Welcome to Bausch and Lomb’s monthly research update.

With our background in clinical ophthalmic research, mainly of the anterior eye, Bausch and Lomb have asked us to produce an independent report of some of the interesting findings coming out of the research journals each month. As a busy practitioner, this should allow you to keep more up-to-date with cutting-edge clinical research and allow you to locate the articles when you want to know more about a topic highlighted.

**Issue 18**

The following key clinical peer reviewed journals will be reviewed:

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Professor James Wolfssohn is Head of Optometry at Aston University. James’ research and teaching interests mainly revolve around intraocular lenses, contact lenses, low vision and the measurement of accommodation. He has published over 100 peer reviewed academic papers, written books on Low Vision and Imaging and has given numerous international presentations. James is also a past President of the British Contact Lens Association.

Amy Sheppard is a research fellow, working with the Anterior Eye group at Aston University. Qualifying as an optometrist in 2004, Amy spent three years in full-time practice in the UK before joining Aston University’s Ophthalmic Research Group in 2007 to undertake a PhD on in vivo analysis of phakic accommodation.
Double vital staining with fluorescein and lissamine green

Yoon et al. describe the application of a mixture of 1% fluorescein and 1% lissamine green in patients with dry eye syndrome (Sjogren’s syndrome and non-Sjogren’s dry eye). Tear break up time, ocular surface disease index and Schirmer test were also evaluated. The authors found that double staining with these agents correlated well with symptoms and enabled easier identification of surface changes, and therefore recommend this approach in the diagnosis and management of patients with dry eye.

Cornea 2011 30: 972-976

Corneoscleral topography and soft contact lens fit

This interesting study evaluated the influence of corneoscleral topography, as assessed by anterior segment optical coherence tomography (AS-OCT) on the fit of soft contact lenses, including a standard hydrogel and a silicone hydrogel. The corneoscleral shape profile by AS-OCT contributed significantly to the prediction of contact lens fit, compared to videokeratoscopy and keratometry measures. The fit of the stiffer silicone hydrogel material was better able to be predicted than the standard hydrogel. AS-OCT can provide useful data on contact lens fitting dynamics.


Rub and rinse required for soft contact lens care

Contact lens care regimens have been simplified following the introduction of multipurpose disinfecting solutions (MPDS) that can be used in a “no rub” approach. This study investigated the effect of “rubbing and rinsing” with MPDS, by examining the bacterial load on various contact lenses after each step in the regimen. The results demonstrate that rubbing and rinsing is indeed the most effective regimen and should be recommended in conjunction with all MPDS and soft contact lens types, especially silicone hydrogels.

Optometry and Vision Science 2011 88: 967-972
Accommodative function not affected by multifocal contact lenses

Montes-Mico et al. examined the effect of multifocal contact lenses on accommodative response and facility in presbyopic and pre-presbyopic patients in this pilot study, finding that accommodative function did not appear to be altered by the simultaneous vision multifocal lenses. The high add of the PureVision contact lens was found to provide enhanced near visual acuity, compared to the other lens models studied.

*Optometry and Vision Science 2011 88: 998-1004*

Pregnancy-induced progression of keratoconus

This small study of seven eyes of four pregnant patients with keratoconus has indicated for the first time that hormonal changes during pregnancy may affect corneal biomechanics and cause progression of keratoconus. Increases in spherical equivalent refraction, and keratometric cylinder were observed, along with a reduction in the required base curve in those eyes wearing rigid gas permeable contact lenses.

*Cornea 2011 30: 991-994*

Long term changes in anterior corneal topography following photorefractive keratectomy

The corneal topography of 66 eyes of 33 patients who underwent photorefractive keratectomy (PRK) for myopia/ myopic astigmatism was followed up for 8 years after treatment. The results showed a very stable central 2.00mm diameter area, although changes in topography in the peripheral region were observed, which were related to the type and magnitude of refractive treatment; higher flattening occurred in highly myopic eyes (-4.50 to -9.00 D), whereas peripheral steepening occurred in the previously astigmatic eyes. The long term changes in anterior corneal topography were outside the functional optic zone of the cornea, and the mechanical stability of the cornea was not affected following PRK.

*Investigative Ophthalmology and Visual Science 2011 52: 6994-7000*
LASIK and LASEK in eyes with steep central keratometry

A retrospective review of the records of 32 patients (54 eyes) with pre-operative mean central keratometry of 47.50 D or more undergoing myopic LASIK or LASEK found that none of the patients studied developed corneal ectasia within the 3 year follow up period. The authors suggest that patients with mean pre-operative central keratometry of 47.50 D or more should not automatically be excluded from cataract surgery due to the risk of developing postoperative ectasia.

*Journal of Refractive Surgery 2011 27: 591-596*

Cataract surgery in eyes with low corneal endothelial cell density

This interesting case-control study compared corneal endothelial cell damage after cataract surgery in eyes with low endothelial cell density (500-1000 cells/mm²) and eyes with normal ECD. The results showed no significant difference between groups in the percentage of cell loss following cataract surgery at both 1 month and 3 months.

*Journal of Cataract and Refractive Surgery 2011 37: 1419-1425*

Pre-operative presenting visual acuity in cataract surgery in Nepal

The authors report pre-operative presenting visual acuity (PPVA) data for 3023 patients undergoing cataract surgery in rural and urban Nepal, between 2007 and 2008. Based on PPVA, one in eight patients was functionally blind (PPVA worse than 3/60 in the better eye) before cataract surgery, this value was similar between rural and urban areas. PPVA represents an important indicator of progress towards eliminating blindness due to cataracts.

*Clinical and Experimental Ophthalmology 2011 39: 501-505*

Development of a novel drug delivery device to prevent infection following cataract surgery in the developing world

Garty *et al.* describe in vitro and in vivo results of an intraocular lens-hydrogel assembly offering sustained antibiotic release. The in vivo results from rabbit eyes following cataract surgery demonstrate that the device is able to deliver sufficient antibiotic in the anterior chamber to prevent post-operative infection. The device may be feasible for use in the developing world as it would reduce the cost of topical post-operative drops.

*Investigative Ophthalmology and Visual Science 2011 52: 5029-5033*
### Development of Visual Field Defects in Highly Myopic Eyes

A retrospective review of the records of 492 eyes of 308 patients with high myopia (>8.00 D, or axial length >26.5 mm) was conducted to determine the characteristics of high myopia which are linked to the development of visual field defects. The mean follow-up time was 11.6 years, during which 13.2% of the eyes reviewed developed significant field defects (determined by Goldmann kinetic perimetry). The incidence of significant defects was significantly higher in eyes with oval, rather than round, optic nerve heads. Due to the relatively high incidence of visual field defects in highly myopic eyes, the authors recommend that these eyes should be examined at least once per year.

*American Journal of Ophthalmology 2011 152: 256-265*

### Geography and Climate Associated with Exfoliation Syndrome

A large, US-based retrospective review study of over 600,000 ophthalmology patients has examined the link between geography/climate and exfoliation syndrome (ES). Living in northern latitudes (above 42° N) was associated with an increased risk of ES, compared to southern latitudes (below 37° N). A link was also identified between summer high temperature, and winter low temperature, with ES, suggesting that ambient temperature and sun exposure could be important environmental triggers for the condition.

*Archives of Ophthalmology 2011 129: 1053-1060*

### Vitrectomy with or without Pre-treatment Using Intravitreal Bevacizumab in Severe Diabetic Retinopathy

A meta-analysis of studies reporting outcomes following vitrectomy has examined the efficacy of pre-treatment with intravitreal bevacizumab (IVB). Eyes with IVB pre-treatment required less surgical time; were less likely to experience recurrent vitreous haemorrhage and achieved better final best corrected visual acuities, compared to eyes that did not receive IVB.

*British Journal of Ophthalmology 2011 95: 1216-1222*

### Link between Macular Pigment Optical Density and Blood Glutathione Levels

A study of 47 healthy elderly volunteers has identified a positive correlation between macular pigment optical density and circulating blood glutathione (sometimes described as a “super antioxidant”) for the first time. The results support a link between local and systemic antioxidant defence mechanisms.

*Investigative Ophthalmology and Visual Science 2011 52: 5029-5033*
Acupuncture with refractive correction to treat anisometric amblyopia

This prospective, randomised crossover trial investigated the use of acupuncture as an adjunct to refractive correction in children with anisometric amblyopia, and visual acuity of 20/40 to 20/200 in the amblyopic eye. The acupuncture treatment was well-tolerated by all of the 83 children, and the more improved visual acuity over the 60 week study in the acupuncture compared to the no acupuncture (although no sham treatment) group indicate it may be useful complementary treatment option, but further large-scale studies are warranted.

*Ophthalmology 2011 118: 1501-1511*

Most fascinating research finding this month...

Uppal *et al.* evaluated reading behaviour assessed with an infrared eye tracker in patients who had undergone 360 degree macular translocation (MT360), a complex surgical procedure to restore reading ability in age-related macular degeneration. MT360 involves retinal rotation and oculomotor globe counter-rotation. The results demonstrate that MT360 can restore near-normal reading function and reduce scotoma size. Although there were some limitations in saccadic function in MT360 patients, compared to a control group, the oculomotor surgery did not limit reading saccadic behaviour.

*Investigative Ophthalmology and Visual Science 2011 52: 6486-6496*

Most intriguing research paper title this month...

“Patients have two eyes! Binocular versus better eye visual field indices”

This interesting study has shown that monocular measures of visual field function (e.g. better eye mean deviation) can overestimate binocular visual field loss in glaucoma, particularly in patients with advanced defects. The authors therefore recommend calculation of a binocular integrated visual field value to assess the severity of binocular field loss.

*Investigative Ophthalmology and Visual Science 2011 52: 7007-7011*

Next report

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