Worldwide survey highlights current cataract surgery practice trends

Sean Henahan
in Paris

CLINICAL practice patterns of European and US cataract surgeons are becoming more similar, although some interesting and important differences continue to distinguish the two groups, according to David Leaming MD

Dr Leaming will present a comparison study of practice styles of European and American surgeons at the XXII Congress of the ESCRS in Paris. He will compare the responses of 964 US surgeons surveyed by mail with those of 500 European surgeons who responded to an on-site survey conducted at last year’s ESCRS Congress in Munich.

The surveys showed similar practice patterns in terms of the use of anesthesia. Topical anesthesia was the favourite among 58% of the US respondents and 47% of the EU respondents, with retrobulbar second in US (24%) and peribulbar in EU (24%). US surgeons appeared more likely to use intracameral lidocaine than their European colleagues. Surgeons from both regions are more likely to use temporal, clear corneal, and sutureless incisions. A majority of both groups said they used Alcon phaco machines. Both groups also expressed a preference for acrylic as an optic material. Following the US trend where virtually all cataract surgeries are performed on an outpatient basis, 76% of cataract procedures in Europe now reportedly take place in the outpatient setting.

“While there is much more variety in practice styles in Europe between individual countries, both societies as a whole seem to following a similar path,” he said.

Regional differences among European respondents were particularly notable regarding use of different intraocular lense (IOLs). While 80% of US respondents said they perform no ECCE, only 37% of the Europeans said they did not perform the procedure at all. While respondents from Finland, Belgium, the UK and Switzerland rarely if ever perform ECCE, the procedure is still used in countries as diverse as Greece, Hungary, Italy, and Spain.

Dr Leaming began surveying US eye surgeons in 1984, and has done so annually ever since. He presented the results of a 2003 survey of nearly 1000 ASCRS members at the annual meeting of the ASCRS earlier this year. The results subsequently appeared in the April 2004 issue of the Journal of Cataract and Refractive Surgery.

The survey respondents came from all regions in the US and ranged in age from 25 to more than 60 years old. The majority of respondents, 59%, were members of group practices. Some 32% of respondents were of Hispanic origin, compared to 12% in the total, while 26% of those of Hispanic origin were women. The survey respondents’ average annual practice volume ranged from 2.7 million procedures, well above the 2002 estimate of 2.4 million procedures.

A look back at previous survey years shows that cataract surgery volume decreased slightly in 1997 and 1998, but rebounded in 2000. This apparently co-incides with the rapid growth of interest in LASIK and subsequent flattening of that market during the same period, he noted.

Ninety-seven percent of ASCRS respondents performed phacoemulsification in their cataract patients, a number that was echoed by European respondents. Phaco volume varied widely with 27% of US surgeons and 19% of European surgeons performing 16-25 phaco procedures per month. Twelve percent of US surgeons performed 25-40 procedures per month and 17% and 22% of US and European surgeons, respectively, performing more than 50 procedures.

Bimanual phaco appears to be catching on in the US, with 16.5% reporting they were using the technique. Another 20% said they planned to switch to bimanual phaco within 12 months. The European survey also revealed a high level of interest in bimanual small incision surgery.

The US respondents expressed enthusiasm for new machines, with 44% saying the AMO Sovereign-Whitestar held the greatest promise for bimanual small incision surgery. Another 28% expressed support for the Alcon Legacy and 18% for the Alcon Infinity. Aqualase system. European respondents similarly showed strong interest in the Alcon Infinity and the AMO Sovereign machines.

In patients with bilateral cataract, almost half of US respondents said they perform cataract surgery in the second eye within three weeks. Most said they perform the second surgery within a month of the first. Less than one percent of surgeons said they performed bilateral same-day surgery. In contrast, 12% of the European surgeons reported that they did perform bilateral, same-day surgery on occasion.

The surveys also yielded interesting clues regarding IOL choice. Some 70% of those surveyed in the US felt that acrylic is the best optic material. A majority, 87%, said the Alcon Acrysof was their preferred acrylic lens, followed by the AMO Senzor, preferred by 12%. Among Europeans, the Acrysof and Senor IOLs were the most popular. The AMO SI-40 was the silicone lens most preferred by surgeons, followed by the Soflens161U.AMO Clariflex, and the recently approved AMO Tecnis lens.

Europeans favoured the AMO SI-40, the Coeeon, Clariflex and Tecnis lenses.

Staar’s Collamer lens was the hydrogel most mentioned by US respondents, accounting for 70% of the total. In 15% cited the B&L Hydroview and another 15% choosing the Ciba/Novartis Memory Lens. The Hydroview and Memory Lens were most cited by the Europeans surveyed.

There was little agreement among the respondents when they were asked which IOL material appeared most promising for small incision surgery. There were advocates for foldable acrylics, silicone foldables, hydrogels and even injectable lens materials.

Most US surgeons (93%) are not implanting the use of unappraised phakic IOLs. A few pioneers are implanting a few phakic IOLs each month. However, the survey did show a high degree of interest in phakic IOLs among respondents and the number of implants is likely to jump after approval.

Both the AMO Verisyse and the Staar ICL are close to approval in the US.

Perhaps waiting for more clinical study results, the US surgeons reported only moderate interest in multifocal IOLs, toric IOLs, and thin optic diffractive IOLs. They showed considerably more enthusiasm for aspheric IOLs and accommodating IOLs.

Interestingly, the European respondents expressed a higher degree of interest in multifocal IOLs than their US colleagues.

Contact applanation continues to be the primary method chosen for A-scans, preferred by 60% in the US survey. Another 29% use partial coherence interferometry and the remainder use the non-contact immersion method. However, partial coherence interferometry gained a few percent points from the year before while con-
PRK trumps LASIK in long-term outcomes for hyperopia

Bainbridge M, Khodadad S, Mannis MJ, Haynes PB.

PHOTOREFRACTIVE keratectomy (PRK) may produce better long-term refractive stability than LASIK in hyperopic patients, data from two new British studies suggest.

David O’Brart, MD conducted two studies of refractive stability in hyperopic patients, one involving LASIK, the other PRK. He will present the results at the XXII annual ESCRS Congress in Paris. Both studies were conducted in the Department of Ophthalmology, St. Thomas’ Hospital, London, UK.

In the LASIK study, 26 patients (40 eyes) with hyperopia underwent LASIK, using a Moria LSK. One microkeratome to cut a flap with a nasal hinge and a Summit SVS Apex Plus Excimer laser with an optical zone of 6.5 mm and a blend zone of 1.5 mm. Only simple hyperopia was treated with no astigmatic correction. All eyes had a follow-up of five years.

The mean age at time of surgery was 51 years, ranging from 32 to 64 years. The preoperative mean spherical equivalent was +3.8 D. The mean attempted LASIK correction was +3.4 D. At five years post-op, the mean spherical equivalent (SE) was +0.84D (range -0.375 to +3.375D) with 62.5% of eyes within one dioptre of the intended correction.

For corrections up to +3.0D, 76% of eyes were within one dioptre of the intended correction, compared to only 40% of eyes for corrections between +4.0D to +6.0D. A statistically significant reduction of refractive correction was found between six months and five years postoperatively, with 60% of eyes 24 eyes experiencing an increase in hyperopia of +0.5 D or more and 33% of eyes showing an increase of +1.0 D or more.

Uncorrected visual acuity was improved in 95% of eyes at five years and was better than 20/40 in 85% of eyes and 20/25 or better in 70%. Best spectacle corrected visual acuity was unchanged or improved in 85%.

Best-corrected acuity was reduced by one line in 15% of eyes at five years’ follow-up. No eyes lost more than one line of BSCVA. Clinically insignificant interface debris was present in two eyes. One eye had persistent microstriae. No eyes developed corneal ectasia.

Dr. O’Brart concluded that LASIK appears to be a safe and moderately effective procedure for the correction of low degrees of hyperopia, cautioning, “There is, however, an increase in hyperopia over five years of follow-up, which is more than would be expected with the physiological increase with age and long-term stability of hyperopic LASIK refractive corrections are therefore uncertain.”

In the second study, Dr. O’Brart carried out a long-term (mean 7.5 years), prospective follow-up study to evaluate refractive stability and safety of excimer laser hyperopic PRK (H-PRK).

Twenty-one patients of an original cohort of 43 who participated in one of the first clinical trials to investigate the efficacy of H-PRK, underwent detailed clinical assessment at a mean follow-up of 91 months (7.5 years). Patients underwent H-PRK with a Summit Technology Apex Plus Excimer laser (6.50 mm optical zone, 1.5 mm blend zone). The mean pre-operative SE was +4.7 dioptres, ranging from +2D to +7.50D.

Patients were allocated to one of four treatment groups based on their preoperative refraction: +1.5, +3.0, +4.5 or +6.0D. Patients in each group received an identical treatment and therefore emmetropia was not the primary aim, Dr. O’Brart noted.

With long-term follow-up, the refractive correction remained stable with a mean difference in spherical equivalent refraction between one year and 7.5 years of +0.28D. At 7.5 years, the mean SE was +0.83D. Sixty-seven percent of eyes undergoing corrections of mild-to-moderate hyperopia of +1.5 and +3.0D were within one dioptre of the predicted correction. Predictability was poorer with +4.5 and +6.0D corrections with only 40% of eyes within one dioptre of the expected refraction.

A majority of eyes, 87.5%, achieved an improvement in unaided near and distance acuity. Best spectacle corrected visual acuity was unchanged or improved from pre-operative values in 62.5% of eyes. Two eyes lost two lines of best-corrected acuity, which in one case was attributable to cataract formation over the follow-up period.

No eyes showed any disturbance of central corneal transparency. A peripheral ring of haze, 6.5 mm in diameter, appeared in most eyes at one month post-operatively. Its intensity was maximal at six months and then diminished with time. In 325%, of eyes, remnants of the haze ring were still evident at 7.5 years. Sub-epithelial iron rings measuring 6.5 mm in diameter were evident in 70% of eyes.

Dr. O’Brart concluded that in H-PRK, refractive stability achieved at one year was maintained up to 7.5 years with no evidence of hyperopic shift, diurnal fluctuation or late regression.

Peripheral corneal haze decreased with time but was still evident in a number of eyes at the last follow-up visit.

Dr. O’Brart’s study reflects the longest follow-up data available for hyperopic LASIK and for hyperopic PRK in the UK, and possibly Europe.

“I also have a very large database of LASIK for hyperopia, which is showing excellent results, especially with large optical zone treatments using flying spot lasers,” Dr. O’Brart told EuroTimes.

Dr. O’Brart told EuroTimes that he was strongly opposed to the use of phakic IOLs for hyperopic patients, because of their shallow anterior chambers. He allowed that there was some role in the presbyopic patient for multifocal, or even some of the accommodative IOLs.

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Two new studies suggest long term results better for PRK than LASIK in treatment of hyperopia

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While writing this editorial, during the last few days of August, the sun is desperately trying to shine through after one of the worst Augusts we have had in this little island in Northern Europe. Many of you who are reading this will be doing so in Paris during the Annual Congress of the ECSRS. This promises to be our largest Congress ever as over three thousand delegates from eighty-seven countries have pre-registered at the time of writing this editorial.

Over a thousand abstracts were submitted and I am pleased to say that we have accepted four hundred free papers and five hundred posters for presentation during the meeting. The Board of the ECSRS and the members of the Programme Committee worked diligently to ensure that the Scientific Programme for this meeting would be interesting and challenging for all the attendees.

The Residents Programme has been re-organised and re-named as the Young Ophthalmologist Programme as we found that many of the attendees were not residents! This programme will include presentations on patient preparation, pre-operative complications and refractive techniques. There will be a guest lecture by Robert Stegmann on “Trying to Widen Latitudes—Thirty Years On”.

On Saturday we have our Clinical Research Symposium discussing such varied topics as night vision after refractive surgery, non-penetrating corneal transplantation and accommodating IOLs. The first ECSRS Workshop in Visual Optics has been organised by Marie-Jose Tassignon and Ioannis Pallikaris and takes place on Sunday, September 19th with presentations on Aberrations in the Living Human Eye, the Quest for Super-normal Vision and Advances in Imaging Equipment and Software. In addition to the Symposia and Free Paper sessions we have eighty-six instructional courses and over forty surgical skills training courses that are almost fully booked.

This year we have one hundred and sixty-seven companies exhibiting during the Congress and I am sure you will all take time between lectures to visit the booths and support our colleagues in the trade, all of whom we would like to thank for their continued support and sponsorship for this meeting.

EuroTimes has been working together with the industry to organise ten Satellite Educational Programmes outside the time of the main scientific programme. This gives industry the independence they require while making sure there are no major educational clashes with our core programme.

I hope that by the time you open your copy of EuroTimes the summer has managed to reurse itself and that those who have managed to “get away” will be having an enjoyable warm and stimulating meeting in Paris. If you cannot be with us this year mark your calendar for Lisbon 2005.

**WELCOME TO PARIS 2004**

**Clive Peckar**

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**ESCRS announces online European survey of keratoctasia following refractive surgery**

The Clinical Cornea Committee of the ECSRS is conducting an epidemiological survey on corneal ectasia following corneal excimer laser surgery. The survey’s aim is to discover the true incidence of the complication and the risk factors associated with it.

“In the past years we have had reports of ectasia in the United States but we don’t have any idea of the epidemiology in Europe. So the goal is to ask the maximum number of European surgeons to participate and to try to have a more accurate evaluation of this very severe complication,” explained Joseph Colin MD, who will be coordinating the survey.

The Committee is inviting surgeons who have seen cases of ectasia to visit the survey website where they will be asked to anonymously provide details about the patients and the surgery they underwent.

The information requested will include the age and sex of the patient and their preoperative refraction together with other preoperative details such as corneal thickness and topography. Participants will also be asked to provide surgical details such as the optical zone, the depth of ablation, model of laser, model of laser and microkeratome used and the intended flap thickness. In addition they will be asked to provide postoperative findings such as corneal topography, keratometry, corneal thickness, refraction, and visual acuity.

Dr Colin said that the study may help identify the risk factors for ectasia and thereby enable surgeons to avoid the complication in the future. The results of the survey will appear in the Journal of Cataract and Refractive Surgery and EuroTimes.

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**So the goal is to ask the maximum number of European surgeons to participate and to try to have a more accurate evaluation of this very severe complication.”**

**Ectasia Study Website**

[www.escrs.org/Corneal_Ectasia.asp](http://www.escrs.org/Corneal_Ectasia.asp)
**Customised Ablation**

**Should it be called Wavefront Guided?**

There have been ongoing advances on customised corneal laser recontouring, resulting in less induced optical aberration. The main sources for the continuing improvement in refractive and functional results are the same ones I wrote about in this column in November 2002 – “refined nomograms, better contour profiles, enlarged optical and blend zones, corneal tissue sparing and more accurate tracking and centration – and not wavefront”. Wavefront technology has been the most useful for diagnostic purposes-not treatment. Improvements in the application of wavefront technology have increased our diagnostic capabilities and have allowed us to better understand and evaluate the optical effects of our laser treatments. Aberrometers are evolving with higher dynamic ranges and higher spatial resolution. Aberrometry measurements need to differentiate contributions from various parts of the eye. Simultaneous measurement of corneal curvatures and optical aberrations is advantageous. Diagnostic instrumentation to analyse how optical aberrations are processed centrally in each patient is not yet available. This type of analysis will be necessary to gauge neural summation and neuroplasticity – which varies from patient to patient but is known to be markedly reduced after childhood.

Paul-Rolf Preussner M.D. of Mainz, Germany recently quantified the limits of the wavefront approach for correction of optical errors of the human eye. He compared optical path length difference (wavefronts) and refractive errors (angular deviation of rays). He demonstrated that “wavefront errors determined preoperatively cannot be used for optimisation of the optical quality if the surgical procedure covers a range of many (5-10) dioptres in defocusing power. Approximation of the wavefront error by a Zernike polynomial series induces additional errors”. Dr Preussner concluded that “the poorer the visual function of a patient’s eye, the less it can benefit from corrections calculated using the wavefront approach.”

Wavefront technology was developed for devices of much higher accuracy than the human eye. This technology has been very useful for adjustments of the optical surface by telescopes by adaptive circuits. Wavefront technology can be used to analyse the optics of the eye, but it cannot be “used to maintain the physiology of the cornea” and should not be the only guide for laser ablation.
Incision size decreases, presbyopic surgery upsurge in French survey

Richard Gold MD
Dermot McGrath
in Paris

A MARKED decrease in the size of the incision for cataract surgery and a significant rise in the number of refractive procedures for presbyopia were among the more notable findings of the latest survey of French ophthalmologists which Richard Gold MD will be presenting at this year’s annual congress of the ESCR.

In the seventh of his annual sur-
vays of French practices in oph-
thalmic surgery, Dr. Gold collected 1,303 responses to an anonymous questionnaire sent out to 3,700 French ophthalmologists. The response rate of 22.5% was a marked improvement on last year’s return of 19%, which was the lowest recorded since 1999.

“It was encouraging to see the response rate rise again after last year’s disappointing figure,” remarked Dr. Gold, who said that this year’s survey provided some interesting findings.

“For cataract surgery, I would particularly highlight the decrease of the incision size and the increasing use of injectors as significant, while on the refractive side, we are seeing a sharp increase in presbyopia surgery and an increasing use of refractive IOLs,” he said.

As well as providing valuable insights into trends and developments in clinical practice, Dr. Gold’s questionnaire serves as a useful barometer of the current well being of French ophthalmology in general.

The proportion of French ophthalmologists with a low volume of cataract surgery continued to decline, with 13% performing fewer than 100 cataract surgeries per year, down from 22% in 1998.

The proportion performing between 100 and 199 procedures annually increased slightly from 27% to 28%, while the proportion performing 200 to 300 per year remained stable at 23%. At the high volume end of the spectrum, those treating 300 to 500 cases per year increased to 22% compared to 15% for 1998, while the proportion treating 500 or more rose from 10% to almost 12%.

Phacoemulsification is now almost universally established as standard in cataract surgery in France, according to Dr. Gold, former Head of the Department of Ophthalmology at the Cognacq-Jay Hospital, Paris, and now in private practice at Le Raincy, France. In 1998, 95% of surgeons used phacoemulsification for most of their cataract extractions, compared to over 98% in 2003.

Most respondents (92%) used clear corneal incisions. The size of the incisions used by French ophthalmic surgeons for cataract surgery has continued to decrease over the past few years.

In 1998, 28% of respondents said they used incisions greater than 4.0 mm compared to only 3% in 2003, while those using incisions 3.2 mm or smaller took a major leap to 49% from 34% in 2002. Almost 4% of surgeons now routinely use incisions of less than 2.8 mm compared to less than 1% when the survey started.

The use of injectors for cataract surgery has shown a dramatic increase in recent years, noted Dr. Gold, with 78% of respondents using injectors in 2003 compared to 61% in 2002 and just 21% in 1998.

Diovisc continues to be the most popular viscoelastic in France, used by 58.5% of respondents, followed by Viscoat (15%) and the remainder evenly divided between Ophthain, Amvisc, Healon, and Healon GV.

OUTPATIENT SURGERY YET TO DOMINATE

Ambulatory cataract surgery was practiced by just over half of respondents (53%). Some 18% of respondents kept patients in hospital overnight, just over one quarter of surgeons kept patients in for two nights, with just 3% keeping them in for more than two nights. In terms of anasthesia, Dr. Gold found a slight trend towards greater use of topical anaesthesia, up to 17% for 2003 compared to 6% for 1999.

However, the French preference for peribulbar remains strong (56%) even though its use has declined from its peak of 77% in 2000. More than 13% of respondents used topical plus intracameral lidocaine, another 10% said they used sub-Tenons anaesthesia, while five percent preferred retrobulbar. Only one percent used general anaesthesia.

For implants, foldable acrylics continue to gain in popularity, with a slight preference for hydrophobic acrylic IOLs (66%) compared to hydrophilic (60%, up from 49% in 2002).

The years of Dr. Gold’s survey charts the steady decline in use of PMMA IOLs, down from 57% in 1998 to only 13% in 2003. Silicone implants are also on the wane, from 31% in 1998 to just nine percent in 2003.

As with cataract surgery, only a small proportion of respondents performed refractive surgery at a high volume. Only 3% of respondents performed more than 300 refractive procedures per year, 12% performed 100 to 199 per year, and the vast majority (78%) performed less than 100 procedures per year. Among the respondents who practiced refractive surgery, all treated myopia, 90% treated astigmatism, and 76% treated hyperopia.

The biggest leap, however, was for presbyopia procedures, up to 19% compared to eight percent in 2002 and just three percent in 1998 when the survey first started.

The French preference for using PRK to treat myopia was again confirmed, with 83% of respondents expressing a preference for that technique. LASIK however is slowly but surely making inroads into French practices, with 71% now using it for that indication, compared to just 31% back in 1998.

The use of LASIK for the treatment of astigmatism also remained steady. The procedure was used by two-thirds (66%) of respondents for that indication in 2003, compared to 62% in 2002. PRK use continues to decline for treating astigmatism, down from 60% in 2002 to 36% last year, and considerably less than its 75% high in 1998.

Clear lensectomy is the third most widely practiced procedure for myopia, its use remaining stable between 1998 and 2003 at 33%. The Artisan anterior chamber IOL continues to grow in popularity with French ophthalmologists, with 14% implanting the device in 2003 compared to less than one percent in 1998.

In contrast with its use in myopia, LASIK continues to outstrip PRK in the treatment of
hyperopia in France. More than half (57%) of the respondents used LASIK for treating hyperopia, while only 36% used PRK.

Phakic IOLs also gained in popularity as a treatment for hyperopia, with 12% of respondents implanting them in 2003, compared to only 4.4% in 1998 and nine percent in 2001.

For the treatment of presbyopia, nine percent of respondents expressed a preference for using IOLTECH’s Newlife implant, the first time it has ever featured in the survey. LASIK (6.5%) and PRELEX (6.2%) were the next preferred techniques for treating presbyopia.

While the use of topographic systems has become almost universally accepted in France, with over 99% of respondents now using topography in their refractive procedures, the figure has declined slightly from last year’s 99% figure. Dr Gold surmised that this was probably due to the increasing popularity of implants in refractive surgery, requiring less systematic use of topography.

Orbscan remains the most popular system for corneal mapping, used by almost one third (30%) of respondents ahead of EyeSys (21%) and TMS (22%).

In microkeratome use, the Hanatome (57%) is still the most popular followed by the Maria Carrizo-Barralqu (35%).

In terms of laser choice, two brand names, Technolas (47%) and Nidek (30%), continue to dominate the French market.

grown steadily over the years (26% in 1998 compared to 41% in 2003), reflecting the fact that ophthalmology was less and less the preserve of male physicians.

In terms of job satisfaction among ophthalmologists, when asked whether they would have become physicians if they had known what it would be like, 27% said they would not, a figure that has remained steady over the past seven years. One in twenty respondents (5%) said that they would choose another profession other than ophthalmology if they had the opportunity to go back and change their career path, up just slightly from 3.9% in 1998.

A new question this year concerned the amount of holidays taken by French ophthalmologists. The majority (61%) took between 30-60 days annual leave every year, one quarter (26%) took between 15-30 days, and only 3.5% took less than 15 days.

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Bimanual microincisional surgery affords benefits in diverse situations

Howard Fine
Cheryl Guttmann
in Paris

BIMANUAL microincision phacoemulsification instrumentation and techniques are proving valuable in the management of a variety of challenging situations, according to I. Howard Fine MD.

Dr. Fine will demonstrate how a bimanual microincision approach enabled completion of cases complicated by zonular weakness or dialysis and recurrent microph- phaema in a presentation at the XXII Congress of the ESCRS.

He will also discuss using bimanual microincision phaco as a tool for optimising the safety of lens removal in eyes undergoing refractive lens exchange.

“Bimanual microincision surgery offers improved fluidics along with enhanced chamber stability, and it greatly minimises incisional outflow so that it approaches the ideal scenario of operating in a completely closed system,” said Dr. Fine, clinical associate professor of ophthalmology, Casey Eye Institute, Oregon Health Sciences University, Eugene.

In any eye where there is zonular damage, capsulorhexis creation can be performed more easily, safely and accurately using the microincision capsulorhexis forceps designed for placement through a 1.2-mm incision.

Since no viscoelastic leaves the eye, there are no fluctuations in the anterior chamber. Consequently, the capsular opening can be made very precisely without distorting the lens and causing stress on the remaining zonular fibres.

“There is a learning curve for this technique because the surgeon has to use the fingers instead of the wrist. However, the fact is the fingers are much more skilled, and I have been amazed at how precise and round the capsulorhexis is when made using this approach,” Dr. Fine said.

Two microincision capsulorhexis forceps are available on the market—the Fine-Hoffman for- ceps (Microsurgical Technology) and the Fine-Ilieda forceps (ASICO).

Cataract removal has also been facilitated in eyes with zonular dialysis using bimanual microincision techniques and technology, Dr. Fine said.

He illustrated that point with two cases, the first featuring a subluxated, posteriorly prolapsed lens associated with torn zonules in the anterior chamber. In that eye, Dr. Fine first used viscoelastic to elevate the lens and capsule into the anterior chamber by placing the Viscoat cannula through one microincision and an irrigating handpiece through the other. He then slightly constricted the pupil and performed bimanual phacoemulsification to remove the cataract.

Next, he performed vitrectomy using a microincision high-speed vitrector, and introduced a foldable IOL through a 2.5 mm incision created between the two bimanual microincisions. To implant the lens, he placed the optic inside the pupil and sutured them to the iris while leaving the optic in the anterior chamber. He then gently nudged the optic behind the pupil.

In another case of a patient who had suffered traumatic zonular dialysis, the versatility and control afforded by bimanual microincision phaco enabled Dr. Fine to pull the anterior chamber contents toward, versus away from, the area of dialysis in order to minimise stress on the residual zonular fibres. In that case, the zonular dialysis was located to the left and would become stressed when working temporally with his right hand holding the phaco tip and the aspirator held in his left. To resolve that situation, Dr. Fine simply switched instruments between his two hands.

“As in all cases of zonular weakness, I began by performing a capsulorhexis using a microincision technique, and then in this case I placed a capsular tension ring and hydro-expressed the lens out of the bag. However, as I began phaco and as soon as the aspiration came on, all of the intracocular contents would be pulled toward the phaco tip in my right hand. Faced with the potential for unzipping the attached zonules that were located toward the left, I instead used the phaco tip in my left hand and aspirator in my right so the intracocular contents would move in the direction of the zonular dialysis and allow them to remain relaxed,” he explained.

he could identify its sites of origin and use wet field cautery to achieve haemostasis.

Dr. Fine also cited the efficiency and safety of bimanual microincision surgery for refractive lens exchange in eyes with a very soft nucleus. In that situation, his technique involves creation of two microincisions that are almost at a right angle to each other—the left microincision is made almost horizontally and the microincision throughout the entire procedure further enhances safety since it minimises the risk of traumatising the vitreous face and causing cystoid macular oedema.

“While it may seem counterintuitive, it is actually more difficult to perform coaxial phacoemulsification on a soft nucleus compared with a 2 or 3+ nuclear sclerotic cataract because the soft nucleus cannot be chopped and does not behave predictably,” Dr. Fine said.
Improved outcomes achieved with enhanced custom ablation platform

Dermot McGrath

in Paris

WAVE-FRONT-GUIDED CUSTOMISATION USING THE NEW ENHANCED ALGORITHM FOR THE LADARVISION® CUSTOMCORNEA® PLATFORHM (Alcon Laboratories) offers better refractive outcomes and more effective treatment of higher-order aberrations compared to conventional LASIK treatments, according to Francesco Carones MD, Milan, Italy.

Dr Carones expressed satisfaction at the clinical performance of CustomCornea and said that the system scored highly in terms of safety, predictability and efficacy.

“The results thus far have been highly satisfactory, both in terms of the quantity and quality of vision. The advanced algorithm results in enhanced contrast sensitivity and a reduction of both residual and induced higher-order aberrations,” said Dr Carones, who will present his study results at the XXII Congress of the ESCRS.

His study involved 72 consecutive virgin eyes of 43 patients who underwent LASIK (Hanatome and BD 4000 microkeratomes) and wavefront-guided custom ablation at the Carones Ophthalmology Centre, Milan, Italy. The patients had a mean spherical equivalent (SE) refractive error of -4.26 D (range: -10.30 D to -8.13 D) and a mean astigmatism of 0.97 D (range: 0 D to -3.75 D), using the commercial LADARVision platform. Follow-up was three months.

Uncorrected and best spectacle-corrected visual acuity manifest refractive spherical equivalent error, wavefront measurement of high order aberrations and subjective visual symptoms report were the parameters used to assess the treatment.

In terms of predictability, Dr Carones said that the mean MRSE was -0.18 D. Furthermore, MRSE was within ± 0.50 D and ± 1.00 D of attempted correction in 78% and 96% of eyes, respectively. In addition, a majority (78%) achieved 20/20 or better uncorrected visual acuity.

Moreover, 89% of eyes recorded 20/16 BSCVA postoperatively and 36% were 20/12.5, compared to a preoperative figure of 34% and 7% respectively. Mean higher-order aberrations root mean square was 0.34 ± 0.010 microns before and 0.35 ± 0.09 microns after surgery. Higher-order aberrations were either reduced or unchanged from preoperative status in 60% of eyes. Subjectively, the patients reported no visual symptoms or vision quality complaints.

“Looking at the overall data, it is clear that patients treated with CustomCornea have better quality of vision than might be expected from eyes treated with conventional LASIK.”

Dr Carones

The CustomCornea platform, the first customised ablation system to be granted FDA approval in the United States, is comprised of two principal components: the LADARVision 4000 excimer laser and the LADARWave® wavefront-measuring device.

“The new optimised algorithm proved itself to be very effective in consistently reducing and not inducing higher-order aberrations.”

The LADARWave offers registration capabilities that ensure accurate wavefront ablation placement on the patient’s “line of sight,” and a wavefront measurement map precisely matched to the patient’s eye. It also includes an automatic “logging” system that eliminates patient accommodation to ensure an accurate reading.

The LADARVision system uses a closed-loop eyetracker to allow the system to lock on to the eye and remain locked for the duration of the surgery. The laser then delivers a Gaussian flying small spot, 0.8 mm beam and sophisticated ablation algorithms to produce smooth corneal surfaces.

Dr Carones said that the software enhancement has been optimised for higher-order aberrations correction and offered patients a better quality and quantity of vision. It provides for an extended range of correction with defocus from +1.00 to - 8.00 D, cylinder up to -6.00 D and monovision and offset from +0.75 to -2.50 D.

The improved accuracy of the CustomCornea Planning Software results in 20% less tissue removal during ablation and also allows for customisation of personal nomograms for defocus and astigmatism.

“Although the clinical results showed a slight SE under-correction, the new optimised algorithm proved itself to be very effective in consistently reducing and not inducing higher-order aberrations. Clinically, this feature translates into significant BSCVA gain and an extremely satisfactory subjective quality of vision,” noted Dr Carones.

The U.S. Food & Drug Administration (FDA) recently approved an expansion of the treatment range for CustomCornea for treatment of myopia up to -8.0 D (up from -7.0 D) and astigmatism up to -4.0 D (up from -0.5 D).

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Delegation of tasks envisaged to reduce burden on French ophthalmologists

Demot McGrath
in Paris

THE taxing question of the place of optometry in the French health system, the evolving role and responsibilities of ophthalmologists in the face of recent legislative changes and the need for urgent measures to tackle the uneven geographical distribution of medical specialists throughout the country are among some of the more pressing issues facing French ophthalmologists.

While optometrists are an accepted feature of the ophthalmic landscape in England, the United States, Canada and some other European countries, the picture in France is more complicated, Thierry Bour MD.

He noted that recent changes to the nomenclature of France's social security system means that optometrists have been singled out to play an enlarged role in ophthalmic practice. The idea is to allow optometrists to carry out routine technical tasks such as refraction, IOP visual field and other non-contact measurements, under the supervision of the ophthalmologist, who remains medically and legally responsible for such procedures.

The decision has been welcomed by the French Union of Ophthalmologists (SNOF), who say that this new designation confirms and gives legal expression to what was already the reality on the ground.

With an estimated 2,000 optometrists working in private practice or employed by the public health service, France has one of the highest concentrations of optometrists in the world. SNOF has long argued against the practice of optometry in France on the grounds that it needlessly complicates the already well-defined relationship between opticians, ophthalmists and optometrists, which they deem adequate to meet the challenge of attending to the nation's ocular health.

They also believe that optometry as practised along Anglo-Saxon/American lines blurs the distinction between medical and commercial services and would ultimately lead to a diminution in the standard of ocular care for the French population. SNOF estimates that the facility to delegate certain tasks to optometrists will ultimately result in a 30% gain of working time for ophthalmologists, help to reduce waiting lists for ocular examinations in certain areas while maintaining high standards of care for patients in a legally validated and fully insured framework.

"Optometrists will collaborate under the direct control of the ophthalmologist, whether in a public hospital or in private practice. The visual and ocular care of the patient will thus be integrated with a proper guarantee of quality and medical responsibility," said Jean-Luc Steegmueller MD, President of SNOF.

Needless to say, optometrists are up-in-arms at the way they have been effectively frozen out of the new arrangements. From their perspective, the delegation of tasks to optometrists is more a question of maintaining the privileged status quo than ensuring a better and more efficient standard of eye care for the population.

In an open letter to the French Minister of Health, the Association of French Optometrists (AOF), which represents 1,100 optometrists in France, called the government plan "unrealistic" and claimed that only their profession had the skills, training and means to help tackle the national deficit of proper eye care.

Their protests, however, have fallen on deaf ears, ensuring that the qualifications obtained by an estimated 2,000 optometrists in France currently remain unrecognised by the authorities.

In terms of the future needs of the population, Dr Bour, who serves on the SNOF commission for rules and regulations, said that some government reports had painted an overly pessimistic view of the demographic situation regarding ophthalmology in France. He noted that official figures predicted a decrease of 4.5% in the overall number of physicians by 2015, rising to 20% in 2020. The same figures also predicted a drop of up to 30% in the number of ophthalmologists by 2020.

According to SNOF's own demographic projections, however, the decrease will be more of the order of about 5% for all physicians in 2020, with a corresponding stabilisation in the number of specialists. At the same time, the number of interns will increase to help make up any shortfall from ophthalmologists retiring.

"Looking at the overall data, 80 ophthalmologists are being trained every year, and in the next five years there will be less ophthalmologists retiring than the official figures allowed for," he believes that the numbers of ophthalmologists will rise slightly until 2007 and remain stable until about 2012 or 2013.

The consequences of a drop in the numbers after that date can be avoided if the right decisions are taken in the meantime. We ultimately hope to maintain the figures close to what we actually have at the moment, that is about 5,400 ophthalmologists," he said.

He added that the really critical issue to be faced in the future will be the increasing demands placed on the entire spectrum of eye care professions by an ageing population. About 17% of the French population was over 65 years-of-age in 2003; a figure expected to rise to 29% by 2030.

"While stabilisation of the number of ophthalmologists is perfectly possible, the need for ocular care is also going to rise by 2020 by between 30% to 50% according to some estimates," said Dr Bour. "While the transfer of certain competencies to ophthalmologists will go some way towards meeting the anticipated upsurge in demand for eye care, SNOF has also proposed doubling the number of interns in ophthalmology over the next five years and increasing recruitment of accredited foreign ophthalmologists to help plug any eventual gaps in the system.

Dr Steegmulder states that French ophthalmologists were ready to play their part in spreading the word and enticing qualified ophthalmologists from abroad.

"We are ready to welcome them and to assist them in integrating in France in the regions where the need for doctors specialises in ophthalmology are most critical."

The issue of the uneven geographical distribution of ophthalmologists throughout France also needs urgent remedial action, according to SNOF.

A statistical breakdown of ophthalmologists in France underlines the true extent of the problem: at one end of the scale, Ile-de-France incorporating Paris and surrounding regions has an average of 13.3 ophthalmologists per 100,000 inhabitants compared, at the other end of the scale, to areas such as Nord-Pas-de-Calais, with just 5.7 ophthalmologists per 100,000.

The upshot is that many people in northern France have to wait three months or more to see an ophthalmologist and the scene of long queues forming outside ophthalmic practices have become commonplace in certain areas.

While offering financial incentives in the form of reduced charges and preferential rates for ophthalmologists to set up practices in underserved areas has been proposed as one solution, SNOF believes that establishing fully-equipped ophthalmic centres which can function for limited periods to meet demand, especially for cataract surgery, offers a more realistic way to reduce the impact of the imbalance of medical specialists in certain regions.

Dr Bour concluded that there was every reason to be optimistic that ophthalmology could rise to the challenge of ensuring the best possible ocular care for the French population in the years to come.

"There is a broad consensus among the relevant government ministries, the Academy of Medicine and ophthalmologists on the direction the profession should take in the future. We need more and better-equipped centres of ophthalmology, multidisciplinary in nature, comprised of medical and paramedical personnel, including ophthalmologists, orthoptists and administrative staff. We also recognise the need to make the best use of ophthalmologists' work-time, by stabilising the number of ophthalmologists in France, increasing the number of orthoptists and improving coordination with opticians," he said.

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Most IOL explants preventable

Three-piece acrylic lenses; and 14% involving one-piece acrylic lenses with haptics. Surgeons also reported cases involving hydrogel lenses, collagen lenses and multifocal IOLs.

Complications varied depending on the type of foldable IOL. The overall pattern indicated that incorrect lens power and lens dislocation and decentration accounted for a majority of cases.

Respondents reported incorrect lens power; glare/visual aberrations and lens dislocation/ decentration as the leading reasons for removal of the three most commonly explanted IOLs reported in the survey: three-piece silicone IOLs, three-piece acrylic IOLs, and one-piece acrylic IOLs. Glare and optical aberrations were also cited as reasons for explanting those types of lenses, as were lenses damaged during insertion, retinal problems, and endophthalmitis.

The situation was a bit different for hydrophilic acrylic, or hydrogel, IOLs. Postoperative lens calcification and opacification accounted for 80% of one-piece hydrogel explants and 72% of three-piece hydrogel explants. Glare and optical aberrations accounted for slightly more than 10% of three-piece hydrogel explants.

Lenses dislocation and decentration were also the most common complication associated with one-piece silicone IOLs. Multifocal silicone IOLs presented a different picture. The leading reason for explantation of these lenses was problems with glare and optical aberrations, accounting for 40% of cases. Incorrect lens power was cited in 30% of cases, and dislocation and decentration in another 15% of cases.

A look back at six years worth of survey data suggests a pattern in reasons for foldable IOL explantations. For example, while the percentage of three-piece silicone IOLs explanted increased from 50% to 30% between 1998 and 2003, the percentage of cases associated with dislocation and decentration increased from 20% to 34%. Complications associated with glare and optical aberrations remained the same, at about 12%.

Dislocation and decentration cases also increased with three-piece acrylic IOLs, up from 13% to 27%. The number of cases associated with glare decreased from 42% to 22% in the same period, while the number of cases associated with incorrect lens power dropped.

Lenses dislocation and decentration still accounts for a majority of plate silicone IOL explants, having increased from 50% in 1998 to 61% in 2003. The number of lenses removed because of damage during insertion had dropped to below five percent. However, incorrect lens power still accounts for 20% of cases.

Incorrect lens power also accounts for 30% of multifocal silicone IOL explants. However, the number of cases associated with glare and optical aberrations has declined from a high of 70% to 40% in 2003.

The data from this survey strongly suggest that the majority of complications involving foldable IOLs are avoidable, Dr Mamalis emphasised.

Good surgical technique, including a continuous curvilinear capsulorhexis with capsular bag fixation of the IOL is essential. Careful folding and insertion of the IOL can also go a long way to preventing problems later on, he said.

The high percentage of IOLs explanted simply because the wrong power of lens was used highlights the importance of accurate biometry. There is a need for new technologies for axial length measurements and IOL calculations.

“New highly accurate methods of measuring axial length include partial coherence interferometry. In addition, non-contact A-scans, measurements of axial length in the hands of a highly skilled techni- cian will also provide more accurate measurements of the axial length. Highly accurate axial length measurements coupled with modern IOL formulas will help improve the accuracy of IOL power calculations,” he told EuroTimes.

Careful patient selection is also vital. This is especially important in patients in whom multifocal IOL placement is being contemplated, he stressed.

There are other issues that are beyond the surgeons’ control that would also make a difference, notably improved quality in manufacturing. Surgeons need to be particularly vigilant when implanting IOLs of new materials.
Surveys reveal global refractive surgery preferences

Sean Henahan
in Paris

EUROPEAN refractive surgeons differ from their US colleagues in terms of the equipment they own and the way they use it, recent surveys indicate. In one survey, David Leaming MD evaluated the refractive preferences of 964 members of the American Society of Cataract and Refractive Surgeons. He compared the results of that survey with a subsequent survey of 500 European surgeons. He will discuss the results at this year’s ESCRS Congress in Paris.

The comparison showed some similarities between the US and European surgeons. For example, 50% of the membership of both organisations reported that they do perform LASIK, and 40% from each group report that they also perform refractive lens exchange. However, LASIK is much more common in Europe, performed by 31% of surgeons in that region, compared with only 13% percent of those in the US.

European surgeons were also far more likely to implant phakic IOLs. Some 31% of European surgeons said they are already doing this procedure, while only seven percent of US surgeons have implanted those types of lenses. This is not particularly surprising, since the lenses have been available for some years in Europe, but not in the US. The ASCRS survey did show a high level of interest among members in phakic IOLs.

These findings were underscored by responses to hypothetical clinical cases. For a patient with –3.0 D of myopia, 86% of US respondents said they would recommend LASIK, compared with only 14% of European doctors. There was closer agreement on a patient with –7.0 D, with 87% of US doctors and 67% of European advising LASIK. However, for a patient with –12.0 D, 52% of the European surgeons would recommend implanting phakic IOLs, compared with 33% of their US colleagues. Differences were also apparent on the hyperopic side. While 60% of US surgeons were comfortable suggesting LASIK for a +1.0 D hyperope, 60% of their European counterparts would advise the patient not to have surgery. An even higher percentage, 69%, of US respondents said they would advise a +3.0 D hyperope to have LASIK, as would 41% of European surgeons. For a patient with +3.0 D hyperopia, 44% of the US surgeons would opt for refractive lens exchange, compared with 34% of European surgeons. However, 34% of surgeons from both groups would advise the patient not to have surgery.

The choice of equipment appeared to reflect market conditions. While 70% of US surgeons say they mostly use the Visx platform, the Bausch and Lomb Technolas is the leader in Europe, cited by 41% of those surveyed. The Alcon Laservision platform was the second preference in both regions.

The Bausch and Lomb Hansatome was the microkeratome most used, cited by 52% of both groups, Moria microkeratomes were the second most used in both regions. The Amadeus microkeratome appeared to gain support among European surgeons.

The Intralase femtosecond laser keratome is catching on in America, with 52% of respondents saying they would like to use that instrument. Interest in the Intralase is beginning to appear in Europe, with 18% of respondents reporting they would like to use it.

Some 45% of US respondents and 76% of European respondents reported that they use wavefront analysis in their practices. The Visx WavePrint system was the reported favorite among US surgeons, while the European surgeons cited the KeraSys.

The Alcon Laser System was the second most cited in both regions.

The results of this survey indicate that the wavefront has a significant rise in the numbers using it both in Europe and US, but I can’t tell if this is just market pressure vs. real enthusiasm since I know a number of centers that recommend it only to those with significant higher-order aberrations,” he told EuroTimes.

Dr. Leaming’s findings correlate with those of another survey conducted in 2003 by Kerry Solomon MD. He evaluated the refractive surgery preferences of ophthalmologists around the world in a survey of 1174 eye surgeons from North and South America, Europe Oceania, Asia, and Africa. He reported those findings in the July 2004 issue of the Journal of Cataract and Refractive Surgeons.

The survey respondents expected to see increases in volume of conventional LASIK, PRK and LASER: A minority, 12%, said they expected to see an increase in custom ablation very though they were not performing custom ablation but were planning to do so in the future. Some 21% said they would consider performing custom ablation once it was approved in their area.

Dr. Solomon’s study revealed an intriguing link between refractive surgery practices and surgeons who themselves underwent refractive surgery. Nearly four percent of those surveyed had undergone refractive surgery, including LASIK. LASER, clear lens extraction and phakic IOL implantation. A majority of those who underwent refractive surgery also performed refractive surgery in their practices. However, surgeons who had not undergone surgery were significantly less likely to perform refractive surgery in their practices.

Dr. Solomon’s survey showed similar findings to Dr. Leaming’s in terms of excimer laser and microkeratome choices in the US and Europe. On a global scale, the Visx excimer was the most commonly used, accounting for 56% of the total. The Bausch & Lomb Technolas® 217 was the leading laser among Asian respondents and the Nidek was the most cited by surgeons in Latin America.

The global survey showed a wide variety in pricing for LASIK procedures. US practices charged the most, with the majority charging at least $1500 per eye. Latin American prices were the lowest, at $500 per eye. Europe was in the middle price range, with most surgeons saying they charged between $1000 and $1500 per eye. A majority of respondents worldwide said they expected prices to remain about the same in the near future.

More than 90% of the respondent said they routinely performed preoperative corneal topography. A similar percentage said they measured scotopic pupil size, with an increasing number reporting that they were utilizing infrared pupillometry. The number of surgeons saying they employed preoperative wavefront measurements more than double from the year before, to 23%.

Dr. Solomon’s study indicated that bilateral surgery has become the norm around the world. In particular, European and Latin American surgeons are more inclined to perform bilateral procedures than in the past. While most respondents, 78%, reported that they changed microkeratome blades with each new patient, half of European surgeons reported that changed the microkeratome blade for each operated eye.

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HRT linked with regression post-LASIK

Daithi Ó hAnluain
in Paris

A NEW study from Ireland suggests a link between refractive regression following LASIK surgery and hormone replacement therapy.

Ms Maive O’Doherty, lead researcher on the Irish study, conducted a retrospective chart review of all myopic females who underwent LASIK at the Mater Misericordiae private hospital in Dublin who were receiving either hormone replacement treatment (HRT) or using the oral contraceptive pill (OCP). She will present the study at the XXII Annual Congress of the ESCRS in Paris.

There were 176 eyes in the OCP group and 44 eyes in the HRT group, with 81 eyes serving as a control group. The researchers recorded postoperative refraction and visual acuity at one week, three months, six months and one year. They compared the change in refraction and change in visual acuity over a six-month period for patients in the OCP HRT and control groups.

Nearly all eyes (96%) of women taking HRT at the time of LASIK had postoperative visual acuities of 6/12 or better at one-week post-surgery. However, only 81% of the HRT group maintained a visual acuity of 6/12 or better at six months. In contrast, 97% of eyes of patients in the oral contraceptive group achieved 6/12 or better one-week post-op, maintained by 96% at six months.

She told EuroTimes that since HRT may be a factor in determining the risk of regression post-LASIK, ophthalmologists needed to determine a prospective patient’s hormone state. In addition to HRT, doctors must check if the patient is pregnant, has had a hysterectomy or oophorectomy, and whether she is peri- or post-menopausal. All these conditions either lower the success rate of refractive procedures like LASIK and PKR, or could potentially do so.

“A study from our survey, and many others, there are indications that all these conditions can have a negative impact on the outcome of refractive procedures like LASIK and PKR. We know hormones play a role in the structural integrity of the cornea, and since there is no current study on the impact of HRT or OCP on the cornea, we wanted to examine whether a link existed,” she said.

She believes there was no significant risk associated with women taking an oral contraceptive because the hormone dose involved is so small.

A similar study on the impact of hormone and menopausal status following excimer laser photorefractive keratectomy (PKR) in women (Aust. NZ J Ophthalm. 1996;24:215–222) found that post-menopausal women suffered a higher rate of regression postoperatively and women on HRT fared even worse. Meanwhile, another recent study (JCRS: 30: 3 (March 2004): 675–684) examined the link between dry-eye and LASIK regression in a retrospective chart review. The study looked at 565 eyes that were examined two weeks before LASIK with follow-up at one, three, six, and 12 months.

Regression after LASIK was related to chronic dry eye. It occurred in 27% of 45 patients with chronic dry eye and a seven percent of 520 patients who did not have dry eye (P<0.001). Patients with chronic dry eye had significantly worse myopic outcomes than those without chronic dry eye.

The risk for chronic dry eye was significantly associated with female sex, higher attempted refractive correction, greater ablation depth, and the following pre-LASIK variables: increased ocular surface staining; lower tear volume; tear stability; and corneal sensation; and dry-eye symptoms before LASIK. The risk for regression was significantly associated with higher attempted refractive correction, greater ablation depth, and dry-eye symptoms after LASIK.

That study added to the consensus that the risk of refractive regression after LASIK was increased in patients with chronic dry eye. An increasing body of evidence indicates that hormone status plays an important role in refractive outcomes. But whether this is caused by a higher incidence of dry-eye among women with a disrupted hormone system, or whether it is as a direct result of changes in the structure of the cornea, is not yet known.

It is known, however, that hormonal status has an impact on the incidence of dry eye. A recent study by the National Eye Institute found that women with premature ovarian failure (POF) have a greater incidence of dry-eye than age-matched controls (Arch. Ophthalmol. 2004;122:151–156).

In an editorial accompanying the POF study, Stephen C. Plufelder, MD, Professor of Ophthalmology in the Baylor Medical School, wrote: “The increased prevalence of keratoconjunctivitis sicca in patients with POF supports the concept that hormones modulate ocular surface homeostasis.”

But no study has yet demonstrated whether hormone disruption alone is responsible for poorer outcomes through damage to the ocular surface, or whether it is mediated through a higher incidence of dry-eye, though the two appear to be linked.

It is known that hormone disruption affects dry-eye, ocular structure and PRK regression, but HRT is meant to reduce hormone disruption in women post-menopause. One would therefore expect it to minimise ocular surface damage and, logically, refractive regression after LASIK and PRK, he noted. At the same time, some studies have actually demonstrated that post-menopausal women on HRT report higher rates of dry eye than post-menopausal women not on HRT, she pointed out, adding: “The body’s hormones are in a constant state of change. Also, of course, some HRT formulations have no oestrogen content but have higher progesterone levels to prevent uterine cancer, so I guess HRT cannot truly represent pre-menopausal status. It would be interesting to perform a study that examined dry-eye and LASIK outcomes in post-menopausal women taking HRT vs. those that are not.”

Maive O’Doherty maiveodoherty@eircom.net
Aberration-free IOL could provide improved quality of vision regardless of decentration

Louis D Nichamin

A NEW aberration-neutral IOL (L61A0, Bausch & Lomb) may provide cataract patients with better quality of vision than they would achieve with a conventional lens and the effect would not be lost or diminished through decentration, Louis D Nichamin MD told the annual meeting of the American Society of Cataract and Refractive Surgeons.

The criteria used to design this IOL were developed with the recognition that optical performance of conventional IOL optics and current aspheric IOL optics can be adversely affected by numerous factors including decentration and tilt as well as variations in corneal aberrations or pupil diameters that exist within a typical pseudophakic population,” Dr Nichamin explained.

The investigational IOL has pronounced posterior and anterior surfaces and results in no spherical aberration. The lens therefore neither adds to nor subtracts from the natural spherical aberration of the cornea. Conventional spherical IOLs impart positive spherical aberration, adding to that already present in the cornea and degrading image quality.

One currently available aspheric IOL, the Tecnis (AMO), is designed to compensate for the positive spherical aberration of the cornea by mimicking the negative spherical aberration of the natural lens in the young eye. However, the design of that lens is based on an average amount of corneal aberration found in a sample population of 71 eyes, whereas in fact the degree and type of corneal aberration varies considerably throughout the population. Moreover, successful visual results with the Tecnis depend on good centration and pupil size.

On the other hand, as the new aspheric IOL, the L61A0, is aberration-neutral it should optimise the image quality regardless of a patient’s degree of corneal aberration and pupil size. The L61A0 will have less spherical aberration than they would with conventional spherical IOLs. Furthermore, a lens without spherical aberration does not induce higher-order asymmetrical aberrations, like coma and astigmatism, when it is decentred. When you consider that the average lens decentration following cataract surgery is 0.4 mm and decentrations greater than 1.0 mm do occur occasionally, this is an important advantage of the design.

The new lens has a three-piece design with a 6.0 mm silicone optic body and blue PMMA, modified C loop haptics with an overall length of 13.0 mm blue PMMA haptics. The anterior and posterior edges are square for the entire 360-degrees of the optic. The blue PMMA haptics have an angulation of six degrees to bring it into close contact with the posterior capsule and enhance capsular support in order to help mitigate PPO.

The IOL will be available in powers from 0 D through 30 D in 1.0 D steps for powers less than 5.0 D and in 0.5 D steps for powers greater than or equal to 5.0 D. The lens will be implantable with the Mperson planar delivery injector that allows insertion of a lens through an unenlarged phaco incision of 2.8 mm or less.

As a demonstration of the visual outcomes that might be expected from the new lens, Jay Pepose MD presented an initial analysis of the optical performance of the lens performed with sophisticated ray-tracing software and a theoretical model eye.

The study compared the new lens with a conventional IOL (L61U, Bausch & Lomb), the Tecnis IOL and the L61A0 IOL in simulated range of intraocular conditions, said Dr Pepose, Chesterfield, Missouri, US. The analysis showed that the new lens performed better than the conventional IOL under all conditions of centration or pupil size. Furthermore, while the optical performance of the Tecnis IOL was diffraction-limited when perfectly centred, with only modest decentration, it performed less well than the new lens at all spatial frequencies. This difference became more pronounced as pupil size increased. At 0.5 mm to 1.0 mm decentration, the aberration-free IOL had a much higher modulation transfer function at all spatial frequencies in comparison to both of the other lenses. In fact, even when decentred by 1.0 mm it outperformed a perfectly centred conventional IOL.

With perfect centration but as pupil size increased from 3.0 mm to 4.0 mm, the Tecnis lens remained diffraction limited while the performance of the aberration-free IOL degraded somewhat and that of the conventional IOL degraded considerably more. However, when the lens was decentred by 0.5 mm to 1.0 mm the modulation transfer function of the new lens remained unchanged as pupil size increased while that of the conventional lens and the Tecnis both performed poorly in comparison to the new lens and showed features suggesting increasing amounts of coma.

“There is some play up the curve between a tangential and sagittal view and that’s because we’re inducing non-symmetric aberrations like coma when we have a lens decentred that has either positive or negative inherent spherical aberrations. You don’t see the play up the MTF curve with an aberration-free IOL because it is basically immune to the optical effects of decentration,” Dr Pepose told EuroTimes that the new lens has several features that may further enhance visual outcomes. For example, because the anterior surface is steeper than the posterior surface, it should have less potential for unwanted surface reflections.

Furthermore, since the refractive index of B&L’s second-generation silicone is only 1.43 and is substantially lower than other lens materials, the potential for dysphotopsia is further reduced.

Further studies carried out with lenses involving bench testing of the lenses with physical measurements have supported the findings of his initial analysis, Dr Pepose noted. The results of these studies will be presented at this year’s meeting of the ESCRS in Paris. The first implantation of the lens will most likely take place later this year, Dr Pepose noted, adding: “Given the extensive and rigorous laboratory testing of the technology and what we know about the clinical performance of other aspheric technologies, we are confident that the L61A0 will perform as anticipated.”

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Decentration of 0.5 mm is typical post-operatively. In such conditions, the aberration-free lens outperforms Tecnis and LMI/O for all spatial frequencies.

Even with 1.0 mm decentration, tangential (T) and sagittal (S) MTF curves for aberration-free lens do not sink or separate, indicating decentration does not affect optical performance.

Decentration does not degrade the optical performance of the aberration-free lens, because it does not have inherent spherical aberration.

Spherical aberration from the cornea and IOL is more detrimental when the pupil is enlarged. Tecnis clearly outperforms the other IOLs when the lens is well-centered.
Mastering the IOLMaster

Sean Henahan
in Barcelona

WHILE the IOLMaster has become an indispensable tool for pre-operative assessment of cataract patients, it is important to understand its limitations, reported British researchers at the 8th ESCRS Winter Refractive Surgery meeting.

“Accurate and precise biometry is one of the key factors in obtaining a good refractive outcome after cataract surgery. An error of only 1.0 mm in axial length will result in a post-operative refractive error of three diopters,” noted consultant ophthalmologist Andrea Kerr, MD.

She commented that the advent of the IOLMaster (Humphrey Zeiss), which uses partial coherence interferometry technology, has mostly eliminated operator error and proven to be a boon for biometric assessment. But she cautioned that the IOLMaster is not accurate in certain eyes, such as those with very dense cataracts. Ultrasound biometry still has an important role to play in this regard.

Dr Kerr and colleagues at Northampton General Hospital in England compared the accuracy of measurements obtained with the Storz Compuscan A/B ultrasound biometry instrument and those obtained with the IOL Master. They compared axial length measurements and predicted intraocular lens implant power in 93 eyes of 93 patients undergoing preoperative assessment for cataract surgery.

Dr Kerr performed sutureless phacoemulsification, scleral tunnel incision, and in-the-bag IOL placement in all eyes. Patients received the Akreos fit foldable lens (Bausch and Lomb). Emmetropia was the target postoperative refraction in all eyes.

The researchers used the Holler Q and SRKT formula to calculate emmetropia according to guidelines established by the Royal College of Ophthalmology. A single examiner performed subjective refractions on all eyes two weeks after surgery.

The axial length measurements obtained with the IOLMaster were significantly longer than with the Compuscan technique. Indeed, the IOLMaster axial length measurements were longer than the Compuscan measurements in 98% of cases. The mean deviation in axial lengths obtained by the two systems was 0.637 mm, with a range of deviation between −0.22 mm and +2.14 mm. The differences were highly statistically significant.

“The correlation value between the A scan and IOL Master was 0.17. This indicates that there is no linear relationship between the two machines. The mean error in axial length measurements was 0.55 mm. IOL implant power determined by the IOL Master compared to that suggested by the A scan showed a mean difference of +2.47D,” Dr Kerr reported.

She noted that there was also a large discrepancy between the machines in terms of the power of the predicted intraocular lens. The difference ranged from −0.5 D to +6.0 D.

Subjective refractive measurements obtained post-operatively showed that 55% of the eyes were within 0.5 D of the spherical equivalent predicted by the IOLMaster and 80% were within one dioptre.

The current prospective clinical study confirms that the IOLMaster provides longer axial length measurements than the A scan Compuscan machine. Other research groups have reported this previously. In this study, the mean difference between the two axial lengths was 0.637 mm, a larger mean difference in axial length than quoted in previous studies. This might be attributable to refractive instability during the two-week post-operative period in which the measurements were taken.

Unlike the IOLMaster, A scan ultrasound biometry is a contact method and is operator-dependent. Experience has shown that excessive corneal indentation compresses the eye, in the anterior-to-posterior direction. This produces an artificially short eye, producing the kind of myopic refractive errors seen in this and earlier studies.

“Our study showed that this myopic error could have been as large as 3.68D in some cases, which would have resulted in an entirely unsatisfactory refractive outcome,” Dr Kerr said.

She stressed that the inability to standardise corneal indentation is a major failing with application ultrasound biometry. The error associated with corneal indentation in ultrasound biometry is not predictable, as it depends in large part on the experience of the operator.

“Despite these failings, the contact method still has a place in current ophthalmic practice. The IOLMaster is unable to determine axial length in up to ten percent of cataract patients. This could include patients with dense cataracts or corneal opacification. In addition, patients with age-related macular degeneration or mental handicap might be unable to fixate, making them candidates for the A scan method.”

The IOLMaster can measure axial length, corneal radii and anterior-chamber depth. The onboard software incorporates all operating processes from the measurement of the parameters to the computation of the IOL through the integrated biometric formulas and lens database. Because it is a non-contact technique local anaesthesia is not required and there is no risk of infection.

Dr Kerr told EuroTimes that in her clinic the A-scan still had an important place, noting that several of her senior nursing staff had gained considerable expertise with the ultrasound technique.

She noted that it was useful as a comparative tool for measuring the accuracy and consistency of the IOL master. It is also useful in difficult cases where the IOLMaster does not give a result and in difficult and uncooperative patients.

Dr Kerr emphasised the value of using computer database programmes for storing all pre-operative and post-operative biometry data. This greatly assists statistical analysis.

Over time, and with regular audit of post-operative refraction results, a nomogram can be obtained for each nurse/technician’s A-scan results, which allows the correct lens to be chosen if the IOL Master cannot be used.

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How do subjective and objective refraction compare?

Sean Henahan in Barcelona

While modern autorefractors cannot replace subjective refraction, the consistent readings they produce are very useful for predicting post-operative cataract surgery outcomes in a busy ophthalmic clinic, reported British researchers at the 8th ESCRS Winter Refractive Surgery Meeting here.

How well do results obtained with autorefraction measure up against those obtained with the more labour intensive measurement of subjective refraction? Consultant ophthalmologist Andrea Kerr MD and colleagues at Northampton General Hospital in England conducted a study comparing results obtained with the Humphrey® AcuScan™ 5015 autorefractor and standard subjective refraction.

The prospective study enrolled 138 consecutive patients scheduled for routine uncomplicated sutureless phacoemulsification cataract surgery with in-the-bag IOL implantation. The researchers obtained autorefractions in 79 cases, subjective refractions in 59 cases, while 48 patients were evaluated with both techniques.

The investigators obtained measurements of post-operative sphere, cylinder, axis and spherical equivalent in all eyes. They compared the spherical equivalents from both the autorefraction and subjective refractions to the spherical equivalents predicted by the IOL Master.

Measurements obtained by the autorefractor showed a mean sphere of -0.266 D and a mean cylinder of -0.377 D. The mean axis measurements obtained with the objective refraction was 97 and the mean spherical equivalent was -0.430 D. The numbers indicate that the autorefractor tended to err consistently on the myopic side.

In contrast, the mean sphere obtained with subjective refraction was -0.03 D and the mean cylinder was -0.21 D. The subjective mean axis was 91 and spherical equivalent was -0.14 D.

The mean difference between the predicted spherical equivalents and subjective spherical equivalents was 0.60 D, ranging from 0.03 to 1.9 units. In slightly more than half of cases, 57%, the patient’s subjective refraction was within half a dioptre of the predicted spherical equivalent.

The systems were within 0.5 D of agreement for sphere in 55.7% of eyes. The systems agreed in 82.7% of cases for cylinder measurements. Cylinder axis measurements were within ten degrees of agreement in 75% of cases.

Among the 48 patients who were measured by both techniques, autorefraction indicated a mean sphere of 0.45 D compared with a mean sphere of 0.00 D indicated by subjective refraction. There was better agreement for cylinder, with autorefraction showing a mean of -0.18 D and subjective refraction showing a mean cylinder of -0.17.

“The Humphrey Zeiss AcuScan autorefractor provided consistent readings. The spherical equivalent obtained is more myopic compared to subjective refraction. This may be explained by failure of the fogging mechanism to completely relax the accommodation. Larger numbers are needed to formulate a nomogram to allow a closer approximation to the subjective refraction,” noted Dr. Kerr.

Given these results, Dr. Kerr expressed confidence in using autorefraction for routine post-operative cases. She suggests specific circumstances where you would use both methods.

She would employ subjective refraction in specific situations including: cases of unexplained poor visual acuity; following phaco-refractive procedures; in post-keratoplasty patients and in patients with keratoconus following phaco procedures.

She added that the current literature supports the view that autorefractors provide good objective refraction and a basis to commence subjective refraction. The advantage of autorefractors is that they allow measurement of refraction with relative ease and accuracy. Moreover, these instruments require only a minimal level of expertise to use.

Dr. Kerr commented that in fact other studies in the literature report greater accuracy for autorefractors than her study found. She noted that this lower degree of accuracy could be explained by the fact that these patients were seen within two weeks of their surgery and quite possibly the post-operative refraction had not yet stabilised.

However, she noted that autorefractors are less accurate at measuring eyes with high degree of accommodation, which, in a population of pseudophakes, may not be relevant.

“While subjective refraction remains the gold standard, autorefractors allow a rapid means of assessing refractive error”

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Uveitis may be more prevalent than previously thought

Daithi Ó hLaulain

The incidence of uveitis in the United States may be three times greater than previously thought, a new large-scale population study suggests.

The authors believe that more than 280,000 people every year develop some form of the disease. It is responsible for 30,000 new cases, or 10%, of blindness a year, in the US.

This cross-sectional, retrospective study reviewed databases and medical records to determine the incidence and prevalence of uveitis in a large, well-defined population in Northern California.

The authors drew the population from the membership of Kaiser Permanente Northern California health care system. They searched the entire database (2.805.443 people) for patients who had the potential diagnoses of uveitis during a 12-month period.

This study population was further divided into six communities (731,896 people), represented by six medical centres and chosen to provide a variety of patient demographics with varying medical centres and population sizes. The sample conformed to the epidemiological definition of a community.

Two uveitis specialists reviewed the medical records of potential candidates to confirm diagnoses and establish time of disease onset. They identified a sample of 2070 people who had potential diagnoses of uveitis.

The review uncovered 382 new cases of uveitis during the target period, while 462 cases of uveitis were diagnosed before the target period. These data yielded an incidence of 52.4/100,000 person-years and with a period prevalence of 115.3/100,000 people.

In the current study, the incidence and prevalence of disease were lowest in paediatric age groups, 6.9/100,000 person years and were very high in patients 65 years or older, 102.7/100,000; 334.6/100,000.

Comparison between the group of patients who had onset of uveitis before the target period (ongoing uveitis) and the entire cohort of uveitis patients showed that women had a higher prevalence of ongoing uveitis than men and that this difference was largest in the older age groups.

Idiopathic uveitis was the most common type encountered by the authors in complete medical records, both in onset (48% of new cases) and prevalence (33.9%). It was also the most common among incomplete medical records, which lacked a fundus examination.

The authors concluded that the incidence of uveitis was approximately three times that of previous US estimates and increased with the increasing age of patients. Women had a higher prevalence of uveitis than men, and the largest differences were in older age groups.

“My surprise was the results. I was expecting similar results to those reported previously by Darrell, (Darrell et al. Arch. Ophthalmol. 1962:68:502-14), perhaps tending to be higher because the ethnic diversity is much greater in our study,” said lead author David Gritz MD, Associate Clinical Professor University of California San Francisco.

He said he believed the newly discovered prevalence went unsuspected in part because most cases were relatively simple iritis. “So you don’t realise how common it actually is. It’s not as if there’s an epidemic of corneal ulcers,” he said.

In their discussion, the authors cite several possible reasons for the disparity of their results with earlier studies. There may be selection bias given the sample was drawn from the membership of the Kaiser Permanent health care system, though this encompasses a large cross section of Northern California’s population.

People from the sample may report symptoms more readily, because they have easy access to health care, whereas uninsured cases that resolve without treatment may not be reported. This would affect the reported incidence, but not prevalence.

Moreover, different types of uveitis affect various racial groups in different ways.

In a discussion accompanying the paper William G. Hodge MD, Associate Professor of Ophthalmology at the Ottawa Eye Institute, noted that the high incidence of uveitis uncovered by the study gives cause for concern. However, he noted that the findings require careful scrutiny.

“In this study, the overall increase in rates relative to other studies is likely true. However, the highest rate among the elderly is perplexing, as it defies published reports and the common experience of uveitis specialists,” Dr Hodge comments.

He believes the denominator (the population) for the elderly group may have been artificially reduced, making the numerator (the cases) artificially high. He also cautions that the overall results probably apply to California only, possibly the US and almost certainly not to other countries.

According to Dr. Gritz, these statements reflect Dr. Hodge’s misunderstanding of the Kaiser system and the methodology of the authors, which is very accurate and if anything, the rates of disease may be even higher than found in this study, for instance if some Kaiser patients sought care outside of the Kaiser system.

Dr. Gritz said he believed the surge in cases among elderly people might be a result of a change in the epidemiology of the disease.

“It certainly has a very worrying implication because of the ageing of our population. I wouldn’t call it an epidemic, but I think it is of concern how many people may likely be affected,” Dr. Gritz added that ophthalmologists may need to be very meticulous in follow-up after patients finish medication to ensure that apparently resolved cases have in fact resolved. Also, it’s important to impress on uveitis patients that they must report any recurrence.

“My impression is that the longer a patient has problems, the fewer symptoms they experience. I have seen patients who were told to taper their steroids and didn’t have a follow-up. When they were finally examined, they were having on-going inflammation all that time. That’s my anecdotal experience, but the findings of the study make me concerned, especially if you had incorrectly assumed that the inflammation would resolve.”


promising Uveitis treat. May II return to Trial.

Daclizumab, a novel treatment for uveitis, is poised to enter the Phase III clinical trial stage. Initial results indicate that the daclizumab is effective with far fewer side effects than current treatments, such as systemic corticosteroids and cytotoxic agents.

Researchers at the US National Eye Institute conducted a long-term (more than four years) phase II single arm interventional study using intravenous anti-interleukin-2 (anti- IL-2) receptor alpha treatments (daclizumab) and a short-term (16 weeks) phase II study evaluating the use of a subcutaneous daclizumab formulation. The data appeared in the Journal of Immunology (21 (2004) 283-293).

Patients were tapered off systemic immunosuppressive therapy and received daclizumab infusions or subcutaneous injections at intervals varying from two to six weeks. In the long-term study, patients were treated exclusively with daclizumab.

The researchers found that six-week injection intervals led to a recurrence of uveitis, while pairing two-week intervals did not. One patient developed resistant, but this disappeared once subcutaneous treatment was begun.

In the short-term study, four of the five patients met study success points within the first 12 weeks, and all five were successful by 26 weeks.

The study offered preliminary evidence that regularly administered long-term daclizumab therapy can be given in lieu of standard immunosuppression for years to treat severe uveitis. It also appears that subcutaneously administered daclizumab may be a clinically viable treatment option.

The results are promising given the apparent risk in cases of uveitis (see main story) and the side effects associated with current treatments. Further, the subcutaneous treatment may offer the way for self-administered medication.

“The initial results sound very promising. I’m anxious to see the full analysis. I am encouraged by the original research that is going into uveitis treatment,” said David Gritz MD.
Sonic phaco system may be less traumatic to the eye

Pippa Wyssong in Vancouver

THE Neosonic® handpiece, a component of the Infini™ phaco system (Alcon) is living up to its promise of reducing phaco time and reducing corneal trauma, report Canadian researchers.

The researchers conducted a prospective study comparing the novel hybrid technology to treatment with conventional ultrasound in patients undergoing cataract surgery. They presented details of the study at the annual conference of the Canadian Ophthalmological Society.

“Neosonic is a hybrid technology based on a specialised handpiece that combines both conventional linear ultrasound and low-frequency rotational oscillations of the hand-piece tip,” explained Rishesh Sood MD, who is a masters student in epidemiology at Harvard School of Public Health.

He was part of a research team headed by Isam Ahmed MD, from the University of Toronto. The team did what is believed to be the first prospective study comparing the outcomes of patients treated with either Neosonic or conventional ultrasound alone. The study randomised 84 cataract surgery patients, with an average age of 74 years, to treatment with either ultrasound phacoemulsification plus Neosonic technology, or standard ultrasound treatment alone. There were 44 eyes and 40 eyes in the two groups respectively, and there were no differences in baseline characteristics.

Main outcome measures were total ultrasound time, average ultrasound power, effective phacoemulsification time, corneal oedema, and uncorrected visual acuity on post-operative day one. Mean total ultrasound time in the Neosonic group was 55.2 seconds, compared with a mean of 63.8 seconds in the ultrasound only group. The mean effective phacoemulsification time was 7.83 seconds in the Neosonic group compared with 11.91 seconds for the ultrasound only. Neosonic also required less ultrasound power.

Statistically significant differences were also seen in patient findings on the first post-operative day. The proportion of eyes that had no corneal oedema was 92.4% in the Neosonic group, and 80.2% in the ultrasound group. As for uncorrected visual acuity of 20/40 or better, the proportions were 83.2% and 76.4% in the groups, respectively.

The reduction of ultrasound intraocularly has been shown to be associated with reduced negative clinical outcomes. Clinically, this is particularly important in people with pre-existing corneal dystrophies, said Dr. Sood.

An advantage of the Neosonic technology is that it allows the surgeon to simultaneously use both sonic and ultrasonic energy, at varying levels, or to choose a single modality and toggle between the two. This allows surgeons to reduce the amount of potentially harmful thermal energy that can come from exposure to too much high-frequency ultrasound, he explained.

“Corneal oedema caused by endothelial damage during cataract surgery has been shown to be related to the amount and duration of exposure to ultrasound energy,” he said.

Another ophthalmologist who has used the technology is William Fishkind MD, who is based in Tucson, Arizona but teaches at the University of Utah. He told EuroTimes he is not surprised by the findings in the Canadian study.

“In my own experience the Neosonic technology is a unique addition to the phaco armamentarium. It actually improves both the jackhammer and the cavitation effect,” he said.

The device is most effective when emulsification is being performed on a nucleus that is held in place. It’s effective during sculpting, and divide and conquer, or stop and chop techniques, he explained.

He cautioned that the system was less effective for fragments. In fragment removal, Neosonic can knock the fragment off the tip during the emulsification. On the other hand, cavitation energy is more pronounced and aids in cavitation of fragments.

“Since it makes both the sculpting and the fragment removal more efficient, you can almost bet that there is going to be less time spent during phaco, and less power going into the anterior segment. This means less potential damage to the blood aqueous barrier and less damage to the endothelium,” he said.

But while there are numerous advantages to the Neosonic device, Dr. Fishkind has opted not to use it in his own practice. He said that he finds the hand-piece is too heavy for his personal preference, “I do a lot of cases in the day and my hands get tired. To have a bigger, heavier hand-piece doesn’t appear to be worth it to me,” he said.

The Neosonic handpiece is designed to work with the Alcon Legacy and Infini machines. The trimodal Infini system offers surgeons the option of using ultrasound phacoemulsification alone, the combination of ultrasound and oscillation provided by the Neosonic handpiece, or the Aqueplazell® liquefaction tool.

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By Paul McGinn

Ophthalmologists lead the way in performing day case surgery

Across Europe, ophthalmologists are leading the way in performing day case surgery. New statistics from the Organisation of Economic Cooperation and Development show that the day case rate for cataract surgery far surpasses that of the overall rate of day surgery in virtually every European country. Also, the statistics show that the day case rates for cataract surgery also surpass the day case rates of four operations tracked by the Paris-based government think tank. In virtually every country, the day case rate for cataract surgery surpassed that of inguinal and femoral hernia repairs, ligation and vein-stripping operations, cholecystectomies, and laparoscopic cholecystectomies.

In 2002, the percentage of cataract operations carried out as day case procedures was far higher than the percentage of all operations carried out as day cases in Denmark, Finland, Italy, Portugal, and the United Kingdom. The overall day case surgery rate for those five countries was just under 75% in 2002. By comparison, the overall day surgery rate for all operations in those five countries was just under 40%. Only in Ireland and Luxembourg did cataract surgeons perform a lower percentage of day case surgery than the overall national day case surgery average. In 2002, the rates of day case cataract surgery rose to as high as 96.5% in Denmark, 92% in Finland, and 89.6% in the UK. By comparison, the overall rates of day case surgery were as high as 61.7% in Denmark, 74.5% in Finland, and 53% in the UK.

In some countries, the rate of day case surgery was twice or three times that of the overall national day case average. In Portugal, for example, the rate of day case cataract surgery in 2002 was 34.7% compared to an overall day case surgery rate of 10.4%. In Finland, the rate of day case cataract surgery was 92%, compared to an overall day case rate of 37.4%. In 2002, Italy recorded a day case cataract surgery rate of 62.1% and an overall day case surgery rate of 28.8%.

The OECD figures also showed that cataract surgery is more commonly performed as a day case than are other operations. For example, the combined average day case cataract surgery rate for Denmark, Finland, Ireland, Italy, Portugal and Switzerland was 62% in 2002. By contrast, the combined average day case rate for those six countries in 2002 was:

- 8.5% for laparoscopic cholecystectomies;
- 42% for ligation and vein-stripping;
- 33.5% for inguinal and femoral hernia repairs;
- 22% for tonsillectomies.

In general, those European countries with the highest rates of day case cataract surgery were the countries with the highest rates of day case surgery for the other four operations tracked by the OECD. Also, those European countries with the lowest rates of cataract surgery were the countries with the lowest rate of day surgery for inguinal and femoral hernia repairs, ligation and vein-stripping operations, cholecystectomies, and laparoscopic cholecystectomies.

For example, Denmark, which posted Europe’s highest rate of day case cataract surgery in 2002, also posted Europe’s highest rates of day case surgery for three of the four procedures tracked by the OECD. Danish surgeons performed 85.8% of their ligation and vein-stripping operations as day cases in 2002. In the same year, Danish surgeons also posted Europe’s highest day case rate for inguinal and femoral hernia repairs – 78.3%.

In addition, Denmark posted the highest day case rate for laparoscopic cholecystectomies in 2002 – 38.6%. By comparison, Danish ophthalmologists in 2002 performed 96.5% of cataract operations as day cases in Finland, which posted Europe’s second-highest rate of day case cataract surgery in 2002, also posted the second-highest rates of day case surgery for laparoscopic cholecystectomies, and inguinal and femoral hernia repairs, and the third highest rate for ligation and vein-stripping.
For more than a decade, Europe’s cataract surgeons sprinted toward the elusive finish line of efficiency as they discharged in-patients sooner and performed more day surgery.

If the newest statistics from the Organisation for Economic Co-operation and Development are any indication, ophthalmologists are still striving for the efficiency finish line. However, the OECD’s statistics also reveal that sprint to reduce the average length of stay for cataract surgery and increase the percentage of day cases has slowed to a walk and even to a crawl in many European countries.

One reason for the slowdown is obvious in a number of countries. There, the percentage of cataract surgery performed as day cases in nearing 100%. But even in those countries where the percentage of day case cataract surgery is under 50%, the rate of out-patient surgery is slowing. Although it is too early to interpret precisely why the pace has slackened, the OECD figures seem to indicate that cataract surgeons in a number of countries find it difficult to increase day case surgery and reduce the length of stay for their patients.

For instance, the country with Europe’s shortest length of stay – Finland – actually increased its average length of stay, according to the most recent OECD figures. In 2002, Finland posted an average length of stay of 1.2 days for cataract surgery, thanks to Europe’s second highest rate of day case cataract surgery – 92%. In 2001, however, Finland recorded a lower average length of stay – of 1.1 days – when ophthalmologists performed 86.9% of cataract operations as day cases.

Finland’s experience of an increase in its length of stay for cataract surgery was not unique. Between 2001 and 2002, cataract surgeons in New Zealand also saw an increase. The New Zealand average length of stay actually grew by 0.3 days between 2001 and 2002. Over the same period, the percentage of day case cataract surgery rose to 90.9% from 89.2%.

In the UK, the average length of stay for cataract surgery doubled between 2001 and 2002 to 2.2 days, according to the OECD figures. However, a closer examination of the figures revealed that the 2002 statistics – unlike the 2001 statistics – excluded day cataract surgery cases and cataract surgery performed in a private hospital. Between 2001 and 2002, the percentage of cataract surgery performed as day cases rose significantly in the UK – to 89.6% from 83.1%.

The length of stay for cataract surgery in Ireland, Italy, and Switzerland was stagnant between 2001 and 2002. In both years, Ireland recorded an average length of stay of 2.3 days; Italy recorded an average length of stay of 2.1 days; and Switzerland recorded an average length of stay of 2.8 days.

Although most countries continued to report reductions in the average length of stay for cataract surgery, those reductions are nowhere near the reductions of the early and mid-1990s. Then, some countries reduced their length of stay by two or three days in a single year. Now, reductions rarely exceed 0.2 days or 0.3 days per year. For instance, the average length of stay for cataract surgery fell by three days – to 9.7 days – between 1993 and 1994 in Hungary. Between 2001 and 2002, the average length of stay fell by 0.3 days to 3.6 days.
Cataract surgery rates make huge gains across Europe

In virtually every country, cataract surgeons performed more operations per capita in 2002 than ever before.

Of the 10 European countries with statistics from the Organisation for Economic cooperation and Development, all but one reported an increase in the number of cataract operations performed per 100,000 of population between 2001 and 2002.

For instance, the rate of cataract surgery between 2001 and 2002 increased in:
- Belgium by 4%;
- Denmark by 14%;
- Finland by 24%;
- Hungary by 38%;
- Italy by 7%;
- Luxembourg by 5%;
- Portugal by 13%;
- United Kingdom by 8%.

Only in Ireland did the rate of cataract surgery fall in 2002. The rate in Ireland fell by 9% to 441.6 from 485.6 operations per 100,000 in 2001. The 2001-2002 gains in the rest of the European countries surveyed came on top of huge gains in the early and mid-1990s.

For instance, the rate of cataract surgery has:
- more than doubled in Portugal since 1993;
- more than doubled in Finland since 1992;
- more than doubled in Italy since 1996;
- nearly doubled in the UK since 1995;
- nearly doubled in France since 1993;
- risen by 43% in Denmark since 1993;
- risen by 26% in the Netherlands since 1999;
- risen 11% in Hungary since 1999.

Of the 10 European countries with OECD statistics from 2002, Italy reported the highest rate of surgery – 783.8 operations per 100,000 of population. That figure represented an increase of about 6.5% over the 2001 figure of 735.2 operations per 100,000.

Although 2002 figures aren’t available for France, it is conceivable that French cataract surgeons performed in 2002 substantially more than the 2001 rate of 757.5 operations per 100,000 of population. Even a modest increase of 4% in the French cataract surgery statistics from 2001 to 2002 would have eclipsed the Italian 2002 statistics.

Of those countries which reported statistics for 2002, Luxembourg was not far behind Italy, with a rate of 766 operations per 100,000 of population. That figure represented an increase of about 5% over the 2001 figure of 730.4 operations per 100,000.

Hungary was third in 2002, with 745.1 operations per 100,000 of population; that figure represented a 3% increase over the 2001 figure of 723.6 operations.

However, the surgery rates of European countries that reported to the OECD are still behind those of Canada. In 2001, the latest year for which statistics were available from Canada, ophthalmologists there performed 1,109.3 cataract operations for every 100,000 persons. On the bottom of the list was New Zealand, with its rate of 199.8 cataract operations per 100,000 of population.

Even within Europe, however, the rates of cataract surgery vary considerably. Compared to Italy’s rate of 783.8 operations per 100,000 of population, Portugal recorded a cataract surgery rate of 231.3 per 100,000; Ireland recorded a rate of 441.6 per 100,000; and Denmark recorded a rate of 514.1 per 100,000.
European Glaucoma Society Congress report

New paradigm for glaucoma management

Sean Henahan in Florence

IT’s not just about intraocular pressure any more. With the current flood of new findings on the pathogenesis, diagnosis and treatment of glaucoma, researchers at the 7th Congress of the European Glaucoma Society declared the existence of a new paradigm for glaucoma management.

The new paradigm considers glaucoma as a progressive optic neuropathy rather than simply a disease involving elevated intraocular pressure and impaired outflow. The new paradigm looks at glaucoma as a continuum, beginning with the imperceptible loss of retinal ganglion cells, followed by structural changes in the retinal nerve fibre layer and then in the optic disc, according to Robert Weinreb MD PhD, Director of the Hamilton Glaucoma Centre, University of California, San Diego.

Those neuropathological changes may precede by many years the visual field changes that are still often the first clinical indication of glaucomatous disease. The objective of the new paradigm is to identify at-risk patients and initiate potentially vision-preserving treatment well before perimetric changes appear, explained Dr Weinreb, who is also the current president of the Association of International Glaucoma Societies.

“The future is bright for being able to detect glaucoma at an early stage. The reason we want to detect glaucoma at an early stage and treat progression at an early stage is that there is a convergence of information from numerous clinical studies showing that treatment by lowering IOP has benefits across the glaucoma continuum”

Robert Weinreb

CIGTS. Each of these trials has demonstrated the benefit of IOP lowering,” he added.

Early detection is a key component of the new glaucoma paradigm. In addition to optic disc measurement, IOP and visual field testing, clinicians can now utilize several important new digital imaging modalities that have emerged in recent years. These techniques, including scanning laser tomography (e.g. Heidelberg Retinal Tomography), scanning laser polarimetry (e.g. GDx-VCC, Laser Diagnostic Technologies), and optical coherence tomography, allow clinicians to identify and track changes in the optic nerve head and retinal nerve fibre layer.

Glaucoma specialists have not abandoned field testing. On the contrary, recent developments in perimeter including short wavelength automated perimeter (SWAP), frequency doubling perimetry and automated flicker perimetry can be used to identify the loss of specific ganglion cell populations, allowing earlier recognition of field loss, and more accurate monitoring of disease progression. There was considerable discussion and debate during the congress regarding how to best integrate the diagnostic tools now available. A consensus is forming that the tools are complementary and together will help glaucoma specialists to recognise glaucomatous changes many years before symptoms appear, and will improve monitoring of treatment and disease progression.

“Glaucoma that is detected early is perhaps easier to stabilise than late glaucoma. Treatment goals include the preservation of visual field to allow patients to maintain their quality of life, including the ability to drive, to continue working or stay independent”

Clive Miggdal MD

“IOP including a pressure-sensing contact lens and a pressure sensor telemetric tonometry device.

The availability of new diagnostic instruments that can identify pre-symptomatic structural changes comes at time when researchers are anxious to improve screening for glaucoma, according to Carlo Traverso MD, a glaucoma specialist from the University of Genoa, Italy.

“It is known that about 50% of individuals with unquestionable glaucoma are unaware of their condition. As a result, many throughout Europe present late with irreversible vision damage”

Carlo Traverso MD

EuroTimes September 2004
Much of what we thought of as good practice in treating glaucoma had now been strengthened by evidence from randomised controlled trials. These trials confirm the benefit of lowering and stabilising eye pressure in slowing disease progression."

Roger Hitchings MD

"We know that thinner corneas, higher levels of intraocular pressure and perhaps a larger cup disc ratio are independent risk factors for disease progression. Treatment decisions should be based on a detailed assessment of individual risk."

The conference also served to introduce the European Glaucoma Society’s updated glaucoma treatment guidelines. The new edition incorporates the latest clinical research and thinking on glaucoma, together with an update on the evidence for the latest therapies and surgical techniques.

"These updated guidelines have been based on the most current glaucoma literature, conferences and clinical experiences available. They’re critical for physicians because glaucoma treatment and management is unique for every patient, which the second edition of the guidelines emphasises even more strongly," explained Professor Roger Hitchings MD, President of the European Glaucoma Society.

The new EGS guidelines incorporate recent results from several large, randomised controlled trials (OHTS, EMGT, CNTGS, AGIS, CGITG), which clarify the value of current treatments. In general, those trials concluded that lowering IOP early in the course of the disease slowed progression of visual loss and blindness later on.

"Much of what we thought of as good practice in treating glaucoma had now been strengthened by evidence from randomised controlled trials. These trials confirm the benefit of lowering and stabilising eye pressure in slowing disease progression. Evidence also shows the benefit of early treatment in preventing further vision loss due to glaucoma," Dr Hitchings commented.

The new EGS guidelines also emphasize the role of patient compliance and the measurement of quality of life in treatment decisions and outcome. The followed the growing recognition among glaucoma specialists that glaucoma patients are frequently elderly and may have concomitant health problems that interfere with their ability to take their medicines correctly.

"Although hard to quantify, quality of life is an important outcome measure for patients and the effect of both diagnosis and treatment on the individual have to be considered. Visual function is closely linked to quality of life. Treatment side effects, dosing schedule and cost all have to be taken into account when choosing a therapy," said John Thygesen MD, Associate Professor in the Department of Ophthalmology, University Hospital of Copenhagen, Denmark.

The Congress highlighted the evolutionary step forward now taking place in glaucoma science. However, it also confronted the many unanswered questions still facing glaucoma researchers, including: the pathogenesis of ganglion cell loss; the utility of neuroprotective drug strategies; the genetics of glaucoma; the need for objective tonometry and perimetry methods; and the importance of 24 variations in IOP.
Acuasions that a major drug manufacturer may have suppressed some negative drug trial results are lending new urgency to calls by ophthalmologists for establishing a unified clinical trial registry.

Such a registry would likely build on existing national and private registries to establish a one-stop online list of all ongoing and concluded clinical trials. A description of the methodology, status and results of all trials would be included, whether their results were published or not.

Such a trial registry would be useful not only for keeping tabs on off-label uses of drugs approved by various national and international agencies, it could make it easier for ophthalmologists to check out new implantable lenses and other devices that are not regulated in every country, said ophthalmologist Emanuel S. Rosen, FRCS, European editor of the Journal of Cataract and Refractive Surgery. “Particularly in the tabloids you get people extolling the virtues of new lenses without the proper trials having taken place.”

A unified registry of all trials would also help bring to light what many believe is that some studies have confirmed — is a bias toward publishing favorable trial results in the peer-reviewed literature. “Every once in awhile something leaks out that the clinical results that don’t get published are at variance with those that do get published,” said Dr. Richard E. Bensinger, MD, who is a spokesperson for the American Academy of Ophthalmology and director of the institutional review board overseeing research at the 700-bed Swedish Hospital in Seattle, Washington.

Dr. Bensinger pointed to a case of a well-known anti-infective agent used in ophthalmic procedures that has been shown ineffective in children. Most new drugs are not tested on children before they reach the market, he notes. “As clinicians, we need to have this information, and it doesn’t always get published,” Dr. Bensinger added.

**RECOMMENDATIONS FOR A UNIFIED TRIALS REGISTRY**

According to the Cochrane Collaboration:

1. All randomised controlled trials should register from the time they are approved by an ethics committee or approved for funding;
2. Registered information should be potentially accessible to all interested parties;
3. Registration should be with a register that complies with an appropriate minimum standard of practice;
4. Prospective registration of trials should be part of ethical guidelines for clinical trials;
5. Government agencies should ensure that adequate mechanisms and infrastructure are provided so that all randomised controlled trials can be registered prospectively;
6. Government agencies should explore legislative and other strategies to mandate prospective registration as a condition of, for example, funding, ethics, or regulatory approval.

Source: Cochrane Collaboration, 2004

**BUDDING SCANDAL SPARKS RENEWED ACTION**

Calls for publicly available registries of clinical trials are nothing new. Organisations such as the Cochrane Collaboration and the World Health Organisation have advocated their development for more than a decade. Now they’re being joined by the powerful American Medical Association, which in June called on the U.S. government to create a publicly available registry of all trials in the U.S. The measure has support from several key members of the U.S. Congress, though no action is likely before next year.

The AMA’s move followed allegations by a state prosecutor in New York that the UK-based drug manufacturer, GlaxoSmithKline, suppressed studies suggesting that the antidepressant paroxetine was ineffective in children and adolescents, and may be associated with increased suicidal behavior. GlaxoSmithKline denies the allegations and has since adopted a policy of posting results of all trials involving its products on the Internet.

Other drug companies that have announced they will make information on all trials publicly available include US-based Merck & Co. and Eli Lilly and Company. Merck has also backed a unified registry approach. Despite the openness of such companies, significance resistance to publishing remains in the pharmaceutical industry. One concern is that publishing the details of early trials could provide valuable data to competing developers, according to Court Rosee, a spokesperson for the Pharmaceutical Research and Manufacturers Association.

While many doctors acknowledge that manufacturers have legitimate commercial interests in keep trade secrets, they believe the public good argues compellingly for disclosure.

“The concept is difficult to oppose,” said Metin Gulmezoglu, MD, a WHO researcher. “There are ethical arguments as well as those for evidence-based decision-making in favor of a unified clinical trials registry. However, different groups understand or expect different things and we need to communicate our aims appropriately.”

WHO is working with its member states to develop a unified trials registry, which it hopes to unveil in November.

“Posting the results of such trials would address growing concerns over publication and outcome bias in clinical trials,” said Joseph A. Heyman, a member of the board of trustees of the American Medical Association.

“The public and physicians have a right and a need to know the results of clinical trials if they are to make informed treatment decisions.”

That’s difficult with existing registries. Many countries maintain multiple registries. For example, the U.K. maintains separate registries for private and publicly funded research; a number of countries have national registries also secure access, so they can’t be used by many physicians. The U.S. National Library of Medicine currently maintains a Web site, www.clinicaltrials.gov, which lists about 10,000 trials. However, the main purpose of the site is to recruit patients, and the list is not comprehensive.

More than 300 public and private clinical trial registries currently exist in the U.S., making it difficult to track all research in a given area. In addition, many trials are completed and never reported anywhere. Support for clinical trials registries is also coming from the medical publishing community. The International Committee of Medical Journal Editors is considering a policy that would require studies to be registered as a condition of publication.

**WHO TARGETS UNIFIED TRIAL RELEASE FOR NOVEMBER**

A World Health Organisation advisory committee is developing a proposal for a unified clinical trial registry. The proposal is slated to be unveiled at the World Health Forum in Mexico this November.

The most likely approach is to recommend upgrades to national registries that are already in place in many countries, and to set up an online portal that would enable researchers to access them all, said Metin Gulmezoglu, a WHO researcher who is leading the registry effort. In addition, an international uniform numbering system would be adopted so that each trial would have a unique identifier to eliminate confusion about whether a trial at a given location is one part of a multicenter effort, or a stand-alone study.

Dr. Gulmezoglu and other WHO staff are currently working with representatives in member countries to iron out the details. There are technical issues that are not trivial, but can be addressed, there is an advocacy side; that we need to inform, consult the stakeholders especially our member states, and then there are the resource-related issues. Our aim is to have a concrete plan by November.

While no country now has a registry that can serve as a complete model for the proposed WHO system, several are well on their way, said Kay Dickersin, a professor at Brown University in the United States, and a consultant to the WHO registry committee. The Netherlands, the United Kingdom, Germany, and South Africa are countries with well-developed national registries, said Dr. Dickersin, who is also director of the U.S. Cochrane Collaboration. The Cochrane Collaboration is an international organisation committed to making reviews of published medical literature and trials available to all.

If established, the unified registry will provide a global resource for conducting clinical trials and disseminating important medical information in less-developed countries, both important WHO goals.

“Research is international,” Dr. Gulmezoglu said. “We should avoid duplication and redundancy. We have the best available evidence, both positive and negative, and we have an ethical duty to inform the public about what research is being conducted and its results.”

Howard Larkin

International pressure builds for unified clinical trials registry

Single information source could reduce publishing bias and improve research efficiency
Electronic patient-charts aid “friendly, fast” practice in Germany

Stefanie Petrov-Binder MD in Heidelberg

AUTOMATING patient documentation using an electronic platform can simplify the physician’s routine and work flow, particularly with the increased bureaucracy associated with outpatient surgery, according to Amir-Mobarez Parasta MD PhD, Technical University Eye Clinic, Munich, Germany “There are certain tedious steps associated with out-patient surgery that often become repetitive and could be automated to ease the work flow, such as: making appointments, documentation of pre-operative exams, the OR report, documentation of follow-up exams, and the now obligatory quality assurance documentation,” Dr Parasta told listeners at the annual Congress of the DGII (German-Speaking Society for Intraocular Lens Implantation and Refractive Surgery).

There are currently two different ophthalmologic organisations that use this electronic platform in Germany to store, transfer, and work with patient data. The Glaucoma Plus Diagnostic Centres (ADGs) that work together with Pfizer Ophthalmics and AMD-Net for quality assurance in PDT patients in association with Novartis. AMD-Net features a completely electronic patient chart that can be documented by clicking, which is used to assure quality of PDT treatments.

ADGs are specialised glaucoma centres that offer glaucoma patients examinations that their health premiums do not cover. Refers patients. Their attending ophthalmologist uses an ADC for additional, periodic testing, Helmut Binder MD, an ophthalmologist based near Frankfurt, Germany, makes appointments for his glaucoma patients at his participating ADC from his office PC. He also analyses the examination results and images online.

“ADGs are designed for glaucoma patients who require increased surveillance, although their health insurances do not cover the costs. Scheduling an appointment electronically is simple. The system is user-friendly and the service I can offer patients through the use of an electronic platform makes going for check-ups easier for them.”

“Before each first visit, I am required to fill in the electronic patient chart, which is stored and used for future visits. I can amend it at any time. What’s more, I can check the HRT results directly online after the visit, with the use of a system key that is provided to ensure patient privacy. When the patient returns to my office for his follow-up visit, I can explain and show the exam outcome to him by simply logging on,” he explained.

The Technical University in Munich developed this concept (the Medtrix project) to simplify data exchanges. The Medtrix concept was carried out in an industrial partnership with the German Ophthalm Medical Group. Ideally, the electronic platform should be adapted for all medical information transfers.

Dr Parasta explained that the Medtrix electronic platform allows for patient-oriented files that can be retrieved at any place of treatment giving physicians access to all previous patient data.

He pointed out that duplicate exams could be avoided. Furthermore, the information that is required for quality assurance is simplified and documentation is limited to the newly gathered data. This way, physicians no longer have to fill out lengthy, repetitive forms. Dr Parasta proposed that the patient health chip-card, already in use in Germany or patient identification, could be transformed into a patient service card, storing administrative and emergency data, and signatures and keys for access to the patient file on the system. The data are not stored on the card itself but on the system, for security reasons.

A prototype of the patient service card, called the ‘Gesundheitspass Augen’ (Eye Health Passport), has been developed. Also, the identification of the physician in the system is possible through electronic signature. The system was first tested in Bavaria, he said.

“Although not yet in widespread use, automated electronic appointment coordination with the transfer of relevant treatment data between offices is the direction that data processing is taking in today’s medical environment, which involves high expectations of quality and service. The costs seem almost negligibly small, compared to what was spent up to now on personnel and time investment. Even postoperative management and statistical analyses for quality assurance are no problem. Once obligatory electronic patients chip cards are issued, the medical web will be the standard. We must set the standards today in order to influence the course of tomorrow,” Dr Parasta said.

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LASIK enhancement corrects residual refractive error in phakic IOL patients

Christian Meltendorf

Stefanie Petrou-Binder MD
in Heidelberg

LASIK surgery is proving to be an effective method for correcting residual refractive error and astigmatism after phakic IOL implantation, report German researchers.

Christian Meltendorf MD and colleagues at the Johann Wolfgang Goethe University Clinic implanted the Artisan iris-fixed anterior chamber lens (Ophthea) in 170 eyes with high levels of myopia and astigmatism. With follow-up of 6 months, all the eyes reached 0.8 or better.

“LASIK appears to be a safe and effective means to treat residual myopia and astigmatism following the implantation of iris fixed phakic IOLs. We were able to reduce the mean astigmatism by 14% with Artisan phakic IOL implantation and by a further 67% following LASIK,”

We were able to reduce the mean astigmatism by 14% with Artisan phakic IOL implantation and by a further 67% following LASIK.

Dr. Meltendorf reported that the implantation of a phakic IOL led to a reduction of the spherical equivalent and a decrease in the mean astigmatism in all six patients. Only 14% achieved uncorrected visual acuity of 0.8 or better before LASIK. One month following LASIK however, all patients achieved at least 0.8. None of the patients experienced a reduction in vision following LASIK re-treatments.

The researchers evaluated patients prior to implantation of the Artisan lens, three months following phakic IOL implantation, before LASIK, and one month following LASIK surgery. They analyzed refractive data with the Dynamic Refractive Analysis software program.

Before phakic IOL implantation, the mean spherical equivalent of the study participants was -9.13D, ranging from -6.38 D to -13.13D. The mean sphere was -8.32 D, ranging from -5.25 D to -12.00 D. The mean amount of cylinder was -1.61 D, ranging from -0.25 D to -2.25 D.

After phakic IOL implantation, but prior to LASIK, the mean spherical equivalent and mean sphere were greatly improved, at -1.09 and -0.39 D ± 0.80 D respectively. However, the mean amount of astigmatism remained high at -1.39 D, ranging widely from -0.75 D to -2.00 D.

Dr. Meltendorf said that one month after LASIK, the mean spherical equivalent was reduced to ±0.05 D, the mean sphere was reduced to ±0.29 D, and the mean cylinder to -0.46 D.

The researchers said that the visual results of LASIK, as seen in seven eyes one month following treatment was good. Fourteen percent showed visual acuity of 1.2 or better; 71% had vision of 0.9 to 1.0, and another 14% had vision of 0.8. By comparison, 29% of the patients had vision of 0.32 or worse, 29% had 0.5, 20% were between 0.6 - 0.7, and only 14% had 0.8, before LASIK.

“In terms of safety and predictability, 71% of patients had unchanged BCVA after LASIK and the remaining 29% have improved vision of one line. The spherical equivalent following LASIK was within a dioptr of intended refraction in 100% of cases and within 0.5 D in 86%,” he said.

The investigators reported a very low complication rate. Two patients developed transient grade I or II diffuse lamellar keratitis and another two developed dry eye. There were no long-lasting complications. There were no cases of endothelial decompensation, halos, blinding, cataract development, incision complications, IOL decentration, epithelial ingrowth, or increased IOP.

Dr. Meltendorf commented that although LASIK appeared to be a safe and effective treatment in the correction of residual error following the implantation of phakic IOLs, larger case studies were needed to verify these results.
Systemic medications effective in treating uveitis, but need careful monitoring

Demet O’Grady
in Monte Carlo

SYSTEMIC corticosteroids and immunosuppressants are potent agents in the treatment of ocular inflammatory diseases with best results achieved when physicians adhere to proper dosing techniques, according to Douglas A. Jabs MD, Johns Hopkins University School of Medicine, Baltimore, Maryland, US.

Speaking at the 5th International Symposium on Ocular Pharmacology and Therapeutics (ISOPT), Dr Jabs said that while the use of such drugs has the potential for serious side effects, their undoubted efficacy provided an acceptable risk benefit profile for most patients with serious ocular inflammation.

Most common problems associated with taking oral corticosteroids such as steepleness, mood swings, cushingoid habitus and elevated intraocular pressure are reversible and typically resolve with dose reduction, said Dr Jabs.

Other side effects that must be monitored carefully include weight gain, hypertension, fluid retention and osteoporosis. A third category of side effects, which includes ischaemic necrosis of bone, psychosis, osteoporosis and myopathy, have more adverse effects on patient health and mark the point of departure into immunosuppressive therapy, he said.

Oral corticosteroid therapy can be used reasonably safely in the intermediate term if you can administer them at low doses, but at high doses these type of side effects are unacceptable and require the addition of an immunosuppressive agent, said Dr Jabs.

“The initial dose of steroids I would typically recommend is in the range of 1.0 mg/kg/day but rarely above the 60 mg to 80 mg/day range. Once the disease is quiet the goal is really to get that target dose for chronic disease less than 10 mg a day,” he said.

To illustrate the risks of doses of steroids above the 80 mg range, Dr Jabs presented data showing how ischaemic necrosis of bone increased depending on the amount of prednisone taken by patients.

“The recommendations for doses of prednisone over 60 mg to 80 mg per day are inappropriate. If the dose is up over 60 mg, the necrosis starts to get high and up over 100 mg it becomes unacceptably high. The same is true when we look at the data for the first six months doses of prednisone and underline why it is vital to get the dose of prednisone down below 10 mg/day within the first three months and try to keep it there,” he said.

Osteoporosis is another known side effect of corticosteroids, even at low doses, and he recommended that ophthalmologists could lessen its impact by advising patients to exercise regularly and take calcium supplements. He also recommended that patients receive annual bone density screenings and be given a bisphosphonate if they are osteoporotic or osteopenic.

Reviewing the range of immunosuppressive agents currently in use, Dr Jabs said that they are very effective in treating inflammation but required careful monitoring and individualised treatments to obtain optimal results.

He explained that these immunosuppressive drugs broadly divided into three classes: anti-metabolites (azathioprine, methotrexate, mycophenolate), T-cell inhibitors (cylosporine, tacrolimus) and alkylating agents (cyclophosphamide, chlorambucil). While objective data on the efficacy of a lot of these drugs in ocular inflammatory disease remained elusive, some general trends were emerging in terms of known side effects of these therapies.

The anti-metabole and azathioprine, for example, had demonstrated its efficacy in randomised controlled trials and seemed to be relatively safe, said Dr Jabs.

Issues with the agent were gastrointestinal upset in about one-in-five patients as well as isolated incidences of liver function abnormalities and bone marrow suppression in about 1.0 % of cases exposed to longer-term treatment.

Side effects of methotrexate, another corticosteroid sparing agent, include gastrointestinal upset, fatigue, hepatitis and porosis. In a large study at Massachusetts Eye and Ear Infirmary, methotrexate was stopped for side effects in about 20% of patients.

Substantial case series data was available on the use of T-cell inhibitor cyclosporine in diseases such as Behcet’s and uveitis, noted Dr Jabs. Side effects to watch out for include hypertension, hirsutism and, in particular, nephrotoxicity.

Less data from controlled clinical trials were available for tacrolimus, but known toxicities associated with the drug include nephrotoxicity, gastrointestinal problems, hypertension, hepatitis, metabolic abnormalities and diabetes.

“Each of these side effects has been reported at somewhere between 15% and 40% in uncontrolled case series and they really have limited the use of tacrolimus for the moment as an immunosuppressive drug for uveitis,” he said.

Dr Jabs noted that alkylating agents are the most potent immunomodulatory drugs used in treatment of uveitis and could induce long-term drug-free remission if used appropriately. Their principal drawback was their side effects, which included bone marrow suppression, infection, sterility and an increased risk of malignancy.

Although acknowledging that “The aim of steroid therapy should be to minimise dosing duration by using steroid sparing strategies whenever possible” the risk of malignancy under-scored the need for very careful monitoring of patients taking alkylating agents, he said that the risk benefit profile was nevertheless acceptable for most patients with serious ocular inflammation.

“With some diseases such as mucous membrane pemphigoid, an alkylating agent really can make a huge difference. When we put plainly to patients the relative risks and benefits of alkylating therapy for their condition, over 90% agree to the treatment because they value their vision much above the possible remote risk of malignancy. I think it is a testament to the value of vision in every patient that we see,” he said.

The means of administering drugs also plays an important part in determining the type and severity of side effects associated with corticosteroid use, said William Aylliffe FRCS PhD, Croydon Eye Unit, Maidon University Hospital, Surrey, UK.

“There are almost as many ways of administering these drugs as there are steroids themselves,” said Dr Aylliffe.

He noted that regional injections of steroids were now being used in an attempt to deliver the drug to the posterior segment while avoiding complications associated with systemic delivery, but said that this assumption was not necessarily correct.

Intracameral injections were also becoming increasingly popular, not just for uveitis but also for the potential treatment of diabetic macular oedema and choroid neovascularisation.

Known side effects with topical steroids include cataracts, elevat- ed IOP and glaucoma, said Dr Aylliffe. He said that while some physicians were now proposing “non-penetrating steroids” to avoid such complications, the reality was actually more complex.

“We have to bear in mind that while these drugs are non-penetre- rating in animal models which are not inflated; if you administer it to a child with severe inflammation you might be surprised to find a significant increase of raised IOP and glaucoma. A recent study from China highlighted showed this swap from inflammatory eye disease to glaucoma, which is not a good thing at all,” he said.

Systemic side effects of corti- costeroids are an increased risk of infection (varicel- la, tuberculosis) gastrointestinal problems (peptic ulcer, candidiasis, pancreatitis), fluid balance prob- lems, skin changes, metabolic disturbance, musculoskeletal problems and psychiatric disturbance, noted Dr Aylliffe.

“The aim of steroid therapy should be to minimise dosing duration by using steroid sparing strategies whenever possible. Maybe what we will be doing in the next few years is not using steroids as a first-line drug at all.”

Douglas A. Jabs MD
Intravitreal steroid effective in treatment of macular oedema

A RECENT study confirms that intravitreal triamcinolone can significantly improve visual acuity and reduce retinal signs in patients with macular oedema, although physicians need to be alert to its potential for serious side effects, according to Ramin Sarrafzadeh MD PhD, Williamburg, Michigan, US.

In a series of 143 eyes of 129 patients with macular oedema who underwent treatment with 4.0 mg to 20 mg of intravitreal triamcinolone, mean visual acuity improved significantly from 20/128 to 20/62 (P=0.0001) after a mean follow-up of 17 months (range: 6-30 months). Dr. Sarrafzadeh told the annual meeting of the Association for Research in Vision and Ophthalmology.

In addition, mean foveal thickness as measured by optical coherence tomography decreased significantly (P=0.0014), from a baseline level of 460 microns to 227 microns, he said.

Some 62% of eyes in the study had diabetic macular oedema, of which 77% had undergone prior focal laser treatment. The remaining eyes had non-diabetic macular oedema, which was most commonly associated with macular pucker, Irvine-Gass syndrome, and macular pucker after retinal detachment repair. One-third of the eyes underwent vitrectomy with membrane peeling at the time of intravitreal steroid treatment.

A sub-group analysis based on current treatment received (steroid alone or steroid plus surgery), diagnosis (diabetic, non-diabetic and diagnostic subgroups of non-diabetic macular oedema), and prior history of treatment (focal laser or no focal laser) consistently showed statistically significant improvements in visual acuity in all groups. Among the various subgroups, mean visual acuity levels ranged from 20/106 to 20/159 at baseline with improvements to levels between 20/58 and 20/70.

“Our study represents a large series of eyes with diverse diagnoses and relatively long duration of follow-up. These results suggest intravitreal triamcinolone offers anatomical and functional benefits independent of a variety of baseline features. As more evidence comes to light regarding improvements achieved with intravitreal triamcinolone, clinicians may develop new paradigms for integrating this modality into their treatment armamentarium,” said Dr. Sarrafzadeh.

Complications included elevated IOP (above 21 mmHg) in half of the eyes in the study. However, even in those eyes, mean visual acuity increased significantly from 20/123 preoperatively to 20/58 at the last visit. All of the eyes that developed elevated IOP required topical glaucoma medications and three eyes underwent trabeculotomy because of poor IOP control.

“When offering intravitreal triamcinolone, we need to be very candid with these patients in warning them about the potential complications, including IOP elevation and uveitis, and the interventions that may be needed to manage these events,” Dr. Sarrafzadeh said.

“While the benefits of focal laser treatment are well-established, we do have other tools in our armamentarium. Therefore, rather than starting everybody with just laser treatment or at the other extreme, using everything in everybody, we believe it is better to target our approach based on the individual clinical situation. To that end, we have developed a simple list of recommendations on how to initiate intervention. We recognise, however, that is the easy part. Knowing what to do next if the treatment fails is more difficult and a decision that will require additional clinical trial data,” Dr. Sarrafzadeh said.
Toric posterior chamber phakic IOL effective over long term for myopic astigmatism

Dermot McGrath
in Barcelona

THE toric implantable contact lens (ICL, Staar) provides safe and stable correction of moderate to high myopic astigmatism, according to a study presented at the 8th Winter Refractive meeting of the ESCRS.

Tobias Neuhan MD reported outcome data from a series of 38 eyes with a mean follow-up of 21 months and a maximum follow-up of four years. Patients presented with myopia ranging from -4.0 D to -1.4 D and regular astigmatism between 1.5D and 8D. All eyes had a minimum anterior chamber depth of 2.8 mm and a corneal diameter of at least 12.0 mm.

The toric ICL predictably corrected sphere and cylinder in the majority of eyes and was associated with good functional outcomes. The phakic IOL maintained a stable position after implantation and was associated with a favourable safety profile so far as well.

“We now have reasonably long-term follow-up for the toric ICL and it has proved its efficacy and safety to date. The toric ICL deals with one of the key issues for any phakic refractive lens, which is astigmatism, and it also helps other refractive procedures to stay in their safety zones,” said Dr. Neuhan.

Postoperative uncorrected visual acuity was 20/40 or better in 92 % of eyes. A small number of the implants (5.0 %) had to be readjusted because of inaccurate axis alignment during the surgery. Some 39 % of patients experienced a gain in best spectacle-corrected visual acuity of between one and four lines. No loss of BSCVA was observed.

One patient developed an intraocular cataract two weeks after surgery, which Dr. Neuhan said was probably surgically induced.

Discussing the properties of the lens, Dr. Neuhan said that the toric version of the ICL is constructed of the same collamer material as its spherical counterpart and also has the same platespheric design, size, thickness and configuration.

The lens is implanted through a 3.0 mm temporal clear corneal incision and positioned behind the iris posterior to the iris plane and into the sulcus. However, the toric ICL features a central convex/concave optical zone design with spherical cylinder in a specified axis location to address the unique astigmatic conditions of each individual patient.

Additional measurements are necessary for the toric ICL before surgery, since in addition to the dioptere values, the axis is central to the correction of astigmatism. The surgeon must ensure that the implanted lens does not rotate inside the eye and that the correct position of the axis is maintained long-term.

A recent Swiss study, presented at the ESCRS Congress in Munich last September, suggested that the design and material of the toric ICL made implantation more challenging and led to istrogenic cataract in a high proportion of patients who had been implanted with the toric ICL.

“Compared with the spherical version, insertion of the toric ICL is overall more traumatic and seems to increase the risk for contact with the crystalline lens,” commented Dr. Borret, one of the chief researchers of the study. She explained that the toric ICL is more rigid than its spherical counterpart and sometimes unfolds asymmetrically in the anterior chamber, a phenomenon that may occur because of the presence of the cylinder correction. Furthermore, the ICL lacks manipulation holes, and that feature makes the insertion of the foepsticks more complex. The lens is available in power ranges of -6.0 D to -23.0 D and for correction of +1.0 to +6.0 D of cylinder. While initial lens power calculation were performed by Staar Surgical based on subjective refraction along with information from automated keratometry and corneal topography, Dr. Neuhan said that since 2002 an electronic calculation program has enabled him to perform the power calculations himself.

He also noted that while the indications allowed corrections up to -23.0 D he personally preferred not to perform ICL implantation in patients beyond the range of -15.0 D with some degree of astigmatism present.

“Intraoperative complications are rare but the potential risk of this unique phakic refractive implant is the loss of accommodation if cataract formation occurs,” he said.

In selecting best-case scenarios for using the toric ICL, Dr. Neuhan said that his clinical experience suggested that the lens was ideal for “rehabilitation” after lamellar or penetrating keratoplasty, in patients with high ametropes combined with astigmatism, or for biopsics, a combined procedure in which the ICL is implanted before a subsequent LASIK treatment.

“In my view, it is currently the only genuine customised implant, although we know that other customised ICLs are on the way and may offer additional treatment options for conditions such as keratoconus in the future,” he said. “The nomogram is very reliable and the postoperative refraction remains stable even after four years.

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EuroTimes September 2004
Hearts and Minds: Effects of pulse and neural adaptation on aberrations

Laurent Castellucci
in Fort Lauderdale

IMPROVED wavefront measurement techniques are revealing the subtle effects of factors such as heartbeat and neural adaptation on optical aberrations, reported researchers at the annual meeting of the Association for Research in Vision and Ophthalmology (ARVO).

As wavefront aberrations have become more and more important considerations in refractive surgery, interest has grown in the possible interaction of other factors with those aberrations and visual acuity, noted Pablo Ardal PhD.

"From the beginning of using this technology, we have had some indication that perhaps the visual system may be adapting somehow to the particular aberrations," Dr Ardal said.

Last year, his group at the University of Murcia in collaboration with David Williams's group at University of Rochester confirmed this, presenting results using blur-matching that showed the neural visual system is adapted to the eye's particular monochromatic aberrations. These results were published in the Journal of Vision (http://journalofvision.org/4/4/4).

But this work left many questions unanswered. For example: for what amount and what types of aberrations can the system compensate? How does it do it? What is the temporal scale of this adaptation?

Some clinicians have suggested in different experiments that the visual system needs months or weeks to adjust to changes in aberrations. Other experiments showed adaptation taking place in only minutes.

"We didn't know exactly what the rate was. If we had adaptation in minutes, we could probably do experiments with adaptive optics. If we had to wait weeks or months, it would not be possible to do these experiments with adaptive optics," Dr Ardal said.

Dr Ardal's group performed additional experiments using adaptive optics to further explore the temporal dependence of this adaptation process. They used an adaptive optics system to induce wavefront aberrations with associated changes in the point spread function in eight healthy volunteers.

The researchers measured visual acuity through an artificial pupil of 6.0 mm. Volunteers were shown the letter E in one of 4 possible orientations, (to the left, to the right, up, or down). They viewed the stimulus through the adaptive optics system with their own aberrations or with a rotated version of their aberrations. Visual acuity was measured after periods of continuous adaptation to the rotated version of the aberrations.

All of the volunteers had initial logMAR acuities lower than 1.0. After rotating the aberrations 45 degrees, average visual acuity decreased 25%. After 15 minutes of continuous viewing through the rotated aberrations, visual acuity returned to near normal, with up to 70% of the normal acuity. Recovery increased to near normal total after 25 minutes. Interestingly, in every subject the visual acuity got worse again after 30 minutes.

"Each subject does have his or her own values, but you see an overall that you have an exponential increase, and at 30 minutes, you get extremely high error bars. We think this can be attributed to them getting tired," Dr Ardal said.

Testing in both monochromatic and polychromatic light showed similar results, as did using low contrast VA and blur matching.

Dr Ardal suggested that the results follow a double-exponential model, with some rapid decay and then some further decay that continues over longer time.

"We did a nice fitting with one exponential, and it fits very well. But the problem is that because of the one exponential, in about one hour, it projects that you will have recovered your normal visual acuity, but in about three hours, it projects that you will have infinite resolution," Dr Ardal acknowledged that in studies such as prism inversion, patients have taken a day to adapt, which may mean the time needed to adapt may have to do with the type of aberration. More experiments will be needed to address the many questions still unanswered. But all these results may have very important practical applications for refractive surgery in the future, he stressed.

THE DYNAMICS OF PULSE

The aberrations of the eye themselves display dynamic behaviour. While the cause of the dynamic aberrometric behaviour remains a mystery, there is some correlation with the pulse and eye movements, corneal pulsation, the high frequency component of the microfluctuations in accommodation, and intracocular pressure, noted Karen Hampson of the Imperial College in London.

She attempted to discover more about the links between pulse and RMS (root mean square) error. She measured the wavefront aberrations of five volunteers with a Shack-Hartmann sensor operating at 21 Hz. The pulse-pressure wave was simultaneously measured, as was the heart rate variability. Further experiments were carried out on two volunteers in whom the properties of the pulse and heart rate variability were changed to see if corresponding changes could be observed in the RMS wavefront error. One example included a comparison between a subject holding their breath and breathing deeply.

Some correlations were observed between the aberrations and some components of the pulse and heart rate variability. However, the particular frequencies and aberrations varied widely from person to person, with no apparent causal relationship. For example, the study showed no real contribution to the RMS error from holding one's breath or changing heart rate.

"The pulse is not sufficient to account for the shape of the power spectrum of the RMS wavefront error. While pulse plays a role in the dynamic characteristics of the higher-order aberrations, it can't account for all of them," she said.

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You can get an update on the clinical applications of wavefront sensing at the ESCRs Congress in Paris.

Events include: the Workshop in Visual Optics on Sunday, 19th September; and the ESCRs symposium "Using Wavefront Technology To Maintain The Physiology Of The Cornea" on Tuesday, 21st September.
Coherence function for the pulse and rms wavefront error for two subjects.

Comparison of rms wavefront error, pulse, and HRV PSD for one subject deep breathing and holding their breath.
Research into AMD pathogenesis suggests new treatment and prevention strategies

Cheryl Guttmann
in Miami

RECENT research on the pathogenesis of exudative age-related macular degeneration (AMD) is suggesting new targets for innovative approaches to both treatment and prevention, according to Scott W Cousins MD, Bascom Palmer Institute, University of Miami, Miami, Florida, US.

“Angiogenesis inhibition is at the foundation of most ongoing clinical trials of investigational agents for the treatment of AMD-related choroidal neovascularisation.

However, there are a number of other paradigms for conceptualising this disease. Over the next ten years, we can expect those new ideas will fuel a pipeline of alternative interventions that will propel us into an exciting new era in the management of this potentially blinding disease,” said Dr Cousins.

In his own laboratory, Dr Cousins and his co-workers have been focusing on the role of inflammation in the development of AMD-related CNV with special attention to the involvement of macrophages. Other research in this field is concentrating on contributions of various environmental factors, such as exposure to cigarette smoke, and systemic health factors, including hormonal influences.

However, among the new pathogenesis paradigms that are under investigation, Dr Cousins characterises the role of inflammation as the one most likely to first result in new therapeutic approaches.

“There are already a few clinical trials underway investigating the use of anti-inflammatory drugs plus anti-angiogenic agents or other modalities, and we can expect that in a few years our management will be based on dual therapy rather than treatment with a single drug,” Dr Cousins said.

Realisation that AMD may be an inflammatory disease is an extension of the growing recognition in medicine that inflammation and infection play an important role in the development of a variety of degenerative diseases, including Alzheimer’s disease and atherosclerosis. With respect to AMD, two areas of intense research are the roles of complement and macrophages.

Dr Cousins and colleagues have documented the presence of blood-derived, highly activated macrophages in the retina and neovascular membrane in eyes with exudative AMD. Their studies in animal models of laser-induced choroidal neovascularisation show that treatment to deplete blood monocytes and lymph node macrophages was effective in decreasing choroidal macrophage density and CNV severity.

Dr Cousins speculates that the “savage” white blood cells have been recruited into the choroids from the circulation where they are playing a detrimental role in promoting progressive retinal degeneration rather than being helpful scavengers. That hypothesis has led him to develop a test for categorising AMD patients into risk groups based on analysis of the macrophages in blood specimens.

“Currently, we are studying the potential value of that test for identifying patients who would be the best candidates for risk modification with anti-inflammatory treatment,” Dr Cousins said.

Also in the area of anti-inflammatory treatment for AMD, knowledge that verteporfin (Visudyne) photodynamic therapy elicits a significant inflammatory response has provided a rationale for studies of combination treatment with anti-inflammatory drugs. Results will be available soon from a recently completed, National Eye Institute-sponsored study that randomised patients undergoing PDT to treatment with ceteolixib (Celebrex, Pfizer) or placebo. Ceteolixib offers anti-inflammatory activity via its inhibition of cyclo-oxygenase-2, but of added interest, it appears to have anti-angiogenic properties as well.

Preliminary reports of data from that trial are encouraging, and meanwhile, results from a number of case series suggest a benefit from using intravitreal triamcinolone acetonide as an adjunct to PDT, he noted.

“More extensive trials are being planned for both of these dual approaches with the idea that a variety of different anti-inflammatory agents can be combined with PDT to improve the functional and anatomic results of that intervention,” Dr Cousins said.

Related to the role of inflammation, there is also interest in the contribution of infectious agents to the pathogenesis of AMD. Against the background that both bacterial and viral agents have been implicated as triggers in promoting atherosclerosis, Dr Cousins notes that his group and other researchers have found the same provocative connection between the presence of exudative AMD and high antibody titres for cytomegalovirus and the bacteria Chlamydia pneumoniae.

“One theory about the mechanisms of immune system amplification in AMD and other neoro-degenerative diseases cites an infectious trigger. Confirmation of that association would suggest a possible therapeutic role for anti-inflammatory agents, particularly as prophylactic intervention to prevent neovascularisation in high-risk AMD patients,” Dr Cousins said.

Interest in environmental risk factors is centring particularly on cigarette smoke as accumulating evidence points to cigarette smoking as the most potent lifestyle risk factor for the development of both dry and wet AMD.

“It has been well-known for four decades that direct and passive exposure to cigarette smoke contributes to increased severity of a number of vascular diseases. As AMD is an ocular vascular disease, it is not unexpected that cigarette smoke is toxic to the macula,” Dr Cousins said.

Results from animal models point to nicotine as playing a particularly harmful role in promoting progression of CNV. That information suggests that advice to “patients about smoking cessation should include a recommendation about avoiding nicotine-based cessation aids, such as patches or chewing gum.

However, Dr Cousins notes that the role of cigarette smoke in AMD pathogenesis may have implications relevant to non-smokers, not only because of the hazards of passive cigarette smoke exposure but also considering that of the 4,000 toxic substances comprising cigarette smoke, many are found as pollutants in the air of developed countries.

“Elucidation of the potential implications of that information is the focus of a number of investigators around the world,” Dr Cousins said.

Just as the roles of post-menopausal oestrogen loss and oestrogen replacement therapy in cardiovascular disease have been the focus of many studies, so too is attention being directed to the effect of that hormone on AMD development and progression. For example, the Women’s Health Initiative—Sight Exam study that is currently underway is evaluating the effect of oestrogen replacement on the risk of developing AMD-related blindness.

While the results from that trial are still pending, relevant preclinical studies show that loss of oestrogen predisposes female animals to more severe manifestations of macular degeneration, while treatment with pharmacological doses of oestrogen further exacerbates the pathology.

“Currently, it remains unclear what to recommend to AMD patients about oestrogen therapy as well as about ingestion of soy and plant-derived phytoestrogen supplements that are being widely used as natural remedies for hot flashes. Hopefully, that information will be available soon so that we can better counsel our patients,” Dr Cousins said.

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Defective sight inspires artistic vision

Daili O hluain
in Chester, UK

FOR many years physicians and artists have debated the role of visual disturbance and the creative process. Some have held that eye dysfunction could be at the heart of some of the world’s greatest art, with different disorders contributing to various art schools and the artistic styles of some painters.

Impressionism, for example, with its focus on contours and colour at the expense of detail, could be the product of myopia. It is already widely known that cataracts cause colour distortion towards the red end of the spectrum, and it very probably influenced the art of Monet. Astigmatism, on the other hand, could have contributed to the elongated figures in some of the works by El Greco.

The list of artists who may have been inspired by their handicaps to create unique works is impressive, including Renoir, Cassatt, Turner, Cezanne, Picasso, Degas, Dufy, Derain, Braque, Vlaminck, Rodin, Segonzac and Matisse.

Speaking at UKCRCS 2003, Chintant Sanghvi MD reported that cataracts have a long history in art. He told the congress that the style of the later works by Claude Monet, Mary Cassatt and Joseph William Turner, may have been influenced by cataracts.

“As we know, cataracts impair visual acuity and contrast sensitivity and cause glare. For the artist with a cataract, these effects can result in a loss of fine detail and difficulty resolving form, but perhaps the most important effect is on colour perception,” she said.

For example, Monet’s ‘Japanese Bridge,’ done in 1900 is rich in detail, while a later painting of the same scene, done in 1922, reveals muddy and darker tones and the bridge is now barely recognisable, Dr. Sanghvi told the conference.

“Many of these later paintings verge on the abstract, with colours bleeding into each other,” she said. Similarly, Mary Cassatt, probably the most famous female impressionist, was afflicted by cataracts at 56 years of age and Sanghvi noted that characteristic detail of her earlier work disappeared.

“This can be seen in her pastel of ‘Margot’ which was done at age 58,” she said. “Although it is a great painting in its own right, in comparison to ‘Lydia’ it is marked by a limited use of colour and relatively little detail. In her later work her canvasses became much larger, coinciding with her loss of visual acuity.”

With Joseph William Turner there was a colour shift in his paintings in the latter part of his career and this might be explained by nuclear cataracts, which abate the light.

“The paintings done at an earlier age illustrate the distinct outline of the subjects, in contrast to the hazy appearance and predominant yellow of his later works,” said Dr. Sanghvi.

Ocular pathology in art is a perennial theme, and not only in ophthalmology. A paper in the Journal of Clinical Neuroscience by Australian neurosurgeon Dr. Noel G. Dan MD synthesised the theories and raised questions that link defective sight to artistic vision.

“Edgar Degas was a high myope which may have affected his entire life,” Dr. Sanghvi said. “His loss of vision became so great that in the latter part of his life he used photographs of models and horses to bring them within his visual range,” writes Professor Dan.

Degas moved to pastels when he could no longer work with oils, and towards the end of his life he sculpted by feel rather than sight.

Similarly, another theory links the work of El Greco to astigmatism. It has been argued that the elongated figures for which El Greco is famous were due to his astigmatism, notes Dr Dan.

Less controversially, Dr. Dan demonstrates, like Dr. Sanghvi, how cataracts affected the sight of Monet.

Cataracts, astigmatism and myopia are not the only pathologies to affect major artistic styles. Dr. Dan believes. Internal deformities can affect both the style and the subject matter of an artist’s work. After he suffered from a vitreous haemorrhage in 1930, Edvard Munch used the lens of his eye as a magic lantern to project the pictures of his damaged eye directly onto paper.

“Art is a personal passion,” Professor Dan told Eurotimes in an interview by email. “The Clinical Neuroscience paper was a lecture to a group of neurosurgeons who asked that it be published. Art often gives certain insights and patients show many of the features which also present themselves in artists.”

However, the theory linking defective sight to artistic styles causes controversy in the art world and his paper has since drawn sharp criticism.

“I strongly disagree! I am convinced that the artists discussed knew exactly what they were doing, and that their reasons for painting as they did were part of their basic artistic programmes, and had nothing to do with eyesight problems. Except, perhaps, a few late works by Monet which do seem to reflect the impact of his cataracts,” said Professor John House of Courttauld Institute of Art, London.

The sensitivities of the art world were not lost on Dr. Sanghvi.

“Of course, all this is speculative and these paintings may actually represent a mature change in style, but given the evidence the theory of visual problems should not be dismissed,” she told the conference.

Nonetheless, the topic has drawn sustained academic interest. The University of Calgary’s Division of Ophthalmology has a website, developed by its Vision and Aging Lab, where visitors can view a permanent tutorial on art and defective vision, available online at: www.psych.ucalgary.ca/pace/va-lab/AVDE/Webstite/default.html.”

Professor Donald Kline, the lab’s director believes the visual problem have had an effect, Dan’s article is unhelpful.

“The Dan article does not appear to have done a very thorough job of investigating the fascinating potential relationships between visual loss and artistic output. A great deal of care needs to be exercised in advancing these ideas, as almost inevitably draws a lot of criticism from the art community, many of whom would like to see all change as wholly ‘muse-inspired’. While I too believe that vision loss can play a role in artistic work, even a few mistakes can lead to the inappropriate rejection of the ‘real’ effects of vision loss.”

Certainly scientific evidence supports some of the theories. “O. Albertson demonstrated that the use of 0.0 D astigmatism correcting lens at 15 (degrees) axis would produce the same figure as some of El Greco’s paintings,” Dr. Dan wrote.

“Ultimately the broader implication is the question raised by embodying deformations into mainstream artistic practice and then marketing them as happened with Impressionism initially I suspect that photography also set the circumstances for realism not to be so important in artistic representation,” said Dr. Dan.

At the conference, Dr. Sanghvi was also keen to emphasise that these paintings represent an opportunity for ophthalmologists.

“For art, these paintings provided the template for change and a natural evolution of 20 century abstract art. And for us (ophthalmologists), I think these paintings give us a unique insight into the world as our patients see it.”


If you would like to read more about art and vision, you might want to have a look at The Eye of the Artist - (1997 - Mosby) by Michael Marmon & James Raven; The Artful Eye - (1995 - Oxford University Press) Richard Gregory, John Harris, Priscilla Kell & David Rips (eds.) and “Vision of the Famous; the artist’s eye”, Ophthalmic & Physiological Optics, 1992, p. 82-90, David Elliott and Amanda Skiff.

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www.psych.ucalgary.ca/pace/va-lab/AVDE/Webstite/default.html. © 2020 Courtauld (UK) Institute of Art
AT CHRISTMAS TIME

GOUDA SWAPS CHEESE FOR CAROLS AND CANDLES

One night a year, an already magical medieval city in Holland adds music to its Gothic architecture and becomes a place of enchantment. On December 14, the people of Gouda forget cheese, switch off the electricity and sing carols by candlelight in the market square. Around them, the 300 or so historic buildings of the city, including the vast, pinnacled town hall dating from the 15th century and the 123-metre-long St. John’s Church with its 16th-century stained-glass windows once again appear as they did on the long winter nights when they were first built, when Gouda was one of the five most important cities in Holland and as big as Amsterdam. Afterwards singers can feast on Goudse Stroopwafels, the thin syrup waffles that are a local delicacy.

For details, see www.visholland.com.

PROBABLY THE BEST DANISH COLLECTION GOES TO LONDON

Masterpieces from the Carlsberg Glyptotek museum in Copenhagen are on display in Britain for the first time at the Royal Academy in London until December 10. Ancient Egyptian Post-Impressionism shows the collection of antiques and French and Danish 19th-century painting and sculpture built up by father and son Carl and Holger Jacobsen, descendants of the founder of the Danish brewery Carlsberg. Among some 250 works on show will be exceptional examples of Greek, Roman and Etruscan sculpture collected by Carl, who also acquired contemporary works by Danish Golden Age painters. After his father’s death in 1914, Holger continued amassing the Impressionists and Post-Impressionists his father deemed as “awful, mannered and ghastly.” Eventually Holger bequeathed the museum a fine collection of works by Monet, Manet, Degas, Cézanne and Gauguin.

For details see www.royalacademy.org and www.glyptoteket.dk.

CELEBRATE DYNAMITE AND CANDILEIGHT IN SWEDEN

Depending whether you are a child or an exceptional adult, there are two red-letter days in the Swedish calendar in December. The first date, December 10, is when the King of Sweden awards the Nobel Prizes. For more than a century, the prizes have marked the world’s greatest achievements in physics, chemistry, medicine, literature and peace as decreed in the will of Alfred Nobel, the inventor of dynamite. But what if you are not part of the august gathering for the prize-giving at the Stockholm Concert Hall? Then, like everyone else in Sweden, you can celebrate St. Lucia’s Day on December 13. In medieval times, St. Lucia, a 4th-century martyr from Syracuse, on the island of Sicily, was revered as the patron saint of sight and of the blind. Artists often depicted her holding a dish containing her eyes. In present-day Sweden, her festival marks the beginning of the Christmas season. Wearing a crown of lighted candles, a school girl assumes the role of St. Lucia. Followed by boys and girls dressed in white, St. Lucia visits schools, hospitals, shops and offices singing traditional songs and handing out coffee, gingerbread biscuits and saffron buns known as “Lucia cats.”

For details, see www.visit-sweden.com.

SEE FRENCH FOWL ON THE MOVE

In the village of Liécurges, a short distance inland from Calais in northern France, a different kind of procession heralds the coming of Christmas. Over the weekend of December 11 and 12, the village celebrates the rearing of free-range poultry, particularly turkeys. First farmed here by monks, the birds are ived here via Latin America through Spanish explorers. This area of France is still known as Les Trois Pays — the three lands — because it was there, in the 16th century, that borders of the English, French and Spanish kingdoms met. Now that the French eat almost as much turkey every year as the Americans, connoisseurs come to Liécurges to buy the best birds. But before they can grace the Christmas table, the condemned birds must parade through the streets of Liécurges, accompanied by local officials, to be adored by onlookers fortified with the local liqueur, also known as liqueurs.

For details, telephone +33-3-21 35-80-03 or see www.cc-trois-pays.fr/liiecurges.

FOLLOW THE DUTCH DEEP INTO CHRISTMAS

The spa-town of Valkenburg in Holland has been a tourist destination for more than 150 years. Valkenburg is well set up for winter visitors with not only heated pavement cafés but also two Christmas markets, running from mid-November until December 21. Uniquely both markets take place underground in the caves and once-secret passages that run through the yellow marlstone on which the town’s now-run down castle was built in 1050. The Gemeentegrot market in the passageways of Town Cave is the largest, with bars and seasonal music. This has been so popular that another market has opened in the Plouweeleegrot, or Wolve Cave, with tableaux on the theme of Christmas around the world, through which Father Christmas makes his rounds accompanied not by a reindeer, but by a suitably subterranean bat.

For details, see www.kerststadvalkenburg.nl and www.vvzseuldamburg.nl.

WALK THROUGH AN ALPINE ADVENT CALENDAR

It can sometimes seem as if the whole of Europe has been given over to Christmas markets in December. But the village of Reith, near the picturesque ski resort of Kitzbühel, in Austria, has devised a unique seasonal attraction. On the night of December 1, one house in the village lights up a window decorated with a Christmas scene. Each night as the month goes on, another house illuminates a decorated window until, on Christmas Eve, 24 houses around the village display brightly lit Christmas scenes in their windows and the whole of Reith becomes an Advent calendar for visitors to walk around. The Advent calendar of light continues until the Feast of the Epiphany on January 6.

For details, see www.kitzbuehel.com.

PLAY AN IRISH MEgalithic LOTTERY

To experience the pre-Christian spirit of winter, apply for tickets to visit the Newgrange passage tomb in Ireland at the winter solstice. Newgrange is the most famous of a group of megalithic burial sites named for their position in a bend of the River Boyne. For a few minutes during sunrise on the winter solstice, the rays of the sun filter through a narrow opening at the entrance of the chamber and dawn a narrow 19 metre-long passage way to the very centre of the tomb. The tomb, which dates from 3,200 BC, is covered with a quarter of a million tons of earth and rock. One of the finest examples of Stone Age mounds in Europe, the tomb features stones carved with spirals, chevrons and lozenges. Each year, the tomb’s visitor centre holds a lottery for about 20 tickets for each sunrise from December 19 to 23. Depending on the year, the solstice falls on December 21 or 22. “By tradition, we celebrate it here on the 21st,” explains one tourist guide. “There’s very little difference on the amount of sunshine seen in the chamber anyway.”

For details, see http://www.knowth.com/winter-solstice.htm.
Neither monumental nor chic, Trastevere has the feel of a Mediterranean village. The narrow streets and alleys of the “People’s Rome” are where you come to wander, enjoying chance discoveries, anonymous ancient buildings, tiny fruit and vegetable markets, and vine-wreathed courtyards. In Trastevere, you are free from the pressure of serious sightseeing, although even on an idle stroll you come upon some of Rome’s most charming and least

by Maryalice Post

Reach Trastevere via Rome’s two oldest bridges across the Tiber; you can also pay your mental respects to the Greek god of medicine on your way. Ponte de Fabbricio sets you down on a small island, Isola Tiberina; from the island, Ponte de Cesto completes the link with the mainland and Trastevere. By legend, the small island was where a serpent sent by Aesculapius wriggled on to dry land to help out during a plague. That was in 289 BC, the island has been dedicated to medicine ever since; one of present-day Rome’s major medical institutions, the Ospedale Fatebenefratelli, has been on Isola Tiberina since the Middle Ages.

Once across the Ponte de Cesto, Trastevere begins. Walk away from the river, down Via della Lungaretta and you’ll soon come to the heart of the district, the Piazza S. Maria in Trastevere. Erected in 337 A.D., it’s thought to be the oldest Christian church in Rome. Most of the present building dates from just after the first millennium but above the porfico is the city’s only surviving example of a medieval church facade: a 12th century gold-ground mosaic. The curious fragments of caved and engraved stone set into the wall under the porfico were scavenged from the catacombs and from the original Basilica. Inside the church are still more breathtaking mosaics. To see the apse revealed in all its magnificence switch on the overhead illumination. To do this, drop a €1 coin in the box by the side of the altar rail. Santa Maria in Trastevere is located on the Piazza di S. Maria in Trastevere; open 08:30 to 19:00.

Before you leave the piazza, you could stop at Di Marzo at No. 14 for coffee. In fine weather, enjoy it on the terrace with a view of the Basilica. Then continue your stroll down the Via della Scala. On the Piazza di San Egidio, you’ll see steps up to the entrance to the unassuming Museum of Rome of Trastevere. Formerly a convent, it’s now an eclectic museum harbouring a strange collection of bits and pieces. You could skip the rest, but it would be a shame to miss the really engaging series of 18th and 19th century prints and paintings upstairs. The works depict every day life in Rome and seem to echo the street life still going on in Trastevere. The Museo di Roma in Trastevere is located at Piazza di San Egidio; open Tuesday-Sunday, 10:00 to 20:00; admission €2.50.

The small piazza of the Church of Santa Maria della Scala is a bit farther along the street bearing its name. The Church is open only for Matins but at one side of the piazza you’ll spot a modern pharmacy. The monks of the Carmelite monastery run it and will, if asked, show you the complete 18th century pharmacy still preserved in the building.

And finally for an idea of what unlimited wealth could buy in Trastevere in the year 1500, you need only continue along Via della Scala until it turns into Via della Lungara. At No. 230 is the Villa Farnesina, a monument to the extravagant lifestyle of the nouveau riche Agostino Chigi. He is said, would instruct his servants to chuck the gold plate on which his guests had just banqueted into the Tiber. When the suitably impressed guests had departed, the servants recovered the gold plate for their master (who was rich, but not crazy) by hauling in the nets previously stretched under the water. A more enduring lifestyle statement were the frescoes Chigi commissioned from Raphael, Sebastiano del Piombo and others that still ornament the interior of the villa. The Villa’s architect, Baldassare Peruzzi, decorated one of the upstairs rooms with an astounding trompe l’oeil painting of arches enclosing views of

16th-century Trastevere. The Villa Farnesina is located at Via della Lungara, 230; open Monday-Saturday 9:00-13:00; admission €3.00.

If Trastevere is sleepy by day, it hums at night. This is where trendy Romans come to dine. If you wish to join them, here are some suggestions:

• ROMOLO. Once the home of Raphael’s mistress, La Fornarina (the baker), close enough to the Villa Farnesina to distract him from his work. In good weather, you can enjoy your meal in the garden. Via di Po mo Settimiano, B; telephone +39.06-581-8284; open Tuesday-Sunday 12:00 to 15:00 and 19:00 to 24:00.
Great wine and good food create la dolce vita in Rome

Il Palazzetto has its feet on the ground on Vicola del Bottino but its head in the air. Its rooftop terrace looks out across Rome’s famous Spanish Steps. In between are the five elegant floors of the International Wine Academy of Roma.

For centuries, Il Palazzetto was one of the favourite residences of an aristocratic Roman family. Abandoned in 1980, it lay empty until 1998, when film director Bernardo Bertolucci used it as the setting for L’assedio (The Besieged), the story of a pianist’s romantic pursuit of a beautiful African servant.

In September 2002, Il Palazzetto opened as the "Wine Academy of Roma," an informal club and meeting place for wine lovers. Today, a pre-dinner guided wine tasting in the library, or a gastronomic lunch or dinner in the garden (roofed and heated in winter), is the kind of refined delight which makes Rome “Rome.”

The work of transforming an abandoned historical building into a luxurious and welcoming setting for the appreciation of fine wine took three years. It began when Roberto Wirth, owner and manager of Rome’s ultra-prestigious Hotel Hassler, acquired Il Palazzetto in 1999. He decided, along with a group of like-minded friends, to express his own enthusiasm for fine wines and food by making Il Palazzetto the headquarters of an International Wine Academy.

The subsequent renovation of the palazzo brought to light ancient materials and finishes such as the original marble pavement of the ground floor which dates from the year 500AD, and the wrought iron of the magnificent spiral staircase, dating to the end of the 1800s. As other architectural details were uncovered, they were restored and reinstated, bringing the building back to harmonious life.

Responsibility for coordinating the educational activities of the Academy was entrusted to Steven Spurrier, who established the Wine Academy of Paris in 1973 and the wine course at Christie’s in 1982. He orchestrates the daily wine tastings, the lunches and dinners at which food and wine are carefully matched, and the various educational courses, which are held at the Academy on a half-day, weekly or full week basis.

Recently, three beautiful bedrooms – one with frescoed walls – have been opened on the upper floors of Il Palazzetto making it possible for a lucky few to stay in an historical palace in the heart of Rome.

TO SAMPLE THE WINE:

Wine tastings, guided by a master sommelier, are held Monday to Friday between 6 and 7 pm. A platter of gourmet cheeses and cured meats accompanies the tastings. €20 per person; reservations are essential. For those who prefer to taste wine on their own, Il Palazzetto’s wine bar is ideal for a casual glass of wine; there are 400 to choose from, along with a cheese and meat platter or an appetiser.

Il Palazzetto’s restaurant, under Chef Antonio Martucci, serves modern Italian fare combining fresh ingredients in adventurous ways. Dinner costs about €50 per person, plus wine. For more information, or to make a reservation for a wine tasting, lunch or dinner: telephone +39-06-699-0878; email info@wineacademyroma.com; visit www.wineacademyroma.com; or write Il Palazzetto, Wine Academy of Roma, Vicolo del Bottino, 80187, Rome, Italy.

Il Palazzetto’s bedrooms, each with stylish bath en suite, cost from €200 to €250 per night, including tax and continental breakfast. To book, contact Monica at the Hotel Hassler. Telephone +39-06-6973-46.

The 9th ESCRS Winter Refractive Surgery Meeting will be held in Rome from Feb 4 – 6 2005
For more information visit www.escrs.org
Custom ablation puts the focus on quality of vision

Dermot McGrath
in Paris

WAVEFRONT-GUIDED customised ablation is capable of improving both quantity and quality of vision for patients, but surgeons should be aware of its limitations and not consider it a silver bullet solution for all refractive ills.

That was the broad message to emerge from a number of papers presented here at the annual meetings of the French Implant and Refractive Surgery Association (SAFIR) and the French Society of Ophthalmologists (SFO).

“Using customised ablation, the concept is to correct not only sphere and cylinder as with traditional laser refractive procedures but also the higher order aberrations (HOAs) that can really impact on a patient’s quality of vision,” said Olivier Prisant, MD.

Dr Prisant, who works in the Ophthalmology Department of the Foundation Rothschild in Paris, said that it was crucial for surgeons to appreciate that while excellent results were achievable with the latest customised ablation systems, there were limitations to be borne in mind for such procedures.

In particular, he noted that the final ablation could only ever be as accurate as the current measurement systems permitted and that there were certain uncontrollable variables that made it more difficult to consistently achieve the desired refractive outcome.

To illustrate the point, Dr Prisant cited the problem of obtaining repeatable and predictable aberrometric measurements. “The problem of achieving consistent aberrometry measurements has been well analysed by Larry Thibos who effectively demonstrated that while repeatability is good over the course of the same day, it is less good from one day to the next, and even less so when evaluated from one month to the next,” he said.

Another important factor which can play a role in giving variable measurements is accommodation of the eye, noted Dr Prisant, since when the eye accommodates, the lens changes shape which may also induce changes in higher order aberrations. Similarly, the fact that most aberrometric measurements are taken through dilated pupils after cycloplegia also means that the system is not capturing the eye’s HOAs under normal physiological conditions.

Furthermore, pupil size, which can alter as a result of varying conditions of light, dark, accommodation and convergence, also affects HOAs and makes repeatable measurements all the more problematic to obtain.

The time factor
The ageing process introduces another important variable into the equation, noted Dr Prisant. “At a certain point we can take a profile of HOAs in the eye, but we have to appreciate that over time the ageing process induces changes in the lens and cornea that will significantly alter the aberrometric profile,” he said.

Biomechanical factors also have to be taken into account, in particular the conditions of the corneal interface and tear film properties. Dr Prisant pointed out that corneal pachymetry tends to change during the course of the day, introducing another, potentially crucial variable into the procedure.

Another technological limitation concerns the fact that aberrometers take measurements using monochromatic light, whereas the eye perceives the world using multiple wavelengths. Current wavefront sensors are therefore unable to detect polychromatic aberrations, which might have a role to play in determining a patient’s overall quality of vision.

Beyond the limitations imposed by aberrometric measurements and other physiologica and biomechanical factors, delivery systems are another vital component in obtaining desired refractive outcomes.

Dr Prisant cited the example of using a small-spot Gaussian beam laser with advanced eye-tracking technology to ensure pinpoint ablation, proper axis alignment and to minimise the effects of cycloptorsion.

He further noted that the creation of the flap in LASIK procedures may itself be responsible for inducing its own aberrations and that LASERK and PRK may therefore offer superior outcomes in terms of correcting eyes with higher order aberrations.

According to Dr Prisant, the role of neuroophthalmology in vision also has to be taken on board by surgeons.

“Even if we achieve what appears to be a perfect optical result, we still have to determine to what extent the brain is actually capable of capturing these perfect images. Perfect optics do not necessarily assure perfect vision,” he said.

Despite these limitations, Dr Prisant believed that custom ablation has much to offer in improving the quality of vision of refractive patients.

“As the research of Dr David Williams has demonstrated, a subjective improvement in the patient’s quality of vision can be achieved, as well as an improvement in visual acuity and contrast sensitivity,” he said.

In a separate presentation, Beatrice Cocker MD, who works at the head of the ophthalmology department at Brest University (France), told delegates that custom ablation marked a clear point of departure from conventional refractive surgery.

“The ability to connect an aberrometer directly to an excimer laser for an integrated system that takes account of both quantitative and qualitative data marks an important technological development for refractive procedures,” she said.

Dr Cocker said that as recently as two years ago, customised ablation was an approach that had fallen short of its early promise. “Initial results were less than satisfactory. Procedures were long and costly, the results were not markedly different to conventional ablation, there was a tendency to undercorrect and the fact that we were unable to treat irregular astigmatism were among some of its more obvious limitations,” she said.

Marketing outstripping clinical reality
She noted that while much had improved in the intervening period, surgeons still needed to be cautious in their deployment of such systems as the marketing was still running ahead of the clinical reality.

She stressed that more randomised, controlled, multi-centre trials were needed to objectively validate the claims of the manufacturers and objectively compare various available systems. Moreover, the fact that the systems used non-standardised methods of measuring and treating aberrations meant that no meaningful direct comparison was possible between different systems.

Like Dr Prisant, she noted the high number of variables that made it almost impossible to obtain reproducible and predictable aberrometric measurements.

“We know that the physiology of the eye modulates and influences the type and degree of aberrations. It varies from one individual to the next, over the course of a day, depending on pupil size, accommodation, age and other factors. We also have to appreciate the existing natural aberrations of the eye which might in fact be needed for obtaining perfect vision, and we are still not sure which aberrations might be worth keeping to maintain a patient’s quality of vision. Definitely, ‘SuperVision’ appears to be defined in terms of vision quality and not only in terms of best visual acuity increase,” she said.

She added that there were certain obstruc-

cles that remained to be overcome for wavefront-guided custom ablation to fully deliver on its promise. For example, she pointed out that there was a considerable gap between the aberrations that could be detected by wavefront sensors (up to 18th order and beyond) and those that could actually be treated by the current generation of lasers (up to the 8th order).

Irregular astigmatism also continued to pose an ongoing problem for custom ablation platforms, she said, as it was not possible to take accurate wavefront measurements of corneas that were very irregular.

She added that more research was needed on establishing whether certain aberrations stemmed from the retina, the lens or the cornea in certain cases, as this was vital for ensuring predictable outcomes.

“We need wavefront maps which take into account the aberrations of the entire optical system, not just the cornea. We also need to understand more about the role of the brain in vision and how it deals with optical aberrations,” she said.

While the current system of Zernike polynomials had served refractive surgery well in categorising higher order aberrations, she felt that more advanced techniques and technology would ultimately expose its limitations and give surgeons new treatment options for their patients.

She emphasised that custom ablation platforms had improved a great deal in recent years and that while there were still obvious limitations on their performance, they were crucial to patients and the systems brought the promise of ‘SuperVision’ for all to closer reality.

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aprisant@hotmail.com
The evidence suggests that the higher the capillary loss is, the less likely laser coagulation will work.
**CK GAINS MOMENTUM**

Refractec reports record sales and procedure numbers with its ViewPoint conductive keratoplasty system since it gained FDA approval in March of this year. Gross revenue surged by more than 64% to $7.9 million in the first half of 2004, compared to $4.8 million in the same period last year. The number of presbyopic conductive keratoplasty procedures increased by more than 131%. This translated into a rise in gross revenue of more than 175%. The company also sold 97 systems, an increase of 35% over the same time period a year ago.

**AMO EXPANDS CL BUSINESS**

Advanced Medical Optics (AMO) announced it would market Complete Aquavision long-wear contact lenses in Europe and Asia. The company made a deal with CooperVision to sell the hydrogel HEMA/GMA contact lens in those markets. It will sell the lenses alongside its complete line of eye care solutions. AMO also markets the Sensar, Sionis, Array and Verisyse IOLs, as well as the Sovereign phaco machine and Amadeus microkeratome.

**INSPIRING STOCK SALE**

Inspire Pharmaceuticals is one of the latest ophthalmic product companies to test the waters of the US stock market. The company announced the closing of its follow-on common stock offering of 6,900,000 shares of common stock, including 800,000 shares sold upon the underwriters’ exercise of their over-allotment option in full. The shares were at $12.00 per share. The company has two products on the market, Elestat™ for the treatment of allergic conjunctivitis and Restasis® for the treatment of dry eye. Both products are marketed under co-promotion agreements with Allergan. Inspire receives royalties on net sales of both Elestat and Restasis. Inspire also has development and commercialization arrangements with Santen Pharmaceutical.

**OCCULOGIX IPO**

OccuLogix, formerly Vascular Sciences, announced its intention to file a registration statement with the SEC for an initial public offering of stock. OculLogix is an ophthalmic therapeutic company founded in 1996 to commercialize innovative treatments for eye diseases, initially targeting the dry form of AMD. The company is developing the rhopheresis blood filtration method with the goal of halting progression of the dry AMD.

**RNAI DRUG TO CLINIC**

Acuity Pharmaceuticals filed an Investigational New Drug application with the FDA to initiate Phase I clinical trials of Cand5, its lead product candidate for treatment of wet age-related macular degeneration. Cand5 is the first of a novel class of compounds called small interfering RNA to reach the clinical trial stage. These compounds use RNA interference (RNAi) to shut down genes that promote the overgrowth of blood vessels that leads to vision loss in wet AMD. Cand5 shuts down the production of vascular endothelial growth factor, shown to be the central stimulus in the development of wet AMD and diabetic retinopathy. Phase I studies are scheduled to begin as early as September 2004, pending the FDA review.

**GDX DEVELOPERS REACHING RECORD LEVELS**

Laser Diagnostic Technologies, developer of the GDXvCC retinal nerve fiber layer imaging system for the detection and tracking of glaucoma, announced a record 35% increase in revenue in the past six months. The company attributes the record sales to several factors including published support of the GDXvCC technology by leading glaucoma specialists; improved performance including reliability, speed, clinical benefits, and ease of use; and customer-centered Practice Building programs.

**VISUDYNE SALES INCREASE**

QLT increased revenues and earnings per share for the second quarter compared with the same period one year before. The increases are attributed to increasing success of the AMD photodynamic treatment Visudyne, which had $109.3 million in sales in the second quarter, an increase of 23% from the prior year. Visudyne sales outside the U.S. were $57.2 million, up 30% over the same period last year.

**NEW DISPOSABLE FROM OASIS**

Oasis Medical has introduced a new instrument, the disposable Stromal Hydration cannula to their line of disposable instruments. The new 27g cannula was designed to irrigate the external portion of the stroma for improved sealing of clear cornea cataract incisions. It has a closed, flattened tip and an anterior 0.2mm port. The closed tip ensures that tissue will not clog the port upon entry into the incision. The anterior port location forces hydration to move to the external segment of the stroma, providing improved sealing of the incision.

**BOTOX GOES UNDER COVER**

Botox (botulinum toxin type A, Allergan), which began its career as a treatment for blepharospasm and has since become a major cosmetic treatment has received FDA approval for treatment of severe primary axillary hyperhidrosis that is inadequately managed with topical agents. The FDA approval was based on the results of two Phase III clinical studies, one conducted in the U.S. and one in Europe.
Cell transplants now potential treatment for retinal degeneration

For two decades, scientists have studied how to transplant cells into the eye to correct a variety of visual disorders. The acid test for such an approach is whether cell transplants can actually maintain spatial vision. New joint American and Canadian research in this field provides encouraging results suggesting that transplanting cells into the retina can significantly limit the deterioration of spatial vision in rats.

Blindness can occur when photoreceptor cells in the retinal cell layer or retinal pigment epithelium cells in the adjacent layer of cells deteriorate. The retinal pigment epithelium (RPE) layer, under normal conditions, provides a supportive housekeeping role to the rod and cone photoreceptor cells. If the RPE does not function correctly, the environment for the rods and cones can deteriorate rapidly.

One approach to counter such deterioration would be to provide a fresh supply of either healthy RPE cells or other types of healthy cells that could provide the same functions as RPE cells. Many research groups worldwide have conducted such tests and have shown considerable photoreceptor protection, sustained visual threshold responses, and improved behavioural responses using cell transplantation. The newest research, from the Department of Psychology and Neuroscience in the Canadian Centre for Behavioural Neuroscience at the University of Lethbridge, and from the Moran Eye Centre at the University of Utah, demonstrate that such cell transplantation treatments can have a significant impact on visual acuity. The research team published their findings in the journal Vision Research this summer.

The research group used Royal College of Surgeon (RCS) rats as their model of retinal degeneration. In these rats, the degeneration results from a mutation in a gene known as “Merkt.” Merkt is expressed in the RPE where it encodes a tyrosine receptor kinase protein believed to be involved in the recognition and binding of outer segment debris produced as a by-product of photoreceptor cell activity. The defect in Merkt compromises the ability of the RPE to dispose of the outer segment debris from photoreceptor cells; the resulting shunt provides a healthy environment for the photoreceptor neuronal cells.

The researchers grew the two cell types in the lab in culture dishes before concentrating them into a small volume of liquid to delivery to the rats’ eyes. Using a fine glass pipette attached by tubing to a Hamilton syringe, the cell suspensions were delivered to the sub-retinal space through a small scleral incision. Either 200,000 RPE cells or 20,000 Schwann cells were delivered in 2 microlitres of fluid to the retinas of the rats. The visual acuity of the animals was tested using a visual perception task known as the Visual Water Task. The apparatus to record such data consists of a trapezoidal-shaped pool with a mid-line divider extending into the pool to create a y-shaped maze with a stem and two arms. Two computer monitors face into the wide end of the pool the animals are trained to discriminate between different visual stimuli projected on the computer screens. The rats readily learn to swim towards the platform that allows escape from the water.

After transplantation with the human RPE cells, the rats were tested from four to seven months of age; the results demonstrated that the transplanted animals had a higher acuity than control animals at all ages. The visual acuity of animals receiving Schwann cell transplants were tested at four and five months of age and also showed that the acuity of the transplanted animals was significantly better than the controls.

The researchers concluded that the use of either immortalized human RPE cells or freshly harvested Schwann cells were capable of providing a significant benefit to vision in an animal model.

The report claims to be the first to present a systematic quantitative study examining the spatial vision thresholds in animals following sub-retinal cell transplantation. Using either of the cell types carries both advantages and disadvantages. The human RPE cells have the obvious advantage of replacing into the retina the same cell type that normally resides in this tissue under normal conditions. However, the source of such cells will likely require a parallel use of immuno-suppressants to ensure that the transplanted RPE cells are not attacked and destroyed by the body’s immune system. Also, because RPE cells are derived from a laboratory immortalized cell line, there is the risk that such cells may replicate in an uncontrolled manner, leading to an additional pathology.

On the other hand, Schwann cells would carry no such replication risks. Schwann cells may be harvested from another part of the patient’s body, such as a peripheral nerve. Because such cells come from the same patient, no immuno-suppressant drugs would be required.

From their findings, the researchers commented that because Schwann cells have benefits to vision very different from the RPE cells in an animal model of retinal degenerative disease, it is clear that with the potential of performing autologous transplantation, the path from laboratory investigation is significantly simplified with this cell type.

Although using Schwann cells in such a treatment approach does not address the primary defect of the Merkt gene, the approach does clearly extend the length of useful vision. In the absence of a “cure,” extending such useful vision in a human patient would represent a significant “second best” and, as such, represents a most welcome advance.

Glossary

Retinal pigment epithelium: refers to a pigment cell layer situated behind the photoreceptors that nourishes the retinal cells. The retinal pigment epithelium is attached to the choroid, a layer filled with blood vessels that nourish the retina.

Royal College of Surgeon (RCS) rats: are a widely used animal model of inherited retinal degeneration.

Merkt: Merkt is a protein expressed in the RPE where it is believed to be involved in the recognition and binding of outer segment debris produced by a by-product of photoreceptor cell activity. Mutations in Merkt disrupt the ability of the RPE to phagocytose debris from photoreceptor cells resulting in accumulation of un-wanted material eventually leading to cell degeneration and blindness.

Tyrosine receptor kinase protein: proteins that play an important role in mediating cell signalling processes.

Schwann cells: A type of cell of the peripheral nervous system that helps separate and insulate nerve cells.

Visual Water Task: a specialised training task used to assess behavioural response in rodents under specific experimental conditions.
Vision science highlights from the world’s leading journals of medicine and science

Big epithelial defects a big problem

Large central epithelial defects resulting from LASIK can lead to significant problems including diffuse lamellar keratitis, irregular astigmatism, flap microfolds, and delayed visual rehabilitation, report German researchers. The investigators reviewed a series of 1650 LASIK operations performed at a single centre, finding 22 eyes of 14 patients who developed severe central epithelial defects as a result of surgery. This included 20 eyes with diffuse lamellar keratitis (DLK), 17 eyes with irregular astigmatism, and 12 with microfolds. Eight cases involved both eyes. Nearly all of the eyes lost some degree of best-corrected visual acuity in the postoperative period. Visual acuity did improve slowly, and no eye lost more than one line of Snellen acuity one-year follow-up, two-thirds of the affected eyes had moderate to severe dry-eye symptoms before surgery. JCRS, A Midhata et al, ‘Clinical course of severe central epithelial defects in laser in situ keratomileusis’, August 2004; Vol 30, Issue 8, 1636-1641.

Blocking growth factor enhances graft survival

A growth factor called vascular endothelial growth factor receptor-3 (VEGFR-3) plays a key role in corneal transplantation, say Harvard scientists. More over, animal studies show that blocking the growth factor enhances the survival of corneal grafts. The finding is an important development towards understanding the immune system pathway linking the eye to the rest of the body. The team was able to show that VEGFR-3 was responsible for mobilizing antigen-presenting cells to move into the lymphatic system. Blocking VEGFR-3 by using immunoglobulin blocked the antigen-presenting cells and prevented them from entering the lymphatic system, blocking the immune response. The researchers believe the findings may extend well beyond ophthalmology to other fields, particularly organ transplantation and cancer therapy. Nature Medicine, R. Dana et al, ‘Vascular endothelial growth factor receptor-3 mediates induction of corneal allograft immunity’, August 2004; 10, 813 – 815.

Tumour patients see clearly now

Patients undergoing plaque radiation therapy for treatment of ocular tumours can continue to see during treatment, thanks to new clear lead glasses. Researchers at the Manhattan Eye and Ear Infirmary tested the glasses in a series of patients undergoing treatment with palladium 103 plaque radiotherapy. Until now patients have been required to wear opaque lead patches during treatment. The glasses are as effective as the patch in blocking radiation from escaping into the environment. Patients practiced the ability to feed themselves and otherwise function at home with greater freedom. American Journal of Ophthalmology, PT Finger et al, ‘Radiation-blocking glasses allow vision during photodynamic plaque radiation therapy’, June 2004; Vol 137, Issue 6, 1149-1151.

AMD gene discovered

Genetics researchers report the identification of defects in a single gene that underlie a hereditary form of age-related macular degeneration. The researchers recruited 402 people with AMD and 429 healthy volunteers. They then examined the patients’ DNA, looking for variations in genes that code for fibulins, proteins previously implicated in AMD. Seven of the 402 AMD patients each had a different change in the FBLN3 gene that was not found in the healthy control group. Six of these seven changes altered an amino acid in the fibulin 5 protein. Although the genetic mutations affect only about two percent of patients with AMD, the researchers believe that the findings offer important insights toward understanding the pathogenesis of AMD. NEJM, EM Stone et al ‘Missense Variations in the FBLN3 Gene and Age-Related Macular Degeneration’, Jul 22, 2004; 351: 146-153.

Perimetry promising for PK patients

Frequency-doubling perimetry may prove useful in postoperative glaucoma screening of penetrating keratoplasty patients. German researchers used the technique to assess postoperative corneal topographic changes in 36 penetrating keratoplasty patients. Patients with pre-existing glaucoma or any postoperative intraocular pressure elevation were excluded. Field-testing was equally effective in PK patients and controls. Post-operative corneal topographic changes including keratometric astigmatism, topographic astigmatism, spherical equivalent, and central corneal thickness did not appear to interfere with perimetry testing. Cornea, NX Nguyen et al, ‘Frequency doubling perimetry in patients following penetrating keratoplasty’, 2004; 23(5):423-8.

European refractive surgery volume expected to remain sluggish

The European refractive surgery market will be sluggish for the foreseeable future, if European Union confidence measures are any predictor. The European Union recently reported that consumer confidence for all EU countries in July measured a pessimistic -12, where it has been stuck since late 2003. The index is based on a survey of 25,000 households. Such a measure is a good predictor of future volume of refractive surgery procedures, according to David Harmon, president of Market Scope, a St. Louis, Missouri US company that measures the US ophthalmology market. Mr. Harmon says his company has linked changes in volume of LASIK procedures to changes in consumer confidence measures in every quarter for the past four years. Although he has not compared European consumer confidence measures with LASIK demand in Europe, Mr. Harmon says that the link he has found in the United States may well apply in Europe. As in United States, refractive surgery procedures in Europe are primarily financed by patients themselves, making the demand for procedures easily influenced by the level of consumer confidence, he notes.

Leigh Page

The European refractive surgery market has shown sluggishness in some recently released reports for the second quarter of 2004. For example, Bausch & Lomb reported that sales for refractive surgery products were flat in Europe, even as they were up by nearly 30% in the Americas. Alcon reported that sales for refractive products fell 16.8% in the second quarter. Although the report said nothing specifically about Europe, the report noted an increased demand for LASIK and custom procedures in the United States. Reflecting the surge in sales already space in the United States, consumer confidence measures there – including the Conference Board and AP-Ipsos surveys – show a looming US consumer appetite this summer. Reports in Europe, however, are gloomier. The European Union’s July confidence measure showed slightly positive figures for only five countries: Denmark, Finland, Ireland, Luxembourg, and Sweden. Major refractive surgery markets, however, showed negative consumer confidence in the economy. For example, Germany reported -17 consumer confidence rating. France reported a -16 rating; Spain reported a -11 rating; and the UK reported a -4 rating. A number of countries, including Portugal, Greece, Italy, and Poland reported consumer confidence ratings of -20 or worse. “While households were somewhat more optimistic concerning future unemployment, their views on their own future financial situation darkened slightly,” the European Commission commented in their survey. “Households’ views on the general future economic situation remained unchanged.”

European consumer confidence

A positive number indicates an overall positive level of confidence in the economy. A negative number indicates an overall negative level of confidence in the economy. The numbers reflect the differences between the percentages of respondents giving positive and negative replies.

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Source: European Commission
Caution urged in steroid treatment for laser retinal injuries

Dermot McGrath
in Monte Carlo

STEROID therapy to treat traumatic laser retinal injury should be used with caution in order to avoid potentially severe complications with wound healing, according to an American researcher.

In a presentation here at the 5th International Symposium on Ocular Pharmacology and Therapeutics (ISOPT), Stephen T. Schuscherba, PhD, said that he had set out to test the hypothesis that treatment with the glucocorticoid methylprednisolone would reduce short-term secondary injury from laser retinal injury as well as improve long-term outcomes.

“Evidence-based therapeutic regimens have been developed for traumatic laser retinal injury, but most clinical interventions currently involve the use of glucocorticoid therapy. The purpose of this study was to determine if high-dose steroid use is justified for medical management of traumatic laser retinal injuries. We concluded that in severe laser-induced retinal trauma, the immunosuppressive effects of high-dose methylprednisolone therapy contributed to a variety of unoward wounds healing outcomes, thereby suggesting caution in its use to treat similar injuries in humans,” Dr Schuscherba said.

Dr Schuscherba, who works at the U.S. Army Medical Research Department in San Antonio, Texas, said that primary laser-induced retinal damage such as photo-thermal and photo-mechanical processes induced the onset of early stage secondary damage such as oedema, ischaemia-reperfusion injury, lipid peroxidation and inflammation. These in turn can lead to late stage injury damage such as scarring, scar remodelling and neovascularisation, which can contribute to retinal traction, retinal hole formation, detachments, continued tissue degeneration and vision loss.

Although damage events responsible for tissue degeneration and vision loss are becoming better understood, Dr Schuscherba pointed out that no effective or results-based therapeutics can be confidently recommended for therapy to spare vision.

In the study, 37 New Zealand Red rabbits were either dosed with methylprednisolone sodium succinate about 20 minutes before laser irradiation or were left untreated. Dosing with methylprednisolone was tapered from 30 mg/kg/day to 10 mg/kg/day for five consecutive days. A multiline argon laser was then used to produce retinal injuries near haemorrhaging levels. A variety of funduscopic and histologic assessments were made from 10 minutes to six months after injury.

Fluorescein angiography showed that control lesions stopped leaking at three days post injury, but methylprednisolone-treated lesions leaked for two to four days longer. After one month, methylprednisolone-treated lesions increased in area while controls became reduced.

Histologic analysis showed no effect on reduction of neutrophils (PMN) in methylprednisolone-treated lesions over controls at three hours. After 24 hours, retinal PMN values in hemorrhagic lesions of the methylprednisolone group were significantly elevated (p<0.05) while monocyte/macrophage counts were reduced (p<0.05) compared to control.

After just four days, retinal lesions treated with methylprednisolone showed suppressed cell proliferation and lack of cell filling-in for lost retinal elements. There was also evidence of early stage retinal hole development in all lesion types, leading to definitive retinal hole development as one month followed by extensive scarring in both the retina and the choroid at six months.

The purpose of this study was to determine if high-dose steroid use is justified for medical management of traumatic laser retinal injuries.

Furthermore, he said that the inhibition of retinal glial cell proliferation by methylprednisolone contributed to retinal holes that resulted around one month after treatment. After six months, increased chorio-retinal scarring occurred, and bearing all these points in mind, methylprednisolone therapy to treat laser-induced retinal injuries should be used with due caution, he added.

stephen.schuscherba@oku البريد الإلكتروني

EuroTimes September 2004
Searching for heavier-than-water tamponades

Stefanie Petrou-Binder MD
in Nürnberg

PROLIFERATIVE vitreoretinopathy has a propensity for the inferior fundus and vitreoretinal investigators are therefore searching for more effective ‘sinking’ agents to help seal retinal breaks in the lower fundus.

The use of a model eye chamber to study the behaviour of tamponade agents seems to indicate that heavier liquids such as F64HB-silicone oil solutions make good contact with the inferior fundus and may be better at excluding aqueous from inferior retinal breaks. Because the vitreous cavity is nearly spherical, it is difficult to totally fill the eye with any tamponade agent. Therefore, while conventional silicone oil is effective for retinal breaks situated at the superior fundus, heavy silicone oil (such as F64HB-silicone oil solutions) is more effective for inferior retinal breaks, said David Wong, Consultant vitreoretinal surgeon at Royal Liverpool Hospital.

“It may be serendipity that standard silicone oil is just a little lighter than water. Nonetheless, it has served us well for 40 years. It is for this reason that we recommend silicone oil solutions that are just a bit heavier than water. Winter et al suggested that Perfluorochemical liquids may be toxic because they are too efficient at excluding water from the retinal surface, thereby causing histological damage to the retina,” he said.

Dr Wong spoke at a retina seminar at the Annual Congress of the German Ophthalmic Surgeons (DOG). He commented that no tamponade agent could be completely effective, as none can achieve and sustain a 100% tamponade effect.

Break closure is best achieved by excluding access of water to retinal breaks thereby stopping or reducing bulk flow of aqueous through the retinal breaks.

Tamponade agents form bubbles that make contact with the retina and keep water away, he said.

The shape of the bubbles, primarily determined by the specific gravity of the substance, plays a deciding role in the ability of a tamponade agent to make contact with the retina. Additionally, tamponade agents that float are more useful for breaks in the superior fundus. Dr Wong has been working with his colleagues Theodor Stepper and Dr Rachel Williams of the Clinical Engineering Department in Liverpool. He reported that using two agents (conventional followed by heavy silicone oil) in two successive operations, one for the upper and then one for the lower fundus, might be a new strategy for treating proliferative retinopathy (PVR).

He said that tamponades only apply a little mechanical force on the retina, and that the word ‘tamponade’ (suggesting packing or completely filling) was, in a way, a misnomer. Because the vitreous cavity was nearly spherical, it can be impossible to completely fill it to achieve a ‘total tamponade.’

Earlier attempts at double filling the vitreous cavity with a combination of agents that float and sink did not achieve overall success, as a slight under-fill can leave a large area of the retina without contact with the tamponade agent.

“Break closure is a nebulous concept. It has the connotation of pushing against as in closing a door. It reality there is very little mechanical force acting on the retina,” Dr Wong commented.

He explained that the buoyancy pressure of an air bubble is the product of water density gravity acceleration, and the height of the bubble. Even for large bubbles or Perfluorocarbon liquids or gas, the buoyancy pressure would still be low. He said that surgeons were concerned that heavy liquids needed to be ‘heavy enough’ to be effective. However, even the heaviest fluid, perfluoropropanethene, exerts a maximum downward pressure of only 3.4 mmHg in a normal size globe, he said.

“It is highly doubtful whether such small pressures play an important part in break closure. It is even more controversial to attribute the trophic changes of the retina to the specific gravity of heavy liquids,” Dr Wong commented.

He maintained that the ability of a tamponade agent to make contact with the retina and exclude bulk flow of aqueous through retinal breaks was the one crucial factor that determines the efficacy of the agent to close retinal breaks. Contact depends on the buoyancy of the agent and on the interfacial tension.

As the retinal surface is hydrophilic, it determines the shape of bubbles coming into contact with it. Air bubbles become flat bottomed and silicone cone bubbles assume a near spherical shape. Even though air has a higher interfacial tension against water than silicone, bubbles of air assume a much more ‘useful’ shape than silicone.

Since tamponade agents seal retinal breaks through contact with the retina, agents that float should be more effective in closing superior fundus breaks and agents that sink should be more effective for inferior fundus retinal breaks.

He noted that, overall, liquids with higher specific gravities are more effective in making contact with the retina and therefore more effective at closing retinal breaks. Semifluorinated alkanes and other fluorocarbons that are miscible with silicone allow surgeons now to use homogeneous solutions of two or more liquids as a single tamponade agent.

Dr Wong pointed out that intrascleral gases were satisfactory in making close to maximum contact with the retina. He would like to identify agents that were specifically more effective in the inferior fundus.

He said that his clinical experience with over 70 cases at Densiron (Fluoron GmbH, Neu-Ulm, Germany) was very positive. The use of this agent focused on cases of retinal detachment complicated by PVR and in which initial surgery with gas or silicone oil had failed. The re-detachment invariably involved inferior pathology either in the form of epiretinal membrane formation or unclosed retinal breaks.

Nevertheless, Dr Wong stressed that patients with retinal detachments complicated by PVR profited from inferior fundus agents that are heavier than water. He stated that this asse-

“It is highly doubtful whether such small pressures play an important part in break closure”
Flap transplants effective in treatment of superficial corneal opacities

Massimo Busin
Roibeard O’Héineacháin in San Diego

MICROKERATOME-ASSISTED lamellar keratoplasty can result in rapid and stable visual rehabilitation with a low amount of induced astigmatism in patients with superficial corneal opacities, Massimo Busin MD told the annual meeting of the American Society of Cataract and Refractive Surgeons.

In a study that involved 20 eyes that underwent microkeratome-assisted superficial anterior lamellar keratoplasty, all achieved a postoperative BCVA of 20/40 or better within the first two postoperative months and none of the eyes had postoperative astigmatism greater than 4.0 D, said Dr. Busin, Villa Serena Hospital, Forlì, Italy.

“The corneal mechanics with this technique are essentially the same as with a LASIK flap, the only difference is that the flap comes from a donor. As a result, the visual recovery is quick and stabilizes well after the first few months and in some patients there is full recovery of vision after a few weeks,” he told EuroTimes in an interview.

The patients in the study had a mean preoperative visual acuity of 20/100 (range: 20/40-20/400). This value improved to about 20/30 at one month’s follow-up and appeared to remain stable thereafter for up to two years.

After one month, best corrected visual acuity was 20/40 in six eyes (30%), 20/30 in seven eyes (35%), 20/25 in five eyes (25%) and 20/20 in two eyes (10%). Similarly, in 13 eyes that had 12 months of follow-up, BCVA was 20/40 in three eyes (23%), 20/30 in five eyes (38%), 20/25 in four eyes (30%) and 20/20 in one eye (8%). Furthermore, in six eyes with two years of follow-up, three eyes were 20/30, two were 20/25, and one was 20/20.

The patients in the study included 12 with corneal dystrophy and degeneration, six with subepithelial scarring following PRK, and two with superficial stroma opacities following keratitis.

Dr. Busin’s surgical technique consists of using the Moria ALTK microkeratome system to first remove a lamella 130 microns - 160 microns in thickness and 9.0-9.5 mm in diameter from the recipient cornea and then preparation of a similar donor lamella from the donor cornea using the same microkeratome head and an artificial anterior chamber. He then uses overlying sutures, rather than radial 10/0 nylon sutures to hold the implant in place on the recipient’s stroma, and then removes the sutures two days later.

Because the overlying sutures do not actually penetrate the donor lamella they do not induce astigmatism. Furthermore, sutures are not always necessary as the donor “flap” adheres quite firmly to the recipient stroma, he noted, adding:

“Since we remove and exchange such a thin layer, the new layer that comes on top of the cornea seals on top of the recipient’s stroma in a way that is similar to a LASIK flap. That means you don’t need radial sutures with the graft; you can just put over-lying stitches that may be removed two days after surgery and the healing is very fast, so it provides very quick visual rehabilitation and minimal change in refraction.”

Dr. Busin acknowledged that the respective lamellae of the donor and recipient may not be completely identical because - just as with the creation of LASIK flaps - there is usually some variation between the depth of microkeratome cuts even when using the same microkeratome head.

However, he maintained that the difference is well-tolerated by the corneas and he pointed out that many of his patients were strongly handicapped before the procedure but had normal vision from the early postoperative period onward.

Complications included five cases where the donor flap and the recipient stroma were of unequal diameter. When the donor lamella was smaller than the recipient bed (3 eyes), the surface epithelium simply grew over the thin annular area of bare stroma around the graft, with no further consequences. In the two grafts with a diameter larger than the recipient bed (1 eye), the surface epithelium simply grew over the thin annular area of bare stroma around the graft, with no further consequences. In the two grafts with a diameter larger than the recipient bed (1 eye), the surface epithelium simply grew over the thin annular area of bare stroma around the graft, with no further consequences.

Epithelial interface ingrowth was seen in four eyes. As the epithelial cysts lay outside of the visual axis, they were left untreated. In general, treatment is needed only in those cases with the interface epithelium communicating with the surface through a “feeding” channel, which keeps on maintaining the ingrowth. In the other cases the epithelium dies off with time and simple observation is sufficient.

Dr. Busin said the advantages of microkeratome-assisted superficial lamellar keratoplasty compared to phototherapeutic keratectomy were similar to those of LASIK compared to PRK. Namely, with the microkeratome-assisted technique there is no scar formation, patients have an intact Bowman’s layer, there is negligible hyperopia, and subsequent LASIK surgery is possible by simply partially lifting the donor lamella.

“With this technique you have the quality of the microkeratome dissection, the speedy rehabilitation with long-term stability, and repeatability. If you’re not happy with the result you’ve got, you can always take it off and put a new one on. It’s little like a living contact lens.”

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Post-PRK scar
Post-PRK scar treated with superficial lamellar keratoplasty
Iris prosthetic system with ‘building blocks’ customises iris replacement

Stefanie Petrou-Binder MD
in Heidelberg

A NEW customisable iris prosthetic system (IPS) appears to be useful for the repair of many different types of iris damage, reported iris prosthesis specialist Henzo Hermeking MD at the Congress of the German-Speaking Society for Intraocular Lens Implantation and Refractive Surgery (DGI).

The IPS®, designed by Dr Hermeking offers different modular ‘building blocks’. The specially designed elements are made of pigmented PMMA (green, blue, black, and brown), and can be used to fulfil any number of anatomic, pathologic, or functional criteria.

“This new iris prosthetic building block system is applicable in any case scenario. The system includes both a novel foldable diaphragm-positioned IPS (dIPS) and a capsular, sulcus-positioned IPS (uIPS). It was developed for universal application and to do away with the requirement of a customised finishing of the product,” said Dr Hermeking, Wuppertal, Germany.

The building blocks include single and double elements (both available for either 3.0 mm and 4.0 mm pupil widths) for either sulcus or diaphragm fixation. All of the building blocks can be combined with an IPS fixation ring that serves to counteract secondary capsule shrinkage and stabilise the artificial aperture.

The elements are used alone or in combination, depending on the individual needs of the patient, to create a new iris diaphragm (pupil reconstruction) or correct partial and total iris defects. They offer optimal control of postoperative artificial pupil diameter. The standard designs and availability in different dioptric powers allow for in-house inventories.

Dr Hermeking explained that the biggest advantages of the IPS were that the iris surgeon could accommodate any anatomic or pathologic situation with this system. Also, the surgery is performed using small-incision techniques, as only a 3.5 mm width is required for implantation, which makes surgery using this building block IPS minimally invasive.

The IPS system (capsular or diaphragmatic) is chosen according to what is needed by the patient in a given situation. The system allows elements to be fixed with any of the standard fixation options, allowing for what can be most easily and safely achieved by the surgeon, such as iris enclavation, ciliary sulcus position, endocapsular position, and transcleral suture. The latter is only used as a last resort, he noted.

“Although, 90% of the ocular findings are 10 years or older, we need a system that satisfies the anatomical, pathological and functional criteria of patients who require spontaneous care. This prosthetic system is feasible for use in acute traumatic situations as well as for chronic iris pathologies,” he said.

Functional criteria for iris reconstruction or replacement include reducing glare and photophobia, and improving depth vision. As the implants augment the iris diaphragm, they reduce both photophobia and glare, which are the most common complaints in patients with damage to the iris.

Anatomically, an iris prosthesis has to form a diaphragm, with separation of anterior and posterior segments of the eye. The pathologic and anatomic findings can be genetic or pathologic, ranging from aniridia, to iris defects such as coloboma, and iris dysfunctions like traumatic mydriasis.

Dr Hermeking noted that although the role of a diaphragm in aqueous fluid dynamics and the formation of secondary glaucoma are still not clear, a diaphragm to separate the anterior and posterior segments is mandatory in the surgical realm for silicone oil in gery in PVR ablations. A prosthetic iris also needs to be cosmetically acceptable, which is challenging in an extremely variable patient population.

“The new iris prosthetic building block system is applicable in any case scenario.”

The system can be applied in a range of ways. Dr Hermeking said. For example, the capsular IPS may be fixed in the sulcus while the diaphragmatic IPS can be positioned in the sulcus or fixed to the iris, or both combined while also fixed by transcleral sutures. “Iris prosthetics are central to the traumatological care of the eye. They must be adaptable, attainable, conform to small-incision surgery, and must adequately replace the iris. Biocompatibility and the degree of light transmission (glare reduction) are important issues for the coloured iris prosthesis. Colour elements must be bound to the prosthesis; otherwise toxic pigments could be set free leading to chronic intraocular irritation. Pigments must be integrated into the PMMA,” he said.

Dr Hermeking explained that prolonged rehabilitation times and minor bleeding, which usually resolve completely within one or two weeks could be expected postoperatively. He urged surgeons to monitor for haemostatic glaucoma and increased IOP due to lens swelling.

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Dacron mesh may prevent rejection of gold

Pippa Wysong in Vancouver

THE use of Dacron mesh may improve retention and appearance during replacement of gold weights in the eyelid for patients with facial nerve palsy, but concerns remain about long-term inflammation, according to Dan DeAngelis MD, Mount Sinai Hospital, Toronto, Ontario, Canada.

In a presentation at the annual meeting of the Canadian Ophthalmological Society, Dr DeAngelis described the outcome of three patients who underwent implant replacements with Dacron mesh used in an effort to stop the implant from migrating.

Dacron mesh is a polyester polymer (polyethylene terephthalate) that has been used for various medical applications for more than 50 years. Uses range from implantable sutures, vascular grafts and as a surgical mesh used for patching and repairs.

“It’s the strongest suture manufactured. We often see it in different forms and it does maintain a threshold integrity over time,” Dr DeAngelis said.

The material is inert, and the mesh is porous allowing for tissue in-growth and greater stabilisation. All these features point to something worth trying in terms of minimising recurrent extrusions of implanted gold weights in eyelids.

Dr DeAngelis and colleagues from the University of California San Francisco conducted a prospective study with three patients to evaluate the effectiveness of Dacron mesh for this purpose. The patients were all referred with a failed primary gold eyelid implantation and an extrusion. The extruding weights were removed, and then the eyelids were allowed to heal for about six weeks before re-implantation was attempted.

“After the initial gold weight removal, we did a lid crease incision and the gold weight was placed over the tarsus,” he explained.

A piece of Dacron mesh was cut to shape. Fixation was done by suturing the mesh to a hole in the gold weight. Outcome measures were retention of the implant, its position, stability, the aesthetic appearance of the lid and patient satisfaction. Follow-up was for at least two years.

The patients presented with primary gold weight extrusions. After re-implantation with the mesh, they initially all had excellent results and the weights were stable. But at four to 30 months post-operatively, problems developed and two of the three patients had to have gold weight removal, Dr DeAngelis reported.

In one patient, the gold weight was centred and stable at 18 months.

“Unfortunately he presented 2.5 years after the initial insertion with a sudden erosion of the gold weight through the Dacron mesh in the skin. He gave no antecedent history of trauma or any other injuries,” Dr DeAngelis said.

The weight was removed, and signs of an inflammatory response were seen in the tissue.

The second patient developed oedema and erythema at three months, though there was no sign of infection. Steroid injections were tried to reduce the inflammation, but eventually the gold weight had to be removed.

As for the third patient, at three years out, the gold weight was still centred and stable with no signs of inflammation. The skin was well healed and the patient is satisfied with the result, he said.

Initially the researchers thought the Dacron mesh alone would be enough to stabilise gold implants, but the inflammatory response seen in the two patients was worrisome.

“Overall, I think initially it’s a reasonable material to use, but over a long period of time, or at least in our follow-up of two and a half to three years, two of the three patients did have to have it removed,” he said.

He believes that studies need to be done of larger series of patients, in order to find out whether the delayed inflammatory reaction is common and whether it can be prevented.

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New approach needed to tackle severe ocular inflammation

Demot McGrath

THE occurrence of ocular inflammatory diseases (OIDs) and their vision-threatening complications is not being given due attention by the ophthalmology profession, according to a leading expert in the field.

Speaking at the 5th International Symposium on Ocular Pharmacology and Therapeutics (ISOPT), Amd Heiligenhaus MD said that while most practitioners believed non-infectious OIDs and associated complications to be extremely rare, a review of the published literature shows that its incidence has in fact been significantly underestimated.

Dr Heiligenhaus marshalled a wide range of evidence in support of his contention, drawing on examples as diverse as allergy-related ocular complications, conjunctivitis, scleritis, Mooren’s ulcer, Behçet’s disease and uveitis to demonstrate the scale and frequency of such pathologies.

Starting with the example of allergies, Dr Heiligenhaus said there was a misconception that most eye complications arising from allergies were relatively benign. He cited atopic dermatitis, a genetic skin disorder common in paediatric patients, as a case in point.

Complications such as skin dryness and intense itching on the inside and outside of the eyelids and the inner corner of the eyes are found in 25% to 42% of patients with atopic dermatitis. In severe cases, inflammation on the inside of the eyelids can damage the cornea leading to visual loss in 15% to 30% of such patients. Atopic keratoconjunctivitis, which is most commonly found in young patients, can also lead to substantial vision loss, noted Dr Heiligenhaus.

Severe ocular complications are also associated with rare diseases such as Stevens-Johnson syndrome, a chronic immune-complex-mediated hypersensitivity disorder caused by drugs, viral infections and malignancies. Ocular sequelae may include corneal ulceration and anterior uveitis. Blindness may also develop secondary to severe keratitis or panophthalmitis in 3.0% to 10% of patients and some vision loss is reported in up to 30% of cases.

Ocular cicatricial pemphigoid (OCP) is another rare inflammatory syndrome involving primarily the oral and ocular mucous membranes, reported Dr Heiligenhaus.

The inflammatory lesions of the ocular surfaces may result in scarring, loss of tear film, adhesions of the lids to the eye, corneal ulceration and perforation. Vision impairment has been estimated in 20% of patients in stage three of the disease and 76% in stage-four patients. In the most relentlessly progressive or untreated cases, loss of the eye may occur.

Among the keratoconjunctivities, Dr Heiligenhaus said that Mooren’s ulcer and rheumatic diseases such as rheumatoid arthritis and Sjögren’s syndrome could all lead to substantial visual loss and even blindness in more chronic cases.

Although necrotising and posterior scleritis are relatively rare, he said that visual loss and pain are frequently found in such patients.

The prevalence of various forms of uveitis differs clearly with race, genetic background and gender, said Dr Heiligenhaus.

Uveitis, an umbrella term covering a wide range of inflammatory ocular conditions, causes symptoms based on the part of the eye involved and may include a red eye, pain, decreased vision, sensitivity to light, increased floaters, blind spots in the vision, or sometimes no symptoms at all.

The disease in all its various forms is responsible for an estimated 10% to 15% of the legal blindness in the United States, and even more in the developing world. In adults, idiopathic acute anterior uveitis is the most frequent form of the disease, but the prognostic factors that are appropriate to predicting poor final outcome are not well defined.

Among patients with inflammation localised primarily to the anterior chamber, 52% or more are HLA-B27 positive, noted Dr Heiligenhaus. In addition, a number of these patients with HLA-B27-associated anterior uveitis have, or will develop, an associated systemic disorder such as ankylosing spondylitis, reactive arthritis (formerly known as Reiter’s syndrome), inflammatory bowel disease, or psoriatic arthropatitis.

While intermediate uveitis was widely considered a less problematic disease to treat compared to the acute anterior form, there was no room for complacency.

“Intermediate uveitis has a reputation as quite a benign disease but this is not completely true. Eye complications occur in up to 50% of patients according to some studies, with cystoid macular oedema responsible for visual loss in 6% to 18% of these types of patients,” he said.

Finally, Dr Heiligenhaus cited patients with Behçet’s disease, of whom 95% suffered some form of associated eye disease. In chronic cases, permanent loss of vision may result from relapsing ocular inflammation and occlusion of the retinal blood vessels.

Dr Heiligenhaus reiterated his view that the occurrence of ocular inflammatory diseases and vision-threatening complications is under-appreciated by most ophthalmologists. He said that positive measures were needed to minimise the risks to patients from OIDs.

“Differentiation of the patients is very important in helping to define subgroups at high risk of OID and drawing up effective treatment strategies that keep vision loss to an absolute minimum,” he said.

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New contrast sensitivity tests let computers do the grading

Dermot McGrath in Barcelona

A NEW computer-based system provides a reliable, sensitive and valid means of testing contrast sensitivity (CS) at different luminance levels with and without glare, according to a German ophthalmologist.

Jens Bühren MD told delegates at the 8th Winter Refractive Meeting of the European Society of Cataract & Refractive Surgeons that the new system, known as the Frankfurt-Freiburg Contrast and Acuity Test System (FF-CATS), compared extremely well with other established CS tests in clinical trials.

“We all recognise the importance of testing optical quality after refractive surgery, and are aware that just testing for Snellen visual acuity may not necessarily give us a good indication of a patient’s quality of vision. We wanted to set up a CS system that could test in different luminance conditions in a way that is observer-independent, reliable and reproducible,” he said.

Dr Bühren explained that FF-CATS, implementing the FrACT (Fribourg Acuity and Contrast Test) originally developed by Dr Michael Bach at the University of Freiburg, has several theoretical advantages over existing CS systems.

“The computer determines contrast thresholds by an algorithm called ‘best PEST’ (Best Parameter Estimation by Sequential Testing; Lieberman & Pentland 1982). It has a low probability of guessing because of a forced-choice method that gives patients eight alternatives, and it is observer-independent because the patient inputs his or her answers by keypad,” he said.

Dr Bühren said that the system allowed the researchers to test visual acuity at different contrast levels as well as determine contrast thresholds at different spatial frequencies.

Patients were tested using Landolt ring optotypes displayed at different contrast settings on a high-resolution black-and-white monitor. For testing at scotopic luminance level (0.167 cd/m²), a neutral filter was used to produce reduced monitor luminance.

Forty eyes of 40 volunteers were examined with the FF-CATS and, for comparison, with the Functional Acuity Contrast Test (FACT) and the Pelli-Robson chart (PRC). There were two subgroups, one ranging in age from 21 to 47 years, the other ranging in age from 54 to 69 years. A control group of 20 eyes of patients with nuclear cataracts were also included in the study.

The Functional Acuity Contrast Test developed by Dr Arthur P. Ginsburg uses sine wave gratings, which measure specific visual channels. The Pelli-Robson chart determines the contrast required to read large letters of a fixed size.

Tests were performed with and without glare in a randomised order; and the test sequence was repeated at least one hour later. Tests were assessed concerning discrimination between group I and II, repeatability factor and also validity in terms of their correlation with higher order wavefront aberrations.

The results showed that the FF-CATS discriminated better between the two groups than FACT or the Pelli-Robson chart. Coefficients of repeatability (r[CS]) were 0.38 for the FF-CATS, 0.25 for the FACT and 0.21 for the Pelli-Robson chart.

The FF-CATS also showed the highest correlation with higher order aberration RMS values (r = 0.55, p < 0.001), compared to FACT (r = 0.14, p = 0.46) and Pelli-Robson (r = 0.45, p < 0.01).

Dr Bühren concluded that the results thus far were encouraging and that the FF-CATS will be used in future clinical trials comparing standard and wavefront-guided algorithms, post-LASIK CS and phakic lenses in high myopia.

The growing need for an accurate and standardised means of measuring CS was further echoed by Miguel Angel Teus MD, who presented a separate study on contrast sensitivity with or without photoablation using the LASIK technique to correct low to moderate myopia.

“Measurement of visual function after LASIK is quite problematic because we all have seen patients with good Snellen visual acuity who still have significant visual complaints such as glare, haloes, and night vision disturbances. At the present time we do not know which is the most sensitive or specific method to measure these particular aspects of the visual function,” he said.

Dr Teus’ prospective single masked study included 31 eyes of 23 consecutive patients who underwent LASIK and 23 eyes of 23 patients with a UCVA 20/20 or better that served as the control group. Inclusion criteria were myopia lower than ±0.75D, astigmatism lower than 3.00D and best-corrected visual acuity of 20/20 or better.

The mean age was 30 years for both groups (range 22-38 years), the average myopia corrected was +3.96D (range –0.5D to –8.75D), and the average cylinder corrected was –0.5D. The researchers used another computer-based system, the INDO CGT-1000 (INDO International), to assess contrast sensitivity, with or without photostress, and tested with the INDO CGT-1000 before LASIK and 3 months after surgery. Six spatial frequencies (0.7, 1.0, 1.6, 2.5, 4.0 and 6.3 cycles per degree) were tested. The pupil size measured in mesopic conditions with Colvard pupillometer was 5.5 mm or larger and the optical zone was 6.0 mm to 7.0 mm.

The statistical comparison of CS with photo stress showed a significant decrease in every frequency analysed at three months after surgery for the study group (p < 0.05), while there was no statistically significant difference for the CS study group without photostress.

“We all recognise the importance of testing optical quality after refractive surgery,” Jens Bühren MD

“We found that after LASIK to correct low to moderate myopia, CS with photostress as measured with CGT-1000 was significantly decreased. This fact may explains some of the common complaints in visual quality after LASIK, in spite of good UCVA,” he concluded.

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“We all have seen patients with good Snellen visual acuity who still have significant visual complaints”

Miguel Angel Teus MD

contrast sensitivity. A Technolas 217 excimer laser and the Hansatome microkeratome were used for all procedures and a single surgeon treated all patients.
OCT useful for post-operative evaluation of capsule/IOL contact

The development of posterior capsule opacification seems to be stunted by quick capsule fusion and early IOL-capsule contact. To determine the time required for capsule closure following cataract surgery, ophthalmic surgeons tested OCT as a new means to document and quantify pseudophakic capsule bend formation.

In a randomised, prospective trial, Stefan Sacu MD, Department of Ophthalmology, Medical University of Vienna, Austria, studied 33 eyes of 33 patients with age-related cataract who were scheduled to undergo cataract surgery. Using OCT (OCT 1020, Zeiss Humphrey), he was able to evaluate the precise time at which the anterior and posterior lens capsules became directly apposed to the optic, as well as the moment at which capsule bend was created at the optic edge, following the implantation of three different sharp-edge IOLs.

All of the eyes underwent standard phacoemulsification surgery followed by the implantation of one of three different types of open-loop IOL with a sharp optic edge: one-piece acrylic IOL (SA60AT, Alcon), three-piece acrylic IOL (Acrysof MA60BM, Alcon), and three-piece silicone IOL (911A, AMO).

The patients were randomised into three groups of 11 eyes each. He performed slit-lamp examinations and used the OCT scan to evaluate the contact of the lens capsule with the IOL optic, and capsule bend formation, at one day, three days, one week, two, three weeks and one month after surgery (average of three measurements at each time). He also determined on which postoperative day the capsule came into contact with the IOL optic and when capsule bend formation occurred.

One day postoperatively, the mean distance between the anterior capsule and the IOL was 161.0 microns for the three-piece acrylic IOL, 197.0 microns for the one-piece acrylic IOL, and 220.0 microns for the three-piece silicone IOL. By day three, the distance was 64 microns, 88.0 microns, and 157 microns respectively. At one week, distances between the anterior capsule and the IOL diminished to 27 microns, 10 microns, and 60 microns. At two weeks post-operatively, both acrylic IOLs had contacted the IOL surface and the three piece silicone IOL was at a distance of 27 microns.

“...The short-term reproducibility of OCT was excellent.”

The posterior capsule came into contact with the IOL on the same day or earlier than the anterior capsule in 83% of all patients. “The short-term reproducibility of OCT was excellent. The three lens types we implanted in this study revealed a mean capsule fusion at approximately two weeks following cataract surgery. OCT was able to show that there was no significant difference regarding capsule bend formation time, however, it was noted earlier in eyes implanted with the one piece acrylic IOL than with three piece silicone IOL,” Dr Sacu reported.

Dr Sacu noted that capsule bend formation occurred within approximately ten days for the one-piece acrylic IOL, 13 days for the three-piece acrylic IOL and 15 days for the three-piece silicone IOL.

The researchers implemented the OCT scan method in a standardised fashion. The scan duration lasted 1.0s; the scan length was 2.8 mm-3.2 mm; the scan meridian was 90° to the optic-haptic junction. Fixation was on the central green fixation point.

The average patient age in each group was 72 years for the one-piece acrylic IOL recipients, 71 for the three-piece acrylic IOL recipients and 73 for the three-piece silicone IOL recipients. The average dioptric power of the three types of IOL was 23.0 D, 22.0 D, and 21.0 D respectively.

The study excluded eyes with uveitis and pseudoxfoliation. The researchers used the ANOVA/T-Test for the statistical analysis of the results.

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