

November 2017 Research Update

Anterior Eye and Contact Lenses

- **Randomised controlled trial of topical antibacterial Manuka honey for evaporative dry eye due to meibomian gland dysfunction**

Meibomian gland dysfunction (MGD) is the leading cause of evaporative dry eye disease, with conventional therapies including warm compresses, lid massage and ocular lubricants. There are 2 standardised antibacterial medical Manuka honey products approved for the treatment of evaporative dry eye in Australia, New Zealand and Europe, although there are very few published studies on their efficacy. This prospective study included 114 participants with moderate/ advanced MGD who received conventional therapy alone (n =40), or conventional therapy plus Manuka lubricating eye drops (n = 37), or conventional therapy plus Manuka Eye Gel (n =37). The results indicated that the Manuka honey products are an adjunctive therapy in evaporative dry eye due to MGD, with both products significantly reducing the need for additional lubricant drops and reducing the *Staphylococcus epidermis* counts, along with an increase in meibum quality and gland expressibility with Manuka Eye Gel. The only adverse effects were transient redness and stinging with the Manuka honey products.

Clinical and Experimental Optometry 100: 603-615, available at:

<http://onlinelibrary.wiley.com/doi/10.1111/cxo.12524/full>

- **Fibrous Catalyst–Enhanced Acanthamoeba Disinfection by Hydrogen Peroxide**

Although Acanthamoeba keratitis is rare, contact lens wearers account for 90 % of cases. One-step hydrogen peroxide disinfection systems have not changed significantly since the 1980s, and rapid neutralisation of peroxide may reduce their antimicrobial efficacy. In this study, the authors describe the addition of an iron-containing catalyst (bound to a nonfunctional propylene:polyacrylonitrile fabric matrix) to enhance antimicrobial action of commercially-available one-step peroxide solutions. The results indicated a significantly greater kill of Acanthamoeba with the novel catalyst, and complete eradication of bacteria following a 6 hour disinfection protocol. The authors suggest that addition of the new catalyst to one-step peroxide solutions could improve safety for contact lens wearers.

Optometry and Vision Science 94: 1022-1028, available at:

http://journals.lww.com/optvissci/Fulltext/2017/11000/Fibrous_Catalyst_Enhanced_Acanthamoeba.5.aspx

- **Choroidal thickness and axial length changes in myopic children treated with orthokeratology**

Many studies have now reported that orthokeratology (Ortho-K) contact lens treatment retards myopic progression. There have been conflicting reports on the effect of Ortho-K on choroidal thickness in young myopes. This prospective study used OCT to determine the effect of Ortho-K on axial length and choroidal thickness over a six-month period. Of the 50 myopic children included, 29 were fitted with Ortho-K lenses, whilst 21 wore single vision distance spectacles. At 6 months, the magnitude of eye growth was lower in the Ortho-K group compared to the controls. Subfoveal choroidal thickness increased significantly in the Ortho-K group, but was unchanged in the control group. The majority of choroidal thickening was found to be due to changes in the large choroidal vascular layer. The underlying mechanism of thickening of this layer is unclear, warranting further research in this field.

Contact Lens and Anterior Eye 40: 417-423, Available at:

<http://www.contactlensjournal.com/article/S1367-0484%2817%2930103-0/fulltext>

- **Desktop Humidifier for Dry Eye Relief in Computer Users**

Dry eye in computer users is a very common problem that can lead to frequent discomfort and reduced productivity. Whilst USB-powered desktop humidifiers are available, their efficacy in dry eye relief has not been established. In this prospective crossover study, 44 computer users performed a 1 hour computer task with and without use of a desktop humidifier. Tear meniscus height, non-invasive break up time, lipid layer grade and subjective comfort were determined pre- and post-task. Whilst no change in lipid layer grade and tear meniscus height was noted between the two environments, median non-invasive tear break up time was 4 seconds longer in the humidified environment and subjective comfort was greater. Although the change in relative humidity was modest with the desktop device, the results indicate the potential to improve tear film stability and comfort during computer use. Further research may be needed to establish whether similar results are achieved with longer periods of computer use, representing normal working conditions.

Optometry and Vision Science 94: 1052-1057, Available at:

http://journals.lww.com/optvissci/Abstract/2017/11000/Randomized_Trial_of_Desktop_Humidifier_for_Dry_Eye.9.aspx

- **Characteristics and survey of keratoconic contact lens wearers who are lost to follow up**

Keratoconus is the most common corneal ectasia, with rigid gas permeable (RGP) contact lenses typically fitted to maintain acceptable visual acuity and delay the need for a corneal graft. In the UK, NHS hospital clinics frequently manage the fitting and follow-up of keratoconic patients following referral by community optometrists. The authors of this study compared the patient records of 102

keratoconic patients lost to follow up from a contact lens clinic, to 102 patients (controls) who continued attending. A survey was also conducted on the discontinued group to assess how they were managing with their vision, and ascertain the reasons for discontinuation. There was no difference between groups in terms of age, sex, distance from home, or having received a corneal graft. Unilateral patients were significantly more likely to discontinue than bilateral patients, and discontinuation was most common within the first year. Back optic zone radius, and indicator of disease severity, was not significantly different between groups. The survey highlighted that poor comfort, handling problems and ability to manage without correction were common factors linked to discontinuation.

Clinical and Experimental Optometry 100: 616-622, available at:

<http://onlinelibrary.wiley.com/doi/10.1111/cxo.12558/full>

- **New pinhole sulcus implant for the correction of irregular corneal astigmatism**

Irregular corneal astigmatism significantly impacts on visual function and may be induced by conditions such as keratoconus, pterygium and pellucid marginal degeneration. Reducing the pupil aperture can lessen ocular aberrations associated with irregular corneal astigmatism although there are several disadvantages of sustained use of miotic agents. This paper reports on a new pinhole intraocular implant (the Xtrafocus), implanted into the sulcus and consisting of a black opaque diaphragm with a central 1.3 mm opening. Notably, the black acrylic material allows transmission of infra-red light, permitting fundus evaluation with technologies such as OCT and scanning laser ophthalmoscopy. Amongst 21 patients implanted with the device, median corrected distance visual acuity improved from 6/60 to 6/15 within the first month post-operatively, remaining stable in the subsequent months. No major complications were observed, and a questionnaire revealed that patients reported visual improvements at all working distances.

Journal of Cataract and Refractive Surgery 43: 1297-1306, Available at:

<http://www.jcrsjournal.org/article/S0886-3350%2817%2930587-4/fulltext>

- **Effects of Lens-Care Solutions on Hydrogel Lens Performance**

There is a lack of information on how newer multipurpose contact lens solutions may impact on ocular surface health and properties of the contact lens surface. This study included in vivo and in vitro elements to establish these effects with PureMoist®, Biotrue® and RevitaLens® solutions used with Acuvue® 2 contact lenses. Differences between the multipurpose solutions on the ocular surface were found – Revitalens® was associated with a longer pre-lens non-invasive tear break up time, but also caused the greatest epithelial disruption (corneal staining). After 10 minutes, subjective comfort was lower with PureMoist® than the other solutions and saline. The authors suggest that the results add to the evidence base that clinicians may consider when recommending care regimens to patients, and that further work with a longer exposure time may be warranted.

Optometry and Vision Science 94: 1036-1046, Available at:

http://journals.lww.com/optvissci/Abstract/2017/11000/Effects_of_Lens_Care_Solutions_on_Hydrogel_Lens.7.aspx

Lens and Cataract Surgery

- **Visual and refractive associations with falls after first-eye cataract surgery**

Cataract surgery is the most frequently-performed operation in economically-developed countries, although in some regions, significant waiting times can delay treatment. In this prospective study, 329 patients aged 65 years and older with bilateral cataract and on the waiting list for cataract surgery were followed up to determine the impact of first-eye cataract surgery on risk of falling. First-eye cataract surgery was found to reduce the risk of incident falls by 33 %, although larger changes (> 0.75 D) in required spectacle lens power in the operated eye resulted in a greater incidence of falls than those with smaller/no change in lens power. The authors suggest that cautious post-operative refractive management and timely second eye surgery are important to ensure maximum benefit of first-eye cataract surgery in reducing falls risk.

Journal of Cataract and Refractive Surgery 43: 1313-1321, Available at:

<http://www.jcrsjournal.org/article/S0886-3350%2817%2930616-8/fulltext>

- **Monovision LASIK versus Presbyopia-Correcting IOLs**

This large-scale study of 590 patients who underwent refractive lens exchange and 608 patients with monovision LASIK directly compared the outcomes of the 2 techniques. For most of the refractive categories studied, there was no difference between the two forms of surgery in terms of patient satisfaction, although moderate/ high myopes were more satisfied with monovision LASIK than refractive lens exchange. Myopic patients who underwent lens exchange experienced more postoperative visual phenomena than those with monovision LASIK. The results suggest that monovision LASIK may be a better option for higher myopes undergoing presbyopia-correcting surgery.

Journal of Refractive Surgery 33: 749-758, available at:

<https://www.healio.com/ophthalmology/journals/jrs/2017-11-33-11/%7B69561c39-1f46-4342-9330-af21f46eaba0%7D/monovision-lasik-versus-presbyopia-correcting-iols-comparison-of-clinical-and-patient-reported-outcomes>

Posterior Eye and General Ophthalmology

- **Myopic glaucomatous eyes with or without optic disc shape alteration**

This interesting longitudinal study examined the clinical course of primary open angle glaucoma (POAG) in 146 axial myopes with either tilted / rotated optic discs, or no optic disc alterations. The progression rate, determined by visual field loss, was faster in eyes with a non-tilted disc, compared to tilted discs. Progression in both the superior and inferior hemifields was significantly more common in the non-tilted group. The results indicate that glaucoma progression is more localised and stable in eyes with tilted optic discs.

British Journal of Ophthalmology 101: 1618-1622, available at:

<http://bj.o.bmj.com/content/101/12/1618>

- **Real-world data for the impact of cataract surgery on diabetic macular oedema**

Cataract is more common, and occurs earlier, in patients with diabetes. However, cataract surgery is known to lead to increased levels of inflammatory mediators and vascular endothelial growth factor (VEGF). This large-scale multicentre diabetic retinopathy database study included 4850 eyes to assess the rate of “treatment-requiring diabetic macular oedema (DMO)” in the 2 years pre- and post- cataract surgery. The rate of developing treatment-requiring DMO was found to increase sharply in the year after surgery, with a pre-operative rate of 2.9 % in the year prior to surgery, rising to 5.3 % in the year after surgery. The peak risk (6.8 %) occurred 3-6 months post-operatively. Patients with more severe pre-operative grades of diabetic retinopathy (e.g. moderate and severe non-proliferative DR) were at particularly high risk. The authors suggest that macular OCT should be considered in all diabetic patients undergoing cataract surgery, and that there may be a need to monitor patients more closely in the post-operative phase.

British Journal of Ophthalmology 101: 1673-1678, available at:

<http://bj.o.bmj.com/content/101/12/1673>

- **Comparison of Foveal, Macular, and Peripapillary Intraretinal Thicknesses between Autism Spectrum Disorder and Neurotypical Subjects**

In this cross-sectional study, spectral-domain OCT was used to compare the thicknesses of intraretinal layers in 27 patients with autism spectrum disorder (ASD) and 27 neurotypical (non-ASD) individuals. Head circumference and cognitive functioning (using a brief intelligence test) were also measured. ASD patients were found to have intraretinal thickening at numerous locations compared

to neurotypical individuals, with some correlations between cognitive status and peripapillary retinal nerve fiber layer thickness observed. No link was established between head circumference and OCT parameters. The authors suggest that the increased retinal thickness in ASD may be due to atypical parenchyma overgrowth, or neuroinflammatory changes, and that the results should be considered when interpreting SD-OCT examinations in individuals with ASD.

Investigative Ophthalmology and Visual Science 58: 5819-5826, available at:

<http://iovs.arvojournals.org/article.aspx?articleid=2663714>

Ocular Examination and Refractive Error

- **Risk factors for myopia progression in second-grade primary school children in Taipei**

In this population-based study including results from 3256 primary school children (mean age 7.5 years), the 1 year progression of myopia and associated risk factors were explored. Visual acuity, cycloplegic autorefractometry and analyses of parental questionnaires were conducted. Fast myopia progression (1.0 D or greater over a year) was associated with a greater myopic refraction at baseline, and interestingly, closer working distance for near work. Increased time spent outdoors and self-reported cycloplegic treatment were not found to be linked to slower progression. The authors suggest that maintaining a proper reading distance is important to help retard myopia progression.

British Journal of Ophthalmology 101: 1611-1617, available at:

<http://bj.o.bmj.com/content/101/12/1611.info>

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All articles were reviewed by Aston University and Bausch + Lomb were not privy to the original article.