

The 2016 Patricia Lance Lecture

50 years: The Development of Research and Publication in the Australian Orthoptic Journal

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ABSTRACT

This lecture was presented in honour and memory of Patricia Mary Lance in recognition of her contribution to orthoptics in the fields of research, education and the association, both in Australia and internationally.

After seven years of publishing the transactions of the annual scientific meetings, the first titled edition of the Australian Orthoptic Journal was published in 1966 as Volume 8, which means that 2016 marked 50 years of our journal with its current name. This anniversary provided

an opportune time to look back over the journal and its development over the decades, from the very first orthoptic paper in the transactions of the 1959 meeting, which was by Patricia Lance, to the latest research publications in 2015.

Over this time the changes in society, culture, education and technology have all affected the development of research and this has been reflected in our journal.

Keywords: orthoptic history, education, research, professional development

INTRODUCTION

In 2016 we are celebrating 50 years of the Australian Orthoptic Journal with its current name. Upon being invited to present the 2016 Patricia Lance Lecture, it seemed fitting to look at the fifty year history of the journal to offer some insight into the development of our profession. Fourteen orthoptists were present at the inauguration of the Orthoptic Association of Australia in 1944 after which they met annually. From 1959, the Transactions of the Annual Scientific Meetings were typed and distributed to members. The first volume labelled as the Australian Orthoptic Journal was issued in 1966 as Volume 8, with the 1959 transactions labelled retrospectively as Volume 1.

1959 TO THE 1960s

In 1959 the very first paper published was by Patricia Lance on the A-Syndrome and as one of the founding members, she enabled so many phases of our development. In this era the majority of papers were on squint and sensory adaptations, with a treatise by Diana Mann in 1959 on perceptual and motor phenomenon of fusion and binocular reflexes, theories that still hold today.

The orthoptic training was hospital-based and in 1962 the

first common final examinations for Sydney and Melbourne were held, with an interesting comment by Diana Mann in her report on the student examinations '... a certain set of minor faults and virtues characterised all Sydney answers, and another set the Melbourne ones ... the lecturers appear to unwittingly have over or under emphasised certain topics'. It was suggested that the Association should give thought to questions of terminology. Coincidentally, the booklet *Orthoptic Terminology* was published by the British Orthoptic Society in 1962 and became the handbook for all students. The Association also discussed the need to determine the minimum body of knowledge required to fulfil the requirements of any clinical post in Australia – the beginning of workforce surveys.

During the 1960s we were beginning to forge a more formal relationship with ophthalmologists and the control of our own profession, with orthoptists first appointed to the Orthoptic Board of Australia in 1964. At this time, orthoptics was defined by squint and sensory disorders. Publications in the journal presented the 60s as the era of 'counting and cataloguing', with many papers describing the characteristics of squint such as type, gender, age of onset, laterality, size ... One particular area of interest was the comparison of the proportion of divergent to convergent squints, with Australia showing a much higher proportion of divergent squints than the United Kingdom. Active orthoptic treatments and their outcomes were described, including anti-suppression, occlusion, bifocals and miotics. Eccentric fixation was the topic of the 60s; children given intensive pleoptic sessions (Haidinger's

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brushes, after-image stimulation, red-filer exercises and inverse occlusion), with rural and non-compliant children hospitalised for daily treatment. The numbers presented in some papers were very large: 70 cases of eccentric fixation, 127 cases of post-traumatic convergence insufficiency and Patricia Lance managed to amass 569 cases of diplopia for one paper.

Patricia Lance reported on a 1960 goodwill tour of Asia '... orthoptics is of very little interest in any of these countries ... because squint plays such an exceedingly small part in their work.' There were '... too many cases of blindness ... a large proportion of myopia among Asiatic people, which means that convergent squint, especially accommodative type is seen less often ...' Fifty years later we are looking at progressive myopia as a population concern, with orthoptists playing a major role in this research.

Of interest was the beginning of orthoptists moving into the wider field of ophthalmic testing, with the Royal Victorian Eye & Ear Hospital employing two orthoptists as 'ophthalmic technicians' in 1964. There were papers on contact lenses and monocular aphakia, noting that 'ocular implants are considered dangerous and are proving unsuccessful overseas'; on the electro-oculogram and research into chloroquine retinopathy and retinal dystrophies; a case of fundus flavimaculatus with fluorescein angiography, which prompted Beverley Balfour to ask for ideas on how to produce eccentric fixation in a 13-year-old. Up until 1966, the transactions included the discussion following each presentation. These topics were all the flag-bearers for our current practice.

During this decade most papers were descriptive, with the first publication to report a two-group comparison of 'early surgery' (prior to five years of age) by Anne Walker in 1962, but no statistics. In 1969 Sandra Kelly published the first paper with statistical analysis, including the manual calculation of chi-square and significance, reporting that anisometropia presented a serious obstacle to the correction of eccentric fixation.

1970s

The last of the Diploma of Orthoptic Board of Australia (DOBA) hospital-based graduates in 1974 started work with Schiottz tonometers, Bjerrum and Goldmann fields. We moved into the colleges of advanced education with an Associate Diploma of Applied Science, transferring control of the curriculum from ophthalmologists to orthoptists; Cumberland College of Health Sciences in 1974 and Lincoln Institute of Health Sciences in 1975. Moving from the hospital service system to academic institutions meant that there was a more overt recognition of the need to ensure professional competence. We now had access to libraries, technical facilities and academic staff in biological, behavioural and physical sciences, providing a much broader support for research. The first male students were

enrolled in the 1970s.

The 1970s saw the growing trend for orthoptists to work as 'ophthalmic assistants/technicians', so a redefinition was required to represent our profession to the government and within the medical and allied health world. Vivienne Gordon, in her 1977 President's address suggested 'Orthoptics is a specialised branch of medical sciences in the area of applied ocular physiology. The orthoptist is a responsible and clinically trained professional, working as part of the ophthalmic team within the scope and ethics of ancillary medical practice'.

The 'critical period' for amblyopia and binocular single vision became paramount with the research of Hubel and Wiesel in the 1970s. Our journal contained papers on what we still understood as 'traditional orthoptics', with the near reflex, AC/A ratio and intermittent divergent squint a perennial Australian problem. Publications on eccentric fixation, ARC and pleoptics were decreasing with the advent of earlier treatment, an effect of the earlier introduction of school medical services which aimed to promote better health and vision outcomes. Of note was Diana (Mann) Craig's 1976 paper on alternating sursumduction, later to be known as DVD, suggesting '... the clues when carefully collected and collated, the aetiology of ASD may ultimately be unravelled' – 40 years later, we are still not completely there. American terminology was now influencing our British heritage, with the change from 'squint' to 'strabismus' first appearing in the 1977 volume of the journal.

The entire 1972 volume was dedicated to dyslexia. Patricia Dunlop, in this volume and later, published several papers on her reference eye test and lateral dominance; and on the ocular characteristics and orthoptic treatment. The need for multidisciplinary basic research was stressed by all authors, along with the importance of the outcomes being assessed by remedial teachers and psychologists to assess the true value of any treatments. The initial 1971 joint statement by the American Academy of Ophthalmology and Otolaryngology, the American Association of Ophthalmology, and the American Academy of Pediatrics on dyslexia and learning disorders was issued in the context of the many claims by alternative therapists to cure dyslexia without scientific evidence, and has been reaffirmed in 2014; that dyslexia is not a disease of the peripheral visual system, that vision training is not supported by scientific evidence, and remedial education is required.

Several large scale vision screening projects were published for kindergarten and school-aged children, helping to establish age-related norms and the criteria for 'failure'. The 1970s saw us moving into the wider community, reporting the higher incidence of visual problems and the multidisciplinary care required for those with major systemic disorders, such as stroke, thyroid eye disease, cerebral palsy, and intellectual, hearing or visual impairment.

The 1970s saw the introduction of many tests that changed our practice – particularly gratings. The Catford drum showed that infants had better visual acuity than we previously thought. The Cam Stimulator for the treatment of amblyopia appeared, however follow-up tests failed to confirm its success. Contrast sensitivity brought us frequencies, square-waves and sine-waves. The journal at this time demonstrated the initial developments of software and technology, with some papers still producing bar charts with biro and a ruler, and those later in the decade presenting graphs such as 'curve of best fit', with complex statistical analysis becoming the norm. The journal was no longer just the transactions of the annual scientific meeting as papers were now submitted for peer review and publication.

1980s

Personal computers first appeared on desks in 1983; we could enter and analyse our own research data with the introduction of statistical software programs in the mid-1980s.

In 1982 Diana (Mann) Craig was still urging us to develop and change, to take on the challenge of the future; 'The more it changes, the more it stays the same. We still have severe critics to keep us on our toes. We still have new ideas to report, new goals appearing. In other words, our profession continues to be a developing and challenging one.'

The recurrent themes of the journal included sensory anomalies, fixation, microtropia, accommodation, convergence, AC/A ratio and orthoptic, surgical and pharmaceutical treatments. The 1983 Australian contribution to an International Orthoptic Association survey was 2,620 cases written by Patricia Lance and Reginald Mitchell, with a relative incidence of 70% esotropia and 30% exotropia. The perennial question of whether latitude or hours of sunlight were statistically significant was unable to be determined due to the uneven and localised population distribution along our east coast.

In 1983 British orthoptist Joyce Mein presented a clinical study that showed abnormal naso-temporal OKN in patients with the ET/LN/DVD triad. Anne Fitzgerald and Sandra Tait demonstrated abnormal decussation of temporal fibres at the chiasm in those with DVD.

Publications supported the expanding role of orthoptists in the community, with papers on head injuries, craniosynostosis, the newborn follow-up clinic, the spectrum of congenital rubella, alcohol and the visual system. A paper on ocular signs and aging was the first mention of senile macular degeneration, something which now takes up a significant portion of orthoptic practice.

Scotopic sensitivity syndrome presented another battle to fight. Tinted lenses were introduced to Australia claiming to cure reading difficulties, however there were no trials,

no controls, no data or statistical analysis to back up their claims of success. In 1989 Anne Fitzgerald presented a vast review of the learning disability literature and then went on to design several trials to test these hypotheses. The issues of outcome measures, such as letter or word recognition, and visual preference vs actual reading improvement were raised; with suggestions of motivational, placebo, attention and self-esteem factors. Looking at 2016 online sites, the argument is still going on.

Papers were appearing on our role in visual rehabilitation of the partially sighted, in 1984 Kerry Fitzmaurice first published her studies of eccentric viewing training initially with tertiary students.

Technology which resulted in work practice changes included ultrasonography, both A and B Scan, reported by Anne McIndoe when IOLs were introduced at the Royal Victorian Eye & Ear Hospital in 1980. In 1987 Susan Bull reported refractive outcomes of 51% within 1 DS, now this is expected to be greater than 90% as reported in the current volume. Anne Fitzgerald presented the use of VERs in various projects, including OKN, DVD and visual field anomalies.

The 1980s was a period of establishing norms including the normal ranges published with new contrast sensitivity tests validated for different age groups; of validating tests to assess sensitivity and effectiveness, such as the Lang Stereotest for microtropia, the City University Colour Vision Test found to be limited for optic nerve defects; or validating clinical variations of testing such as using the Goldmann for static perimetry, measuring accommodation towards or away, or assessing the efficacy of single versus multiple pinhole.

Literature reviews and case reports published in the journal showed an increasing interest and knowledge of neuro-ophthalmology. This was the time of international neuro-ophthalmologists John Leigh and David Zee's book '*The neurology of eye movements*' and attending any neuro-ophthalmology conference meant arriving home with yet another new eye movement pathway. New colour vision tests stimulated a resurgence of interest in its testing and interpretation.

1990s

Moving into the 1990s major developments were occurring in the education of orthoptists, with the first graduates from the Bachelor degree courses in the early 1990s. In 1991 Elaine Cornell was the first Associate Professor of Orthoptics appointed in Australia, followed by Alison Pitt in 1992. In 1994, Julie Green was the first orthoptist in Australia to receive a PhD.

A few papers are mentioned which demonstrated some themes of the 1990s. In 1991, I investigated the VA and oculomotor development of infants to establish normal

responses in a clinical environment in comparison to those published in the research environment. British orthoptist Carolyn Calcutt, in 1993, challenged all our conceptions of the natural history of strabismus and amblyopia with her report on untreated early onset esotropia, where only 7% of adults had visual acuity less than 6/12 in their non-fixing eye when conventional theory would have predicted far worse levels of reduced visual acuity. Zoran Georgievski in 1994 studied the effects of central and peripheral binocular field masking on fusional-disparity vergence, reporting that peripheral fusion plays a major role; a fitting follow-on from Diana Mann's treatise on 'perceptual and motor phenomenon of fusion and binocular reflexes' published in Volume 1. Robin Wilkinson presented her work with the Strabismus Inheritance Study Tasmania in the 1997 Patricia Lance Lecture.

The 1990s saw the beginning of orthoptists' involvement in sports science, with Pierre Elmur leading this research. Neryla Jolly established the role of orthoptists in driver assessment and rehabilitation. We demonstrated our ever-widening role within the community with such papers as visual screening in diabetes; VF-14 test of visual function, satisfaction scores and cataract outcome measures; cortical blindness in multi-handicapped children; accommodation in young offenders; and cluster seating in the classroom.

In the 1990s new instruments abounded – photorefractors, retinal photography, automated perimetry, excimer laser, infrared eye movement recording, contrast sensitivity – it was time again to establish norms. No review of research and development would be complete without a mention of Zoran Georgievski's Torsionometer, 1996. Complex statistical analysis was now the norm, and the importance of interpreting statistical significance within the clinical context was regularly noted.

Through the 1990s, there was a wide range of topics presented in the form of literature reviews and case reports, providing detailed summaries to update and educate the reader. These range from strabismus to neuro-ophthalmology and glaucoma. It was the time to stress the importance of case reports in adding to our knowledge and understanding by building case-law and applying our understanding of pathology to individual variations. Alison Pitt in 1992 noted 'The importance of reporting on relatively rare clinical problems is stressed to build up a case-law of conditions which will gradually add to our knowledge ...' Similarly, Julie Green in 1995 commented 'Individual patient descriptions with specific lesions or disorders contribute along with experimental animal studies to our understanding of ocular pathology'.

2000s

In the new century, we are still protecting our role in the eye health field and wider community, with alternative therapies made all the more available to the public via

the internet, with no scientific evidence required of their validity. The discussion revolves around the questions of how the public makes an informed choice and how they know whether there is any science behind what they read. Through Informit, Australian Orthoptic Journal publications now appear in a Google or Google Scholar search.

One of the major professional developments was the legislative changes for glasses prescribing rites in 2007. The formation of the Australian Orthoptic Board, also in 2007, placed registration and continuing professional development completely in the control of orthoptists. This decade saw the introduction of graduate Masters programs at University of Technology Sydney and La Trobe University. One consequence of the increased numbers of orthoptists in academic institutions and their requirement for publications in high-impact factor journals is that there are fewer research publications submitted to our journal.

Orthoptists continued to move further into the role of ophthalmic diagnosis and management; including glaucoma, corneal thickness, biometry, contact lenses, myopia and monovision. It was satisfying to see that there were still significant publications on strabismus, sensory and motor processes – aetiology, diagnosis and treatment; including esotropia, exotropia, diplopia, surgical and non-surgical management.

This decade orthoptists became involved in corporate screening and the effects of computer-based equipment, the occupational and health issue of the times. Dyslexia has been replaced with attention deficit disorder as the issue for school children. Visual rehabilitation is now emphasising the functional aspects of vision loss, reconciling clinical measures with those activities of daily living.

In the 1999 Patricia Lance Lecture published in 2000, Kerry Fitzmaurice commented 'Search widely, if you have had a good idea someone may have had it before you', or as I have found reading through 50 years of journals, that there is often an oblique reference maybe in another context, that fits beautifully into whatever you were thinking. In a 2007 editorial, British orthoptist Fiona Rowe promoted the virtues of literature reviews. These are becoming more frequent in our journal, allowing comparison and contrast, revising knowledge and compiling it into a particular context, which often gives a whole new outlook with which to view your patients.

2010s

Moving into the 2010s, one of the most significant changes in health funding was the introduction of the National Disability Insurance Scheme, which has designated orthoptists as funded clinicians for the management of those with vision impairment. We can only hope that this will live up to its promise. Sue Silveira has published on the need to develop a new methodology to determine functional impact and the process of implementing this within the

government frameworks.

Jane Scheetz in a 2013 editorial discussed the need to build the evidence for innovation within eye health care to safely address future workforce challenges, with higher patient expectations and increased need for services within a resource-limited health system. Three examples of new models of care have been published, our journal being an ideal platform to publish this pilot data to promote these innovative models for conditions that are appearing in ever increasing numbers – glaucoma, AMD and diabetes.

Strabismus is now being presented more often in the form of case reports and literature reviews. One of my case reports brought us full circle from the very first edition, with two cases of eccentric fixation, revealing minimal mention of this topic since the 1970s. We noted that every treatment modality reported some success, but all had a number of patients failing to improve. Eccentric fixation remains a condition about which we could say that relatively little may be known. Another case of coexisting DVD and DHD, reminded me of the 1970s with Diana (Mann) Craig wondering if the puzzle of DVD would be solved; and the 1980s with the long list of acronyms and the developments of OKN and neurological pathways. The last paper published in 2015 returned us to the initial core role of an orthoptist – strabismus and sensory disorders, again causing us to question our common beliefs of the critical period and amblyopia treatment in the older patient.

A 2015 paper presented the microperimeter in routine retinal practice. This paper provides a perfect example of the developments over the years from Bjerrum perimetry and exemplifies our scientific development with a mind-boggling array of statistics.

CONCLUSION

Looking at the Australian Orthoptic Journal: Where have we come from? Where to from here? Zoran Georgievski's comment in 2007, 'It is possible we persevere because we consider a journal to be a diary, an ongoing measure or gauge ... a permanent record that chronicles our growth year after year' sums up how we look at our journal. In the context of the current external factors it means that the highest level of scientific evidence-based projects; those prospective, randomised control studies are now less likely to be submitted to our journal. We need to continue to publish the highest quality case reports, literature reviews, clinical projects, models of care, and evaluation projects; all of which contribute to its success.

The journal is now 50 years old. After all those years of amazing developments, we cannot let it wither, we must continue to watch it thrive in a new context and this relies upon you all to 'chronicle our growth year after year' and champion the future of our journal. Bill Gillies, in his

Patron's address of 1977 stated 'Although it is fascinating to look back at how far orthoptics has come, it is far more important to look at the way ahead and how you may more effectively get there.' Almost 40 years on, these words are more relevant than ever.

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