Selected Abstracts from the Orthoptics Australia 73rd Annual Scientific Conference held in Melbourne 20th to 22nd November 2016

PATRICIA LANCE LECTURE
50 YEARS: THE DEVELOPMENT OF RESEARCH AND PUBLICATION IN THE AUSTRALIAN ORTHOPTIC JOURNAL

Linda Santamaria

This lecture is presented in honour and memory of Patricia Mary Lance in recognition of her contribution to orthoptics in the fields of research, education, and the Association both in Australia and internationally. After seven years of publishing the transactions of the annual scientific meetings, the first titled edition of the Australian Orthoptic Journal was published in 1966 as Volume 8, which means that this year marks 50 years of our journal with its current name. This anniversary provided an opportune time to look back over the journal and its development over the decades, from the very first orthoptic paper in the transactions of the 1959 meeting, which was actually by Patricia Lance, to the latest research publications in 2015. Over this time the changes in society, culture, education and technology have all affected the development of research and this has been reflected in our journal.

REVIEW OF THE PREVALENCE OF STRABISMUS AND FACTORS CONTRIBUTING TO VARIATION

Felicia Adinanto, Amanda French, Kathryn Rose

Strabismus presents in 2-5% of the population and is highly associated with amblyopia. It is known that those with poor vision in one eye are more likely to have pathology in the better eye later in life, contributing to the proportion of those with vision impairment with age. Literature has established that the contribution of genetics to strabismus is approximately 30% with associations between strabismus and various craniofacial and global syndromes. Environmental risk factors such as low economic status, maternal exposure to smoking, low birth weight, prematurity and admission to neonatal intensive care units have been identified as modifiable risk factors. This raises the question of whether the prevalence of strabismus has varied over decades. In order to determine this and whether the contribution of demographic characteristics of the population, such as age and ethnicity and methods of sampling and testing across populations has caused variation in the recorded prevalence of strabismus, this has been assessed by systematic analysis of the available literature.

Papers presenting the prevalence of strabismus within various population samples have been identified through database searches of PubMED and MEDLINE. Search terms included prevalence, strabismus, risk factors, school-based and population. Papers were selected for analysis if the samples were either population-based or school-based and the method of detection was by cover test by a qualified practitioner.

RISK FACTORS FOR ESOTROPIA AND EXOTROPIA

Felicia Adinanto, Amanda French, Kathryn Rose

Purpose: To identify risk factors associated with the development of esotropia and exotropia, which may have contributed to trends observed in the prevalence over the past few decades.

Methods: A systematic literature review was performed to provide insight into the relative contribution of genetics and modifiable risk factors in the development of esotropia and exotropia in children.

Results: Genetic studies of strabismus have established that the risk of developing esotropia is 3 to 5 times greater if a first degree relative had strabismus. The overall prevalence of strabismus was not significantly different between ethnicities (p=0.81). However, in European Caucasian populations 62.6% had esotropia while 74.3% of those in East Asian populations had exotropia. Modifiable risk factors such as low socio-economic status, maternal exposure to smoking, low birth weight, prematurity and admission to neonatal intensive care units have been previously identified. Esotropia is associated with antenatal factors, such as admission to NICU and low birth weight, whereas exotropia is related to modifiable risk factors such as low socio-economic status.

Conclusions: While the prevalence of strabismus is consistent across different locations, there is variation in the prevalence of esotropia and exotropia based on ethnicity. A family history of strabismus increases the risk of developing strabismus, but in itself is unable to account for the majority of strabismus cases. The contributions of modifiable risk factors appear to play a major role in the development of esotropia and exotropia in children. However ethnic differences in esotropia and exotropia are unexplained by any of these risk factors.

UNDERSTANDING THE RELATIONSHIP BETWEEN INCOMITANT STRABISMUS AND THE RADIOLOGICAL FINDINGS

Natalie Ainscough, Gulsah Bakar, Nermina Mustafic, Jessica Collins

Using case studies seen in ophthalmology departments run by South Australia Health, the interpretation of a range of radiological assessments was presented, including MRI and CT scans, and their relationship to eye movement deficits identified in the outpatient clinic.

THE SAFETY AND EFFICACY OF CORNEAL COLLAGEN CROSS LINKING COMBINED WITH ORTHOKERATOLOGY LENSES FOR KERATOCONUS

Mitchell Bagley, Tess Huynh

Purpose: To evaluate the results of corneal collagen cross linking (CXL) alone compared to when CXL is performed in combination with corneal moulding orthokeratology (OK) lenses for progressive keratoconus.

Method: A pilot study was conducted involving patients who presented with progressive keratoconus and proceeded with treatment of either CXL alone or CXL with OK wear. Patients who were treated using OK lenses wore these for a minimum of one month prior to CXL and resumed OK wear one month postoperatively, continuing until vision had stabilised. The same accelerated CXL protocol was followed for all cases. Vision, autorefraction, keratometry and pachymetry were obtained throughout the study.

Results: There were 10 eyes in each group. In both groups VA improved by seven letters and there was no progression across all keratometric indicators between the preoperative appointment and the most recent appointment post CXL. Mean best corrected visual acuity indicated a slightly greater improvement in the OK group of three letters compared to one. The mean minimum pachymetry revealed greater thickening in the OK group (+23.22um) compared to the control group (+12.13um). Two patients in each group appreciated an improvement in their vision, however three patients who wore OKs reported ocular discomfort. There were no adverse advents in either group.

Conclusion: Given the similarity in results between CXL alone and combining this procedure with OK wear it is difficult to ascertain what place this treatment option has in the current clinical context. It is likely that a higher-powered study may reveal more significant findings.

THE EVALUATION OF PATIENT EDUCATION AND THE PROVISION OF INFORMATION REGARDING PATIENT SUPPORT GROUPS AND LOW VISION SERVICES TO PATIENTS RECEIVING TREATMENT FOR NEOVASCULAR AMD

Jessica Boyle, Meri Vukicevic, Konstandina Koklanis, Catherine Itsiopoulos, Gwyneth Rees

Background: Central to the patient experience of ophthalmic treatment is patient education. Despite the chronic and invasive nature of anti-vascular endothelial growth factor (VEGF) treatment for neovascular age-related macular degeneration (AMD), the perceptions of patients around patient education have not been widely investigated in this clinical population. Of the handful of studies to have explored this to date, all have been limited by small sample size. These studies have reported that patients receive inadequate information pertaining to the injection procedure and its outcomes. Improving patient education standards may help minimise known pre-procedural anxiety often experienced in those undergoing anti-VEGF treatment for neovascular AMD. In addition, no study to date has investigated issues surrounding the provision of information to patients in relation to patient support groups/low vision services from the perspective of ophthalmologists and orthoptists involved in patient care. The aim of this study was to investigate the experiences and perceptions of patients undergoing repeated intravitreal anti-VEGF injections for neovascular AMD in relation to patient education. A secondary aim was to identify issues surrounding patient education and the provision of information relating to low vision services and patient support groups from the perspective of ophthalmologists and orthoptists.

Methods: Forty patients (16 males, 24 females) with neovascular AMD undergoing anti-VEGF treatment were recruited from a private ophthalmology practice and public hospital in Melbourne. Patients underwent semi-structured, one-on-one interviews. Interview topics included: treatment burden and satisfaction; tolerability; barriers to adherence; treatment motivation; and patient education. Interviews were audio recorded and thematic analysis performed using NVivo 10 (QSR International, Doncaster, Australia). Eighteen orthoptists and one ophthalmologist with experience in managing patients with neovascular AMD were recruited from the same private ophthalmology clinic and public eye hospital. Eye health care professionals completed a self-administered electronic questionnaire designed by the study investigators exploring their perceptions around patient education and the provision of information to patients about support groups/services.

Results: Patient satisfaction in relation to the provision of educational information was low, especially among public patients. Many patients reported receiving inadequate information about AMD and its treatment. Visual feedback in the form of optical coherence tomography (OCT) imaging was perceived by patients to represent a useful adjunct to verbal information conveyed by their specialist and facilitated their understanding of treatment. However, not all patients reported having been shown their OCT scan in the past. A lack of patient awareness was found concerning low vision services and support groups, irrespective of public versus private status. Not surprisingly, service uptake was also low with only one patient enrolled in a patient support group and few patients aware of low vision services available to them. Factors influencing the uptake of low vision rehabilitation services and patient support groups (as identified by patients) included: timing of referral, financial outlay, perceived benefit/s, and accessibility. Referral rates were low amongst orthoptists. Barriers to the referral of patients to low vision services and patient support groups (as identified by orthoptists) included: practical factors, knowledge-based factors, patient factors and clinical protocol.

Conclusion: Despite treatment adherence typically being high in patients undergoing anti-VEGF injections for neovascular AMD, patient satisfaction with the level of educational information provided was low, especially in public patients. Many patients felt uninformed about the treatment process and reported limited knowledge of support services available to them. Improving the standards of patient education may help lessen pre-procedural anxiety and assist patients to better manage the challenges of AMD treatment.

CHALLENGING OUR THINKING ON AMBLYOPIA: A PARADIGM SHIFT

Louise Brennan, Jane Lock

Amblyopia is fundamentally a neurological disorder resulting in subnormal vision that arises from disruption of visual development during early childhood. Amblyopia, which is more commonly referred to as 'lazy eye' affects about 2% of the Australian population. The current mainstay of treatment is occlusion therapy, which involves patching or penalisation of the non-amblyopic eye. Some scientists and clinicians purport that whilst patching improves monocular vision, it neglects binocular visual development. The latter is important for depth perception, and appreciation of form and motion. Recent experimental evidence supports the role of binocular methods of treating amblyopia, referred to as dichoptic therapy. This treatment method forces both eyes to function together by presenting different images to each eye, either in a movie or as an interactive game. The amblyopic eye sees images of higher contrast, while the fellow eye sees images of lower contrast. For the game to be played successfully both images must be seen. Multiple small studies have already demonstrated the efficacy of dichoptic tablet games for visual improvement in amblyopes. Our current thinking on amblyopia and how this is being challenged will be discussed along with an outline of a prospective study being conducted at The Children's Hospital at Westmead.

INVESTIGATING A FEAR OF THE DARK - ERG FINDINGS IN CHILDREN WITH NYCTALOPIA

Nick Brislane

Objective: To report on the clinical phenotypes in a series of children who presented with complaints of night blindness.

Discussion: During the commissioning of the visual electrophysiology testing service at The Royal Children's Hospital, 10 patients underwent standard and extended electroretinogram (ERG) testing to investigate their common complaints of night blindness. Under scotopic test conditions, six patients' ERGs showed an absence of rod-derived b-waves, a negative response to a bright white stimulus. The use of photopic, cone-derived ERG to short and long duration flash stimuli assisted in differentiating between genetically distinct conditions which are indistinguishable based on a negative ERG alone. ERG testing beyond the standard ISCEV protocols was informative in making distinctions between complete and incomplete congenital stationary night blindness (4 cases), retinitis pigmentosa (3 cases), x-linked retinoschisis (1 case), enhanced s-cone syndrome (1 case) and rod dysfunction secondary to isotretinoin use (1 case).

Conclusion: ERG studies beyond the ISCEV standard protocols are useful in diagnosing various causes of nyctalopia in children.

ORTHOPTISTS AND ORTHOPTICS IN THE WAR YEARS, 1939-1945

Shayne Brown

When war broke out in September 1939 the exact number of trained orthoptists in Australia was unknown. At least six were in Sydney, at least four in Melbourne, one in Adelaide and one in Hobart. The profession was in its infancy. The Orthoptic Association of Australia (OAA) was yet to be formed and the Orthoptic Board of Australia (OBA) was barely a year old. Research by Canadian born, British ophthalmologist, Air Commodore Sir Philip Livingston developed visual standards required for trainee aircrew in the Royal Air Force (RAF) and these standards were mainly adopted by the Royal Australian Air Force (RAAF). Livingston had found that some trainee pilots with poorly controlled heterophorias displayed inaccuracies in depth perception which affected their ability to land their aircraft safely. He was a strong advocate for orthoptic treatment. This was a controversial matter both in England and in Australia. However Australian ophthalmologist, Joseph Ringland Anderson, argued for the inclusion of orthoptic investigation and treatment for aircrew trainees under the

Empire Air-Training Scheme. Consequently, Australian orthoptists, Beatrice Barnes, Ethel D'Ombrain, Diana (Mann) Craig, Emmie Russell and Lucy (Willoughby) Retalic assessed and treated RAAF aircrew with ocular motor imbalances from 1940-45. Little has been written about this period in Australian orthoptic history. To my knowledge there are no personal records written by these orthoptists. Much of what we know is through scientific papers and some accounts by ophthalmologists and RAAF personnel. Nevertheless, there is sufficient evidence to show that these women played an important part in aviation medicine.

BEFORE I WAS BORN

Kirsten Campbell

Prior to the development of computerised perimetry, monitoring glaucoma involved measuring IOP, often by Schiotz tonometry and performing fields with a Bjerrum screen or arc perimeter. Pilocarpine was the standard treatment for glaucoma with the resulting miosis reducing the field. Refracting patients after cataract surgery meant waiting for 6 to 8 weeks for the large wound to heal and refraction to stabilise. Aphakic correction required patience and continued explanation to gain an accurate refraction. The artist Monet exemplified difficulties following cataract surgery and his rejection of what was then a satisfactory result.

NOT YOUR AVERAGE SQUINT...

Nicole Carter

In a paediatric setting doing initial examinations on patients with a possible strabismus becomes as routine as brushing your teeth. From the information on the referral and the parent's description of eye signs, the orthoptist usually has a good idea of one or two differential diagnoses as soon as they enter the room. But every now and then a case presents that is not your average squint! This presentation showcased a selection of interesting squint cases. The details of each case were followed from referral to orthoptic and ophthalmic examination, diagnosis and follow-up.

THE USE OF A TOOL TO DETECT THE PRESENCE OF VISION DEFECTS IN PATIENTS DIAGNOSED WITH STROKE – VISION SCREENING TOOL VALIDATION RESULTS

Michelle Courtney-Harris, Neryla Jolly, Kathryn Rose

Aim: To validate a vision screening tool for use by hospital-based health practitioners in stroke-affected patients to identify pre-existing and stroke-related ocular conditions.

Methods: A vision screening tool was devised in consultation with multidisciplinary vision care experts to be part of routine stroke assessment. Stroke units in two metropolitan Sydney public hospitals with no access to on-site eye care professionals, participated in the study. Patients admitted to these units for a minimum of three days were eligible for recruitment. Participants were allocated randomly to one of two groups. In Group 1, a detailed visual assessment by an experienced eye care practitioner (orthoptist) was compared to information elicited by the tool when administered by a non-eye practitioner. In Group 2, the vision screening tool was administered by both the orthoptist and practitioner for comparison. This study had institutional ethical approval.

Results: 100 participants were recruited; analysis showed the tool was highly successful in ascertaining pre-existing eye conditions. While the tool is able to detect obvious newly acquired visual problems, subtle conditions are more likely to be missed.

Conclusion: The vision screening tool is suitable and a valid instrument for achieving its designated purpose of identifying pre-existing and newly acquired visual problems in patients with a diagnosis of stroke. It is suggested that minor modifications to the vision screening tool along with an education package will enhance its overall functionality.

EXPLORING THE PATIENT PERSPECTIVE OF CATARACT SURGICAL OUTCOMES

Vu Quang Do, Lisa Keay, Anna Palagyi, Jan Steen, Andrew White, Peter McCluskey

Background: Success of cataract surgery has traditionally been assessed by visual acuity and vision function measures. However, little is known about the relationship between these clinical outcomes and patient satisfaction following cataract extraction.

Purpose: This study aims to identify the main predictors of patient satisfaction following cataract surgery and to explore how satisfaction and quality of life is related to key visual outcomes such as visual acuity and vision-related quality of life.

Methods: The aim is to recruit 400 bilateral cataract patients aged 50 years and above currently on the cataract surgery waiting list at four public hospitals and one private clinic in Sydney. Participants will undergo comprehensive assessment of vision, self-reported visual function, quality of life and mood prior to first eye surgery, three months after first-eye surgery and three months after second-eye surgery. Satisfaction with surgery will be rated by the participant, and target post-surgical refractive status and surgical complications assessed by surgical record review.

Results: 330 participants have undergone baseline assessment as of July 2015, with 27% (n=90) having completed follow-up assessment post first-eye surgery. One-third (n=28) of participants were dissatisfied with their self-reported wait-time from initial hospital appointment to surgery date (median 6 months, range 1-18 months); median preferred waiting time was 4.5 months (range 0.5-12 months). Most participants (91%, n=82) were satisfied with their first-eye cataract surgery.

Conclusion: Eliciting the personal perspective of cataract surgery may allow eye professionals to better determine the suitability of a patient for cataract surgery, manage expectations and appropriately time surgery.

A CASE OF FOVEAL HYPOPLASIA

Allanah Crameri

A four-year-old boy was referred to the clinic for poor visual acuity which the optometrist was unable to improve. On further investigations by the orthoptist and ophthalmologist, foveal hypoplasia was suspected. Foveal hypoplasia is the underdevelopment of the fovea and macula which includes an absent or abnormal maculofoveal reflex, unclear definition of the area and capillaries running abnormally close to the foveal region. Isolated foveal hypoplasia is often subtle and difficult to detect however, other accompanying signs may include nystagmus, poor visual acuity, aniridia, albinism, microphthalmia and achromatopsia. This case looked at the initial presentation, investigations and suspected diagnosis of foveal hypoplasia.

HOW DO WE COMMUNICATE WITH OUR PATIENTS?

Catherine Devereux

Increasingly, health providers are expected to partner with their patients in the delivery of health care services. Person-centred practice puts the consumer (patients, family and their carers) at the centre of their care by including them in decision making and focusing on their unique and individual needs. Patients tell us that they want timely care, respect, positive communication and to feel supported. Based on a series of consumer-led projects this presentation addressed communication as the integral component in building effective relationships with patients and their

families. How we talk with consumers and consider their understanding of health information is pivotal to empowerment and maximising health outcomes. The Teach Back technique will be outlined and encouraged as a useful method to 'confirm that you have explained to the patient what they need to know in a manner that the patient understands'.

ORTHOPTISTS DRIVING CLINICAL IMPROVEMENTS VIA THE SAVE SIGHT REGISTRIES (SSR)

Amanda Dinh, Amparo Herrera-Bond, Phuc Nguyen, Mark Gillies, Stephanie Watson

Background: The SSR is a sophisticated web-based data system used worldwide to collect data on the outcomes of therapy for eye disease, including patient reported treatment outcomes. Modules are currently available for macular degeneration (nAMD), diabetic retinopathy and keratoconus. Outcomes data collected via the registry is driving improvements in patient care and providing a clear picture of the patient journey. Orthoptists play a key role facilitating the use and growth of this significant registry and providing patient education on the outcomes of their eye disease and treatment course.

Method: A review of the current procedures for implementation of the SSR was conducted utilising the keratoconus module. Key roles for the orthoptist were identified. Data collected from the keratoconus module was used to illustrate the role of the orthoptist for the Save Sight Registries.

Results: 116 key roles for the orthoptist were identified. Orthoptists identified as being actively involved with data input from patients in real-life clinical settings, facilitating the collection of patient reported outcomes via survey, reviewing treatment outcomes with the ophthalmologist and patient education. Interests in the SSR have been encouraging with increasing implementation across various centres nationally and internationally. The database for nAMD has grown from 293 patients in 2009, to 5,500 patients, 7,109 eyes in 2016 with a total of 146,159 treatments. Likewise, there are already 261 treatments captured and 851 eyes in the Keratoconus Module.

Conclusion: SSR is a unique system empowering orthoptists with clinical knowledge. It is driving improvements in ophthalmology by tracking outcomes of treatment in real life clinical settings with a patient focused approach. Orthoptists registered in the system are self-educating and becoming more actively involved in patient care and the patient's treatment journey and in turn, professional development.

THE AUSTRALIAN ORTHOPTIC BOARD AND YOU

Kerry Fitzmaurice

Historically the orthoptic profession in Australia was regulated by the Orthoptic Board of Australia, a sub-committee of the Royal Australian and New Zealand College of Ophthalmologists (RANZCO). The Board members included ophthalmologists and orthoptists and the functions included conferring the entry to practice qualification – Diploma of the Orthoptic Board of Australia, and to ensure professional standards. As the orthoptic profession developed, having professional standards regulated by another professional body became inappropriate. The preferred position was regulation under government legislation however as this was not possible the agreed option was to form an independent body that would be recognised nationally in a court of law. The Australian Orthoptists Registration Body Pty Ltd was formed with a sub-committee – the Australian Orthoptic Board (AOB). The current AOB provides independent oversight of the quality of orthoptic practice by: accrediting the university training programs for orthoptists in Australia; assessing the equivalence of non-Australian qualifications; regulating professional development and providing disciplinary procedures and actions in the case of professional misconduct. The role of the AOB in professional regulation was discussed.

RISK FACTORS FOR LONGITUDINAL BIOMETRIC AND REFRACTIVE CHANGE IN AUSTRALIAN SCHOOLCHILDREN

Amanda French, Kathryn Rose

Purpose: To investigate longitudinal change in biometry and refraction and examine the impact of risk factors in Australian schoolchildren.

Methods: The Sydney Adolescent Vascular and Eye Study followed up participants (6 years; N=1,765 and 12 years; N=2,353) from the Sydney Myopia Study, 5 to 6 years after initial examination. Children underwent a comprehensive ocular examination including cycloplegic autorefraction (Cyclopentolate 1%, Canon RK-F1). Change in spherical equivalent refraction (SER) and biometry for the right eye were analysed and the impact of risk factors examined.

Results: There was a significant negative shift in mean refraction between baseline and follow-up (both cohorts $p<0.0001$) associated with increases in axial length (AL), anterior chamber depth (ACD) and axial length/corneal radius ratio (AL/CR). Children of East Asian ethnicity and those with myopic parents had greater changes in refraction and biometry (all $p<0.0001$). Children who spent more time in near work also had larger increases in AL and AL/CR, although this was significant only in the older cohort (AL, $p=0.02$ and AL/CR, $p=0.03$). Conversely, spending greater time outdoors reduced AL growth in the younger (high=0.71 mm, moderate= 0.77 mm and low=0.86 mm, $p<0.0001$) and older cohort (high=0.22 mm, moderate=0.26 mm and low=0.28 mm, $p=0.008$), as well as AL/CR (both $p<0.0001$).

Conclusion: Greater time spent in near work increased refractive and biometric change but, this was significant for the older cohort only. More time spent outdoors slowed AL/CR change and AL elongation in both cohorts, although the impact appeared greater at a younger age.

THE USE OF BLENDED LEARNING TO INCREASE ORTHOPTIC STUDENTS' ACCEPTANCE AND SUCCESS IN EVIDENCE-BASED PRACTICE LEARNING

Amanda French, Kathryn Rose

Purpose: This study aimed to assess the impact of blended learning on student acceptance and success in learning evidence-based practice (EBP).

Method: Blended-learning was introduced to increase student engagement in EBP subjects in the Master of Orthoptics course in Sydney. Student acceptance was assessed quantitatively through formal subject evaluation scores and qualitatively through thematic analysis of student survey comments. The contribution of blended learning to student success was investigated by analysis of grades.

Results: In 2010, student acceptance of learning EBP was low with only 37% satisfied with the research subject. With the introduction of a preparatory subject incorporating blended learning in 2011, student satisfaction with the semester 2 subject increased to 56%, although student comments suggested that the relevance was not well understood: 'I do not at all see the relevance to my degree and how this knowledge will be used in my career as an orthoptist' (student, 2011). With further refinement of the curriculum, student satisfaction increased to 87%, 100% and 81% in 2012, 2013 and 2014 and comments indicated a greater understanding of the relevance. Student grades for the final research subject also increased, with the failure rate dropping and an upward shift in the mean grade.

Conclusion: The use of blended learning strategies to encourage orthoptic students' engagement has significantly increased student acceptance and success in their learning of EBP. This is likely to translate into greater engagement in EBP and research as orthoptic graduates.

TAKE TWO APPS AND TWEET ME IN THE MORNING: HEALTHCARE IN A DIGITAL WORLD

Michelle Gallaher

Social media and the internet of things is playing an increasing role in healthcare delivery, and practitioners and providers can no longer afford to ignore its value. Initially seen as a detrimental distraction and a source of misinformation by many healthcare providers, social media is fast becoming a primary tool for many clinical researchers, medical technology developers, healthcare providers and patients. Digital health and the opportunity these platforms offer to orthoptics and ophthalmology is being transformed, literally before our eyes. Vision technologies and patient engagement opportunities are emerging in the market, built upon smartphone platforms. Social media platforms, particularly Facebook and Twitter, are seeking to serve clinical researchers and patients who are vision impaired and clinical researchers looking for engagement and data. The rise of digital health is transforming the sector with technologies that are disrupting the major players in the medtech market with cheaper, easier and more sympathetic approaches improving compliance, access and outcomes. Examples were introduced of high value social media and IofT technologies such as Research Kit and IBM Watson, and ways in which regulation, legislation, quality clinical evidence, market access and reimbursement need to keep pace with the way patients and practitioners are engaging online, specifically in vision sciences, were discussed.

GOLDMANN APPLANATION TONOMETRY AUDITS (RVEEH)

Debra Gleeson

Raised intraocular pressure (IOP) has been shown to be a significant risk factor for glaucomatous damage and progression. The goal for treating patients with glaucoma is to lower the IOP to a targeted pressure to reduce the risk of further damage. Goldmann applanation tonometry (GAT) is the gold standard for measuring IOP and accuracy performing this test is of high importance. It had been noted on the RVEEH EGTH glaucoma clinic that there was some disparity between the IOP measurements taken by the orthoptists and those measured later by the glaucoma consultants. An audit was undertaken over a three-week period to note the number and range of disparity in the IOP measurements. A professional development opportunity was provided on several occasions for the orthoptic staff to outline the many factors affecting measurement and how to improve technique. An audit of IOP readings was conducted in 2016 after two of these teaching sessions.

THE TED TALK: AN OVERVIEW AND CASE PRESENTATIONS

Lindsay Horan

Thyroid eye disease is autoimmune disorder that can lead to dysfunction of multiple organ systems. Its effect on the eye can be mild to very severe. The eye muscles are often involved, leading to eyelid retraction, dry eye, and restrictive strabismus. In this presentation, an overview of thyroid eye disease, including its ocular manifestations and natural history, was provided. In addition, case presentations illustrated the disease course and management.

PREVALENCE AND RISK FACTORS FOR DIABETIC RETINOPATHY IN A HOSPITAL-BASED POPULATION OF AUSTRALIAN CHILDREN AND ADOLESCENTS WITH TYPE 1 DIABETES

Stuart Keel, Catherine Itsiopoulos, Konstandina Koklanis, Meri Vukicevic, BOrth, Fergus Cameron, Laima Brazionis

Aim: To investigate the prevalence, and traditional and emerging risk factors associated with retinopathy in a hospital-based population of Australian children and adolescents with type 1 diabetes.

Methods: This was a cross-sectional study of 483 children and adolescents with type 1 diabetes. The medical files of participants who had retinal images taken were audited to collect all relevant clinical data. Diabetic retinopathy was assessed from colour retinal images by an ophthalmologist according to the Modified Airlie House classification system.

Results: Diabetic retinopathy was observed in 11 (2.3%) participants. Univariate analysis revealed a higher mean HbA1c (M=9.2±1.6 vs 8.3±1.3; p=0.008) and BMI (M=27.4±5.2 vs 23.1±4.6; p=0.009), and lower serum HDL cholesterol (M=1.2±0.3 vs 11.5±0.3; p=0.006) in participants with diabetic retinopathy. Logistic regression revealed that the principal components analysis derived risk profile of: higher serum creatinine, older age, higher SBP, higher BMI, abnormal eGFR (<59 ml/min), lower HDL cholesterol, higher serum sodium, longer duration of diabetes and narrower retinal arteriolar calibre was associated with diabetic retinopathy (ExpB=2.60, 95% CI 1.36-4.96, p=0.004).

Conclusions: These results support the concept that the pathogenesis of diabetic retinopathy is likely due to the combined influence of various risk factors, many already identified. Furthermore, the results of univariate and multivariate analysis provide novel evidence for the possible benefit of more intense management of diabetic retinopathy for persons with a low HDL level.

CHILDREN REFERRED FOR TERTIARY CARE AT THE CHILDREN'S HOSPITAL AT WESTMEAD FROM COMMUNITY-BASED SURVEILLANCE WITH COMPLEX NEURODEVELOPMENT AND ADDITIONAL NEEDS

Lindley Leonard, Louise Brennan

With the initiation of a pilot clinic in 2010 there has been an evolution in the management of children seen within a busy outpatient combined orthoptic/ophthalmology service. Changes have been evident in referral patterns including a noticeable increase in referral of children with complex neurodevelopment and additional needs being assessed within the community, requiring appropriate ophthalmology assessment. This has required us, as orthoptists, to consider a model of service delivery to accommodate children that previously have not been reviewed within this particular clinic. Discussion highlighted modifications within the service and a number of cases that confirmed the necessity of a thorough assessment whilst considering adaptations for children with additional needs.

EARLY LIFE RISK FACTORS OF AMBLYOPIA, STRABISMUS AND ANISOMETROPIA IN A YOUNG ADULT POPULATION

Gareth Lingham, Seyhan Yazar, Paul Sanfilippo, Jenny Mountain, Alex Hewitt, John Newnham, David Mackey

Aim: Amblyopia, strabismus and anisometropia are childhood diseases that frequently co-occur. We investigated the underlying possible early life risk factors associated with these three conditions in 20-year-old individuals.

Methods: The Western Australian Pregnancy Cohort (Raine) Study is a cohort study of individuals born between 1989 and 1991. During prenatal period, parents of these individuals completed comprehensive questionnaires on medical history, life style and environmental exposures. At the 20-year follow-up, 1,344 participants underwent an extensive eye exam including a complete orthoptic assessment. Risk factors were explored for each condition by comparing with a disease-free control group. Identified differences were further investigated using univariate and multivariate regression models.

Results: Of 1,128 participants of Northern European ancestry, 14 (1.2%) had amblyopia, 47 (4.2%) had clinically significant strabismus and 34 (3.0%) were anisometropic. The frequency of individuals born via normal delivery was consistently lower in amblyopia (42.9%), esotropia (40.7%), exotropia (50%) and anisometropia (58.8%) groups compared to control

(78.3%) (all p<0.001). Birth by caesarean section was associated with increased likelihood of having amblyopia after adjusting for sex (OR: 2.28, 95% CI: 2.08-2.49, p<0.001). Occipitofrontal diameter, median gestational age and duration of first stage of labour and delivery mode were all associated with strabismus in univariate analyses (all p<0.05).

Conclusion: Among the long list of risk factors we investigated, non-vaginal delivery was associated with amblyopia, strabismus and anisometropia in our Western Australian cohort. This study supports the hypothesis that abnormal delivery methods may be related to common childhood eye diseases.

PAPILLOEDEMA: TRUE SWELLING, DRUSEN IN DISGUISE ... OR BOTH?

Melanie Lloyd

Children are often urgently referred to the ophthalmology department with 'papilloedema'. This presentation took a closer look at the literature regarding the prevalence, diagnosis and management of idiopathic intracranial hypertension and drusen, as well as the necessary investigations required to differentiate between them.

THE ROLE OF OCULAR ELECTROPHYSIOLOGY IN AUTOIMMUNE RETINOPATHIES

Jo Lynch

Autoimmune retinopathies such as MAR (melanoma associated retinopathy) and CAR (cancer associated retinopathy) are rare conditions but need to be considered in patients who present with rapidly progressive, bilateral, painless vision loss, particularly if they have a history of cancer. Symptoms may include visual field defects, nyctalopia, photopsias and defective colour vision. Extensive testing is required to exclude other causes such as genetic conditions and electrophysiology has an important role to play.

ROYAL VICTORIAN EYE AND EAR HOSPITAL AND ACO COLLABORATIVE CLINIC - A NEW MODEL OF CARE FOR LOW RISK GLAUCOMA PATIENTS

Linda Malesic, Catherine Green, Caroline Clarke, Tracy Siggins, Sharon Bentley, Maureen O'Keefe

To develop a sustainable clinical model of care for the management of glaucoma suspects involving a collaboration between the Royal Victorian Eye and Ear Hospital (RVEEH) and the Australian College of Optometry (ACO). The Glaucoma Collaborative Clinic (GCC) was established in April 2016, at the ACO's main clinic in Carlton, Melbourne. The clinic utilises the full scope of eye care professionals, ophthalmologists, optometrists and orthoptists, to provide eye care the numerous public patients suspected of having glaucoma. The service has been developed with a focus on providing the most appropriate care at the most appropriate time in the patient journey. This presentation outlined how this new clinic has involved new collaborative models and pathways to eye care, building on and bringing together the skills and experience of both the RVEEH and ACO to deliver the best outcomes for patients. In addition, the ways in which the new GCC has provided scope for the clinical training of orthoptists and optometrists in a unique collaborative environment will be presented.

SPECIALIST CLINIC REDESIGN AT THE ROYAL VICTORIAN EYE AND EAR HOSPITAL

Catherine Mancuso, Tracy Siggins

The Royal Victorian Eye and Ear Hospital (RVEEH) is changing. Anyone who works there or has visited in the past four years can see that. There are workmen walking through the hospital in their hard hats and high-vis vests, there is a large gantry erected off the side of the hospital and there is dust and noise and vibration. This is all because we are undergoing a major redevelopment which will bring our facilities into the 21st century. Although these changes are significant they are not the only changes taking place. Significant clinic redesign activities have also taken place. In order to achieve this, we have had to look at: i. how The Royal Victorian Eye and Ear Hospital transitioned from an undifferentiated general eye clinical service to the Surgical Ophthalmology and Acute Ophthalmology specialist eye services; ii. the use of data to support well informed service decisions, and iii. defining clinic role and patient pathways – a compelling narrative for change.

A REVIEW OF StEPS OUTCOMES

Danielle Morgan

The Statewide Eyesight Preschool Screening program (StEPS) provides free vision screening for all 4-year-old children in NSW. The program targets children before starting school to maximise the potential for visual improvement during the critical period of visual development. This presentation explored outcomes from the Sydney Children's/Prince of Wales Hospital StEPS clinics over the last few years and focused on the importance of encouraging patient attendance and the need for orthoptic screening in the StEPS program.

DIABETIC RETINOPATHY IN PREGNANCY: A REVIEW

Julie Morrison, Lauren Hodgson, Lyndell L Lim, Salmaan Al-Qureshi

The prevalence of diabetes in Australia has more than doubled in 20 years. The prevalence of diabetes in pregnancy is increasing even more rapidly due to increasing gestational age and the increasing prevalence, and younger age of onset of type 2 diabetes in the population. Pre-existing diabetes is present in 1 in 167 pregnancies in Australia, divided equally between type 1 and type 2 diabetes. Diabetic retinopathy is a leading cause of blindness in women during their childbearing years and pregnancy increases the short-term risk of diabetic retinopathy progression. We examined the risk factors for progression of diabetic retinopathy during pregnancy including; duration of diabetes, baseline level of retinopathy, level of glycaemic control and hypertension. We also examined current screening and management guidelines and their levels of evidence, current treatment options for diabetic retinopathy and avenues for further research.

THE ORTHOPTIC-LED DIABETIC SCREENING CLINIC AT THE ALFRED HOSPITAL

Mercy Nguyen

In 2014, the ophthalmology department at the Alfred Hospital introduced an orthoptic-led diabetic screening clinic. This clinic was developed in response to the increasing demand required to care and monitor the ocular health of those with diabetes. It allows the orthoptist to be more actively involved in patient care and management, as well as provide a more efficient and effective way of dealing with the ever-growing diabetic health concern. Through this diabetic screening clinic, results have shown that patients receive a more thorough and comprehensive assessment than previously, as well as more appropriate regular eye appointments. This presentation outlined the protocols and procedures that have been implemented through this screening clinic and the benefits it has provided both to the patients and to the productivity of clinics.

A NOVEL METHOD FOR MEASURING NYSTAGMUS

Cem Oztan

Nystagmus is the involuntary repetitive rhythmic oscillation of the eyes. The movements of the eyes are commonly from side to side, but sometimes can be up and down, clockwise and counter clockwise rotation or any combination of these. Additional characteristics of nystagmus include type, whether pendular or jerk, amplitude, frequency, intensity, foveation, conjugate/disconjugate and presence of a null point. Nystagmus in infancy and childhood can be idiopathic or associated with ocular or systemic conditions. It is a common cause of vision impairment, resulting in variable classifications from near normal vision to profound low vision. The clinician is faced with a unique challenge of examining and treating patients with nystagmus. The aim of this presentation was to briefly review current eye movement recording techniques used in nystagmus such as electrooculography, electronystagmography and video eye/gaze tracking devices, and evaluate a novel method for measuring nystagmus which can be used in clinic and applied to the assessment phase and treatment success of nystagmus patients.

ORTHOPTICS IN AN OPHTHALMIC CLINIC

Becc Page, Shandell Wishart

It is nearing the middle of a busy, four doctor clinic and a new patient has presented to a retinal specialist with a 6th nerve palsy – they turn to you for your expert opinion on how to manage this patient. What do you do!? Working within a busy ophthalmic practice, we saw a need to follow in the footsteps of several public hospitals and set up orthoptic-only clinics to provide one-on-one care to patients who require an in-depth orthoptic assessment that cannot be provided within the confines of an ophthalmic clinic. These sub-contracted clinics allow ocular motility patients to be seen at a more suitable time and managed by their orthoptist on an ongoing basis. This presentation aimed to explain how we got our clinics up and running, what challenges we faced along the way and why this model could be useful to many other clinicians working in an ophthalmic setting.

FINGOLIMOD (GILENYA) SCREENING AT THE ALFRED HOSPITAL

Alannah Price

In 2013 at the Alfred Hospital an Orthoptic Drug Screening Clinic was established to screen and monitor ocular changes associated with the use of plaquenil, ethambutol and fingolimod (Gilenya) medications. Gilenya 0.5mg was approved for use in Australia by the Therapeutic Goods Administration (TGA) in February 2011 and placed on the Pharmaceutical Benefits Scheme (PBS) in September 2011 for the treatment of relapsing forms of multiple sclerosis (MS). Collective data from clinical trials found the incidence of macula oedema associated with the use of 0.5mg of Gilenya to be 0.4% of participants. It is therefore recommended that patients who commence Gilenya have an eye exam to assess macula oedema within the first 3 to 4 months of commencing the drug. An overview of the protocols and procedures for Gilenya screening in the Orthoptic Drug Screening Clinic was discussed.

BULA! ORTHOPTISTS IN FIJI 2015

Maria Pritchard, Tony Wu

Last November a group of volunteer medical and allied health professionals visited the Coral Coast in Fiji to provide a range of health based services and education to the local community. The two orthoptists provided vision screening, education and glasses. The experience of these orthoptists was presented.

A RETROSPECTIVE STUDY TO IDENTIFY FACTORS THAT INFLUENCE CLINICAL ADHERENCE RATES IN PATIENTS WITH DIABETIC MACULAR OEDEMA UNDERGOING INTRAVITREAL INJECTION TREATMENT

Monique Rose, Catherine Itsiopoulos, Meri Vukicevic, Konstandina Koklanis, Gwyneth Rees, Suki Sandhu

Diabetic macular oedema (DME) is due to leakage of fluid from damaged blood vessels. Vascular endothelial growth factor (VEGF) is elevated in eyes with DME, and drives vascular leakage. Centre-involving sight-affecting DME is currently treated with intravitreal anti-VEGF injections. It is a commonly performed procedure, which involves multiple injections every four to six weeks until the fluid is resolved and may be continued indefinitely to maintain vision. To date no studies have identified clinical attendance rates and explored personal and clinical factors that influence attendance and non-attendance in patients with DME receiving intravitreal injection treatment. Studies have primarily focused on the barriers and incentives to attend diabetic retinopathy screening. A retrospective study utilising data from medical records of DME patients who attended (patients who attended all appointments) and did not attend (patients who missed one or more appointments in the previous 12 months) the eye clinic between 1st January 2014 to 31st December 2014 was identified from The Royal Victorian Eye and Ear Hospital medical retina injection clinic and retinal clinics at the Cheltenham Eye Centre. A telephone survey was conducted to gain patients' perspectives on attendance and non-attendance. The attendees were asked one open-ended question and non-attendees two open-ended questions. Data analysis has commenced and results will be presented. This person-centred approach will inform strategies for patient education and support to minimise non-attendance in patients with diabetes-related eye complications.

GEOGRAPHIC ATROPHY IN THE CLINICAL TRIAL WORLD

Sutha Sanmugasundram

Age-related macular degeneration (AMD) is a progressive eye disease, which is the leading cause of irreversible blindness in people aged 50 years and older in the developed world. There are two clinical forms of AMD: a non-exudative or dry form, geographic atrophy (GA), and an exudative or wet form. GA affects roughly five-million people worldwide and its occurrence increases exponentially with age. Although the cause of GA is not well understood, studies have shown that specific genetic characteristics and environmental factors may contribute to its development and progression. In the early stages of GA, patients typically show minimal changes in their central visual acuity. Patients can also experience symptoms from visual dysfunction including dense parafoveal scotomas, delayed dark adaptation and reduced contrast sensitivity. In the later stages, as the GA lesion expands into the fovea, a significant decrease in central VA occurs. Currently there are no approved medical treatments for GA, however there are several clinical studies investigating treatment to reduce the rate of GA progression and vision loss. At CERA, we are currently partaking in five different sponsored clinical studies for GA, with three trialling three different investigational drugs and two studying the natural history of these patients. This presentation briefly outlined the three different investigational products being trialled and the differences and benefits of participating in both treatment and non-treatment trials.

HOW TO WRITE A CASE REPORT FOR THE AUSTRALIAN ORTHOPTIC JOURNAL

Linda Santamaria

Are you thinking of writing for the Australian Orthoptic Journal, but not sure where to start? For the beginning writer, this could be with a case report, or an outline of a new model of care. This presentation outlined the process of preparing a case report for submission to the journal, with hints on ethics considerations, literature searching, reading and writing.

OCULAR TORSION IN STRABISMIC PATIENTS AND HOW IT AFFECTS THEIR BINOCULAR POTENTIAL

Angela Serna

We prospectively looked at 40 patients who presented to our clinic with binocular diplopia. Using a Clement Clarke synoptophore, we assessed how many of these patients presented with ocular torsion and how this impacted their binocular potential by testing Worth's three grades of binocular vision. Clinically, we have seen that small negligible amounts of torsion can often affect a patient's binocularity, especially their horizontal fusional amplitudes and stereopsis. Often these patients are unable to fuse with prisms, they demonstrate intermittent fusion or report a somewhat 'single' but blurred image when corrected with prisms or post-surgically. These patients often will not complain of torsional diplopia and ocular motility testing does not always indicate the presence of a superior oblique palsy.

NEW OCT SIGNS IN INTERMEDIATE AMD

Pyrawy Sharangan

Age-related macular degeneration (AMD) is the leading cause of vision loss in people aged fifty years and over in Australia. AMD has relatively slow progression from the early to the advanced stage therefore leaving a window of opportunity for early intervention. With the advancement of available technology and introduction of high resolution imaging techniques, we are now able to detect and analyse new characteristics of AMD that may assist with better understanding the disease. Through this we would be able to detect high-risk signs that indicate a subgroup more likely to progress to vision loss. The spectral domain optical coherence tomography (SD-OCT) is one such device with the ability to help identify additional risk features. This presentation focused on three features that have been identified through our longitudinal studies: nascent geographic atrophy, reticular pseudodrusen and non-exudative detachment of the neurosensory retina.

FAMILIAL RETINOBLASTOMA AND GENETIC TESTING: A PARADIGM SHIFT IN CLINICAL CARE

Sandra Staffieri, Lisa Kearns, James Elder, John McKenzie, Lisette Curnow, David Amor, Alex Hewitt, David Mackey

Background: Retinoblastoma (RB) is the most common intraocular malignancy occurring in children. The RB1gene was first identified in 1986 with genetic testing for RB translating to clinical care by the end of the 1990s. This heralded a paradigm shift in the clinical management of affected individuals by informing their clinical care and that of their siblings and offspring.

Aim: To report on the frequency and outcomes of the use of pre- and post-natal genetic testing for familial retinoblastoma using the Victorian Retinoblastoma Database cohort since 1998.

Methods: Retrospective audit of the Victorian Retinoblastoma Database.

Results: Twenty-six infants were born of 13 individuals with a personal or family history of RB. Only four of the 13 parents elected to undergo pre-natal testing for seven pregnancies. Pre- or post-natal genetic testing was completed in 19 pregnancies. Of these, 12 (63%) infants were found to carry the familial RB1 mutation, six of whom remain unaffected carriers. Five of the unaffected carriers are from two known low-penetrant families. The gestational age at which the first lesions developed in all the affected infants ranged from 35 to 43 weeks (mean 40 weeks). One pregnancy was induced due to the identification of lesions prenatally with intrauterine MRI. With treatment, 21 eyes of 12 affected children have been retained.

Conclusion: Timely genetic counselling and testing for individuals with a personal or family history of RB is an integral part of optimal clinical care. This multidisciplinary approach to care and surveillance is vital to ensure the earliest diagnosis and treatment for optimal outcomes.