Canadian Journal of Optometry
Revue Canadienne D'Optométrie
Vol 70, No 5
September / septembre 2008
(Date of issue: September 2008)
(Date de parution: septembre 2008)
ISSN 0045-5075

CJO•RCO
Canadian Journal of Optometry
Revue Canadienne D'Optométrie

The Canadian Journal of Optometry is the official publication of the Canadian Association of Optometrists (CAO) /
La Revue canadienne d'optométrie est la publication officielle de l'Association canadienne des optométristes (ACO):
234 Argyle Avenue, Ottawa, ON, K2P 1B9. Phone 613 235-7924 / 888 263-4676, fax 613 235-2025, e-mail info@opto.ca, website www.opto.ca.
Publications Mail Registration No. 558206 / Envoi de publication - Enregistrement no. 558206.
The *Canadian Journal of Optometry / La Revue canadienne d'optométrie* (USPS#0009-364) is published six times per year at CDN$55, and CDN$65 for subsriptions outside of Canada. Address changes should be sent to CAO, 234 Argyle Avenue, Ottawa, ON K2P 1B9.

President's Podium • Mot du président

Guest Article • Article Invité

Clinical Diagnosis • Diagnostic clinique

Practice Management • Pratique et gestion

Articles • Articles

Uniform requirements for manuscripts: login to the member site at *www.opto.ca* or contact CAO.
Exigences uniformes pour les manuscrits: voir sur le site des membres à *www.opto.ca* ou contactez l'ACO.

Cover: The new three-year communications campaign continues to build on the eye health brand. It is being cleverly communicated with an orange - even though it may appear good on the outside, it might not be what you expect on the inside. An optometrist knows your eyes inside ... & out! For more information on the advertising campaign see the Guest Article on page 135.

Couverture: La nouvelle campagne de communications continue à construire sur la marque de la santé de l'œil. Elle est abilement communiquée avec une orange - quoiqu'elle puisse sembler bonne de l'extérieur, elle ne l'est pas nécessairement de l'intérieur. Pour plus de détails sur la campagne de publicité, allez à la page 136.

CAO and Student Relations

L'ACO et relations avec les étudiants

Len Koltun, OD
President CAO /
président de l'ACO

" Communication is the Key.
La communication est la clé! "

One important component of CAO's 2006 – 2009 strategic plan is prioritizing our internal and external communications. We are concentrating on improved relationships with government, inter and intra professional as well as our optometric students.

At several meetings this past year CAO council has been steadily creating opportunities to improve student relations and access for improved communications – 'the Key'! Several new initiatives include:

1. Appointing Dr. Henry Smit (NS Councilor to CAO) as our new student relations' liaison.
2. In May 2008 CAO launched a new free student membership opportunity to all North American optometry students available simply by applying through the CAO website. This provides students with access to many CAO on line publications as well as access for inquiries to our head office.
3. At its July meeting CAO Council ratified a proposal to provide funding for student's 'White Coat Ceremony' at U of W. This 'ceremony' is a historic day for students, as they will receive a white clinic coat signaling the formal crossing of that threshold from 'student' to 'eye doctor health care professional'. This is the day they will don a white clinic coat for the first time and engage in their first clinical experience, symbolically accepting the privilege and responsibility to practice optometry.
4. CAO hosted a reception at the American Association of Optometrists (AOA) congress where the CAO President meets with Canadian students attending optometry schools in the USA.
5. CAO also allocates $3,000.00 per year to CAOS (Canadian Association of Optometric Students - UW and UM).
6. CAO invites the 4th year President of CAOS from UW and UM optometry schools to attend the Optometric Leaders' Forum in January each year.
7. CAO offers free registration to student members who attend the CAO Biennial Congress.
8. The CAO President (or President –Elect) attends the convocation ceremonies at both UW and UM and presents the CAO/COETF recognition awards.
9. CAO provides students with links to provincial associations with student memberships. This provides students with an important placement, information and inquiry pipeline.
10. CAO helps coordinate a CCPP (Canadian Council of Provincial Presidents) meeting and tour every second (non Congress) year at both Canadian Schools.

PRESIDENT'S PODIUM
MOT DU PRÉSIDENT

This is an opportunity for Presidents, students and faculty to interact and exchange information on the state of the profession across Canada and inform of provincial practice opportunities, and School activities

I believe Optometry will continue to thrive because we are attracting, retaining motivating and inspiring our brilliant students and new graduates. CAO is conscious of the importance of building and maintaining student relations and is proud of our commitment to increasing involvement. I would respectfully ask each and every practicing OD to help us build the ultimate optometric workforce with increased communications and staying connected with students, our greatest resource.

Un grand volet du plan stratégique 2006-2009 de l'ACO consiste à rendre prioritaires les communications internes et externes. Nous nous employons à resserrer les liens avec le gouvernement, à l'échelle interprofessionnelle et intraprofessionnelle et avec les étudiants en optométrie.

À plusieurs rencontres au cours de la dernière année, le Conseil de l'ACO a constamment créé des possibilités d'améliorer les relations avec les étudiants et les conditions de cet accès pour de meilleures communications suivant le mot d'ordre « *La communication est la clé* »! Voici un certain nombre d'initiatives nouvelles :

1. Nous avons désigné le Dr Henry Smit (conseiller de la Nouvelle-Écosse) comme nouvel agent de liaison dans le cadre des relations avec les étudiants.
2. En mai 2008, l'ACO a donné à tous les étudiants nord-américains en optométrie la possibilité d'adhérer sans frais à titre de membres étudiants, et ce, simplement en faisant une demande au site Web de l'Association. Les étudiants ont ainsi accès à un

grand nombre de publications en ligne de l'ACO et peuvent adresser des demandes de renseignements à notre siège social.

3. À sa réunion de juillet, le Conseil de l'ACO a ratifié une proposition de financement d'une « cérémonie de la blouse blanche » à l'Université de Waterloo à l'intention des étudiants. Cette cérémonie est toujours mémorable pour les étudiants qui reçoivent une blouse blanche de clinicien qui marque officiellement le passage de l'état d'étudiant à celui de professionnel de la santé de l'œil. À cette occasion, ils revêtiront une blouse blanche pour la première fois et feront leur première expérience de clinicien en acceptant symboliquement le privilège et la responsabilité de la pratique optométrique.
4. L'ACO a tenu une réception au congrès de l'American Association of Optometrists où son président a rencontré des étudiants canadiens inscrits aux études optométriques aux États-Unis.
5. L'ACO affecte 3 000,00 $ par an à l'ACEO (Association canadienne des étudiants en optométrie des universités de Waterloo et de Montréal).
6. L'ACO invite le quatrième président annuel de l'ACEO à assister en janvier chaque année au Forum des dirigeants optométriques.
7. L'ACO offre l'inscription gratuite aux étudiants membres désireux d'assister au Congrès biennal.
8. Le président (ou la présidente désignée) de l'ACO est présent aux cérémonies de remise des diplômes des universités de Waterloo et de Montréal et y décerne les prix ACO-FFOCE.
9. L'ACO fait bénéficier les étudiants membres d'une liaison avec les associations provinciales, ce qui constitue pour eux un important moyen de placement et de recherche de renseignements.
10. L'ACO aide à coordonner la tenue d'une réunion et d'une visite du CCPP (Conseil canadien des présidents provinciaux) tous les deux ans (en dehors de son congrès) dans les deux écoles canadiennes d'optométrie. C'est l'occasion pour les présidents, les étudiants et les enseignants d'entrer en interaction et d'échanger de l'information sur la situation de la profession à l'échelle du Canada, ainsi que de renseigner sur les possibilités qui s'offrent en optométrie dans les provinces et sur les activités des écoles.

Je crois que l'optométrie demeurera une discipline florissante, parce que nous attirons, retenons, motivons et inspirons nos étudiants d'avenir et nos nouveaux diplômés. L'ACO est bien pénétrée de l'importance de cultiver les relations avec les étudiants et est fière de l'engagement pris d'accroître la participation. Je prie respectueusement chacun de nos praticiens de nous aider à façonner une main-d'œuvre optométrique d'excellence grâce à des communications accrues et à une liaison maintenue avec les étudiants, qui sont notre ressource de choix.

ITEMS OF INTEREST TO CANADIAN VISION CARE PROVIDERS CAN BE FOUND AT VHRC.NET NEWS LINK.

THREE UPCOMING MEETINGS ARE ANNOUNCED:

Form & Function in Ocular Disease
Halifax, Nova Scotia
September 26-27, 2008
A multidisciplinary clinical and basic science meeting.
We have assembled guest faculty who are renowned in areas ranging from imaging to genetics to the impact of global blindness. There is no cost for registration.
More information can be found on http://ophthalmology.medicine.dal.ca/.

3rd Alberta Vision Sciences Symposium
Eye Development, Diseases of the Eye and Therapeutics of Eye Diseases.
October 3 and 4, 2008
Faculty of Medicine, University of Calgary Registration and Abstract submission details are posted on the Foundation Fighting Blindness website at: http://ffb.ca/events_avss08.php

International Glaucoma Risk & Disease Management Symposium
October 18, 2008
The Sutton Place Hotel
955 Bay Street, Toronto Ontario
To view the Brochure & Register on-line, please visit:
http://events.cmetoronto.ca/website/index/OPT0806

An inside look at your new campaign

Votre nouvelle campagne vue de l'intérieur

Jim Ryan
Managing Director,
Ryan Edwards
Communications

Ryan Edwards

It's been a long time coming but it's here. After many months of creative development, consultation with CAO's National Public Education Committee (NPEC), research and fine-tuning the new CAO television commercial has been filmed.

In May, three creative TV advertising campaign options were tested on various focus groups, representing a broad cross section of our target group from across the country. The online panels were very instructive and the participants all gravitated to and coalesced around the testimonial execution of the new Inside & Out communications strategy.

The Inside & Out communications platform is built on the premise that many things, such as an orange, may look good on the outside but inside you just don't know. When this premise is applied to vision it becomes a powerful metaphor that immediately gets people thinking beyond how well they're seeing to asking – just how healthy are my eyes? Importantly, it also clearly captures and expresses the unique skills and services of optometrists.

The television commercial was filmed in both English and French in late August and will be aired the week of September 29. A programming schedule (and the ad!) can be accessed via the CAO Member portal. You can login at www.opto.ca.

The photos on the following page show some of the hard work that was put into the actual production by the crew and especially the patients who agreed to come to Ottawa to be filmed. As Michelle, Jodie, Don, Debbie, Robert and Melanie (Lindsay's mum) told their stories about how an optometrist made a real difference to them and their families' lives, it provided powerful and compelling proof as to why the public should regularly visit an optometrist for a preventive eye health examination.

While only two patients' stories will be used for the Fall 2008 Television launch, all of the testimonials will be used throughout the three year advertising campaign. The testimonials will be used in rotation so that the target audience is exposed to the different messages. In addition, a web version of all six stories will be available on the national public website.

We asked more of these wonderful patients – we asked them to also allow us to take still

GUEST EDITORIAL
ÉDITORIAL INVITÉ

Michelle Conte from Toronto, patient of Dr Kristin Heeney, tells her story of cataracts discovered at a young age.

Robert Hainsworth, patient of Dr Susan Judson of PEI, discusses optic nerve swelling that led to the removal of a brain tumour.

Director Arev Manoukian (left) and Michael Edwards (right) of Ryan Edwards.

The Mutch family are proud patients of Dr Greg MacDiarmid of New Brunswick. They were surprised Lindsay needed glasses after she had passed a school vision test.

Jodie Brown of Calgary thanks Dr Sonja G. Hagemann for saving the vision in her right eye from a retinal detachment.

photos of each of them so that we could develop brand related print materials. By the end of September you will find a range of materials (newspaper and magazine ads, Yellow Page ads, outdoor posters, etc), which you will be able to download and adapt for use to promote your practice.

Special thanks to all the optometrists who responded to the national call for the testimonials. Over 65 patient stories were collected and this provided the luxury (and added difficulty!) of choosing compelling cases. Without the participation of these optometrists, the production of this campaign would not have been possible.

Optometry continues defining its relationship with the public through the important management of its brand. This new powerful creative upholds the brand of preventive eye health examinations and effectively distinguishes the unique service that optometry provides to Canadians.

Cela aura pris du temps, mais nous aurons réussi. Après des mois de création, de pourparlers avec le Comité national d'éducation publique (CNEP) de l'ACO, de recherche et de peaufinage, la nouvelle publicité télévisée de l'ACO a été enregistrée sur film.

Au mois de mai, trois options de campagne de publicité créative à la télévision ont été mises à l'essai auprès de divers groupes de discussion qui représentaient un large éventail de notre auditoire cible à l'échelon national. Les groupes en ligne ont été très instructifs et les participants ont tous gravité vers la nouvelle stratégie de communication « de fond en comble » qui sera exécutée par témoignage publicitaire.

La plate-forme de communication « de fond en comble » repose sur l'hypothèse que beaucoup de choses, comme une orange, peuvent paraître belles à l'extérieur sans qu'on sache comment elles sont à l'intérieur. Lorsqu'on applique une telle prémisse à la vision, elle devient une puissante métaphore qui amène tout de suite les gens non plus à se demander s'ils voient bien, mais quelle est la qualité de la santé de leurs yeux. Il est important de souligner que cette prémisse fait aussi clairement ressortir les compétences et les services particuliers des optométristes.

La publicité télévisée a été filmée en anglais et en français à la fin d'août et sera diffusée dans la semaine du 29 septembre. On peut consulter le calendrier de diffusion (et la publicité elle-même!) sur le portail des membres de l'ACO, à www.opto.ca.

Les photos que vous voyez sur cette page montrent tout le travail accompli par l'équipe pour mener à bien cette réalisation, et surtout par les patients qui ont bien voulu se rendre à Ottawa participer au film. Après que Michelle, Jodie, Don, Debbie, Robert et Melanie (la mère de Lindsay) eurent raconté comment l'intervention d'un optométriste avait vraiment fait une dif-

férence dans leur vie personnelle et dans celle de leur famille, nous savions que nous disposions d'une preuve puissante et convaincante qui amènerait le public à vouloir consulter régulièrement un optométriste pour un examen préventif de la vue.

Même si nous n'utiliserons que le cas de deux patients pour le lancement de la publicité télévisée à l'automne 2008, tous les témoignages serviront pendant la campagne de publicité triennale. Nous ferons une rotation des témoignages afin que l'auditoire visé soit exposé à des messages différents. De plus, une version Web des six témoignages pourra être consultée sur le site Web national ouvert au public.

Nous avons sollicité encore plus ces merveilleux patients en leur demandant de se prêter chacun à une séance de photos afin que nous puissions avoir en main des photographies liées à la marque de commerce. D'ici la fin de septembre, vous aurez accès à tout un éventail de documents (annonces dans les journaux et les magazines, annonces dans les Pages jaunes, affiches extérieures, etc.) que vous pourrez télécharger et adapter à votre propre cabinet.

Nous remercions tout spécialement les optométristes qui ont répondu à l'appel national de témoignages. Les quelque 65 cas de patient et plus que nous avons recueillis nous ont donné le luxe (et la difficulté accrue!) de pouvoir choisir les meilleurs d'entre eux. Sans la participation de ces optométristes, nous n'aurions pas pu produire cette campagne.

L'optométrie continue de définir son lien avec le public grâce à la bonne prise en charge de sa marque de commerce. Cette nouvelle création puissante soutient la marque des examens préventifs de la vue et permet de bien distinguer le service particulier que l'optométrie dispense aux Canadiens.

CLINICAL DIAGNOSIS

UNIVERSITY OF WATERLOO, SCHOOL OF OPTOMETRY

Norris Lam
Optometry Student

Patricia Hrynchak, OD, FAAO
Clinical Lecturer

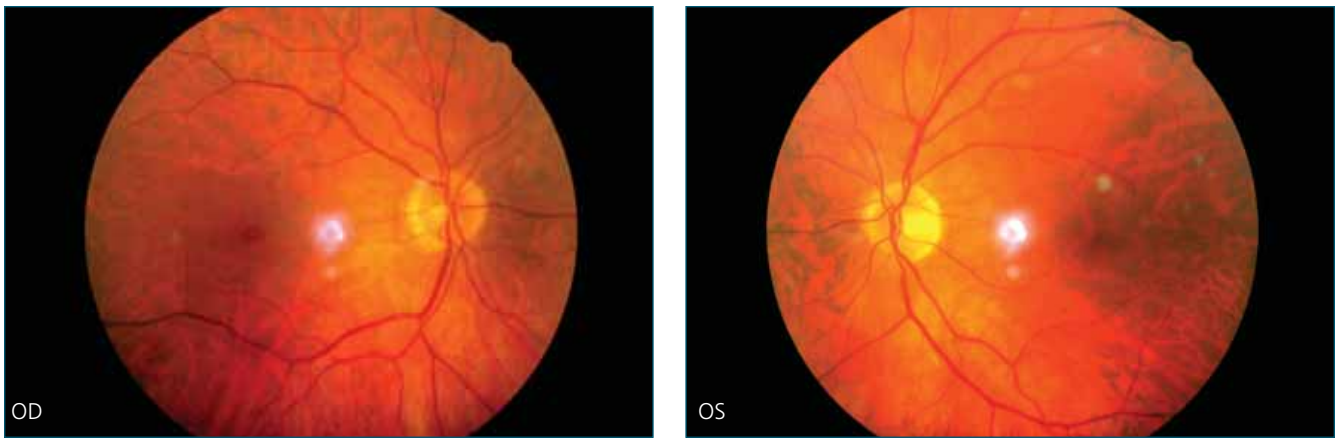


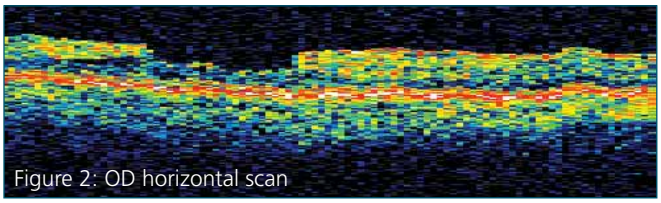
Figure 1: Fundus photographs of the right and left eye.
Tableau 1: Photographie du fond de l'œil droit et gauche.

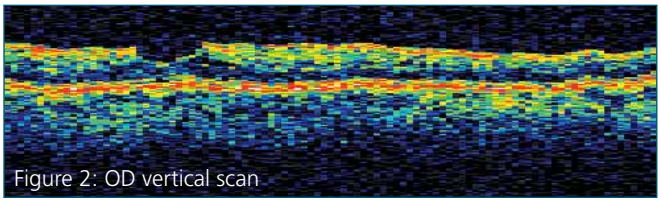
A 70-year-old male retired university professor with bilateral high myopia presented for his annual eye examination. He had been diagnosed with a pseudohole in the right macula secondary to an epiretinal membrane 16 years previously. There was a significant history of trauma to the right eye 19 years previously. He reported that the vision in his right eye had remained stable over the 16 year period. He was noticing some decrease in the vision in his left eye over the previous several months. He was under medical care for hypertension, hypercholesterolemia and osteoporosis.

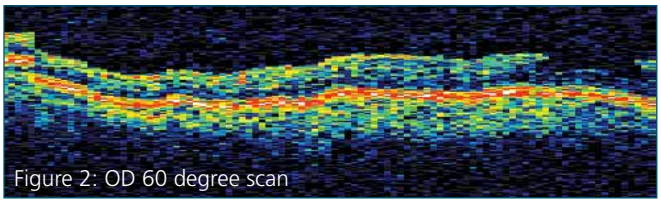
Presenting aided visual acuities were 6/9+1 (20/30) in the right eye and 6/7.5-1 (20/25) in the left eye. Monocular subjective refraction revealed -8.25-0.50 X 160 6/9 (20/30) in the right eye and -8.25-2.00 X 165 6/7.5 (20/25) in the left eye. The patient had a stable 25 prism diopter alternating esotropia. Amsler grid testing revealed no central scotoma in either eye, however, doubling of both the vertical and horizontal grid lines was reported with each eye. Pupils were round and equally responsive to direct and consensual light with no relative afferent defect. Intraocular pressures were 16mmHg in both eyes. Mild blepharitis and meibomian gland dysfunction as well as Grade 2+ nuclear sclerosis and cortical cataract were detectable in both eyes with slit-lamp biomicroscopy. A dilated fundus examination performed with fundus biomicroscopy revealed, in the right eye, an oval, red well-circumscribed lesion in the centre of the macula surrounded by an epiretinal membrane. There were no abnormalities noted in the left eye. The fundus appearance of the right eye is shown in Figure 1. The Watzke-Allen test was performed and the patient reported a continuous streak of light with no waviness or distortion in the right eye.

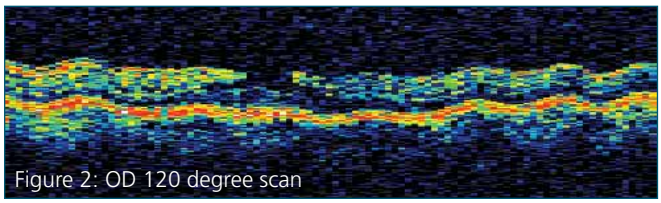
Was the original diagnosis correct? / What is the differential diagnosis? / What management is needed? / What is the long-term prognosis?

(see page 165)









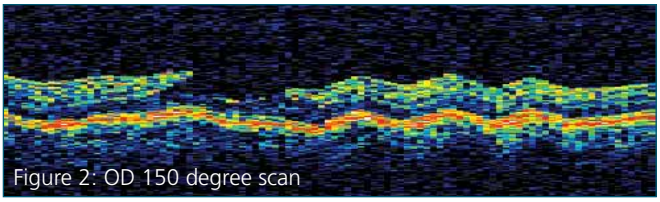


Figure 2: OCT images of the right eye in 5 radial scans. There is an irregular foveal contour, a break in the inner fovea, a lateral splitting of retina at the level between outer plexiform layer and the outer nuclear layer, and an absence of a full thickness foveal defect with an intact foveal photoreceptor layer.

Tableau 2: Les images de la TCO de l'œil droit dans cinq balayages radiaux. On constate un contour fovéal irrégulier, une solution de continuité dans la fovéa interne, une séparation latérale de la rétine entre la couche plexiforme extérieure et la couche nucléaire extérieure, et l'absence d'un défaut fovéal sur toute la profondeur, la couche de photorécepteurs fovéaux étant intacte.

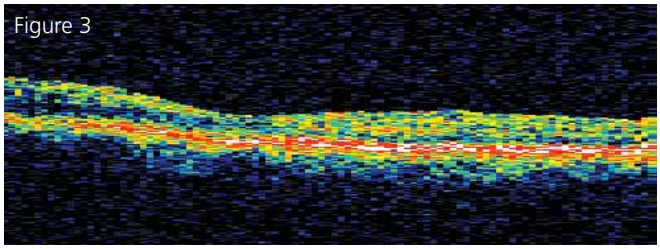


Figure 3: OCT horizontal scan through the normal macula of the left eye.

Tableau 3: Le balayage horizontal de la TCO dans la macule normale de l'œil gauche.

Un homme de 70 ans, ancien professeur d'université, souffrant de myopie bilatérale avancée se présente pour son examen annuel de la vue. Seize ans auparavant, on avait diagnostiqué un pseudo-trou dans la macule droite consécutif à une membrane épirétinienne. Il y avait eu des antécédents importants de trauma à l'œil droit 19 ans auparavant. Il indique que sa vision de l'œil droit est demeurée stable depuis 16 ans. Il a remarqué une légère baisse de la vision de son œil gauche depuis quelques mois. Il est soigné pour de l'hypertension, de l'hypercholestérolimie et de l'ostéoporose.

Il présente une acuité visuelle assistée de 6/9+1 (20/30) à l'œil droit et de 6/7,5-1 (20/25) à l'œil gauche. Une réfraction subjective monoculaire révèle -8,25-0,50 X 160 6/9 (20/30) pour l'œil droit et -8,25-2,00 X 165 6/7,5 (20/25) pour l'œil gauche. Le patient a une dioptrie prismatique de 25 avec strabisme convergent alternant. Les cartes d'Amsler ne révèlent aucun scotome central dans un œil ou l'autre, cependant, il y a doublage à la fois vertical et horizontal des lignes de la grille dans les deux yeux. Les pupilles sont rondes et répondent de façon égale à la lumière directe et au réflexe consensuel sans défaut afférent relatif. Les pressions intraoculaires sont de 16mmHg dans les deux yeux. À l'aide d'une biomicroscopie avec lampe à fente, on a détecté une légère blépharite et une dysfonction des glandes de Meibomius de même qu'une cataracte corticale et une sclérose nucléaire de type 2+. Un examen du fond de l'œil dilaté effectué à l'aide d'une biomicroscopie révèle, dans l'œil droit, une lésion circonscrite rouge et ovale dans le centre de la macula entourée d'une membrane épirétinienne, mais aucune anomalie dans l'œil gauche. L'apparence du fond de l'œil droit est présentée au tableau 1. On a procédé au test Watzke-Allen et le patient a fait part d'une strie de lumière continue sans ondulation ni distorsion dans l'œil droit.

Le diagnostic d'origine était-il exact? / Quel est le diagnostic différentiel? / Quel traitement est nécessaire? / Quel est le pronostic à long terme? (voir la page 166)

Innovation — Your Responsibility

Alphonse Carew
BSc, OD, MBA

Like any business an optometric practice should always look for ways to improve the services it provides, the products that it sells and the processes in place to run the practice effectively. If you fall into complacency while your competitors continue to innovate, you will surely struggle and fall behind.

Although innovation can come from many sources, as the owner of the practice you have to take the lead and foster imaginative change. It starts with having an open mind to new ideas and thinking outside the box (which presumes that at some point you could think inside the box). You have to actively seek out these sources of change, sitting and waiting for that million-dollar idea to fall into your lap just won't do. Interaction with your colleagues and staff in a creative environment are logical first steps to seek new imaginative ideas. Patients themselves can be a source of inspiration but be careful for their feedback can often provide misleading information. As Henry Ford said, "If I asked my customers what they wanted, they'd have said a faster horse."

Change doesn't always have to happen in dramatic leaps and bounds. Sometimes small incremental changes (the "new and improved" scenario) over long periods of time can be just as effective. In fact, because our industry is basically a "mature" industry, developing radically new ways of doing things can be difficult. Optometrists are naturally conservative by nature so this slower pace of change suits us well.

Most of your attention should be directed towards innovating the services you provide. This is the part of your practice you know best and where your optical competitors cannot follow. You have many sources from which to draw from, including continuing education seminars, trade shows, journals, your staff, and interactions with your colleagues both in person and online. Find out what the latest research is saying about new treatment modalities and think about how it might fit into your practice. The research may still be years away, but being ready for when it comes can put you at a significant advantage.

Laser corrective surgery co-management is a prime example of this. Optometrists who sought out this new service and introduced it early in their practice benefited greatly from the recognition in their community as being a leader in this field. Thankfully we live in a time where research is bringing new treatment regimes into doctors office faster than ever. You simply have to keep your "ear to the ground" and adapt these new technologies to your practice quickly.

Innovation in the products we sell (contact lenses, frames and lenses) often comes "gift wrapped" from our suppliers and their representatives. Manufacturers of these products spend a lot of money on research to make the better "mousetrap". Whether it's the most breathable contact lens or the progressive spectacle lens with the largest reading corridor you can easily adapt their technological enhancements to your practice and win the innovation race over your competitors.

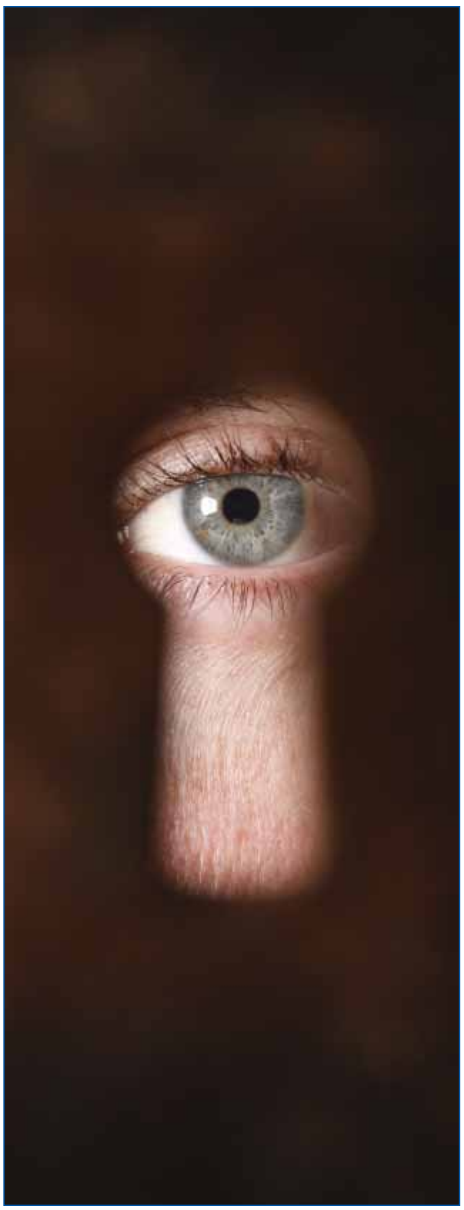
Another area where you can look for innovation as a way to gain a competitive edge is in the way you manage your practice. There are plenty of great business ideas out there that can help you organize, train and reward your staff, hire and keep the best employees, as well as improve profitability and efficiency. Look outside the optometric community for sources of inspiration. Many years ago we merged our entire administration into one physical location. They now handle all incoming and outgoing calls, insurance issues, correspondence with patients and other professionals, scheduling, and recalls for four locations. All these tasks were once done at the front desk but now the receptionist can concentrate on our patients as they arrive and take care of their needs without any distraction. I got this idea from other industries and it has turned out wonderfully.

The final piece of the puzzle when it comes to being innovative is to make sure your patients know that you are constantly improving. Because they only see you once every year or two they may not know that you have the latest diagnostic equipment, or provide the best technology in contacts and glasses. You need to tell your patients at every point of contact. Include information in all outgoing literature and place it on your website.

Become the leader of innovative change in your practice and seek out new ideas from many varied sources. However, a good idea alone is not enough. You, along with your team, have to put these ideas into action. Nurture and reward innovation in your practice and you will reap the benefits.

CAO President's Annual Report

Rapport annuel du président de l'ACO



With optimism and commitment for 2008 – 2009,
Respectfully submitted,
Len Koltun, OD
President CAO

C'est avec optimisme et résolution pour 2008-2009 que je vous présente espectueusement ce rapport.
Len Koltun, OD
Président de l'ACO

I am very pleased to report on CAO's activities for this past year July 2007 – July 2008. Firstly, I must say how quickly the time has passed! It seems like only a very few short weeks ago that we were at Congress in Saskatoon, and then the Alberta Annual General Meeting in Calgary distributing hats and 'T' shirts with excitement and anticipation for a great year ahead. Much happened since then and I believe we have made progress in many areas, which are summarized as follows:

❶ **Implementing the CAO Strategic Plan and Action plan.** At our first Council meeting in Calgary we confirmed our intention to follow through with the strategic directions recommended for 2006 – 2009. Our actions and successes in 2007 – 2008 have been that:

- We have influenced government policy by successfully obtaining reclassification for all contact lenses including 'cosmetic' lenses as medical devices as well as recognition of optometrists as 'prescribers' under Bill C51. We have held meetings with representatives of the Health Ministry (March 7th), Progressive Licensing Department (April 30th), with PHAC, (May 7th), and the Competition bureau (May 16th).
- We are elevating the Standard of care through a new Diabetes Committee, its core document, and making huge strides towards implementation of TPA legislation in Ontario, Manitoba, Prince Edward Island and British Columbia.

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- We are improving and emphasizing communications in many areas: inter, intra professional, with students and the public. At the first Council meeting of my term, CAO council supported my suggested President's theme of 'Communication is the Key' – by promoting communications we will be able to open many doors for optometry. We have followed through with this theme in many areas:
  - *Member communications has improved through our revised member website platform design, a new In Touch format and completing a membership satisfaction survey in May 2008.*
  - *We are reaching out and attempting to communicate to all North American optometry students by offering them a free membership.*
  - *Both the new diabetes initiative (Dr. Richard Lee) and CAO's Occupational Vision Program are re-emphasizing communications as the theme to educate and inform the public of optometry's role in the management of people with diabetes and the importance of eye safety.*
  - *Perhaps our greatest achievement this year was that the Canadian Public Relations Society awarded a Silver Medal Recognition Award to NPEC, our National Public Education Program, for 'Best Use of Communications Tools' for the 2007 Eye Health Month Campaign. This is an outstanding tribute to the dedication and commitment of Chair Dr. Lil Linton, her committee and all Canadian optometrists who have faithfully supported this initiative, which has become the model and the envy of other professional organizations. We can be extremely proud of this accomplishment.*
  - *Through 'Presidents Travels' summaries I have attempted to keep CAO Council aware and up to date on activities and priorities of all CAO corporate members. I also look forward to writing the President's Podium in the Canadian Journal of Optometry, relaying updates on CAO activities and thoughts about the future of optometry.*
- We have revised CAO infrastructure to achieve our goals with office renovations now completed; hired

a Webmaster, and adopted a new Council and Executive meeting format that reflects our strategic directions.

- We adopted a new template to monitor progress of the strategic plan. It is an 'organic' document, reviewed at all our council meetings and serves as an efficient blueprint to track strategies, actions and progress.

❷ **Implementing the 2007 Optometric Leaders' Forum (OLF) Futures Recommendations.** The OLF Futures recommendation of 1) increased recognition, improved integration, 3) elevating the Standard of Care, 4) improving government relations and, 5) improving individual OD awareness were a reaffirmation of the CAO Strategic Plan. This validation has increased the importance of striving to achieve the goals as set out in the Strategic Plan.

❸ **Obtaining TPAs** for all Canada is nearly a reality with ON, MB, PEI and BC. We expect to see TPA legislation implemented throughout Canada this next year.

❹ **Funding on new research projects.** CAO provided funding for, 1) a Forum discussion at the School of Optometry, UW to describe the profile of a 2015-optometry graduate, and 2) a joint study by COETF and CNIB to determine the incidence of uncorrected refractive error in the Canadian population.

❺ **Public Visual Welfare Committee** This committee continues to monitor policy and legislation to ensure a comprehensive standard of eye care in Canada. The provision of 'sight tests' by opticians remains in place in BC, Alberta and Ontario, despite questionable legal standing. CAO is monitoring outcomes of 2 court proceedings: 1) an appeal by an Ontario optician who was found guilty of prescribing from sight testing measurements, and 2) Quebec decision that opticians rescind certain sections of their bylaws and that they 'cease to perform acts that fall solely under the practice of optometry'…like over refraction and 'eye examinations'.

❻ This fall we are embarking on an **improved CAO OVP program** (Ontario) with emphasis on communications to expand the program and increase awareness with industry.

❼ **Providing speakers.** We are pleased that Dr. Chris Hudson will be speaking to the 2008 Family Physician's Forum in Toronto and Dr. Langis Michaud to the 2008 CDA forum in Montreal.

❽ **Expanding Member Programs.** CAO Council approved an expansion to the Centennial private label frames sales program to include several 'higher end' models and will launch a new merchant card program with Chase paymentech.

❾ **Continued assistance for COETF and OGS.** CAO provides ongoing secretariat support for both these worthwhile optometric charities.

❿ **Maintaining responsible governance.** We are focused on operational excellence and committed to delivering advocacy for optometry. The entire CAO Council, and staff are to be congratulated for administering association affairs with due diligence committed to success. Thank You!! Our strategy of financial discipline and investing in our infrastructure is providing the support needed to achieve our goals.

Moving forward

This past year has stimulated my passion. desire and commitment to advance optometry further. The year has gone by so quickly I feel I have taken only the first step in establishing many key relationships for optometry and CAO. I believe I can cultivate these further as well as create others.

Another reason why this coming year and a second term is so special and important is that I believe we have a clear message and a clear goal to continue the momentum to complete what we've just started. I believe we have made significant progress and I would like to thank everyone for their support, and in particular CAO Council for their endorsement for a second term.

I have great confidence in Optometry's future. I continue to believe in the dream that optometry have the recognition and respect that it deserves, and I continue to believe that the theme 'Communication is the Key' is an important element of our future success– that improved member communication will make us a stronger association and improved public communication will educate and elevate optometry's profile and status.

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Je suis heureux de rendre compte des activités de l'ACO pendant la dernière année, soit de juillet 2007 à juillet 2008. Je dirai d'abord que le temps a passé si vite! Il me semble que, il y a seulement quelques courtes semaines, nous étions au congrès à Saskatoon. Beaucoup d'eau a coulé sous les ponts depuis et, à mon avis, nous avons progressé dans bien des secteurs. Je résumerai ces progrès :

❶ **Mise en application du plan stratégique et du plan d'action de l'ACO.** À la première réunion du Conseil à Calgary, nous avons confirmé notre intention de réaliser les orientations stratégiques recommandées pour 2006-2009. Nos activités et nos réalisations en 2007-2008 ont été les suivantes :

- Nous avons influencé la politique du gouvernement en obtenant le reclassement de toutes les lentilles cornéennes, y compris les lentilles « cosmétiques », à titre de matériel médical, ainsi que la reconnaissance des optométristes comme « prescripteurs » dans le projet de loi C51. Nous avons eu des réunions avec les représentants du ministère de la Santé (7 mars), du Projet d'homologation progressive (30 avril), de l'ASPC (7 mai) et du Bureau de la concurrence (16 mai).
- Nous élevons les normes de soins grâce à un nouveau comité du diabète et son document de base et nous faisons de très grands pas vers l'adoption de mesures législatives relatives aux APT en Ontario, au Manitoba, à l'Île-du-Prince-Édouard et en C.-B.
- Nous améliorons et valorisons nos communications dans bien des secteurs, soit à l'échelle interprofessionnelle et intraprofessionnelle et avec les étudiants et le public. À la première réunion du Conseil pendant mon mandat, celui-ci a retenu le thème que je proposais « La communication est la clé ». En favorisant les communications, nous pourrons ouvrir bien des portes à l'optométrie. Nous avons cultivé ce thème dans nombre de secteurs :
  - *Les communications avec les membres se sont améliorées grâce à une reconception de la plateforme du site Web des membres, à une nouvelle présentation de Contact et à un sondage sur la satisfaction de ces mêmes membres en mai 2008.*
  - *Nous tendons la main à tous les étudiants nord-américains en optométrie et tentons d'entrer en communication avec eux en leur offrant l'adhésion gratuite à notre association.*
  - *Dans la nouvelle initiative portant sur le diabète (Dr Richard Lee) comme dans le Programme professionnel des soins de la vue, nous insistons à nouveau sur les communications comme le thème d'une éducation et d'une information du public sur le rôle de l'optométrie dans la prise en charge des diabétiques, ainsi que sur l'importance de la sécurité oculaire.*
  - *Peut-être notre plus grande réalisation cette année a-t-elle été l'octroi par la Société canadienne des relations publiques d'une médaille d'argent au CNEP – notre Programme national d'éducation publique – dans la catégorie « Meilleure utilisation d'outils de communications » dans le cas de la campagne du Mois de la santé de l'œil 2007. C'est là une reconnaissance insigne du travail inlassable et empressé de la présidente, la Dre Lil Linton, de son comité et de tous les optométristes canadiens qui ont sans cesse appuyé cette initiative devenue l'envie et le modèle pour les autres organismes professionnels. Nous ne pouvons qu'être extrêmement heureux de cette réalisation.*
  - *Par des résumés des déplacements du président, j'ai essayé de tenir le Conseil de l'ACO au fait des activités et des priorités de toutes les sociétés membres de l'ACO. J'ai également hâte d'écrire le Mot du président dans la Revue canadienne d'optométrie; j'y ferai le point sur les activités de l'ACO et livrerai mes réflexions sur l'avenir de l'optométrie.*
- Nous avons révisé l'infrastructure de l'ACO en vue de la réalisation de nos objectifs. Les travaux de rénovation des bureaux ont été menés à bien. Nous avons embauché un webmestre et adopté pour les séances du Conseil et du Comité exécutif une nouvelle formule qui traduit nos orientations stratégiques.
- Nous avons officialisé un nouveau modèle de surveillance des progrès dans l'exécution du plan stratégique. Il s'agit là d'un document « organique » qui est révisé à toutes les réunions du Conseil et sert de plan pratique de suivi des stratégies, des mesures et des progrès.

❷ **Mise en application des recommandations du Sommet de l'avenir de 2007 du Forum des dirigeants optométriques.** Que le Sommet sur l'avenir du FDO ait recommandé 1) d'accroître la reconnaissance de l'optométrie, 2) d'améliorer l'intégration, 3) d'élever les normes de soins, 4) de resserrer les liens avec le gouvernement et 5) de sensibiliser individuellement les OD n'est qu'une réaffirmation de ce que dit le Plan straté-

gique de l'ACO. Cette confirmation confère encore plus d'importance à nos efforts en vue d'atteindre les objectifs de ce plan.

❸ **La mise en place d'un cadre législatif des APT** partout au pays est presque devenue réalité en Ontario, au Manitoba, à l'Île-du-Prince-Édouard et en Colombie-Britannique. Nous nous attendons à ce que, au cours de l'année qui vient, des mesures législatives soient mises en place dans tout le Canada.

❹ **Financement de nouveaux projets de recherche.** L'ACO a financé 1) un débat à l'École d'optométrie de l'Université de Waterloo en vue de faire le portrait du diplômé de 2015 en optométrie et 2) une étude coréalisée par le FFOCE et l'INCA sur la fréquence des erreurs réfractives non corrigées dans la population canadienne.

❺ **Comité sur le bien-être visuel du public.** Ce comité continue à surveiller les politiques et les lois afin de garantir l'application de normes d'ensemble sur les soins oculo-visuels au Canada. En Colombie-Britannique, en Alberta et en Ontario, les opticiens s'occupent toujours d'examens de la vue, bien que cette pratique soit juridiquement contestable. L'ACO surveille l'aboutissement de deux causes en justice, à savoir 1) l'appel interjeté par un opticien de l'Ontario reconnu coupable d'avoir prescrit à partir de mesures de « test de la vision » et 2) une décision en appel des tribunaux québécois ordonnant aux opticiens d'annuler certaines dispositions de leur règlement et de cesser d'exécuter des actes qui relèvent exclusivement de la pratique optométrique (surréfraction, examens de l'œil, etc.).

❻ Cet automne, nous lançons pour **le régime professionnel des soins de la vue** un programme amélioré avec l'Ontario où nous mettrons l'accent sur les communications en vue d'étendre les activités et de mieux sensibiliser l'industrie.

❼ **Service de conférenciers.** Nous sommes heureux d'annoncer que les Drs Chris Hudson et Langis Michaud prendront respectivement la parole en 2008 devant le Forum en médecine familiale à Toronto et le forum de l'ACD à Montréal.

❽ **Extension des programmes aux membres.** Le Conseil de l'ACO a approuvé l'extension à plusieurs modèles « haut de gamme » du programme des montures « sous marque du fabricant » de Centennial. Il lancera un nouveau programme de cartes de commerçants avec Chase Paymentech.

❾ **Maintien de l'aide au FFOCE et à l'« Optometry Giving Sight ».** L'ACO assure en permanence des services de secrétariat à ces deux louables organismes de bienfaisance de l'optométrie.

❿ **Maintien d'une gouvernance en toute responsabilité.** Nous nous vouons à l'excellence opérationnelle et à la promotion de l'optométrie. Nous félicitons tous les conseillers et les membres du personnel d'administrer les affaires de l'Association avec diligence dans un souci de réussite. Merci à tous! Notre stratégie de discipline financière et d'investissement dans notre infrastructure constitue le point d'appui dont nous avons besoin pour atteindre nos objectifs.

Prochaines étapes…

Cette dernière année a stimulé mon désir passionné et ma résolution de faire progresser l'optométrie. Le temps a passé si vite que j'ai l'impression d'avoir seulement effleuré les possibilités d'apprentissage et de n'avoir fait qu'un premier pas dans l'établissement de tout un réseau de relations clés pour l'optométrie et l'ACO. Je crois pouvoir cultiver ces relations et en susciter d'autres.

Une autre raison pour laquelle l'année qui vient et un second mandat sont si spéciaux et importants est que, à mon avis, le message et le but sont clairs : il nous faut continuer et mener à bien ce que nous avons si bien commencé. À mes yeux, les progrès sont nets, et je remercie tout le monde de son appui et, en particulier, le Conseil de l'ACO d'avoir approuvé un autre mandat.

J'ai toute confiance dans l'avenir de l'optométrie. J'ai toujours ce rêve d'une optométrie jouissant de la reconnaissance et du respect qu'elle mérite. Pour moi, le thème « La communication est la clé » est un grand facteur de réussite pour demain. L'amélioration des communications avec les membres nous renforcera comme association et, si nous faisons de même avec le public, l'image et le statut de l'optométrie seront plus connus et rehaussés d'autant.

Keratoconus: Clinical Associations and Treatment Options

Caractéristiques et traitements du kératocône

Abstract: *The focus of the present review of literature is keratoconus, a progressive thinning of the cornea. Because keratoconus usually induces irregular astigmatism, the most affected patients experience a decreased visual acuity that limits the correction using ophthalmic lenses. The CLEK (Collaborative Longitudinal Evaluation of Keratoconus) is a study carried out in several centers with the aim of describing the evolution and associations between the visual and physiological manifestations of keratoconus. Since the treatment of keratoconus varies according to its severity, this paper proposes a summary of the results of the CLEK and a review of the therapeutic options.*

Sommaire: *La présente revue de littérature traite du kératocône, un amincissement progressif de la cornée. Le kératocône induit habituellement de l'astigmatisme irrégulier de sorte que les patients les plus affectés ont une acuité visuelle diminuée limitant ainsi la correction à l'aide de lentilles ophtalmiques. La CLEK (Collaborative Longitudinal Evaluation of Keratoconus) est une étude effectuée dans plusieurs centres dans le but de décrire l'évolution et les associations entre les manifestations visuelles et physiologiques des kératocônes. Étant donné que le traitement du kératocône varie selon la sévérité, le présent article propose un sommaire des résultats du CLEK et un survol des options thérapeutiques.*

INTRODUCTION

Keratoconus is the most common dystrophy inducing corneal ectasia. According to the National Keratoconus Institute, the occurrence of this disease is one in 2,000. Keratoconus is char-

This article first appeared in French in the July 2008 issue of the CJO (Vol. 70 No. 4). Clinical articles are published in the language submitted by the author(s), unless there is a clear indication of interest from readers and permission of the clinical editors and author(s). We are pleased to present a translated version of the original article.

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Mots clés: Kératocône, CLEK, Lentilles Cornéennes, Kératoplastie Pénétrante, Anneaux intra-cornéens, LASIK, KPR, Riboflavine

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acterized by a progressive thinning of the corneal stroma and corneal ectasia over several decades. This disease generally starts in a very productive period of patients' lives: the twenties. This usually bilateral non-inflammatory process induces myopia and irregular astigmatism that limits correction with ophthalmic lenses. The treatment for keratoconus varies according to severity of the case. The CLEK (Collaborative Longitudinal Evaluation of Keratoconus) study was done in several centers over an eight-year period with the aim of describing the evolution and associations between the visual symptoms and physiological signs of keratoconus. Over a thousand patients were recruited in 15 different U.S. clinics. This article represents part of the literature review done as part of a master's degree on the density of keratocytes in contact lens wearers with or without keratoconus. A summary of the CLEK results followed by an overview of the therapeutic options available to patients with keratoconus unsatisfied with their condition will be presented.

Collaborative Longitudinal Evaluation of Keratoconus (CLEK)

The overall goals of the CLEK involved characterizing the visual and corneal changes as well as the quality of life of patients with keratoconus. The study also intended to describe the progression of changes over time. To do so, patients were first examined when recruited (1995-2006), then every year afterwards. During each patient's visit, the CLEK clinicians evaluated the following aspects: vision-related quality of life, case history, time wearing contact lenses, visual acuity, corneal signs, corneal scarring, topography, treatment method, and the parameters of their adjustment to gas-permeable lenses allowing apical clearance. Finally, the cornea and the lens/cornea relationship through fluorescein were photographed. This accumulation of data on case development was covered in several different publications that are summarized in the following section.

Vision-related factors

The National Eye Institute visual function questionnaire (NEI-VFQ) was filled out at the annual follow-up exam by 1,166 patients. This questionnaire contains 51 different scales. A binocular visual acuity lower than 6/12 is associated with a low quality of life on all scales except those about general health and eye pain. Keratometric measurements higher than 52 diopters (D.) are correlated with poor results on the scales pertaining to mental health (loss of control and concern caused by vision), work (difficulty in close-up vision tasks at work), automobile driving (difficulty driving during the day and at night), dependency (need for others and necessity of staying at home) and eye pain (pain and discomfort around the eyes).[1, 2] According to another study, there is no association between the subjective reduction in comfort when wearing gas-permeable lenses and the increase in the severity of keratoconus measured by the steepest keratometric curve or by the first contact lens allowing apical clearance.[3]

In a multi-centre study of this scope, it was important to ensure repeatability of the observations and consistency among the various centers. Moreover, in a sample frequently wearing contact lenses, like the patients with keratoconus, the feasibility of assessing the contact lens adjustment based on apical clearance using a photograph and direct observation by the clinician was possible and useful.[4,5] The lens/cornea relationship at the corneal apex of the gas-permeable contact lenses observed in the presence of fluorescein was assessed and categorized into four qualitative divisions: significant touch, touch, clearance and significant clearance. The repeatability and validity between the evaluations of this type done by the clinicians during visits and by the clinicians using photographs are excellent.[6] The repeatability of the visual acuity measurements of keratoconus is comparable to normal subjects.[7] On the other hand, the repeatability of refractions of subjects with keratoconus is lower than normal subjects. Over-refraction with contact lenses in place increases repeatability, but it remains lower than over-refraction done with normal subjects.[8] Only 36% of subjective refractions of subjects with keratoconus yielded repeatable spherical measurements at +/- 0.50 diopters (D.) compared to 90% for normal subjects.[9] It is important to account for this clinical variation in refraction when choosing the correction to apply to keratoconic patients.

On the other hand, the repeatability of the three topography instruments used in axial and tangential mode in this study, the EyeSys Model II, the Dicon CT 200

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and the Keratron Corneal Analyser, is also reduced in the presence of a keratoconic irregular cornea.[10] The repeatability of the topographies of keratoconic corneas using the Tomey 1 (TMS-1) instrument is also lower than that of normal subjects.[11]

General characteristics of the CLEK study subjects

The longitudinal observation of 1,209 patients helped describe the frequency of characteristics of these patients. The average age at recruitment was 39.3 +/- 10.9 years of age with moderate to severe keratoconus. Ninety-five percent of the patients had a keratometry of at least 45 diopters (D.). Sixty-five percent were bilateral wearers of gas-permeable lenses and 73% of all wearers found them comfortable despite apical touch in 88% of adjustments. The best corrected visual acuity in each eye was 6/12 or better in 78% of cases. Fifty-three percent had corneal scarring in at least one eye. Corneal opacification is associated with corneal staining, number of years worn, the presence of a Fleischer ring and steeper corneas.[12] In the case history, 13.5% reported the presence of keratoconus in their family and 53% a personal history of atopy.[13] The only difference between the men and women following statistical analysis was in the presence of Vogt striae and monocular and binocular high-contrast visual acuity. The women had fewer Vogt striae and had lower visual acuity. In general, women tend to report symptoms more easily.[14] A reduction in high- or low-contrast visual acuity was seen in the presence of corneal scarring.[12, 15]

Factors associated with the presence of corneal scarring

The evaluation of the presence of corneal scarring by the clinicians matches the evaluation done by external observers using photographs. Taking photos helped ensure that all of the study's clinicians had the same evaluation criteria.[16] The risk of having corneal scarring is positively associated with the following factors: degree of corneal curvature, age, the presence of corneal staining or a Fleischer ring, wearing lenses.[17] In the latter case, contact lens wearers have twice the risk of developing corneal scars. It is important to eliminate apical touch of contact lenses to reduce the risk of developing scars.[18] Figures 1 and 2 show the topography and biomicroscopic aspect of a cornea from a keratoconic patient with scarring.

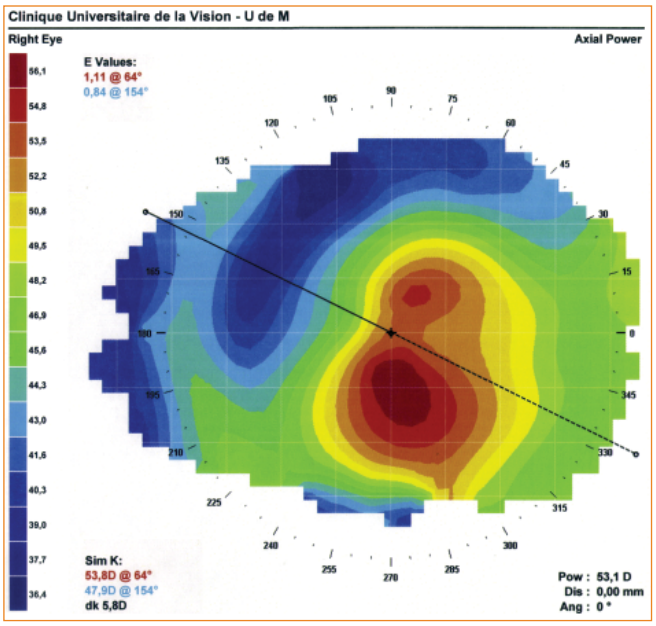

Figure 1. Medmont topography of a steeped cornea with keratoconus

The increase in the corneal curve is related to the presence of Vogt striae, the Fleischer ring and corneal scarring. These biomicroscopically visible signs are more common, namely about 60% of eyes, in corneas with keratoconus that is considered severe.[19] The asymmetry between the two eyes of keratoconic patients in terms of corneal curvature, visual acuity, ametropia and corneal scarring is statistically significant when compared to that of myopic subjects who wear contact lenses. There is also an association between unilateral eye rubbing and asymmetry; the rubbed eye being the eye with the greatest curvature.[20] Patients with a more severe form of keratoconus are also more asymmetric in this disease.[21]

Several studies have long observed in the corneal stroma the presence of proteinases, enzymes that can denature the proteins making up the cornea. For marking one of these types of enzymes, esterases, the CLEK study adapted a technique of transferring conjunctival cells onto a membrane using impression cytology. This technique is preferable to taking a biopsy over the entire conjunctival thickness. The specimens from keratoconic subjects had higher levels of esterases than those in

Figure 2. Corneal scarring in the same patient as Figure 1

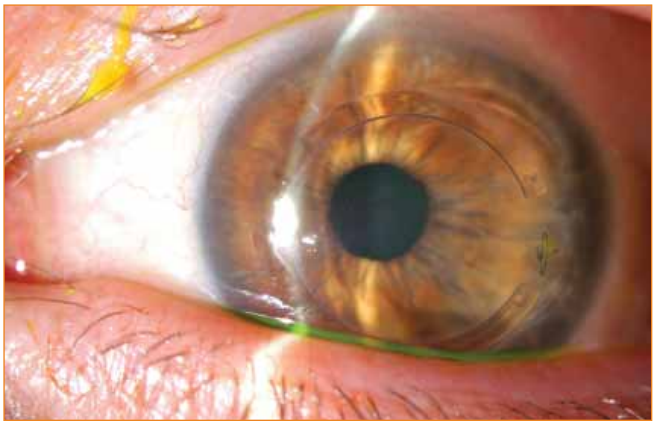

Figure 3. Keratoconic cornea with Intacs intra-corneal rings

the control group, suggesting the presence of enzymes capable of destroying the corneal tissue.[22]

On the other hand, contrary to previous publications indicating the possibility that keratoconus is caused by collagen anomalies, keratoconus is not associated with an increased risk of having a connective tissue disease.[13] Moreover, the CLEK study did not investigate the pathophysiology of keratoconus. Increased knowledge of the mechanisms inducing keratoconus is needed to better define appropriate treatments based on severity.

Treatment

The first therapeutic approach involves adjusting rigid contact lenses in order to correct the irregular surface of the cornea and improve vision, when the patient's visual acuity is no longer satisfactory using glasses. There are several types of gas-permeable lenses specialized for adjusting keratoconic corneas. Describing these lenses is outside the scope of this article. However, one new development in the field deserves to be mentioned. It is now possible to manufacture customized soft contact lenses. The lenses take into account aberrations of the eye and corneal topography to achieve optimal correction.[23]

If the patient becomes intolerant to gas-permeable lenses or if declining visual acuity is no longer sufficient for meeting the patient's visual needs, "piggyback" lenses are sometimes prescribed. This wearing method combines a soft carrier lens, applied directly onto the cornea, with a small gas-permeable lens that can move around on the soft lens. This latter lens is sometimes manufactured so as to facilitate centering of the semi-rigid lens. As such, the set combines the comfort of soft lenses with the visual acuity brought about by gas-permeable lenses.

Most often after failure of contact lenses, penetrating keratoplasty (PK) called full-thickness corneal transplant is done. This procedure involves substituting the central portion of the cornea of a keratoconus patient with a healthy cornea from a deceased donor. The frequency of keratoconus and the waiting time varies depending on the countries concerned. In Canada, a retrospective study over 10 years shows that keratoconus is the second indication for penetrating keratoplasty with 10% of cases following pseudophakic bullous keratopathy.24 The waiting time in Quebec is at least two years. In Brazil, keratoconus comes after ulcers and pseudophakic bullous keratopathy.[25] In China, keratoconus is the fourth indication for PK[26] just like in the United States.[27] The average time elapsed between keratoconus diagnosis and the transplant is 8.5 years in England.[28] According to a study done in a London tertiary reference centre, 21.6% of keratoconic patients will need a corneal transplant.[29] The best visual acuity lower than 6/12, astigmatism greater than 10 D., a corneal curvature greater than 55 D., an age of 30 years or less and a diagnosis 5 years ago or less increase the chance of needing a corneal transplant.[30] However, the significant cost connected with penetrating keratoplasty and the aberrations caused by the resulting irregular astigmatism is motivating surgeons to consider this approach as a last resort. Other techniques are now developed to prevent or delay penetrating transplant.

One of those techniques, more delicate to perform

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but less likely to result in significant astigmatism, involving replacing only part of the cornea, is lamellar keratoplasty. Microkeratome-assisted deep lamellar keratoplasty involves creating a corneal lamella in the host cornea and introducing the donor stroma and then replacing the lamella. This technique enables keeping the host endothelium. Some suggest injecting an air bubble into the anterior chamber to minimize the risks of perforation before the formation of the lamella.[31] In some studies, refractive surgery was done six months after the stromal transplant using an excimer laser to correct the patient's ametropia. The laser treatment is performed using the photorefractive keratoplasty (PRK) or LASIK (Laser in situ keratomileusis) method, in other words by removing the lamella to expose the stroma to the laser. The results seem promising, but follow-ups were only done over a period of 7 to 22 months. In a study on 9 eyes of 7 keratoconus subjects, corneal thickness went from 432.7 to 578 µm on average after surgery. The corrected visual acuity of all patients improved by an average of five lines.[32] Another study on 50 eyes of 50 patients measured a best-corrected visual acuity (BCVA) of 6/12 in 88% of patients one year after this procedure.[33] PRK or LASIK was not done in this latter study. It should be noted that the use of refractive surgery techniques with incisions like LASIK is far from being unanimously approved among practitioners. In fact, these techniques are contra-indicated for patients with keratoconus, because they increase corneal instability. Other promising approaches discussed further on are currently being tested.

One experimental therapeutic approach involves colonizing a polymer with keratocytes to then hope to replace the cornea of patients affected by the new biocompatible material.[34] This latter technique has been used successfully on four different patients whose corneas had completely opacified.[35]

One last surgical option involves inserting rings into the mid-periphery of the corneal stroma of patients whose corneas are free of scarring. These half-moon-shaped intra-corneal rings attempt to flatten the ocular surface. This reversible technique[36] is especially applicable to patients with mild keratoconus who no longer tolerate contact lenses and have poor visual acuity with glasses. Based on topography, location and size of the cone, surgeons implant one or two segments horizontally in lower or higher position.[37] The segments must be placed asymmetrically in relation to the centre of the cornea for best results.[38] Implantation in more advanced cases required adjustment of a contact lens because the correction made by the intra-corneal rings was limited.[39] Two types of rings are marketed: Intacs and Ferrara. Intra-corneal rings can correct between –1.00 D and –3.00 D and up to 1.00 D astigmatism. The results from several studies that used them have recently been published.[38, 40-45] This procedure can also be performed on patients with marginal pellucid degeneration.[46] Over a 12-month period, the spherical equivalent of 36 eyes went from–7.29 D to –4.80 D.[47] Following insertion of segments in patients with keratoconus waiting for a corneal implant, best-corrected visual acuity went on average from 20/50 to 20/32.37 This limited procedure only mitigates the visual problems of keratoconic patients. Figure 3 shows a cornea with intra-corneal rings.

Some surgeons perform photorefractive keratectomies (PRKs) or therapeutic photo-keratectomies (TPKs) on keratoconus. Even though keratoconus is a contra-indication for incisive refractive surgery, a Russian team attempted to correct the myopia and astigmatism of subjects with keratoconus using an excimer laser treatment.[48] Since keratoconus is an anomaly that starts in the anterior stroma and gradually progresses to the posterior stroma, the team claims to be able to halt the progression of the cone in mild keratoconus cases with PRK. This highly controversial treatment reportedly slows the progress in nearly 91% of cases over a follow-up period of 3.5 years.[48, 49] Another team from California performed the same procedure on keratoconus subjects with similar results.[50, 51] Long-term follow-up on these patients will better assess the relevance and actual effectiveness of this treatment, because the risk that treated keratoconus will progress further is present. While waiting, TPK can be used to remove apical opacity causing intolerance to contact lenses without correcting the ametropia.[52]

One new approach involves inserting an intra-ocular lens to correct myopia in subjects with stable keratoconus. The residual astigmatism is corrected by making a relaxing incision parallel to the limbus[53] or keratoplasty with intra-corneal rings.[54] Toric intra-ocular lenses can

also be inserted into the anterior chamber.[55] No large-scale results are currently available for evaluating this technique.

With the aim of slowing the progress of keratoconus, it is possible to alter the cornea's resistance to deformations. The cornea's rigidity can be increased by modifying the interweaving of the collagen fibres. The method used involves incising the epithelium at the center of the cornea to apply drops of riboflavin (vitamin B2). The cornea is then exposed to ultraviolet A (UVA) radiation for a 30-minute period. This procedure was previously tested on rabbits to confirm its safety.[56] UVA radiation is toxic for the endothelium of corneas that are thinner than 400 µm.[57] Riboflavin alone is not toxic for the endothelium.[58] However, apoptosis of keratocytes is observed on an anterior depth of 50 µm.[59] The first study on humans involved 23 eyes of 22 different patients. The follow-up length varied between 3 months and 4 years. No treated keratoconus advanced. The keratometry dropped by 2.01 D and ametropia by 1.14 D. in the case of 16 eyes. However, no improvement in visual acuity was observed.[56] Further studies are needed to set the markers for this technique.

Some teams have successfully inserted, using a virus or plasmids, new genes into the corneal keratocytes of rabbits or rats in vivo.[60-64] Other carriers have successfully been used in vitro in humans.[65, 66] For example, the effectiveness of the transduction of the gene implanted by cationic liposomes into human keratocytes is 40.5%.[66] The hope for this treatment method lies in the possibility of identifying the defective genes to then modify them.

Conclusion

The CLEK is an excellent descriptive study of the changes in and characteristics of keratoconus. However, this study has several weaknesses. Since this study was started in 1995, the contact lenses do not use current designs. Moreover, the study does not look at posterior keratoconus, since the topography instruments used could not analyse the posterior curvature of the cornea. The characteristics described in this study help with better assessing the chance of progression and with guiding treatment. The many treatment options clearly show the heterogeneity of keratoconus. Keratoconus is the end result of several different processes affecting the cornea the same way that several processes affect the optic nerve in glaucoma. A better understanding of the pathophysiological mechanisms is needed for categorizing and defining the sub-groups affected by this disease in order to manage the development of it and select the best treatment option. At present, treatment selection is based on case severity without considering the process causing the disease.

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The COETF received a total of 25 applications for awards in 2008. Of those 25 applications, 20 were granted at least partial funding for projects or research. In most cases, applicants are not given full funding as the total amount of funding requested greatly exceeds the money available for granting. Awards funding is based on the Trust Fund's interest earned over the previous year.

All award recipients are required to submit an interim and final report upon completion. In an effort to recognize some of the projects and research being done by COETF award recipients, the Awards Committee intends to publish project reports in the *Canadian Journal of Optometry* so that our members can learn more about where COETF funding goes as well as highlighting exciting optometric research.

APPLICATIONS SUMMARY

Total WATERLOO School of Optometry APPLICATIONS	16	$ 82,730.00
Total WATERLOO School of Optometry AWARDS	13	$ 23,200.00
Total MONTRÉAL École d'Optométrie APPLICATIONS	5	$ 21,695.00
Total MONTRÉAL École d'Optométrie AWARDS	4	$ 7,000.00
Total VISION INSTITUTE Practitioner APPLICATIONS	2	$ 6,800.00
Total VISION INSTITUTE Practitioner AWARDS	1	$ 1,800.00
Total INDEPENDENT Practitioner APPLICATIONS	2	$ 41,200.00
Total INDEPENDENT Practitioner AWARDS	2	$ 5,000.00
Total APPLICATIONS for 2008	25	$ 152,425.00
Total AWARDS for 2008	20	$ 37,000.00
Total APPLICATIONS (since inception)		**$5,575,149.78**
Total AWARDS		**$1,648,063.00**

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Quick Facts:
The Canadian Optometric Education Trust Fund (COETF) was created in 1976 by the members of the Canadian Association of Optometrists to assist programs in research, education and human resources development in the vision and eye care field in Canada.

Through its annual program of Awards, the COETF has supported (i) faculty development, (ii) research and/or specialized education programs carried out by graduate students, and (iii) investigative projects conducted by undergraduate students enrolled or on staff at Canada's Schools of Optometry.

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CANADIAN ASSOCIATION OF OPTOMETRY STUDENTS (Project Supervisor: Dr. B. Robinson): "The Canadian Handbook of Optometry"

CHEN, J., FENG, Y., SIMPSON, T.: "Corneal neural adaptation and symptoms of ocular dryness"
(*** PhD PROGRAM *** / Supervisor Dr. T Simpson)

DALTON, K.: "Diurnal variation in tear film osmoliality" (*** Master's Degree PROGRAM *** / Supervisor Dr. L Jones)

DUENCH, S.: "Conjunctival blood flow and haemoglobin oxygen saturation in conjunctival vessels"
(*** PhD PROGRAM *** / Supervisor Dr. T Simpson)

KEIR, NJ.: "Customised LASIK: A procedure to optomise visual performance following refractive surgery
(Based on current ORE study #12000)" (*** PhD PROGRAM *** / Supervisors Drs. L Jones & T Simpson)

LEAT, S.J., HRYNCHAK, P., IRVING, E..: "Prevalence of binocular vision anomalies in the elderly"

LORENTZ, H.: "Model blink cell apparatus that can be utilized to simulate in vivo lipid deposition"
(*** PhD PROGRAM *** / Supervisor Dr. L Jones)

LORENTZ, N.: "Universal design and the built environment: visual performance factors in universal design"
(*** Master's Degree PROGRAM *** / Supervisor Dr. G Strong)

LUCK, S.: "Cellular changes during lenticular accommodation" (*** Master's Degree PROGRAM *** / Supervisor Dr. V Choh)

LUENSMANN, D.: "To locate proteins of the aqueous humour on the surface and inside intraocular lenses"
(*** PhD PROGRAM *** / Supervisor Dr. L Jones)

MENZIES, K.: "Wettability of silicone hydrogel contact lenses and the impact of care regimens"
(*** Master's Degree PROGRAM *** / Supervisor Dr. L Jones)

PARENT, C. (Optometry Learning Resource Centre):
"Continuance of 'Library Information Resources & Services for Canadian Optometrists' program"

SRINIVASAN, S.: "Expression of soluble and membrane bound muc16 in dry eye postmenopausal women" (*** PhD PROGRAM ***)

ÉCOLE D'OPTOMÉTRIE, UNIVERSITÉ DE MONTRÉAL

CARCENAC, G., KERGOAT, H.: "Assessing Vision in Vulnerable Seniors" (*** PhD PROGRAM *** / Supervisor Dr JH. Kergoat)

HAKIM, A.: "Study on Satisfaction and Vision Quality Following Implantation of a
Rezoom Intra-ocular Lens" (*** Master's Degree PROGRAM *** / Supervisor Dr N.M. Quesnel)

HANSSENS, J-M.: "Study on Motion Sickness and Postural Reaction as Part of a Visual-Perceptual Adaptation to Optical Distortion"
(*** PhD PROGRAM *** / Supervisor Dr J. Faubert)

LAGACE-NADON, S.: "The Effects of Aging on the Perception of Motion"
(*** Master's Degree PROGRAM *** / Supervisor Dr J. Faubert)

VISION INSTITUTE

CHIARELLI, C.: "Visagraph III Eye Movement Recording"

INDEPENDENT PRACTITIONER

BROWNELL, K.: "Relating movement, reading and saccadic disruptions in children"
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MACULAR PSEUDOHOLE OR MACULAR LAMELLAR HOLE *(from page 138)*

Fundus biomicroscopy revealed an epiretinal membrane and a red, oval lesion that was 1/4DD vertically and 1/3DD horizontally in the macula of the right eye. The contraction of the membrane resulted in a slight distortion of the retinal vessels surrounding the epiretinal membrane. The left eye fundus was unremarkable. The differential diagnosis to be considered in this case is between a pseduohole and a lamellar macular hole.

Traditionally, the diagnosis of a macular pseudohole (MPH) is based on the appearance of an oval or round image of the macula in eyes which have epiretinal membrane with retinal folds.[1] Macular lamellar hole (MLH) is diagnosed by the presence of a round or petal-shaped, well-delineated red lesion.[1] In the case of a pseudohole, the fovea is intact and covered by the epiretinal membrane everywhere except at the centre of the macula, giving the false appearance of a hole. On the other hand, a lamellar hole is a partial-thickness macular hole that is associated with the global adherence of an epiretinal membrane.[2] Although they may appear similar on a fundus examination, their pathogenesis is completely different. Macular pseudohole is due to the centripetal contraction of the epiretinal membrane, whereas lamellar hole typically represents an abortive process of macular hole formation or the partial opening of a macular cyst.[1]

In this case, a definitive diagnosis cannot be made solely on the fundus appearance. Firstly, it is difficult to determine whether the well-circumscribed profile of the macula is due to MPH or MLH. Secondly, an epiretinal membrane may be present in both conditions.[1] Since both the shape of the macula and the presence of an epiretinal membrane are indicative of either of the conditions, we must look elsewhere for a definitive diagnosis.

Functional tests are not particularly helpful in this differential diagnosis. In an observational case series by Haochine et al[1], both conditions result in similar visual impairment (median visual acuity was 6/12 in both cases). Also, both conditions may result in a negative Watzke-Allen test and no metamorphosia. In our case, the Amsler test was negative and the doubled image of the grid lines was likely due to the irregular astigmatism induced by the cortical cataract in both eyes. Optical coherence tomography (OCT) is indicated to differentiate between MPH and MLH.

In a macular pseudohole, the central foveolar thickness is normal to slightly thick with increase in thickness in the parafoveal area. The neurosensory retina is intact. It has a steepened contour and a smaller than normal foveal pit diameter. In a lamellar hole, the central foveal thickness is always thinner than normal with slightly increased parafoveal thickness. In this case there is an actual break in retinal layers up to the foveal photoreceptors. The edges of a lamellar hole are split horizontally.[2]

The OCT images (Humphrey-Zeiss OCT model I) of the right eye seen in Figure 2 show the epiretinal membrane as evidenced by the presence of a highly reflective band at the vitreo-retinal interface. There is an increased retinal thickness in the macular region of the patient's right eye which may be due to the epiretinal membrane or it might be attributable to a macular cyst seen in the horizontal scan image. The epiretinal membrane appears to be globally attached to the retina, which is a common finding in the case of lamellar holes.[2]

In addition to the epiretinal membrane, the OCT images of the patient's right eye show characteristics of a typical lamellar macular hole. There is an irregular foveal contour, a break in the inner fovea, a lateral splitting of retina at the level between outer plexiform layer and the outer nuclear layer, and an absence of a full thickness foveal defect with an intact foveal photoreceptor layer as shown in Figure 2. The left eye image seen in Figure 3 shows a typical foveal impression without apparent interruption of the retinal architecture.

This patient has a typical lamellar macular hole surrounded by an epiretinal membrane. Fortunately, lamellar holes rarely progress to a full-thickness macular holes. It is postulated that the epiretinal membrane proliferates before vitreous separation, and hence prevents foveal dehiscence and the formation of a full-thickness hole.[3] Another postulation suggests that the highly reflective band anterior to the retina represents a thickened posterior hyaloid that serves to stabilize the retinal architecture.[3]

Current evidence suggests caution in treating a lamellar macular hole with vitrectomy and gas tamponade, because it does not produce a promising outcome.[3] Epiretinal membranes with a pseudohole have good outcomes with vitrectomy and membrane stripping with the majority of eyes improving in visual acuity by 2 lines.[4] This highlights why it is important to confirm the actual diagnosis in this presentation should visual acuity decline to the point where surgery is being considered.

The prognosis for vision is good in this case. The patient was advised to continue annual eye examinations.

PSEUDO-TROU MACULAIRE OU TROU LAMELLAIRE MACULAIRE *(de la page 139)*

La biomicroscopie du fond de l'œil révèle une membrane épirétinienne et une lésion ovale et rouge de 1/4DD à la verticale et 1/3DD à l'horizontale dans la macula de l'œil droit. La contraction de la membrane a entraîné une légère distorsion des vaisseaux rétiniens entourant la membrane épirétinienne. On ne remarque rien dans le fond de l'œil gauche. Le diagnostic différentiel à considérer dans ce cas se situe entre un pseudo-trou et un trou lamellaire maculaire.

D'habitude, un diagnostic de pseudo-trou maculaire (PTM) est basé sur l'apparence d'une image ronde ou ovale de la macula dans les yeux dont la membrane épirétinienne présente des plis rétiniens[1]. Le trou lamellaire maculaire (TLM) est diagnostiqué par la présence d'une lésion rouge bien délimitée ronde ou en forme de pétale1. Dans le cas d'un pseudo-trou, la fovea est intacte et entièrement couverte par la membrane épirétinienne sauf au centre de la macula, donnant ainsi une fausse apparence de trou. Par contre, un trou lamellaire est un trou maculaire modérément profond associé à l'adhérence totale de la membrane épéritinienne[2]. Même s'ils peuvent sembler similaires lors d'un examen du fond de l'œil, leur pathogénèse est complètement différente. Le pseudo-trou maculaire est dû à la contraction centripète de la membrane épirétinienne, tandis que le trou lamellaire présente généralement un processus avorté de la formation du trou maculaire ou l'ouverture partielle d'un kyste maculaire[1].

Dans le cas présent, on ne peut donner un diagnostic définitif en se fiant seulement sur l'apparence du fond de l'œil. Tout d'abord, il est difficile de déterminer si le profil bien circonscrit de la macula est dû à un PTM ou à un TLM. Ensuite, une membrane épirétinienne peut être présente dans les deux maladies[1]. Compte tenu que la forme de la macula et la présence d'une membrane épirétinienne sont présentes dans les deux maladies, nous devons chercher ailleurs pour poser un diagnostic définitif.

Les tests fonctionnels ne sont pas particulièrement utiles pour ce diagnostic différentiel. Dans une série de cas observés par Haochine et autres[1], les deux affections produisent une insuffisance visuelle similaire (l'acuité visuelle médiane dans les deux cas était de 6/12). Également, les deux conditions peuvent aboutir à un test Watzke-Allen négatif et aucune métamorphose. Dans le cas qui nous concerne, le test Amsler était négatif et l'image doublée des lignes de la grille était probablement due à un astigmatisme irrégulier produit par la cataracte corticale dans les deux yeux. La tomographie en cohérence optique (TCO) est indiquée pour différencier le PTM du TLM.

Dans un pseudo-trou maculaire, l'épaisseur au centre de la fovea va de normale à légèrement épaisse avec augmentation dans la zone parafovéale. La rétine neurosensorielle est intacte. Elle présente un contour prononcé et un diamètre plus petit de la fossette fovéale normal. Dans un trou lamellaire, l'épaisseur au centre de la fovea est toujours plus mince que la normale mais l'épaisseur s'accroît légèrement en périphérie. Dans le cas qui nous concerne, il y a une solution de continuité dans les couches rétiniennes jusqu'aux photorécepteurs fovéaux. Les bords du trou lamellaire sont fendus horizontalement[2].

Les images de la TCO (*modèle I OCT Humphrey-Zeiss*) de l'œil droit dans le tableau 2 révèlent la membrane épirétinienne comme en témoigne la présence d'une bande hautement réfléchissante sur l'interface vitréorétinienne. L'augmentation de l'épaisseur rétinienne dans la région maculaire de l'œil droit peut être causée par la membrane épirétinienne ou elle peut être attribuée au kyste maculaire visible sur l'image du balayage horizontal. La membrane épirétinienne semble être entièrement attachée à la rétine, ce qui est habituel dans le cas de trous lamellaires[2].

En plus de la membrane épirétinienne, les images de

la TCO de l'œil droit présentent les caractéristiques d'un trou maculaire lamellaire typique. On constate un contour fovéal irrégulier, une fissure dans la fovea interne, une fente latérale de la rétine entre la couche plexiforme extérieure et la couche nucléaire extérieure, et l'absence de défaut fovéal sur toute la profondeur, la couche de photorécepteurs fovéaux étant intacte comme l'indique le tableau 2. L'image de l'œil gauche au tableau 3 présente une impression fovéale typique sans interruption apparente de l'architecture rétinienne.

Le patient présente un trou lamellaire maculaire typique entouré d'une membrane épirétinienne. Heureusement, les trous lamellaires progressent rarement vers des trous maculaires de profondeur complète. On pense que la membrane épirétinienne a proliféré avant la séparation vitreuse, prévenant ainsi la déhiscence fovéale et la formation d'un trou sur toute la profondeur3. Une autre hypothèse serait que la bande très réfléchissante antérieure à la rétine représente une membrane hyaloïde postérieure épaissie qui a stabilisé l'architecture rétinienne[3].

Les éléments actuels nous indiquent d'être prudents dans le traitement d'un trou maculaire lamellaire par vitrectomie et bulle gazeuse car les résultats ne sont pas prometteurs[3]. Les membranes épirétiniennes avec un pseudo-trou présentent de meilleurs résultats lorsqu'il y a vitrectomie et pelage de la membrane, améliorant l'acuité visuelle de deux lignes[4] dans la majorité des cas. Cela met en évidence l'importance de confirmer le diagnostic actuel de cette présentation si l'acuité visuelle baisse au point où la chirurgie doit être envisagée.

Le pronostic est bon dans ce cas. On a conseillé au patient de continuer ses examens de la vue annuels.

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