

Preschool vision screening

M J Moseley, A R Fielder

Benefit to individuals versus the population

There is a longstanding debate as to when is the best age or ages to screen children for strabismus and amblyopia.¹ Our understanding of the sensitive period for visual development would suggest that ideally this is as early as possible once a precipitating amblyogenic factor is present. Assuming a high sensitivity, screening at school entry allows for almost all amblyopia that is likely to occur to be detected but at a risk that treatment for longstanding amblyopia will not be as effective as it would be had it been detected earlier. This observation leads us to ask what is the quantifiable benefit of implementing an additional screening programme before school entry?—a question elegantly addressed by Williams and colleagues in this issue of the *BJO* (p 988).

Williams *et al*² have previously reported on a randomised controlled trial (RCT) nested within a large geographically based, population birth cohort study (ALSPAC, The Avon Longitudinal Study of Parents and Children). They found what they termed “de luxe” early intensive screening (five orthoptic examinations between 8 and 37 months) referred for treatment more children with amblyopia than routine surveillance at 37 months. At 7½ years, those children in receipt of de luxe screening had significantly better visual acuity and proportionately less amblyopia than those screened at 37 months only. While the authors conceded that their de luxe screening protocol could never be practically realised on grounds of cost, it did support the notion that early treatment is beneficial.

However, in this RCT, all study participants received, at a minimum, a single screen at 37 months, thus the benefit arising from this, as opposed to no screening whatsoever in the preschool period, could not be assessed. It is this issue that Williams *et al* have now addressed by prospective observation of over 6000 ALSPAC participants, none of whom had received de luxe vision screening. Around one quarter of these children had, none the less, been offered preschool vision screening (at 37 months) provided in one out of the three health districts within the ALSPAC study area. All participants were offered screening at school entry (4–5 years). At 7½ years the prevalence of amblyopia (defined as acuity in the worse seeing eye poorer than 0.3 log-MAR (6/12 Snellen equivalent)) in those

screened at 37 months was almost half that of those who had not. Further, the mean visual acuity in the worse seeing eye of those treated (by patching) was a statistically significant, but clinically marginal, three letters greater in those screened early. However, by including in the analysis those children who had been offered *but not attended* for screening (33% of those invited; in epidemiological parlance, an “intention to screen” analysis), the proportion of amblyopia and the difference in the mean visual acuity of those treated did not differ between the groups by more than would be expected by chance.

The benefits of screening before school entry have yet to be demonstrated in practice

At a scientific level, these findings provide further support for the notion that early intervention can benefit individuals. However, at a practical level, the model of preschool vision screening adopted in the study area (typical of that found elsewhere in the United Kingdom at that time) did not provide any benefit to the at-risk population owing to insufficient participation in the programme. Here, it should be pointed out that children from very deprived backgrounds are under-represented among the ALSPAC participants and hence the 67% coverage achieved is likely to be better than average.

Thus, how might one look to improve the screening model in order to achieve the benefits that we know now can be gained? The most obvious is of course to increase participation in the screening process which Williams *et al* acknowledge when they state “Coverage of the whole population at risk ideally requires a coordinated approach between different aspects of the child health and surveillance network, such as developmental reviews, vaccinations, and other screening programmes . . .” One might extend this approach to the incorporation of screening within the school system—in accordance with recommendations of the Child Health Sub-Group of the National Screening Committee⁴ for orthoptic screening between the ages of 4 and 5—although this approach ignores the benefits of early screening for *individuals* which Williams *et al* have demonstrated.

Might improvements in current vision screening protocols prove beneficial? Here, it has to be said that the (basic) screening offered to the ALSPAC participants is not that which would be considered optimal by today’s standards as it did not incorporate testing with the newly recommended logarithmically scaled optotypes.⁴ Williams *et al* found the majority of children amblyopic at 7½ years were “straight eyed,” as were nearly all those who had not been patched previously. This is a clear indication that the child with amblyopia alone can slip through the net when screening consists of a visual acuity test alone, an observation made on the children of Leicestershire 20 years ago.⁵ Surely now is the time to look seriously at the incorporation of refractive assessment (particularly at those techniques not requiring cycloplegia, for which the positive benefits continue to accrue⁶) into routine screening for amblyopia, so that those children with ametropia but with no deviation can be better identified.

Five years ago the available evidence was considered insufficient to “substantiate clinical beliefs that children with amblyopia do improve during treatment”; that at least can no longer be considered the case. However, the benefits of screening before school entry have yet to be demonstrated in practice.

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Evolution and evidence based medicine

R A Hill

A costly but necessary practice

Evolution as a process has led inventors and glaucoma surgeons to sites distal to the pretrabecular, trabecular, and post-trabecular origins of difficult to treat glaucomas. Evolution as a process has also led investigators to the multicentre randomised trials of sufficient power to answer questions and advance medical knowledge in a step-wise fashion. "Evidence based medicine" is a costly but necessary practice. These studies are made successful by dedicated physicians and patients willing to participate in these studies. The monetary

costs are supported by physician sacrifices, committed educational institutions, private foundations, and government sponsored agencies. Susanna and colleagues (p 994) are to be congratulated and thanked for their contribution to our fund of knowledge. These studies are arduous at best, requiring long term sacrifice and devotion. Susanna and coworkers have noted that the conjunctival and subconjunctival physiologies of the equator of the globe are different from that of the limbus. This is an ironic finding, as this is part of the reason that

initially pushed inventors and glaucoma surgeons to shunt aqueous to this distal site. The next advancements and directions in aqueous drainage devices may be argued. Perhaps a bioerodible film on implants might be used to release antimetabolites and modulate wound healing of the filtering capsule over a longer period. Perhaps the answer might be in a better understanding of material-tissue interactions. Or, perhaps it is time for a paradigm shift away from the bigger is better theme. This new theme could be a functional and focal therapy based on a physiological approach similar to coronary artery bypassing and stenting. This year, clinical trials of smaller, ab externo and ab interno shunting and stenting devices will start. Both approaches will utilise aqueous outflow physiology. Time and evidenced based medicine will determine if they are new steps or missteps that need re-evaluation.

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The lighter side



Mr Pennybottom's odd behavior began soon after he received his cat's eye transplant. © Michael Balis.