Khan

AFFILIATIONS: St. George's University, McMaster University

TITLE: Visual Snow Syndrome: A review of consistency within literature

PURPOSE: Visual Snow Syndrome (VSS) is a rare neurological disorder defined by continuous visual disturbances. Common characteristics of VSS include static/pixels or “snow”, photopsia, floaters, nyctalopia, and palinopsia. The true prevalence is unknown due to lack of knowledge of VSS in the medical community. The objective of this study is to examine the consistency amongst information provided in research literature pertaining to VSS.

METHODS: A systematic literature review of peer-reviewed journals was independently conducted. Publications were found using the terms: “Visual Snow OR Visual Snow Syndrome”. Publications before August 2020 were included. Data extracted from each article was compared primarily for diagnostic criteria, pathophysiology, alternate diagnosis, and treatments.

RESULTS: 360 abstracts were identified; 44 full-text papers were reviewed and the following data was found: 73% mentioned at least 3 of the following VSS diagnostic criteria: a) Visual disturbance (dynamic tiny dots < 3m time frame) b) Two additional visual symptoms (palinopsia, photophobia, nyctalopia, entoptic phenomenon) c) Symptoms not consistent with migraine/migraine aura d) Symptoms not explained by another disorder. 91% described patients experiencing other visual symptoms such as palinopsia, photophobia, and nyctalopia. 30% outlined the most likely pathophysiology of VSS. 48% used at least one of the following lab investigations to help diagnose VSS: a) VEP adaptation b) EEG c) MRI d) MetLab e) rTMS f) PET g) BOLD fMRI. 73% listed migraine with or without aura as a comorbidity of VSS. 27% described treatments to minimize symptoms associated with VSS and only 5% described treatments to treat VSS itself.

CONCLUSION: This review illustrated a consensus regarding clinical diagnostic criteria, associated symptoms, and comorbidities of VSS. However, there is currently no clear pathophysiology, consistent method of lab investigation, or treatment options for VSS. Future directions include establishing guidelines to characterize VSS and education of health care professionals on VSS. Improving the characterization of VSS will allow for improved detection, diagnosis, and further treatments to mitigate symptoms and improve patient quality of life.
AUTHOR: Emaan Chaudry

CO-AUTHORS: Danielle Solish; Humzah Quereshy; Danah Albreiki

AFFILIATIONS: Queen’s University, Case Western Reserve University, University of Ottawa Department of Ophthalmology


PURPOSE: The coronavirus pandemic changed the world of education drastically. The necessity of utilizing virtual learning, has led to an increased demand for remote learning materials, specifically for medical education. Restrictions and delays of clinical rotations have created a need for medical students to find opportunities and learning experiences outside of the traditional teaching paradigm, especially in smaller specialties like ophthalmology.

METHODS: A list of popular and useful ophthalmology educational websites was collated through a comprehensive search strategy of keywords (ex. ophthalmology, application, website, online resource) on MEDLINE. Each source was analysed to assess their advantages, disadvantages, their main use and relevance to pre-clerkship students.

RESULTS: Through this approach, Eye Curriculum (EC), a website that collates all of these resources into a convenient location, was made accessible to medical students at www.eyecurriculum.com. Numerous resources were explored to create a multimodal curriculum that features all learning styles. The following modalities were included: case studies (18%), interactive tutorials (21%), podcasts (9%), readings (20%), practice questions (6%), videos (26%). Since launching the website, EC has had 235 unique visitors. 47.3% of users have been from Canada, 31.3% from the United States, 3.1% from India, 2.0% from Brazil, and 1.8% from Morocco.

CONCLUSION: During a time when curricula and clinical guidelines are constantly changing, the flexible nature of a virtual curriculum allows for adaptations to be made as needed. EC is an innovation that has effectively restructured learning both outside of the classroom and clinic, an essential modality to be drawn upon during the pandemic.
PRESENTOR: Kevin Lane

CO-AUTHORS: Edward Ho; Edward Wang; Asaanth Sivajohan; Saerom Youn; Kevin Lane; Jin Chun

AFFILIATIONS: Schulich Applied Computing in Medicine, School of Medicine & Dentistry, Western University.

TITLE: Deep Ensemble Learning For Retinal Image Classification

PURPOSE: Vision impairment affects 2.2 billion people worldwide, with half of these pathologies being preventable. Challenges exist with triaging the pathologies for early detection and treatment. Automatic screening of ocular pathologies using convolutional neural networks (CNNs) on retinal fundus photos is limited to a few pathologies. The detection of multiple ophthalmic pathologies has not been effectively determined.

METHODS: 1920 multiclass, multi-labeled images were used from the Retinal Fundus Multi-Disease Image Dataset (RFMiD). Models were trained (n=1536) and validated (n=384). 5 selected CNN architectures (SE-ResNeXt, InceptionV3, EfficientNet-B4, EfficientNet-B5, and DenseNet) were trained to predict the presence or absence of any pathology and categorize the 28 pathologies. All models were trained to minimize asymmetric loss, a modified form of binary cross-entropy. Individual model predictions were averaged to obtain a final ensembled model. Model performance was assessed using 5-fold stratified cross-validation, yielding the mean area under the receiver-operator characteristic curve (AUROC).

RESULTS: The SE-ResNeXt architecture model predicted the best pathology screen (AUROC 0.9630). The full ensemble of networks had a positive impact on model performance (AUROC 0.9703). The EfficientNet-B5 architecture model predicted the best disease classification for each pathology (AUROC 0.9173) and increased with the full ensemble (AUROC 0.9449).

CONCLUSION: Retinal fundus images analyzed by an ensemble of CNNs trained to minimize asymmetric loss reported higher diagnostic performance for detection and classification of 28 ocular pathologies than individual models. Multicenter external validation is needed to translate machine learning models to diverse clinical contexts and low-resource communities.
PRESENTOR: Haaris Khan  
CO-AUTHORS: Gavin Docherty, Patrick Gooi  
AFFILIATIONS: University of British Columbia Faculty of Medicine & University of Calgary Department of Ophthalmology  
TITLE: Evaluating the Efficacy of Micropulse Cyclophotocoagulation in the Treatment of Glaucoma: A Literature Review  
PURPOSE: Glaucoma encompasses a group of progressive optic neuropathies that result in changes in the optic nerve head and is the leading cause of irreversible blindness worldwide. Micropulse transscleral cyclophotocoagulation (MPTSCPC) is a treatment option in the form of a non-continuous diode laser that aims at reducing intraocular pressure (IOP). The purpose of our review was to investigate the safety profile and efficacy of MPTSCPC and whether the results are comparable to continuous wave transscleral diode cyclophotocoagulation (CWTSCPC).  
METHODS: We conducted a literature search on the PubMed database and Google Scholar using a combination of the search terms “glaucoma,” “micropulse laser” “cyclophotocoagulation” and micropulse cyclophotocoagulation.” After excluding articles that did not meet our inclusion criteria, a total of 31 manuscripts were evaluated.  
RESULTS: Our findings indicate that MPTSCP is effective at lowering IOP as well as the number of glaucoma medications needed in adult patients post-operatively. Although research comparing MPTSCP and CWTSCPC is limited, current literature supports similar efficacy between the two treatment modalities, with MPTSCP having a better safety profile overall. Comparatively, MPTSCP was also associated with less severe ocular complications.  
CONCLUSION: Overall, most studies concluded that MPTSCP appears to be a safe and efficacious treatment option for glaucoma. Larger prospective comparative studies are needed to confirm the long-term IOP lowering effect and potential complications of this treatment modality. Furthermore, standardization of the technique for widespread clinical application is still needed.
RESEARCH ABSTRACTS

PRESENTOR: Harrison Watt

CO-AUTHORS: Ali Salimi; Harrison Watt; Hassan Elhawary; Mahshad Darvish-Zargar; Mona Harissi-Dagher

AFFILIATIONS: Department of Ophthalmology, Faculty of Medicine, McGill University, Montreal, QC, Canada; Faculty of Medicine, McGill University, Montreal, QC, Canada; Division of Plastic and Reconstructive Surgery, Faculty of Medicine, McGill University, Montreal, QC, Canada; Department of Ophthalmology, Faculty of Medicine, McGill University, Montreal, QC, Canada; Department of Ophthalmology, Faculty of Medicine, University of Montreal, Montreal, QC, Canada

TITLE: Awareness and attitudes toward corneal donation among Canadians: Informational and motivational videos can increase willingness toward corneal donation.

PURPOSE: To assess the knowledge of corneal transplantation, willingness toward corneal donation, and the efficacy of a short informational and motivational video in increasing the willingness toward corneal donation among Canadian adults.

METHODS: Cross-sectional interventional study. A survey targeted Canadian adults assessing their knowledge and attitude toward corneal donation, and the efficacy of a one-minute-long informative and motivational video on increasing willingness toward corneal donation.

RESULTS: The survey was accessed by 1361 individuals and 1013 completed the questionnaire (74% completion rate). The sample consisted of 36% males and 64% females, with an average age of 37.0±15.3 years. The majority (58%) thought to lack basic knowledge about corneal donation. Similarly, objective knowledge of corneal donation was relatively low with an average score of 7.8±4.5 (out of 20). In our sample, 44% had not opted-in for organ donation, among whom willingness to donate one’s own cornea increased from 59% pre-video to 79% post-video (relative increase of 34%; p<0.001). Lack of awareness about the benefits of corneal donation was the most commonly cited reason for unwillingness to donate.

CONCLUSION: The results demonstrated a general lack of awareness of corneal donation among the Canadian population and highlighted the efficacy of a short informative and motivational video in increasing willingness to donate corneal tissue. With lack of awareness about the benefits of corneal donation being among the primary reasons for the unwillingness to donate, simple but efficacious interventions via informative and motivational videos can increase tissue donors and help reduce corneal tissue shortage.
RESEARCH ABSTRACTS

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TITLE: The Impact of COVID-19 Pandemic on Emergency Ophthalmology Consultations in a Single Academic Centre

PURPOSE: Stemming from the strict hospital regulations and the fear of contracting coronavirus disease, emergency departments (ED) have seen a decline in patient influx for speciality services during the COVID-19 pandemic. This study aims to describe the changes noted in the emergency consultations for ophthalmic concerns during the COVID-19 pandemic. Current findings will determine whether circumstances surrounding a pandemic led to altered care-seeking behaviour in patients.

METHODS: A retrospective chart review was conducted on all patients presenting to the Jewish General Hospital’s ED with ophthalmic concerns during April 2019 (pre-pandemic) and April 2020 (intra-pandemic). Details pertaining to the patient demographics, ED assessment, ophthalmology service notes, ophthalmic examination, final diagnosis, and medical or procedural management were documented.

RESULTS: Following inclusion and exclusion criteria, the number of ED consultations for ophthalmic concerns were significantly higher during April 2019 (23.8 ± 11.3 consultations/week, n=119, p=0.0072) as compared to April 2020 (5.2 ± 2.7 consultations/week, n=26). While the frequency of procedural management was similar in April 2019 and April 2020 (16.8% versus 19.2%, respectively), the proportion of patients requiring medical management such as antibiotic and steroid therapy were 12.3% higher in the pre-pandemic period. Furthermore, the proportion of patients requiring hospital admission were considerably higher in April 2020 as compared to April 2019 (7.7% versus 1.68%, respectively).

CONCLUSION: The decrease in consultation volume and frequency may indicate overuse of emergency and ophthalmology services for non-emergent cases. However, current findings also suggest that patients may delay necessary ophthalmic consultations during a pandemic which later necessitates more rigorous management.
PRESENTOR: Jobanpreet Dhillon

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TITLE: Significance of Subconjunctival Hemorrhage in Predicting Ocular Pathology for Patients with Orbital Fractures

PURPOSE: Subconjunctival hemorrhage (SCH) in patients with orbital trauma often warrants further investigation of any underlying ocular pathology (OP). Our study aims to evaluate the association between the varying degree of SCH and presence of OP in patients with orbital fracture.

METHODS: A retrospective chart review was conducted on 244 patients with 278 fractured orbits presenting to a level 1 trauma centre between August 2015 and January 2018. Information regarding SCH graded on a spatial, 0–360-degree scale along with any associated OP was collected from ophthalmology consultation notes. Patient demographics and key findings from the complete ophthalmic exam were also documented.

RESULTS: A simple logistic regression revealed a significant increase in the incidence of OP with increasing degree of SCH (odds ratio=1.004, p=0.0085). The predicted probability of OP ranged from 6.5% at 0 degrees of SCH to 24.7% at 360 degrees of SCH, with common pathologies including hyphema, globe rupture, traumatic optic neuropathy, and commotio retinae. When assessed as 90-degree SCH subgroups, frequency of OP was significantly higher in 181-270 degree (25%, n=8, p=0.0466) and 271-360 degree (26.3%, n=19, p=0.0031) subgroups in comparison to the 0 degree subgroup (6.3%, n=158). A higher degree of SCH was also associated with significantly decreased vision (n=206, p=0.0012), increased proptosis (n=193, p=0.0087) and increased platelet count (n=239, p=0.0246).

CONCLUSION: Our findings highlight that a higher degree of SCH, especially greater than 180 degrees, in patients with orbital fractures should raise clinical suspicion for OP and guide appropriate patient management in acute care settings.
PRESENTOR: Maheshver Shunmugam

CO-AUTHORS: Dr. Olubayo, Kolawole; Dr. Travers Weaver; Dr. Kevin Gregory-Evans

AFFILIATIONS: UBC PhD Candidate; UBC Vitreoretinal Fellow; UBC Professor of Ophthalmology and genetic retinal specialist

TITLE: Interpreting the results of molecular genetic testing in ocular disease

PURPOSE: We are proud to present the very first molecular genetic testing results for ocular disease in Canada. As such we hope to spark discussion surrounding disease, testing and treatments for genetic ocular disease amongst our population.

METHODS: Retrospective analysis of the results of molecular genetic testing in 314 individuals with suspected genetic retinal disease in Western Canada. Saliva samples were collected between March 1st, 2019 and April 1st, 2021 and were analyzed by Blueprint Genetics. All genetic results were interpreted by Dr. Kevin Gregory-Evans, Professor of Ophthalmology at UBC and Dr. Travers Weaver, Vitreoretinal Fellow at UBC.

RESULTS: The most common genetic mutations were in the ABCA4, USH2A, BEST1, RS1 and CACNA1F genes. 24% of patients had a positive test result. 43% had a positive test result with additional variants of uncertain significance (VUS). 23% had VUS alone and 10% had no findings. In addition, 54% of our cohort were white, 23% asian or pacific islander, 2% hispanic, 1% black, 1% aboriginal and 19% multiple race or unspecified.

CONCLUSION: The majority of patients carry VUS, therefore, clear cut interpretation of genetic testing is an unresolved issue. This suggests we need clear guidelines on how to interpret VUS results as well as implement genetic testing in our Ophthalmology practice. Secondly, genetic data has (historically) been drawn from euro-centric and American populations. The sheer number of participants and data we have accrued from non-white populations provides valuable insight to the manifestation of genetic ocular disease and patterns amongst varied populations.
PRESENTOR: Michael Penny

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TITLE: A rare case of superior ophthalmic vein thrombosis secondary to a dural arteriovenous fistula of the cavernous sinus.

PURPOSE: To report a rare case of unilateral superior ophthalmic vein thrombosis (SOVT) secondary to a dural arteriovenous fistula of the cavernous sinus. This case adds to the limited literature on the presentation and management of this condition and highlights the importance of urgent diagnosis and treatment to prevent progression to a potentially catastrophic cavernous sinus thrombosis (CST).

METHODS: Case report - An 87-year-old Caucasian male presented to the emergency department with unilateral decreased vision, diplopia, proptosis, and chemosis suggestive of orbital congestion. With the utilization of plain computed tomography (CT), CT angiography (CT-A), and ultimately magnetic resonance imaging (MRI), the diagnosis of superior ophthalmic vein thrombosis (SOVT) secondary to a dural arteriovenous fistula (DAVF) of the cavernous sinus was made.

RESULTS: The patient was initially treated conservatively with steroids, anticoagulation therapy and ocular hypertensives. Neurosurgical intervention was ultimately required due to clinical progression. Successful embolization of the right cavernous sinus resulted in significant improvement of his orbital and neuro-ophthalmological symptoms.

CONCLUSION: SOVT is a rare but potentially devastating disease process. For patients presenting with signs of orbital congestion, early detection, diagnosis, and treatment of SOVT is crucial to prevent permanent ocular sequelae and potentially life-threatening complications.
PRESENTOR: Stephen Carrell  
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AFFILIATIONS: Department of Ophthalmology and Visual Sciences, University of Alberta, MD; Department of Ophthalmology and Visual Sciences, University of Alberta, MD  
TITLE: Online Ophthalmology Academy Surgical and Procedural Videos: Punctal Dilation and Irrigation  
PURPOSE: As residency programs across Canada transition to “Competency By Design” models, the University of Alberta has begun developing educational video training modules encompassing key concepts: clinical skills, and surgical/procedural skills. The goal of these training modules is to provide high level and accurate training on required learning objects while in residency. In this particular video we illustrate the key concepts and steps in treatment of the “tearing patient” with emphasis on a punctal dilation and irrigation for suspect Nasolacrimal Duct obstruction.  
METHODS: First we illustrate the proper technique of examination of the Nasolacrimal duct system on physical examination. Next we show a step by step guide to applying lateral traction on the eyelid, dilating the punctum with a punctal dilator, and irrigation with saline to investigate patency of the nasolacrimal duct system. Careful emphasis is given to clinically relevant anatomy to ensure proper technique.  
RESULTS: A proper history, clinical examination, dilation and irrigation of the nasolacrimal duct system can provide important information on management of the tearing patient.  
CONCLUSION: Important factors in assessing a patient with tearing are: Clinical history, Physical exam, and Proper technique during a dilation and irrigation of the Nasolacrimal Duct. With careful study and supervised training, this technique will become an essential skill for all Ophthalmology residents and staff alike.  

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TITLE: A 10-year Analysis of Trends in Open-Globe Injuries in Edmonton, Canada from 2009 to 2018

PURPOSE: To identify the incidence and correlates of open globe injuries presenting to the Eye Institute of Alberta (EIA).

METHODS: A 10 year retrospective chart review was conducted from 2009-2018 of patients with a traumatic globe rupture repaired at the EIA. Incidence across key demographics were assessed using Poisson regression. Associations between the key demographic variables were also analyzed.

RESULTS: In total 556 cases were identified, in which 79.5% were male. Where eye protection use was recorded, only 11% reported using eye protection at the time of trauma. Globe ruptures among males was 2.5 times higher than females. The rate of individuals >35 years old was significantly higher than for those <35 by 18.1% for both sexes.

CONCLUSION: Open-globe injuries remain a significant source of ocular morbidity averaging 1-2 cases per week at the EIA. A male predilection and the infrequent use of eye protection stresses the need for targeted public health measures to diminish the burden of these serious injuries.
RESEARCH ABSTRACTS

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TITLE: Affordable 3D-Printed Frenzel Goggles for Improved Nystagmus Detection

PURPOSE: Frenzel goggles have been an essential tool for evaluation of involuntary eye movements in neuro-ophthalmology. However, modern day versions of Frenzel goggles have major disadvantages including weight, size, and cost. Our design utilizes 3D printing to develop an affordable and customizable pair of Frenzel goggles for adult and pediatric populations.

METHODS: Proof of concept study. Two biconvex lenses of a focal length of 50mm were purchased from a scientific distributor (Ajax Scientifics®). Using Autodesk Fusion 360® we designed a frame encasing the two lenses, and printed it using an Ultimaker 3® 3D printer (Geldermalsen, Netherlands). A Velcro strap with a 3D printed back rest was used to strap the goggles on a tester's head. Lighting was provided via two detachable LED button lights, attached to lateral internal walls of the goggles.

RESULTS: Our 3D printed goggles were able to visualize both eyes of our testers, for both children and adults, with adequate illumination. We were able to adequately observe and capture post-rotational nystagmus induced by the vestibular-ocular reflex. Overall, this model cost approximately $31.60 (CAD) inclusive of the printing, LED light units, Velcro strap, and two glass biconvex lenses; a significant cost reduction compared to other commercially available pairs of Frenzel goggles. The focal length of lenses and the face-sealing design of the goggles eliminated visual fixation target for the testers, and the attached lights appropriately illuminated patient's eyes for observation. We were able to design and print a smaller pair with the same lenses for our pediatric testers as well.

CONCLUSION: Our 3D-printed Frenzel goggle design are a significant improvement in terms of weight, comfort, and affordability over the existing Frenzel goggles available in most neuro-ophthalmology clinics. We hope to release this model as an open-source CAD file, available and customizable to anyone in the world with the appropriate software and a 3D printer.
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TITLE: The effects of the COVID-19 lockdown on Canadian ophthalmologists: A survey

PURPOSE: COVID-19 has impacted Canadian physicians in numerous ways. Many medical fields, including ophthalmology, were not previously equipped to deal with the logistical, emotional, and mental stresses of this pandemic. Furthermore, the safety restrictions and public health guidelines changed the way many ophthalmologists practiced medicine. The aim of this study is to create a survey to explore the potential benefits and challenges that the COVID-19 lockdown has imposed on Canadian ophthalmologists in regard to their professional and personal lives during March-July 2020.

METHODS: A web-based survey was created using the online platform, SurveyMonkey. The survey consisted of three sections: 1) demographics (general background questions including level of training, practice setting, subspecialty), 2) current practice characteristics (current work setting, workload) and 3) personal wellbeing. The survey was emailed to all the members of the Canadian Ophthalmological Society (COS), including 905 ophthalmologists and 220 residents and fellows. Participation in this survey was voluntary and all information collected was anonymous. The survey aimed to capture data from March-July 2020.

RESULTS: A total of 164 responses were collected. The survey revealed that 83.5% of Canadian ophthalmologists had a decreased workload and consequently 77.4% of participants reported a decrease in their monthly income ranging between a 50 to 100 percent drop. Furthermore, a majority of ophthalmologists (63.6%) reported utilizing telemedicine during this time period. However, only 3.7% reported their experience using telemedicine to be “excellent” and 14% reported it as “good”. In terms of personal impacts, 28% and 37.8% reported having much higher or higher stress levels, respectively. Although stress levels were generally increased most ophthalmologists were able to maintain their mental wellbeing as 11.0% and 37.8% reported excellent or very good mental health, respectively.

CONCLUSION: The drop in workload, monthly income, and change in work settings were no doubt found to be significant in the day to day practice of ophthalmologists. The future role of telemedicine beyond the pandemic is unclear as ophthalmologists have mixed reviews regarding it’s effectiveness in providing high-quality patient care. Lastly, although ophthalmologists were negatively impacted in terms of stress levels during the period of March-July, there was an overall realistic and hopeful outlook held by many ophthalmologists. Overall, the COVID-19 pandemic brought forth challenges of which many were successfully overcome, however it also clear that ophthalmologists are working and living in less-than-ideal circumstances with continued improvements to be made.
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