

## 13th British Society for Refractive Surgery Conference 2006

The 2006 British Society for Refractive Surgery (BSRS) Conference took place in St Catherine's College, Oxford and 100 delegates gathered for a jam-packed and varied programme. As ever the BSRS's inclusive nature gave rise to this variety in that the conference involved ophthalmologists, optometrists, nurses, technicians and trade alike.

The programme kicked off with a lively and thought-provoking talk from Dr Alison Finlay, MCOptom, DBO Lecturer from City University, on 'Binocular Vision (BV) and Refractive Surgery'. This is an area that has perhaps not been considered enough in patient selection and therefore provided stimulating material for future decisions and management. Dr Finlay discussed three different scenarios in refractive surgery: how refractive surgery can be used to treat a pre-existing problem, how a BV anomaly can affect the surgical results, and how it can cause or exacerbate a BV problem. She described how accommodative esotropias can be treated successfully with refractive surgery, but that some surprising results can be found. Anisokonia cannot be predicted by retinal image size and contact lens trial should be considered for high anisometropes. Examples of how a BV anomaly can affect refractive surgery results was particularly significant in cyclotorsion in high astigmats. Refraction and topographical mapping, both monocularly and binocularly, can help prevent these errors. Problems with manifest squints including microtropia can be avoided by preventing change in ocular dominance. Density of suppression and size of suppression scotoma should also be considered. For problems with incomitancy, Dr Finlay suggests avoiding swapping fixation and different angles of deviation fixating either eye. Finally, don't assume patients are orthophoric: ensure preoperative refraction does not have refractive control of phoria or prescribed prisms. She would recommend a full orthoptic examination if the patient has history of eye exercises, strabismus surgery, amblyopia therapy or prisms.

The BSRS next welcomed the first of two guest speakers, Professor Joseph Colin MD, President of the Department of Ophthalmology at Bordeaux University Medical School. Prof Colin provided us with an update on intracorneal ring implants. Several studies have demonstrated that intracorneal rings are able to improve the corneal shape and visual acuity (VA) of patients with keratoconus. Two available options are Intacs and Ferrara rings.

Intacs are indicated for patients with clear central corneas who are contact lens intolerant. They are not indicated in Prof Colin's recommendation for corneas under 450µm or over 55D steep. In his study of 100 eyes 70% showed improved visual outcome, and the majority remain stable for two years postoperatively. It is also possible to combine Intacs with other refractive procedures to improve vision once the patient is stable.

Ophthalmologist Keith Bates chaired a dynamic session on a variety of intraocular lenses (IOL). IOLs are becoming an increasingly integral part of refractive surgery and therefore this session was enlightening for many reasons. The symposium addressed the issue of

intraocular lens options to be used in conjunction with refractive lens surgery and in particular compared and contrasted the relative advantages of multifocal vs. focus shift lenses. Mr Bates started the symposium with an overview of the advantages and disadvantages of refractive lens surgery compared to corneal refractive surgery, and the broad features of the different IOLs available. This was followed by Tayo Akingbehin on his personal experience with the Alcon ReSTOR multifocal lens, Jag Chawla on the AMO Tecnis multifocal lens, Don Sanders on the Lenstec Tetraflex focus shift lens, and finally Milind Pande on the CU focus shift lens. There was then a brief question and answer session for the speakers.

Steven Bailey, FRCOphth, gave a report on 150 medico-legal cases in refractive surgery, in which his work as an expert witness since 1999 has given him key experience. In assessing these cases, valid features of the statement of claim and issues identified by the expert as being relevant to the claim were assessed. A remarkable 65% of the claims included issues of consent. In one third of these the claimant had particular risk factors for which especially careful counselling was warranted. Other cases included: claims where there were clear contraindications to surgery (29%), cases where there was surgical error (24%), avoidable delay in instituting medical management for postoperative complications (23%), and a small proportion of cases were precipitated by a second opinion where the clinician giving the opinion was not fully conversant with the facts (4%). Mr Bailey concluded that the number of claims could be substantially reduced by:

1. Initiating proper policies for consent with full documentation throughout the process.
2. Ensuring that surgeons are adequately trained in evaluating preoperative tests and allowing surgeons adequate time to assess patients prior to surgery. This includes training of optometrists where they are carrying out a delegated function.
3. Moderating the case load for surgery.
4. Ensuring patients have easy access to medical care post surgery.

Professor Dan Reinstein, FRCSC, DABO, spoke on the 'Applications of High Precision 3D Anatomical Imaging of the Cornea and Anterior Segment in Refractive Surgery'. This lecture focused on 'Artemis' scanning and its safety benefits in refractive surgery selection and management. The ultrahigh frequency scanning of the Artemis allows measurement of the cornea and anterior chamber to an amazing 1mm accuracy, which means that all layers of the cornea can be accurately analysed. This accuracy is due to a 50MHz probe enhanced by digital signal processing, giving meridian scans for 3D data set of individual corneal interfaces and 3D topography. The Artemis means that flap thickness can truly be analysed post LASIK, and residual stromal bed accurately predicted, meaning safer outcomes for patients.

Sunday's events commenced at 9am, with Prof Colin delivering a talk on post LASIK ectasia. Prof Colin stated that ectasia; post LASIK thinning and bulging of the

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Chris Hull, Cynthia Roberts and Johnny Moore.

cornea occurs in between 1/10,000 and 1/300 cases. The lower rate being where careful screening is carried out and the higher figure where 'anyone is suitable'. Time taken to diagnose after LASIK is approx 13 months. The worldwide incidence is unknown due to many unreported incidents. A brief summary of ectasia risk factors is: high myopia / high attempted corrections; abnormal preoperative topography; residual stromal bed (RSB) <250um; preoperative pachymetry <500um; preoperative corneal power >47D; abnormal corneal rigidity; unknown factors / combinations of all of the above; trauma (eye rubbing). Treatment options for kerectasia now include Intacs as well as the more conventional refractive corrections and corneal transplants including lamellar and full thickness grafts.

This was followed by a much anticipated and exciting debate on the femtosecond laser microkeratome vs. mechanical microkeratome. The BSRS were proud to welcome two eminent speakers to put up the fight for each side: Professor Jan Vantor, Medical Director of Optimax Laser Eye Clinics, arguing for the femtosecond laser and David Gartry, Consultant Ophthalmic Surgeon at Moorfields Eye Hospital, for the mechanical microkeratome. The session was chaired (and the battle controlled!) by Julian Stevens. Both speakers had an opportunity to put forward their views, then counter respond and finally, after questions, a winner was voted for by the delegates. On this occasion the mechanical microkeratome won a well thought out and cleverly executed debate from both sides. It is important to be aware that these views were put forward for the benefit of good debate, but may not be the true views of each of the speakers.

The BSRS then welcomed the second of the guest speakers from the USA, Dr Cynthia

Roberts, PhD, with a special interest in corneal biomechanics in glaucoma and refractive surgery. For her first talk Dr Roberts discussed the importance of the corneal biomechanical response in refractive surgery, stating that it offers an explanation for induced aberrations, particularly spherical into the cornea. In the periphery of the cornea, loss of ablation efficiency may form a component of the induction of spherical aberration, but this does not explain the difference in response between surface ablations and LASIK. Furthermore, the artefact in IOP (intraocular pressure) measurement induced by refractive surgery has been assumed to result from a decrease in curvature and thickness in myopic procedures. Clinical evidence points to the fundamental change in biomechanical properties of the cornea with an ablative procedure. Finally Dr Roberts mentioned that the ability to measure properties preoperatively offers the possibility to predict the biomechanical response and potentially compensate for it leading to potential biomechanical customisation in the next generation of refractive surgery.

After lunch, a session on contact lenses commenced. We welcomed Mr Basil Bloom, an Optometrist in private practice with a special interest in orthokeratology (OrthK) for over 10 years. OrthK is often a choice for patients who are tired of glasses and contact lenses but who do not wish to take the step into refractive surgery. Mr Bloom illustrated the variety of lenses now available to correct a range of refractive errors from myopia, hyperopia and astigmatism. The importance of thorough topography readings and interpretation was demonstrated. Mr Bloom stressed that OrthoK is a time-consuming method of contact lens correction but can be extremely rewarding for the practitioner.

Next Chris Steele, Principal Optometrist for Sunderland Eye Infirmary, spoke on contact lens fitting post-refractive surgery. Mr Steele stated that despite recent advances in refractive surgery a small number of patients do not achieve optimal results and may require contact lenses. These fittings can be challenging for psycho-social, as well as practical, reasons. Mr Steele concentrated on contact lens fitting post LASIK. In many cases, routine fitting principles apply, but fitting an oblate rather than prolate cornea can cause new challenges. In a number of cases rigid lenses provide the only viable correction, and can be more complex as a conventional lens cannot follow the shape of both the flattened central cornea and the relatively steeper periphery in high corrections. Computerised topography is essential for accurate fitting and the use of reverse geometry lenses will apply. However, for the majority of patients post-refractive surgery lens fitting is not so challenging, and may be used simply to balance an intended monovision correction for night driving for example.

Dr Cynthia Roberts gave her second fascinating talk on corneal topography vs. wavefront analysis. A comparison of the strengths and limitations of whole eye wavefront and corneal topographic analysis was presented, with regard to application in excimer laser refractive surgery. Dr Roberts discussed tools for analysis, including Zernike polynomials for functional assessment of the wavefront, as well as conic section asphericity for corneal first surface shape assessment. Although the shape of the preoperative cornea can be well characterised by a conic section analysis, and its functional contribution to the whole eye wavefront captured and analysed by most current wavefront sensors, Dr Roberts stated that postoperative evaluation of both shape and function is a much greater challenge. The induction of large variations in surface curvature, from central flattening to paracentral steepening, and the resulting increase in optical aberrations, can lead to significant errors with current analysis techniques, likely contributing to the marginal success of wavefront-guided enhancements. Potential solutions include the integration of corneal topography and ocular wavefront analysis to capitalise on the advantages of both techniques and overcome the disadvantages, in the next generation of refractive surgery. ■

**Further information**

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**Future Meeting**

2007 Annual Scientific Meeting  
Oxford, UK; 30 June – 1 July, 2007.