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congenital cataract

AMD treatment decision  
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Laser pointer injury

Vision impairment and  
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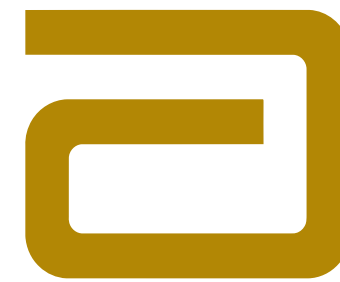
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**Web Page:** Cancer Council Australia. Position statement: eye protection; 2006 [Updated Aug 2008, cited 2010 31st Jul] Available from: <http://www.cancer.org.au/policy/positionstatements/sunsmart/eyeprotection.htm>.

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## Editorial

### Orthoptic Education in NSW: New Beginnings

In 2014 the education of orthoptists at University of Sydney ceased after a long association with the Faculty of Health Sciences and its predecessors. This association began in 1973, with the School of Orthoptics being created in the New South Wales College of Paramedical Sciences, with Patricia Lance as its Head, a position she retained for the next 14 years. In 1975, the College was re-named the Cumberland College of Health Sciences (CCHS) and in 1978, CCHS moved west to Lidcombe in Sydney.

As one of the inaugural paramedical professions educated at the College, the orthoptics course also underwent significant development, with the creation of an Associate Diploma of Orthoptics in 1976, then a Diploma of Applied Science in 1981 and a Bachelor of Applied Science in 1989. The CCHS then became established as the Faculty of Health Sciences, University of Sydney in 1991. The course continued as a Bachelors program until 2006, when the combined Bachelor of Health Sciences, Master of Clinical Vision Science (BHlthSc/MClinVisSc) degree replaced it. In the meantime a Master of Orthoptics had commenced in 2004 and with the discontinuation of the BHlthSc/MClinVisSc in 2010, this became the sole education program for Orthoptics in New South Wales. The Master of Orthoptics had its last intake at the University of Sydney in 2013. During this period, the orthoptic programs have been led by four academics, initially Dr John Burne (1988-9) and then Mrs Neryla Jolly and Associate Professor Elaine Cornell variously held the position until 2010, when Associate Professor Kathryn Rose became Head of the then Discipline of Orthoptics.

To say that the ending of the association of orthoptic education with the University of Sydney was a time of pain and uncertainty for the profession, staff and students, is probably putting it mildly. However, fortunately the future now looks very bright. In 2014 the University of Technology Sydney (UTS) became interested in establishing an orthoptics course in the recently formed Graduate School of Health (GSH), with the enthusiastic support of the Head of GSH, Professor Shalom (Charlie) Benrimoj.

Staff from University of Sydney gradually transferred to UTS over 2014 and Kathryn Rose was appointed the first Australian Professor of Orthoptics in late 2014. This was followed by the massive pack-up and moving of accumulated equipment and other sundries to UTS in early 2015. These were located into the newly created orthoptic teaching spaces and clinics at

UTS. Looking back, collectively the staff cannot quite believe that this was all able to be done in such a short space of time; the establishment of a new course, the design and building of new teaching spaces, the re-location, and somewhere in the middle, concluding teaching the final cohort at University of Sydney and the recruitment of a new cohort of students, all in less than a year. Of course we did not do it alone, without the support and skill of existing staff at UTS and in the GSH in particular, this never would have been possible.

So why is the future looking so bright:

- Relocation to a university that has a focus on innovative teaching and practice-based learning, which aligns well with the aims of orthoptic education.
- 57 students enrolled, with three applications for every student place offered as a consequence of targeted marketing.
- New staff - an addition of five practitioner teachers and two tutors to the existing three full-time staff.
- Purpose-built orthoptic teaching and research spaces, including clinical simulation rooms with capacity to stream live patient examinations to teaching rooms.
- An injection of new ophthalmic and orthoptic equipment funded by UTS.
- Encouragement of strong links with the professions and industry, necessary to ensure that orthoptics remains relevant and up to date.
- Strong support from the ophthalmic equipment and pharmaceutical industries for the discipline, including a new Bayer education scholarship for a research student.
- The establishment of an Industry Advisory Board to assist the discipline in its education and research programs.

And that is just the start.

#### **Kathryn Rose**

Discipline of Orthoptics, Graduate School of Health,  
University of Technology, Sydney



# The Development of Aphakic Glaucoma Following Lensectomy in Congenital Cataract in a NSW Children's Hospital

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## ABSTRACT

Congenital cataract affects children and their vision from an early age and as such early diagnosis and treatment is vital. Following surgical lensectomy, children with congenital cataract will either have an intraocular lens inserted, be fitted with an aphakic contact lens or be prescribed aphakic spectacles. One possible complication of lensectomy in

these children is aphakic glaucoma. The aim of this study was to ascertain the prevalence of aphakic glaucoma in children with congenital cataract following lensectomy. A retrospective review of children presenting to the eye clinic at The Children's Hospital at Westmead NSW with congenital cataracts between 2008 and 2010 was performed.

**Keywords:** Congenital cataract, aphakic glaucoma

## INTRODUCTION

Congenital cataract is one of the leading causes of stimulus deprivation amblyopia in infants<sup>1</sup> with an estimated 200,000 children blind from cataracts worldwide.<sup>2</sup> A congenital cataract is defined as any opacity of the lens that is identified within the first six months of life.<sup>3,4</sup> Congenital cataracts can present as either bilateral or unilateral and early detection and treatment is vital in achieving adequate visual outcomes. Congenital cataracts have a devastating impact on visual development, and as a result this condition is a priority of the global Vision 2020 initiative.<sup>5</sup>

Treatment of congenital cataract requires early lensectomy to provide a clear optical pathway as well as optimal refractive correction. Congenital cataracts block sensory input to the retina and therefore cause significant stimulus deprivation amblyopia. This creates the need for a management plan that includes both amblyopia treatment and refractive correction. In relation to the refractive correction there are three options including intraocular lens (IOL) implant, contact lens wear or the prescription of spectacles. At The Children's Hospital at Westmead, the preferred refractive correction for aphakia following congenital cataract surgery is contact lenses until the child is older, at which time an IOL will be implanted. Once refractive correction is in place, amblyopia management

is commenced. The duration of occlusion therapy is determined by the amount of amblyopia and age of the child.

Postoperative complications following lensectomy include aphakic glaucoma, posterior capsule opacification, vitreous haemorrhage, inflammation and retinal detachment.<sup>6</sup> Aphakic glaucoma is the most common long-term complication of congenital cataract surgery<sup>7</sup> and refers to glaucoma that occurs after congenital cataract surgery. Unlike the name suggests, it can be present in the absence of aphakia when an IOL is inserted. The incidence of aphakic glaucoma varies and has been reported as low as 5% and as high as 41%.<sup>8-11</sup> A reason for the variability in the reported incidence is the duration of follow-up post lensectomy. A longer follow-up period may be associated with a higher incidence of aphakic glaucoma.<sup>8</sup> A number of risk factors have been implicated, namely microcornea, early surgery and poorly dilated pupils which increase surgical manipulation, inciting more inflammation.<sup>7</sup>

The most common type of glaucoma following congenital cataract surgery is open-angle glaucoma.<sup>12</sup> Acute angle-closure aphakic glaucoma occurs less frequently and usually presents in the early postoperative period, generally within the first six months.<sup>13</sup>

The aim of this study was to ascertain the prevalence of aphakic glaucoma in children with congenital cataract following lensectomy.

## METHOD

A retrospective analysis of the medical records of patients with a diagnosis of congenital cataract seen in the eye clinic

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at The Children's Hospital at Westmead over a twenty-four month period between 2008 and 2010 was performed. Ethics approval was granted by the institution for this study.

The data retrieved from medical records included gender, affected eye, age at lensectomy, type of aphakic correction, onset of aphakic glaucoma post lensectomy, intraocular pressure (IOP) measurement prior to medical intervention and treatment options for aphakic glaucoma.

For the purposes of this study, congenital cataract was defined as an opacity of the lens identified in an infant within the first six months of life with surgical intervention prior to twelve months of life. Aphakic glaucoma was defined as having persistent raised IOP of over 22 mmHg requiring medical intervention, without associated cause such as systemic disease or topical steroid use.

## RESULTS

A total of 57 patient files with a diagnosis of congenital cataract were reviewed. Of these, nine were excluded from the study as the age at lensectomy was greater than 12 months. In total, 48 patients were included in the study; 25 (52%) were male and 23 (48%) were female.

Of the 48 patients, 69 eyes had a congenital cataract. Unilateral cataracts were slightly more prevalent at 56% (n=27) as compared to 44% (n=21) bilateral cataracts.

### Age at Lensectomy

The age at which the lensectomy was performed ranged from 10 days to 12 months with the mean age being 3 months (SD±2.92) (Figure 1).

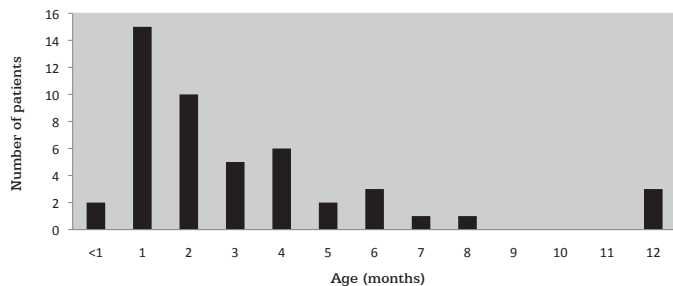


Figure 1. Age of patients at the time of lensectomy.

Twenty-seven patients (56%) underwent lensectomy at less than three months of age. Of the patients with unilateral cataracts, 13 (48%) underwent lensectomy before three months of age. Of the bilateral patients 14 (67%) underwent lensectomy before three months of age. All bilateral cases underwent a bilateral lensectomy (Table 1).

### Treatment of Aphakia

Patients undergoing a lensectomy at The Children's Hospital at Westmead had either an IOL implanted at the time of the lensectomy or were prescribed contact lenses or spectacles

Age (months)	Unilateral (N=27)	Bilateral (N=21)
0	1 (3.7%)	1 (4.8%)
1	10 (37.0%)	5 (23.7%)
2	2 (7.4%)	8 (38.1%)
3	4 (14.8%)	1 (4.8%)
4	3 (11.2%)	3 (14.2%)
5	1 (3.7%)	1 (4.8%)
6	2 (7.4%)	1 (4.8%)
7	1 (3.7%)	0
8	1 (3.7%)	0
9	0	0
10	0	0
11	0	0
12	2 (7.4%)	1 (4.8%)

postoperatively. Contact lenses for the correction of aphakia were prescribed in thirty-six patients (75%) and as such was the most prevalent management in the cohort. Eight patients (17%) underwent a primary IOL implant and four (8%) were prescribed glasses (Figure 2).

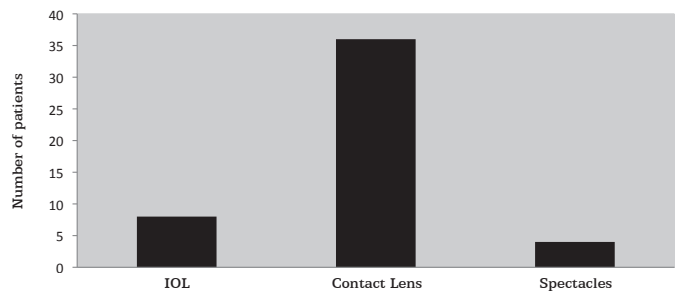


Figure 2. Type of primary correction of aphakia post lensectomy.

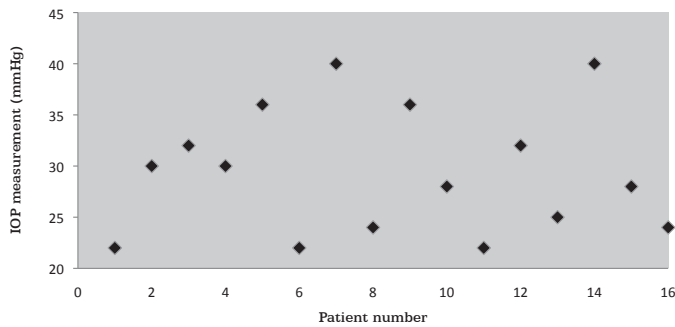
### Aphakic Glaucoma

Fifteen eyes (22%) were diagnosed with glaucoma post lensectomy. This involved eleven patients, four of whom were bilateral cases.

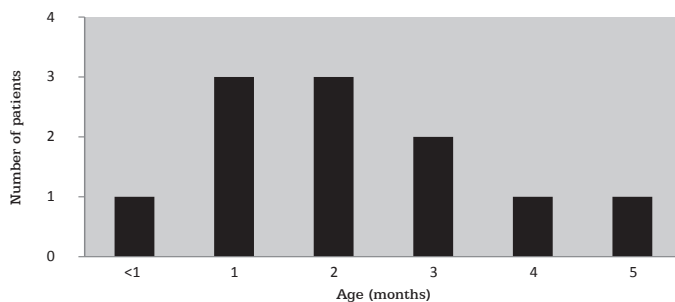
The time of onset of glaucoma following lensectomy ranged from 14 days to 49 months with the average being 23.7 months (SD±19.8). Five of the sixteen eyes (31%) were diagnosed with acute angle-closure aphakic glaucoma and eleven (69%) were diagnosed with open-angle aphakic glaucoma. At the time of diagnosis IOP measurements ranged from 22 mmHg to 40 mmHg with an average IOP of 29 mmHg (SD±6.2) (Figure 3).

The age of the patients at the time of lensectomy who developed glaucoma was reviewed. Lensectomy in these patients was performed between 10 days and 5 months of age with an average age of 2 months (SD±2.41) (Figure 4).





**Figure 3.** Intraocular pressure measurement in affected eyes at the time of diagnosis of glaucoma.



**Figure 4.** Age at time of lensectomy in those who went on to develop aphakic glaucoma.

**Treatment of Aphakic Glaucoma**

Treatment methods for glaucoma varied throughout the period of follow-up for each patient. Treatment included both medical and surgical intervention. Medical options included prostaglandin analogs, beta-blockers, carbonic anhydrase inhibitors and combined medications. All glaucomatous eyes were initially treated with medical intervention. Nine eyes (56%) went on to have surgical intervention when IOP could not be controlled by topical treatment. Surgical interventions included Baerveldt drainage tube in seven eyes (44%), cyclodiode laser in one eye and anterior vitrectomy and peripheral iridotomy in one eye. Six eyes (40%) achieved adequately controlled IOP measurements on medical intervention alone.

**DISCUSSION**

Management of congenital cataracts remains a challenge for health professionals. The timing of surgery, choice of refractive correction and postoperative complications make congenital cataracts a complex disease to manage.

Although advanced techniques of cataract surgery have improved the outcome for these patients,<sup>3</sup> the treatment of dense stimulus deprivation amblyopia and postoperative complications remains complex. The risk of developing aphakic glaucoma increases when surgery is performed in the first year of life. However, there is no clinically significant evidence to suggest that delaying lensectomy

within the first year of life reduces the risk.<sup>14</sup> In this group of children 56% underwent lensectomy before three months of age. This corresponds with the literature that suggests early lensectomy at six weeks of age is recommended to ensure a clear visual pathway for the best visual outcome.<sup>15</sup>

Whilst aphakic glaucoma is the most common long-term complication of congenital cataract surgery,<sup>7</sup> the diagnosis of glaucoma may be more difficult in children after congenital cataract surgery. This may be due to these eyes lacking the classic signs of congenital glaucoma, such as buphthalmos, epiphora and blepharospasm. Typically, patients with aphakic glaucoma are asymptomatic.<sup>9,12</sup> Close monitoring of IOP in children with congenital cataract after lensectomy is required to ensure early diagnosis and treatment.

Aphakic glaucoma requires careful treatment and surveillance as it is associated with a poor visual prognosis.<sup>16</sup> Aphakic glaucoma can develop in the early postoperative period (acute angle-closure glaucoma) or more commonly, many years after cataract surgery (open-angle glaucoma). It is therefore imperative that patients who have had a lensectomy for congenital cataract are followed up long-term. Research that has had a long period of follow-up has reported a higher incidence of aphakic glaucoma.<sup>8</sup> The period of follow-up in our research was only two years and the incidence of aphakic glaucoma found was 23%. Therefore, it can be hypothesised that with a longer follow-up the incidence of aphakic glaucoma may be higher.

It is significant to note that eight patients in our study received an IOL implant at the time of the lensectomy, and only one of these patients developed aphakic glaucoma. This patient received medical intervention for a postoperative period of two months, at which time the IOP stabilised and medical therapy was withdrawn. This may indicate a more acute, inflammatory increase in IOP rather than true aphakic glaucoma. This finding corresponds to the literature reporting that an IOL may be protective against aphakic glaucoma.<sup>15</sup> Despite the indication that early IOL implant reduces the risk of developing aphakic glaucoma, it is not always the best treatment choice when features such as microphthalmos and persistent hyperplastic primary vitreous are present.

It is noteworthy that treatment of aphakic glaucoma differs from that of other paediatric glaucomas.<sup>17</sup> While the first line of treatment for paediatric glaucoma is surgery,<sup>18</sup> the first line of treatment for aphakic glaucoma is medical management.<sup>7</sup> Medical treatment should be the first choice of treatment for patients with aphakic glaucoma, followed by surgical intervention if appropriate IOP control cannot be gained. In our study nine of the sixteen eyes with aphakic glaucoma went on to require surgical intervention, with 44% of affected eyes receiving a drainage tube. It has been reported that drainage implant surgery may be more likely to succeed in controlling IOP than other surgical techniques in patients with aphakic glaucoma.<sup>12</sup>

## CONCLUSION

Congenital cataracts require early detection and intervention to enable the best patient care and visual outcomes. Early screening can be achieved by the red reflex check on all newborns prior to discharge from hospital. Upon diagnosis of a congenital cataract, immediate assessment with an ophthalmologist is recommended with lensectomy being performed within the first three months of life.

Aphakic glaucoma is a common and serious postoperative complication in congenital cataract patients following lensectomy. Patients who have undergone lensectomy for congenital cataract must be followed up by an eye healthcare professional for the rest of their life, as aphakic glaucoma can present at any time after lensectomy.

Understanding the risk factors of aphakic glaucoma is important in the management of the disease. In our study it was found that late-onset open-angle aphakic glaucoma is more common than acute angle-closure aphakic glaucoma. The incidence of aphakic glaucoma was higher in patients who were left aphakic following lensectomy and in those who had a lensectomy in the first three months of life. These risk factors must be considered when determining the timing of surgical intervention for congenital cataract. Medical management is often the first line of treatment for aphakic glaucoma, however in some cases this is not sufficient to control the glaucoma and surgical intervention is required. This highlights the importance of regular monitoring of all patients who have undergone lensectomy for congenital cataract.

## REFERENCES

- Lloyd IC, Goss-Sampson M, Jeffrey BG et al. Neonatal cataract: aetiology, pathogenesis and management. *Eye (Lond)* 1992;6(Pt2):184-196.
- Foster A, Gilbert C, Rahi J. Epidemiology of cataract in childhood: a global perspective. *J Cataract Refract Surg* 1997;23(Suppl 1):601-604.
- Lambert SR. Treatment of congenital cataract: it may all come down to timing. *Br J Ophthalmol* 2004;88(7):854-855.
- Wirth MG, Russell-Eggitt IM, Craig JE et al. Aetiology of congenital and paediatric cataract in an Australian population. *Br J Ophthalmol* 2002;86(7):782-786.
- World Health Organization, Prevention of Blindness and Deafness. Global Initiative for the Elimination of Avoidable Blindness. WHO; 2000. WHO/PBL/97.61.
- Kuhli-Hattenbach C, Luchtenberg M, Kohnen T, Hattenbach LO. Risk factors for complications after congenital cataract surgery without intraocular lens implantation in the first 18 months of life. *Am J Ophthalmol* 2008;146(1):1-7.
- Kirwan C, O'Keefe M. Pediatric aphakic glaucoma. *Acta Ophthalmol Scand* 2006;84(6):734-739.
- Mills MD, Robb RM. Glaucoma following childhood cataract surgery. *J Pediatr Ophthalmol Strabismus* 1994;31(6):355-360.
- Simon JW, Mehta N, Simmons ST, et al. Glaucoma after pediatric lensectomy/vitreotomy. *Ophthalmology* 1991;98(5):670-674.
- Asrani SG, Wilensky JT. Glaucoma after congenital cataract surgery. *Ophthalmology* 1995;102(6):863-867.
- Walton DS. Pediatric aphakic glaucoma: a study of 65 patients. *Trans Am Ophthalmol Soc* 1995;93:403-413.
- Facciani J, Trivedi RH, Wilson ME Jr. Postoperative glaucoma. In: Wilson ME, Trivedi RH, Pandey SK, editors. *Pediatric Cataract Surgery: Techniques, Complications, and Management*. Philadelphia: Lippincott, Williams and Wilkins; 2005. p. 244-253.
- Parks MM, Johnson DA, Reed GW. Long term visual acuity results and complications in children with aphakia. A function of cataract type. *Ophthalmology* 1993;100(6):826-840.
- Chen TC, Bhatia LS, Halpern EF, Walton DS. Risk factors for the development of aphakic glaucoma after congenital cataract surgery. *J Pediatr Ophthalmol Strabismus* 2006;43(5):274-307.
- Lloyd IC, Ashworth J, Biswas S, Abadi RV. Advances in the management of congenital and infantile cataract. *Eye (Lond)* 2007;21(10):1301-1309.
- Chen TC, Bhatia LS, Walton DS. Complications of pediatric lensectomy in 193 eyes. *Ophthalmic Surg Lasers Imaging* 2005;36(1):6-13.
- Yi K, Chen TC. Aphakic glaucoma after congenital cataract surgery. *Int Ophthalmol Clin* 2008;48(2):87-94.
- Mandal A, Chakrabarti D. Update on congenital glaucoma. *Indian J Ophthalmol* 2011;59(Suppl):S148-157.



# Indication for Anti-VEGF Treatment for Neovascular Age-Related Macular Degeneration Based on Optical Coherence Tomography Interpretation: Decision Agreement Rate between Orthoptist and Ophthalmologist

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## ABSTRACT

**Objective:** Although orthoptists play an integral role in the care of patients with chronic eye diseases, the clinical decision making of orthoptists within this setting has not often been investigated. The aim of this study was to evaluate the inter-rater agreement between orthoptists and an ophthalmologist in determining whether anti-VEGF treatment for neovascular (wet) age-related macular degeneration (AMD) is required based on optical coherence tomography (OCT) interpretation.

**Methods:** A retrospective audit was conducted of patient data from a private ophthalmology practice. Data collected included details pertaining to patient demographics and clinical assessment, OCT retinal thickness, and the treatment decisions of five orthoptists and one senior vitreoretinal ophthalmologist

when interpreting OCT scans. The inter-rater agreement between the orthoptists and the ophthalmologist was calculated as a percentage and the kappa ( $\kappa$ ) statistic computed.

**Results:** Of a total 669 treatment decisions made, on 619 occasions (92.5%) agreement was found between the orthoptists and the ophthalmologist ( $\kappa = 0.85$ ; 95%CI 3.43 - 1.26,  $p < 0.001$ ) representing an almost perfect agreement.

**Conclusion:** Agreement between the orthoptists and ophthalmologist in AMD clinical decision making is very high suggesting that orthoptists could potentially have a greater involvement in shared-care models within specialist eye clinics.

**Keywords:** neovascular age-related macular degeneration, orthoptist, inter-rater agreement, anti-VEGF clinical decision making, optical coherence tomography

## INTRODUCTION

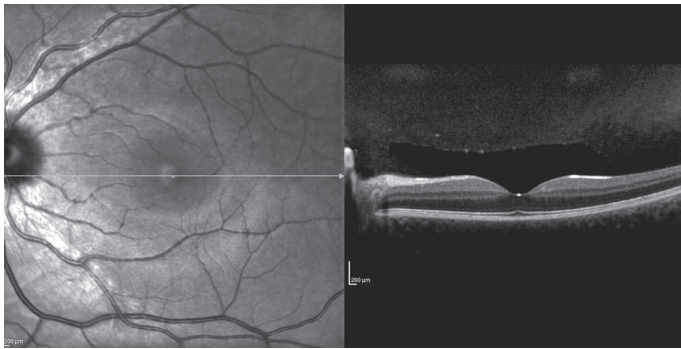
As a consequence of population ageing, it is well known that the demand for eye care services is rapidly increasing. The most prevalent causes of vision impairment in developed countries are those related to ageing: age-related macular degeneration, cataract, glaucoma, diabetic retinopathy and refractive error.<sup>1</sup> Age-related macular degeneration (AMD) is the most common cause of irreversible vision loss world-wide and in Australia accounts for 50% of all cases of legal blindness in those aged 40 or older.<sup>2</sup>

AMD is a progressive eye condition that results in loss of central vision. Treatment options in the most severe form of the disease, neovascular AMD (nAMD), aim to slow disease progression. The current treatment method of choice involves intravitreal injection of an anti-vascular

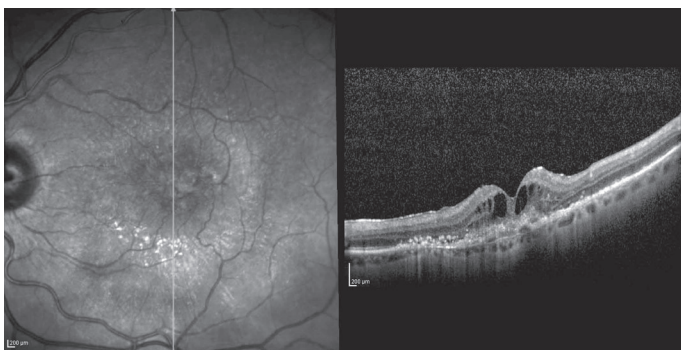
endothelial growth factor (VEGF) drug. Injections are continued indefinitely and usually administered on a needs-only basis dependent on disease activity.<sup>2,3</sup> To monitor disease progression, patients with nAMD undergo regular ophthalmic examinations involving an assessment of the fundus, including retinal imaging with optical coherence tomography (OCT). Whilst fundus fluorescein angiography (FFA) is considered the gold-standard for the differential diagnosis of nAMD, OCT imaging is increasingly used as a diagnostic tool prior to angiography<sup>4</sup> and performed to determine clinical management. Information obtained from the OCT scan, such as the presence/absence of fluid and change in retinal thickness, greatly influences the re-treatment decision.<sup>5,6</sup> A normal appearance on OCT is shown in Figure 1 and presence of fluid with increased retinal thickness is shown in Figure 2.

Whilst ophthalmologists are responsible for the management of patients with nAMD, orthoptists are increasingly involved in supporting patient care through their involvement in the visual assessment and OCT imaging of patients with nAMD. Whilst orthoptists

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**Figure 1.** Macular OCT scan showing normal foveal contour and retinal thickness and no areas of hyporeflectivity.



**Figure 2.** Macular OCT scan showing areas of hyporeflectivity indicating presence of fluid, with increased retinal thickening and loss of foveal contour.

commonly undertake OCT imaging, interpretation is not a conventional role undertaken during clinical assessment. Traditionally, the expertise of orthoptists has been in strabismus, ocular motility and binocular function investigation and management. In Australia, this role has evolved significantly to include general ophthalmic care within the secondary and tertiary care settings. For example, more recently orthoptists have become involved in diabetic retinopathy screening and grading, and in glaucoma shared-care schemes.<sup>7-10</sup> In relation to nAMD, orthoptists are increasingly involved in making recommendations for anti-VEGF treatment particularly on the basis of the OCT assessment.

To the authors' knowledge, the rate of agreement between orthoptists and ophthalmologists in making a treatment decision based on OCT interpretation has yet to be investigated. Previous studies have examined inter-observer agreement for detection of nAMD features on OCT scans,<sup>6,11</sup> OCT grading reproducibility in nAMD clinical research trials<sup>12</sup> and inter-grader consensus between the spectral- and time-domain OCT.<sup>13,14</sup> Most of these studies have involved certified trained readers from international reading centres interpreting the OCT scans. The aim of this study was to determine the rate of agreement

between five orthoptists and an ophthalmologist working in a private ophthalmology practice in deciding whether anti-VEGF treatment for nAMD is indicated based on the interpretation of OCT images.

## MATERIALS AND METHODS

### Participants

A retrospective clinical audit was conducted at a private ophthalmology clinic in Melbourne, Australia. Data was collected from existing data reserves at the clinical practice during nAMD sessions conducted between the 8th April and 3rd September 2013. Three groups of data were collected: i) patient demographics, ii) clinical assessment details, and iii) the treatment decisions of five orthoptists and one senior vitreoretinal ophthalmologist based on the interpretation of the OCT images (Table 1). Each OCT image was reviewed by one of the five orthoptists and the ophthalmologist. At the time of data collection, the mean years of experience of the orthoptists was 3.61 years (range 1 to 4 years). All orthoptists routinely reviewed nAMD patients and received no additional specific training in OCT interpretation for the purposes of this study. The senior ophthalmologist had over 30 years experience in the investigation and management of posterior segment disorders and as such, their clinical decision making skills/treatment decisions were utilised as the 'gold standard' in this study.

Table 1. Data variables collected for clinical audit	
Data Collected	Description
Patient demographics	<ul style="list-style-type: none"> <li>Gender</li> <li>Date of consultation</li> <li>Treated eye/s</li> </ul>
<b>Clinical assessment</b>	
Distance BCVA (LogMAR, number of letters correct)	<ul style="list-style-type: none"> <li>Right eye</li> <li>Left eye</li> </ul>
OCT (Spectralis, Heidelberg Engineering)	<ul style="list-style-type: none"> <li>Central retinal thickness (CRT)</li> <li>Maximum retinal thickness</li> <li>Pigment epithelial detachment (PED)</li> </ul>
<b>Treatment decision</b>	
Orthoptist	<ul style="list-style-type: none"> <li>No treatment</li> <li>Injection required</li> </ul>
Ophthalmologist	<ul style="list-style-type: none"> <li>No treatment</li> <li>Injection required</li> </ul>
Agreement between the orthoptists and ophthalmologist	<ul style="list-style-type: none"> <li>Agreement</li> <li>Disagreement (with reasons/ ophthalmologist's clinical notes)</li> </ul>

**Procedures**

Each patient attending the nAMD clinic during the study period underwent a routine clinical examination, including visual acuity testing and OCT imaging. The orthoptist was aware of the patient’s acuity prior to OCT imaging. Best corrected visual acuity (BCVA) was assessed by the orthoptist using a retro-illuminated Early Treatment of Diabetic Retinopathy Study (ETDRS) chart at 3 metres and recorded as the number of letters read correctly. A value of zero (0) was recorded if the BCVA was no perception of light (NPL), light perception (PL), hand movements (HMs) or count fingers (CFs). An orthoptist also performed the OCT scan for each patient. All OCT images were acquired using the same Spectralis HRA+OCT machine (Heidelberg Engineering, Heidelberg, Germany) and measurements of central retinal thickness (CRT), maximum retinal thickness and pigment epithelial detachment (PED) were recorded in micromillimetres ( $\mu\text{m}$ ). After acquiring the OCT scan, the orthoptist indicated in writing on the patient file if they recommended an injection based on the appearance of the scan. The treating ophthalmologist then independently reviewed the OCT scan and recorded their treatment decision on the same patient file. Treatment decision was primarily based on the level of disease activity evident on OCT scanning, whereby areas of hyporeflectivity represent the presence of fluid and indicate the need for intravitreal injection. This treatment regime is classified as *pro re nata* methodology, that is, a patient receives treatment when needed, as opposed to the more commonly used regime for anti-VEGF treatment known as ‘treat and extend’. In instances where the ophthalmologist’s treatment decision was not solely based on OCT appearance, the ophthalmologist included written commentary in the patient’s file as to the additional factors influencing their treatment decision. For all cases where there was disagreement between the treatment decision of the orthoptist and that of the ophthalmologist, the relevant OCT scans were retrieved by the study investigators to investigate the possible reason(s) for disagreement.

**Data Analysis**

An analysis of the inter-rater agreement between the five orthoptists and the treating ophthalmologist (all orthoptists versus ophthalmologist) was performed using the kappa statistic. The kappa statistic was interpreted in line with the ranges suggested by Landis and Koch,<sup>15</sup> where a kappa of: 0.81 - 1.00 = near perfect agreement; 0.61 - 0.80 = substantial agreement; 0.41 - 0.60 = good agreement; 0.21 - 0.40 = fair agreement; 0.10 - 0.20 = slight agreement; and 0 = poor agreement. The SPSS statistical program (IBM SPSS Statistics 21.0) was used for calculations.

**RESULTS**

**Participants**

A statistical power calculation conducted a priori showed that a minimum sample size of 635 eyes was required to detect a statistically significant result, where the minimum acceptable value of kappa was 0.70 and the ideal kappa to detect was 0.80, with power set at 90% and  $p \leq 0.05$ , two-tailed. A total of 669 eyes were included in this clinical audit. This consisted of 402 individual patients, with 267 patients having nAMD in both eyes.

There were 443 eyes of female patients (66%) and 226 eyes of male patients (34%). Right and left eyes were almost equally represented (RE 50.8%, LE 49.2%). The mean BCVA was 64.5 letters (range 0 to 91;  $SD \pm 17.69$ ) and 63.9 letters (range 0 to 90;  $SD \pm 18.83$ ), in the right and left eyes respectively, approximately equivalent to 6/15 Snellen acuity. The measurements of CRT, maximum retinal thickness and PED for the right and left eyes are shown in Table 2.

Table 2. Central retinal thickness, maximum retinal thickness and pigment epithelial detachment

Measurement ( $\mu\text{m}$ )	Right eye Mean (SD)	Left eye Mean (SD)
Central retinal thickness (CRT)	262.49 (126.69)	261.42 (120.29)
Maximum retinal thickness	423.87 (125.74)	415.58 (118.64)
Pigment epithelial detachment (PED)	198.67 (126.79)	187.56 (112.02)

**Inter-rater agreement between orthoptists and ophthalmologist**

Of a total 669 treatment decisions made, there were 619 agreements between the orthoptists and the ophthalmologist. This was equivalent to an agreement rate of 92.5%. Conversely, on 50 occasions, the treatment decision of the orthoptist differed to that of the ophthalmologist. This was equivalent to a disagreement rate of 7.5%. The pattern of agreement and disagreement is shown in Table 3, with an almost equal proportion of disagreement between the decision of injection or no injection. The inter-rater agreement between the orthoptists and the ophthalmologist in making a treatment decision based on OCT interpretation was found to be  $\kappa = 0.85$  (95%CI 3.434 - 1.258,  $p < 0.001$ ), representing an almost perfect agreement.<sup>15</sup>

Table 3. Treatment decision by orthoptists compared with ophthalmologist (N = 669)

	Ophthalmologist: Injection needed	Ophthalmologist: Injection not needed
Orthoptist: Injection needed	280	26
Orthoptist: Injection not needed	24	339



The 50 disagreements were investigated for possible reason(s) contributing to the difference in treatment decision. The clinical notes of the ophthalmologist (where available) were the first source of information when investigating the reason(s) for disagreement. The OCT scans were also retrieved by the study investigators. In a large proportion of cases where there was disagreement between the orthoptist and ophthalmologist, the patient's OCT scan showed stability of the disease but the ophthalmologist had indicated that it was safer to inject to prevent disease re-activity/fluid return with no additional commentary provided. Other reasons included subtle disease activity (slight subretinal fluid or slight macular oedema), or the patient was going on vacation and/or unable to attend a future scheduled visit so it was considered necessary to administer treatment at the present visit. On occasions where the orthoptist had indicated an injection was required but no injection was administered by the ophthalmologist, the main reason for the discrepancy was that the disease state was considered stable by the ophthalmologist and as such, no treatment was administered.

## DISCUSSION

OCT imaging is gaining increasing recognition as a valuable tool in the diagnosis and monitoring of disease progression in patients with nAMD. In particular, OCT interpretation forms a critical part of the treatment decision-making process in patients with nAMD. Currently, this task is predominantly performed by the treating ophthalmologist. However, the increasing prevalence of nAMD due to an ageing population is likely to translate into greater demand for eye care services in the future. In Australia, the orthoptic scope of practice has expanded over the past few decades in response to heightened service capacity pressures, with orthoptists assuming greater responsibility in the management of glaucoma patients<sup>1</sup> and becoming increasingly involved in paediatric triaging<sup>7,9,16</sup> and diabetic screening.<sup>6</sup> The inter-rater consensus between orthoptists and ophthalmologists is of considerable interest as orthoptist-led AMD screening/monitoring clinics represent a potential means of addressing the increased burden on the healthcare system.

This study has been the first to investigate the agreement rate between orthoptists and an ophthalmologist in making a clinical decision as to whether anti-VEGF treatment for nAMD is indicated based on OCT interpretation and has found a near perfect agreement. Where there was disagreement, the patients were not placed at sight-threatening risk.

Previous studies have likewise reported relatively high inter-observer agreement for the grading of nAMD features on OCT scans.<sup>6,11-13</sup> The high inter-rater agreement value in the current study could be partially attributed to the

use of highly trained orthoptists. Orthoptists involved in this study were recent graduates from La Trobe University where there is a significant focus on the diagnosis and management of ophthalmic disease as well as ocular motility disorders and were routinely working on a clinic dedicated to AMD patients. Another factor which may have contributed to the high agreement rate observed was the use of spectral-domain OCT. All images acquired in this study were obtained using a Spectralis HRA+OCT machine. OCT device-type can influence clinical interpretation of OCT imaging in the context of nAMD.<sup>13,14</sup> Spectral-domain OCT systems have been found to generate a higher degree of inter-rater consensus than time-domain OCT systems when judging scans for the presence of intraretinal and subretinal fluid,<sup>13,14</sup> and epiretinal membranes.<sup>15</sup> Whilst a limitation of these studies was that they only included a small number of independent graders,<sup>3</sup> their findings suggest that the choice of spectral-domain versus time-domain OCT systems can impact clinical decision-making in nAMD.

A healthcare model utilising shared-care management of AMD could address the growing demand for eye care. Introducing orthoptist-led AMD screening and monitoring clinics may produce greater efficiency by reducing waiting times for patients and increasing capacity within specialist clinics.

In summary, this study revealed an almost perfect agreement between orthoptists and an ophthalmologist in making treatment decisions for nAMD patients based on OCT interpretation. These early results, in conjunction with those of other studies, lend support to the expanding role of orthoptists and the development of orthoptist-led clinics for screening/monitoring patients with AMD. With the growing ageing population, increasing the orthoptic scope of practice represents a potential solution to ease the burden of chronic eye diseases on the healthcare system. However, it is important to acknowledge that this retrospective review was confined to only one private ophthalmology clinic and data was collected from a small sample of orthoptists and only one ophthalmologist. The inclusion of only one ophthalmologist limits the capacity to identify if there are differences in management decisions between ophthalmologists. For instance, it is likely that some ophthalmologists may have elected not to inject where the nAMD was stable, when the *pro re nata* regime is used. Furthermore, the ophthalmologist was not masked to the treatment decision made by the orthoptists. Thus, additional studies conducted across a variety of different hospital and clinical settings that involve a larger number of raters, all of whom are blind to the treatment decision of other raters, are required to confirm these findings.

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## REFERENCES

1. Australian Institute of Health and Welfare. A guide to Australian eye health data. Cat no PHE86. Canberra: AIHW; 2007.
2. Australian Institute of Health and Welfare. Vision problems among older Australians. Bulletin no 27. Cat no AUS60. Canberra: AIHW; 2005.
3. Brown DM, Regillo CD. Anti-VEGF agents in the treatment of neovascular age-related macular degeneration: applying clinical trial results to the treatment of everyday patients. *Am J Ophthalmol* 2007;144(4):627-637.
4. Centre for Eye Health (CFEH). Clinical Guidelines: Age Related Macular Degeneration. 2012 [cited 2013 25th September]. Available from: [http://cfeh.com.au/uploads/62003/ufiles/downloads/guidelines/Guideline5\\_2012\\_AMD\\_WEB.pdf](http://cfeh.com.au/uploads/62003/ufiles/downloads/guidelines/Guideline5_2012_AMD_WEB.pdf).
5. Bloch SB. Implementation studies of ranibizumab for neovascular age-related macular degeneration. *Acta Ophthalmol* 2013;91(7):1-22.
6. Patel PJ, Browning AC, Chen FK, et al. Interobserver agreement for the detection of optical coherence tomography features of neovascular age-related macular degeneration. *Invest Ophthalmol Vis Sci* 2009;50(11):5405-5410.
7. Georgievski Z, Koklanis K, Fenton A, Koukouras I. Victorian orthoptists' performance in the photo evaluation of diabetic retinopathy. *Clin Experiment Ophthalmol* 2007;35(8):733-738.
8. Gleeson D. The multidisciplinary glaucoma monitoring clinic at the Royal Victorian Eye and Ear Hospital. *Aust Orthopt J* 2013;45:15-18.
9. Thorburn D. Orthoptic led glaucoma monitoring clinics at Alfred Health: a pilot study. (Honours Thesis), Australia: La Trobe University; 2013.
10. Vernon SA, Adair A. Shared care in glaucoma: a national study of secondary care lead schemes in England. *Eye (Lond)* 2010;24(2):265-269.
11. Zhang N, Hoffmeyer GC, Young ES, et al. Optical coherence tomography reader agreement in neovascular age-related macular degeneration. *Am J Ophthalmol* 2007;144(1):37-44.
12. DeCroos FC, Toth CA, Stinnett SS, et al. Optical coherence tomography grading reproducibility during the Comparison of Age-related Macular Degeneration Treatments trials. *Ophthalmology* 2012;119(12):2549-2557.
13. Cukras C, Wang YD, Meyerle CB, et al. Optical coherence tomography-based decision making in exudative age-related macular degeneration: comparison of time- vs spectral-domain devices. *Eye (Lond)* 2009;24(5):775-783.
14. Knecht PB, Kordic H, Kurz-Levin M, et al. Inter-observer agreement for spectral- and time-domain optical coherence tomography image grading: a prospective study. *Int Ophthalmol* 2013;33(1):47-52.
15. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics* 1977;33(2):159-174.
16. Scheetz J, Koklanis K. Accuracy of orthoptists in the diagnosis and management of triaged paediatric patients [Abstract] *Aust Orthopt J* 2012;44(2):26.

## Laser Pointer Retinal Injury: A Case Report

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### ABSTRACT

A healthy 15-year-old boy presented with decreased visual acuity and central blur in the right eye following the misapplication of a green laser pointer. Focal retinal pigment epithelial disturbance at the fovea was revealed on optical coherence tomography and ophthalmoscopy

examination. Visual function remained impaired 9 weeks following the incident, however it is unclear whether the misuse of laser pointers results in a permanent decrease in vision. This case emphasises that laser pointer devices may cause macular injury when used inappropriately.

**Keywords:** laser pointer, retina, retinal pigment epithelium

### INTRODUCTION

**H**andheld laser pointers are commercially available for purchase in Australia or via the internet and are used in lecture theatres and sometimes misused as toys. Lasers are generally classified by their wavelength (visible lasers range from 400-700nm) and by power output (mW). Class 1 lasers have a power of less than 1mW, Class 2 lasers range from 1-5mW and Class 3 and 4 lasers are in excess of 5mW.<sup>1</sup> Commercially available laser pointers are considered Class 2 and are available in red (635nm), green (532nm) and less commonly in blue (445nm).

Previous reports of laser pointer retinal injuries have described vitreous and choroidal haemorrhage, foveal granularity, pigment epithelial scars and subretinal haemorrhage.<sup>2-4</sup> However it is unclear whether retinal injuries as a result of laser pointing devices result in a permanent decrease in visual acuity. While some studies reported that decreased visual acuity may be permanent, follow-up periods did not extend beyond 12 months.<sup>5,6</sup> In contrast, others have reported decreases in lesion size and visual improvement following retinal laser exposure.<sup>7,8</sup>

The importation and possession of laser pointers is regulated in Australia and the Australian government announced significant changes to the legislation in 2008 following laser pointer attacks on passenger jets in Sydney.<sup>9</sup> In Victoria for example, the *Control of Weapons Act 1990* stipulates that handheld laser pointers over 1mW are prohibited and both importation and possession require a

'Chief Commissioner's approval for prohibited weapons'. Difficulties arise when the power of the laser pointer is not labelled or the label is not consistent with the actual power emitted. Customs and Border Protection have reported a significant increase in the illegal importation of laser pointers as of July 2012 and cite that over 14,000 pointers were seized at Sydney International Mail Centre in a one-year period, a 60% increase.<sup>10</sup> This suggests that importers are either unaware of the legislation or are importing laser pointers which are described as less than 1mW but in fact are much stronger when tested.

This case report describes the injury caused by a handheld laser pointer directed at the eyes.

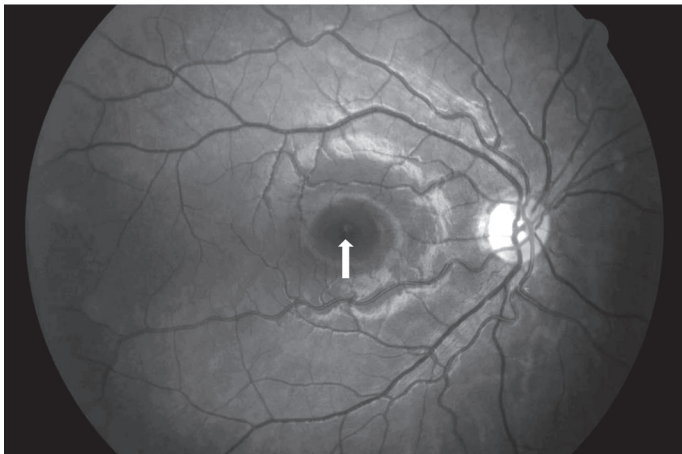
### CASE REPORT

A healthy 15-year-old boy presented for ophthalmic consultation complaining of decreased vision and central blur in his right eye for 3 weeks. He denied a precipitating event but upon careful questioning following ocular examination he revealed that he noticed the blur after playing with a handheld laser pointer with his friends. He remembered having the laser shone directly into his eye for an estimated 30 seconds and that it was labelled '532 nm' which is consistent with the wavelength of a green laser pointer.

His best corrected visual acuity was 6/9 right and 6/5 left. There were no anterior segment abnormalities, however examination of the posterior pole via ophthalmoscopy and retinal photography revealed a small, pale sub-macular lesion at the fovea (Figure 1). There was no sign of haemorrhage, sub-retinal fluid or exudates.

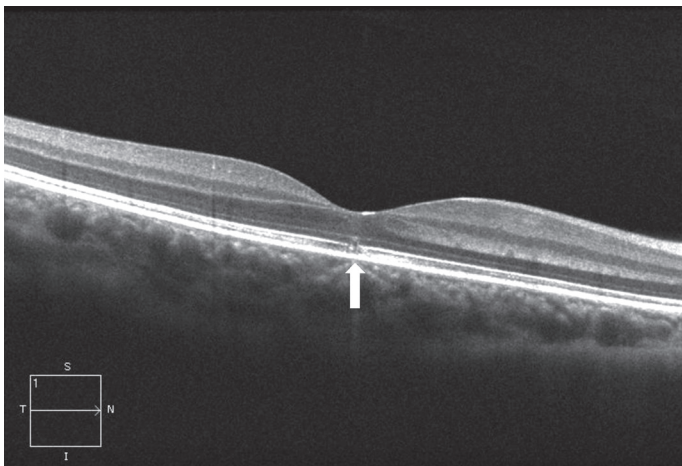
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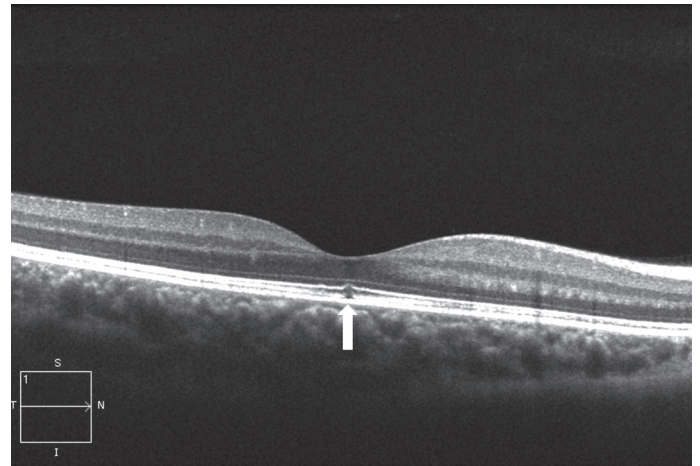
**Figure 1.** Pale sub-macular lesion at the fovea.

Spectral-Domain Optical Coherence Tomography (SD-OCT) was performed. This showed a small focal defect in the sub-foveal retinal pigment epithelium (RPE) and photoreceptor inner segment/outer segment (IS/OS) line (Figure 2). This highlighted that the visible abnormalities revealed via ophthalmoscopy were at the level of the RPE. Also evident were inner retinal condensations along the track of the laser beam.



**Figure 2.** SD-OCT showing small focal defect in the sub-foveal retinal pigment epithelium and photoreceptor IS/OS line and inner retinal condensations along the track of the laser beam.

The patient returned 6 weeks later. The vision in his right eye had improved to 6/7.5 and the central blur had shifted slightly to the right. SD-OCT showed the small focal defect in the sub-foveal RPE and the IS/OS line (Figure 3). The inner retinal condensations had resolved but there was a track of decreased reflectivity persisting. There was no evidence of a thin shaft of increased choroidal reflectivity, indicating the focal RPE defect may have healed somewhat, presumably by metaplasia.



**Figure 3.** SD-OCT showing the small focal defect in the sub-foveal RPE and the IS/OS line. Inner retinal condensations have resolved but there is a track of decreased reflectivity left behind.

## DISCUSSION

It is not surprising that retinal disturbance was observed in this case when considering that the human retina is more sensitive to shorter wavelengths.<sup>7</sup> This is evident from previous research that has indicated that melanin in the retinal pigment epithelium absorbs more energy at shorter wavelengths than longer wavelengths.<sup>11</sup>

Whilst we are uncertain as to the precise power (mW) of the laser that caused the injury to this adolescent, we do know that it was of similar wavelength (532nm) to that of an Argon laser which is commonly used by ophthalmologists in the treatment of diabetic retinopathy. Therefore, it can be hypothesised that the RPE disturbance described in the present case may be similar to that caused by argon laser treatment of retinal photocoagulation.

To date, researchers are not in agreement as to whether retinal injuries as a result of laser pointing devices result in a permanent decrease in vision. Previous case reports of individuals with retinal damage induced by green laser pointers have consistently described a reduction in lesion size and often full visual recovery at follow-up.<sup>7,8</sup> Therefore permanent visual impairment is unlikely in the present case. It appears that pulse duration and the energy level of the laser beam are important risk factors related to the extent of the eye injury. Furthermore, the exposed retinal location is also an important determinant of the persistence of ocular damage.<sup>3</sup> That is, a laser burn closer to the fovea centre results in more functional loss compared to more peripheral laser burns.<sup>12</sup>

The findings of this case emphasise the importance of the cautious use of commercially available green laser devices. Future research should adopt longer follow-up periods in order to determine the extent of the persistence of these laser injuries.

## REFERENCES

1. Macquarie University. Faculty of Science Occupational Health and safety – Lasers: Laser classifications; 2011 [Updated Nov 2012, cited 2014 16th Aug] Available from: <http://web.science.mq.edu.au/intranet/ohs/lasers/#Classifications>.
2. Boosten K, Van Ginderdeuren R, Spileers W, et al. Laser-induced retinal injury following a recreational laser show: two case reports and a clinicopathological study. *Bull Soc Belge Ophthalmol* 2011;317:11-16.
3. Turaka K, Bryan JS, Gordon AJ, et al. Laser pointer induced macular damage: case report and mini review. *Int Ophthalmol* 2012;32(3):293-297.
4. Ziahosseini A, Doris JP, Turner GS. Maculopathy from green diode laser pointer. *BMJ* 2010;340(c2982):1261.
5. Sell CH, Bryan JS. Maculopathy from handheld diode laser pointer. *Arch Ophthalmol* 1999;117(11):1557-1558.
6. Wyrsch S, Baenninger PB, Schmid MK. Retinal injuries from a handheld laser pointer. *N Engl J Med* 2010;363(11):1089-1091.
7. Robertson DM, McLaren JW, Salomao DR, Link TP. Retinopathy from a green laser pointer: a clinicopathologic study. *Arch Ophthalmol* 2005;123(5):629-633.
8. Ueda T, Kurihara I, Koide R. A case of retinal light damage by green laser pointer (Class 3B). *Jpn J Ophthalmol* 2011;55(4):428-430.
9. The Sydney Morning Herald. Laser pointers restricted after attacks; 6 Apr 2008 [cited 2014 16th Aug] Available from: <http://news.smh.com.au/national/laser-pointers-restricted-after-attacks-20080406-240f.html>.
10. Australian Customs and Border Protection Service. Illegal imports of laser pointers explode; 24 July 2012 [cited 2014 16th Aug] Available from: <http://newsroom.customs.gov.au/channels/Seizures-cargo-and-mail/releases/Illegal-imports-of-laser-pointers-explode-24-July>.
11. Mainster M. Wavelength selection in macular photocoagulation. Tissue optics, thermal effects, and laser systems. *Ophthalmology* 1986;93(7):952-958.
12. Barkana Y, Belkin M. Laser eye injuries. *Surv Ophthalmol* 2000;44(6):459-478.

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## Reframing Vision Impairment for the Australian National Disability Insurance Scheme

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### ABSTRACT

Australia has recently undergone a major shift in the way people with disability are supported, with the implementation in 2013 of the National Disability Insurance Scheme (NDIS). Disability support including people with vision impairment will be determined using a series of validated tools to develop a negotiated plan between the NDIS and the person. Due to the immediate roll-out of the NDIS, an urgent need exists for access to suitable tools for the planning process. Discussions in 2014 between the National Disability Insurance Agency (NDIA) and key stakeholder organisations revealed that a tool to measure the severity of a person's vision impairment is not currently available.

It is vital that eye health professionals become aware of

the NDIS process and the reporting requirements. It is also crucial that eye health professionals as experts support the development of the NDIS tools, to ensure the outcome considers the person's broad visual function rather than relying exclusively on clinical measurements to best define the person's support needs. This paper aims to report on a preliminary method rather than a tool that has been developed and recommended to the NDIA. The method has drawn on the Model of Visual Functioning, proposed by Corn (1983) that portrays vision as a multifactorial and complex entity. The method reflects the model's approach by adjusting the severity of a person's vision impairment when additional factors are present that impact on the person's visual function. The strengths and limitations of the method are also discussed.

**Keywords:** vision impairment, disability, visual function

### INTRODUCTION

Australia has recently undergone a major shift in the way people with disability are supported, with the implementation in 2013 of the National Disability Insurance Scheme (NDIS). Impetus for the NDIS stemmed from an inquiry by the Australian Government Productivity Commission<sup>1</sup> after extensive criticism that people with disability were experiencing systematic disadvantage within a system that was unable to meet their needs or the needs of their family and carers.<sup>2</sup> The Council of Australian Governments accepted and has welcomed the NDIS and heralded it as 'a substantial and important reform that will fundamentally change the nature of disability care and support in Australia'.<sup>3</sup> Vision impairment has been included in the group of disabilities considered eligible for NDIS funding support since it meets the NDIS criterion as a permanent sensory impairment that can result in a person having substantially reduced functional capacity, and substantially reduced participation in communication, social interaction, learning, mobility, self-care, and self-management over their lifetime.<sup>4</sup> Therefore it is vital that eye health professionals become

aware of the NDIS processes and the potential reporting requirements.

The NDIS has been constructed on a foundation of discrete objectives, one of which is that it will 'provide reasonable and necessary support'<sup>5</sup> to people with disability including those with vision impairment. The National Disability Insurance Agency (NDIA), the independent statutory agency responsible for implementing the NDIS, will work in partnership with the person with disability to complete a 'Support Needs Assessment' that identifies core areas of functional capacity that are significantly and permanently impaired and that present specific challenges for the person.<sup>4</sup> The range of life functions assessed include learning and applying knowledge; general tasks and demands; communication; mobility; self-care and special health care needs; domestic life activities; interpersonal interactions and relationships; community, social and civic life; education and training; and employment.<sup>4</sup>

NDIS roll-out across Australia commenced in 2013, and NDIA staff, otherwise known as 'planners', immediately started assisting people with NDIS support planning. This activity created an urgent need for access to suitable tools to be used in the planning process that addressed functional capacity. To investigate the availability of such tools, the NDIA convened meetings early in 2014 with key disability stakeholder organisations including those in

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vision impairment, where it was clearly acknowledged that such a tool was not available. As a preliminary measure, the decision was made to develop a method based on the clinically informed opinions of the members from the key vision impairment stakeholder organisations. As a starting point, the method would describe the process that NDIA planners could use to identify the severity of the person's vision impairment using the clinical measurements available in a standard ophthalmology report, with an adjustment for the impact of factors known to affect a person's visual functioning.

The purpose of this paper therefore, is to inform the reader of the method that has been recommended for use in the NDIA planning process to determine the severity of a person's vision impairment; this method is currently awaiting approval with the NDIA. The paper will also identify and discuss the strengths and limitations of this proposed method. The author plans further exploration of this topic with the aim of developing a method that will identify the functional impact of a person's vision impairment, and suggest its use in the NDIA planning process. This information will be shared in future publications.

## THE PROCESS

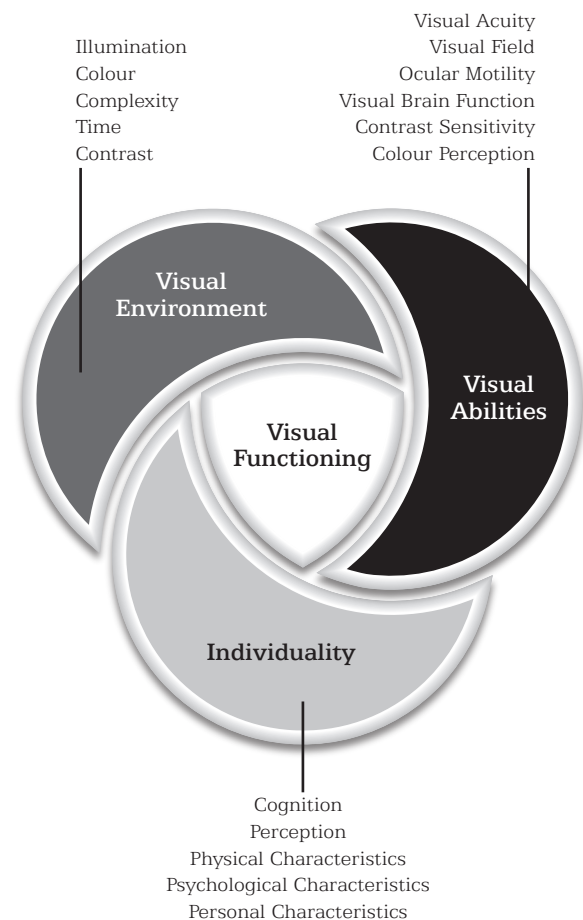
### Developing the concept of visual function for the method recommended to the National Disability Insurance Agency

Traditionally, the system used to determine the severity of a person's vision impairment has been to apply clinical measurements recorded in an ophthalmology report, such as visual acuity and visual fields, to defined categories of vision impairment in the World Health Organization International Classification of Disease Version 10 (WHO ICD-10).<sup>6</sup> These categories include mild, moderate, and severe vision impairment and blindness. However, this practice may underestimate visual function. It is widely acknowledged that there is a weak correlation between clinical measurements such as visual acuity and the way a person uses their vision, also known as their visual function.<sup>7-9</sup> This lack of correlation has also been explored by Colenbrander who commented that clinical measurements provide a threshold parameter for the physiological function being measured, but they are not necessarily indicative of a threshold performance or of 'the most relevant performance level for activities of daily living'.<sup>9</sup>

The development of the method discussed in this paper and recommended to the NDIA began with identification of an exemplar of visual function. A literature review revealed the Model of Visual Function, proposed by Corn.<sup>10</sup> This model was chosen as it recognised the importance of clinical measurements as a component of the person's visual function, but more importantly captured visual function

as a multifactorial and complex entity. The model included three dimensions: visual abilities, visual environment and individuality. Visual abilities according to Corn encompass visual acuity, visual field, ocular motility, visual brain function, contrast sensitivity and colour perception. Visual environment encompasses illumination, colour, complexity, time and contrast; while individuality encompasses cognition, perception, physical, psychological and personal characteristics.<sup>10</sup> Corn explained the complex relationship between the three dimensions of visual functioning as follows: 'to elicit, maintain or maximise visual functioning, each component of all three dimensions must be present in the minimum amount needed to create the volume required by an individual at any given moment to meet the visual demands of a particular task'<sup>10</sup> (p. 374).

The Model of Visual Functioning was used as a point of reference during the method's development to ensure where possible, that the outcome focusses on the person's visual reality and not exclusively on their clinical findings. For the purpose of this project, the original model was modified slightly and can be seen in Figure 1. This modification was done to better reflect common clinical terminology and was approved by Corn (personal communication).<sup>11</sup>

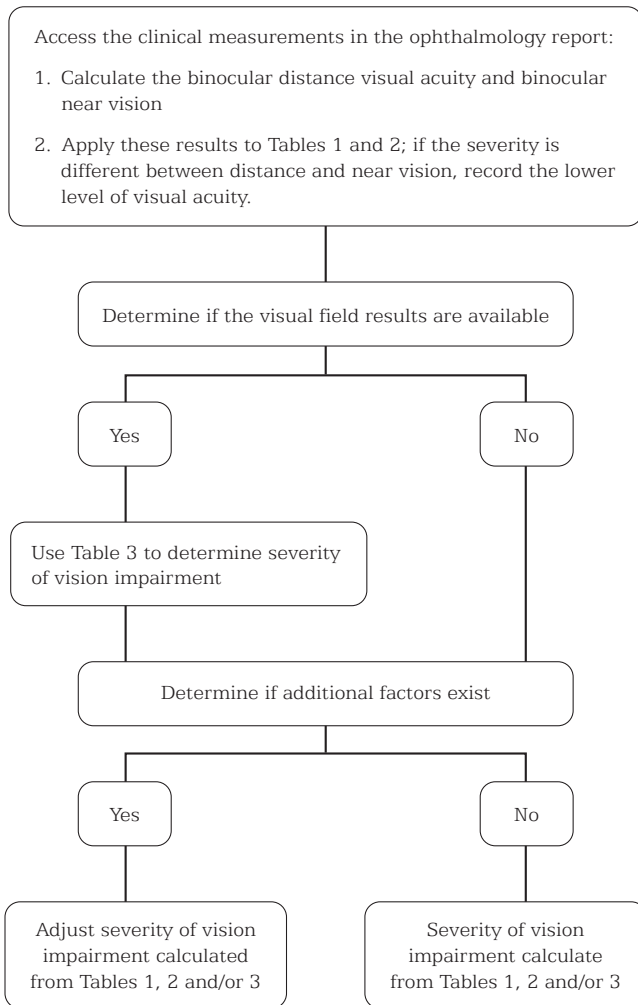


**Figure 1.** Model of Visual Functioning (Modified from the Corn Model of Visual Functioning).<sup>10</sup>

**The method recommended to the National Disability Insurance Agency**

The method recommended to the NDIA is presented in Figure 2. It will be contained in a booklet that provides definitions of near and distance visual acuity, visual fields, vision impairment, and a brief description of the various types of the visual acuity tests. These definitions and descriptions will be included as it is likely that NDIA planners will have general rather than expert knowledge of vision impairment and may not be skilled at interpreting measurements from an ophthalmology report.

The proposed method begins with determining the severity of the person’s vision impairment from their clinical measurements. The level of severity of the vision impairment is then adjusted, depending on whether additional factors, known to affect visual function, are present.



**Figure 2.** Method recommended to the NDIA to determine the severity of the person’s vision impairment.

**Determining the severity of the person’s vision impairment from their clinical measurements**

The method begins by instructing the NDIA planner to locate the clinical measurements within the ophthalmology report and then, to calculate the person’s binocular visual acuity in order to gain a more comprehensive understanding of the person’s visual ability.<sup>12</sup> For the purposes of determining vision impairment by the NDIA planner, this is defined as visual acuity with both eyes open. As ophthalmology reports frequently provide monocular clinical measurements, this calculation will be necessary, and is made using the approach proposed by Rubin et al who found that a person’s binocular visual acuity can be closely predicted by their better monocular acuity.<sup>13</sup> It is recommended, therefore, that binocular visual acuity be calculated from the visual acuity of the better-seeing eye, noted in the ophthalmology report. Once the binocular visual acuity is known, the NDIA planner is directed to tables that outline the common visual acuity tests and notation of measurements. Within these tables the WHO ICD-10<sup>6</sup> categories for vision impairment have been used, and the range of visual acuity per level of impairment is indicated by a shaded band, as evident in Table 1.

	Tested at 6 metres	Tested at 3 metres
No vision impairment	6/6	3/3
	6/7.5	
	6/9	3/4.5
	6/12	3/6
Mild vision impairment	6/18	3/9
Moderate vision impairment	6/24	3/12
	6/36	3/18
	6/48	3/24
	6/60	3/30
Severe vision impairment	5/60 (6/72 equivalent)	
	4/60 (6/90 equivalent)	
	3/60 (6/120 equivalent)	
Blindness	2/60 (6/180 equivalent)	
	1/60 (6/360 equivalent)	
	1/120 (6/720 equivalent)	

It is well recognised that most activities of everyday life are performed at distances less than six metres which is the standard testing distance used for distance visual acuity.<sup>12</sup> The sole reliance on distance visual acuity measurements to determine the severity of vision impairment will prevent the method from including important information about the person's visual function at near. Therefore the method recommended to the NDIA also includes the person's near vision. As the WHO ICD-10<sup>6</sup> does not currently include near vision, an arbitrary approach has been taken to determine the severity of vision impairment using the N series of near vision, with the categories indicated in Table 2. The determination of the severity of near vision impairment was calculated by using a visual acuity conversion for near reading tests,<sup>14</sup> and then applying the WHO ICD-10<sup>6</sup> categories.

Table 2. Near vision by the N series

No vision impairment	N5
	N6
Mild vision impairment	N7
	N8
Moderate vision impairment	N10
	N12
	N16
	N18
Severe vision impairment	N20
	N24
	N32
	N36
	N48

The potential exists for a discrepancy between the calculated severity of vision impairment for near vision and distance visual acuities when using Tables 1 and 2. One example of this discrepancy occurs when a person has visual acuity of 6/60 indicating moderate vision impairment but near vision of N8 indicating mild vision impairment. When such a discrepancy occurs it has been recommended that the more severe vision impairment level is accepted. For this example the person would therefore be assessed as having moderate vision impairment.

To gain a broad impression of the person's visual function the method recommended to the NDIA also includes the measurements of visual field testing, when available. As

the WHO ICD-10<sup>6</sup> methodology has been criticised for providing a limited understanding of visual field loss,<sup>15</sup> the current WHO ICD-10<sup>6</sup> classification for visual field loss was modified and presented in combination with distance visual acuity, for ease of interpretation by the NDIA planner (see Table 3). The most common types of visual field loss have been included. However, when the person's visual field loss varies from the examples given, it is recommended that an expert be consulted for further interpretation.

Table 3. Calculation of the severity of vision impairment when both binocular distance visual acuity and visual field defects are reported

Moderate vision impairment	<ul style="list-style-type: none"> <li>• Binocular visual field of &lt; 20 degrees and visual acuity from 6/6 to 6/36</li> <li>• Homonymous hemianopia and visual acuity from 6/6 to 6/12</li> </ul>
Severe vision impairment	<ul style="list-style-type: none"> <li>• Binocular visual field of &lt; 20 degrees and visual acuity of 6/60 to 1/60</li> <li>• Binocular visual field of &lt; 10 degrees, regardless of visual acuity level</li> <li>• Homonymous hemianopia and visual acuity level &lt; 6/18</li> </ul>

#### Adjusting the severity of vision impairment for additional factors that affect visual function

Once the NDIA planner has determined the severity of the person's vision impairment from the clinical measurements, they will be asked to consider the presence of additional factors that could impact on the person's visual function; examples of such factors are provided. This adjustment will permit an outcome that more closely reflects the person's visual reality.<sup>9</sup> If any additional factors are identified, the NDIA planner is instructed to adjust the level of calculated severity of vision impairment to the next, more severe level. This process is presented in Figure 3 where a calculated mild level of vision impairment is adjusted to a moderate level, a moderate level is adjusted to a severe level, and a severe level is adjusted to blindness.

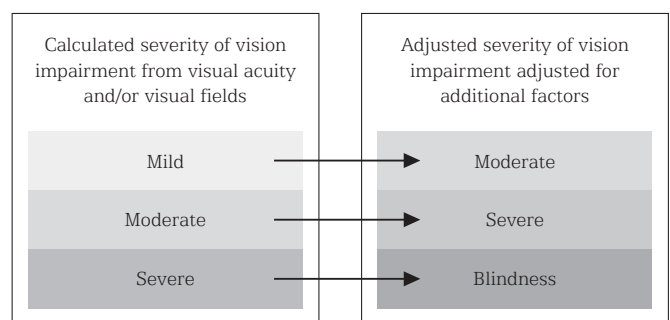


Figure 3. Adjustment of the level of severity of vision impairment.



To assist NDIA planners the following common scenarios and explanations are provided when such an adjustment should occur. These include in the presence of:

*Nystagmus, photophobia and/or visual fatigue*

It is well recognised that people with vision impairment frequently experience nystagmus, photophobia and visual fatigue<sup>7</sup> and that these factors, in isolation or in combination, will significantly worsen the person's visual function from that indicated by the recorded visual acuity and visual fields. Therefore it is recommended that, where possible, the severity of the person's vision impairment is adjusted to the next more severe level.

*Cortical vision impairment (CVI)*

It is recommended that any person who has been diagnosed with CVI should be considered to have severe vision impairment, regardless of the reported visual acuity and visual fields. This adjustment to the level of their vision impairment accommodates for the characteristic behaviours associated with CVI and their ongoing interference with visual functioning despite the person's visual acuity.<sup>16</sup>

*Dual sensory loss or deafblindness*

It is recommended that any person who has been diagnosed with dual sensory loss or deafblindness should be considered to have severe vision impairment, regardless of the reported visual acuity and visual fields. This adjustment to the level of their vision impairment balances the compounding influence of vision and hearing impairment.

*A deteriorating eye/vision condition*

Despite initial clinical measurements that are within normal limits, it has been recommended that people diagnosed with eye conditions that will deteriorate in the future to severe vision impairment and blindness be considered to have moderate vision impairment from the time of their diagnosis. This permits early intervention strategies such as orientation and mobility training, particularly given that the onset of vision impairment may be sudden and severe in such conditions. Examples of eye conditions that are known to deteriorate include age-related macular degeneration (wet and dry), retinal dystrophy, retinitis pigmentosa, Stargardt's disease, Stickler's syndrome, high myopia and retinal detachment.

*No conventional measurement of visual function*

It may not be possible to test a person's visual abilities, especially in the case of people with multiple disabilities. In such a situation, the ophthalmology report may refer to such observed visual behaviours as fixing and following or the person turning their eyes to a light source. In this situation, it is recommended that the person should be considered to have severe vision impairment until future retesting indicates otherwise.

*A brain injury with disturbance to visual functioning other than visual acuity and visual fields*

A person with a brain injury may have intact visual acuity and visual fields, but show a disturbance to specific areas of their visual functioning; for example, altered visual recognition, perception and eye movement defects. It is recommended that expert opinion be sought to determine the severity of vision impairment in these people.

Once the NDIA planner has identified the presence of additional factors that could impact on the person's visual function, they will be instructed to adjust the level of severity of vision impairment using Figure 3 as a guide. The adjusted level then becomes the level used in the NDIA planning process. If no additional factors are identified, then the original level of vision impairment determined from Tables 1, 2 and 3 will be used in planning.

The following scenario provides an example of adjustment to the severity of the person's vision impairment when additional factors known to impact on visual function are present. A person with oculocutaneous albinism will have reduced visual acuity due to foveal hypoplasia, nystagmus and defective fundus pigmentation.<sup>17</sup> It is likely that he or she will also experience varying levels of photophobia dependent on their environment,<sup>18</sup> and also high levels of visual fatigue.<sup>19</sup> As a result, their vision will vary from the threshold visual acuity reported in the ophthalmology report, to a lower level of visual function depending on their environment and the visual reserve they can draw upon. Adjusting the severity of vision impairment calculated from the person's visual acuity levels to a more severe level will reflect the known impact of the nystagmus, photophobia and/or visual fatigue, and will thus provide a more accurate impression of their visual function.

## DISCUSSION

A prime NDIS objective is to provide funding that will secure 'reasonable and necessary support'<sup>4</sup> for people with disability, so that they can 'participate in and contribute to social and economic life to the extent of their ability'.<sup>3</sup> To achieve this objective, suitable tools should be employed to determine the needs of the person.<sup>4</sup> This paper has proposed a preliminary method, rather than a tool that can be applied to the planning process for people with vision impairment. It is suggested that this method is appropriate for the immediate NDIA planning requirements as it begins to capture the complex nature of visual function, by inclusion of clinical measurements and by adjusting for factors that can impact on visual function.

Several limitations exist in the method described in this paper. First, due to the precipitous roll-out of the NDIS and the subsequent urgent need for an approach to support NDIA planning, it has not yet been possible to evaluate this

method. Such an evaluation is planned and it is the author's intention to report on this in future publications. Second, the method described here employs only one dimension of the Model of Visual Functioning,<sup>10</sup> ie visual abilities, and falls short of measuring the resulting consequence for the individual<sup>20</sup> when vision impairment is present, by not attending to the person's visual environment or their individuality. The utility of a NDIS plan is that it describes the whole person and not just their particular disability or health condition.<sup>4</sup> As Rubin et al comment 'disability is defined at the level of the entire individual'.<sup>13</sup> To meet this need, future planned work will focus on broadening the scope of the method to the development of a tool that will assess the functional impact of vision impairment. The Model of Visual Functioning<sup>10</sup> will be used as a framework to guide this development, and ensure that the tool better defines the person, their visual function and their support needs.

## CONCLUSION

There is no doubt that Australia's recent major paradigm shift in disability support aligns with the aspirations that eye health professionals hold for their patients with vision impairment, that the NDIS will deliver a support system that adequately meets people's needs. As has been shown in this paper, eye health professionals can and should be encouraged to make a positive contribution to ensuring this outcome, by offering clinically informed opinions that will represent Australians with vision impairment and help shape the NDIS as it evolves.

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## REFERENCES

1. Australian Government Productivity Commission. Disability Care and Support No. 54, Canberra; 2011 [Cited 2014 1st Oct] Available from [http://www.pc.gov.au/\\_\\_data/assets/pdf\\_file/0012/111270/disability-support-volume1.pdf](http://www.pc.gov.au/__data/assets/pdf_file/0012/111270/disability-support-volume1.pdf).
2. Australian Government Department of Social Services. Shut Out: The Experience of People with Disabilities and their Families in Australia; 2012 [Updated Nov 2014, cited 2014 1st Oct] Available from <http://www.dss.gov.au/our-responsibilities/disability-and-carers/publications-articles/policy-research/shut-out-the-experience-of-people-with-disabilities-and-their-families-in-australia>.
3. National Disability Insurance Scheme. The Council of Australian Governments Intergovernmental Agreement for the National Disability Insurance Scheme (NDIS) Launch; 2013 [Cited 2014 1st Oct] Available from <http://www.ndis.gov.au/document/180>.
4. National Disability Insurance Scheme. Planning and Assessment – Assessment of Participants' Needs; 2014 [Cited 2014 1st Oct] Available from [http://www.ndis.gov.au/sites/default/files/documents/og\\_planning\\_assessment\\_participants\\_needs2.pdf](http://www.ndis.gov.au/sites/default/files/documents/og_planning_assessment_participants_needs2.pdf).
5. Australian Government. National Disability Insurance Scheme Act; 2013 [Cited 2014 1st Oct] Available from <http://www.comlaw.gov.au/Details/C2013A00020>.
6. World Health Organization. International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10) Version: 2015; 2014 [Cited 2014 18th Dec] Available from <http://apps.who.int/classifications/icd10/browse/2015/en#/H54.9>.
7. Corn AL, Lusk KE. Perspectives on low vision. In: Corn AL, Erin JN, editors. Foundations of Low Vision: Clinical and Functional Perspectives. 2nd Ed. New York: AFB Press; 2010. p. 3-34.
8. Dawson N, Fitzmaurice K. Are clinical measures good indicators of performance of daily activities in vision-impaired children. *Aust Orthopt J* 2008;40(2):21-25.
9. Colenbrander A. Assessment of functional vision and its rehabilitation. *Acta Ophthalmol* 2010;88(2):163-173.
10. Corn A. Visual function: a theoretical model for individuals with low vision. *J Vis Impair Blind* 1983;77:373-377.
11. Corn A. Personal communication. 2014; 20th Aug.
12. Colenbrander A. Aspects of vision loss – visual functions and functional vision. *Vis Impair Res* 2003;5(3):115-136.
13. Rubin GS, Munoz B, Bandeen-Roche K, West SK. Monocular versus binocular visual acuity as measures of vision impairment and predictors of visual disability. *Invest Ophthalmol Vis Sci* 2000;41(11):3327-3334.
14. Holladay JT. Proper method for calculating average visual acuity. *J Cataract Refract Surg* 1997;13(4):388-91.
15. Dandona L, Dandona R. Revision of visual impairment definitions in the International Statistical Classification of Diseases. *BMC Medicine* 2006;4(7) doi:10.1186/1741-7015-4-7.
16. Roman-Lantzy C. Cortical Visual Impairment: An Approach to Assessment and Intervention. New York: AFB Press; 2007.
17. Phillips PH. Management of common neuro-ophthalmology problems. In: Wright KW, Strube YNJ, editors. Pediatric Ophthalmology and Strabismus. 3rd Ed. New York: Oxford University Press; 2012. p. 567-584.
18. Schwartz TL. Causes of visual impairment: pathology and its implications. In: Corn AL, Erin JN, editors. Foundations of Low Vision Clinical and Functional Perspectives. 2nd Ed. New York: AFB Press; 2010. p. 137-191.
19. Sticken J, Kapperman G. Integration of visual skills for independent living. In: Corn AL, Erin JN, editors. Foundations of Low Vision Clinical and Functional Perspectives. 2nd Ed. New York: AFB Press; 2010. p. 97-110.
20. International Council of Ophthalmology. Colenbrander A. Causes vs Consequences of Functional Loss International Council of Ophthalmology; 2010 [Cited 2014 1st Oct] Available from <http://www.icoph.org/resources/59/Causes-vs-Consequences-of-Functional-Loss.html>.

## Profile of the Australian Orthoptic Workforce 2012/13

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### ABSTRACT

**Purpose:** This paper presents the findings of the Orthoptics Australia 2012/13 orthoptic workforce study.

**Methods:** An online survey was sent to Orthoptics Australia members and promoted to non-members by colleagues, via social media and at various continuing education events. Data was collected from October 2012 to April 2013 using the online survey tool Survey Monkey.

**Results:** Four-hundred-and-fifteen orthoptists completed the online survey. Results indicate that the female to male ratio is 9.6:1 with the average age of orthoptists 37 years and 61.5% of orthoptists under the age of 40. The majority

(81.7%) of orthoptists reside in New South Wales or Victoria and most (81.1%) work in metropolitan areas. Orthoptists work in a diverse range of clinical areas, including advanced practice, with 91.8% working in specialist public or private eye clinics, 52.8% working full-time and 42% having a career interruption at some point. Overall 27.2% of orthoptists indicated that they would be leaving the profession within the next five years.

**Conclusions:** This study provides a valuable dataset which should be further explored with finer analysis of the workforce.

**Keywords:** orthoptist, workforce, eye healthcare

### INTRODUCTION

The orthoptic workforce makes a significant contribution to secondary and tertiary eye care services, meeting a diverse range of patient needs. The orthoptic profession however, will face many workforce challenges in the future to ensure that the current and projected numbers of orthoptists meets the needs of the Australian community, particularly given the ageing of the population. By the year 2020 the Australian population will increase by approximately 20%.<sup>1-2</sup> With extended life expectancy, there will be a simultaneous increase in the number of people with an age-related eye disease including cataract, glaucoma, diabetic retinopathy and age-related macular degeneration (AMD). It is predicted that with a doubling in the number of people with vision impairment and eye disease in the next 20 years there will be twice as much work for eye healthcare professionals in Australia.<sup>1</sup>

In line with the given projected increase in the burden of eye disease, it is anticipated that there will be an increased demand for the unique skills of orthoptists in the specialist eye care setting. Whilst originally the role of the orthoptist was in the diagnosis and management of eye movement disorders and disorders of binocular vision, this role has expanded over the years to embrace advancing medical knowledge and technology. Today orthoptists are

increasingly involved in monitoring low-acuity disease in specialist settings and involved in non-medical led clinics.<sup>3-7</sup> It is suggested that such advanced orthoptic practice, with appropriate training and support from the medical profession, can improve efficiency whilst maintaining a high standard of care and has the capacity to assist in addressing the increased demand for eye care services.

Orthoptics Australia monitors the orthoptic profession and will commence publishing workforce studies periodically to map changes within the profession. This study aims to provide a profile of the current Australian orthoptic workforce and reports the results of the workforce survey conducted in 2012/13.

### METHODS

#### Participants

Orthoptics Australia contacted all 354 current members of the association. The total membership of the association does not represent all orthoptists within the workforce, as membership is voluntary. However, orthoptists were asked to forward the survey to colleagues who were not association members. In addition, the survey was promoted via social media and at events where non-members were in attendance to gain a broader representation of the workforce.

#### Instrument

Orthoptics Australia developed an online survey to gain information regarding practitioner demographics,

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qualifications, work patterns and clinical activities. The questionnaire consisted of questions based on previous workforce surveys disseminated by the association and adapted to meet the current aims of the study. The questions were closed-ended and included multiple-choice, fill-in and Likert scale rating type questions. The Likert-type scales were given ratings from 1 to 3 representing various levels of satisfaction.

The questionnaire was reviewed and pretested by council members of the association and feedback was sought to ensure the questions were clear. Feedback was used to refine the content and clarity of the questions.

### Procedure

The research was conducted using the online survey tool, Survey Monkey, and data was collected from October 2012 to April 2013.

An email invitation for participation was sent with the survey link to all current members of Orthoptics Australia. As noted earlier orthoptists were encouraged to forward the survey to colleagues and the workforce survey was promoted at various national and state branch continuing education events attended by both association members and non-members, and through social media. Multiple reminders were sent periodically via email to all members.

### Data Analysis

Data from completed questionnaires were exported into Microsoft Excel. Descriptive statistics were used to analyse the responses to the survey questions using Excel programs and SPSS Version 13.0 (SPSS Inc, Chicago, IL).

## RESULTS

Overall 448 survey responses were received. Of these, 33 were excluded from the final analysis as the participants did not complete any of the survey questions or were identified as students. A total of 415 survey responses were therefore included and of these 298 (71.8%) were members of Orthoptics Australia. Considering that the most current census data which indicates that the orthoptic workforce consists of 678 individuals,<sup>8</sup> it is estimated that the survey represents 61.2% of the workforce.

### Demographics

The overall ratio of female to male respondents was 9.6:1 with 376 females (90.6%) and 39 males (9.4%) completing the survey. The mean age of respondents was 36.7 years (SD  $\pm$  12.2) with the age ranging from 21 to 84 years. Of all 415 respondents, 158 (38.1%) were between the age of 20 and 29, 97 (23.4%) between the age of 30 and 39, 75 (18.1%) between the age of 40 and 49, 66 (15.9%) between the age of 50 and 59, and 13 (3.1%) over the age of 60 years. Six (1.4%) did not provide their age.

Most respondents (81.7%) were currently residing in New South Wales (NSW) or Victoria, where training programs are available. Of the 415 respondents, 195 (47.0%) were located in NSW, 144 (34.7%) in Victoria, 28 (6.7%) in Queensland, 11 (2.7%) in Western Australia, eight in South Australia (1.9%), six (1.4%) in Tasmania, and six (1.4%) in Canberra. Seventeen (4.1%) did not provide their residence.

### Training

Fifty-three respondents (12.8%) indicated they qualified as an orthoptist with a Masters degree, 205 (49.4%) with a Bachelor degree (44 of whom qualified with Honours) and 115 (27.7%) with a Diploma or Associate Diploma. Two respondents (0.5%) did not provide information regarding their qualifying degree. Of those who completed this question, 213 (51.6%) gained their qualification in NSW, 182 (44.1%) in Victoria, and 18 (4.3%) overseas. One-hundred-and-twenty-two (29.5%) also indicated they held an additional degree to their orthoptic qualification. The average length of time since qualification was 15.4 years (SD  $\pm$  13.1) ranging from 4 months to 64 years.

### Graduate employment

When respondents were asked how long it took to be gainfully employed upon graduation, 337 of 398 (84.7%) who responded, indicated they were working within 12 weeks of graduation. Of these 273 (68.6%) found work within the first four weeks of graduation. Gainful employment excluded any casual or locum work.

### Current employment

The majority of respondents, 354 (85.3%), indicated they were currently employed as an orthoptist.

*Work location:* Of those currently employed, 287 (81.1%) worked in a metropolitan area, 53 (15.0%) in a regional or remote area and 14 (3.9%) divided their time between a metropolitan and regional area.

*Work sector:* In relation to the work setting, 325 (91.8%) indicated they are employed in a specialist eye clinic either in the public and/or private sector, 38 (10.7%) in education or research institutions and 15 (4.2%) were self-employed. Overall 67 (18.9%) individuals indicated they worked in multiple settings. Most orthoptists (96%) indicated they worked in multidisciplinary settings with ophthalmologists, registrars and nurses or with allied health professionals such as optometrists, occupational therapists, orientation and mobility instructors, physiotherapists, speech pathologists, social workers and medical photographers.

*Work hours:* The mean average hours worked by orthoptists was 31.1 hrs per week (SD  $\pm$  11.0). Of these 187 (52.8%) were working full-time ( $\geq$ 35 hours per week). Overall 318 (89.8%) were satisfied with the hours of their employment.

*Orthoptic roles:* Of the participants currently working, 332 (93.8%) were working in the clinical care of patients, 73 (20.6%) in education, either within the tertiary sector

or as part of their clinical role, 60 (16.9%) were involved in research and 120 (33.9%) indicated their role included administrative or management responsibilities. Overall 165 orthoptists had multiple responsibilities beyond the clinical care of patients.

With regards to participation in clinical placements, 183 (44.1%) orthoptists indicated they are involved in or have taken part in the supervision of orthoptic students undertaking fieldwork placements.

*Clinical practice:* With regards to the clinical roles of the currently employed orthoptists, 179 (50.6%) worked in traditional orthoptics including paediatrics, eye movement disorders and/or neuro-ophthalmology and 41 (11.6%) worked in low vision rehabilitation. The majority of orthoptists, 267 (75.4%), worked within the general ophthalmology sector.

*Advanced practice:* Eighty-three (23.4%) were also working in an extended role which including orthoptist-led clinics within secondary and tertiary care settings. Advanced practice roles included glaucoma monitoring, diabetic retinopathy screening and monitoring, cataract care, postoperative care, laser and refractive eye care, ocular screening of adverse drug effects and monitoring of AMD patients between intravitreal injections.

*Career interruptions:* Overall, 176 (42.4%) of the 415 respondents reported having had a career interruption at some point in their career with the most common reason being maternity leave (63.8%).

*Future work plans:* A total of 94 (27.2%) of 345 respondents indicated that they intend to leave the profession in the next 5 years. Twenty-two of these (23.4%) indicated it was due to retirement. Other reasons included starting a family, pursuing further education and/or a different career path.

## DISCUSSION

The aim of undertaking this survey was to gain a comprehensive view of the current Australian orthoptic workforce. To date there is very little published data on the workforce, despite the integral role of orthoptists in the delivery of eye care services.

It is difficult to accurately determine the number of orthoptists working in Australia as membership of the association and registration with the Australian Orthoptic Board are not compulsory. The most recent census data in 2011 indicates that there are 678 orthoptists in Australia, an increase from 515 in 2006.<sup>8</sup> Given the diversity of orthoptic roles, we asked our participants to indicate whether they describe themselves as orthoptists in the Australian Census. Only 329 (79.3%) of the respondents indicated that they document their profession as orthoptics highlighting that the census may underestimate the workforce.

As expected, the survey results indicate that the Australian orthoptic workforce is predominately female. This is consistent with other allied health professions such as occupational therapists and speech pathologists.<sup>9</sup> However, the profession should consider strategies for attracting a greater number of males to the profession and supporting the masculinisation of the orthoptic workforce.

The average age of orthoptists is 37 years with 61% of orthoptists under the age of 40 and with a smaller proportion of the profession belonging to the two oldest cohorts. This is also reflected by the majority of orthoptists having a Bachelor degree or above which were first offered by universities in 1989. Although the profession does not appear to be ageing at a fast rate, it is of concern that just over one-quarter of orthoptists have plans to either retire or leave the profession within the next five years. Cumulative attrition, coupled with the high proportion of orthoptists having a career interruption, could result in issues with workforce supply. It is of interest to note that this study found that there are no significant difficulties in graduates attaining work suggesting that there is a substantial demand for orthoptists. According to Orthoptics Australia there is a recognised shortfall of orthoptists particularly in states where there is no training program. Indeed it is noted in this study that over 80% of orthoptists reside in NSW or Victoria and the majority work in metropolitan cities. Further research is required to investigate national vacancy rates and explore the supply-demand of orthoptists.

The hours worked by orthoptists are an important contributor to workforce capacity. Just over 50% of the profession works full-time, with 48% working less than a 35-hour week and almost 90% satisfied with their hours of employment. This is most likely a reflection of the high number of females within the profession. Given that part-time employment can drive workforce shortages, strategies to assist women to return to the workforce should be considered. Additionally a masculinisation of the profession could potentially assist in increasing the number of equivalent full-time orthoptists.

The depth of the clinical experience noted in this workforce survey is a positive finding. The majority of orthoptists work in multidisciplinary teams within public or private specialist clinics and are involved in a diverse range of clinical areas, from paediatrics to general ophthalmology. In addition, almost one-quarter of the profession is involved in advanced practice. Increased involvement of orthoptists in the screening or monitoring of low-acuity disease is a reflection of the increased demand for services and innovation in service delivery models within the secondary and tertiary care setting.

Overall workforce planning should be underpinned by a comprehensive understanding of the current workforce and changes within the profession. This study has resulted in a valuable dataset which should be further explored. A finer analysis of the distribution of the orthoptic workforce,

university student numbers, graduate destinations and demand for services would be valuable for future planning.

## ACKNOWLEDGEMENTS

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## REFERENCES

1. Taylor HR. Eye care for the community: Fred Hollows lecture. *Clin Experiment Ophthalmol* 2002;30(3):151–154.
2. Taylor HR. Eye care for the future: the Weisenfeld lecture. *Invest Ophthalmol Vis Sci* 2003;44(4):1413-1418.
3. Georgievski Z, Koklanis K, Fenton A, Koukouras I. Victorian orthoptists' performance in the photo evaluation of diabetic retinopathy. *Clin Experiment Ophthalmol* 2007;35(8):733-738.
4. Gazarek J, Jessup R, Wallace R, Dayoub Z. Orthoptist-led assessments for diabetic retinopathy and cataracts. [Abstract] *Aust Orthopt J* 2012;44(2):21.
5. Thorburn D, Koklanis K. Orthoptic-led glaucoma monitoring clinic at Alfred Health. [Abstract] *Aust Orthopt J* 2012;44(2):26.
6. Gleeson D. The multidisciplinary glaucoma monitoring clinic at The Royal Victorian Eye and Ear Hospital. *Aust Orthopt J* 2013;45:15-18.
7. Lim YE, Vukicevic M, Koklanis K, Boyle J. Indication for anti-VEGF treatment for neovascular age-related macular degeneration based on Optical Coherence Tomography interpretation: Decision agreement rate between orthoptist and ophthalmologist. *Aust Orthopt J* 2014;Online First.
8. Health Workforce Australia. Australia's health workforce series - health workforce by numbers. Adelaide; 2013 [cited 2015 12th May] Available from <https://www.hwa.gov.au/sites/uploads/Health-Workforce-by-Numbers-FINAL.pdf>.
9. Australian Institute of Health and Welfare. Health and community services labour force, 2006. Canberra; 2009 [cited 2015 12th May] Available from <http://www.aihw.gov.au/WorkArea/DownloadAsset.aspx?id=6442458396>.



## ORTHOPTICS AUSTRALIA 72<sup>nd</sup> ANNUAL SCIENTIFIC CONFERENCE 2015

Sunday 1st November to Wednesday 4th November

### Conference Venue:

James Cook Hotel Grand Chancellor  
147 The Terrace Wellington

### Key Dates:

**Abstract Submission Deadline:**  
31st July 2015

**Early Bird Registration Deadline:**  
Friday 9th October 2015

### Social Functions:

#### Welcome Reception

Date: Sunday 1st November  
Time: 6.30pm – 9.00pm  
Venue: Wharewaka Function Centre,  
Wellington Waterfront

#### Conference Dinner

Date: Tuesday 3rd November  
Time: 7.00pm – 11.30pm  
Venue: Museum of New Zealand,  
Te Papa Tongarewa, Te Marae



Register at: [www.orthoptics.org.au](http://www.orthoptics.org.au)

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## Selected Abstracts from the Orthoptics Australia 71st Annual Scientific Conference held in Brisbane 23 to 26 November 2014

### PATRICIA LANCE LECTURE A LIFE IN ORTHOPTICS

#### Patricia Dunlop

Patricia Dunlop has been in orthoptics since graduating with the first Maddox Prize from Moorfields in 1949. This training school was run by Sheila Mayou who was a pupil of Mary Maddox, the first orthoptist. Patricia Maguire Dunlop was born in Enniskillen, Northern Ireland and graduated from school there with three top places in the state, Physics, Maths and Chemistry at the end of the war (1939-1945). The family moved to London where she joined the first orthoptic training school at Moorfields (City Road).

Moorfields Eye Hospital ran a training course for doctors from many countries worldwide, wishing to specialise in ophthalmology. After graduating in orthoptics she was taken on the staff of Moorfields where she helped in training the doctors aiming to specialise in ophthalmology. There she met her future Australian husband. She came out to Australia after her marriage in 1950 as a '£10 Pom' going to live and practise orthoptics, privately in a large ophthalmic practice in Newcastle and publicly at the Royal Newcastle Hospital. Meeting Patricia Lance in 1952 she joined the Australian Orthoptic Association, of which she has been elected President on two occasions (1967-1968 and 1978-1979).

Patricia's life has been busy and very stimulating, attending many overseas conferences and making many friends in ophthalmology from all over the world. In 1978 she received the Demonstrator's Diploma to add to her DBO and the Charles Leonard Gimblett Memorial Prize for work in dyslexia in 1975. She and her husband Donald, have been part of a team investigating binocular vision, stereopsis and dyslexia and have received NH&MRC grants for a period of 17 years. They were one of the first to bring Botulinum toxin A into Australia and were part of Alan Scott's group in testing its efficacy in squint. The toxin is now produced under the name of Botox and is used by many people for a myriad of conditions.

Orthoptics has now increased its role in many aspects of ophthalmology and orthoptists have been recognised for their contribution. Joyce Mein, from Sheffield UK, received an MBE from the Queen. She came to Australia in the 1970s and helped set up the training school in Sydney before it moved from Salisbury Road to Lidcombe and thence to Sydney University. Now the NSW course will be at UTS. Such is the progress of our profession.

There are many highlights in her life, not least of all Donald and Patricia's family of six doctors, all graduating from Sydney University and now all specialising in postgraduate medicine with three in ophthalmology, one in pathology, one in cosmetic laser and one in ENT.

### CALCULATING IOL POWERS IN POST RADIAL KERATOTOMY PATIENTS

#### Ana Alexandratos

It is now a weekly occurrence that we are faced with calculating the intraocular lens power for patients who have undergone LASIK and PRK. Whilst most formulae these days give accurate results, calculating implant powers for patients who have undergone 8-12 cut radial keratotomy (RK) is a more challenging process. The current recommendations for calculating this special group were presented. A short case study with immediate and long-term results demonstrated the accuracy of these suggested theories.

### THE ROLE OF ORTHOPTISTS IN DELIVERING OPHTHALMIC CARE TO DEVELOPING COUNTRIES

#### Angelique Antonio, Donna Ha, Mitchell Bagley

**Purpose:** To determine the level and type of contribution made by orthoptists in delivering ophthalmic care in developing countries.

**Method:** An observational study was performed investigating the role of orthoptists in delivering community ophthalmic care in Myanmar, the Philippines and Vietnam. Information and statistics concerning each clinic were gathered. Pre and postoperative orthoptic investigations involved VA, biometry, keratometry, autorefraction, intraocular pressure and recommendation of intraocular lens.

In Myanmar the orthoptist was also involved in triaging, subjective refraction, slit lamp examination and diagnosis, binocularity assessment and treatment and training of the local ophthalmic workforce. The orthoptist in the Philippines assessed a range of ophthalmic conditions and assisted in training ophthalmic screening techniques. The orthoptist who contributed to the Vietnam Vision Project counselled suitable patients regarding surgical risks and complications, enabling informed consent.

**Results:** Over a 19-day period, the total number of patients seen in Myanmar was 1,542. There were 455 operations performed including cataract, pterygium, oculoplastic, strabismus and trabeculectomy surgeries. Over a 14-day period in Philippines, 157 cataract surgeries and one corneal repair was completed. During the two weeks in Vietnam, 353 cataract operations were completed and an additional 170 consultations were performed by orthoptists and optometrists.

**Conclusion:** Orthoptists are a valuable and unique asset when delivering ophthalmic care to developing countries. Their broad ophthalmic knowledge and skills reduce the clinical burden on surgeons, enabling the surgeon to utilise their time and expertise in performing vital surgery leading to improved efficiency and patient care.

### I WOKE UP WITH DOUBLE VISION ... HELP!

#### Jodie Attard

A 27-year-old male presented to Sydney Eye Hospital Emergency Department with sudden onset horizontal diplopia, short episodes of right sided periorbital pain, dizziness and gradually worsening visual acuity. The orthoptic investigation, ancillary testing and diagnosis was presented and discussed.

### UNDERSTANDING OCULAR MOTOR APRAXIA

#### Nicole Carter

Ocular motor apraxia (OMA), also known as saccadic initiation failure, is a rare condition that affects a person's horizontal eye movements. OMA is a neurological condition, which occurs when there is a defect in any of the numerous structures within the brain that are used to control horizontal eye movements. It can be acquired or congenital. This presentation focused on congenital OMA.

The most recognisable clinical feature of OMA is a jerky head thrust which is used to compensate for the lack of horizontal saccades. This movement utilises the intact vestibulo-ocular reflex in order to change fixation from one object to another without the need to make a saccade. In this presentation OMA was discussed and case studies presented.

## AMD PROGRESSION THROUGH THE EYES OF OPTICAL COHERENCE TOMOGRAPHY (OCT)

**Emily Caruso**

OCT has become a crucial diagnostic tool, in many ocular diseases, especially in retinal diseases such as age-related macular degeneration (AMD). Spectral-domain OCT (SD-OCT) technology allows us to obtain high resolution images which enables us to diagnose and monitor signs of progression in AMD at much earlier stages. This presentation discussed the risk factors and the early signs of progression that can be identified on SD-OCT.

## MANAGEMENT OF VISUAL IMPAIRMENT IN PAEDIATRIC PATIENTS: THE ROLE OF THE ORTHOPTIST. WHAT IS OUR SCOPE OF PRACTICE?

**Melanie Cortes**

At The Sydney Children's Hospital Lion's Eye Clinic for Children all paediatric patients reviewed by ophthalmologists are also assessed by an orthoptist. With increasing demand for eye services in the public health system, current workflow processes of paediatric eye services were reviewed with the aim of improving patient journeys through better allocation of resources.

**Method:** A retrospective study was undertaken to review the roles of the multidisciplinary team in the management of paediatric patients with reduced vision. More specifically the input of the ophthalmologist and orthoptist into management decisions regarding glasses and/or patching was reviewed.

**Results:** The role of the orthoptist and ophthalmologist in the management decisions of paediatric patients with visual impairment was discussed.

## FOUNDATIONS ARE THE KEY: DIFFERENTIAL DIAGNOSIS IN NEURO-OPHTHALMOLOGY

**Melanie Cortes**

An unusual and complex neuro-ophthalmic case of an intracranial aneurysm and third nerve palsy was presented. The importance of a sound knowledge of neuro-anatomy for differential diagnosis was highlighted in the presentation of this case.

## ORTHOPTIST-LED CLINICS: INVESTIGATING THE EFFECTIVENESS AND EFFICIENCY OF ORTHOPTISTS IN DIABETIC RETINOPATHY SCREENING AND CATARACT ASSESSMENT

**Allanah Cramer, Konstandina Koklanis, Zeina Dayoub, Jana Gazarek**

Northern Health in Melbourne has been active in expanding its orthoptic services to cater for the changing population and increase in chronic eye disease. It is one of the first public health services in Australia to introduce orthoptist-led diabetic retinopathy (DR) screening and cataract assessment clinics whereby the orthoptist manages the care of a patient with low acuity disease in accordance with clinic protocols or guidelines.

The aim of this study was to (i) investigate the effectiveness of orthoptist-led diabetic retinopathy screening clinics and cataract assessment clinics at Northern Health in terms of clinic efficiency, and (ii) to investigate the diagnosis agreement between orthoptists and ophthalmologists. Data was retrospectively collected from the medical histories of patients who attended the DR screening clinic and/or cataract assessment clinic at the Northern Health service. The information collected included patient demographics, appointment and referral details and clinical data. Clinical data included

visual acuity, diagnosis by the orthoptist and the ophthalmologist. The classification and stage of the ophthalmic condition was also documented. Strong agreement was found between the orthoptists and ophthalmologists when detecting and diagnosing DR and/or cataract for patients attending the Northern Health orthoptist-led clinics.

This study indicated that there is the potential for the extended role of orthoptists in hospital outpatient settings to improve efficiencies in clinics whilst maintaining a high level of care.

## AN UNUSUAL CASE OF OPTIC NEURITIS

**Susan Downing**

A 47-year-old female presented to Sydney Eye Hospital Emergency complaining of a five-day history of blurred vision and pain in the left eye. Taking a thorough history revealed the likely cause of optic neuritis and a plan for future prevention.

## BEING THE PATIENT AND ALL THE THINGS YOU SHOULD REMEMBER

**Cynthia Dykes**

After finally agreeing to have adjustable suture surgery for a large secondary exotropia with troubling diplopia, this presentation presented a personal journey. Knowing a bit about eyes and surgery, what could possibly go wrong? The things I may have been dismissive about in relation to patient complaints and their fears about surgery will be viewed more sympathetically in the future. The presentation included 'before and after' photographs of the strabismus and its progression, has it made a difference?

## DRAGGED FOVEA DIPLOPIA SYNDROME

**Keren Edwards**

A case demonstrating the diagnosis and management of a patient with binocular diplopia resulting from macular pucker was presented.

## RETINAL HAEMORRHAGES IN INFANTS AND CHILDREN: ABUSE OR NOT?

**Suzy Edwards**

Retinal haemorrhages are one of the most common findings for shaken baby syndrome or abusive head trauma as it is otherwise known. However they may also be associated with other accidental traumas or systemic illness. There is a significant amount of information in the literature discussing retinal haemorrhages associated with child abuse, with less of a focus on the other possible causes of retinal haemorrhages in children including accidental trauma, birth trauma, convulsions, systemic illness and cardio-pulmonary resuscitation.

Any sign of retinal haemorrhages in a child or infant, prompts thorough investigation but there are many differential diagnoses that must be considered. This presentation discussed the variety of possible causes for retinal haemorrhages and identified the differences in clinical presentation.

## LOSS OF VISION WITHOUT PATHOLOGIC CAUSE: A COMPLEX CASE STUDY

**Rachel Elliott**

This case study described a student's vision loss in the absence of pathologic cause and highlighted the value of a collaborative multidisciplinary team approach in achieving a good outcome. The orthoptist has an important role in careful assessment of visual function and observation of visual behaviours. A holistic approach to management, an awareness of associated factors and appropriate referral pathways is needed. In collaboration with educators, a psychologist, paediatrician, speech pathologist, occupational therapist and parents, the needs of a young woman with possible conversion disorder were identified and addressed.

## IOL POWER PREDICTABILITY POST LASER REFRACTION SURGERY

**Lilian Farag, Penny Chow**

How do we choose IOL powers for post refractive patients using Haigis-L predictability?

## EFFICACY OF NULL POINT TRAINING: A PILOT STUDY

**Kerry Fitzmaurice, Norliza Fadzil, Linda Malesic**

Nystagmus is associated with reduced visual acuity. Null point strategy is a non-surgical intervention observed clinically to reduce the impact of nystagmus. A pilot study has been conducted with children with nystagmus to evaluate the efficacy of null point training to improve visual performance and to reduce reliance on a compensatory head posture. Nineteen participants aged between 12 and 19 years with reduced vision due to nystagmus were recruited. Participants were trained in null point technique. Outcome measures were print size, reading speed and performance of activities of daily living (ADLs) measured at three time points: pre training, post training and six months follow-up. Results indicated print size decreased and self-perceived performance of ADLs improved between pre and post training and maintained at follow-up. Reading speed increased between post training and follow-up. These performance changes were significant ( $p=0.001$ ). Actual performance of ADLs demonstrated gradual improvement at each test time with change being significant ( $p=0.001$ ) between pre training and follow-up. Abnormal head posture was eliminated or reduced in 12 participants. These results support the efficacy of null point training as a strategy to reduce the impact of nystagmus and support the need for further study.

## CURRENT TRENDS IN THE TREATMENT AND PREVENTION OF MYOPIA IN CHILDREN

**Amanda French, Kathryn Rose**

Myopia is a potentially sight-threatening condition and the prevalence is rising internationally, with some evidence of a rise in Australia as well. In addition, onset is frequently occurring at a younger age, thus presenting a greater risk of progression to high myopia and development of pathology. A number of environmental factors have been linked to myopia onset, most notably, a lack of time outdoors via reduced exposure to high intensity light. This is the focus of a number of outdoor intervention trials in children, currently being conducted in Asia.

Preliminary results suggest that increased time spent outdoors effectively prevents myopia development in children while its impact on the progression of myopia is less certain. Other types of interventions for myopia progression have been, or are currently under investigation,

with variable results. These include optical treatments either targeting accommodation (myopic undercorrection, bifocals or progressive addition lenses) or to reduce relative peripheral hyperopic defocus (orthokeratology and multifocal contact lenses). In addition, pharmacologic treatment using atropine (most recently low-dose atropine) has also been trialled. Randomised control trials of interventions for myopia were identified through database searches of PubMed and MEDLINE. Search terms included myopia, refractive errors, interventions, progression, eyeglasses, atropine, contact lenses, orthokeratology, and time outdoors. Further relevant studies were identified by searching citations and reference lists of included studies. The current evidence for the impact of outdoor light exposure on the onset and progression of myopia were reviewed and the effectiveness of other interventions to slow progression discussed.

## IMPROVE PATCHING OUTCOMES USING AN APP

**Dee Garland**

Using the app 'Patching Pirate' is a method of combining patching and technology. In the future orthoptists may be held more accountable for patching treatment and this is a method of obtaining data which can be held in a patient's records. It can also be a tool for research into patching and amblyopia. The app was launched in July 2014. Google analytics data will show how the app has been taken up around the world.

## THE EFFECTS OF TEMPORAL-OCCIPITAL RESECTION ON FUNCTIONAL VISION IN A CHILD WITH CORTICAL VISION IMPAIRMENT

**Kylie Gouliotis**

Lobectomy and resection are procedures to reduce seizure activity in people who are unresponsive to medication or have severe seizure disorders. This surgery carries risks of damage to surrounding structures in the brain and associated loss of function. In the occipito-temporal region, there is a risk of damage to the visual pathway. While the pattern of visual field loss can be predicted, the impact of this can be difficult to ascertain in the case of pre-existing neurological visual loss. This case outlines the pre- and postoperative assessments of an 8-year-old girl with cortical vision impairment and severe seizure disorder. Cortical vision impairment affects the way in which one is able to functionally use vision and process visual information. In this case, it was essential to understand the way in which the child is able to use and process her vision in order to ascertain if surgery will affect visual functioning.

## THE DEVELOPMENTAL IMPLICATIONS OF OPTIC NERVE HYPOPLASIA

**Kylie Gouliotis**

Optic nerve hypoplasia is one of the most common causes of congenital vision impairment. While it can occur in isolation, it is commonly associated with abnormalities of the corpus colosum, pituitary gland and cerebellum. As a result, children with optic nerve hypoplasia may also face developmental delay, intellectual impairment, language disorders, learning difficulties, growth and endocrine abnormalities and behavioural disorders. In the past, it was thought that the behavioural and language anomalies could be attributed to the vision loss and so called 'blindisms'. However, optic nerve hypoplasia and vision loss as a whole has become more understood and as a result more children with optic nerve hypoplasia are now being diagnosed with autism. This presentation outlined the journey of a child with optic nerve hypoplasia and the developmental progression that lead to a diagnosis of autism and developmental delay. The issue of autism in vision impaired children and its implications were discussed.

## THE PROFESSION'S RESPONSE TO THE TASMANIAN CHALLENGE: WHAT IS OUR PROFILE? WHAT CAN WE DO BETTER?

**Neryla Jolly, Sue Silveira**

At the 2013 conference in Tasmania members of the orthoptic profession were asked to spend time discussing and then recording their thoughts about the profile of Australian orthoptists and how we could move forward as a profession. The comments gathered from the session have been analysed and will be presented as feedback to the profession.

Areas raised include personal characteristics of orthoptists, diverse areas of employment, concerns facing the profession, and an improved future profile for the profession. Things we can do better include promotion, networking, and working at a higher level with other professions. Further opportunity will be provided to respond to the outcome as we move to becoming a more vital profession in the eye care field.

## THE NEW AUSTRALIAN STANDARD FOR PERIPHERAL VISION AND DRIVING

**Neryla Jolly**

In 2012 the vision standard for driving changed to a risk-based analysis. In NSW this is being very strictly translated with recall of licenses for drivers currently driving with peripheral vision loss. The current standard and its translation were discussed. Cases were presented that demonstrate appropriate application of the revised guidelines, as well as those demonstrating an unfair application. Strategies to support drivers were discussed.

## HOW DOES OCCLUSION HELP THIS PATIENT?

**Neryla Jolly**

A 17-year-old learner driver presented with a peripheral vision standard that did not meet the licensing requirements, until occlusion was introduced, then she did. What happened?

## NOT JUST CIRCLES AND SQUARES IN FAMILY TREE DRAWING

**Lisa Kearns, Alex Hewitt, Sandra Staffieri, David Mackey**

Family tree information is typically obtained from the patient, parent or close family member who has attended the appointment and it is critical to use standardised symbols. Yet, clinicians should think outside the box as this information is an integral aspect of clinical care and if not considered meaningfully, information may be overlooked. Using Leber's hereditary optic neuropathy, retinitis pigmentosa and cone dystrophy case studies, the importance of enquiring beyond first degree relatives, identifying consanguineous relationships, revisiting old family trees to add additional generations and/or potentially linking families was presented.

## INFLUENCE OF MODIFIABLE LIFESTYLE FACTORS ON THE RETINAL MICROVASCULATURE IN CHILDREN AND ADOLESCENTS WITH TYPE 1 DIABETES

**Stuart Keel**

**Purpose:** To examine the associations of diet, sedentary behaviours and physical activity with retinal vascular calibre in children and adolescents with type 1 diabetes.

**Methods:** A total of 83 participants with known type 1 diabetes, recruited from the Royal Children's Hospital, were evaluated in this cross-sectional study. Retinal vascular calibres were measured from digital retinal photographs using the semi-automated computer program. Self-reported dietary, sedentary and physical activity information was obtained using a semi-quantitative Food Frequency Questionnaire (FFQ).

**Results:** After controlling for age, gender and ethnicity, wider retinal venules was significantly associated with decreased physical activity level ( $p=0.036$ ). Multivariate analysis also revealed participants who spent more time engaged in sedentary behaviours displayed narrower arteriolar calibre ( $p=0.001$ ) and wider venular calibre ( $p=0.015$ ). Furthermore, an increased intake of fruit/vegetables and protein-rich foods loaded significantly with narrower retinal venules on principal components analysis.

**Conclusions:** These findings suggest that lifestyle factors may influence microcirculation early in life. Our research proposes that exposure to modifiable risk factors may affect systemic physiology, which is reflected in microvascular structure.

## EVALUATION OF AN ORTHOPTIST-LED STRABISMUS SCREENING CLINIC

**Lindley Leonard**

Since the initial pilot project in 2009 the strabismic screening clinic at The Children's Hospital at Westmead has seen close to 700 children. Developed as part of the triaging protocol, how this orthoptic-led clinic has served the community, the referral base and the eye clinic five years on was evaluated.

## PREVALENCE OF CORNEAL ASTIGMATISM IN AUSTRALIAN CATARACT PATIENTS AND PREDICTING THE RATE OF TORIC INTRAOCULAR LENS IMPLANTATION

**Jit Ale Magar**

**Background:** Prevalence of preoperative corneal astigmatism in cataract patients is a predictor of toric intraocular lens (IOL) implantation rate. Better prediction requires consideration of incision-induced changes to the astigmatism. This study documented preoperative keratometric astigmatism prevalence, and estimated the toric IOL implantation rate for various incision positions in an Australian cohort based on estimated postoperative corneal astigmatism.

**Method:** Preoperative keratometry data of patients undergoing routine cataract surgery was examined in 1,790 eyes (1,454 participants). This was adjusted for surgically-induced astigmatism for various surgical incision positions to estimate postoperative astigmatism. The toric IOL implantation rate was calculated for each incision position.

**Results:** Mean preoperative corneal astigmatism of all eyes was  $0.98 \text{ D} \pm 0.80 \text{ D}$ . At a 1.0 D astigmatism threshold, 34.9% of eyes would require a toric IOL when no surgically-induced alteration in astigmatism is expected. Allowing for the keratometric effect of the incision, the toric implantation rate would reduce to 16.8% by positioning the incision on the steeper meridian. When the incision is placed independently of keratometry, the rate increased up to 46.2%, depending on incision location. In the sample population, an independent incision on the horizontal meridian had least impact on toric IOL implantation rate (39.2%).

**Conclusion:** Preoperative keratometric astigmatism among this Australian cataract cohort is comparable to reports from other countries. Strategic positioning of the surgical incision on the steeper corneal meridian has the potential to greatly reduce the rate of toric IOL requirement.



**USING ADAPTIVE TECHNOLOGY IN THE WORKPLACE TO OVERCOME BARRIERS FOR PEOPLE WITH LOW VISION**

**Damian McMorro**

This presentation demonstrated through a series of case studies, the ways in which adaptive technology can be used to overcome barriers to employment for people who are blind or have low vision. A number of specific barriers to employment experienced by Vision Australia clients, and the adaptive technology and equipment which was used to overcome these barriers were outlined.

**CORRECTION OF HIGH ASTIGMATISM WITH TORIC INTRAOCULAR LENSES, AND A REFRACTIVE SURPRISE OUTCOME**

**Bree Moore**

Focus Eye Centre has been using toric intraocular lenses (IOLs) since mid-2006 to correct corneal astigmatism at the time of surgery. The rate of toric IOL usage is around 60%, with 40% of the total being T2 and T3 IOLs. The amount of astigmatism correction in IOLs has increased over the years. Today we are able to correct from 0.75 up to 4.0 dioptres of astigmatism with a standard toric lens. This case study presented a patient who underwent cataract surgery with toric implantation in both eyes, and the refractive surprise that occurred despite all our experience and technology. Management and outcome was discussed.

**BEYOND EYE DROPS: TREATMENT OF REFRACTORY UVEITIS**

**Tanya Pejnovic**

Although intermediate, posterior and pan uveitis are relatively uncommon conditions, they are a significant cause of visual impairment. The mainstay of treatment is corticosteroids, however, there can be serious side effects from their long-term use. Other agents are utilised to allow the tapering of corticosteroids and so minimise these complications. The use and action of some of these steroid-sparing agents including the most recently developed drugs, tumour necrosis factor (TNF) inhibitors, was discussed.

**OPPORTUNITIES FOR MODELS OF EYE SERVICE DELIVERY IN THE OPHTHALMOLOGY DEPARTMENT AT THE ROYAL CHILDREN'S HOSPITAL**

**Faten Qunqar, Connie Koklanis, Cathy Lewis, Cameron Palmer**

**Aim:** To audit the outpatient eye clinic at the Royal Children's Hospital (RCH) in order to address the issue of increasing demand for paediatric eye services, via reviewing processes and proposing extensions in and/or innovative models of service delivery.

**Methods:** Service encounters scheduled to be delivered at the RCH outpatient eye clinic from December 2012 to February 2013 were retrospectively reviewed. For each occasion of service, eleven points of data were collected. Analysed data related to areas of patient demographics, appointment details and clinical documentation. Pivot tables, vlookups, chi-squared and t-tests were utilised, with statistical significance set at  $p < 0.05$ .

**Results:** 1,566 service encounters were scheduled during the study period and of these, data was available for 1,547 (98.79%) occasions. Of these, 221 (14.3%) did not attend their appointment. No significant relationship was found between attendance rate and appointment scheduling. A significant difference was found between the suggested review and scheduled review ( $t(1,832) = -2.97, p = 0.002$ ), however was not considered clinically significant. Inflow was greater than outflow with 21.5% of appointments

being scheduled for new patients and 7.4% documented to be discharged. A significant number of patients (36.4%) presented with concomitant strabismus and/or amblyopia. Less than half of patients (44.4%) presented with a medical condition that complicated their care.

**Conclusion:** There is opportunity to extend current services and/or implement new, innovative models of care. Although introducing new models can address the issue of increasing demand for services, further research must be undertaken to ensure their efficiency and safety.

**'THE ANSWER IS DUCTIONS ... WHAT IS THE QUESTION?'**

**Kristen Saba, Ross Fitzsimmons**

Many orthoptists, independent of their level of experience, find the assessment and recording of ocular movements challenging. Inter-observer reliability for this clinical test is low. We have looked at the ocular motility recordings of a random group of orthoptists, ophthalmologists and eye registrars. All subjects were asked to record ocular movements for the same patients. There is considerable variation in the results. Why is it so varied and how could we make it more consistent? Perhaps, we are asking the wrong question in the first place...

**DO INDICATORS GROUNDED IN CLINICAL RESULTS FAIRLY REPRESENT THE SEVERITY OF CHILDHOOD VISION IMPAIRMENT?**

**Sue Silveira**

The National Disability Insurance Scheme (NDIS) has been heralded as 'a new way of providing community linking and individualised support for people with permanent and significant disability, their families and carers'. To date the scheme has had limited roll-out across Australia, with several trial sites being launched. Individuals seeking support under the NDIS negotiate individualised plans with assessors from the National Disability Insurance Agency. However there is growing concern over the cost of these plans, both short and long term, with the average cost of pre-launch projections being exceeded. In examining this cost blowout it has been acknowledged that a lack of alignment exists between the severity of the disability and the support planning. This has the potential for inequitable and unaffordable resource allocation.

This presentation reported a project that has aimed to initially identify severity indicators for childhood vision impairment, using the clinical results of visual acuity for both near and distance and visual fields. These severity indicators are based on the World Health Organization International Classification of Disease, Version 10. The limitations of these severity indicators and an approach to include indicators that reflect the functional impact of childhood vision impairment will be presented. The current approaches by the NDIS to support childhood vision impairment were also discussed.

**THE GLAUCOMA INITIAL TREATMENT STUDY (GITS): METHODOLOGY**

**Sutha Sanmugasundram, Marios Constantinou, Jonathan Crowston, Brian Ang, Jessica Brennan, Ecosse Lamoureux**

Glaucoma is the leading cause of irreversible blindness in the world, the most common type of glaucoma being open-angle glaucoma (OAG). Currently treatment for OAG is to lower intraocular pressure by treating with topical medical therapy, however eye drops can have both ocular and systemic side-effects resulting in reduced quality of life and can also be costly. Selective laser trabeculoplasty (SLT) has been shown in randomised clinical trials to be as effective in lowering intraocular pressure as eye drops, however despite this demonstrated equivalence in clinical efficacy

and reduced long-term side-effects, SLT is still not commonly used as a first-line treatment for OAG.

The Glaucoma Initial Treatment Study (GITS) is a multicentre (both national and international), randomised controlled trial, comparing SLT with topical medical therapy for the initial treatment of OAG. This trial aims to determine the most appropriate initial treatment for OAG, based not only on clinical efficacy and safety outcomes, but also on patient reported outcomes (including quality of life) and cost-effectiveness. The primary outcomes of this trial are the comparison between groups of patient-reported outcomes and also the cost-effectiveness of the two treatments. Other secondary outcomes include intraocular pressure reduction, predictors of success for the two treatments, incidence or progression of ocular surface disease, and adverse event rates.

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## DIFFERENTIAL DIAGNOSIS OF UPGAZE DISORDERS

**Pyrawy Sivrajah, Rhiannon Bellotti**

Working in a busy ophthalmic practice, orthoptists are often exposed to many complex and unique cases of strabismus. The orthoptist's role is primarily in helping to differentiate and diagnose these anomalies. Upgaze palsies usually result from mid brain lesions, tumours and infarcts. This presentation focused on a selection of upgaze palsies and the orthoptic tests required in the differential diagnosis of these conditions.

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## GOOGLING DR GOOGLE: LEUKOCORIA, RETINOBLASTOMA AND THE WORLD WIDE WEB

**Sandra Staffieri, Alex Hewitt, Lisa Kearns, David Mackey**

Retinoblastoma (RB) is the most commonly occurring intraocular tumour in children. With leukocoria being the most common presenting sign, it is often seen in photographs, all too often retrospectively. A web-based questionnaire was developed to determine the public perception of leukocoria as seen in photographs, as well as examine the free text search words people would use to seek more information. The most commonly used search terms, websites visited and on-line search behaviours were identified. The use of social media as a method of obtaining data for health research is a growing area that health care providers need to interact with and utilise. Such data can be used to inform awareness campaign strategies about childhood eye diseases.

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## HERE'S ONE FOR THE STUDENTS ...

**Kirsty Somerville McAlester**

A case presentation of patient with a plethora of motility issues following surgery for insertion of a Baerveldt device, including possible inferior rectus toxicity following anaesthesia.

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## A GOOD GLASSES CASE

**Sally Steenbeck**

Protective eyewear is not worn as frequently as it should be and injuries can be devastating in numerous ways. A good case for wearing protective eyewear was presented.

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## ENGAGING CONTEMPORARY METHODS TO IMPROVE TEACHING AND ASSESSMENT OF ORTHOPTICS

**Meri Vukicevic, Connie Koklanis, Leigh Blackall**

La Trobe University has been developing a range of skills and methods in their teaching and assessment work, aimed at improving flexibility for people studying subjects in the degree program. Many of the methods are internet and media based, and seek to engage professional and consumer communities online. Major web-sites such as Wikipedia, YouTube, Yahoo Answers and Google+, are sites that offer a gateway to information for professionals and consumers alike – certainly for students and some academics. It is these sites around which it is aimed to develop appropriate teaching and assessment methods.

This presentation outlined a range of methods tested so far, discussed issues from teacher, student and institution perspectives, and asked questions overall about the possible relationship between sites of formal and informal learning, and the prospects for orthoptics and other health professions.

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## WHY NO DIPLOPIA?

**Pamela Walton**

The case of a 60-year-old man who presented to Sydney Eye Hospital Emergency Department on the advice of his optometrist was presented. The patient was a vague historian and his main complaint seemed to be that of the uncosmetic appearance of his worsening left exotropia. The patient denied any diplopia. The resultant orthoptic assessment, diagnosis and follow-up were discussed.

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## ASSESSING A CHILD WITH CEREBRAL VISUAL IMPAIRMENT IN A CLINICAL SETTING

**Rosa Wright**

Cerebral vision impairment (CVI) is the most common cause of vision impairment in children in developed countries. As a consequence, orthoptists may need to assess a child with neurological vision loss at some point in time. By definition, CVI is caused by damage to the posterior visual pathways and/or the occipital lobes, and affects the processing and perception of what is seen. The health of the eyes may still be normal. There are various characteristics specific to CVI that are not seen in children without damage to the visual areas of the brain. With this in mind, some simple considerations and strategies can be implemented into the orthoptic workup in a clinical setting to optimise the child's ability to respond, and to offer the parents a bigger picture of how their child may be using their vision.

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## THE APPLICATION OF GENOME-WIDE ASSOCIATION STUDIES TO OPHTHALMIC DISEASE: INSIGHTS FROM THE RAINE STUDY

**Seyhan Yazar**

Genome-wide association studies (GWAS) are powerful tools for identifying genes associated with disease and disease-related quantitative traits. Detailed ocular phenotypic data has been collected during the 20-year Raine Study follow-up which includes over 300 variables. This has provided the unique opportunity to study multiple outcomes. This work has shown that studying disease-associated continuous traits in healthy individuals through genome-wide approaches enables new insights into the understanding of many ophthalmic diseases. In this presentation, some of the GWAS publications on refractive error, astigmatism and keratoconus were reviewed and applications of this method to other ophthalmic diseases including strabismus and other ocular movement disorders were discussed.

## Named Lectures, Prizes and Awards of Orthoptics Australia

### THE PATRICIA LANCE LECTURE

1988	Elaine Cornell	Home exercises in orthoptic treatment
1989	Alison Pitt	Accommodation deficits in a group of young offenders
1990	Anne Fitzgerald	Five years of tinted lenses for reading disability
1992	Carolyn Calcutt	Untreated early onset esotropia in the visual adult
1993	Judy Seaber	The next fifty years in orthoptics and ocular motility
1995	David Mackey	The Glaucoma Inheritance Study in Tasmania (GIST)
1997	Robin Wilkinson	Heredity and strabismus
1998	Pierre Elmurr	The visual system and sports performance
1999	Kerry Fitzmaurice	Research: A journey of innovation or rediscovery?
2005	Kathryn Rose	The Sydney Myopia Study: Implications for evidence based practice and public health
2006	Frank Martin	Reading difficulties in children - evidence base in relation to aetiology and management
2008	Stephen Vale	A vision for orthoptics: An outsider's perspective
2009	Michael Coote	An eye on the future
2010	John Crompton	The pupil: More than the aperture of the iris diaphragm
2011	Neryla Jolly	On being an orthoptist
2012	Shayne Brown	A snapshot of orthoptics from the 1960s to 2000
2013	Sue Silveira	Finding the leader within
2014	Patricia Dunlop	A life in orthoptics

### THE EMMIE RUSSELL PRIZE

1957	Margaret Kirkland	Aspects of vertical deviation
1959	Marion Carroll	Monocular stimulation in the treatment of amblyopia exanopsia
1960	Ann Macfarlane	A study of patients at the Children's Hospital
1961	Ann Macfarlane	A case history "V" Syndrome
1962	Adrienne Rona	A survey of patients at the Far West Children's Health Scheme, Manly
1963	Madeleine McNess	Case history: Right convergent strabismus
1965	Margaret Doyle	Diagnostic pleoptic methods and problems encountered
1966	Gwen Wood	Miotics in practice
1967	Sandra Hudson Shaw	Orthoptics in Genoa
1968	Leslie Stock	Divergent squints with abnormal retinal correspondence
1969	Sandra Kelly	The prognosis in the treatment of eccentric fixation
1970	Barbara Denison	A summary of pleoptic treatment and results
1971	Elaine Cornell	Paradoxical innervation
1972	Neryla Jolly	Reading difficulties
1973	Shayne Brown	Uses of fresnel prisms
1974	Francis Merrick	The use of concave lenses in the management of intermittent divergent squint
1975	Vicki Elliott	Orthoptics and cerebral palsy
1976	Shayne Brown	The challenge of the present
1977	Melinda Binovec	Orthoptic management of the cerebral palsied child
1978	Anne Pettigrew	
1979	Susan Cort	Nystagmus blocking syndrome
1980	Sandra Tait	Foveal abnormalities in ametropic amblyopia
1981	Anne Fitzgerald	Assessment of visual field anomalies using the visually evoked response
1982	Anne Fitzgerald	Evidence of abnormal optic nerve fibre projection in patients with dissociated vertical deviation: A preliminary report
1983	Cathie Searle	Acquired Brown's syndrome: A case report
	Susan Horne	Acquired Brown's syndrome: A case report
1984	Helen Goodacre	Minus overcorrection: Conservative treatment of intermittent exotropia in the young child
1985	Cathie Searle	The newborn follow up clinic: A preliminary report of ocular anomalies
1988	Katrina Bourne	Current concepts in restrictive eye movements: Duane's retraction syndrome and Brown's syndrome
1989	Lee Adams	An update in genetics for the orthoptist: A brief review of gene mapping
1990	Michelle Gallaher	Dynamic visual acuity versus static visual acuity: Compensatory effect of the VOR

1991	Robert Sparkes	Retinal photographic grading: The orthoptic picture
1992	Rosa Cingiloglu	Visual agnosia: An update on disorders of visual recognition
1993	Zoran Georgievski	The effects of central and peripheral binocular visual field masking on fusional disparity vergence
1994	Rebecca Duyshart	Visual acuity: Area of retinal stimulation
1995-7	Not awarded	
1998	Nathan Clunas	Quantitative analysis of the inner nuclear layer in the retina of the common marmoset callithrix jacchus
1999	Anthony Sullivan	The effects of age on saccades made to visual, auditory and tactile stimuli
2001	Monica Wright	The complicated diagnosis of cortical vision impairment in children with multiple disabilities
2005	Lisa Jones	Eye movement control during the visual scanning of objects
2006	Josie Leone	The prognostic value of the cyclo-swap test in the treatment of amblyopia using atropine
2007	Thong Le	What is the difference between the different types of divergence excess intermittent exotropia?
2008	Amanda French	Does the wearing of glasses affect the pattern of activities of children with hyperopic refractive errors?
2009	Amanda French	Wide variation in the prevalence of myopia in schools across Sydney: The Sydney Myopia Study
2010	Alannah Price	Vertical interline spacing and word recognition using the peripheral retina
2011	Amanda French	Comparison of the distribution of refraction and ocular biometry in European Caucasian children living in Northern Ireland and Sydney
2012	Melanie Cortes	Treatment outcomes of children with vision impairment detected through the StEPS program
2013	Jess Boyle	The accuracy of orthoptists in interpreting macular OCT images
2014	Allanah Cramer	Orthoptist-led clinics: investigating the effectiveness and efficiency of orthoptists in diabetic retinopathy screening and cataract assessment

## PAEDIATRIC ORTHOPTIC AWARD

1999	Valerie Tosswill	Vision impairment in children
2000	Melinda Syminiuk	Microtropia - a challenge to conventional treatment strategies
2001	Monica Wright	The complicated diagnosis of cortical vision impairment in children with multiple disabilities
2005	Kate Brassington	Amblyopia and reading difficulties
2006	Lindley Leonard	Intermittent exotropia in children and the role of non-surgical therapies
2007	Jody Leone	Prevalence of heterophoria in Australian school children
2008	Jody Leone	Can visual acuity screen for clinically significant refractive errors in teenagers?
2009	Jody Leone	Visual acuity testability with the electronic visual acuity-tester compared with LogMAR in Australian pre-school children
2010	Fiona Gorski	Neurofibromatosis and associated ocular manifestations
2011	Suzy King	Understanding Sturge-Weber syndrome and the related ocular complications
2012	Jane Scheetz	Accuracy of orthoptists in the diagnosis and management of triaged paediatric patients
2013	Louise Brennan	Visual outcomes of children seen in the StEPS High Priority Clinic at The Children's Hospital at Westmead
2014	Nicole Carter	Understanding ocular motor apraxia

## THE MARY WESSON AWARD

1983	Diana Craig (Inaugural)
1986	Neryla Jolly
1989	Not awarded
1992	Kerry Fitzmaurice
1995	Margaret Doyle
1998	Not Awarded
2001	Heather Pettigrew
2004	Ann Macfarlane
2008	Julie Barbour
2010	Elaine Cornell
2011	Zoran Georgievski
2014	Mara Giribaldi

## ZORAN GEORGIEVSKI MEDAL

2012	Neryla Jolly (Inaugural)
2013	Connie Koklanis
2014	Linda Santamaria



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Vol 16 1978	Diana Craig	Vol 30 1994	Alison Pitt	Vol 45 2013	Connie Koklanis & Linda Santamaria
Vol 17 1979-80	Diana Craig	Vol 31 1995	Julie Green	Vol 46 2014	Linda Santamaria & Connie Koklanis
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		Vol 36 2001-02	Neryla Jolly & Kathryn Thompson		

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[www.latrobe.edu.au/courses/orthoptics](http://www.latrobe.edu.au/courses/orthoptics)

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