A1-0059

EVALUATION OF DIGITAL PHOTOGRAPHIC SCREENING FOR NEOVASCULAR AGE-RELATED MACULAR DEGENERATION

Teri V. Fisher, Marie Carole Boucher, David Maberley

Purpose

To determine whether high-resolution (1200 x 980 pixels) nonstereoscopic and/or stereoscopic digital imaging has sufficient sensitivity to screen for the clinical signs of neovascular age-related macular degeneration (AMD).

Methods

In this prospective, masked clinical validation study, 100 patients with provisional diagnoses of neovascular AMD will undergo stereoscopic digital fundus imaging and fluorescein angiography of both eyes. Retina specialists will evaluate the images to identify signs of neovascular AMD. The data will be compared with clinical diagnoses and fluorescein angiographic findings to determine the sensitivity and specificity of the digital images in screening for neovascular AMD. Coefficients of intra- and interreader agreement on interpretation of the digital images will be measured. Weighted κ values will be calculated to compare the results of clinical assessment, nonstereoscopic and stereoscopic imaging (with or without the clinical history) and fluorescein angiography.

Results and conclusions

Pending.

A2-0079

THREE-YEAR RESULTS OF A PROVINCE-WIDE TELEOPHTHALMOLOGY PROGRAM FOR REMOTE EVALUATION OF DIABETIC RETINOPATHY IN ALBERTA'S FIRST NATIONS COMMUNITIES

Christopher Rudnisky, Matthew T.S. Tennant, Abshir Moalin, Ellen Toth, David Strong, Mark Greve, Brad Hinz

Purpose

To report the rate and severity of diabetic retinopathy in a province-wide First Nations population.

Methods

Since December 2001, teams have travelled to 44 First Nations communities in Alberta, making 3 visits per year. Along with assessment of glycemic control, renal status and lipid profile, and foot examination, patients have undergone high-resolution stereoscopic digital fundus photography.

Results
On a per-eye basis (n = 3294), 21.0% (691 patients) had some degree of diabetic retinopathy. A total of 24.7% of patients (290/1175) required referral for further clinical evaluation, of whom only 42.8% (124) were referred for further evaluation and possible treatment of diabetic retinopathy.

Conclusions
The rate of diabetic retinopathy in this large group of subjects is slightly lower than that previously reported for First Nations populations. Because most referrals were made for reasons other than diabetic retinopathy, high-resolution stereoscopic imaging provides a higher standard of care than simple screening.

This paper has received funding from Secure Diagnostic Imaging Inc.

A3-0076

ESTIMATING THE COST OF VISUAL DISABILITY TO GOVERNMENT IN BRITISH COLUMBIA

Hussein Hollands, David Maberley, Ken Bassett

Purpose
To estimate direct health care costs of visual disability through routinely gathered health administrative data.

Methods
In 2003 we reviewed a representative sample of patients who sought ophthalmic care in a medium-sized city in British Columbia. A cohort of 962 representative patients were identified, of whom 43 were visually disabled. Health care costs will be measured for the cohort members by linking their personal health numbers using the British Columbia Health Linked Database. Data linkage is encrypted to ensure confidentiality. Two databases will be used: Pharmacare and Medical Services Plan. The latter will be used to estimate medial costs, and Pharmacare data will be used to estimate prescription drug costs for those over 65 years of age. General health care costs and ophthalmic-specific costs of visually disabled people will be compared with those for normally seeing people.

Results and Conclusions
To be presented.

A4-0052

COMPARISON OF STEREOSCOPIC DIGITAL IMAGING AND SLIDE FILM PHOTOGRAPHY IN THE IDENTIFICATION OF MACULAR DEGENERATION

Rizwan Somani, Matthew T.S. Tennant, Christopher Rudnisky, Ezekiel Weis, Andrew Ting, Jayson Eppler, Mark Greve, Brad Hinz, Alex de Leon

Purpose
We compared the efficacy of stereoscopic digital photography of the retina through a dilated pupil with a 45° nonmydriatic camera and 35-mm slide film photography in the identification of age-related macular degeneration (AMD).

Methods
Consecutive patients with a diagnosis of AMD were enrolled. Stereoscopic images of the optic disc, macula and temporal macula of 203 eyes (of 103 patients) were captured with both digital and standard fundus cameras. AMD was graded in a masked fashion on a modified AREDS (Age-Related Eye Disease Study) severity scale. The primary outcome measures were the presence and absence of AMD pathological features.

Results
Correlation of the 2 image formats in identifying AMD was good (k = 0.64) for AREDS level 3a or greater and was excellent (k = 0.83) for level 4b or greater.

Conclusions
High-resolution stereoscopic, mydriatic digital images captured with a nonmydriatic camera correlate well with stereoscopic slide film photographs in the identification of moderate to advanced AMD.

This paper has received funding from Secure Diagnostic Imaging.

A5-0077

INCIDENCE OF OPACIFICATION OF HYDROVIEW HYDROGEL INTRAOCULAR LENS ACCORDING TO THE VISCOELASTIC USED DURING SURGERY

William Dubinski, Sherif El-Defrawy, Jeff Sher, Seymour Brownstein

Purpose
It has previously been shown that silicone leaching into the Hydroview hydrogel intraocular lens (IOL) from the packaging gasket may be one of the factors involved in the late opacification of this lens. The purpose of this paper was to determine the incidence of opacification according to the viscoelastic used during surgery.

Methods
Retrospective chart review of 1033 cases of Hydroview hydrogel IOL implantation performed from February 1998 to September 2000. Viscoat (sodium chondroitin sulfate–sodium hyaluronate) was used intraoperatively in 538 cases, and Healon (sodium hyaluronate) was used in 495 cases. We determined the number of lenses that opacified and required explantation in the 2 groups.

Results
Sixty-six IOLs opacified sufficiently to warrant explantation. In all cases Viscoat had been used intraoperatively.

Conclusions
These results suggest that Healon played a role in preventing the late calcification and opacification that occurred in the Hydroview hydrogel IOL.

A6-0043

AMERICAN TELEMEDICINE ASSOCIATION TELEHEALTH PRACTICE RECOMMENDATIONS FOR DIABETIC RETINOPATHY

Matthew T.S. Tennant, Helen Li, Sven Bursell, Jerry Cavallerano, Mark Horton

Purpose
To develop practice recommendations for ocular telehealth for diabetic retinopathy.

Methods
The American Telemedicine Association (ATA) and the National Institute of Standards and Technology (NIST) held workshops to address 3 components of practice recommendations: clinical, technical and business/operational. Participants then prepared a written document, with the assistance of an editorial committee.

Results
Seven standard-field, ETDRS (Early Treatment Diabetic Retinopathy Study), 35-mm stereoscopic images (standard photos) are the accepted standard for validating imaging for diabetic retinopathy. Technology should comply with Digital Imaging and Communications in Medicine standards. Four categories of validation are recognized for telemedicine systems. These categories range from the ability to identify the presence or absence of diabetic retinopathy to a system that could replace ETDRS photographs in a research setting.

Conclusions
A multidisciplinary team supported and facilitated by the ATA and NIST has established telehealth practice recommendations for diabetic retinopathy.

A7-0015

RETINAL PHOTOGRAPHY AND OPTICAL COHERENCE TOMOGRAPHY IN SCREENING FOR DIABETIC RETINOPATHY

M. Mandell, Jeff Gale, Alan Berger

Purpose
To evaluate the performance of a diabetic retinopathy screening protocol that includes retinal photography and optical coherence tomography (OCT).

Methods
We studied 24 eyes of 13 patients referred to a retinal specialist for evaluation of diabetic retinopathy. Each eye was assessed clinically, with retinal photography and with OCT. Findings and follow-up recommendations derived from clinical assessment were compared with those derived from photography and OCT.

Results
On clinical assessment, 10 eyes showed proliferative diabetic retinopathy (PDR) and 8 showed clinically significant diabetic macular edema (CSDME). On screening with retinal photography and OCT, the same 10 eyes showed PDR and the same 8 eyes showed CSDME. In 4 eyes, clinically undetected CSDME was detected by screening with photography and OCT.

Conclusions
A screening program involving retinal photography and OCT is effective in detecting PDR and macular edema, resulting in appropriate referral and treatment.

A8-0120

"PIGGYBACKING" INTRAOCULAR LENSES FOR POSTOPERATIVE REFRACTIVE ERROR MANAGEMENT

Iqbal Ahmed, Christoph Kranemann

Purpose
To report results of a low-power posterior chamber intraocular lens (IOL) for postoperative refractive surprises or anisometropia.

Methods
Retrospective review of cases in which the STAAR AQ5010 posterior chamber IOL was implanted into the sulcus for postoperative refractive surprises or anisometropia. Chart review was performed, and refractive results and complications were noted.

Results
Eight patients received the STAAR AQ5010 posterior chamber IOL (power range –3.00 to +4.00 dioptres); 4 had adjunctive limbal-relaxing incisions. The mean preoperative spherical equivalent deviation from plano was 2.13 D, compared with 0.50 D postoperatively (mean length of follow-up 8.1 months). Early optic capture through the pupil developed in 1 patient, which was managed effectively with slit-lamp manipulation. Another patient had early pigment dispersion with elevated intraocular pressure, which was medically controlled.

Conclusions
The use of a low-power silicone IOL for "piggybacking" for refractive surprises or anisometropia was found to be effective, although iris chafing and optic capture were minor postoperative complications that required management.

A9-0072

α-INTRAOPERATIVE FLOPPY IRIS SYNDROME AND SYSTEMIC BLOCKER THERAPY

Jacinthe Rouleau, Alfred Assalian

Purpose
Intraoperative floppy iris syndrome (IFIS) has been recently described as repeated incisional prolapse of floppy iris causing intraoperative miosis. It may be related to the systemic use of tamsulosin (Flomax), an α-blocking agent for symptomatic benign prostatic hypertrophy. We performed a study to evaluate the use of systemic α-blocker therapy in patients presenting IFIS during cataract surgery.

Methods
Retrospective review of the records of a consecutive series of patients who presented floppy iris or miosis, or both, during cataract surgery. The personal computed database of 1 surgeon was used.

Results
Between 1995 and 2005, 38 patients (28 men and 10 women) presented floppy iris or miosis, or both, during cataract surgery. Tamsulosin use was found for 20 men, and use of labetolol, a combined α–β blocking agent, was found for 2 women.

Conclusions
IFIS appears to be primarily related to the use of tamsulosin in male patients. It may also be related to the use of labetolol.

A10-0018

MONITORED ANESTHESIA CARE PROVIDED BY REGISTERED RESPIRATORY CARE PRACTITIONERS DURING CATARACT SURGERY: A REPORT ON 1957 CASES

Peter A. Zakrzewski, Tammy Friel, Gordon Fox, Rosa M. Braga-Mele

Purpose
To evaluate the safety and feasibility of having monitored anesthesia care during cataract surgery provided by registered respiratory care practitioners (RRCPs).

Methods
We analysed retrospectively a consecutive series of 1957 cataract operations (phacoemulsification plus intraocular lens insertion) performed with topical anesthesia with or without intravenous administration of sedatives. An RRCP, trained to function as an anesthesia assistant, provided monitored anesthesia care during all stages of surgery, with an anesthesiologist available for consultation or assistance as required. We documented the number of serious medical complications resulting from the anesthesia or surgery and the number of anesthesiologist interventions required at each stage of surgery (preoperative, intraoperative and postoperative), along with the reasons for the interventions. We analysed age, preoperative American Society of Anesthesiologists (ASA) Physical Status Classification and the number of intravenous sedative agents given, as potential predictors of the need for anesthesiologist intervention.

Results
There were no adverse medical events that resulted in death, hospitalization or tracheal intubation. Two operations were stopped intraoperatively for medical reasons. Anesthesiologist intervention was required for 78 operations (4.0%): preoperatively for 34 (1.7%), intraoperatively for 43 (2.2%) and postoperatively for 3 (0.2%); 4 cases required 2 interventions. The mean patient age was significantly greater in the intervention group than in the nonintervention group (73.9 vs. 71.0 years; $p = 0.02$). A higher ASA rating (> 2) correlated with an increased risk of intervention overall ($p < 0.001$) and intraoperatively ($p < 0.001$). The use of more sedative agents (2 or 3 vs. 0 or 1) was marginally associated with the overall risk of intervention ($p = 0.053$) but not with the intraoperative risk ($p = 0.68$).

Conclusions
With the inherent safety of cataract surgery and the relatively low need for anesthesiologist intervention, the use of RRCPs trained as anesthesia assistants to monitor anesthesia is justified so long as anesthesiologist support is directly available when required. Potential benefits include cost savings to the health care system and decreased demand for anesthesiology services.

A11-0064

THE CANADIAN NATIONAL UVEITIS SURVEY: A CLOSER LOOK AT UVEITIS INVESTIGATION BY CANADIAN OPHTHALMOLOGISTS

Farzin Forooghian, Rishi Gupta, Larissa Derzko-Dzulynsky, David Wong

Purpose
Anterior uveitis (AU) (nongranulomatous or granulomatous) is commonly seen in ophthalmology practice and may result from a number of underlying problems. However, often the condition first presents devoid of any accompanying signs or symptoms of systemic disease. The clinician must thus choose from a battery of potential screening tests. A nonselective approach to testing is costly and inefficient. Furthermore, it can lead to misinterpretation of false-positive results. The purpose of our study was to identify AU investigation patterns of ophthalmologists in Canada and, ultimately, to make recommendations based on the literature that would lead to improved patient care and more cost-effective use of health care resources.

Methods
In September 2004 we mailed an 11-item questionnaire to 1197 physicians in Canada as a cross-sectional survey of practising ophthalmologists, fellows and residents.

Results
To date, 492 (41%) of the physicians have responded. For nongranulomatous AU the tests most commonly ordered (and proportion of respondents ordering them) were as follows: HLA-B27 test (68.4%), 1 or more of complete blood count (CBC), blood chemistry and urinalysis (64.5%), granulomatous syphilis test (56.3%), measurement of the erythrocyte sedimentation rate (ESR) (51.5%), chest radiography (51.1%), sacroiliac joint radiography (40.3%), and tests for antinuclear antibody (ANA) (43.7%), rheumatoid factor (RF) (36.6%) and angiotensin-converting enzyme (ACE) (34.4%). For granulomatous AU the tests most commonly ordered were as follows: chest radiography (75.5%), syphilis test (73.2%), 1 or more of CBC, blood chemistry and urinalysis (70.1%), purified

protein derivative of tuberculin test for tuberculosis (64.1%), ACE test (59.3%), ESR measurement (55.4%), and tests for HLA-B27 (43.7%), ANA (38.3%), C-reactive protein (31.6%) and RF (31.0%). For a child with AU the tests most commonly ordered were as follows: 1 or more of CBC, blood chemistry and urinalysis (49.4%), and tests for RF (43.5%) and ANA (41.8%). When testing for syphilis in a patient with AU, 12.1% would order only a screening test, but 74.5% would order the more specific confirmatory test as well.

Conclusions
Many Canadian ophthalmologists in this survey chose to order various tests with low diagnostic yields for AU. CBC, blood chemistry and urinalysis, ESR measurement, and tests for C-reactive protein and RF are too sensitive or nonspecific to be valuable in this setting. Although juvenile rheumatoid arthritis is a known cause of childhood uveitis, an ANA test was not ordered in most cases. Increased education and awareness will undoubtedly lead to a more cost-effective and efficient approach to investigation of AU. We will discuss investigation recommendations based on the literature in addition to a cost analysis of potential savings gained from avoiding unnecessary tests.

A12-0038

OPTICAL COHERENCE TOMOGRAPHY IMAGING OF THE CORNEA AND ANTERIOR SEGMENT

Stanley Chan, Hélène Boisjoly, Michèle Mabon, Michel LeFrançois, Isabelle Brunette

Purpose
To determine the indications and standard parameters for optical coherence tomography (OCT) imaging of the cornea and anterior segment with the OCT 3 system.

Methods
We performed OCT 3 imaging in 27 patients and compared the results with those of slit-lamp examination and central ultrasound pachymetry. A standardized technique was established to optimize the quality of the images.

Results
OCT images of the normal central cornea were clear, and the procedure did not require contact. In good conditions, these images may be clearer than those obtained with central ultrasound pachymetry, which does require contact. OCT cannot currently image the anterior chamber angle well and cannot penetrate opaque structures.

Conclusions
The OCT 3 system is a useful, complementary modality for imaging the cornea and anterior segment in selected cases. A new-generation OCT model designed for anterior segment imaging would facilitate the acquisition of high-quality cross-sectional images.

A13-0074

DEEP LAMELLAR ENDOTHELIAL KERATOPLASTY: 1-YEAR RESULTS

Natasha Yepes, Fanny Segev, Michael Hyams, Allan Slomovic, David Rootman

Purpose
To evaluate visual acuity, corneal topography and endothelial cell density 1 year after deep lamellar endothelial keratoplasty for endothelial dysfunction.

Methods
Prospective, comparative, interventional cases series. Twenty eyes of 20 patients who had undergone deep lamellar keratoplasty and had been followed for at least 1 year were included. The main outcome measures were best corrected visual acuity, uncorrected visual acuity, astigmatism, topographic regularity and symmetry, and endothelial cell density.

Results
One year postoperatively the mean best corrected visual acuity (and standard deviation [SD]) was 0.31 (0.15) (average 20/60, range 20/40 to 20/100), compared with preoperative values of 0.14 (SD 0.17) (average 20/200, range counting fingers to 20/70). The mean spherical equivalent was –0.009 dioptres (SD 1.296 dioptres), the mean manifest refraction astigmatism was 1.21 (SD 1.18), the mean surface regularity index was 0.90 (SD 0.44), and the mean surface asymmetry index was 0.92 (SD 0.44). The average endothelial cell count for the donor graft was 2892 (SD 539), compared with 1662 (SD 722) at 1 year, a loss of 42.5%.

Conclusions
Deep lamellar keratoplasty is an excellent method to replace the endothelium in patients with Fuchs' dystrophy. We found minimal astigmatism, good topographic parameters and acceptable visual acuity.

A14-0011

DIETARY OMEGA-3 FATTY ACID INTAKE AND RISK OF CLINICALLY DIAGNOSED DRY EYE SYNDROME IN WOMEN

Jeffrey P. Gilbard, Biljana Miljanovich, Komal Trivedi, M. Reza Dana, Julie Buring, Debra Schaumberg

Purpose
To determine the association between dietary intake of omega-3 fatty acids and risk of dry eye syndrome (DES).

Methods
A total of 32 470 female healthcare professionals aged 45–84 years participating in the Women's Health Study provided information on diet (answers to a validated food-frequency questionnaire) and DES (self-reports of clinically diagnosed DES).

Results
After adjustment for potentially confounding factors, the odds ratio (OR) (and confidence interval [CI]) for the highest versus the lowest dietary intake of omega-3 fatty acids was 0.83 (0.70-0.98) (*p* for trend = 0.04). In addition, the number of 4-oz. (114-g) tuna servings per week was significantly associated with DES (OR 0.82 [CI 0.67–1.00] for 2 to 4 servings vs. fewer than 2; OR 0.34 [CI 0.13–0.81] for 5 to 6 servings vs. fewer than 2; *p* for trend = 0.004).

Conclusions
Women with a higher dietary intake of omega-3 fatty acids may be at decreased risk for DES.

A15-0023

IN VITRO TOXIC EFFECTS OF FORTIFIED VANCOMYCIN, CEFAZOLIN AND TOBRAMYCIN ON HUMAN CORNEAL EPITHELIAL CELLS

Yannik Boutin

Purpose
To compare the in vitro effects of fortified vancomycin, cefazolin and tobramycin on human corneal epithelial cells.

Methods
Human corneal epithelial cells were cultured. The antibiotics were prepared as they would be for fortified intravenous administration and then were diluted in the culture medium. Confluence and cellular morphology were observed by contrast phase microscopy. When controls reached 100% confluence, cells were counted.

Results
The fortified antibiotic most toxic in terms of cell proliferation was cefazolin; in the most dilute concentrations, it resulted in cell numbers 4 times lower than those of controls. Tobramycin was also toxic in the most dilute concentrations, cell numbers being 50% lower than those of controls. Vancomycin had no effect on cell proliferation in all dilutions except the lowest one.

Conclusions
Topically applied fortified cefazolin is much more toxic to corneal epithelial cells than tobramycin and vancomycin. This finding will be important for the clinician who deals with severe infections, especially when toxicity becomes a main concern.

A16-0055

UPDATE ON DEVELOPMENT OF THE OPTIMAL MULTIFOCAL SHAPE FOR PRESBYOPIC CORRECTION WITH THE EXCIMER LASER

W. Bruce Jackson, George Mintsioulis, Marc D. Lafontaine, Brian Lorimer, Lori O'Connor, Nancy Whyte, Sabrina Taylor

Purpose
To discuss the results of the Canadian multicentre trial of multifocal LASIK (laser-assisted in situ keratomileusis) for the correction of presbyopia.

Methods
We treated 26 hyperopic presbyopic eyes with multifocal LASIK and studied the results at 12 months in 10 eyes. Preoperatively the mean sphere was +1.72 (range 0.75–3.50) dioptres and the mean cylinder +0.32 (range 0.00–0.75) dioptres. At 12 months a questionnaire was administered to the 5 patients. Myopic patients with 2 different ablation profiles were also treated, and the results will be discussed.

Results
At 12 months postoperatively, vision was 20/20 or better at distance and J3 or better at near in 9 of the 10 hyperopic presbyopic eyes, and 8 eyes simultaneously achieved 20/25 at distance and J3 at near. Four of the 5 patients were satisfied with overall visual sharpness and clarity, all were satisfied with distance vision, and 4 were satisfied with near vision.

Conclusions
Long-term results of multifocal LASIK correction for hyperopic presbyopia have demonstrated stability and safety, along with high overall patient satisfaction. Early results of presbyopic treatment in myopic patients suggest the need for further refinement of the ablation shape.

This paper has received funding from VISX, Inc.

A17–0057

RESULTS OF LASER ANTERIOR CILIARY EXPANSION WITH ER: YAG FOR RESTORATION OF PRESBYOPIA

John Blaylock, Zhaomin Si, Charilyn Bowden, AnnMarie Hipsley

Purpose
To evaluate safety and efficacy of laser anterior ciliary expansion (ACE) with Er: YAG to restore accommodation in presbyopic eye.

Methods
Paired-radial scleral ablations in four quadrants were performed using Er: YAG in eyes of 9 presbyopic patients who were followed for 1 week to 3 months. Patients were assessed pre and postoperatively for accommodative amplitude, near and distance vision, refraction, intraocular pressure, and pupil size. Differences between pre-op and post-op were analyzed using paired-sample Student *t* test.

Results
Postoperatively, accommodative amplitude (K-range measurement) increased by 2.42 ¡À 1.41 (¡À SD) diopters (P< 0.001). There was a significant improvement in uncorrected-near visual acuity at 40 cm by 0.49 ¡À 0.27 (logMAR, ¡À SD) (P< 0.001). Changes in other measurements were not statistically significant. There were no significant adverse effects.

Conclusions
Laser ACE shows a safe and effective procedure for restoring accommodation in presbyopes. Data of longer follow-up is required.

A18–0067

PLANNING ABLATIONS FOR THE OPTIMAL EYE MODEL WITH WAVEFRONT AND TOPOGRAPHIC DATA

George Mintsioulis, Réjean Munger, W. Bruce Jackson, Marc D. Lafontaine

Purpose
To demonstrate a new technique that allows the design of a wavefront correction when only corneal topography data are available.

Methods
Corneal topography data are imported into custom ablation software, and the corneal wavefront error of the anterior surface is calculated. A target wavefront error map is generated for the postoperative cornea, and a wavefront correction is calculated from the differences between the preoperative and postoperative optical properties of the cornea. The wavefront correction is used to calculate an ablation profile and a treatment table that can drive the wavefront-guided refractive laser.

Corneal-topography-guided treatments based on the described technique were designed for 5 patients, all with vision of 20/60 or worse, whose irregular corneal surface precluded reliable ocular wavefront measurements.

Results
Visual outcomes will be discussed.

Conclusions
Corneal-wavefront-based corrections offer a significant treatment advantage when ocular wavefront data are not available or are unreliable.

This paper has received funding from VISX, Inc.

A19–0078

BIOMICROSCOPIC VS. INFRARED PUPILLOMETRY

Sébastien Gagné, Mounir Bashour, Pierre Demers, Avi Wallerstein, Mark Cohen

Purpose
To describe the use of the biomicroscope (slit-lamp) as a pupillometer and compare its usefulness with that of the Colvard infrared pupillometer.

Methods
The pupil size of 341 patients (682 eyes) scheduled to undergo refractive surgery were measured by 2 examiners using the biomicroscope and the Colvard pupillometer. The measurements were performed in scotopic light conditions.

Results
The mean pupil diameter (and standard deviation [SD]) was 6.90 mm (0.71 mm) with the biomicroscope and 5.90 mm (0.97 mm) with the Colvard pupillometer. The mean difference between the two devices was –0.998 mm (SD 0.85 mm) for examiner 1 and –1.005 mm (SD 0.84 mm) for examiner 2. The limits of agreement ranged from 3.34 mm (examiner 2) to 3.4 mm (examiner 1). The coefficient of reliability was 1.4 with the biomicroscope and 1.94 with the pupillometer. The mean difference between examiner 1 and examiner 2 was 0.0017 (SD 0.70) and 0.0086 (SD 0.97) respectively. The limits of agreement ranged from 2.8 (biomicroscope) to 3.89 (pupillometer).

Conclusions
The biomicroscope demonstrated better reliability and measured larger pupil diameters in scotopic conditions than the Colvard pupillometer.

A20–0030

IMPLANTATION OF SUBEPITHELIAL LENTICULES IN THE CORNEA FOR REFRACTIVE CORRECTION

W. Bruce Jackson, Christopher Marmo, Yuwen Liu, David Carlsson, Donna Bueckert, Cecilia Becerril, Réjean Munger, May Griffith

Purpose
To test the feasibility of using tissue-engineered extracellular matrix substitutes as implantable lenticules for refractive correction.

Methods
Extracellular matrix substitutes comprising collagen, with or without additional proteoglycans, were fabricated into lenticules (6 mm in diameter, 70 μm thick at the centre) with 1 of 2 cross-linkers. The lenticules were characterized in vitro for physical properties and biocompatibility, then were implanted subepithelially within 1 cornea of mini-pigs, the contralateral cornea serving as control.

Results
Both cross-linkers resulted in fully biocompatible lenticules that showed smooth host–implant integration. The corneas with implants were optically clear, with no vascular infiltration. Topography showed a change of about 50 μm in thickness in central corneal elevation.

Conclusions
The collagen-based lenticules were able to integrate functionally within the host corneas. There is potential for such lenticules as corneal supplements or alternatives to laser-based refractive correction.

This paper has received funding from Ocular Sciences-CooperVision.

A21–0065

INDICATIONS FOR PENETRATING KERATOPLASTY IN CANADA, 1996–2004

Stephen Dorrepaal, Kathy Cao, Allan Slomovic

Purpose
To describe the indications for penetrating keratoplasty (PKP) in a tertiary medical referral centre in 1996–2004, to determine trends in these indications over the study period and to compare our results with those recently published. An additional objective was to build on a previous study that looked at indications for PKP at our centre in 1986–1995.

Methods
We reviewed the charts of all patients who had undergone PKP in a single tertiary care referral practice at the Toronto Western Hospital,

University Health Network, from July 1, 1996 to June 30, 2004. During the study period, 617 patients underwent 794 PKP procedures. Sufficient documentation was available to study 600 patients and 777 operations (97.8%). Indications for each PKP procedure were classified according to a standard set of established diagnostic categories and were further classified into specific clinical diagnoses when appropriate. Other data collected included patient demographic characteristics, relevant medical history, lens status and associated surgical procedures. Also, in patients undergoing regrafting, the indication for the first graft in that eye was documented. The recent literature was extensively reviewed in order to compare the leading indications for corneal transplantation in various countries.

Results

The leading indications for PKP were regrafting (209 cases [26.9%]), pseudophakic bullous keratopathy (PBK) (193 cases [24.8%]), primary corneal endotheliopathies, including Fuchs' endothelial dystrophy (101 cases [13.0%]), anterior keratoconus (93 cases [12.0%]) and viral or postviral causes (41 cases [5.3%]). These indications have been widely recognized in the literature as leading indications for PKP worldwide. On linear regression, none of the leading indications had trends that were statistically significant at the 95% level. Regrafting, keratoconus and Fuchs' endothelial dystrophy displayed a nonsignificant decreasing trend, whereas PBK, herpes simplex and mechanical injury displayed a nonsignificant increasing trend. The median patient age and the yearly number of PKP procedures remained constant over the study period and were also consistent with data from previous studies at our centre.

Conclusions

Regrafting is the leading indication for PKP at our centre, followed by PBK. Compared with the results of a previous study at our centre, the frequency of regrafting as an indication for PKP over the study period was greater and the frequency of PBK as an indication for PKP was lower. The leading indications for PKP in this study are in agreement with those reported recently.

A23–0085

WAITING TIMES FOR CORNEAL TRANSPLANTATION IN SASKATCHEWAN

Ahmed Al-Ghoul

Purpose

To assess the indications and waiting times for patients requiring corneal transplantation in Saskatchewan.

Methods
Retrospective chart review of all corneal transplantation cases performed by 2 surgeons from 1994 to 2003 in Saskatoon.

Results
A total of 129 eyes were operated on from 1993 to 2003. The indications for corneal transplantation were pseudophakic/aphakic bullous keratopathy (37.4% of cases), keratoconus (23.7%), Fuchs' endothelial dystrophy (15.1%), traumatic or idiopathic corneal scarring (7.9%), lattice dystrophy (7.2%), herpes simplex corneal scar (4.3%), Reis–Bückler's dystrophy (2.2%) and pellucid marginal degeneration (0.7%). The average waiting time was 533 days (range 1–1334 days).

Conclusions
An increase in public awareness of the need for organ donation is recommended in hopes of reducing waiting times for corneal transplantation.

A24–0071

CORRELATIONS BETWEEN CONFOCAL SCANNING LASER OPHTHALMOSCOPY AND FREQUENCY-DOUBLING TECHNOLOGY PERIMETRY IN A GLAUCOMA SCREENING POPULATION

Alvine Kamdeu Fansi, Paul Harasymowycz

Purpose
To determine the relation between structural optic disc changes detected with the Heidelberg Retina Tomograph II (HRT II) and visual field changes measured by means of frequency-doubling technology (FDT).

Methods
A total of 300 subjects underwent FDT (C-20-5) and confocal scanning laser ophthalmoscopy (HRT II). The HRT II results were classified on a scale from 0 (normal subjects) to 4 (patients with glaucoma). HRT II classification was subdivided into 2 parts, HRT II Superior (Sup) and HRT II Inferior (Inf). The FDT printouts were classified based on two different protocols (Akio et al. and Patel et al.). The FDT Patel and al scores were then subdivided into 2 parts, FDT Superior (Sup) and FDT Inferior (Inf).

Results
In the right eye, the FDT Sup score correlated with the HRT II Inf score (Pearson's correlation coefficient 0.296, $p < 0.01$), and the FDT Inf score correlated with the HRT II Sup score (Pearson's correlation coefficient 0.168, $p < 0.01$). FDT Akio et al. scores also correlated with HRT II diagnosis ($\chi^2 = 9.758$, $p = 0.008$) and HRT II Sup score ($\chi^2 = 17.628$, $p = 0.001$). Analysis of variance indicated a significant association

between HRT diagnosis and FDT Patel et al. general score ($p = 0.020$) and between HRT diagnosis and FDT Sup score ($p = 0.000$). In the left eye, the FDT Akio et al. score correlated with HRT II diagnosis ($\chi^2 = 7.996$, $p = 0.018$) and HRT II Sup score ($\chi^2 = 9.659$, $p = 0.047$).

Conclusions
In this glaucoma screening population, there was a good correlation between functional visual field damage, as assessed with FDT, and topographic changes of the optic disc, as measured with HRT II. Although not reproduced in both eyes, a high accordance between HRT II-based diagnosis of glaucoma and FDT scores with 2 grading methods was found. This result confirms the validity of the FDT scoring techniques.

A25–0048

THE VALIDITY OF SCREENING FOR GLAUCOMATOUS OPTIC NERVE DAMAGE WITH HEIDELBERG RETINA TOMOGRAPH II CONFOCAL SCANNING LASER OPHTHALMOSCOPY IN HIGH-RISK POPULATIONS: A PILOT STUDY

Paul Harasymowycz, Alvine Kamdeu Fansi, Demosthenes G. Papamatheakis, Jacques Gresset, Mark R. Lesk

Purpose
To evaluate whether the Heidelberg Retina Tomograph II (HRT II) confocal scanning laser ophthalmoscope is a valid glaucoma screening tool.

Methods
This prospective, cross-sectional study focused on groups at high risk for open-angle glaucoma. Subjects underwent frequency-doubling perimetry, HRT II confocal scanning laser ophthalmoscopy and clinical examination. Outcome measures included likelihood ratios, sensitivities, specificities and positive predictive values (PPVs) from Moorfield's regression analysis (MRA) and other HRT II measures.

Results
Of the 303 patients examined, 21 (7%) had glaucoma. Scanning laser ophthalmoscopy was successfully performed in 531 (88%) of 604 eyes. There was significant accordance between MRA-based and clinical diagnoses ($\kappa = 0.372$, $p < 0.001$). The best accordance was seen when "normal" eyes were grouped with "suspect" eyes in both MRA-based and clinical diagnoses ($\kappa = 0.604$, $p < 0.001$). Depending on glaucoma definitions, sensitivity ranged from 25% to 100%, specificity from 87% to 97% and PPV from 28% to 68%.

Conclusions
These findings suggest that a glaucoma screening program is effective in detecting open-angle glaucoma when one targets high-risk populations. HRT II may prove to be a useful tool in detecting glaucomatous optic nerve damage.

A26–0029

COSTS TO THE ONTARIO HEALTH INSURANCE PLAN OF SELECTIVE LASER THERAPY VS. DRUG THERAPY FOR GLAUCOMA

Richard Lee, Cindy M.L. Hutnik

Purpose
To compare the 5-year cumulative costs of selective laser therapy (SLT) and drug therapy for glaucoma patients aged 65 years and older in the context of the Ontario Health Insurance Plan.

Methods
Costs were calculated with reference to the provincial formulary, existing literature and a review of provincial prescription patterns that included 707 patient charts from 5 practices across Ontario.

Results
The use of SLT instead of therapy with 1, 2 or 3 drugs produced a per-patient, 5-year cumulative saving of $281.78, $1354.57 and $2450.94 respectively.

Conclusions
Over 5 years, SLT is less expensive than drug therapy in the management of glaucoma in patients aged 65 years and older in the context of the Ontario Health Insurance Plan.

A27–0045

RELATION BETWEEN GLAUCOMA PROGRESSION AND CHANGES IN OPTIC NERVE HEAD TOPOGRAPHY AND BLOOD FLOW AT THE TIME OF INITIAL REDUCTION OF INTRAOCULAR PRESSURE: A PROSPECTIVE PILOT STUDY

Demosthenes G. Papamatheakis, Denise Descovich, Ali S. Hafez, Mark R. Lesk

Purpose
Our recent data for patients with glaucoma and ocular hypertension suggest that, compared with those with thicker corneas, patients with thin corneas have larger reductions in optic nerve head (ONH) cup depth and smaller improvements in neuroretinal rim blood flow when

they have sustained reduction of intraocular pressure (IOP). We studied whether topographic and blood flow changes in the ONH after therapeutic IOP reduction in patients with ocular hypertension and glaucoma correlate with long-term visual field stability.

Methods
In 26 patients with glaucoma or preperimetric glaucoma, we performed Heidelberg retinal tomography and scanning laser Doppler flowmetry (with SLDF software, v. 3.3) of the ONH before and 2–6 months after sustained, therapeutically indicated IOP reduction. We measured peripheral vasospasticity with laser Doppler flowmetry of the fingers during cold-water immersion. We also performed ultrasound pachymetry. Over the next 4.2 years (standard deviation [SD] 1.0 years), we monitored visual field stability with the use of modified Hodapp–Anderson–Parrish criteria.

Results
Glaucoma progressed in 8 patients and was stable in 16; it was indeterminate in 2, and data for these 2 were excluded from analysis. At the time of initial IOP reduction, the patients with disease progression had a mean reduction in ONH cup depth of 89 (SD 144) μm, compared with 1 (SD 50) μm for the patients with stable disease ($p = 0.029$), and were more vasospastic (minimum finger blood flow 4.1 [SD 2.3] tpu vs. 10.3 [SD 8.2] tpu; $p = 0.017$). The patients with disease progression had insignificantly thinner corneas (546 [SD 50] μm vs. 569 [SD 59] μm; $p = 0.4$) and insignificantly smaller initial increases in neuroretinal rim blood flow (32 [SD 96] au vs. 70 [SD 119] au; $p = 0.44$) than the patients with stable disease. The 2 groups had the same initial IOP reduction; the group with disease progression had slightly lower IOPs during follow-up.

Conclusions
Greater movement of the base of the ONH cup, interpreted as a sign of a more compliant lamina cribrosa, appears to be linked to an increased risk of progression of glaucoma, as does vasospasticity.

A28–0046

RACIAL VARIABILITY OF GLAUCOMA RISK FACTORS IN A CANADIAN URBAN POPULATION

Demosthenes G. Papamatheakis, Alvine Kamdeu Fansi, Paul Harasymowycz

Purpose
To determine the effect of race on the variability of risk factors for glaucoma and ocular hypertension in an urban Canadian population.

Methods
Study data were gathered during a community-based, high-risk glaucoma screening clinic conducted in Montreal between October 2003 and February 2004. Patients underwent complete ophthalmic examination, including visual acuity testing, intraocular pressure (IOP) measurement, corneal pachymetry to determine the central corneal thickness (CCT), gonioscopy, and slit-lamp and dilated fundoscopic examinations, as well as imaging of the optic nerve with the Heidelberg Retina Tomograph II (HRT II) confocal scanning laser ophthalmoscope. Outcome measures included IOP, CCT, grades for the optic nerve on the Disk Damage Likelihood Scale and HRT measures (cup/disc ratio, disc area, cup area, rim area, cup/disc area ratio and rim/disc area ratio, cup shape measure, height variation contour and mean retinal nerve fibre layer thickness). Statistical analyses, including Student's *t* tests, were performed with SPSS software, and only results that were repeated in both eyes were considered statistically significant.

Results
Of the 274 patients screened, 59 (22%) were of African-Caribbean descent, and 199 (73%) were white. Although there was no significant difference in sex ratio between the racial groups, the white group was significantly older than the African-Caribbean group (mean age 66.2 vs. 55.1 years; $p = 0.001$). Compared with the white group, the African-Caribbean group had a significantly higher IOP ($p < 0.001$), lower CCT ($p < 0.001$), greater cup/disc ratio ($p = 0.016$), disc area ($p < 0.001$), cup area ($p = 0.002$) and cup/disc area ratio ($p = 0.009$), and a smaller rim/disc area ratio ($p = 0.009$). No significant differences were found between the 2 groups in race and cup shape measure, height variation contour or mean retinal nerve fibre layer thickness.

Conclusions
In a Canadian urban setting, African-Caribbean race is associated with an increased number of risk factors for the development of open-angle glaucoma, including a higher IOP, thinner cornea, and greater cup/disc and cup/disc area ratios.

A29–0032

ASSESSMENT OF ANOMALOUS OPTIC DISCS: THE ROLE OF OPTICAL COHERENCE TOMOGRAPHY

Christopher S. Jackman, Jonathan Boekhoud, Cindy M.L. Hutnik

Purpose
To determine whether optical coherence tomography (OCT) measurements of the nerve fibre layer (NFL) thickness correlate with the presence of visual field defects (VFDs) in patients with anomalous optic

discs and whether NFL thickness could be used to predict the presence of a VFD.

Methods
In a prospective study, we measured NFL thickness by OCT in 61 eyes of 32 subjects with anomalous optic discs, defined to include tilted optic discs and hypoplastic optic discs. Thickness was analysed at 3.4 mm centred on the optic disc. As well, each subject underwent Swedish Interactive Threshold Algorithm 24-2 perimetry.

Results
The mean NFL thickness (and standard deviation [SD]) in the 50 eyes with and the 11 eyes without a VFD was 77.8 (20.3) μm and 87.6 (27.3) μm respectively ($p = 0.27$). The area under the receiver operator characteristic curve for mean NFL was 0.63, and the optimal mean NFL thickness — that with the highest sensitivity and specificity — for detecting a VFD was 77.3 μm. The positive predictive value for detecting a VFD with use of the optimal mean NFL thickness as a lower limit was 90.9%.

Conclusions
NFL thickness measurements by OCT may be clinically useful in identifying subjects with anomalous optic discs who have visual field loss. Since NFL damage occurs before development of a VFD, perhaps OCT-measured NFL thickness in this group of subjects could predict the development of VFD in those with glaucoma.

A30–0080

PLANNING FOR THE NEXT GENERATION: PRACTICE PATTERNS OF CANADIAN GLAUCOMA SPECIALISTS

Tanya Orton, Robert Schertzer

Purpose
To identify practice patterns of Canadian glaucoma specialists and identify areas requiring further development.

Methods
All 130 Canadian ophthalmologists identified as glaucoma specialists from the Canadian Ophthalmological Society specialist list were mailed a survey in 2004.

Results
Seventy-eight physicians responded, for a response rate of 60%. Of the 78, 55 considered themselves glaucoma specialists. Of the 55, 78% had formal glaucoma training, with 89% having 1 year or more. The mean number of years in practice was 15.8. A total of 91% practised in urban settings. The respondents spent a mean of 2.5 days doing laser procedures

and had a mean of 5.7 operating room half-days per month. The primary reason for office visits was glaucoma. Overall, 68% of the surgical procedures performed were for cataract and 20% for glaucoma. A total of 60% of the respondents indicated that the waiting time for nonemergent surgery was adequate. All the respondents stated that the waiting time for emergency care was within hours.

Conclusions
Most Canadian glaucoma specialists practise in an urban setting. Cataract is the primary surgical procedure performed. The specialists feel that adequate emergency coverage is available for their patients, but many have concerns regarding nonemergent care.

A31–0091

INTRAOCULAR PRESSURE REDUCTION WITH SELECTIVE LASER TRABECULOPLASTY VS. ARGON LASER TRABECULOPLASTY

Catherine Birt

Purpose
Selective laser trabeculoplasty (SLT) is a new laser treatment. I examined results in patients receiving argon laser trabeculoplasty (ALT), SLT or SLT following prior ALT.

Methods
A total of 106 patients were given laser trabeculoplasty: 39 received ALT, 30 received SLT, and 37 received SLT after previously having 360° of ALT therapy.

Results
All 3 groups experienced a statistically significant decrease of intraocular pressure (IOP) by 4.5 months. There were no statistically significant differences between groups in IOP before or after laser treatment.

Conclusions
The reduction in IOP following SLT is similar to that seen following ALT in patients who have had prior laser treatment and those who have not.

A32–0002

EFFECT OF MEDICAL THERAPY ON RATES OF GLAUCOMA FILTRATION SURGERY IN ONTARIO

Rony Rachmiel, Mary Chipman, Pieter Gouws, Graham Trope, Yvonne Buys

Purpose
To analyse trends in glaucoma filtration surgery and to correlate these with the introduction of new glaucoma medications.

Methods
The number of filtration operations performed in Ontario from April 1992 to March 2004 was obtained from the Ontario Health Insurance Plan. The Ontario population distribution by age was obtained from Statistics Canada for the same period. The prevalence of primary open-angle glaucoma (POAG) was estimated. For comparison, identical calculations were done for cataract surgery.

Results
The total number of trabeculectomy procedures increased from 1735 in 1992 to a maximum of 2647 in 1997 (52.6%) and then remained stable. The estimated prevalence of POAG increased from 51 727 in 1992 to 69 154 in 2004 (33.7%; 2.4%/yr). The number of trabeculectomy procedures per 1000 patients with POAG increased from 33.5 in 1992 to a maximum of 46.2 in 1997 (37.7%; 6.6%/yr) and then steadily decreased, to 38.2 in 2004 (17.3%; 2.7%/yr). New medications were introduced in Ontario as follows: Trusopt, December 1996; Xalatan, June 1997; Alphagan, November 1997; Cosopt, May 1999; Travatan, November 2001; Lumigan, May 2002; and Combigan, December 2003. The number of cataract operations increased from 44 943 in 1992 to 100 751 in 2003 (124%). The estimated prevalence of cataract increased from 695 299 to 920 028 (32.3%) in the same period. The number of cataract operations per 1000 patients with cataract increased from 64.6 in 1992 to 109.5 in 2003 (69.4%, 6.0%/yr).

Conclusions
The substantial decrease after 1997 in the trabeculectomy rate among Ontario patients with POAG coincided with the introduction of glaucoma medications.

A33–0105

EVIDENCE FOR RETINAL AUTOIMMUNITY IN MULTIPLE SCLEROSIS

Farzin Forooghian, Melanie Sproule, Carol Westall, Grazyna Adamus, Lynn Gordon, Guy Jirawuthiworavong, Kaori Shimazaki, Paul O'Connor

Purpose
Multiple sclerosis (MS) has been associated with intraocular inflammation of the uveal tract, which suggests an immunologic link between the uvea and central nervous system (CNS) in this disease. The retina is embryologically derived from the CNS, and it is conceivable that retinal antigens may also be recognized by the immune system in MS. We performed this study to further explore and elucidate the presence of retinal autoimmunity in MS.

Methods
Thirty-four patients with clinically definite MS and 38 control subjects were recruited. All patients and control subjects had standard electroretinographic (ERG) testing done as well as a special ERG protocol to isolate rod photoreceptor function. Serum samples from both groups were analysed for the presence of antiretinal antibodies using Western blot techniques.

Results
We found statistically significant differences between the patients with MS and the control subjects in 3 ERG measures. In the MS group, implicit times of the mixed response b-wave and rod photoreceptor response were increased. The amplitudes of the photopic oscillatory potentials were reduced. Patients with the highest titres of antiretinal antibodies had abnormal ERG recordings for all 3 of these parameters.

Conclusions
We report ERG evidence of retinal dysfunction in MS, including, to our knowledge, the first report of photoreceptor dysfunction in this disease. The finding that patients with the highest antiretinal antibody titres had abnormal ERG recordings suggests immune recognition of the retina. We are currently characterizing the antibody specificities and HLA types of the MS group. The discovery of autoimmunity in an unmyelinated part of the body suggests that nonmyelin antigens shared by the retina and CNS may play an important role in the pathogenesis of MS.

A34–0036

UNUSUAL NEURO-OPHTHALMIC MANIFESTATIONS OF AN UNUSUAL DISEASE

Mark Gans, Edward Margolin

We will describe 2 patients presenting with unusual brain-stem manifestations of an unusual systemic disease. The patients presented to the neuro-ophthalmology clinic with signs of brain-stem disease. The first patient had binocular vertical diplopia and, on examination, signs of dorsal midbrain syndrome (convergence retraction nystagmus, papillary light-near dissociation and limitation of extraocular muscles in upgaze). Magnetic resonance imaging (MRI) demonstrated a lesion in the tectal area. The second patient had binocular diplopia with a torsional component. MRI demonstrated a very large infiltrative tectal lesion. Both patients underwent tissue biopsy of their lesions. Presentation and management of the diagnosed condition will be discussed. The possibility of the disease in question should be kept in mind and included in the differential diagnosis when a patient presents with brain-stem signs.

A35–0066

IS A SMALL CUP/DISC RATIO A RISK FACTOR FOR PSEUDOTUMOUR CEREBRI?

Shuan Dai,Camelina Trimboli, Raymond Buncic

Purpose
To determine the optic cup/disc ratio in children with pseudotumour cerebri.

Methods
Retrospective observational study. We obtained digital fundus photographs with the Zeiss FF 450 plus fundus camera in 70 children with clinically confirmed pseudotumour cerebri. We measured the cup/disc ratio digitally with VISUPAC software, then compared the mean of the average cup/disc ratio in the studied population with published norms for the same age group.

Results
Preliminary results for many of our subjects showed a small cup/disc ratio.

Conclusions
Children with pseudotumour cerebri have a small cup/disc ratio in comparison with age-matched norms. They may therefore be vulnerable to disc swelling in the event of raised intracranial pressure.

A36-0069

SOME HEAD TILTS INDICATE SERIOUS CENTRAL NERVOUS SYSTEM PATHOLOGY

Shuan Dai, Raymond Buncic

Purpose
To report our clinical experiences in the diagnosis and management of ocular tilt reaction (OTR) in children.

Methods
Observational case series. Ocular tilt reaction was documented by full ocular examination and fundus pictures. Central nervous system (CNS) causes were investigated by a pediatric neurologist and magnetic resonance imaging (MRI) of the brain.

Results
Ten children presenting to the pediatric neuro-ophthalmology clinic were found to have various degree of OTR. All but 1 was confirmed to have CNS pathology on MRI. One child presenting with OTR was found to have recurrence of optic pathway glioma.

Conclusions
OTR is present in a significant number of patients with CNS pathology. It may be the first clinical sign indicating CNS tumour.

A37–0040

EXTRAOCULAR MUSCLE METASTASIS: A DIAGNOSTIC CHALLENGE

Katie Luneau, Julie Falardeau, Dan Boghen

We report a case of bilateral extraocular muscle metastasis from breast carcinoma in the initial absence of imaging abnormalities or known neoplasia. A healthy 45-year-old woman presented with diplopia. Examination revealed abnormal ocular motility bilaterally and, on the left side, orbicularis weakness, ptosis and lid lag. Imaging and an edrophonium chloride (Tensilon) test gave normal results, and the serum level of thyroid-stimulating hormone was normal. Subsequently there was increased restriction of ocular motility, left-sided pain on upgaze, chemosis and mild proptosis. A computed tomography scan suggested orbital pseudotumour. A failed steroid trial led to left orbital biopsy, which revealed metastatic adenocarcinoma. Eye muscle metastasis can be a diagnostic challenge because it can present in the absence of known carcinoma and with normal imaging results. It should be included in the differential diagnosis of acquired diplopia. This case demonstrates the potential value of the association of ptosis and downgaze retraction as a sign of neoplastic eyelid infiltration.

A38–0109

PRESUMED PARANEOPLASTIC POSTERIOR UVEITIS ASSOCIATED WITH PINEAL GLAND GERMINOMA

Rajeev Muni, Farzin Forooghian, Grazyna Adamus, Hall Chew, Jim Drake, Raymond Buncic

A 14-year-old boy was referred with papilledema. The visual acuity was 20/20 bilaterally. The patient had dorsal midbrain syndrome. There was 0.5+ anterior chamber reaction and 2+ vitritis in both eyes. Fundoscopy showed bilateral disc edema and perivenular sheathing. Serum samples taken before chemotherapy were screened for antiretinal and anti-optic nerve antibodies using Western blot techniques. Magnetic resonance imaging of the brain identified a pineal gland tumour. The intracranial pressure was normal, which suggested that the disc edema was inflammatory in nature. Biopsy demonstrated pineal germinoma. During chemotherapy the posterior uveitis dramatically resolved. There was low reactivity with a 30-kDa optic nerve protein, but no antiretinal antibodies

were found. The pineal gland and eye share common antigens. To our knowledge, this is the second reported case of paraneoplastic posterior uveitis associated with a pineal germinoma.

A39–0129

COEXISTENCE OF ACNE ROSACEA IN PATIENTS PRESENTING WITH CHALAZION

Patrick O'Keeffe, Jeff Van Impe, Larry Allen

Purpose
To determine the prevalence of acne rosacea in patients presenting with acute or recurrent chalazion.

Methods
Patients with chalazion presenting to the Oculoplastics Service in London, Ont., were evaluated for clinical signs or a previous history consistent with acne rosacea.

Results
The prevalence of acne rosacea in the general population is 4.78%. Preliminary data demonstrate the prevalence to be 40% (44/110) in patients presenting with chalazion. Patients with multiple chalazia on initial presentation had a slightly higher prevalence (47% [7/15]). A total of 75% (15/20) of patients with recurrent chalazia were found to have coexisting acne rosacea. Patients who presented with recurrent chalazia were significantly more likely to have coexisting acne rosacea than those who presented with their first chalazion ($p = 0.001$).

Conclusions
Compared with the general population, patients presenting with chalazion have a high rate of coexisting acne rosacea. Recurrent and multiple chalazia are strongly correlated with underlying rosacea.

A40–00106

CHARACTERIZATION OF CONJUNCTIVAL LYMPHOPROLIFERATIVE LESIONS BY IMMUNOHISTOCHEMICAL AND MOLECULAR GENETIC STUDIES

Andrew Merkur, James Farmer, Manisha Lamba, William Hodge, David Jordan, Bruce Burns, Dharmendra Sengar, Wiplove Lamba

Purpose
Despite the marked advances in immunohistochemistry and molecular genetics, the characterization of conjunctival lymphoproliferative lesions remains limited.

Methods
Retrospective examination of biopsy specimens from 16 consecutive patients with conjunctival lymphoproliferative lesions.

Results
The diagnosis was lymphoma in 12 cases, atypical lymphoid hyperplasia in 1 case and reactive lymphoid hyperplasia in 3 cases. Complete remission was achieved in 9 of 10 primary lymphomas. The secondary lymphomas included 2 diffuse large B-cell lymphomas. Immunophenotyping showed 11 lymphomas to be of B-cell lineage. Molecular genetic studies (*IgH* rearrangement by polymerase chain reaction) showed clonal bands in 6 lymphomas, in 1 case of reactive lymphoid hyperplasia and in the case of atypical lymphoid hyperplasia. The *BCL2-IgH* [t(14;18)] rearrangement was seen in 8 cases.

Conclusions
Conjunctival lymphomas are B-cell tumours with a high prevalence of mucosa-associated lymphoid tissue (MALT). They have a favourable prognosis and respond well to local radiation therapy. Unreported *BCL2-IgH* rearrangements were seen in 4 of 5 MALT cases in our series.

A41–0125

EPIPHORA: DEMOGRAPHIC FEATURES AND REFERRAL PATTERNS

Kenneth Williams, Vladimir Kratky

Purpose
To analyse the true diagnosis of patients referred for "blocked tear duct" and to assess any correlation with the referring practitioner.

Methods
One hundred consecutive patients with a chief complaint of tearing were enrolled in the study. The exact etiology was established, and patients were classified into diagnostic categories. Demographic data were collected with respect to any prereferral testing and the type of referring professional.

Results
True nasolacrimal obstruction was found in only 22% of cases, eyelid problems in 33% and nonlacrimal causes in 40%.

Conclusions
Approximately 75% of patients referred for "tear duct blockage" in fact have tearing due to causes not related to the lacrimal drainage system. Appropriate assessment and triage at the primary eye care level would result in a significant decrease in unnecessary referrals and cost.

A42–0004

DACRYOCYSTORHINOSTOMY WITH CONSCIOUS SEDATION AND RESPIRATORY-TECHNOLOGIST MONITORING

Jeffrey Hurwitz, Tammy Kriel

Dacryocystorhinostomy, either unilateral or bilateral, is more commonly performed with local anesthesia and constant sedation than with general anesthesia. Owing to the shortage of anesthesiologists across the country, alternative arrangements need to be considered so that these operations can be performed in a timely fashion. At Mount Sinai Hospital, Toronto, a program to train respiratory technologists as "physician assistants" has been implemented for the cataract surgery and oculoplastics programs. Although dacryocystorhinostomy is more invasive than cataract surgery, the former has been quite successful with the use of respiratory technologists to administer the medications and monitor the patient, in close proximity to the anesthetist, so that communication is easy.

A43–0101

GRAVES' ORBITOPATHY MANAGEMENT-ORIENTED CLASSIFICATION: A NEW EVIDENCE-BASED CLASSIFICATION TOOL FOR THE COMPREHENSIVE OPHTHALMOLOGIST

Khalid Kratky, Vladimir Kratky

Purpose
To describe a new "user-friendly" classification of thyroid eye disease, with correlation to clinical management, and to determine its reliability by measuring interobserver agreement.

Methods
Photographs and clinical measurements of 30 patients with Graves' orbitopathy were shown to 3 observers. They classified the cases into the 3 categories of Graves' Orbitopathy Management-Oriented Classification (GOMOC): soft-tissue signs, diplopia/proptosis, or optic nerve/corneal compromise. Interobserver agreement (κ statistic) was calculated by determining the degree of agreement corrected for that predicted by chance.

Results
There was good agreement for all observers across all categories ($\kappa = 0.72$, $p < 0.05$). The observers found the method simple to learn and to apply.

Conclusions
The GOMOC provides consistency and reliability in assessment of thyroid eye disease. It is simple and well suited for helping with management decisions at the comprehensive ophthalmology level.

A44–0014

CLINICOPATHOLOGICAL ANALYSIS OF 15 EXPLANTED HYDROXYAPATITE IMPLANTS

David Jordan, Seymour Brownstein, Hamid Faragi

The clinical course of porous orbital implant infection may be quite long. The early symptom, recurrent discharge (a common problem for implant recipients), may delay the diagnosis. We present the clinical findings, management methods, outcomes and histopathological findings in 14 patients with 15 hydroxyapatite implants that required removal because of suspected infection. Histopathological examination of the removed implants revealed acute inflammation, chronic inflammation or a foreign body granulomatous response; microorganisms were not always identified. Implant infection should be suspected when there is persistent conjunctival inflammation and discharge after implant placement despite antibiotic therapy, discomfort on implant palpation and recurrent pyogenic granuloma (indicative of implant exposure). Implant removal is usually required.

A45–0041

AN UNUSUAL CASE OF UNILATERAL ENOPHTHALMOS

Edward Margolin, Bryan Arthurs, Martin Derosiers

A young woman presented to the oculoplastics clinic with a 2-year history of unilateral progressive enophthalmos. She was healthy and had no history of breast lesions or sinusitis. Computed tomography of the brain, orbits and sinuses demonstrated an atelectatic maxillary sinus with a lateralized uncinate process. Silent sinus syndrome was diagnosed and the patient referred to the otolaryngology service for evaluation. Surgery was performed to correct the enophthalmos. Silent sinus syndrome should be included in the differential diagnosis for patients presenting with enophthalmos and no other medical history. The presentation and management of this unusual condition will be discussed.

A46–0051

A CASE OF AN ENLARGED MEDIAL RECTUS MUSCLE

David Rossman, David Lederer, François Codère

A 50-year-old woman first presented to the oculoplastics service with gradually increasing proptosis due to an isolated enlargement of her medial rectus muscle. Two years previously euthyroid Graves' ophthalmopathy causing an enlargement of the medial rectus muscle had been diagnosed, and she had undergone orbital decompression surgery to

relieve compressive optic neuropathy. A muscle biopsy was performed and tissue sent for pathological analysis and immunohistochemical testing. In cases of isolated ocular muscle enlargement, muscle biopsy is necessary to establish a definitive diagnosis and guide clinical management.

A47–0103

ULTRASONIC SURGICAL ASPIRATOR: "PHACO" FOR THE ORBITAL SURGEON

Don Kikkawa, Bobby Korn, Karim Punja, Nattawut Wanumkarng

Purpose
To study the use of the ultrasonic surgical aspirator as an adjunct in the resection of orbital tumours.

Methods
Retrospective chart review at the University of California, San Diego, Medical Center from July 2000 to October 2004.

Results
Six patients with the following tumours were identified: 3 meningiomas, 1 nasopharyngeal squamous cell carcinoma, 1 lymphangioma and 1 primitive neuroectodermal tumour. The length of follow-up ranged from 8 to 40 months. Patients with residual tumour (3 meningiomas and 1 squamous cell carcinoma) were also treated with systemic chemotherapeutic therapy or radiotherapy or both. There were no complications related to the excision of the orbital tumours. No damage to the globe, vital vasculature or central nervous system occurred.

Conclusions
The ultrasonic surgical aspirator is a safe, efficient adjunct to assist in the removal of large infiltrative tumours that are not easily removed by conventional means.

A48–0130

RADIOFREQUENCY SURGERY: A SAFE, VERSATILE AND EFFECTIVE TECHNIQUE FOR EYELID AND FACIAL SURGERY

Yasser Khan

Purpose
Traditional electrocautery and laser incorporate low frequency and high temperature energy and thus can cause considerable tissue damage from the electric current and direct heat or from lateral heat spread. In contrast, radiofrequency surgery incorporates high-frequency (4 MHz) and low-temperature energy and can therefore be used to incise, excise, ablate or coagulate tissue with considerably little tissue damage.

I examined the efficacy and safety of this technique in periocular and oculoplastic surgery.

Methods
Retrospective study examining one surgeon's experience with the Ellman International Inc. radiofrequency unit to perform excision of facial and periocular lesions, upper and lower eyelid blepharoplasty, eyelid myectomy, and ptosis, ectropion and entropion repair. Patients were followed for 18 months.

Results
A total of 65 facial and periocular lesions were excised, and 25 blepharoplasty procedures, 2 eyelid myectomy procedures, and 82 ptosis, ectropion and entropion repairs were performed. No complications were encountered. There was minimal trauma at the incision site and to surrounding tissues. No atypical surgical scarring occurred. Wound healing was rapid, with minimal postoperative pain and inflammation and no prolonged erythema. There was no increased risk of infection.

Conclusions
Radiofrequency surgery is an effective, safe and versatile technique to perform facial and periocular surgery. It allows surgery to be fast and efficient, and provides a highly favourable return on investment when enhancing or building an in-office procedure room or surgical suite.

This paper has received funding from Ellman International.

A49–0094

MOLECULAR SURVEILLANCE FOR METASTATIC RETINOBLASTOMA

Brenda Gallie, Diane Rushlow, Helen Chan

Purpose
Long-term cure of extraocular retinoblastoma may depend on marrow-ablative chemotherapy and rescue by stem cell transplantation after chemotherapy. We propose that *RB1* mutant alleles may be useful to assess the quality of remission and appropriateness for transplantation.

Methods
We determine the sensitivity to detect *RB1* mutant alleles of the retinoblastoma tumour that are not present in the child's normal cells. Serial cerebrospinal fluid and bone marrow samples as well as peripheral blood stem cells for transplantation are examined for tumour *RB1* mutant allele(s).

Results
Some *RB1* mutant alleles are detectable at 1:12 280 dilution, the most sensitive way to ascertain tumour load. Determination of the suitability of 2 children for stem cell transplantation aimed at cure of extraocular retinoblastoma relied on *RB1* mutant allele surveillance.

Conclusions
Molecular management can optimize the use of resources and the chance for cure of metastatic retinoblastoma.

A50–0087

CONSECUTIVE EXOTROPIA IN A CHILD WITH SURGICALLY CORRECTED CYCLIC ESOTROPIA

Ryan Eidsness, Kenneth Romanchuk

A 2-year-old boy presented to the pediatric service with right esotropia and mild amblyopia. He was treated with patching. Following resolution of the amblyopia he manifested cyclic esotropia. Bilateral medial rectus recession was performed for the full amount measured on a "manifest" day. Following the surgery he was orthophoric and demonstrated binocular single vision. His condition remained stable for 5 years, after which he returned with occasional diplopia and intermittent exotropia. Cyclic esotropia is a rare disorder of ocular motility that spontaneously occurs and disappears at regular intervals. After surgical correction, the deviation disappears, and recurrence of esotropia is very infrequent. To our knowledge, this is the first reported case of consecutive exotropia occurring after surgical correction of cyclic esotropia.

A51–0127

CONGENITAL FIBROSIS OF THE EXTRAOCULAR MUSCLES: CLUES TO THE UNDERLYING ETIOLOGY

Christopher Lyons, John Valenzuela, Megan Rees

Congenital fibrosis of the extraocular muscles is a group of rare genetically transmitted disorders classified as dysinnervation syndromes, characterized by the presence of bilateral ptosis, exotropia, substitution of convergence for elevation and hypotropia. We describe 2 affected patients. One underwent examination under anesthesia in early childhood, at which time forced duction testing gave negative results, whereas it gave positive results at age 8. This finding suggested fibrosis secondary to congenital palsy. The second patient was born with pupillary signs suggestive of third cranial nerve palsy as well as ptosis,

exotropia, elevation deficits and convergence substitution. The differential diagnosis of this condition will be discussed and a cautious management plan advocated since the absence of Bell's phenomenon makes ptosis correction hazardous and strabismus correction is complicated by reduced extraocular muscle function. The appearance of these patients and the presenting signs are characteristic. Early diagnosis is helpful to avoid unnecessary investigation and to offer genetic and prognostic advice as well as support of the child and family.

A52–0126

TRIPLETS OF DIFFERENT AGES

John Valenzuela, Andrew McCormick, Jane Gardiner, Christopher Lyons

The gestational ages of fetuses in multiple pregnancies can occasionally be different. This can be the result of fertilization of 2 or more ova from different ovulations. Subsequent consecutive implantation results in the presence of embryos of different ages, an occurrence known as superfetation. Thus, although the children are born simultaneously, they are of different gestational ages. We report a case of triplets apparently born at 30 weeks' gestation in which one infant's lower birth weight (compared with his siblings) and ocular findings (corneal haze, pupillary membrane and stage 2 zone II retinopathy of prematurity [ROP]) were indicative of a younger gestational age. Superfetation was supported by ultrasonography and computed tomography of the brain and a history of intercourse 5 weeks after in vitro fertilization. Large discrepancies in birth weight are common with multiple pregnancies. Clinicians should be aware that this discrepancy can occasionally be due to different gestational ages, and birth-weight-based ROP screening criteria should apply.

A53–0095

THE NATIONAL RETINOBLASTOMA STRATEGY: OPTIMIZING CANADIAN RETINOBLASTOMA CARE

Brenda Gallie, Peggy Gronsdahl

The purpose of the National Retinoblastoma Strategy (NRBS) is to establish national uniform access to a common standard of clinical care for all affected Canadians. The NRBS will develop best-practice guidelines for retinoblastoma control, prevention and treatment, collaboratively with all provincial health care plans. We will model and audit the effect on quality and cost of care. Relevant retinoblastoma experts and stakeholders formed the NRBS and identified current management shortcomings that have a negative effect on family well-being and

outcome for children. We developed the standard operating procedure framework and propose online collaborative work and national meetings to deliver a report within 18 months. The NRBS is a useful prototype to deal with issues that arise from a federal system, disparate geography and the opportunity to apply the best of basic science.

This paper has received funding from Occulogix.

A54–0081

RESIDUAL ACTION OF THE INFERIOR OBLIQUE MUSCLE AFTER MYECTOMY AS DETERMINED WITH MAGNETIC RESONANCE IMAGING

Louis-Étienne Marcoux, G. Robert LaRoche, Matthias Schmidt

Purpose
To prove the predictability of the anatomic result of inferior oblique (IO) myectomy based on magnetic resonance imaging (MRI) findings.

Methods
In this prospective in vivo anatomic study, MRI was done pre- and postoperatively in 6 patients to visualize the IO muscle in primary position and in elevation in adduction to evaluate its position and contractility. Patients with previous extraocular muscle surgery or with surgery on other vertical muscles were excluded.

Results
The myectomy site was clearly demonstrated, as was the stability of the Lockwood complex postoperatively.

Conclusions
The MRI images demonstrate the anatomic predictability of a standardized IO myectomy procedure. Our results help elucidate the well-documented clinical predictability and effectiveness of this simple procedure. Better anatomic understanding of myectomy surgery may help settle the controversy regarding the various IO-weakening procedures.

A55-0061

VITREOUS LEVELS OF ERYTHROPOIETIN IN DIABETIC RETINOPATHY

Stella Briggs, Marisa Sit, Wai-Ching Lam, Shelley R. Boyd

Purpose
Diabetic retinopathy has traditionally been thought of as exclusively a vascular disease, but recently the question of whether it is also a neuronal disease has been raised. Erythropoietin is both neuroprotective

and hematopoietic in models of retinal degeneration and clinical stroke. The objective of this study was to determine whether erythropoietin can be found in the human eye and whether it is upregulated in the vitreous of patients with diabetic retinopathy. An additional objective was to examine the relation between vitreous concentrations of vascular endothelial growth factor A (VEGF-A) and erythropoietin.

Methods

In an observational case series, the vitreous erythropoietin and VEGF-A concentrations in 19 patients with diabetic retinopathy and 13 control patients were determined at the time of elective pars plana vitrectomy for proliferative disease. Serum erythropoietin and VEGF-A concentrations were also determined. Enzyme-linked immunosorbent assays (R&D Systems, Minneapolis, Minn.) were used and the results evaluated with the Mann–Whitney rank-sum test and Pearson correlation.

Results

Vitreous erythropoietin concentrations were significantly elevated in the diabetic patients compared with the control patients ($p < 0.001$). The vitreous erythropoietin levels were significantly higher than the serum levels in the diabetic patients ($p < 0.001$). There was no significant difference in serum erythropoietin levels between the diabetic and control groups. There was a modest but significant correlation between vitreous erythropoietin concentrations and vitreous VEGF-A concentrations ($r2 = 0.61$, $p < 0.001$).

Conclusions

The higher concentration of erythropoietin in the vitreous than in serum suggests production of this hormone in the eye. The elevated erythropoietin concentration in the patients with proliferative diabetic retinopathy may reflect a neurodegenerative process; further analysis is needed. We are looking for erythropoietin in nonproliferative clinical specimens and evaluating the role of erythropoietin receptors in the retina of nonobese diabetic mice.

This paper has received funding from Occulogix.

A56–0093

FIFTEEN-YEAR FOLLOW-UP OF THE OCULAR AND MEDICAL STATUS OF EARLY TREATMENT DIABETIC RETINOPATHY STUDY PATIENTS ENROLLED AT THE JOSLIN DIABETES CENTER, BOSTON

Lloyd P. Aiello, Lica Chui, Haytham Salti, Jerry Cavallerano, Paul Arrigg, Timothy Murtha, Deborah Schlossman, Saberah Shah, George Sharuk, Lloyd M. Aiello

Purpose
To evaluate the ocular and medical status of patients enrolled in the Early Treatment Diabetic Retinopathy Study (ETDRS) at the Beetham Eye Institute (BEI), Joslin Diabetes Center, Boston, 15 years after the conclusion of the trial. The ETDRS was a multicentre clinical trial that evaluated laser photocoagulation in patients with diabetic retinopathy. The BEI was the highest enrolling centre in the trial, accounting for 7% of all patients studied.

Methods
The current investigation was a single-site observational follow-up study. Patients alive in 2004 were contacted by mail and telephone, and respondents received a complete eye examination, including ETDRS protocol refraction, visual acuity assessment and 7-field fundus photography. Information on present health status, diabetes mellitus control and medical complications was obtained through a standardized questionnaire. Blood pressure, hemoglobin A_{1c} value and lipid profile were determined and urinalysis was performed within 3 months of ocular examination.

Results
Of the 232 BEI patients alive at the end of the ETDRS, 94 (40%) were confirmed deceased, 89 (38%) did not respond, and 49 (21%) were reexamined as of November 2004, 12–17 years (median 15 years) after their final ETDRS visit. Most patients (88%) had type 1 diabetes, compared with about 30% overall in the ETDRS. On examination, 9.8% of eyes had better than 20/20 visual acuity, 36% had 20/30 or better, 85% had better than 20/40, 94% had better than 20/80, and 97% had better than 20/200. Compared with the ETDRS final examination, 16% of eyes had moderate vision loss (more than 3 lines), and 2 eyes had severe vision loss (vision less than 5/200, total retinal detachment and macular scar). No patient had visual acuity less than 20/40 binocularly. All untreated eyes with severe nonproliferative diabetic retinopathy at the end of the ETDRS had received scatter photocoagulation by the time of follow-up examination. Post-ETDRS scatter or focal photocoagulation or both had been performed in 33% of eyes, cataract surgery in 33% and pars plana

vitrectomy in 13%. The average systolic and diastolic blood pressure values were 131 and 68 mm Hg respectively, the median HbA_{1c} value was 7.8%, and 29% of patients had concurrent nephropathy, neuropathy and cardiovascular disease.

Conclusions
As previously reported for a group of ETDRS subjects with primarily type 2 diabetes, the death rate for this cohort was high. Concurrent complications were frequent; however, there was long-term maintenance of good visual acuity. The finding that additional photocoagulation and cataract extraction were common suggests both the benefit and the need for lifelong ophthalmic evaluation in patients with diabetic retinopathy.

A57–0098

RELATION OF PERCEIVED DIABETIC CONTROL TO DIABETIC RETINOPATHY AND HEMOGLOBIN A_{1C} LEVEL

Andrew Ting, Christopher Rudnisky, Ezekiel Weis, Matthew T.S. Tennant, Brad Hinz, Mark Greve

Purpose
The Wisconsin Epidemiologic Study of Diabetic Retinopathy (WESDR) and the more recent Diabetes Control and Complications Trial (DCCT) have shown that elevated hemoglobin A_{1c} (HbA_{1c}) levels indicate poor glycemic control and an increased risk of progression and incidence of diabetic retinopathy. The extent to which this information has been integrated into clinical practice and further translated into patient compliance remains a question. We investigated the relations among diabetic self-perception, HbA_{1c} level and clinical outcome.

Methods
The study population was derived from patients with diabetes mellitus newly referred to or being followed by a retinal practice in Edmonton. Consenting patients completed a questionnaire detailing self-perception of diabetic control and underwent HbA_{1c} testing. In addition, 7-field digital stereo fundus photography was performed using a Topcon TRC-NW6S retinal camera, and the photographs were graded using a modified Early Treatment Diabetic Retinopathy Study protocol. The level of diabetic retinopathy in combination with a chart review of focal/pan-retinal photocoagulation and diabetes-related eye surgery was used to establish a clinical measure of microvascular complications. Multivariate logistic and linear regression were performed to determine the independent role of predictors and risk factors. The generalized estimating equation controlled for the correlation in disease severity between a patient's two eyes, allowing them both to be analysed.

Results
The study involved 167 patients, 66% male and 34% female, with an average age of 62 years (standard deviation [SD] 13 years). The average diabetes duration was 18.7 (SD 11.5) years; 17% of patients had type 1 diabetes, and 83% had type 2. The average body mass index was 30.2 (SD 6.2), and the average systolic blood pressure was 142 (SD 19) mm Hg. The ideal laboratory HbA_{1c} value of less than 7.0% was not met in 70% of patients. However, 45% still self-reported good diabetic control, and only 11% self-reported poor diabetic control. Furthermore, although 90% of patients had taken diabetic education classes, 36% lacked awareness of HbA_{1c}. Of those who were aware, only 35% could recall their last HbA_{1c} value. Nevertheless, diabetes education significantly decreased the odds of a high HbA_{1c} level ($p = 0.011$). The duration of diabetes and the number of years of self-reported poor diabetic control were significant predictors of diabetic retinopathy requiring surgery and laser treatment respectively ($p < 0.001$). However, increasing frequency of daily glucose monitoring ($p = 0.003$) and the ability to recall last reported HbA_{1c} value ($p = 0.013$) decreased the odds of requiring laser treatment.

Conclusions
Patient self-perception of glucose control predicted interventions required to treat diabetic complications but not current HbA_{1c} level. This finding suggests that patients base self-perception of diabetic control on complications rather than on laboratory measures. Diabetic education continues to be important, although more emphasis on HbA_{1c} level may prove beneficial.

A58–0100

ATHEROSCLEROTIC RISK FACTORS IN PATIENTS WITH OCULAR STROKES

Kenman D. Gan, Ezekiel Weis, Mikael Mouradian, Naeem Dean, Sarah Flynn, Ian MacDonald

Purpose
The atherosclerotic risk profile of patients with acute vascular occlusion of the visual system has not been well studied. We used comprehensive, systematic, modern ophthalmologic and neurologic examination to characterize the atherosclerotic risk profile of patients with ocular strokes and to subdivide these risk factors according to stroke type.

Methods
Patients with a diagnosis of retinal venous occlusion (RVO), retinal arterial occlusion (RAO) or a nonarteritic anterior ischemic optic neuropathy (NAAION) were enrolled prospectively and underwent a complete

assessment by an ophthalmologist and a systematic atherosclerotic risk factor investigation by a stroke neurologist. Logistic regression was used to compare data between groups.

Results
A total of 166 patients were enrolled, 91 with RVO, 48 with RAO and 27 with NAAION. Overall, 72% had hypertension, 73% had dyslipidemia, 20% had diabetes mellitus, and 22% were smokers. The corresponding proportions for the patients with RVO were 74%, 71%, 20% and 18%; for those with RAO, 71%, 63%, 20% and 31%; and for those with NAAION, 67%, 96%, 22% and 19%. There were no statistically significant differences in atherosclerotic risk factors between patients with RAO and those with RVO except that the former had 2.3 times the odds of having a history of cardiovascular disease ($p = 0.038$). Patients with NAAION had 15 times the odds of having dyslipidemia compared with patients with RAO ($p = 0.011$) and 10 times the odds of having dyslipidemia compared with patients with RVO ($p = 0.025$). Overall, 81% of patients required a change in management at presentation owing to uncontrolled or undiagnosed hypertension, hyperlipidemia or diabetes. Two percent of the patients with RVO qualified for endarterectomy following carotid Doppler examination, 10% of those with RAO qualified, and none of those with NAAION qualified.

Conclusions
Our results show the importance of assessing and carefully managing patients with ocular stroke: for 4 of every 5 patients with modifiable atherosclerotic risk factors (hypertension, dyslipidemia or diabetes) the condition was poorly controlled or not managed at all.

A59–0115

COLOURED DIGITAL MEDIAMETRY: A NEW CONCEPT IN THE MANAGEMENT OF VITREOUS HEMORRHAGE

Meenakshi Gupta, Yogesh Gupta

Purpose
To describe the design and use of a "coloured mediameter" to diagnose and assess the prognosis of vitreous hemorrhage.

Methods
We have designed a mediameter in which a light-sensitive sensor is placed on the cornea and adjoining sclera during the process of transillumination. We can thus record the transcorneal and transscleral light transmittance objectively. These recordings are made with white, red and green lights of appropriate wavelengths produced by interposing pure filters on the light source. Fifty normal eyes were studied to

standardize the instrument, and 12 eyes with vitreous hemorrhage were subjected to the technique to establish the diagnosis and assess the prognosis over 1 year.

Results
In normal eyes the transmittance recorded with the 3 lights is more or less in the same range. In eyes with vitreous hemorrhage the white and red lights pass through the vitreous relatively unhindered, but the green wavelength gets absorbed by the blood, resulting in very poor transmittance of green light. This difference in light transmittance readings with different lights can be used to diagnose vitreous hemorrhage even in the presence of a cataract or an opaque cornea. Repeated recordings at regular intervals can give an accurate assessment as to whether the vitreous hemorrhage is resolving.

Conclusions
This instrument is very simple, inexpensive, portable and easy to use. It should be very useful in the diagnosis and assessment of vitreous hemorrhage.

A60–0031

MEDICAL STUDENTS' SELF-CONFIDENCE IN PERFORMING DIRECT OPHTHALMOSCOPY IN CLINICAL TRAINING

Rishi Gupta, Wai-Ching Lam

Purpose
Direct ophthalmoscopy is widely accepted as an important skill for medical students to learn. Although the skill requires practice for proficiency, in general, limited time has been dedicated in medical school curricula to its formal teaching. The purpose of this study was to investigate the confidence that medical students have in performing direct ophthalmoscopy at different stages of training. An understanding of medical students' perceived needs and weaknesses in specific aspects of performance would allow for more targeted and effective teaching.

Methods
A 21-question survey was developed to investigate self-confidence in performing different aspects of direct ophthalmoscopy. In June 2004 it was emailed to a cross-sectional sample of University of Toronto undergraduate medical students. Approximately 800 students in 4 years were sent the invitation, and 208 (26%) agreed to participate. Data were analysed with the use of an Excel 2002 spreadsheet. All variables were summarized with descriptive statistics. Responses to the 5-point self-confidence scale were dichotomized, those who reported being "not at all" or "a little" confident against those who reported being "somewhat,"

"quite" or "extremely" confident. Data for the 2 groups were then analysed with χ^2 tests.

Results
Clerks (students in the third and fourth years of medical school) were significantly more confident in their overall skill in performing direct ophthalmoscopy ($\chi^2 = 28.03$, $p < 0.001$) than were preclerks (students in the first and second years). Even so, 47% of the clerks were "not at all" or only "a little" confident in performing the skill on an undilated pupil, and 64% reported the same lack of confidence in focusing on the fovea. Students who practised on more than 10 occasions outside of formal teaching were significantly more confident in their overall skill than those who did not ($\chi^2 = 22.94$, $p < 0.001$). Of all the students surveyed, 62% reported "not enough formal education" as a major deterrent to practising direct ophthalmoscopy.

Conclusions
Overall, the medical students surveyed were not very confident in their skill in performing direct ophthalmoscopy. Although clerks were more confident than preclerks, a large proportion of clerks were not confident in performing various aspects of the skill. Self-confidence was significantly greater among the students who practised more outside of formal teaching sessions. Medical schools should encourage teachers in rotations such as internal medicine, emergency medicine and family medicine to promote the skill and push students to examine patients and confirm findings.

A61–0083

EFFECT OF TRIAMCINOLONE ACETONIDE AS AN ADJUNCTIVE TREATMENT TO VERTEPORFIN THERAPY IN NEOVASCULAR AGE-RELATED MACULAR DEGENERATION: A PROSPECTIVE, RANDOMIZED, PLACEBO-CONTROLLED PILOT CLINICAL TRIAL

Varun Chaudhary, Alex Mao, Phil Hooper, Tom G. Sheidow

Purpose
To evaluate the effect of triamcinolone acetonide as an adjunctive treatment to photodynamic therapy (PDT) in the treatment of "occult" and "minimally classic" subfoveal choroidal neovascular membranes (CNVMs) secondary to age-related macular degeneration (AMD).

Methods
This study is a 1-year prospective, randomized, placebo-controlled pilot clinical trial. Twenty patients were enrolled in the study and were randomly assigned to receive either PDT plus intravitreal triamcinolone acetonide injection (treatment group, $n = 10$) or PDT alone (control group,

n = 10). Patients were assessed at baseline, 1 week and 6 weeks, and active lesions were retreated at 3-, 6- and 9-month intervals. At each visit, Early Treatment Diabetic Retinopathy Study visual acuity and contrast sensitivity were determined, and fluorescein angiography and optical coherence tomography of the macula were performed. The primary outcome was the proportion of eyes with fewer than 15 letters (approximately 3 lines) of visual acuity loss. Secondary outcomes included number of PDT treatments, change in macular thickness, contrast sensitivity, intraocular pressure and cataract.

Results
At 6 months 80% of patients in both groups had lost fewer than 15 letters of visual acuity. There was no statistically significant change in contrast sensitivity between the 2 groups. Foveal thickness decreased in the treatment group from an average of 395 μ at baseline to 171 μ at 6 months ($p < 0.001$). In the control group there was no significant change in foveal thickness. A total of 70% of patients in the control group required retreatment of their lesion based on angiographic leakage, whereas no patients in the treatment group required retreatment. There was no significant difference in cataract progression between the 2 groups. Thirty percent of patients in the treatment group required topical pharmacotherapy to control intraocular pressure spikes.

Conclusions
Six-month data indicate that PDT plus intravitreal injection of triamcinolone acetonide is as effective as PDT alone in limiting vision loss and preserving contrast sensitivity in patients with occult and minimally classic subfoveal CNVMs secondary to AMD. However, combined treatment with PDT and triamcinolone acetonide significantly reduces the number of treatments required to result in an inactive lesion and hastens the resolution of macular edema.

A62–0049

INTRAVITREAL INJECTION OF TRIAMCINOLONE ACETONIDE IN THE TREATMENT OF MACULAR EDEMA

Arif Samad, Sheila Lewis

Purpose
To determine the safety and efficacy of intravitreal injection of triamcinolone acetonide in the treatment of macular edema.

Methods
Retrospective, noncomparative review of the charts of 49 patients who had undergone intravitreal steroid injection. Indications for treatment in the 52 eyes included postoperative cystoid macular edema (CME) (22),

diabetic macular edema (16), retinal venous occlusion (6), uveitis (5), Coats' disease (2) and parafoveal telangectasia (1). The patients were reexamined at 1 week, 1 month and 3 months to assess visual acuity, intraocular pressure (IOP) and the presence of complications. Fluorescein angiography was performed before treatment and 3 months after treatment. The patients were followed for an average of 10 (range 2–24) months.

Results
Intravitreal injection of triamcinolone acetonide was both angiographically and clinically effective in resolving CME in 18 of the 52 eyes by 3 months. CME recurred or persisted in the other eyes. Visual improvement occurred after 55 of the 80 injections (average logMAR –0.29). Complications included steroid-induced IOP elevation (in 20 eyes), cataract (in 3), corneal edema (in 2) and endophthalmitis (in 2).

Conclusions
Intravitreal injection of triamcinolone acetonide can be effective in resolving CME resulting from a multitude of causes. Visual improvement may accompany the resolution of macular edema. Patients must be monitored for the development of complications, the most frequent being steroid-induced elevation of the IOP.

A63–0060

SAFETY OF RHEOPHERESIS FOR DRY AGE-RELATED MACULAR DEGENERATION: ANALYSIS OF DATA FROM THE RHEONET REGISTRY

David Wong, Rheinhard Klingel, Claus Fassbender, Irv Siegel, Bernard Erdtracht

Purpose
To describe data on the safety of rheopheresis, a therapeutic apheresis procedure.

Methods
Data from RheoNet, an ongoing international registry, were reviewed for adverse events up to November 2004.

Results
We reviewed 4096 treatments of 678 patients, 439 of whom had AMD. The mean age was 66 years for the entire group of patients and 74 years for those with AMD. There were reports of adverse events for 5.35% of all treatments and 5.41% of those for AMD, with treatment discontinuation in 1.84% and 0.51% respectively. Patients with AMD aged more than 80 years (26.4%) did not have a greater incidence of adverse events than the entire group. The most common adverse event was transient

hypotension, which occurred in 2.23% of all treatments and 2.27% of those for AMD. Vascular access problems occurred in 6.91% and 6.54% respectively, but in only 1.00% and 0.86% respectively was completion of treatment not allowed. There were no serious adverse events.

Conclusions
Rheopheresis appears to be safe, with no increase in the incidence of adverse events among patients with AMD and patients over 80 years old.

A64–0033

VF-14 VISUAL FUNCTION QUESTIONNAIRE: RESPONSIVENESS TO PATIENT-REPORTED GLOBAL ASSESSMENT OF CHANGE IN VISION AND MINIMUM CLINICALLY IMPORTANT DIFFERENCE IN AGE-RELATED MACULAR DEGENERATION

Rajeshvar K. Sharda, Jeff Bakal, Sanjay Sharma

Purpose
Measurement of health-related quality of life (HRQoL) in patients with age-related macular degeneration (AMD) helps unite patient perceptions and clinical decisions. The 14-item Visual Function questionnaire (VF-14) measures visual functioning and HRQoL. To further validate the VF-14 as an evaluative instrument in AMD, we studied the responsiveness of the VF-14 to patient-reported global assessment of change in vision. In addition, we determined the minimum clinically important difference (MCID) of the VF-14. The MCID defines the smallest change in an outcome measure that reflects a change that is meaningful to the patient and subsequently to the management of the patient's care.

Methods
Patients with AMD presenting consecutively to the retina service of a tertiary care hospital in Kingston, Ont., between May 2000 and July 2001 (n = 156) underwent clinical evaluation and a standardized interview consisting of administration of the VF-14 and collection of demographic data. Patients completing the first interview were interviewed again, between November 2002 and June 2003. The second interview expanded on the first with the addition of a patient-reported global assessment of change in vision with a 7-item Likert scale. Continuous and categorical variables were described in the usual fashion. Correlation coefficients were calculated to determine the degree of association between the dependent variable, change in the VF-14 composite score, and the independent variables. In addition, a multivariate regression model involving stepwise techniques was created to explain the source of variability in the dependent variable. The model included the following independent variables: visual acuity (in the better-seeing eye), age, sex, marital status and VF-14 composite score.

Results
Of the 99 patients (63%) who completed both interviews, 63% were male and 30% were married. Their mean age was 73 (range 38–88) years. The correlation coefficient of change in patient-reported global assessment and change in VF-14 composite score over the length of the study was 0.230 ($p < 0.05$). The multivariate regression model found that the unit change in patient-reported global assessment corresponded to a 2.4 unit change (95% confidence interval 0.77–4.05) in the VF-14 composite score, which yielded an MCID of 8% to 11% for the VF-14.

Conclusions
The VF-14 is responsive to patient-reported global assessment of change in vision. Furthermore, the definition of the MCID of the VF-14 in patients with AMD allows for interpretation of future data in terms of clinical significance in addition to statistical significance.

A65–0050

DEGREE OF OPTIMISM IS NOT ASSOCIATED WITH UTILITY SCORE IN PATIENTS WITH DIABETIC RETINOPATHY OR ACUTE MACULAR DEGENERATION

Shaun M. Segal, Sanjay Sharma, Jeff Bakal, Wei Lei

Purpose
Utility values obtained from patients with ocular disease have been shown to be strongly associated with visual acuity in both the better-seeing and the worse-seeing eye. From this a mathematical model has been developed to predict the health-related quality of life of those with vision-threatening ocular disease. Quantifying quality of life is necessary in determining the economic value of novel therapies; utilities are the backbone of cost-utility models. Utility based on economic theory assumes that when individuals are faced with decisions involving risk they have the ability to integrate complex probabilities so as to make the most rational decisions. This model does not take into account a person's level of optimism. Optimism as measured through the Revised Life Orientation Test is thought to play an important role in decision-making. The purpose of this study was to determine whether patients' level of optimism influences the amount of time that they are willing to trade off in order to eliminate their visual dysfunction.

Methods
Ninety-eight patients with either diabetic retinopathy or acute macular degeneration met our study selection criteria. All were interviewed to determine their utility with the time trade-off (TTO) technique and their degree of optimism with the Revised Life Orientation Test, a 10-item, validated instrument that quantifies life optimism on a scale of 0–100.

Clinical data were obtained through clinical evaluation and chart review. Multivariate models were created to determine whether the degree of optimism was a significant predictor of utility.

Results
On average, the subjects were willing to trade 21% of their remaining life to eliminate their visual dysfunction (mean TTO score 0.79). The mean value of optimism in the sample was 66%, indicating a moderately high level of optimism in the study population. Optimism and utility showed no significant association (R = –0.052, p = 0.612). Using a regression model controlling for age, visual acuity in the better-seeing eye, number of concurrent conditions and utility, we found that age and logMAR visual acuity were associated with optimism (B = –0.03 and –0.52, p = 0.02 and 0.06 respectively). Utility values were significantly associated with vision in both eyes ($p < 0.01$), as confirmed by regression analysis conducted earlier.

Conclusions
We were unable to detect a significant association between optimism and utility. This further strengthens the validity of the TTO technique as a measure of health-related quality of life.

A66–0063

COMPARISON OF VITRECTOMY FOR PSEUDOPHAKIC RHEGMATOGENOUS RETINAL DETACHMENT (RRD) AND SCLERAL BUCKLING FOR PHAKIC RRD

Matthew T.S. Tennant

Purpose
To review outcomes in a consecutive series of repairs of primary rhegmatogenous retinal detachments (RRDs) with pars plana vitrectomy (PPV) or scleral buckling.

Methods
The charts for all RRD repairs by a single vitreoretinal surgeon in 1 year were reviewed. All pseudophakic RRDs repaired with PPV and all phakic RRDs repaired with scleral buckling were identified.

Results
Of 104 RRD repairs, 19 pseudophakic and 35 phakic repairs were analysed. All retinas were successfully reattached with 1 or more operations. Redetachment occurred in 1 eye (5%) in the pseudophakic group and 3 eyes (8%) in the phakic group. Postoperatively, the visual acuity improved by a mean of logMAR 0.60 in the pseudophakic group and 0.16 in the phakic group.

Conclusions
There does not appear to be a difference in success rate between pseudophakic RRD repair with PPV and phakic RRD repair with scleral buckling.

A67–0110

SUBMACULAR SURGERY: EFFECT OF AGE ON VISUAL OUTCOME IN PATIENTS WITHOUT AGE-RELATED MACULAR DEGENERATION

Adnan Pirbhai, Tom Sheidow

Purpose
To determine the effect of patient age on visual outcome after surgical removal of choroidal neovascular membranes (CNVMs) due to causes other than age-related macular degeneration (AMD).

Methods
Retrospective review of all cases of surgical removal of CNVMs due to causes other than AMD done by 1 surgeon over a 2-year period. The primary outcome measure was best corrected Snellen visual acuity. Two subgroups of patients were compared: those aged 55 years or more, and those aged less than 55 years.

Results
A total of 35 eyes of 34 patients underwent submacular surgery for juxtafoveal/subfoveal CNVM due to causes other than AMD. The etiology of the membranes included presumed ocular histoplasmosis syndrome, idiopathic, myopic degeneration, multifocal choroiditis and injury. The median age of the patients was 41 (range 11–84) years; 11 were aged 55 years or more, and 24 were less than 55 years. The median length of follow-up was 41 (range 20–163) weeks. Surgical removal of the membrane led to improvement of at least 2 lines in final best corrected visual acuity in 23 eyes (65.7%), with a mean change of 3.0 lines (standard deviation [SD] 0.9 lines). In the younger group, best corrected visual acuity improved by a mean of 4.54 (SD 0.92) lines, whereas the older group had a mean decrease of 0.36 (SD 1.67) lines. The difference in mean final visual outcome between the 2 groups was 4.91 (SD 1.76) lines ($p = 0.01$). Ten eyes (28.6%) (9 in patients under 55 years) had recurrent membranes following initial surgical removal; 6 of the 10 gained at least 2 lines of Snellen vision. The mean change in visual acuity over the course of treatments for the 10 eyes was 2.20 (SD 1.73) (95% confidence interval 1.72–6.11).

Conclusions
In this series, younger patient age had a significant effect on visual outcome after submacular surgery for non-AMD-related CNVM, regardless

of membrane recurrence. Submacular surgery in patients under 55 years of age offers excellent chances for visual improvement, whereas in those aged 55 years or more, surgical intervention has a high rate of visual loss.

A68–0112

SUTURE PARS PLANA MESH FOR MAINTAINING SILICONE OIL IN THE POSTERIOR SEGMENT IN TRAUMATIC APHAKIA

David Wong, Trevor Chin Fook

Purpose
To report the results with a new technique to prevent anterior advancement of silicone oil in patients with traumatic aphakia and retinal detachment.

Methods
Retrospective review of the cases of 11 patients with traumatic aphakia who underwent retinal detachment repair with silicone oil tamponade performed at St. Michael's Hospital, Toronto, from 1999 to 2004. In all cases a suture pars plana mesh was used.

Results
Nine of the patients had concurrent penetrating keratoplasty. In all cases the silicone oil remained posterior to the suture mesh, preventing silicone oil – corneal touch.

Conclusions
In aphakic patients requiring silicone oil tamponade, a suture pars plana mesh is able to maintain silicone oil in the posterior segment, maintain an anterior chamber and prevent silicone oil from touching the cornea.

A69–0073

ENDOTHELIAL PROGENITOR CELLS REGULATE THE CELLULAR PHENOTYPE OF RETINAL STEM CELLS

Xu Zhao, Stella Briggs, Filiberto Altomare, Shelley Boyd

Purpose
To evaluate the influence of endothelial progenitor cells (EPCs) on the behaviour of retinal stem cells (RSCs) in vitro.

Methods
RSCs were isolated from the ciliary body, and EPCs from the bone marrow of CD1 mice. Cells were cultured together or separated by a semipermeable membrane. Direct microscopy and immunohistochemistry were used to assess cell morphology, proliferation, migration and differentiation.

Results
EPCs rescued RSCs grown on a nonpermissive substrate and induced higher rates of RSC migration and colony expansion. The differentiation of RSCs along the neuroglial lineage was altered by the presence of EPCs. Reciprocally, RSCs altered EPC phenotype. Neurally derived nestin-positive strands were observed to align alongside, forming endothelial tubes.

Conclusions
EPCs influence RSC development and differentiation through a paracrine exchange of signals. Knowledge of this molecular dialogue provides insight into neurogenesis and its relation with angiogenesis, and will be used to enhance retinal repair and regeneration in vivo.

A70–0042

OPTIMAL MANAGEMENT OF ADVANCED COATS' DISEASE

Robert Adam, Wai-Ching Lam, Peter Kertes

Purpose
To determine the optimal treatment for advanced Coats' disease presenting with total or subtotal exudative retinal detachment.

Methods
Retrospective review of the charts of 9 patients treated with various techniques, including cryopexy or laser photocoagulation, or both, together with posterior sclerotomy with vitreous infusion, as compared with vitrectomy, membrane peeling, retinotomy and air-fluid exchange.

Results
All 9 patients were male. At presentation the average age was 4.6 years (range 21 months to 7 years). The average number of retinal quadrants with telangiectasia was 2.9 (range 1–4, median 3); 8 patients had retinal detachments (total in 6), and all patients had macular involvement with either exudate or fibrosis. The patients were followed for an average of 1.4 years (range 1 month to 4 years). The best visual outcomes were observed in the patients who presented with less severe disease. Vision at the most recent follow-up assessment was comparable to the vision at presentation regardless of the surgical intervention. For example, the only 3 patients to maintain ambulatory vision all presented with subtotal retinal detachments, 2 or fewer quadrants of retinal telangiectasia and visual acuity better than light perception. The other 6 patients presented with total retinal detachments, more than 2 quadrants of retinal telangiectasia and visual acuity of light perception or worse. Secondary angle-closure glaucoma due to neovascularization did not develop in any patient. All patients have kept a cosmetically acceptable eye.

Conclusions
Visual outcome in advanced Coats' disease depends largely on disease severity and visual status at the time of presentation. Minimally invasive surgery with vitreous infusion through the pars plana, combined with external drainage of subretinal fluid together with cryotherapy or laser photocoagulation, or both, is sufficient to effect retinal reattachment and prevent progression to neovascular glaucoma and loss of the eye.

A71–0025

PEELING THE INTERNAL LIMITING MEMBRANE IN SEROUS MACULAR DETACHMENT ASSOCIATED WITH OPTIC DISC PIT AND RETINAL COLOBOMA

Ahmad Mirshahi, Yousef Alizadeh, Mahnaz Abdollahian

Purpose
There have been a number of surgical procedures described for the management of optic disc pits associated with macular detachment, but the results have varied. We evaluated vitrectomy with internal limiting membrane (ILM) peeling and removal of membrane overlying the pit.

Methods
Our 2 patients were 24- and 27-year-old white women with bilateral congenital optic disc pits and colobomata and unilateral serous macular detachment. Optical coherence tomography showed ILM overlying the pits with direct communication between the schisis cavities and the pits in addition to macular detachment with schisis. Surgical reattachment of the retina was attempted by means of pars plana vitrectomy and posterior vitreous detachment. About 4 disc areas of ILM over the macula was peeled with microretinal forceps. Fluid–air exchange was performed and sulfur hexafluoride injected into the vitreous cavity (final intraocular concentration 20%). Laser photocoagulation was not applied to the peripapillary retina. Postoperatively the patients were asked to maintain a face-down position for 10 days.

Results
Visual acuity improved from 20/800 and 20/400 before surgery to 20/200 and 20/40 respectively. Optical coherence tomography showed macular attachment within the first week after surgery.

Conclusions
Macular reattachment was likely facilitated by the removal of vitreoretinal traction by ILM peeling or by the removal of membrane overlying the pit, which may act as a check valve, allowing vitreous to pass into the subretinal space.

A72–0056

FLEXIBLE RAKE FOR REMOVAL OF EPIRETINAL MEMBRANES

T. Mark Johnson, Bert Glaser

Purpose
To develop a surgical instrument that allows complete removal of epiretinal membrane (ERM) in an atraumatic fashion.

Methods
A rake composed of multiple extensible, flexible tines was developed. When completely extended, the tines engage a large surface area of the ERM, allowing complete removal without the need for a defined membrane edge or incision in the ERM. We conducted a prospective study of the use of the rake in 8 consecutive patients undergoing removal of ERM during vitrectomy.

Results
The mean visual acuity improved from 20/80 to 20/25. No patients had persistent ERM or cystoid macular edema.

Conclusions
The ERM rake appears to allow complete and atraumatic removal of membrane tissue without significant risk. Early results suggest that the rake is associated with good visual recovery and a very low rate of persistent ERM or cystoid macular edema.

A73–0116

"XEROSIS-METER": A NEW CONCEPT IN DRY EYE EVALUATION

Yogesh Gupta, Meenakshi Gupta

Purpose
The treatment of dry eye is challenging. The condition would undoubtedly be more amenable to treatment if it could be detected at an early stage and its prognosis recorded accurately and sensitively. There has been a tremendous contribution by the pharmaceutical industry toward the treatment of dry eye. However, diagnostic and prognostic tests such as Schirmer's test and tear film break-up time (BUT) appear primitive. We have designed a xerosis-meter, an electronic device that can detect and grade tissue dryness.

Methods
This device is based on the principle that the electrical conductivity of any tissue is directly proportional to its wetness. The sensitivity of the instrument was compared with Schirmer's test and tear film BUT in normal eyes and dry eyes. The results were compared using the unpaired *t* test.

Results and Conclusions
The readings were significantly different between the 2 groups ($p < 0.001$). The sensitivity of the xerosis-meter (86.11%) was higher than that of Schirmer's test (80.55%) and much higher than that of the tear film BUT (66.66%).

A74–0117

A NONTOUCH CORNEAL ANESTHESIOMETER

Yogesh Gupta, Meenakshi Gupta

Purpose
Measurement of corneal sensitivity is an important test in everyday ophthalmic practice. The current method of testing corneal sensation with a cotton wick appears primitive and has many other shortcomings. We designed a device capable of assessing the sensitivity of the cornea without having to touch it.

Methods
Controlled and calibrated pressure air jets were used to test corneal sensation. The simple device was mounted onto a conventional slit-lamp. A 26-gauge needle was attached through a regulator and a pressure gauge to a cylinder containing pressurized air. Air jets were directed onto the cornea, and the pressure of the jet that was just enough to initiate a lid-closure reflex was recorded. Recordings were made in 50 normal eyes to calibrate the device and determine the range of readings one could expect in normal corneas. Sixty-two eyes with diminished corneal sensitivity due to various causes were then studied.

Results and Conclusions
The corneal anesthesiometer is an excellent device to test for corneal sensitivity without having to actually touch the cornea.