

28th OF APRIL 2008

Attention to

DR DAVID WORTH AND MR ROY TESTER

SUBMISSION FOR THE EDUCATION AND HEALTH STANDING COMMITTEE AIMED TO RESOLVE AND MAKE RECOMMENDATIONS INTO THE GENERAL HEALTH SCREENING OF CHILDREN AT PRE-PRIMARY AND PRIMARY SCHOOL LEVEL

- **APPRAISAL OF THE ADEQUACY OF THE AVAILABILITY OF THE SCREENING PROCESS FOR HEARING, VISION, SPEECH, MOTOR SKILLS DIFFICULTY AND GENERAL HEALTH**
- **AN ASSESSMENT OF ACCESS TO APPROPRIATE SERVICES THAT ADDRESS ISSUES IDENTIFIED BY AN APPROPRIATE SCREENING**

Dear Sirs,

I am writing on behalf of the West Australian Orthoptic Association, to inform you of our views in relation to the current review of general health screening, in particular the vision screening, of Pre-school and school aged children in WA.

As part of our submission, I attach a number of referenced studies which explain in detail the importance of early amblyopia detection for best treatment results.

It is our concern that the current provisions for vision screening in West Australia are not fully protecting all children from the threat of loss of vision by amblyopia.

Under the current arrangement, we understand that vision screening is presently done up to the age of 3 1/2 years by the community nurse. There is then a period until the child reaches pre-primary years at around the age of 5 or even 6 years for which there is no screening protocol. It is during this period that there will be no screening unless the parent or caregiver has some concerns. Therefore vital time is going to elapse when some form of visual testing and intervention could have been taking place to maximise the visual outcome.

It is of great importance in the treatment of amblyopia that the sooner it is found the greater the potential for long term normal vision. With our aging population, visual health is already under threat from diseases such as macula degeneration and diabetic retinopathy: these conditions being at almost epidemic levels. It is our concern that if people don't start with two healthy eyes in childhood then the impact of these conditions in the future aging population will be devastating. If the vision of one eye is affected by accident or disease, it is vital that the remaining eye has full vision.

Up until approximately 10 years ago, amblyopia screenings were organized by the Lions club of West Australia using volunteer Orthoptists in both metropolitan and country areas. On these occasions it rendered an 8% referral rate of vision problems including amblyopia, which would otherwise have gone undetected. There are no screenings of this type currently being held due to lack of funding and volunteers.

The Orthoptic Association of West Australia would like to submit that additional vision screening should take place between the ages of 3 1/2 and 5 years of age. These ages also coincide with the ability of the child to better co-operate with vision testing and therefore more reliable results obtained than that when they are only 3 1/2 years old. The children are able to do more subjective testing rather than relying on objective measurements that may not be as accurate. This would result in an additional 18 months to treat any amblyopia detected and maximise visual potential.

If parents, teachers or other caregivers have any concerns about their children's vision, or eye movements or if there is a significant family history of eye disease, then the child should be seen by a relevant eye health professional at any age. However, screening of otherwise normal children should be undertaken in a systematic way to include all children, at regular intervals.

We propose that this should be a paid position ideally for an Orthoptist who specializes in the art of testing and treating amblyopia. We are well trained with these skills and spend many hours in the University courses studying the area of ocular motility and amblyopia. Orthoptists can deal directly with Ophthalmologists, sometimes receiving referrals from them, to provide full assessment, supervision of amblyopia treatment, and follow up post surgery if this is required, in cases of strabismus (turned eye). Orthoptists also work with ophthalmologists both in the private sector and public hospital settings.

Orthoptists are experienced in dealing with children and parents. Often parents and children find an Orthoptist very approachable and easier to talk to than a Doctor and therefore would be an asset in the holistic approach of screening children in the pre-school age group. Parents often feel more at ease to express any concerns with an Orthoptist.

In closing, I reiterate the importance of early intervention in the detection and treatment of amblyopia, and our hope that regular vision screening will be introduced for all children in WA.

Yours Sincerely

President
West Australian Orthoptic Association

WHAT DOES VISION SCREENING AIM TO DETECT?

Vision screening of children at any age aims to detect what a child can see in both their right and left eye. An easy measure of this is to test the child's visual acuity. Their ability to participate will depend on the child's age and their level of understanding. Referral is generated from vision screening when vision in one or both eyes is not found to reach a standard level, usually 6/9. Children who fail vision screening are then referred for further diagnostic assessment, usually with an ophthalmologist who can rule out the presence of disease or the need for glasses, known as refractive error.

Treatment begins with correction of refractive error and this may be all that is required. When the reduced vision continues despite refractive error correction and in the absence of eye disease, it is considered that amblyopia is present. Amblyopia is described by Hrisos, Clarke and Wright (2004) as a "form of cerebral visual impairment characterized by abnormal neuronal numbers and connections in the visual pathway and cortex caused by a disturbance of vision during a sensitive period of development lasting up to the age of 7 years" (p. 1550). These authors provide a prevalence of between 2-4%.

Choong, Lukman, Martin and Laws(2004) commented:

"Amblyopia is an acquired defect in vision caused by abnormal visual experience early in life. On clinical testing, it is usually unilateral but may be bilateral. Amblyopia itself produces no apparent change in the appearance of ocular structures. The visual system is sensitive to the effects of abnormal visual experience only during a limited time in infancy and childhood when it is immature and plastic. This period extends from birth through the end of the first decade. Visual loss can be potentially reversed if amblyopia is detected and treated within this period. It is the most prevalent visual disability in children. A recent review estimated the prevalence of amblyopia in the UK to be between 2.4% and 6.1% in children of 3-4 years old" (p. 369).

Why should vision screening be conducted early?

It is important that vision screening occurs as early as possible due to the nature of the development of the visual system. There is a defined visual development period from birth to approximately 8-10 years of age. The visual system is particularly plastic and therefore responds to change early on. However this plasticity reduces as the child ages and approaches the end of the visual development period. Thus early vision screening allows for detection and more effective treatment of conditions, which can potentially cause vision impairment if not detected and treated by the end of the visual development

Amblyopia as a life long concern

The relevance of an individual suffering from undiagnosed and untreated amblyopia does often not occur until reaching the senior years when age related eye disease occurs such as cataract, glaucoma and age related macular degeneration. Brown, Weih, Fu, Dimitrov, Taylor and McCarty (2000) commented:

It has long been considered that amblyopia should be detected and treated early and there is evidence that early treatment can cure amblyopia. The rationale behind the early detection and treatment is to 'save' the individual from a life of loss of unilateral sight in case of trauma or disease affecting the sound eye later in life. This is of particular concern in a number of developing countries where amblyopia is considered one of the important causes of unilateral visual loss. It is also of concern in developed countries such as Australia where age related macular degeneration largely untreatable, is the leading cause of visual impairment in adults and where the number of elderly people is increasing (p. 250).

Incidence of Adult Vision Impairment in Australia: from the Blue Mountains Eye Study and Vision Impairment Project

Two major scientific studies have provided insight into the prevalence of vision impairment in the Australia population, including amblyopia. The first of these are the Blue Mountains Eye Study (BMES), which was a population based study of vision and the causes of visual impairment in a well defined urban, Australian population, aged 49 years and older; 3647 people participated.

Attebo, Mitchell and Smith (1996) reported vision impairment in 4.7% of participants, which increased in age from 0.8% of persons aged 49-54 years, to 42% of persons aged 85 years or older; 79% of people with severe vision impairment were females, with the cause being age related macular degeneration (ARMD).

Wang, Foran and Mitchell (2000) reported on the same study with the conclusion that ARMD was the predominant cause of bilateral blindness & of moderate to severe bilateral visual impairment in people aged 70+ years. Cataract was the most frequent cause of mild bilateral visual impairment in persons aged 60+ years. Amblyopia was the most frequent cause of mild or worse unilateral visual impairment in persons aged 49-59 years.

The second study is the Vision Impairment Project (VIP), which is a population-based study of age related eye disease in the state of Victoria. The study utilizes a cluster-stratified sample of adults aged 40 years and over, residing in 9 urban and 4 rural, randomly selected pairs of adjacent census collector districts. The strength of the study is that it is strongly representative of an Australian population incorporating participants from diverse socio-demographic backgrounds, with a wide range of ethnicity, from urban and rural locations. The study is easily compared to the Blue Mountain Eye Study.

Brown, Weih, Fu, Dimitrov, Taylor and McCarty (2000) reported that the prevalence of amblyopia in adults studied in the VIP was 3.06%. There were equal numbers of males and females, and there was no difference in prevalence of amblyopia between age and gender. There was no association with country of birth. Glasses had been prescribed for only 12% of amblyopes in the VIP before the age of 12, compared to 26% in the BMES. The authors concluded "because the ethnic mix of VIP is greater, with a larger number of people born overseas compared to those in the BMES, this finding may indicate better access to eye services in Australia compared to overseas countries between the 1920s and 1950s" (p. 256).

Incidence of Paediatric Vision Impairment in Australia: from the Sydney Myopia Study

The Sydney Myopia Study is a population-based survey of refraction and other eye conditions in a sample of 6 and 12 year old school children residing in the Sydney metropolitan areas. 1738 children participated.

Robaei, Rose, Ojaimi, Kifley, Huynh, Mitchell (2005) reporting from this study noted uncorrected visual impairment was found in the better eye of 1.3% and the worse eye of 4.1%. The prevalence was higher in girls than boys, and among children of lower socioeconomic status. Refractive error was the most prevalent cause of visual impairment in the sample, accounting for 69% of the total, followed by amblyopia at 22.5%.

The authors commented that the study had documented a "relatively low prevalence of visual impairment in a population of Australian children" (p. 1281), perhaps due to the existence of vision screening.

Other Population Studies including Amblyopic Individuals.

Jakobsson, Kvarnstrom, Abrahamsson, Bjernbrink-Hornblad & Sunnvist (2002) The frequency of amblyopia among visually impaired persons

The purpose of the study was to establish how many visually impaired patients at Visual Rehabilitation Centres (VRC) in Southern Sweden have amblyopia.

Amblyopia was the main cause of decreased visual acuity in one eye in 1.72% of patients at the VRCs; the authors commented that the percentage was "most certainly underestimated as amblyopia may not always have been reported, especially in the presence of other organic disease" (p. 45).

They concluded "a small but considerable number of patients who attend the VCRs have amblyopia as a cause of their visual impairment. Since amblyopia can be treated if detected in early childhood, the visual rehabilitation of these patients can be avoided or delayed, thereby reducing rehabilitation costs for society" (p. 46).

Support of Early Screening for Amblyopia

Eibschitz-Tsimhoni, Friedman, Naor, Eibschitz and Friedman (2000) Early screening for amblyogenic risk factors lowers the prevalence and severity of amblyopia.

The study compared two cohorts of children aged 8 years. One cohort of 808 children was from the city of Haifa and its vicinity that had been screened in infancy between 1988 & 1990. This was compared to a control group of 782 children from Hadera and its vicinity, which had not been screened.

The prevalence of amblyopia in the non-screened Hadera cohort was 2.6 % compared with the screened Haifa group with a prevalence of 1.0%. The authors concluded, "The screening program for amblyopia and amblyogenic risk factors in infants, followed by appropriate treatment, is effective in significantly reducing the prevalence and severity of amblyopia in children."

Newman and East (2000) Prevalence of amblyopia among defaulters of preschool vision screening

The study determined the incidence of amblyopia among preschool vision screening defaulters compared to preschool vision screening attendees; the attendance rate at an orthoptist-based preschool vision screening program in the study was 79.2%.

The study showed that “defaulters of preschool vision screening include children with amblyopia. The prevalence of amblyopia among screening defaulters was not significantly different from the prevalence of amblyopia among screened attendees (1.3% vs. 2.5%, $P=0.53$). This suggests that children with amblyopia do not have an increased tendency to attend preschool screening...The efficacy of amblyopia detection by preschool vision screening is therefore highly dependent on attendance rate” (p. 70).

Outcome of Amblyopia Management: when amblyopia is not treated or is unsuccessfully treated

Simons and Preslan (1999) Natural history of amblyopia untreated owing to lack of compliance.

The authors reported on a longitudinal study of 18 amblyopic children who were not prescribed treatment or did not comply with treatment. 17 of the 18 amblyopic children showed no improvement and 41% showed a further deterioration in their visual acuity.

Rahi, Logan, Timms, Russell-Eggitt and Taylor (2002) Risk, causes and outcomes of visual impairment after loss of vision in the non-amblyopic eye: a population study

A study of 370 individuals with untreated amblyopia and newly acquired vision loss in the non-amblyopic eye showed 28% had socially significant visual impairment, 49% had visual impairment, and 23% had severe visual impairment or blindness.

Outcome of Amblyopia Management: is treatment for amblyopia effective?

Woodruff, Hiscox, Thompson and Smith (1994) Factors affecting the outcome of children treated for amblyopia.

The study examined the outcome of amblyopia treatment in a retrospective review of a cohort of 961 amblyopic UK children. 48% achieved 6/9 or better, 35% achieved <6/9 – 6/18, & 17% achieved < 6/18.

The age of the child at the start of treatment did not correlate with the final visual acuity; both poor initial acuity and poor compliance were associated with poor outcome.

Leiba, Shimshoni, Oliver, Gottesman and Levartovsky (2001) Long-term follow-up of occlusion therapy in amblyopia

The study aimed to determine whether the results of occlusion therapy for amblyopia were maintained into adulthood. Best corrected visual acuity at a long term follow up examination performed 21.5 years on average after cessation of occlusion therapy for amblyopia was evaluated. This showed that visual acuity was maintained or improved in 2/3s of patients who had been successfully treated by occlusion for unilateral amblyopia in childhood.

Ohlsson, Baumann, Sjostrand and Abrahamsson (2002) Long term visual outcome in amblyopia treatment

The study examined a cohort of 24 individuals who had been treated for amblyopia in childhood. They were followed up 10 years after cessation of occlusion treatment for their amblyopia. For the amblyopic eyes 17% had deteriorated, 50% were stable and 33% had improved in visual acuity. In the group showing deterioration, the shift in visual acuity was no greater than 0.2 logMAR units.

The authors concluded that the visual acuity in the amblyopic eyes had remained stable 10 years after treatment.

Outcome of Amblyopia Management: Does amblyopia treatment adversely affect the child and family?

Hrios, Clarke and Wright (2004) The emotional impact of amblyopia treatment in preschool children: randomized controlled trial

The aim of the study was to investigate whether treatment of amblyopia in preschoolers has an adverse emotional impact. Preschoolers already participating in a multicenter, randomized controlled trial of treatment for unilateral visual impairment detected at preschool vision screening were included.

A brief, self-completion, postal questionnaire was implemented to explore 3 key issues – the experience of the treatment for the child & family, the child's general well-being since diagnosis and possible psychopathology associated with amblyopia treatment. The questionnaire was administered on 3 occasions – during active treatment for children treated at 4 & 5 years of age, for all children at 5.5 years of age after cessation of patching & after discharge from treatment. 144 families participated.

Some parents responsible for ensuring children wore glasses and occlusion as treatment for their amblyopia reported a "pattern of distress" (p 1554). However the authors commented "...parents reporting substantial difficulties and distress associated with treatment were in the distinct minority...moreover, outcomes on the behavioural measure did not suggest an adverse effect on the child's global well-being either during or after cessation of treatment. These findings were the same regardless of the child's age at treatment onset and suggest that beginning treatment during the early school years does not intensify a child's psychologic response to treatment" (p. 1554).

Choong, Lukman, Martin and Laws (2004) Childhood amblyopia treatment: psychosocial implications for patients and primary carers

This study attempted to evaluate the psychosocial impact of occlusion therapy on the patient and carer. The authors commented:

"Following onset of occlusion therapy, carers did not perceive their stress level to be higher or their child's psychosocial well-being to be poorer...in conclusion there is at present no evidence from this study to suggest that occlusion therapy exerts a significant adverse psychosocial impact on carers and patients alike" (p. 375).

Rahi, Cumberland & Peckham (2006) Does amblyopia affect educational, health and social outcomes? Findings from 1958 British birth cohort.

The study reports on a cohort born in one week in Britain in 1958. The cohorts have been followed since birth at ages 7, 11, 16, 23, 33 & 41 years. 429 amblyopes were identified. The authors recognise "...our study does not examine the qualitative impact of amblyopia at the level of the individual" (p.5). They further conclude "we suggest that the need is greater than ever before for concerted research on what it means to be amblyopic and importantly, how this varies with severity of amblyopia and how it changes with treatment, so that screening programmes can be designed to best serve those people who have the most to gain from the earliest possible identification". (p. 5)

One criticism of this study is that it addresses the association of amblyopia with diverse educational, health and social outcomes in a relatively young cohort, one in which are not likely to yet be affected by age related eye conditions such as cataract, glaucoma and age related macular degeneration. The cohort was aged 41 years at the most recent review.

References

Attebo, Mitchell. & Smith. (1996). Visual acuity and the causes of visual loss in Australia. The Blue Mountains Eye Study. *Ophthalmology*, 103(3), 357-364.

Brown, Weih., Fu, Dimitrov, Taylor and McCarty. (2000). Prevalence of amblyopia and associated refractive errors in an adult population in Victoria, Australia. *Ophthalmic Epidemiology*, 7(4), 249-258.

Choong, Lukman., Martin and Laws. (2004). Childhood amblyopia treatment: psychosocial implications for patients and primary carers. *Eye*, 18, 369-375.

East, N. a. (2000). Prevalence of amblyopia among defaulters of preschool vision screening. *Ophthalmic Epidemiology*, 7(1), 67-71.

Eibschitz-Tsimhoni, Friedman., Naor, Eibschitz and Friedman. (2000). Early screening for amblyogenic risk factors lowers the prevalence and severity of amblyopia. *J AAPOS*, 4(4), 194-199.

Hrios, Clarke and Wright. (2004). The emotional impact of amblyopia treatment in preschool children: randomized controlled trial. *Ophthalmology*, 111(8), 1550-1556.

Jakobsson, Kvarnstrom., Abrahamsson, Bjernbrink-Hornblad and Sunnqvist. (2002). The frequency of amblyopia among visually impaired persons. *Acta Ophthalmol. Scand*, 80, 44-46.

Leiba, Shimshoni, Oliver, Gottesman and Levartovsky. (2001). Long-term follow-up of occlusion therapy in amblyopia. *Ophthalmology*, 108(9), 1553-1555.

Ohlsson, Baumann, Sjostrand and Abrahamsson. (2002). Long term visual outcome in amblyopia treatment. *British Journal of Ophthalmology*, 86, 1148-1151.

Rahi, Cumberland and Peckham. (2006). Does amblyopia affect educational, health and social outcomes? Findings from 1958 British birth cohort. *British Medical Journal*, 1-6.

Rahi, Logan, Timms, Russell-Eggitt and Taylor. (2002). Risk, causes and outcomes of visual impairment after loss of vision in the non-amblyopia eye: a population study. *The Lancet*, 360.

Robaei, Rose, Ojaimi, Kifley, Huynh and Mitchell. (2005). Visual acuity and the causes of visual loss in a population-based sample of 6-year old Australian children. *Ophthalmology*, 112(7), 1275-1282.

Simons and Preslan (1999). Natural history of amblyopia untreated owing to lack of compliance. *British Journal of Ophthalmology*, 83, 582-587.

Wang, Foran and Mitchell. (2000). Age-specific prevalence and causes of bilateral and unilateral visual impairment in older Australians: the Blue Mountains Eye Study. *Clinical and Experimental Ophthalmology*, 28(4), 268-273.

Woodruff, Hiscox, Thompson and Smith. (1994). Factors affecting the outcome of children treated for amblyopia. *Eye*, 8(Pt 6), 627-631.