

LINCOLN INSTITUTE KINDERGARTEN SCREENING

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During 1976, Lincoln Institute School of Orthoptics conducted a visual survey of the children attending Melbourne City Council Kindergartens; 638 children between the ages of 3 years 5 months and 5 years 6 months, average age 4 years 4 months, were tested.

Investigation

The following tests were performed —

1. Visual Acuity using a Sheridan Gardiner chart for distance and near.
2. Cover Test at 6 metres and 1/3 metre for manifest squint.
3. Ocular movements.
4. Convergence.
5. Fusion range using the prism bar. The synoptophore was found to be impractical for a screening program of this nature.
6. Stereopsis — Titmus stereo test.
7. Colour vision using the Guy's Colour Vision Test.
8. Confrontation fields were originally attempted but found to be unsuitable as a screening procedure for children of this age group due to lack of co-operation and comprehension.
9. Pupillary light reflexes were also observed.

Due to various circumstances it was not possible to perform every test on all occasions, this is one reason why the numbers quoted for the various tests are not equal. Another reason is that certain children at every age level refused to take part in some tests. Other children, whose date of birth was not recorded had to be excluded from Fig:1.

Results

Of the 638 children screened, 53 (8.3%) were found to have some ocular defect. 16 other children in the kindergartens, who were already under supervision for ocular defects, were not included in the screening. Their inclusion in the figures would bring the total rate to 10.5%.

We found:—

- defective V.A. (less than 6/9 in one or both eyes) in 35 children;
- manifest squint in 17 children (this included 5 having unioocular amblyopia);
- 6 children gave unequivocal evidence of colour defect.

The names of 55 children who refused to join in V.A. testing were noted for review at a later date.

Visual Acuity

The following table is of the Visual Acuity obtained in the 3½ — 5½ year age group, from children classed as having no ocular defect.

TABLE I

S — G Chart			S — G Singles	
6/9	6/6	6/5	6/9	6/6
211	250	25	17	27

When the V.A. varied by not more than one line, the vision in the lower eye is given. 44 children showed no understanding of the chart of letters, so results were obtained using S — G singles. It was routine to test the right eye first; not infrequently initial tests showed better vision in the left eye. With these children we retested the right eye and usually found an improvement from the initial result.

Of those 30 children with defective V.A. and no detectable manifest squint, 18 were found to have defective vision in one eye only, while 12 children had defective vision in both eyes. The maximum V.A. of the more defective eye was below 6/18 in 7 cases, 3 having 6/60 only.

Squint

Of the 17 children found to have a squint, 5 had amblyopia, the rest had equal vision.

Intermittent Squints

Convergent	...	6
Divergent	...	5
Vertical	...	2

Constant Squints

Convergent	...	3
Divergent	...	—
Vertical	...	1

Colour Defects

Of the 6 males shown to be colour vision defective, 3 had a known family history of this.

We found that Guy's Colour Vision Test is not suitable for mass screening of young children. The instructions state that if 2 answers are incorrect the child is probably colour defective; but we found that the majority gave incorrect answers on at least 2 of the 6 test plates. To a person with normal colour vision, both the alternatives of any test plate are quite clearly discernible, some of the children called our attention to this. This being so we did not feel justified in recording a child as colour defective unless answers on all test plates were incorrect.

Fusion Amplitude

The fusion amplitude was measured using a prism bar on a fixation target at 33cm.

TABLE II

Convergence (Prism Dioptres)

	20 — 25	30 — 35	40 +
6 — 8	1	10	13
10 — 12	3	10	33
14 — 16	2	18	97
18 — 20	3	1	9

This table shows that the major distribution is in the area of $14^{\Delta} - 16^{\Delta}$ divergence — $40^{+}\Delta$ convergence. The majority of the children (76%) are able to converge to 40 dioptres or more, with 65% able to diverge to 14 dioptres or more.

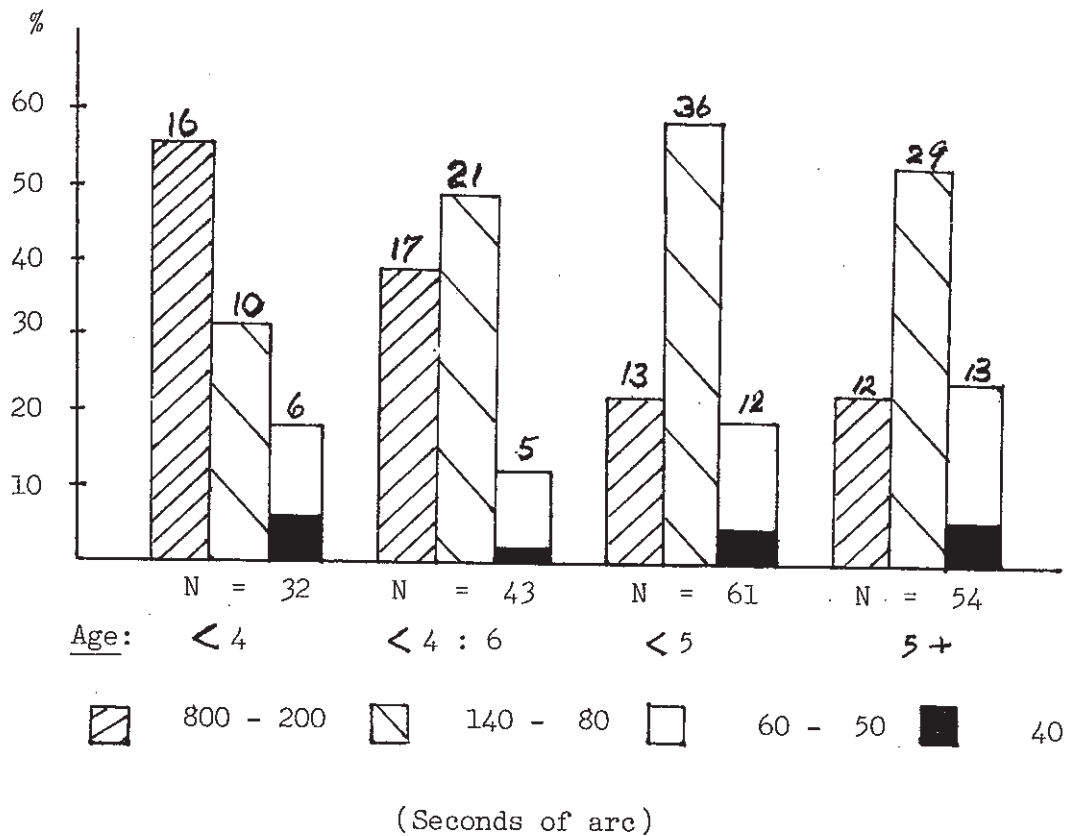
Though the prism bar fusion range is an easily administered test, it does not appear to be an appropriate test for mass screening as it has no differentiating value in the detection of amblyopia. The 'straight amblyopes' appear to have the same fusion range, using this test, as those children with good visual acuity.

Stereopsis

Results of 190 children of known age on the Wirt-Titmus stereo-test are shown graphically in Figure 1.

FIGURE 1

Proportions of poor, moderate and good stereo-acuity found at various ages.



It can be seen that there is an increase in the proportion of children having an acuity of 140 seconds of arc or better, for each successive age group. It is interesting to note that the percentage demonstrating acuity of 40 seconds (correct answers on all of the 9 circles) was not related to age.

Summary

We have found that the results of all tests depend a great deal on the confidence and maturity of the child, as well as on chronological age. Hopefully, these results may help in establishing standards to be expected for the various tests performed.

In this survey we found ocular defects, previously undetected, in 8.3% of the children. This indicates the importance to the community of continuing and even expanding the orthoptist's role in visual screening programmes within the field of preventive medical eye care.

Acknowledgements

The screening of these children was performed by staff from the School of Orthoptics - Miss R. Wilkinson and Mrs. G. Heinze and myself, with the aid of our first and second year students.

We thank Dr. I.B. Broderick and her staff of Infant Welfare Sisters and Kindergarten Teachers for their co-operation in this program.