

## Letter to the Editor

### What is vision screening? And more importantly, what is it not?

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**Summary:** The history of screening for amblyopia, strabismus and refractive error has been well publicised and described.<sup>1,2</sup> Despite recommendations from the UK National Screening Committee (NSC)<sup>3</sup> and Hall Report<sup>4</sup> for screening to be offered at to all 4- to 5-year-olds, variation in what is offered, and by whom, remains an ongoing issue. The consequences of this are discussed.

#### What is screening?

It is important to recognise that screening is a defined process. Programmes should be assessed for viability, appropriateness and reliability before they are adopted.<sup>5</sup> Within any screening programme it is necessary to recognise that screening is not foolproof. The NSC clearly states that ‘Screening can reduce the risk of developing a condition or its complications but it cannot offer a guarantee of protection’.<sup>6</sup>

#### Screening for amblyopia, strabismus and/or refractive error

Screening for amblyopia, strabismus and/or refractive error is an emotive subject, not least due to professional invested interest. But is screening for these target conditions justified? When we consider it alongside other national screening programmes that currently exist in England, screening for amblyopia, strabismus and/or refractive error is notably different from screening for the other target conditions (Table 1). The other screened conditions have obvious consequences in terms of health detriment or quality of life. Can the same be said for amblyopia, strabismus and/or refractive error?

#### Screening test versus diagnostic test

Screening tests are used to indicate the possibility or probability of a disease or condition; whereas diagnostic tests are used to make quantitative measurements. The information the diagnostic tests provide is used to determine how to treat a disease or condition. To apply these principles to vision screening for amblyopia, strabismus and refractive error, consider the use of photorefractors in screening programmes. These can be used to determine the presence of refractive error; if a child is found to have a reading outside of pre-defined parameters of normal (for age and the instrument) he or she can be referred for further investigation. This is a

screening test. Referral is made on the basis that clinically significant refractive error may be present; the photorefractor was used to detect the problem, not to quantify how ‘bad’ the problem is. If glasses were to be prescribed using the readings from the photorefractor, then this could be classed as a *diagnostic* test.

#### Which tests to include?

There remains much debate as to which tests to include on the vision screening programme. It can be argued that as the purpose is to detect amblyopia, manifest strabismus and/or refractive error then only tests which assess these should be included. In some areas in the UK orthoptists are conducting a barrage of orthoptic tests with the aim of stating whether a child is ‘orthoptically satisfactory’ or not. The ethics of this are questionable. If the aim of screening is to test for the target condition, to include other tests, particularly tests which detect a condition for which you will be offering no subsequent clinical treatment, is wrong. The child is subjected to unnecessary procedures, and the impact upon the time taken to screen (and ultimately the cost of screening) is also compromised. An example of this is testing smooth pursuit movements. The detection of Brown’s or Duane’s syndrome is *not* the aim of the screening process. When such an anomaly is found, hospital referrals are made. In this instance the child, and the family, are subjected to more tests and appointments, to which a cost is attached, both financial and emotional. The anxiety of further testing should not be overlooked.

#### The problem with continued variation across the UK

One major problem with continued variation of screening practice across the UK is that of ‘equity’. Primary Care Trusts (PCTs) are not offering every child the same health opportunities. This problem is exacerbated when commissioners examine the differences in programmes from one area to another. Consider the implications of Table 2. Each programme has its own advantages and disadvantages. When faced with which option to choose it is possible that decisions upon resource allocation are made purely on cost – and therefore Programme B will be favoured over Programme A. The problem is further exacerbated when schemes fall mid-way between Programmes A and B. For example, is it necessary to test for stereo-acuity, and if so which is the most appropriate test for the population? Are there published normative values for stereo-acuity measured using that instrument in that population? If the answer is no, then the inclusion of the test within a screening context is not appropriate. If we can’t say what normal is, how can we say what abnormal is?

Studies have shown that orthoptists do perform better than others in detecting the target conditions when screening.<sup>8–11</sup> The NSC guidelines recommend that vision screening be conducted by orthoptists or by

**Table 1.** Current screening programmes available in England<sup>7</sup>

Programme	Time offered
Antenatal and newborn screening, includes: <ul style="list-style-type: none"> <li>● Sickle cell and thalassemia screening</li> <li>● Down's syndrome and fetal anomaly ultrasound screening</li> <li>● Infectious diseases in pregnancy</li> <li>● Newborn hearing screening</li> <li>● Newborn blood spot</li> <li>● Newborn and infant physical examination</li> </ul>	Antenatally and shortly after birth
Diabetic retinopathy screening	Annually to people with diabetes from the age of 12 years
Cervical cancer screening	Women aged 25–49 every 3 years; women aged 50–64 every 5 years
Breast cancer screening	Women aged 50–70 every 3 years; women aged 70 or over can self-refer
Bowel cancer screening	Men and women aged 60–69 every 2 years
Abdominal aortic aneurysm screening	Men in their 65th year; men aged 65 or over can self-refer

**Table 2.** Analysis of two vision screening programmes

Programme	Personnel	Tests included	Advantages	Disadvantages
A	Orthoptists	Visual acuity Cover test Smooth pursuit movements Convergence 20 <sup>A</sup> reflex test Stereo-acuity test	Likely to have a better PPV and NPV compared with B	Longer test time for child Personnel costs high Overall higher screening cost Unnecessary referrals of non-progressive conditions (e.g. Brown's or Duane's syndrome)
B	School nurse assistants	Visual acuity	Shorter test time for child Lower personnel cost Overall lower screening cost	Possible lower PPV and NPV compared with A, i.e. detects amblyopia resulting from refractive error and strabismus but would not detect effect on BSV

PPV, positive predictive value (the proportion of patients with positive test results who are correctly diagnosed); NPV, negative predictive value (the proportion of patients with negative test results who are correctly diagnosed); BSV, binocular single vision.

professionals trained and supported by orthoptists.<sup>12</sup> However, with a birth rate of over 700 000 per year in England and Wales<sup>13</sup>, the demand for screening far exceeds the number of practising orthoptists (1305 orthoptists registered with the Health Professions Council: 904.79 whole time equivalent (wte) in the UK and Ireland, 879.69 wte in the UK alone)<sup>14</sup>. It is clear that *if* national guidelines were to be adopted, there is an urgent need for more orthoptists. An alternative would be to adhere to the second component of the recommendation, that screening be undertaken by professionals trained and supported by orthoptists. There are no nationally validated training programmes for school nurse assistants. If school nurse assistants (or other such personnel) were employed to undertake screening, this will certainly mean a shift in role for orthoptists, who currently screen as part of their existing workload.

### The impact of public health reform

Unprecedented reform of health services in the UK and Ireland demands a change in how services are delivered and commissioned. Evidence of the value, both clinically and financially, of orthoptic interventions will be required. The widespread development and use of clinical pathways will change the face of healthcare delivery. Orthoptic interventions will be assessed using set 'outcome' criteria. These may include quantifiable improvement in visual acuity and strength of binocular single vision. Patient Reported Outcome Measures (PROMs) are already being used to assess the efficacy of management of other medical conditions, such as varicose vein surgery. It is likely that orthoptic inter-

ventions will be evaluated using quality of life measures. Each orthoptic intervention (whether this is vision screening or treatment planning) must be inexorably linked to the evidence base, and demonstrate that the orthoptic, optometric and ophthalmological intervention will be of benefit to the individual.

### Short-term challenges

A more pressing issue, which should be addressed now, is variation in referral criteria, especially for visual acuity (VA) measurement. Guidelines state that children should be tested 'each eye separately using logMAR charts' with 'referral of children who do not achieve 0.2 in each eye (approximately 6/9 on a Snellen-based linear chart), despite good cooperation'.<sup>15,16</sup> Local referral criteria have been adopted, partly due to clinical experience, and partly in response to recent publications on normative acuity values for children.<sup>17</sup> There remains debate as to whether testing VA to threshold is necessary. Testing to threshold increases the time taken to screen an individual, and affects the number of children it is possible to screen in one session. Is it necessary to know that a child is capable of 0.125 and 0.150 respectively? Or is it sufficient to say that they have a minimum VA of 0.2?

### What to do?

Current guidelines are not being adhered to. Frank discussions are needed to establish a strategic plan for the future of screening for amblyopia, strabismus and/or refractive error. Orthoptic service providers need to review their existing clinical outcome database and

decide whether they have sufficient evidence to support 'value for money'. Issues such as referral criteria, the screening tests to include and staffing must be addressed, with clear guidance from professional bodies, such as the British and Irish Orthoptic Society.

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